OPERATION MANUAL



TYS-32 Towing Winch

WARNING!!

ALL OPERATORS MUST READ OPERATION MANUAL BEFORE OPERATING WINCH

Manufactured By: MARKEY MACHINERY CO., INC. 7266 8th Avenue South Seattle, Washington 98108 USA

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Markey Operation Manual

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Operation Manual For TYS-32

Chapter 1

Table of Contents

Genera	I Description and Specifications	
1.	Outline	2
2.	Identification	2
3.	Drum Specifications	2
4.	Winch Performance Summary	2
5.	Weights	2
6.	Winch Base	2
7.	Drum Brake	3
8.	Paint & Primer Specification	3
9.	Renewal Components	3
Winch	Lubrication	
1.	Before Start-Up	4
Winch	Operation	
1.	Control Stations	5
2.	Warping Head Operation	7
3.	Towing Drum Operation	7
4.	Paying-out Tow Wire	9
5.	General Operating Notes	11
6.	Drum Brake Adjustment	11
7.	Installation and Care of Wire Rope	12
8.	Level-wind Head Synchronization	13

System Failure

ADDENDUM – Space Heater Circuits



General Description and Specifications

1. OUTLINE

The MARKEY Towing Winch is a special winch designed to suit the ship requirements specified for towing work.

The Deck Winch is provided with the following features:

- Heavy-duty wire rope drum(s)
- Air-actuated drum brake(s)
- One hydraulic motor & drive
- One oil-lubricated planetary and gear reduction

For general winch arrangement and equipment features, refer to MARKEY Towing Winch Outline Drawing (See Chapter 2)

2. IDENTIFICATION

The winch data plate is located on the base. The winch serial number, is also welded to the base sill.

3. MACHINERY & DRUM SPECIFICATIONS

Refer to the Outline Drawing in chapter 2.

4. WINCH PERFORMANCE SUMMARY

Refer to the Markey Performance Chart in chapter 2.

5. WEIGHTS

Refer to the Outline Drawing in chapter 2.

6. WINCH BASE

The winch base and its side frames are fabricated from steel plates and tubes to form a rigid main structure designed to withstand the large line loads associated with ship handling duties. The main shaft fit is line-bored for accuracy and fitted with bronze bushings.

7. DRUM BRAKE

The winch drum is fitted with a heavy-duty T-1 steel band type brake that is lined with weather-resistant non-asbestos friction lining. For brake ratings refer to MARKEY Towing Winch Outline Drawing (See Chapter 2).

8. PAINT & PRIMER SPECIFICATION

See specification sheet in chapter 2.

9. RENEWAL COMPONENTS

When requesting parts assistance, **please refer to the Serial Number**, which is stamped on the winch nameplate and welded on the winch base. For part identification see the appropriate assembly drawing(s) in Chapter 2.

Renewal components may be obtained directly from:

Markey Machinery Co., Inc.	Phone:	206-622-4697
7266 8th Ave South	Toll-Free:	800-637-3430
Seattle, WA 98108	Fax:	206-623-9839
	E-mail: info	@markeymachinery.com



Winch Lubrication

MARKEY Winches are designed for a long, trouble-free life. However, it is most important that proper maintenance and lubrication be carried out to sustain this longevity. The following text details the lubrication of the MARKEY Towing Winch.

It is equally important to lubricate the winch when it is idle to keep operating parts free from corrosion.

NOTE: Refer to the lube chart(s) in chapter 2 for lubrication points.

1. BEFORE START-UP

This winch was lubricated and tested with all fittings and locations lubricated at the factory. Before running the winch for the first time, please go over the following checklist:

- A. Remove all shipping protection.
- B. Clean shipping and installation debris off the machinery.
- C. Fill the gearcase(s) to the proper level with the specified type of oil.
- D. Grease all "Alemite" grease fittings with the specified lubricant.

Winch Operation

PLEASE READ!

This section describes the operating procedures for a MARKEY Towing Winch. These procedures address the operation of the winch and power / control system only. Shipboard procedures may differ from these procedures to accommodate specific situations. Always consult with the key shipboard winch operator regarding winch operations.

1. CONTROL STATION

The Towing Winch can be operated from the Main Control Station. This provides access to all of the operational functions of the winch.



Operator's Control Station



Manual Brake Screw – Is meant only to lock the drum brake band after it has been set via the air cylinder

NOTE An extension bar is stored near the brake handwheel and can be used for extra leverage ONLY WHEN RELEASING the handwheel.

WARNING!

All winching and hoisting operations have inherent risks. Therefore, the safe operation of this product is dependent upon the operator's skill, knowledge and judgment. To avoid hazardous situations, operators must be familiar with all operating guidelines, safety codes, and regulations related to rigging, soft line, and winch usage.

CAUTION

Avoid sudden or fast starts! Line or equipment damage could occur!

WARNING!

Stay clear of all brake linkages while the winch is in use.

2. WARPING HEAD OPERATION

- A. Set the drum brake(s) using the brake joystick(s) to activate the air cylinder(s). Lock the Brake(s) using the manual handwheel.
- B. Disengage the drum by moving the Drum Clutch Control Switch to the "CLUTCH OUT" position.
- C. To rotate the warping head in the desired direction, push the joystick in either the "INHAUL" or "PAYOUT" direction.
- D. To stop the warping head allow the speed joystick to return to center. The auto-brake will set and hold the load.

3. TOWING DRUM OPERATION

CAUTION

The warping head will rotate whenever the main towing drum is rotated under power (jaw clutch engaged). Be certain the warping head is clear of lines, rigging, and personnel before operating the Towing Drum.

TO OPERATE THE TOWING DRUM:

WARNING!

DO NOT ENGAGE JAW CLUTCH WHILE DRUM IS IN MOTION.

Doing so may cause serious damage to the equipment. Always fully set the drum brake prior to engaging the Jaw Clutch.



- A. Engage Drum Jaw Clutch
 - Winch drive and drums must be fully stopped before attempting this.
 - Move the clutch switch to the "CLUTCH IN" position.
- B. Release the drum brake.
 - Unlock the brake by turning the handwheel counterclockwise until it reaches its stop. If necessary, use the provided extension bar located near the brake handwheel to break the handwheel loose.
 - Use the "DRUM BRAKE" joystick at the operator's console to "RELEASE" the brake air cylinder
- C. Use the "**SPEED/DIRECTION**" joystick at the operator's console to start the winch drive in the desired direction.
- D. To stop the drum, move the "SPEED/DIRECTION" joystick to the center "STOP" position. The Main Drum Brake will automatically "SET" (The Auto-Brake will hold the load until the Main Drum brake is set).
- E. **For Extended Towing:** lock the brake drum brake band: turn the brake handwheel clockwise until the brake mechanism is tight. Do not use the extension bar to tighten the brake hand wheel.

WARNING!

DO NOT tow using just the motor auto-brake alone.

<u>Doing so may damage the equipment.</u> Always Set and Lock the drum brake during towing operations.

DO NOT tow on the air brake alone.

Doing so could result in loss of the Tow due to a drop or loss of air pressure. Use the Brake Handwheel to Lock the Drum Brake.

DO NOT tow with the Drum Clutch Engaged.

Always disengage the drum clutch after the Drum Brake is SET and ready to tow. It may be necessary to unload the jaws by "bumping" the drum Speed/direction joystick in the "PAYOUT" direction to accomplish this.

4. PAYING-OUT TOW WIRE

4.1 With Drive Disengaged

- A. STOP the winch drive. (The drum brake will automatically set)
- B. Disengage the drum clutch.
- C. Push the brake joystick to the fully "SET" position to release the Auto-Brake and take manual control of the brake. If needed Unlock the drum brake by rotating the brake handwheel counterclockwise. Slowly release the drum brake by moving the brake joystick toward the "RELEASE" position,
- D. Control the speed of the drum with the drum brake joystick.
- E. Stop the drum at the desired point by moving the brake joystick fully to the "**SET**" position. Always apply the brake gradually to bring the drum to an even stop and avoid excessive shock.
- F. Lock the brake drum brake band.

WARNING!

DO NOT tow with the Drum Clutch Engaged.

Always disengage the drum clutch(es) after the Drum Brake is SET and ready to tow. It may be necessary to unload the jaws by "bumping" the drum Speed/direction joystick in the "PAYOUT" direction to accomplish this.

4.2 With Drive Engaged

WARNING!

DO NOT ENGAGE JAW CLUTCH WHILE DRUM IS IN MOTION.

Doing so may cause serious damage to the equipment. Always fully set the drum brake prior to engaging the Jaw Clutch.



A. Engage Drum Jaw Clutch

- Winch drive must be stopped and the drum brake "SET" before attempting this.
- Move the clutch selector switch to the "CLUTCH IN" position. Use Speed/Direction to jog if need.
- B. Release the drum brake.
- Unlock the brake by turning the handwheel counterclockwise. If necessary, use the provided extension bar located near the brake handwheel to break the handwheel loose.
- Use the "WINCH BRAKE" joystick at the operator's console to "RELEASE" the brake air cylinder

C. Use the "**SPEED/DIRECTION**" joystick at the operator's console to start the winch drive in the desired direction.

- D. To stop the drum, move the "**SPEED/DIRECTION**" joystick to the center "**STOP**" position. The Drum Brake will automatically set to hold the load
- E. Lock the drum brake:
- To lock the brake drum brake band, turn the brake handwheel clockwise until the brake mechanism is tight. Do not use the extension bar to tighten the brake handwheel.

F.Disengage the drum clutch: The controls will automatically "jog" the motor to unload the clutch jaws. When the clutch is fully released a red indicator light next to the Drum Clutch Control Switch will illuminate

WARNING!

DO NOT tow using just the auto-brake alone.

Doing so may damage the equipment. Always Set and Lock the drum brake during towing operations.

WARNING!

DO NOT tow on the air brake alone.

Doing so could result in loss of the Tow due to a drop or loss of air pressure. Use the Brake Handwheel to Lock the Drum Brake.

DO NOT tow with the Drum Clutch Engaged.

Always disengage the drum clutch after the Drum Brake is SET and ready to tow. It may be necessary to unload the jaws by "bumping" the drum Speed/direction joystick in the "PAYOUT" direction to accomplish this. NOTE: Always fully set the drum brake and disengage the drum clutch during towing operations. Do not tow on the motor's auto-brake.

5. GENERAL OPERATING NOTES

- Never tow on the auto-brake alone. Always set the drum brake with air and lock it down using the manual brake handwheel.
- Never tow with the drum clutch engaged. Doing so can result in serious damage to the equipment.
- Do not engage jaw clutch while drum is in motion. Doing so may cause serious damage to the equipment. Always fully set the drum brake prior to engaging the jaw clutch.
- The drum brake sets automatically when the "SPEED/DIRECTION" joystick is returned to center "STOP" position. Manual control of the drum brake can only be established after the drum clutch is "DISENGAGED". Manual control is established by pushing the joystick on the operator's console fully to the "SET" position then pulling back.
- Lubrication from the wire rope builds up on the drum brake surfaces. This is the single largest contributor to brake band slippage. A periodic flushing of the brake band with vinegar or other approved solvent will remove small amounts of lubrication buildup.
- Always reduce vessel speed as much as circumstances will allow during towing wire operations.
- After the brake has been set and locked, check the manual brake handwheel setting. Due to cooling of the components additional movement in the brake mechanism may occur. Continue to check at approximately 15 minute intervals, until the maximum setting is confirmed.
- Periodically drag the drum brake (using the manual brake joystick) while inhauling the drum to reduce the accumulation of corrosion on the brake drum surface.
- Winch "SPEED/DIRECTION" joysticks control is disabled when the brake is over 90% engaged.
- If the winch "SPEED/DIRECTION" joystick or the "WINCH BRAKE" joystick go out range electrically, the fault light on the wheel house control panel will light. To clear a fault, the joysticks must be returned to neutral, and the fault light reset must be pushed.
- Winch "SPEED/DIRECTION" joystick must be in Neutral to shift the high/low speed control.
- After a power failure, or E-stop, the brake will set. Upon power restore, the joystick must be brought back to Neutral to regain complete functionality.



6. DRUM BRAKE ADJUSTMENT

- A. As the brake lining wears, the band may be adjusted by removing the necessary amount of shims provided at the band joint blocks where the two band halves bolt together. The shims are slotted and do not require complete removal of the band tie bolts. Store the removed shims on the outside of this block.
- B. New brake lining is ½" thick. And the brass securing screws are countersunk ¼" deep. When the thickness of the lining is reduced to ¼" in any area, it should be replaced.
- C. If the brake band drags on the drum when it is fully released, it can be adjusted by means of the two band supports located on the base frame near the brake band. To adjust the support, fully release the brake (make sure the manual handwheel is all the way up against its lock nut). Loosen the support bolt jam nuts. Turn the support bolts the necessary direction and amount to move the brake band away from the brake drum surface.

7. INSTALLATION AND CARE OF WIRE ROPES

To fasten the line to the drum, use the rope clamp provided. This end fastening must not be too strong, so that in an emergency the towing vessel can free itself of the tow merely by unreeling the towline and allowing the end fastening to pull loose. In normal operation, the first three or four wraps of the rope on the drum will have enough friction grip to develop the full strength of the wire rope.

In spooling on a new wire, great care should be taken to prevent twisting and kinking of the line. When it is received, the reel should be mounted on a spindle and the wire run off. It is best to place the reel so that the rope will lead from the top of the reel to the top of the drum. This will utilize the bend that is already in the wire and will help it lie properly. It is important that the wire be laid tightly and accurately. The first layer is particularly important as it determines how all succeeding layers will lie.

NOTE: When loading wire onto an empty drum a block of wood and a mallet should be used to pack the barrel layer into a tight lay.

Occasionally a new wire will not lie properly the first time it is reeled in. If this happens, the wire should be unwound and reeled in once or twice again. In any case, the wire will lie better after it has some use and been stretched.

A used wire that is still serviceable, but has been reduced in diameter by stretching, abrasion and corrosion may not lay onto the drum properly with the original level-wind timing. This condition may be corrected by changing the level-wind chain drive to slow the traverse of the level-wind head. The assistance of Markey Machinery should be obtained before making a change of this nature.

Periodically (consult the ship's maintenance department for frequency), the wire rope should be removed from the winch and carefully examined for weaknesses. If

the wire is found to be in good condition it should be cleaned, re-lubricated, turned end-for-end and reinstalled. The lubricant should be one that has been developed for use on wire rope and should be resistant to saltwater. For further information on the care and lubrication of wire rope, refer to the detailed information available from various rope manufacturers.

8. LEVEL-WIND HEAD SYNCHRONIZATION

Before winching operations or initial spooling can start, the position of the levelwind head must be set properly for accurate spooling of the wire.

- A. De-clutch the level-wind from the winch drum by backing off the handnut in the center of the level-wind handwheel and pulling the handwheel out to clear the clutch jaws.
- B. When hauling in, rotate the handwheel in the same direction, as the drum until the level-wind head direction matches the direction the wire will travel as it winds onto the drum. This may require cycling the head through a turnaround at the end of the diamond screw.
- C. Rotate the handwheel to align the level-wind head with the wire. Set the head approximately ¼ of the wire diameter behind the current wrap, so that the wire is pulled against the previous wrap, increasing the accuracy of the spooling.
- D. Engage the level-wind clutch and tighten the handnut.
- E. Observe the spooling during the first of several wraps of wire movement. If the head requires a small adjustment, stop the winch, and use the level-wind clutch to advance or retard the head timing as required.

Once the level-wind is set properly it should not require any further adjustments. However, it is good practice to check the spooling of the wire periodically during the running of the winch. Adjust the head as required using the above procedure.



SYSTEM FAILURE

The following describes the operating conditions of the towing winch if key systems of the ship fail:

IN THE EVENT OF FAILURE OF SHIP'S AIR SYSTEM ONLY:

- Speed/Direction Controllers would be inoperative.
- Manual Brake Override Controller would be inoperative.
- The winch air brakes would be inoperative.
- Station Selector Pushbutton would be inoperative.
- The Speed Range Selector continues to be functional.
- The Operating Mode Pushbutton continues to be functional.

IN THE EVENT OF FAILURE OF SHIP'S ELECTRICAL SYSTEM ONLY:

(Assumes 24V Battery Backup for Controls)

- The Speed/Directional Controllers continues to be functional.
- The Towing Winch controls default to the "**FREEWHEEL**" mode.
- The winch drum brake continues to function.
- The Manual Brake Override Controller continues to function.
- The Operating Mode Push button is inoperative.



MARKEY MACHINERY COMPANY, INC.

Addendum to Operation Manual

Space-Heater Circuits

Application

This addendum applies to all Markey electrically-driven equipment with space-heaters, including such items as:

- Winch, windlass, and capstan electric motors (both above-deck and below-deck)
- Electric automatic-brakes
- Hydraulic pump-drive electric motors
- AC-variable frequency drives, Single and Multi-speed FVR Starters and Electronic Softstarters
- On-deck control stations (excluding stations with only Pushbutton controls, Emergency stop buttons, or Pendant controllers unless otherwise noted in the Operations Manual)

Markey utilizes small space-heaters mounted internally within electric motors, automatic-brakes, on-deck control stations, motor drive-panels and motor-starters to minimize condensation and its detrimental effects. The space-heaters maintain a positive temperature-differential between the interior of the component and the ambient external temperature inhibiting condensation.

This equipment is supplied by multiple power sources.
Contact could cause electric shock, serious injury or death.
Disconnect power and lock-out / tag-out before servicing.



	 Servicing energized equipment can be hazardous. Follow Safety related practices of NFPA 70E, Electrical Safety for Employee Workplaces. DO NOT work alone on energized equipement. Severe injury or death can result from electrical shock, burn or unintended actuation of controlled equipment Disconnect power and lock-out / tag-out before servicing.
	 Electrical components may become hot during operation. Allow equipment to cool before servicing.
NOTICE	 Non-functional space heaters in any component will allow the accumulation of condensation. Condensation may lead to component damage or failure.

Space Heater Operation

1. SPACE-HEATER POWER SUPPLY

These space-heaters are typically powered by a separate 110 VAC ship's power supply that runs through a motor-starter or drive panel and should normally be left "ON", regardless of the ambient air temperature. Drive-panel or motor-starter circuitry for motor and automatic-brake applications include relays which automatically cut power to the heaters when the motor and automatic-brake is energized (as in moved from "stop" to "hoist"), then returns to the normally "ON" condition when the motor and automatic-brake are de-energized (as in moved from "stop").

2. SPACE-HEATER CONTROLS



Space-heater controls may be located on the motor-drive or motor-starter panel enclosure, front panel door. Markey has employed three different configurations for heater controls on various systems:

- 1. Circuits with no heater-circuit controls
 - a. These circuits can not be controlled at the motor-drive or motor-starter panel.
 - b. The heater-circuit is continually energized and is switch by a circuit-breaker located on a shipboard-circuit panel.
- 2. PUSH-TO-TEST indicator lamp.
 - a. This configuration is equipped with a continually energized heater supply circuit that is automatically switch on/off by the control system. For example, when a motor is running the heater circuits, to the motor brake and motor frame, will be automatically de-energized. When the motor is stopped, the circuits will automatically re-energized.
 - b. The power supply for this type of circuit is usually manually switched by a circuit-breaker located within the motor-drive / motor-starter panel. The circuit-breaker may also be located on a shipboard-circuit panel.
 - c. The indicator lamp will illuminate when the heater-circuit is energized.
 - d. When the motor is running, and the autobrake is energized, the indicator lamp will turn off, indicating the heater-circuits have been automatically de-energized.
 - e. When the indicator lamp is off, one can test if the heater circuit is functional, by holding down the PUSH-TO-TEST button. If the heater circuit is functional the indicator lamp will illuminate.
- 3. Heater-Circuit OFF/ON selector switch configuration
 - a. This is a black, two-position, OFF/ON switch that controls the supply of power to the heater-circuit.
 - b. This switch should remain in the ON position at all times to prevent the build-up of condensation.
 - c. The switch should be placed in the OFF position during maintenance or troubleshooting processes.



NOTICE	 Heater-Circuit OFF/ON selector switches must be in the ON position to prevent condenstation.
	 Only turn OFF the heater-circuit during maintance or trouble shooting processes.
	Condensation may lead to component damage or failure.

3. HEATER-CIRCUIT VERIFICATION

Annually inspect and test all heater-circuits for operation. Reference electrical drawing documentation located in the Markey Operations and Maintenance Manual.

Note that a heater-circuit generally consists of more than one space-heater element, and that the indication of supply-power to the circuit is not an indication that all space-heater elements are functional.

In addition to the above-noted annual inspection, it is recommended that a periodic check be made of each component's space-heater function simply by placing a hand on the component – if the component is warm to the touch (i.e. warmer than the ambient air temperature), then the space-heater is most likely functional.

NOTICE	Periodically verify that all space- heater elements are functional.
	Space-heater element failure may result in condensation.
	Condensation may lead to component damage or failure.

Periodically verify that all space-heater elements are functional. Space-heater element failure may result in condensation. Condensation may lead to component damage or failure.

Operation Manual for TYS-32



Chapter 2

Drawings & Specifications

Table of Contents

Markey	Machinery Drawings	
-	. TYS-32 TOWING WINCH, OUTLINE	19
2	2. TYS-32 TOWING WINCH, ASSEMBLY	21
	3. FAIRLEAD, ASSEMBLY	27
2	LUBE CHART	28
Ę	5. AIR SCHEMATIC	30
Charts		
	. DRUM PERFORMANCE CHART	31
Engine	ering Specifications	
	. ES-A075 PAINT	32
2	2. ES-A103 AIR CYLINDER, 5 BORE, 4 STROKE	33
3	B. ES-A349 AIR CYLINDER, 12 BORE, 8 STROKE	34
2	ES-A817 HYDRAULIC MOTOR	35
Ę	5. ES-A819 HYDRAULIC POWER SKID	36
6	6. ES-A820 HYDRAULIC RESERVOIR & COMPONENTS	37
7	2. ES-A821 HYDRAULIC CONTROLS	38
8	B. ES-A822 PNEUMATIC COMPONENTS	39
ę	9. ES-A831 PNEUMATIC CONTROLS	40
-	0. ES-A833 PLANETARY REDUCER	42



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- DRUM CAPACITY 2300 FEET OF 2" DIAMETER WIRE ROPE IN II LAYERS

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TYS-32 REACTION LOADS*								
-	-	LOAD	Case #1	LOAD	Case #2			
Load Point	Dead Loads Only	Vertical Load	Horizontal Load	Vertical Load	Horizontal Load			
А	-10,837	-155,173	84,740	-56,125	24,970			
В	-13,033	-54,412	27,329	-153,459	87,099			
С	-10,837	132,242	84,740	33,194	24,970			
D	-13,033	28,345	27,329	127,393	87,099			

*LIVE LOADS ARE ASSUMED TO BE HORIZONTAL IN +X DIRECTION.

BASED ON WINCHES WITH FULLY LOADED DRUMS AND LINE PULL = REFERENCE LOAD (RL) = 2 X BP (BOLLARD PULL) = 224,138 LBS. HORIZONTAL LOADS ARE ASSUMED TO BE EQUALLY DISTRIBUTED BETWEEN THE FORE AND AFT LOAD POINTS.

THE ABOVE ANALYSIS CONSIDERED ONLY LOADS APPLIED DIRECTLY ASTERN. THE EFFECT OF HORIZONTAL LINE DEFLECTION AT THE LEVELWIND ROLLERS HAS NOT BEEN CONSIDERED.

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	8				7	6	5	\downarrow		4		3		2
	Λ	ITEM 90	I REQD	PART NUMBER MM2496	DESCRIPTION THRUST WASHER	REMARKS	MATL BRASS	COMMENTS	ITEM	REQD P	ART NUMBE A833	R DESCRIPTION PLANETARY REDUCER		REMARKS
	<u>/H\</u>	91	2	MM2269	KEEPER PLATE		SS		2 3	I ES- I E52	A817 152 14.0	HYDRAULIC MOTOR AND BRAKE FAIRLEAD ASSEMBLY BASE FRAME		
Н		94		MMI774B MMI774A	BUSHING		BRONZE BRONZE		5	I E52	004	DRUM, STB'D, TESD-32		
		96 97		E52I39-96 E52I39-97	BARS-4140-0.500 X 2.000 LG BARS-4140-0.500 X 6.625 LG	SQUARE BAR SQUARE BAR	AISI 4140 AISI 4140		7 8	I D43	861 285	PINION SHAFT, MAIN MAIN GEAR, 73T-I DP		
		98 99		E52139-98 E52139-99	BARS-4140-0.500 X 2.500 LG BARS-4140-1.250 X 9.000 LG	SQUARE BAR SQUARE BAR	AISI 4140 AISI 4140		9	I D43	256 171	CHAIN GUARD, FAIRLEAD IST REDUCTION GEAR (107 TEETH)		
		100	2	E52139-100 E52139-101 E52130-102	BARS-4140-1.750 X 5.750 LG BARS-4140-1.250 X 9.750 LG	SQUARE BAR SQUARE BAR	AISI 4140 AISI 4140		 2	I D43	086	GEARCASE COVER BACKING PLATE		
		102		E52139-102 E52139-103 E52139-10/	BRG-SKF-23128 CC-W33 BRC-SKF-23128 CC-W33	SPHERICAL ROLLER BEARING		SKF	13	I D41	277	INPUT SHAFT		
	R	104		E52139-105 E52139-106	RCIOO CHAIN, AQUA SERIES RCIOO CONNECTOR LINK, AQUA SERIES	I-I/4" PITCH, I45.000 LG	STL	НКК	16 17	I C36	264	BRACKET, CLUTCH CYLINDER WARPING HEAD, 15"		
	حصر	107	2	E52I39-I07 E52I39-I08	RCI00 OFFSET LINK, AQUA SERIES DOWEL-BR-0.625 X 1.000 LG	I-I/4" PITCH DOWEL PIN	STL BRASS	НКК	18 19	I C36	052 976	CLUTCH STOP AIR CYLINDER, 12" BORE X 8" STROKE		
G		109	26	E52I39-I09 E52I39-II0	FITG-ALMT-1688B FITG-ALMT-1627-S	LUBE FITTING - 45 DEG 1/8 NPT 1/4 NPT LUBE FITTING, SS	STL SS		20 21	I C35	808 760	REDUCER ADAPTER IST REDUCTION PINION (43 TEETH)		
	Δ	111		E52139-111 E52139-112 E52130-113	FITG-ALITI-1901-S FITG-SS-1.500 SCH 10 FPI C-BPJ 500 NPT	90° ELBOW	SS SS BRASS	ALEMITE	23	I C34	281	SUPPORT, GEAR GUARD		
	<u>/F`</u>			E52139-114 E52139-115	FPLG-BR-1.000 NPT FPLG-BR-0.250 NPT	I" PIPE PLUG	BRASS		25	I C34	272	CYLINDER GUARD BELL CRANK: CLUTCH SHIFTER HYD		
	$\wedge \wedge \frac{F}{F}$	116	5	E52I39-II6 E52I39-II7	FPLG-BR-0.375 NPT FRED-BR-0.500 NPT X 0.250 NPT	3/8" NPT PLUG REDUCER FITTING	BRASS BRASS		27 28	2 C34 I C34	068 067	KEY JAW CLUTCH		
—	<u>ZG\/F\/E</u>	118	2	E52I39-II9	PIN-CUNN-5P	CLEVIS PIN W/ COTTER PINS	SS	CUNNINGHAM	29 30	2 C34	064 643	BELLCRANK SUPPORT; BRAKE BAND		
	<u>/c\</u>	120 121	2	E52139-121	PINC-SS-0.250 X 5.000 LG		SS		31 32		973 964 007	BRAKE LEVER		
	E	123	4	E52139-122 E52139-123 E52139-124	PINC-SS-0.188 X 3.000 LG SFAI -JMC-0612-11061-1 PD		SS SS COMM	JMC CLIPPER	34 35	I C32	907 147 962	CLUTCH BRACKET		
		125	2	E52139-125 E52139-126	SEAL-JMC-0606-7141-LUP SHC-GR8-1.250 NC X 9.000 LG	LIP SEAL HEX CAP SCREW	COMM STL, GRADE 8	JMC CLIPPER	36 37	I B28	961 955	SPACER SEAL RETAINER		
F		127 128	2	E52I39-I27 E52I39-I28	SHC-GR8-1.250 NC X 7.500 LG SHC-GR8-1.250 NC X 7.000 LG	HEX CAP SCREW HEX CAP SCREW	STL, GRADE 8 STL, GRADE 8		38 39	I B28	954 953	SEAL RETAINER SEAL RETAINER		
		129	2	E52I39-I29 E52I39-I30	SHC-GR8-1.250 NC X 6.500 LG SHC-GR8-1.250 NC X 6.000 LG	HEX CAP SCREW HEX CAP SCREW	STL, GRADE 8 STL, GRADE 8		40	I B28	951 950	END COVER SUPPORT, MAIN GEAR GUARD		
		131	8	E52139-131 E52139-132	SHC-GR8-1.250 NC X 5.500 LG SHC-GR8-1.250 NC X 5.000 LG	HEX CAP SCREW	STL, GRADE 8 STL, GRADE 8		42	2 B28	903 607 580	THRUST WASHER		
		134	4	E52139-135 E52139-135	SHC-GR8-0.875 NC X 2.250 LG SHC-GR8-0.750 NC X 3.750 LG	HEX CAP SCREW HEX CAP SCREW	STL, GRADE 8		44 45 46	I B28	277	CLUTCH STOP GUARD		
	Λ	136 137	2	E52I39-I36 E52I39-I37	SHC-GR8-0.750 NC X 1.750 LG SHC-GR8-0.750 NC X 1.250 LG	HEX CAP SCREW HEX CAP SCREW	STL, GRADE 8 STL, GRADE 8	A.	47	I B27 2 B26	958 682	KEEPER PLATE THRUST WASHER		
	<u>/h\</u> ^	138 139	8	E52139-139	SHC-GR8-0.625 NC X 2.750 LG	HEX CAP SCREW	STL, GRADE 8		49 50	I B26	528	NAME/LUBE PLATE		
	<u>/D\</u> ^	140	48	E52I39-I40 E52I39-I4I	SHC-GR8-0.625 NC X 1.500 LG SHC-GR8-0.625 NC X 1.000 LG	HEX CAP SCREW HEX CAP SCREW	STL, GRADE 8 STL, GRADE 8		51 52					
Е	<u>B</u>	142	4	E92139-142	SHC-SS-0.500 NC X 2.500 LG	HEX CAP SCREW	55		53 54 55	2 B26	500	THRUST WASHER		
	<u>\c</u>	144	4	E52139-145 E52139-146	SHC-SS-0.750 NC X 1.250 LG	HEX CAP SCREW	SS		56 57	I B25	398 062	SHAFT; CLUTCH SHIFTER		
	~	147	2	E52139-147 E52139-148	SHC-SS-0.625 NC X 3.250 LG (FULLY THD) SHC-SS-0.625 NC X 3.000 LG	HEX CAP SCREW HEX CAP SCREW	SS SS	A A A A A A A A A A A A A A A A A A A	58 59	i B24	812	AIR CYLINDER ASSY, 5" BORE X 4" S	TROKE	
	/B	149	8	E52139-149 E52139-150	SHC-SS-0.500 NC X 1.500 LG SHC-SS-0.500 NC X 1.250 LG	HEX CAP SCREW HEX CAP SCREW	SS SS		60 61	4 B24 2 B24	808 807	BUSHING BUSHING		
₽	<u>/c\</u>	151	9	E52139-151 E52139-152	SHC-SS-0.500 NC X 1.000 LG SHC-SS-0.500 NC X 0.750 LG	HEX CAP SCREW HEX CAP SCREW	SS SS		62 63	I B24 3 B24	806 805	BUSHING BUSHING		
	70 (153	2	E52139-153 E52139-154	SHC-SS-0.375 NC X 1.250 LG SHC-SS-0.375 NC X 0.750 LG	HEX CAP SCREW HEX CAP SCREW	SS SS STL CDADE 120		64 65	2 B24	803	BUSHING BUSHING BDAKE SOCKET		
		155	12	E52139-155 E52139-156 E52139-157	SSHC-GR8-0.625 NF X 2.000 LG	SOC HD CAP SCREW	STL, GRADE 129 STL, GRADE 8		67	I B24	201	VENT PLUG BRACKET BRAKE NUT		
		158	2	E52139-158 E52139-159	STDD-GR5-1.250 NC X 7.500 LG	TAP END STUD	STL, GRADE 5	SKF	69 70	I B23	917	PIN; BRAKE PIVOT BRAKE SCREW		
D	^	160		E52139-160 E52139-161	NTLK-SKF-AN34 NTJM-GR8-I.250 NC	LOCK NUT HEX JAM NUT	STL STL, GRADE 8	SKF	71	I B23	900 444	PIN; LIVE END PIN; DEAD END		
		162 163	12	E52139-163	NTHH-GR2H-I.250 NC	HEAVY HEX NUT	STL, GRADE 2H	E	73	I B23 2 AI2	200 762	BRAKE BAR HOLDER BUSHING		
	<u>/н`</u>	164	8	E52139-165	NTHX-GR2H-0.625 NC	HEX NUT	STL		75					
		166	4	E52139-166 E52139-167	NTHX-SS-0.625 NC NTHX-GR2H-0.500 NC	HEX NUT	SS	<u> </u>	78	2 AI2	629 001	BUSHING; BRAKE PIVOT		
	<u>/ ()</u>	169	2	E52139-169 E52139-170	WALK-SKF-W32 WALK-SKF-W34	LOCK WASHER	STL STI		80 81	I AI2	200 200 4319	KEEPER PLATE		
	∧ ∕₿	171	i	B28053 B28052	TAG - OIL FILL TAG - OIL LEVEL		ABS PLASTIC ABS PLASTIC		82 83	i TW	+211 +210	BRAKE SCREW; LOCK COLLAR BRAKE NUT		
	F	173	2	B28051 B28981	TAG - OIL DRAIN CLUTCH BRACKET SHIM		ABS PLASTIC		84 85	I TW	3519 5241	BRAKE BAR HANDWHEEL; 16" DIA		
	<u> </u>	175		B28979 ES-A817-04	CLUTCH BRACKET SHIM COUNTER BALANCE VALVE		STL	<u>/H\</u>	86 87	I B29 2 MM	846 2511	THRUST WASHER BUSHING; SHIFTER BRACKET		
C		177		D43987 B29038	MANIFOLD BRACKET		A36		88 89	2 MM I MM	2509 2497	THRUST WASHER THRUST WASHER		
	^		3	E52139-179 E52139-180 B26527	WASH-SS-0.375 WIDE	FLAT WASHER	<u> </u>		-					
	E	182		B25742 AI2899	TAG - CLUTCH WARNING TAG - BRAKE WARNING		STL STL		1					DRAWING
_		184 185		E52I39-I84 E52I39-I85	FNIP-STL-0.375 NPT X 2.000 LG FNIP-STL-1.000 NPT X 4.000 LG	3/8 PIPE NIPPLE I" PIPE NIPPLE	STL STL				н	DELETED -91, -138, & -164, ADDED -197 & -198, QTY OF -48 WAS I, QTY OF -80 WAS	LY 08/30/17	SHEET I:
	F	186		E52I39-I86	FS90-STL-0.375 NPT MALE X 0.375 NPT FEMALE	3/8 STREET ELBOW	Steel, Cast					2, -77 WAS AI2655, -86 WAS MM2658 MOVED -51, -52, -53, -75, -76, -118, & -162		SHEET 2:
		187		E52139-187	FS90-STL-1.000 NPT MALE X 1.000 NPT FEMALE	90° STREET ELBOW	STL		-		G	TO D41099 (BRAKE BAND). ADDED -195, -196, & FLAG NOTE 4	LY 11/17/14	SHEET 3:
		188		E52139-188 E52139-189	VLVB-BR-1.000 NPT	I" NPT BALL VALVE	BRASS, CAST BRASS		1			MAT'L OF -113 & -114 WERE PLASTIC, MAT'L OF -116 WAS STEEL, -118 WAS		SHEET 4:
В		190	2	E52139-191 E52139-191	FITG-ALMT-1629-S SHC-SS-0.375 NC X 2 000 LG	1/4 NPT LUBE FITTING-67 DEG	STEEL STAINLESS STEEL				F	ADDED -184 THRU -194, DELETED LUBE CHART	LY 09/16/14 2218/	
		193	1	B24907 B29048	LUBE BLOCK: 2 ALEMITE HOSE ASSEMBLY, 3/16 ID - 1/8 NPT ENDS		SS COMM					ADDED ITEMS -181 THRU -183. QTY OF -74 WAS 4. QTY OF -119 WAS 3. QTY OF -123		SHEET 5:
	G	195		B29107 E52139-196	COVER PLATE SHC-SS-0.375 NC X 0.625 LG	HEX CAP SCREW	STL SS				G	WAS 6	LY 07/02/14 22009	SHEET 6:
	Ĥ	<u>197</u> 198	2	E52I39-I97 B29847	ISHC-GR8-0.750 NC X 2.000 LG KEEPER PLATE	HEX CAP SCREW	STL, GRADE 8 SS]		D	ADDED -176 THRU -180. QTY OF -140 WAS 44. QTY OF -152 WAS 4. QTY OF -153 WAS	LY 06/26/14 22000	,
											Ļ	37 REMOVED -59, -120 8 -168 AND MOVED TO		-
											c	CYLINDER DWG (B24812), DELETED -144, QTY OF -151 WAS 3, ADDED -174 & -175,	LY 05/21/14 22009	
											\vdash	ADDED FLAG NOTE 3 -79 WAS AI2622, DELETED -49 & -143,		-
											R	MAI'L OF -105 THRU -107 WERE TSUBAKI NEPTUNE, MAT'L OF -142 WAS GR8, QTY OF -149 WAS & ADDED -171 THRU -173	LY 05/13/14 22000	,
А												ADDED LUBE NOTE OF PLANETARY REDUCTION UNIT		THIS DRAWING IS THE PROPERTY OF MARKEY MACHINERY COMPANY, INC. AND ALL PROPRETARY RIGHTS ARE RESERVED BY MARKEY MACHINERY COMPANY, INC. THIS DRAWING APP.
											A	ISO ISO WAS ISO 220 ON LUBE NOTES	LY 05/02/14 22009	INFORMATION CONTAINED HEREIN SMALL NOT BE USED OR DISELOSED TO ANY THIRD PARTY EXCEPT AS AUTHORIZED IN WRITING BY MARKEY MACHINERY COMPANY, INC. PARTIES DEPENDING COMPANY, INC. PARTIES
											RE	REVISION HISTORY	DI DALE JOB	AGREE NOT TO USE THIS DRAWING IN ANY WAY DETRIMENTAL TO THE INTERESTS OF MARKEY MACHINERY COMPANY, INC.
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DRAWING MAP

SHEET I:	PARTS LIST	\vdash
SHEET 2:	ISO VIEW OF MAIN ASSEMBLY & NOTES	
SHEET 3:	PLAN, FRONT, & SIDES VIEW OF MAIN ASSEMBLY	
SHEET 4:	MAIN SHAFT ASSEMBLY (SECTION 30-F) INPUT SHAFT ASSEMBLY (SECTION 26-F) CLUTCH SHAFT ASSEMBLY (SECTION 30-B)	В
SHEET 5:	BRAKE LEVEL ASSEMBLY, (38-C)	
SHEET 6:	GEAR GUARDS ASSEMBLY (46-B)	
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	DOWEL PIN	BRASS		
	1/4 NPT LUBE FITTING, SS	SS	ALEMITE	_⊢
	1/8 NPT LUBE FITTING, 30°	SS	ALEMITE	-
	1/8 NPT LUBE FITTING	SS	ALEMITE	4
LG	DOWEL PIN	SIL ODADE O		-
6	HEX CAP SCREW	STL, GRADE 8	-	-
6	HEX CAP SCREW	STL, GRADE 8		-
	HEX CAP SCREW	STL, GRADE 0		4
,	HEX CAL SCREW	55		
ò	HEX CAP SCREW	SS		1
G	FLAT HD SOCKET SCREW	BRONZE		
LG	SOC HD CAP SCREW	STL, GRADE 8		1
.G	FLAT HD MACH SCREW	BRASS		1
	1/8 X 1/4 NPT MALE PIPE ELBO	WSIL		-
	1/4 NPTE - 1/8 NPSM SWIVEL	SIL	+	-
	2./JU A 0.8/J	AJ0		-
		COMM	1	IE









PARTS LIST	
IPTION/PART ND. /REMARKS	
AKE, 12" BORE X 8" STROKE CUNNINGHAM P/N 12APCP1N812S250	
UTCH, 5' BORE X 4' STROKE CUNNINGHAM P/N 5AANP1C412S250	
LD #70-105-27 / 1' NPT, BRASS BDDY, LOCKING, NON-VENTED	
LD #70-101-27 / 1/4 NPT PORTS	
R / MCMASTER-CARR #4547K355 / 1" NPT, 100 MESH (140 MICRON)	
EUMATICS 1'NPT/ASP-8	
EUMATICS 1/2"NPT/ASP-4	
NTOR / WATTS #R-119-02D / 0-250 PSI, 1/4 NPT,	ח
NOSHOCK #20.110 W/ 1/4 NPT PORTS 0-160PSI CENTER BACK MOUNT	
ALVE, BRAKE, REXROTH #P52935-0008 W/ 1" NPT PORTS	
ALVE, CLUTCH, REXROTH #P52935-0004 W/ 1/2 NPT PORTS	
ALVE / REXROTH #P52935-0002 / 1/4 NPT, 150 PSI	
BRAKE, REXROTH 8-S, #P55163 W/ 1' NPT PORTS	
CLUTCH, REXROTH 4-S, #P55161 W/ 1/2 NPT PORTS	
VE	
NKE VALVE	
ER	
ER & ABSORBER	

MARKEY MA	CHINERY	TYS-32	Novembe	er 28, 2017				SIL#	RE
Drum	Barrel Dia 24 Flange Dia 66 Face width 40	ln. In. In.							
Wire	Wire Dia2H2O WtNAUlt. StrengthDeploy2300= 701	In. Lbs/Ft (NA) Lbs Ft Meter							
Spooling	@ 7.5 Wraps, theo. 18.5 Wraps chosen 18.67 Actual 7.1	%, air gap %, air gap							
Motor	Displ., 100% 13.7 Pressure 2500 Flow 45 Motor Effic'y 85 Partial displ. 8.81	Cu. Inch psi gpm % Cu. Inch (NA)							
Gearing	No. of red.3Mech. eff.90Tot. Ratio275.4Drum spd.3bbl line spd19bbl line pull19	:1 RPM FPM 88,342 Lbs							
Notes			11 66.0 17	323 2473		34801	48 15 ↔	22380	74 23
			10 62.0 16	303 2150		37047	45 14	23823	70 21
			9 58.0 15 8 54.0 14	283 1847 264 1564		39602 42535	42 13 39 12	25466 27353	65 20 61 18
			7 50.0 13	244 1300		45938	36 11	29541	56 17
			6 46.0 12 5 42.0 11	225 1056		49933 54688	33 10 M 30 9	32110	<u> </u>
			4 38.0 10	186 626		60445	27 8	38870	43 13
			3 34.0 9 2 30.0 8	147 274		76563	25 7 22 7	43443 49235	38 12 34 10
			1 26.0 7			88342	19 6	56810 DUU	29 9 Spd Spd
		NO.	DIAM. PER	PER ON	OFF WEIGHT	LB. LOAD F	t/min M/min	LB.	Ft/min M/min
			IN. WRAP	LAYER DRUM	DRUM Lb. In H20	LB. F	ULL Displ	LIGH	Part'l Displ
							↔ M	TOP LAYER MID-CAPACITY	′ LAYER

MARKEY

MARKEY MACHINERY COMPANY, Inc. Engineering Specification / Request

Job #:			
Specification #:	ES-A075	Revision	D
Equipment:	Paint Black		
Creation Date:	10/27/14		
Created By:			
Additional Comments:			

ITEM 1 – Paint The following paint specifications or equivalent shall be used.

Preparation: The use of filler materials for the purpose of filling or sealing nicks, dents and gouges is prohibited.

- **1.) Masking:** Critical areas having special surface finish requirements should be protected from abrasives used in blasting. Plastic, rubber, and working parts of the machinery shall be masked or otherwise protected from being painted or sand blasted.
- 2.) Blasting: All ferrous material shall be sandblasted to SSPC-SP10, a near white condition prior to applying primer. All surfaces shall be cleaned free from dirt, grease, oil, sand, visible rust, scale or other debris that might interfere with the application and adhesion of paint.

Coatings:

3.)	 Primer: International Devoe Cathacoat 302H zinc (Not for use on internal gearbox surfaces or other surfaces subjected to an oil bath) All surfaces including non stainless steel fasteners, unless otherwise specified. Ferrous metal fasteners require sandblast and primer coat unless galvanized. Exceptions; Interfacing part surfaces (fits, rotating and sliding surfaces), bearing surfaces, bushing surfaces, seal surfaces, threads, Gear meshes and stainless steel parts.
4.)	Intermediate: International Devoe Bar-Rust 235 Black (Not for use on internal gearbox surfaces or other surfaces subjected to an oil bath) All external surfaces unless otherwise specified. Exceptions; Interfacing part surfaces (fits, rotating and sliding surfaces), bearing surfaces, bushing surfaces, seal surfaces, threads, Gear meshes and stainless steel parts.
5.)	Top Coat: International Devoe Devthane 349 Black (Not for use on internal gearbox surfaces or other surfaces subjected to an oil bath) All external surfaces unless otherwise specified. Exceptions; Interfacing part surfaces (fits, rotating and sliding surfaces), bearing surfaces, bushing surfaces, seal surfaces, threads, and Gear meshes.
6.)	Interior: International Intergard 264 (FPD052 Epoxy, Off White) All Internal surfaces unless otherwise specified. Exceptions; Interfacing part surfaces (fits, rotating and sliding surfaces), bearing surfaces, bushing surfaces, seal surfaces, threads, Gear meshes and stainless steel parts.

MMCo. P/N PNT-COMM-BLACK

MARKEY

MARKEY MACHINERY COMPANY, Inc. Engineering Specification / Request

ES-A103	Revision	-
Air Cylinder, 5 Bore,	4 Stroke	
05/27/14		
Quantities Reflect ON	E (1) Winch	
	ES-A103 Air Cylinder, 5 Bore, - 05/27/14 Quantities Reflect ON	ES-A103RevisionAir Cylinder, 5 Bore, 4 Stroke05/27/14Quantities Reflect ONE (1) Winch

ITEM 1 – Cylinder 5 Bore, 4 Stroke

One (1) Cunningham Air Cylinder

Quantity	Markey part number
1	CYL-CUNN-5AANP1C412S250

ITEM 2 - DOCUMENTATION

Quantity	Markey part number
1	DOC-MISC
MARKEY MACHINERY COMPANY, Inc. Engineering Specification / Request

Specification #:	ES-A349	Revision	В
Equipment:	Brake Air Cyl	inder, 12 Bore	x 8 Stroke
Creation Date:	05/27/14		
Additional Comments:	Reference Ma	rkey Drawing	C34265

ITEM 1 – Cylinder 12" Bore x 8" Stroke

One (1) Cunningham Pneumatic Cylinder

MMCo. P/N	CYL-CUNN-12APCP1N812S250

MARKEY MACHINERY COMPANY, Inc. Engineering Specification / Request

Specification #:	ES-A817	Revision -	
Equipment:	Hydraulic Motor and I	Brake	
Creation Date:	05/27/14		
Additional Comments:	Quantity Reflects One	(1) Winch	

ITEM 1 – PARKER DENISON HYDRAULIC MOTOR

One (1) Parker Denison M4SDC Two Speed Vane Hydraulic motor

MMCo. P/N MTR-PARK- M4SDC1380753N03*50200

ITEM 2 – MICO BRAKE, SUPPLIED ASSEMBLED WITH MOTOR.

One (1) Mico Brake

MMCo. P/N MTR-MICO-3C141498CZ

ITEM 3 - TWO -SPEED MOTOR VALVE, SUPPLIED ASSEMBLED WITH MOTOR.

One (1) Two –Speed Motor Valve.

MMCo. P/N MISC-WIT-5749

ITEM 4 – COUNTER BALANCE VALVE

One (1) Counter Balance Valve, ships loose.

MMCo. P/N MISC-WIT

ITEM 5 - DOCUMENTATION

MMCo. P/N DOC-

MARKEY MACHINERY COMPANY, Inc. Engineering Specification / Request

Specification #:	ES-A819	Revision -	
Equipment:	Hydraulic Power Skid		
Additional Comments:	Quantity Reflects One	(1) Winch	

ITEM 1 – PARKER PUMP, LOAD SENSE

One (1) Parker

MMCo. P/N

PUMP-PARK- PD100PS02RS5AL00S000000

ITEM 2 – ELECTRIC MOTOR, 75HP.

One (1) Baldor Electric Motor

MMCo. P/N MTR-BLDR-75HP

ITEM 3 – 30 X 60 MOTOR PLATE, VARIOUS COUPLINGS AND MOUNTS TO ALLOW ALL OF THE ABOVE COMPONENTS TO BE DELIVERED PLUMBED AS AN ASSEMBLY

One (1) Skid assembly and components.

MMCo. P/N

ITEM 4 – 75HP SOFT START, NEMA 12 ENCLOSURE

One (1) 75HP Soft Start mounted in NEMA 12 enclosure.

MMCo. P/N

ITEM 5 -- DOCUMENTATION

MMCo. P/N DOC

MARKEY MACHINERY COMPANY, Inc. Engineering Specification / Request

Specification #:	ES-A820	Revision	-
Equipment:	Hydraulic Reservoir &	Components	
Creation Date:	05/27/14		
Additional Comments:	Quantity Reflects One	(1) Winch	

ITEM 1 – HYDRAULIC RESERVOIR,

SPECIFFIC One (1) WIT Hydraulic reservoir

MMCo. P/N	MISC-WIT
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ITEM 2 – RESERVOIR COMPONENTS

One (1) Set of Components for the above reservoir

MMCo. P/N

ITEM 3 -- DOCUMENTATION

MMCo. P/N

MARKEY MACHINERY COMPANY, Inc. Engineering Specification / Request

Specification #:	ES-A833
Equipment:	Planetary Reducer
Creation Date:	05/27/14
Additional Comments:	

ITEM 1 – PLANETARY REDUCER

One (1) only Planetary Reducer

Quantity	Markey part number
1	REDR-RR-RR 3200 L2 FS 27.29

ITEM 2 – MOTOR ADAPTER KIT

Quantity	Markey part number
1	MISC-RR-TBD

ITEM 3 - DOCUMENTATION

Quantity	Markey part number
1	DOC-RR

MARKEY MACHINERY COMPANY, Inc. Engineering Specification / Request

Specification #:	ES-A821	Revision	-
Equipment:	Hydraulic Controls		
Creation Date:	05/27/14		
Additional Comments:	Quantity Reflects One (1) Winch		

ITEM 1 – HYDRAULIC CONTROLS

One (1) Per WIT HPU

MMCo. P/N MISC-WIT-C11327

ITEM 2 – STAINLESS STEEL PLATE

One (1) Stainless Steel Console Plate, plumbed, engraved assembled. To include all of the above components.

MMCo. P/N	MISC-WIT

ITEM 3 - DOCUMENTATION

MMCo. P/N DOC-WIT

MARKEY MACHINERY COMPANY, Inc. Engineering Specification / Request

ES-A822	Revision	-
Pneumatic Components		
05/27/14		
Quantity Reflects One	(1) Winch	
	ES-A822 Pneumatic Component 05/27/14 Quantity Reflects One	ES-A822RevisionPneumatic Components05/27/14Quantity Reflects One (1) Winch

ITEM 1-E-STOP BRAKE VALVE

One (1) Parker Skinner solenoid valve E-stop brake valve

MMCo. P/N MISC-VLV-7133KBN2GVJ1 / C222C2

ITEM 2 – PROPORTIONAL BRAKE VALVE

One (1) Parker proportional air regulator brake control

MMCo. P/N MISC-VLV- P31PA92AD2VP1A

ITEM 3 – CLUTCH VALVE

One (1) Numatics dual solenoid valve, clutch control

MMCo. P/N MISC-VLV- L22BB452B0000061

ITEM 4 – PARTICULATE FILTER

One (1) Parker particulate air filter

MMCo. P/N MISC- - P31FA92EMBN

ITEM 5 – COALESCING FILTER AND ABSORBER

One (1) Parker Coalescing absorber filter

MMCo. P/N MISC- - P31FA92MMN

ITEM 6 – PNEUMATIC COMPONENTS PLATE

One (1) All of the above to be mounted on a plate and plumbed together.

MMCo. P/N

ITEM 7 – MANUALS

MARKEY MACHINERY COMPANY, Inc. Engineering Specification / Request

Specification #:	ES-A831	Revision	Α
Equipment:	Pneumatic Controls		
Creation Date:	05/27/14		
Additional Comments:	Quantities Reflect ONE (1) Winch		

ITEM 1 – APOLLO BALL VALVE

One (1) Apollo Ball Valve

Quantity	Markey part number
1	PNEU-VLVB-7010527

ITEM 2 – APOLLO BALL VALVE

One (1) Apollo Ball Valve

Quantity	Markey part number
1	PNEU-VLVB-7010127

ITEM 3 – BRONZE Y-STRAINER

One (1) Bronze Y-Strainer

Quantity	Markey part number
1	PNEU-MCMC-43935K55

ITEM 4 – MUFFLER, ARROW PNEUMATICS

Two (2) Muffler, Arrow Pneumatics

Quantity	Markey part number
2	PNEU-ARROW-1"NPT/ASP-8

ITEM 5 – MUFFLER, ARROW PNEUMATICS

Two (2) Muffler, Arrow Pneumatics

Quantity	Markey part number
2	PNEU-ARROW-1/2"NPT/ASP-4

ITEM 6 – PNEUMATICS REGULATOR

One (1) Watts Air-Spring Regulator

Quantity	Markey part number
1	PNEU-WATT-R-119-02D

ITEM 7 – PRESSURE GAUGE

One (1) Pressure Gauge

Quantity	Markey part number
1	PNEU-NSHK-20.110

ITEM 8 –QUICK RELEASE VALVE, BRAKE

Two (2) Quick Release Valve

Quantity	Markey part number
2	PNEU- REXR-P52935-0008

ITEM 9 –QUICK RELEASE VALVE, CLUTCH

Two (2) Quick Release Valve

Quantity	Markey part number
2	PNEU- REXR-P52935-0004

ITEM 10 -QUICK RELEASE VALVE, FOR WATTS AIR SPRING

One (1) Quick Release Valve

Quantity	Markey part number
1	PNEU- REXR-P52935-0002

ITEM 11 - BRAKE RELAY VALVE

Two (2) Wabco/Rexroth "8-S" Relay Valve

Quantity	Markey part number
2	PNEU-REXR-P55163

ITEM 12 - CLUTCH RELAY VALVE

Two (2) Wabco/Rexroth "4-S" Relay Valve

Quantity	Markey part number
2	PNEU-REXR-P55161

ITEM 13 - DOCUMENTATION

Quantity	Markey part number
1	DOC-COMM



Western Integrated Technologies MECHANICAL * FLUID POWER SYSTEMS * ELECTRICAL 8900 North Ramsey Portland, Oregon 97203 Phone (503)228-6666 Fax (503) 228-7318

Operation & Maintenance Manual

Markey Machinery

Winch HPU and Controls





Table of Contents

Operating Data (Warranty, Flushing, Startup Info., etc)

Hydraulic Schematic

General Arrangement Drawing

Electrical Drawing

Miscellaneous Drawings

Bill of Material

Catalog Data for Basic Components



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Warranty

All products sold by Western Integrated Technologies Inc. are subject to the warranty of the manufacturer of that product. Where the fabricator/manufacturer is Western Integrated Technologies Inc, all work performed by WIT is warranted to be free from defective materials and workmanship for a period of one year after shipment or the date of installation for service.

No other warranties, expressed or implied, are made. Defects in work by WIT will be repaired or replaced, at WIT discretion, FOB Portland, OR.

Components and products subject to the warranty of the manufacturer will be processed and responded to by each respective manufacturer involved.



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HYDRAULIC SYSTEM START-UP PROCEDURE

Warranties are not valid unless proper starting and maintenance procedures are followed.

PUMP START-UP PROCEDURE

- Make sure reservoir is filled with a suitable, premium quality, anti-wear hydraulic oil with a viscosity range of 110-250 SUS (24-50Cst) at 100°F (38°C), unless otherwise noted. Other:______
- 2. Check coupling alignment. (Refer to coupling literature in service manual for specifications)
- 3. Check fittings for tightness.
- 4. Be sure system piping is properly sized and is clean.
- 5. On pumps with case drains, remove drain line from pump and fill pump case with clean hydraulic oil. On other pumps, disconnect one of the pump ports and fill pump with as much clean hydraulic oil as possible, then reconnect. This may not be required if the pump is below the fluid level of the reservoir.
- 6. Make sure suction line shutoff valves (where applicable) are open.
- 7. Jog motor briefly to check direction of rotation.
- 8. To be sure pump primes; jog motor 3 or 4 times for 2-4 seconds.
- 9. Whenever possible, do not start a pump against a blocked system.
- 10. If the pump does not pull a prime, temporarily loosen a fitting in the pressure line to remove any trapped air.
- 11. Check gauge pressure to be sure it is as specified.
- 12. Turn unit off if overheating is evident.
- 13. On systems with pressure compensated pumps, insure pressure relief is a minimum of 200 PSI above compensator setting.
- 14. Check oil level again after filling piping, actuators, etc.

MAINTENANCE TIPS

- 1. Maintain as low a system pressure as possible to give adequate performance.
- 2. Prohibit unauthorized personnel from making adjustments on the hydraulic system.
- 3. Maintain adequate oil level. When adding oil, be sure it is new and clean and if possible, pump into the unit through a 10-micron filter cart.
- 4. Keep fittings tightened.
- 5. Maintain clean fluid in system by:
 - a) Changing filter elements when indicated
 - b) Cleaning strainer elements
 - c) Replace oil if it becomes contaminated or overheated.
 - d) Clean or replace reservoir air breathers regularly
- 6. Lubricate motor coupling periodically if required.
- 7. Check system regularly for overheating. Seal damage may occur at temperatures over 170° F.
- 8. Keep power unit clean.
- 9. The three most important indicators of trouble are:
 - a.) Heat
 - b.) Noise
 - c.) Leakage

Need help? Have questions? Give us a call!



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HYDRAULIC SYSTEM FLUSHING PROCEDURES

Warranties are not valid unless proper starting and maintenance procedures are followed.

Most hydraulic systems can be properly flushed by using the hydraulic pump(s) to circulate fluid through the fluid lines and returned through the filter(s) into the reservoir.

Connect all actuator and valving manifold hoses together, using flushing nipples. Your objective is to bypass the actuators and valving for proper flushing of the fluid lines. Start the pump and circulate fluid through the fluid lines. It is common to get surges of air from the fluid lines returning to the reservoir which may cause the pump(s) to be noisy as air bubbles are drawn into the pump. If the noise persists for a long period of time and the fluid is aerated or foamy, allow the fluid to settle out over night. If the noise continues beyond a reasonable period of time, consult the manufacturer.

IMPORTANT - Monitor the indicators on the system filter(s) during start up to assure that fluid does not bypass the filter elements.

Required flushing time will vary with the size and complexity of the entire hydraulic system and the degree of contamination resulting from installation. Simple systems can usually be flushed within one to two hours. Large systems may require ten to twelve hours. **Careful monitoring of the filter condition indicators will dictate the necessary flushing time required.**

It is necessary to flush all fabricated piping tubing and hoses without introducing contamination into the valving manifold or actuators (cylinder and motors). When this has been completed, reconnect the hoses to the proper ports and operate the system manually during the initial phase. Carefully check for any mechanical interference, binds, non-lubricated machinery and fluid leaks.



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HYDRAULIC SYSTEM SERVICE RECOMMENDATIONS

See instruction material for individual units.

EACH SHIFT_____

CHECK	POSSIBLE TROUBLES	CORRECTIVE ACTION
Reservoir level	Excessive heat, air in system.	Fill as required
Fluid leaks	Fluid loss, Pressure loss, Air in system, excessive heat Dirty equipment, safety hazards.	Repair as required
Fluid temperature	Deterioration of fluid, excessive Pump wear	Trouble-shoot cause and correct.
Erratic operations	Erratic operation is often a Warning of impending component failure. Corrective measures can be taken to prevent shutdown. This also provides some time to secure replacement parts before a complete failure occurs.	Report in detail
	WEEKLY	

CHECK	METHOD	REMEDY	POSSIBLE TROUBLES
Fluid filters	Filter indicators	Change element	Contaminated oil, component wear, pump cavitation (when using inlet filters)
Heat exchanger	Leaks, corrosion	Repair/replace	Excessive heat, fluid loss, Water in fluid
Heat exchanger Water valve	Check fluid temperature when valve opens	Re-adjust as necessary	Excessive heat, excessive water consumption.
Hoses	Visually inspect for cracking, abrasions, kinks and leaks	Replace hose	Personal injury, machine down time fluid loss, dirty equipment.

Check	Possible troubles	Corrective Action		
Air Breathers	Dirt in hydraulic system, cavitation.	Clean or replace.		
Hydraulic tube connections	Loss of fluid, loss of pilot pressure, air entering system, dirty equipment, safety hazard.	Tighten or repair as required.		
Solenoids	Valve failure, loss of production and fire hazard	Replace broken wires or covers. Tighten connections and covers.		
Dirty Equipment	Dirt entering system, failure to notice leaks, safety and fire hazard.	Clean as required, remove rags etc.		

THREE MONTHS

Check	Possible troubles	Corrective Action		
Filters	Contaminated oil, eventual component failure.	Replace all elements in use for over 3 months.		
Fluid Condition	Component failure due to excessive wear, erratic operation due to sticking valves caused by varnish buildup, gumming, etc.	Send oil sample to fluid supplier to be analyzed for contamination and viscosity breakdown. Unacceptable results will require oil to be drained from the entire system and replaced with new, appropriate hydraulic oil. New oil most always contains unacceptable amounts of particulates and must be filtered prior to placing into the system. 10-micron filtration is usually acceptable.		
Hydraulic connections and pipe braces	Leaks, broken pipes, noise, dirty equipment.	Tighten connections and clamps.		
Relief valves, Pressure switches, timers	Erratic operations, heat buildup, slow moving equipment, machine crashes due to timing discrepancies.	Check settings and adjust as required.		
Heat Exchanger	Heat buildup, water in system.	Refer to heat exchanger service literature in service section of manual.		
	SIX MONTHS			

Check	Possible troubles	Corrective Action
Pump/motor coupling alignment	Shaft and bearing failure, coupling failure, excessive noise and vibration.	Remove coupling guards and check alignment. Refer to Coupling literature in service section of manual for specifications.
Pump, motor and valve mounting bolts	Vibration, noise, leaks, Coupling wear, extruded o-rings, and machine failure.	Tighten to proper torque. Tighten Directional valve mounting bolts evenly to prevent binding spool in valve body.
Cartridge Valves	Leaks, erratic operation, drifting equipment, personal injury	Tighten to specified torque. Refer torque specifications located in the general information section of the manual.

Troubleshooting Hints For Hydraulic Systems Individual Component Service Bulletins May Contain Additional Information

PROBLEM	PROBABLE CAUSE AND CORRECTIVE STEPS			
Noisy pump	 a) Low fluid level in reservoir, air entering system; Fill reservoir to proper level. b) Leaking fittings, hose and tube connections on inlet side of pump, allowing air to enter system. Use system compatible grease or oil to coat the fitting/connection suspected of leaking (while system is running). Pump should quiet momentarily after application if connection is leaking. c) Inspect suction strainers for cleanliness. Clogged strainers or obstruction in suction line will likely cause pump cavitation and severe pump damage. 			
Low system pressure	 a) Relief valve setting too low. Relief valve may have been re-adjusted. If setting is too low, fluid will be diverted back to reservoir, resulting in heat build-up and low system pressure, Re-adjust relief valve to proper setting. b) Worn or damaged pump or actuators. Plug work ports at power unit and check pressure. If relief valve is set properly and pressure is still low, the pump most likely needs repair. If pressure is normal, isolate each actuator is normal, isolate 			
	 C) Unloading circuit malfunctioning. If using a fixed displacement pump in conjunction with an unloading circuit, make sure circuit is functioning as intended. Contamination, wear or damage could cause unloading valve to remain partially or completely open. Inspect valve, repair/replace as necessary. 			
	d) Pump compensator set too low. Variable displacement pumps with pressure compensation controls may have been re-adjusted. Re-adjust compensator to proper setting; use care when adjusting compensator, the system relief valve may need re-adjusted to maintain a higher setting than the compensator (usually around 200 PSI higher than the compensator setting).			
Erratic operation	Valves, pistons, etc. sticking or binding. Inspect suspected part for mechanical deficiencies such as misalignment of shaft, worn bearings, etc. Also look for signs of dirt, sludge, varnishes caused by fluid deterioration.			
Relief valve stuck open	Depressurize hydraulic system and remove valve. Inspect for contamination and clean as needed. Physically operate moving parts in valve to test for sticking or broken bias springs. Replace if needed.			
Leakage in the system	Check the whole system for escaping fluid. Serious leaks in the open are easy to find, however, leaks often occur in concealed piping. Install pressure gauge in discharge line near pump and then progressively block circuit downstream until leak is located. A high leakage path through a valve or a component generates heat. A hot spot in the circuit often indicates the point of leakage.			
Aerated hydraulic fluid	Low fluid level prevents entrained air from having sufficient time to settle out of the oil. Check oil level in reservoir daily.			
Cavitation	Cavitation is the formation of a vacuum inside the pump. This is usually caused by a restriction on the inlet, too high a viscosity (cold fluid), or insufficient head pressure (atmospheric pressure is required to push the oil into the pump, at high elevations, there is less pressure available to do the work). Pseudo cavitation is similar to cavitation, but is caused by air entering the pump inlet, which will have similar effects as cavitation. Look for loose/leaking components on all suction lines. Un-corrected cavitation conditions will cause severe damage to pump components.			
Loose/worn pump parts	Look for worn gaskets and packing. Replace if necessary. Usually there is no way to compensate for wear in a component; it is always best to replace it.			
Stuck valves	Parts may be stuck by metallic chips, bits of lint, carbonized fluid etc. If so, disassemble and clean thoroughly. Avoid the use of files, emery cloth, steel hammers etc. on machined surfaces. Products of fluid deterioration such as gums, sludge, varnish, may also cause sticking. Use solvent to clean parts and wipe dry before reassembly. If parts are stuck by correspondent user they will probably have to be replaced			
Overheating	 Water shut off or heat exchanger clogged. Continuous operation at relief setting. a. Stalling under load, etc. b. Fluid viscosity too high. Excessive slippage or internal leakage. a. Check stall leakage past pump, motors and cylinders. 			
	 Fluid Viscosity too low. Reservoir sized too small. Reservoir assembled without baffling or sufficient baffling. Case drain line from pressure compensated pump returning oil too close to suction line. Pipe, tube or hose I.D. too small causing high fluid velocities. Valving too small, causing high fluid velocity. Improper air circulation around reservoir. System relief valve set too high. Power unit operating in direct sunlight, or ambient temperature is too high. Pressure compensated pumps require the system relief be set 150-200 PSI higher than compensator setting. 			

Troubleshooting Hints For All Types of Pumps Individual pump instruction bulletins may contain additional information

Symptom	Possible Cause
Pump not delivering fluid	 Insufficient fluid in reservoir. Suction line or strainer clogged. Air leaking into suction line preventing pump from priming. Pump rotating too slowly. Oil viscosity too high. Oil lift too high, preventing pump from priming. Improper pump rotation. Sheared pump shaft or other broken internal pump parts. Excessive contamination in pump. Improper stroke adjustment on variable delivery pumps.
Oil accumulating around pump	 Worn shaft seal. Head pressure on suction line causing oil to escape through loose or damaged connections. Pump housing bolts improperly torqued or loose. Case drain line restricted or too small causing shaft seal to leak (excessive case pressure). Pump housing cracked from being struck or over-pressurized. Leaking pressure line or connection.
Excessive pump wear	 Oil not properly filtered, causing it to get contaminated with dirt and other abrasive materials. These circulate through pump and other components causing rapid wear. Viscosity of oil too low. Pump not rated for pressures at which system is operating. Pump/prime mover misalignment or drive belt too tight. Air being drawn into pump from a leaking suction line or fitting, or low reservoir fluid level.
Excessive pump noise	 Check for air leaks in the suction line. Flood inlet connections with oil from reservoir; when oil is poured over a leak point, pump noise should be reduced momentarily. Poor alignment of pump/prime mover. Verify compatibility of oil to components in the system. Unloading valve or relief set too high. Use a reliable, calibrated pressure gauge to check operating pressure. Relief valves may have been adjusted with a damaged gauge and be out of acceptable operating range. Check any unloading devices for proper operation. Reservoir oil aerated, caused by low fluid level in reservoir or return lines terminating above fluid level inside reservoir. Sticking or worn vanes, damaged cam ring (vane pumps). Damaged or worn gears or housing (gear pumps) Other damaged pump components. Failing bearings. Improper Pump rotation. Components installed improperly. Suction line restriction, causing cavitation. Oil too thick because it is cold or improperly selected. Pump turning at excessive speeds. Air entering pump through shaft seal. Inlet line too small. Inlet lines should be sized too keep fluid velocity under 5 feet per second. Shutoff valve on flooded suction systems not fully opened. Bolts on pump housing loose or torqued improperly during assembly. Case drain port improperly positioned during pump installation, allowing air to be trapped inside pump housing. Case drain should be oriented so it is at the highest possible point on the pump.



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Hydraulic Schematic



REFERENCE JOBS 1031914

37 C FPOX PAINT VIT DEVOC 36 2 PRESSURE GAUGE SIALF SPE065-33500-05-S-N04 34.4 2 SOLENOISS (2: PER SECTION) PARKE ST67647 34.4 2 SOLENOISS (2: PER SECTION) PARKE ST67647 34.4 2 SOLENOISS (2: PER SECTION) PARKE ST67647 34.7 D.REGENANCE MALE, ASSY IMBERLINE ICCLOSECT-SINGEC-SINGECON 33.5 MOTO-CONTROLS MAYE SUN CSCH-LON-PKO/S 34.1 DRAKE MOTO-CONTROLS MAYE SUN 35.7 IOAN-MOZ PARKE MOSC BRAKE SCH4938CZ 36 IOAN-MOZ PARKE MOSC CONTROLS ST67617 28 IOAN-MOZ PARKE MOSC CONTROLS SCH4938CZ 28 SULTIC VANE PARKE MOSC CONTROLS SCH4938CZ 28 SPROL VANE NUN MOTO SCH4147 29 SPROL VANE NUN MOTO SCH4147 24 TEST FORT		38	1	STRAINER	STAUFF	SUS-A-	150-N40F-2B-125-3
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33 1 2-SFEED VANE MOTOR PARKER W4SDC080753N0250200 28 1 IOAN-V02 PARKER 20073689 28 1 SOLENO'D VALVE HYDRAFORCE SV08-30-0-N-00 27 1 SHUTLE VALVE PARKER CSHIDIB 26 1 SPODL VALVE SUN DOCC-XYN 25 2 3-WAY SPDDL VALVE SUN DOCC-XYN 24 1 2-SPED MOTOR MANFOLD WIL D11417 25 2 JHKSSURE CAUCE SUN MSEC-G300-05-S-V04 26 1 ARDED MARFER SUN MSEC-G300-05-S-V04 26 HAUSE SNUBBER SUN MSEC-G300-05-S-V04 SUN 27 1 AR BLEED MARKER NH D11374 20 4 TEST-POINT HYDRA C6003737 I 18 1 STAT-UP MANFOLD ASSEMBLY MIT D11374 I I I 17 2 BALL VALVE, 1-1/4" DMIC	F	31	1	BRAKE	MICO BRAKE	3C14149	98CZ
29 1 IOAN-MC2 PARKER 20073893 28 1 SOFINORD VALVE HYDRAFORCE SV08-30-0-N-03 27 1 SHUTLE VALVE PARKER CSE1013 26 1 SPOOL VALVE SUN DCCC-VNN 23 2 3-WAY SPOOL VALVE HYDRAFORCE PD16-40N-0-NS-110 24 1 2-SPECE MOTOR WANFOLD WT D11417 23 2 FRESSURE GAUGE STAUFF SP0063-33000-05-S-N04 24 1 ALGOS NUBBER SUN NSAB-KXY-AS 24 CALCE SUBBER SUN NSAB-KXY-AS 25 1 ALR ELED PARKER NCFE-XAN 26 4 ISSI FOIN HYDR CBCE-XYAN 26 4 ISSI FOIN HYDR DARKER NCFE-XAN 27 PARKER NALVE PARKER NCFE-XAN 28 START-UP WANDOLD ASSEMBLY WT D11374 IT 29 ILELED MARKER <td></td> <td>30</td> <td>1</td> <td>2-SPEED VANE MOTOR</td> <td>PARKER</td> <td>M4SDC08</td> <td>380753N0250200</td>		30	1	2-SPEED VANE MOTOR	PARKER	M4SDC08	380753N0250200
28 1 SOLENOID VALVE FMDRAFORCE SV08-30-0-N-00 27 1 SHUTTE VALVE PARKER CS-11318 26 1 SPOD_VALVE SUN DCCC_XIX 25 2 SPOD_VALVE SUN DCCC_XIX 25 2 SPACESDURE SAUGE STAUTE SPOS3-03000-03-S-N04 24 1 2-SFEED_MOTOR_MANIFOLD WT DT1417 23 2 PRESSURE SAUGE STAUTE SPOS3-03000-03-S-N04 21 1 AR BLED PARKER NOTE DT1417 23 2 PRESSURE SAUVE PARKER NOTE 21 1 AR BLED PARKER NOTE DT111-AZZA 24 TEST POINT FMARC DMIC DSWH-1250S-1111-AZZA 17 2 SALVAUX T-11750-MDWE-5 T111-AZZA 16 1 NUNF CHECK PARKER DT-1250-MDWE-5 15.1 T-11000 ASSENDELY <td< td=""><td>-</td><td>29</td><td>1</td><td>IQAN-MC2</td><td>PARKER</td><td>2007089</td><td>9</td></td<>	-	29	1	IQAN-MC2	PARKER	2007089	9
27 1 SHUTLE VALVE PARKER CSH101B 26 1 SHUTLE VALVE SUN DCCC-XYN 25 2 3-WAY SPOOL VALVE SUN DCCC-XYN 24 1 2-SPEED MCTOR MANIFOLD WIT D11417 23 2 PRESSURE CAUCE STAUFF SPC063-030CC-05-S-N04 24 14 CASE SUBBER SUN NSAB-KXY-AS 21 1 AIR BLED PARKER N.21B-XAN 20 4 TEST POINT FYDAC D6003737 9 1 RELIEF VALVE PARKER RAH161S30 18 START-UP MANIFOLD ASSEMBLY WIT D11374 17 2 BALL VALVE, 1-1/4" DMIC EV+1250S-1111-AZZA 18 START-UP MANIFOLD ASSEMBLY <wit< td=""> D11374 17 2 BALL VALVE, 1-1/4" DMIC EV+1250S-1111-AZZA 16 INJINE CHECK PARKER D1-1250S-1111-AZZA 15.1 INTURE SEGURA MARALEY MARALEY 15.1 INTURE SEGURA SSEMELY MASALEY 15.1 INT</wit<>		28	1	SOLENOID VALVE	HYDRAFORCE	SV08-30)-0-N-00
26 1 SPCOL VALVE SUN DCCC-XYN 25 2 3WAY, SPCOL VALVE HYDRAFORCE PD16-40N-0-NS-110 24 1 2-SPEED, MOTOR, MANIFOLD WIT D11417 23 2 PRESSURE, CAUCE STAUFF SPC063-03000-05-S=-V04 24 1 ALR BLEED FARKER NOEE-XAN 20 4 CAJGE SNJBBER SUN NSAB-KXV-AS 21 1 ALR BLEED FARKER NOEE-XAN 26 4 TEST POINT HYDRAC 06003757 19 1 RELIET VALVE PARKER D11374 17 2 BALL WALVE, '-1/4" DMIC BVI-1250S-1711-AZZA 16 1 INUER CHECK PARKER D1-1250-WDM-55 15.1 1 ILLEE ELEMENT PARKER MP14002 15 1 IN-JINE PRESSURE FILTER PARKER MP14002 15 1 IN-JINE PRESSURE FILTER PARKER MP14002 14 <t< td=""><td></td><td>27</td><td>1</td><td>SHUTTLE VALVE</td><td>PARKER</td><td>CSH101E</td><td>}</td></t<>		27	1	SHUTTLE VALVE	PARKER	CSH101E	}
25 2 3-WAY SOOL VA VF HYDRAFORCE 2016-40N-0-NS-11C 24 1 2-SPEED MOTOR MANIFOLD WT D11417 23 2 PRESSURE GAUGE STAUFF SPEC63 03000-05-S No4 22 4 GAUGE SNJBBER SUN VSAB-6XV-AS 2 1 AIR BLEED PARKER NOEE-XAN 20 4 TEST POINT HYDAC 06003737 19 1 REFF VALVE PARKER NOEE-XAN 06003737 17 2 BALL VALVE, 1-1/4" DMIC 3VH-1250S-1111-AZZA 16 1 NULL CHECK PARKER 9410400 15.1 1 INUNE CHECK PARKER WF1002VM2KX201 14 1 COUPLINC ASSEMBLY MACNALCY S524572C 12 1 ELECTRIC NOTOR, 75 P BALDOR 1800 RPM, 460/3/60, TEFC 11 PUMP/MOTOR SKID ASSEMELY WT D11418 0 -2-1/2" 12 1 ELECTRIC NOTOR, 75 IP <td>F</td> <td>26</td> <td>1</td> <td>SPOOL VALVE</td> <td>SUN</td> <td>DCCC-X`</td> <td>YN</td>	F	26	1	SPOOL VALVE	SUN	DCCC-X`	YN
24 1 2-SPEED MOTOR MANIFOLD W T D11417 23 2 PRESSURE CAUCE STAUFF SP0063-03300-05-S-N04 21 1 AR BLEED DARKER NOEB-XAN 20 4 TLST POINT FYDAC C6003737 19 1 RELEF VALVE PARKER NOEB-XAN 20 4 TLST POINT FYDAC C6003737 19 1 RELEF VALVE PARKER RAH161533 18 1 START-UP MANIFOLD ASSEMBLY WT D11374 17 2 BALL VALVE, 1-1/4" DMIC BVH-1250S-1111'-AZZA 16 1 INUNE CHECK FARKER DT1260-MDME-5 15.1 1 FLER FLEMENT PARKER DT1260-MDME/5 15.1 1 INTER FLEMENT PARKER DT1260-MDME/5 15.1 1 INTER FLEMENT PARKER DT1260-MDME/5 15.1 1 INTER FLEMENT PARKER DT10600000000000000000000000000000000000	F	25	2	3-WAY SPOOL VALVE	HYDRAFORCE	PD16-40	DN-0-NS-110
23 2 PRESSURE CAUCE STAUFF SP0063-030C0-05-S-N04 22 4 GAUGE SNUBBER SUN NSAB-XXV-AS 20 4 TEST POINT HYDAC C6003737 19 1 RELEFD PARKER NQB-XAN 19 1 RELEFD PARKER NQB-XAN 18 1 START-UP MANIFOLD ASSEMBLY WIT D11374 17 2 BALL VALVE, 1-1/4" DMIC BVH-1250S-1111-AZZA 16.1 INLINE CHECK PARKER D1-1250-MDMF-5 15.1 FILTER ELEMENT PARKER D1-1250-MDMF-5 15.1 FILTER ELEMENT PARKER D1-1250-MDMF-5 13 PUMP/WOTOR ADAPTER MAGNALOY MS70H5/M50011612/M50021220 13 PUMP/WOTOR ADAPTER MAGNALOY S324872C 12 ELECTRIC WOTOR, 75 HP BALDOR 1800 RPM, 460/3/60, TEFC 14 DISUCTION PUMP, 46 GPM PARKER PD100CPS02SRUSAC0005100PB00 10 HUMP/WOTOR SKID ASSEMELY		24	1	2-SPEED MOTOR MANIFOLD	WIT	D11417	
22 4 GAUGE SNUBBER SUN NSAB-KXV-AS 21 1 AR BLEED PARKER NQEB-XAN 20 4 TEST POINT HYDAC 36003737 19 1 RELEF VALVE PARKER NQEB-XAN 20 4 TEST POINT HYDAC 36003737 19 1 RELEF VALVE PARKER NQEB-XAN 16 1 INLINE CHECK PARKER RH161S30 15.1 1 FILTER ELEMENT PARKER DT-1250-WDWF-5 15.1 1 INLINE CHECK PARKER DT-1250-WDWF20011512/M50021220 14 1 COUPLING ASSEMBLY MAGNALCY S32472C 12 1	F	23	2	PRESSURE GAUGE	STAUFF	SPG063-	-03000-05-S-N04
21 1 AR GLEED PARKER NQEB-XAN 20 4 HEST FOINT -YJAC 06003/37 18 1 START-UP_MANFOLD_ASSEMBLY_WIT D11374 17 2 BALL_VALVE	F	22	4	GAUGE SNUBBER	SUN	NSAB-K>	XV-AS
20 4 IEST PONI HYDAC D6603/3/ 19 1 RELEF VALVE PARKER RAH 61S30 18 1 STATT-UP WANIFOLD ASSEMBLY D11374 17 2 BALL VALVE, 1-1/4" DMIC BVH-1250S-1111-AZZA 16 1 INLINE CHECK PARKER D1-1250-MDVF-5 15.1 1 FULTE FLEMENT PARKER 9410400 15 1 N-LINE PRISSURE FILTER PARKER 9410400 15 1 N-LINE PRISSURE FILTER PARKER 9410400 15 1 N-LINE PRISSURE FILTER PARKER 9410400 13 1 PUMP/MOTOR ACAPTER MAGNALOY S324872C 12 1 ELECTRIC MOTOR, 75 HP BALOR 1800 RPM.46C/3/60, TEFC 11 1 PDMP/MOTOR SKID ASSEMELY WIT D11418 9 1 SUCTON BALL VALVE, 2-1/2" ABZ VALVE 402-109-LH-2-1/2 8 1 BALL VALVE, 3/4", DRAIN DMIC BVAL-0750S-4321-	F	21	1	AIR BLEED	PARKER	NQEB-XA	AN
19 1 RELIEF VALVE PARKER RAH161S30 18 1 START-UP WANIFOLD ASSEMBLY WT D11374 17 2 BALL WALVE, 1-1/4" DMIC BVH-1250S-1111-AZZA 16 1 INLINE CHECK PARKER DT-1250-WDVF-5 15.1 1 FILTER ELEMENT PARKER WFF4100EVW2KX201 14 1 COUPLING ASSEMBLY MACNALOY V570H5/V50011612/M5002122C 13 1 PUMP/MOTOR ADAPTER MAGNALOY V570H5/V50011612/M5002122C 13 1 PUMP/MOTOR ADAPTER MAGNALOY V570H5/V50011612/M5002122C 14 1 COUPLING ASSEMBLY MACNALOY V570H5/V50011612/M5002122C 12 1 ELECTRC WOTOR, 75 HP BALDOR 1800 RPM, 466/3/60, TEFC 11 1 PUMP/MOTOR SKID ASSEMBLY WT D11418 9 1 SUCTON BALL VALVE, 2-1/2" ABZ VALVE 402-109-U1-2-1/2 8 1 BALL VALVE, 3/4", DRAIN DMIC BVAL-0750S-4321-AZZA 7.1 1 FILTER ELEMENT PARKER KLS7100BGS241 <t< td=""><td>F</td><td>20</td><td>4</td><td>TEST POINT</td><td>HYDAC</td><td>0600373</td><td>7</td></t<>	F	20	4	TEST POINT	HYDAC	0600373	7
18 1 START-UP MANIFOLD ASSEMBLY WIT D11374 17 2 BALL VALVE, 1-1/4" DMIC 3VH-1250S-1111-AZZA 16 1 INLINE CHECK PARKER DT-1250-MDMF-5 15.1 1 FILTER ELEMENT PARKER DT-1250-MDMF-5 15.1 1 IN-LINE PRESSURE FILTER PARKER WF41040Q 14 1 NOLIC ASSEMBLY MAGNALOY W570H5/M50011612/M50021220 13 1 PUMP/MOTOR ADAPTER MAGNALOY S324572C 12 1 ELECTRIC MOTOR, 75 HP BALDOR 1800 RPW, 460/3/60, TEFC 11 1 PISTON PUMP, 46 GPM PARKER 2D100PS02SRU5AC00S100PB00 10 1 PUMP/MOTOR SKID ASSEMBLY WIT D11418 9 1 SUCTION BALL VALVE, 2-1/2" ABZ VALVE 402-109-LH-2-1/2 8 1 BALL VALVE, 3/4", DRAIN DMIC 3VAL-070SO-4321-AZZA 7.1 1 FILTER ELEMENT PARKER Q109-LH-2-1/2 8 1 BALL VALVE, 3/4", DRAIN DMIC 3VAL-070SOS-4321-AZZA 7.1	F	19	1	RELIEF VALVE	PARKER	RAH161S	530
17 2 BALL VALVE, 1-1/4" DMIC BVH-1250S-1111-AZZA 16 1 INLINE CHECK PARKER DT-125D-MDMF-5 15.1 1 INLINE CHECK PARKER WF410400 15 1 INLINE CHECK PARKER WF410400 15 1 INLINE CHECK PARKER WF410400 15 1 INDUB X825WBLY MACNALOY M570H5/M50011612/M50021220 13 1 PUMP/MOTOR ADAPTER MAGNALOY S324872C 12 1 ELECTRIC MOTOR, 75 HP BALOR 1800 RPM, 460/3/60, TEFC 14 1 PUMP/MOTOR SKID ASSEMBLY WIT D11418 9 1 SUCTION BALL VALVE, 2-1/2" ABZ VALVE 402-109-LH-2-1/2 8 1 BALL VALVE, 3/4", DRAIN DMIC		18 1 START-UP MANIFOLD ASSEMBLY		WIT	D11374	D11374	
16 1 INLINE CHECK PARKER DT-1250-MDMF-5 15.1 1 FILTER ELEMENT PARKER 941040Q 15 1 IN-LINE PRESSURE FILTER PARKER WFF410QEVM2KX201 14 1 COUPLING ASSEMBLY MAGNALOY M570H5/M50011612/M50021220 13 1 PUMP/MOTOR ADAPTER MAGNALOY S324872C 12 1 ELECTRIC MOTOR, 75 IIP BALDOR 1800 RPM, 460/3/60, TEFC 11 1 PUMP/MOTOR SKID ASSEMELY WIT D11418 9 1 SUCTION BALL VALVE, 2-1/2" ABZ VA_VE 402-109-LH-2-1/2 8 1 BALL VALVE, 3/4", DRAIN DMIC EVAL-0750S-4321-AZZA 7.1 1 FILTER ELEMENT PARKER 936974Q 7 1 RETURN FILTER PARKER KLS710QBGGS241 6 1 SAMPLE VALVE NOSHOK 102-MFAB 5.1 1 BULB WELL THERNAL TRANSFER 65140 5 5 1 TEMP SWITCH ACT	F	17 2 BALL VALVE 1-1/4"		DMIC	BVH-125	50S-1111-AZZA	
15.1 1 FILTER ELEMENT PARKER 941040Q 15 1 IN-LINE PRESSURE FILTER PARKER WPF4100EVM2KX201 14 1 COUPLING ASSEMBLY MAGNALOY M570H5/M50011612/M50021220 13 1 PUMP/MOTOR ADAPTER MAGNALOY S324872C 12 1 ELECTRIC MOTOR, 75 HP BALDOR 1800 RPM, 460/3/60, TEFC 11 1 PISTON PUMP, 46 GPM PARKER PD100PS02SRU5AC00S100PB00 10 1 PUMP/MOTOR SKID ASSEMBLY WIT D11418 9 1 SUCTION BALL VALVE, 2-1/2" ABZ VALVE 402-109-LI-2-1/2 8 1 BALL VALVE, 3/4", DRAIN DMIC BVAL-0750S-4321-AZZA 7.1 1 FILTER ELEMENT PARKER KLS7100BGGS241 6 1 SAMPLE VALVE NOSHOK 102-MFAB 5.1 1 BULB WELL THERMAL TRANSFER 65140 5 1 TEMP SWITCH BARKSDALE MLIH-H203 4.1 1 LEVEL SWITCH ACT ALJK-8444 10.1 1 ISOHT/TEMP GAUGE	F	16	16 1 INLINE CHECK		PARKER	DT-1250)-MDMF-5
15 1 IN-LINE PRESSURE FILTER PARKER WPF410QEVM2KX201 14 1 COUPLING ASSEMBLY MAGNALOY M570H5/M50011612/M50021220 13 1 PUMP/MOTOR ADAPTER MAGNALOY S324872C 12 1 ELECTRIC MOTOR, 75 HP BALDOR 1800 RPM, 460/3/60, TEFC 11 1 PISTON PUMP, 46 GPM PARKER PD100PS02SRU5AC00S100PB00 10 1 PUMP/MOTOR SKID ASSEMBLY WIT D11418 9 1 SUCTION BALL VALVE, 2–1/2" ABZ VALVE 402–109–LH–2–1/2 8 1 BALL VALVE, 3/4", DRAIN DMIC BVAL–0750S–4321–AZZA 7.1 1 FILTER ELEMENT PARKER MS6974Q 7.1 1 RETURN FILTER PARKER KLS710QB6GS241 6 1 SAMPLE VALVE NOSHOK 102–MFAB 5.1 1 BULB WELL THERMAL TRANSFER 65140 4.1 1 LEVEL SWITCH ACT B20043AFF2BW048 4 1 TEMP/LEVEL SWITCH HOUSING	F	15.1	1 FILTER ELEMENT		PARKER	941040Q)
14 1 COUPLING ASSEMBLY MAGNALOY M570H5/M50011612/M50021220 13 1 PUMP/MOTOR ADAPTER MAGNALOY S324872C 12 1 ELECTRIC MOTOR, 75 HP BALDOR 1800 RPM, 460/3/60, TEFC 11 1 PISTON PUMP, 46 CPM PARKER PD100PS02SRU5AC00S100PB00 10 1 PUMP/MOTOR SKID ASSEMBLY WIT D11418 9 1 SUCTION BALL VALVE, 2-1/2" ABZ VALVE 402-109-LH-2-1/2 8 1 BALL VALVE, 3/4", DRAIN DMIC BVAL-0750S-4321-AZZA 7.1 1 FILTER ELEMENT PARKER 9369740 7.1 1 FILTER ELEMENT PARKER M2510QBGGS241 6 1 SAMPLE VALVE NOSHOK 102-MFAB 5.1 1 BULB WELL THERMAL TRANSFER 65140 5 5 1 TEMP SWITCH ACT B20043AFF2BW048 4.1 1 LEVEL SWITCH ACT ALJK-8444 MWJ 2 1 SIGHT/TEMP GAUGE <td></td> <td>15</td> <td>1</td> <td>IN-LINE PRESSURE FILTER</td> <td>PARKER</td> <td>WPF410C</td> <td>)EVM2KX201</td>		15	1	IN-LINE PRESSURE FILTER	PARKER	WPF410C)EVM2KX201
13 1 PUMP/MOTOR ADAPTER MAGNALOY \$324872C 12 1 ELECTRIC MOTOR, 75 HP BALDOR 1800 RPM, 460/3/60, TEFC 11 1 PISTON PUMP, 46 GPM PARKER PD100PS02SRU5AC00S100PB00 10 1 PUMP/MOTOR SKID ASSEMBLY WIT D11418 9 1 SUCTION BALL VALVE, 2-1/2" ABZ VALVE 402-109-LH-2-1/2 8 1 BALL VALVE, 3/4", DRAIN DMIC BVAL-0750S-4321-AZZA 7.1 1 FILTER ELEMENT PARKER 936974Q 7 1 RETURN FILTER PARKER KLS710QBGGS241 6 1 SAMPLE VALVE NOSHOK 102-MFAB 5.1 1 BULB WELL THERMAL TRANSFER 65140 5 1 TEMP SWITCH ACT B20043AFF2BW048 4.1 1 LEVEL SWITCH ACT B20043AFF2BW048 4.1 1 FILLER/BREATHER LHA/DONALSON GBB-10-N WW 2 1 SIGHT/TEMP GAUGE	F	14 1 COUPLING ASSEMBLY		MAGNALOY	M570H5/	/M50011612/M50021220	
12 1 ELECTRIC MOTOR, 75 HP BALDOR 1800 RPM, 460/3/60, TEFC 11 1 PISTON PUMP, 46 GPM PARKER PD100PS02SRU5AC00S100PB00 10 1 PUMP/MOTOR SKID ASSEMBLY WIT D11418 9 1 SUCTION BALL VALVE, 2-1/2" ABZ VALVE 402-109-LH-2-1/2 8 1 BALL VALVE, 3/4", DRAIN DMIC BVAL-0750S-4321-AZZA 7.1 1 FILTER ELEMENT PARKER 936974Q 7.1 1 FILTER ELEMENT PARKER KLS7100BGGS241 6 1 SAMPLE VALVE NOSHOK 102-MFAB 5.1 1 BULB WELL THERMAL TRANSFER 65140 5 1 TEMP SWITCH BARKSDALE ML1H-H203 4.1 1 LEVEL SWITCH ACT B20043AFF2BW048 4 1 TEMP/LEVEL SWITCH HOUSING ACT ALJK-8444 10WJ 2 1 SIGHT/TEMP GAUGE KENCO K99M50-9-CBL-6S-5-190-NS RJA 1 1 150 GAL RESERVO		13	1	PUMP/MOTOR ADAPTER	MAGNALOY	, S324872	.C
11 1 PISTON PUMP, 46 GPM PARKER PD100PS02SRU5AC00S100PB00 10 1 PUMP/MOTOR SKID ASSEMBLY WIT D11418 9 1 SUCTION BALL VALVE, 2-1/2" ABZ VALVE 402-109-LH-2-1/2 8 1 BALL VALVE, 3/4", DRAIN DMIC BVAL-0750S-4321-AZZA 7.1 1 FILTER ELEMENT PARKER 936974Q 7 1 RETURN FILTER PARKER KLS710QBGGS241 6 1 SAMPLE VALVE NOSHOK 102-MFAB 5.1 1 BULB WELL THERMAL TRANSFER 65140 5 1 TEMP SWITCH BARKSDALE ML1H-H203 4.1 1 LEVEL SWITCH ACT B20043AFF2BW048 4 1 TEMP/LEVEL SWITCH HOUSING ACT ALJK-8444 10WJ 2 1 SIGHT/TEMP GAUGE KENCO K99M50-9-CBL-GS-5-190-NS RJA 1 1 150 GAL RESERVOIR ASSY WIT D11419 RJA 1 1 </td <td>F</td> <td>12</td> <td>1</td> <td>ELECTRIC MOTOR, 75 HP</td> <td>BALDOR</td> <td>1800 RF</td> <td>PM. 460/3/60. TEFC</td>	F	12	1	ELECTRIC MOTOR, 75 HP	BALDOR	1800 RF	PM. 460/3/60. TEFC
10 1 PUMP/MOTOR SKID ASSEMBLY WIT D11418 9 1 SUCTION BALL VALVE, 2-1/2" ABZ VALVE 402-109-LH-2-1/2 8 1 BALL VALVE, 3/4", DRAIN DMIC BVAL-0750S-4321-AZZA 7.1 1 FILTER ELEMENT PARKER 936974Q 7 1 RETURN FILTER PARKER 936974Q 7 1 RETURN FILTER PARKER KLS710QBGGS241 6 1 SAMPLE VALVE NOSHOK 102-MFAB 5.1 1 BULB THERMAL TRANSFER 65140 5 1 TEMP SWITCH ACT B20043AFF2BW048 4 1 LEVEL SWITCH ACT B20043AFF2BW048 4 1 FILER/BREATHER LHA/DONALSON GBB-10-N IWJ 2 1 SIGHT/TEMP GAUGE KENCO K99M50-9-CBL-CS-5-190-NS ZJA 1 1 150 GAL RESERVOIR ASSY WIT D11419 <td>F</td> <td>11</td> <td>1</td> <td>PISTON PUMP, 46 GPM</td> <td>PARKER</td> <td>PD100PS</td> <td>02SRU5AC00S100PB00</td>	F	11	1	PISTON PUMP, 46 GPM	PARKER	PD100PS	02SRU5AC00S100PB00
9 1 SUCTION BALL VALVE, 2-1/2" ABZ VALVE 402-109-LH-2-1/2 8 1 BALL VALVE, 3/4", DRAIN DMIC BVAL-0750S-4321-AZZA 7.1 1 FILTER ELEMENT PARKER 936974Q 7 1 RETURN FILTER PARKER KLS710QBGGS241 6 1 SAMPLE VALVE NOSHOK 102-MFAB 5.1 1 BULB WELL THERMAL TRANSFER 65140 5 1 TEMP SWITCH BARKSDALE ML1H-H203 4.1 1 LEVEL SWITCH ACT B20043AFF2BW048 4 1 TEMP /LEVEL SWITCH HOUSING ACT ALJK-8444 1WJ 3 1 FILLER/BREATHER LHA/DONALSON GBB-10-N 1WJ 2 1 SIGHT/TEMP GAUGE KENCO K99M50-9-CBL-GS-5-190-NS 20A 1 1 150 GAL RESERVOIR ASSY WIT D11419 20A THE ROMERN MOT DESIGN INSTRE PROPERTY OF WESTERN INTEGRATED TECHNOLOGIES AND MAY NOT BE USED ON CORED WITHOUT PERMISSION OF MESTAWEES CONTROL SALT LAKE ON', UT DE		10	1	PUMP/MOTOR SKID ASSEMBLY	WIT	D11418	
8 1 BALL VALVE, 3/4", DRAIN DMIC BVAL-0750S-4321-AZZA 7.1 1 FILTER ELEMENT PARKER 936974Q 7 1 RETURN FILTER PARKER 936974Q 6 1 SAMPLE VALVE NOSHOK 102-MFAB 5.1 1 BULB WELL THERMAL TRANSFER 65140 5 1 TEMP SWITCH BARKSDALE ML1H-H203 4.1 1 LEVEL SWITCH ACT B20043AFF2BW048 4 1 TEMP/LEVEL SWITCH HOUSING ACT ALJK-8444 1WJ 3 1 FILLER/BREATHER LHA/DONALSON GBB-10-N 1WJ 2 1 SIGHT/TEMP GAUGE KENCO K99M50-9-CBL-GS-5-190-NS RJA 1 150 GAL RESERVOIR ASSY WIT D11419 RJA 1 150 GAL RESERVOIR ASSY WIT D11419 RJA Item ony DESCRIPTION SUPPLIER PART NUMBER RJA THE PROPERTY OF WESTERN INTEGRATED TECHNOLOGIES MARCES, GAL BOSCO, WA BELLOVE, WA BULL OF MATERIALS RJA		9	1	SUCTION BALL VALVE, 2-1/2"	ABZ VALVE	402-109	9-LH-2-1/2
7.1 1 FILTER ELEMENT PARKER 936974Q 7 1 RETURN FILTER PARKER KLS710QBGGS241 6 1 SAMPLE VALVE NOSHOK 102-MFAB 5.1 1 BULB WELL THERMAL TRANSFER 65140 5 1 TEMP SWITCH BARKSDALE ML1H-H203 4.1 1 LEVEL SWITCH ACT B20043AFF2BW048 4 1 TEMP/LEVEL SWITCH HOUSING ACT ALJK-8444 100///4000 3 1 FILLER/BREATHER LHA/DONALSON GBB-10-N 100///4000 2 1 SIGHT/TEMP GAUGE KENCO K99M50-9-CBL-GS-5-190-NS RJA 1 1 150 GAL RESERVOIR ASSY WIT D11419 RJA 11 150 GAL RESERVOIR ASSY WIT D11419 RJA 11 150 GAL RESERVOIR ASSY MOM SUPLIER PART NUMBER RJA THE PROPERTY OF WESTERN INTEGRATED TECHNOLOGIES AND MAY NOT BE USED OR WESTERN INTEGRATED TECHNOLOGIES AND M	-	8	1	BALL VALVE, 3/4", DRAIN	DMIC	BVAL-07	, 50S-4321-AZZA
7 1 RETURN FILTER PARKER KLS710QBGGS241 6 1 SAMPLE VALVE NOSHOK 102-MFAB 5.1 1 BULB WELL THERMAL TRANSFER 65140 5 1 TEMP SWITCH BARKSDALE ML1H-H203 4.1 1 LEVEL SWITCH ACT B20043AFF2BW048 4 1 TEMP/LEVEL SWITCH HOUSING ACT ALJK-8444 1WJ 3 1 FILLER/BREATHER LHA/DONALSON GBB-10-N 1WJ 2 1 SIGHT/TEMP GAUGE KENCO K99M50-9-CBL-GS-5-190-NS RJA 1 150 GAL RESERVOIR ASSY WIT D11419 RJA 1 150 GAL RESERVOIR ASSY WIT D11419 RJA 1 150 GAL RESERVOIR ASSY WIT D11419 RJA 1 150 GAL RESERVOIR ASSY BILL OF MATERIALS SALT LAKE CITY, UT MARE WIDD BESIGN OF CAS SALT MAKE CITY, UT DAME WIDD PERMISSION OF CAS SALT MAKE CITY, UT DAME WIDD PERMISSION OF CAS SALT MAKE CITY, UT SALT LAKE CITY, UT SALT LAKE CITY, UT SALT LAKE CITY, UT SALT LAKE CIT		7.1	1	FILTER ELEMENT	PARKER	936974Q)
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MECHANICAL * FLUID POWER SYSTEMS * ELECTRICAL 8900 North Ramsey Portland, Oregon 97203 Phone (503)228-6666 Fax (503) 228-7318

General Arrangement Drawing



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Electrical Drawing







F	IELD	CABLE TAG #	MAIN CONTROL PANEL		
Ships Servio 460 V, 3 Ph	ce , 93 A	01-A13-C	O L1 O L2 O L3	Main Breaker	
STOP 34 START 35 START 36	(34) (35) (36)	01-A1-C	$(34) \bigcirc 34$ $(35) \bigcirc 35$ $(36) \bigcirc 36$	Terminal Strip	
T1 WH CONTROL PANEL T1 T2 T3	(10) (20) (U/2T1) (V/4T2) (W/6T3)	01-A9-C	(10) ○ 10 (20) ○ 20 (L1) ○ U/2T1 (L2) ○ V/4T2 (L3) ○ W/6T3	Soft Start	
	(GND) (15) (50)	01-A11-C	(GND) (X) (X) (X) (X) (X) (X) (X) (50)	Terminal Strip	
HI_TEMP	(15) (51)	01-A12-C	(X) 0 15 (X) 0 51	Terminal Strip	
	THIS DRAWING IS THE PROPERTY OF TIMBERLINE CON AND IS LOANED SUBJECT TO RETURN UPON DEMA CONFIDENTIAL AND IS NOT TO BE REPRODUCED OR ANY PURPOSE OTHER THAN THE OPENATION OF TIM CONTROLS EQUIPMENT.	TROLS, INC. CUSTOMER: WIT / Marky ND, IT IS JSED FOR IBERLINE DRAWN BY: VDL BERLINE HULL NO: J2724	TIMBERLINE CONTROLS, INC. 921 4TH ST., STE 'D', WASHOUGAL, WA 98671 ~ U.S.A. TEL (360) 335.8598 FAX (360) 39631	75 HP 460 VAC Soft Start Mot	or Starter SHEET: 4 or 9 NS DATE: 07/02/14

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_ Г	F	IFI D	CABLE TAG #	MAIN CONTROL PANEL	
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	CLUTCH OUT VALV	E			
	·····	(211)		(X) O 211	
		(502)	02-A8-C	(X) O 502	
	CLUTCH IN VALVE				
В					
A		THIS DRAWING IS THE PROPERTY OF TIMBERLINE AND IS LOANED SUBJECT TO RETURN UPON DE CONFIDENTIAL AND IS NOT TO BE REPRODUCED ANY PURPOSE OTHER THAN THE OPERATION OF	CONTROLS, INC. CUSTOMER: MAND, IT IS OR USED FOR TIMBERLINE APPROVED:	VUL TIMBERLINE CONTROLS, INC.	75 HP 460 VAC Soft Start Motor Starter
		CONTROLS EQUIPMENT TOLERANCES UNLESS OTHERMISE NOTED XX a MA XX X ANA	8/27/14 A ASBUILT BLDGYARD: DATE NO. P.E. V. L.S. L.O. N.S. CUSTOMER:	J2724 921 41H 51, 51E 'D', WASHOUGAL, WA 98671 ~ U.S.A. TC SHOP TEL (360) 335-8598 FAX (360) 335-9963 APPROVED: www.TimberlineControls.com	DC CADLE KUNS DATE: 07/02/14 DWG No: 010357 SCALE: NONE REV. A
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			AND IS LOANED SUBJECT TO RETURN UPON DEM CONFIDENTIAL, AND IS NOT TO BE REPRODUCED OR ANY PURPOSE OTHER THAN THE OPERATION OF TIL CONTROLS EQUIPMENT. UNLESS OTHERWARES UNLESS OTHERWARES XXXX NA XXXX NA	ND, IT IS USED FOR MBERLINE 8/27/14 A DATE NO. R E	ASBUILT EVISIONS	DRAWN BY: VDL INPROVED: JLL HULL NO: J2724 ILDG/YARD: TC SHOP JUSTOMER APPROVED:	TIMBERLINE CONTRO 921 4TH ST., STE 'D', WASHOUGAL, WA 9 TEL (360) 335-8598 FAX (360) 335 www.TimberlineControls.
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FIELD CABLE TAG # MAIN CONTROL PANEL инидая 210 0 200 002/A3-S 0													н
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TOLERANCES B227/4 A A SBUILT BLDGYARD: TC SHOP VALUE NA DATE NO. R E V I S I O N S CUSTOMER APPROVED:	SHEET: 7 of 9 DATE: 07/02/14 DNE REV. A	Start Motor Starter SF ABLE RUNS D, SCALE: NONE R'	75 HP 460 VAC Soft C SIGNAL C G No: 010357	CONTROLS, INC. ASHOUGAL, WA 98671 ~ U.S.A. 598 FAX (360) 335-9963 rlineControls.com	TIMBERLINE C 921 4TH ST., STE 'D', WASH TEL (360) 335-8598 www.Timberlin	CUSTOMER: WIT / Marky DRAWN BY: VDL APPROVED: JLL HULLNO: J2724 BLDGY/ARD: TC SHOP CUSTOMER APPROVED:	ASBUILT E V I S I O N S	CONTROLS, INC. EMAND, IT IS OR USED FOR F TIMBERLINE 8/27/14 A DATE NO.	THIS DRAWING IS THE PROPERTY OF TIMBERLINE CONT AND IS LOANED SUBJECT TO RETURN UPON DEMANI CONFIDENTIA. AND IS NOT TO BE REPROUCED OR US ANY PURPOSE OTHER THAN THE OPERATION OF TIME CONTROLS EQUIPMENT. TOLERAMEES UNLESS OTHERWISE NOTED X.X. NM X.X. MA				A





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en. 22mm. mom	entarv	ldec	HW1B-M1F1	0-G	
the door, main br	rk	Cutler Hammer	EHMVD12R		
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00 va, 400/120		LittelEuco		,	
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6 2mm		Phoonix Contact	1.0 FLIVI		
, 0.2mm		Phoenix Contact	3004302		
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pole, 125 A		Cutler Hammer	EGE3125FFC	j	
		Cooper Bussmann	170M1370		
, 22mm, 120 V		Idec	HW1P-1FQ-D)-G-120	
r, 22mm, 120 V		Idec	HW1P-1FQ-D	D-A-120	
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os, 22mm, M-M-I	M	Idec	HW1S-3TF20		
pole		Phoenix Contact	2966197		
N/O. 120V		Cutler Hammer	XTMC9A10A		
rotector 1 note	5A	Cutler Hammer			
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LS. INC.	75 HP 46	0 VAC Soft Start Motor	Starter	SHEET: 9 of 9	
LS, INC. 1963	75 HP 46 PANE	0 VAC Soft Start Motor L LAYOUT W	· Starter /BOM	SHEET: 9 oF 9 DATE: 07/02/14	
ILS, INC. 18671 ~ U.S.A. 19963 com D	75 HP 46 PANE I WG No:	0 VAC Soft Start Motor L LAYOUT W/ 010357 SCAL	Starter BOM E: NONE	SHEET: 9 oF 9 DATE: 07/02/14 REV. A	



MECHANICAL * FLUID POWER SYSTEMS * ELECTRICAL 8900 North Ramsey Portland, Oregon 97203 Phone (503)228-6666 Fax (503) 228-7318

Miscellaneous Drawings



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	3	2	W176-20-20)-11	SOCKET WELD FLBOW F	IPF	ANCHOR	-	
	4	2	W31-20-20-	-U	1-1/4" CODE 61 DEEP SO WELD PIPE	CKET	ANCHOR	Ť	
	5	2	PIPE		PIPE 1 1/4" SCH 40 X 4.	600	ANY	1	
	6	2	PD16-40N-0)-NS-110	3-WAY SPOOL VALVE		HYDRAFORCE	-	
	7	1	DCCC-XYN		SPOOL VALVE		SUN	1	
	8	1	CSH101B		SHUTTLE VALVE	PARKER	1		
	9	1	SV08-30		SOLENOID VALVE	HYDRAFORCE	3		
	10	4	EMA3/9/16-	18UNF-2A	TEST POINT	PARKER			
	11	7	2 HP5ON-S		#2 SAE HOLLOW HEX P	PARKER			
	12	10	4 HP5ON-S		#4 SAE HOLLOW HEX P	LUG	PARKER		
	13	3	6 HP5ON-S		#6 SAE HOLLOW HEX P	LUG	PARKER		
	14	12	10 HP5ON-9	5	#10 SAE HOLLOW HEX I	HOLLOW HEX PLUG PAP			
	15	8	3/8-16 UNC	X 7 1/2	SOCKET HEAD CAP SCR	W	ANY		
	16	2	2-219		O-RING		PARKER		
	THIS DRAWING AND DESIGN HEREIN IS THE PROPERTY OF WESTERN INTEGRATED TECHNOLOGIES AND MAY NOT BE USED OR COPIED WITHOUT PERMISSION OF WESTERN INTEGRATED TECHNOLOGIES			WEST	ERN INTEGRATED TECHNOLOGIES		W 1/30/2014	_	
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	UNLI	TOLEF ESS OTHE X.X	ANCES RWISE NOTED ±0.1 ±0.03			D11	.417 E		
	X	00X /X	±0.005 +1/16	2-SPEED MOTOR MOUNTED MANIFOLD SHEET 3 OF 3					

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MECHANICAL * FLUID POWER SYSTEMS * ELECTRICAL

8900 N. Ramsey Blvd. Portland, Oregon 97203 Phone (503)228-6666 Fax (503) 228-7318 **Customer: Markey Machinery**

Customer Part Number: N/A

Description: Winch HPU and Controls

Drawing Number: C11327

Quantity: 1

ltem	Qty	Description	Manufacturer	Part Number
1	1	HYDRAULIC RESERVOIR & COMPONENTS	WIT	D11419
1.1	1	RESERVOIR ASSEMBLY, 150 GAL	МОНАШК	D11419
1.2	4	TANK FLANGE	FLUID DESIGN PRODUCTS	#12 TFC x 3/4" SW
1.3	3	TANK FLANGE	ANY	PF-4
1.4	1	TANK FLANGE	ANY	PF-12
1.5	2	CLEAN OUT COVER	МОНАШК	B-7426
1.6	1	SIGHT GAUGE	KENCO	K99M50-9-CBL-GS-5-190-NS
1.7	1	FILLER / BREATHER	LHA / DONALDSON	GBB-10-N
1.8	1	TEMP / LEVEL SWITCH HOUSING	ACT	ALJK-8444

ltem	Qty	Description	Manufacturer	Part Number
1.9	1	LEVEL SWITCH	ACT	B20043AFF2BW048
1.10	1	COOLER TEMPERATURE SWITCH	BARKSDALE	ML1H-H203
1.11	1	BULB WELL	THERMAL TRANSFER	65140
1.12	1	SAMPLE VALVE	NOSHOK	102-MFAB
1.13	1	RETURN FILTER, IN TANK	PARKER	KLS710QBGGS241
1.14	1	FILTER ELEMENT	PARKER	936974Q
1.15	1	SUCTION STRAINER	STAUFF	SUS-A-150-N40F-213-125-3
1.16	1	BALL VALVE, 3/4", DRAIN	DMIC	BVAL-0750S-4321-AZZN
1.17	1	SUCTION BALL VALVE, 2-1/2"	ABZ VALVE	402-109-LH-2-1/2
1.18	1	HOSE BARB	DMIC	SBE-25-HB-25SM-11
1.19	1	HOSE	PARKER	302-24 x 32"
1.20	1	ADAPTER	PARKER	12 F50HAO-S
1.21	1	ADAPTER	PARKER	12 FNTX-S

ltem	Qty	Description	Manufacturer	Part Number
1.22	1	PLUG	PARKER	12 P5ON-S
1.23	2	ADAPTER	PARKER	20-12 F50G5-S
1.24	1	ADAPTER	PARKER	6 F50X-S
1.25	1	ADAPTER	PARKER	6 FNTX-S
1.26	1	FLANGE THREADED	ANY	2 1/2" FLANGE THREADED, CLASS 150 (STEEL)
1.27	1	FLANGE WELDING NECK	ANY	2 1/2" GLANGE WELDING NECK, CLASS 150
1.28	2	GASKET	ANY	2 1/2" 150# TWI SPIRAL WOUND GRAPHITE FILLED
1.29	1	EPOXY PAINT	DEVOE	CATHACOAT 302H PRIMER, DEVRAN 261 EPOXY PRIMER, DEVTHANE 349QC TOP COAT
2	1	HPU SKID	WIT	D11418
2.1	1	PUMP / MOTOR SKID ASSEMBLY	МОНАШК	D11418
2.2	1	PISTON PUMP, 48 GPM	PARKER	PD100PS02SRU5AC00S100PB00
2.3	1	ELECTRIC MOTOR	BALDOR	75 HP MARINE DUTY, Q39149
2.4	1	MOTOR DEMPENING BARS	MAGNALOY	MDB365-B

ltem	Qty	Description	Manufacturer	Part Number
2.5	1	WELD PAD KIT	MAGNALOY	MWP324-365
2.6	1	PUMP / MOTOR ADAPTER	MAGNALOY	S324872C
2.7	1	COUPLING INSERT	MAGNALOY	M570H5
2.8	1	COUPLING HALF	MAGNALOY	M50011612DSS
2.9	1	COUPLING HALF	MAGNALOY	M50021220DDS
2.10	1	INLINE PRESSURE FILTER	PARKER	WPF410QEVM2KX201
2.11	1	FILTER ELEMENT	PARKER	941040Q
2.12	1	INLINE CHECK	PARKER	DT-1250-MDMF-5
2.13	2	BALL VALVE, 1-1/4"	DMIC	BVH-1250S-1111-AZZA
2.14	1	START-UP MANIFOLD ASSEMBLY	WIT	D11374
2.15	1	MANIFOLD, DUCTILE IRON, 65-45-12	WIT	7.00" x 7.00" x 9.00"
2.16	1	NICKEL PLATING	TFC	NICKEL PLATED PER MIL-C-26074
2.17	1	RELIEF VALVE	PARKER	RAH161S30

ltem	Qty	Description	Manufacturer	Part Number
2.18	1	AIR BLEED	SUN	NQEB-XAN
2.19	4	GAUGE SNUBBER	SUN	NSAB-KXV-AS
2.20	2	PRESSURE GAUGE	STAUFF	SPG063-03000-05-S-N04
2.21	1	DIRECTIONAL CONTROL VALVE	PARKER	VP170LSEH1-MV45-TR88 (12VDC PROP.)
2.22	2	GASKET	ANY	2-1/2" 150# RWI SPIRAL WOUND GRAPHITE FILLED
2.23	1	COIL	PARKER	7133KBN2GVJ1
2.24	1	COIL	PARKER	C111C2
2.25	2	PRESSURE GAUGE	STAUFF	SPG063-00500-05-S-N04
2.26	1	COUNTERBALANCE VALVE	SUN	CBGG-LCN-YKQ/S
2.27	1	EPOXY PAINT	DEVOE	CATHACOAT 302H PRIMER, DEVRAN 261 EPOXY PRIMER, DEVTHANE 349QC TOP COAT
2.28	1	HOSE END FITTING	PARKER	10643-20-20
2.29	1	HOSE END FITTING	PARKER	10643-24-24
2.30	1	HOSE END FITTING	PARKER	13943-20-20

ltem	Qty	Description	Manufacturer	Part Number
2.31	1	HOSE END FITTING	PARKER	13943-24-24
2.32	1	HOSE END FITTING	PARKER	16A43-20-20
2.33	1	HOSE END FITTING	PARKER	16N43-20-20
2.34	2	ADAPTER	PARKER	12 F50HAO-S
2.35	4	PLUG	PARKER	12 HP50N-S
2.36	1	PLUG	PARKER	12 P5ON-S
2.37	1	PLUG	PARKER	16 HP5ON-S
2.38	2	ADAPTER	PARKER	16-20 F50G5-S
2.39	7	PLUG	PARKER	2 HP5ON-S
2.40	2	ADAPTER	PARKER	20 F5OHAO-S
2.41	1	ADAPTER	PARKER	20 F5OX-S
2.42	1	PLUG	PARKER	20 HP5ON-S
2.43	3	PLUG	PARKER	20 P5ON-S

ltem	Qty	Description	Manufacturer	Part Number
2.44	1	ADAPTER	PARKER	20-16 F50X-S
2.45	3	ADAPTER	PARKER	24 F50X-S
2.46	2	ADAPTER	PARKER	24 FNTX-S
2.47	1	ADAPTER	PARKER	24-20 F50X-S
2.48	1	PLUG	PARKER	3/4 HP-S
2.49	10	PLUG	PARKER	4 HP5ON-S
2.50	3	PLUG	PARKER	6 HP5ON-S
3	1	HYDRAULIC MOTOR & BRAKE	WIT	
3.1	4	TEST POINT	PARKER	EMA3/9/16-18UNF-2A
3.2	1	MOTOR MOUNTED MANIFOLD	WIT	D11417
3.3	1	MANIFOLD, DUCTILE IRON, 65-45-12	WIT	7.00" x 7.00" x 12.50"
3.4	1	NICKEL PLATING	TFC	NICKEL PLATED PER MIL-C-26074
3.5	2	3-WAY SPOOL VALVE	HYDRAFORCE	PD16-40N-0-NS-110

ltem	Qty	Description	Manufacturer	Part Number
3.6	1	SPOOL VALVE	SUN	DCCC-XYN
3.7	1	SHUTTLE VALVE	PARKER	CSH101B
3.8	1	SOLENOID VALVE	HYDRAFORCE	SV08-30-0-N-00
3.9	1	COIL	HYDRAFORCE	4303624
3.10	1	2-SPEED VANE MOTOR	PARKER	M4SDC0880753N0250200
3.11	1	BRAKE	MICO BRAKE	3C141498CZ
3.12	2	FLANGE	ANCHOR FLANGE	W176-20-20
3.13	2	FLANGE	ANCHOR FLANGE	W31-20-20
3.14	6	ADAPTER	PARKER	4MSC4N-316
3.15	2	ADAPTER	PARKER	8M1SC8-316
3.16	1	ADAPTER	PARKER	1/2 MRO-S
3.17	2	ADAPTER	PARKER	1/2 x 1/4 PTR-SS
3.18	1	ADAPTER	PARKER	20-16 F5OX-S

ltem	Qty	Description	Manufacturer	Part Number
3.19	2	FLANGE	ANCHOR FLANGE	SP-20
3.20	8	SHCS	ANY	3/8"-16 x 7-1/2, SS
4	1	CONTROLS	WIT	
4.1	1	MOTOR CONTROL PANEL ASSEMBLY	TIMBERLINE CONTROLS	TC130801-01
4.2	1	TIMBERLINE ADDER	TIMBERLINE CONTROLS	TC130801-02
4.3	1	TIMBERLINE ADDER	TIMBERLINE CONTROLS	TC130801-03
4.4	1	JOYSTICK	PQ CONTROLS	M120SL15F67-UNI
4.5	1	JOYSTICK	PQ CONTROLS	M115SL15F87
4.6	1	CONTROLS PLATE	МОНАШК	D11749 - SHEET 1
4.6A	1	ANODIZE	ELECTROCHEM	BLACK SATIN
4.6B	1	GRAPHICS DECAL	INTERNATIONAL GRAPHICS	D11749 - SHEET 2
4.7	1	IQAN - MC2	PARKER	20070899
4.8	1	IQAN - MC2 WIRE HARNESS	PARKER	5030030

ltem	Qty	Description	Manufacturer	Part Number
4.9	1	CABLE	PARKER	5030124
4.10	1	DIGITAL MODULE	ocs	HE-XPV
5	1	AIR CONTROL VALVES	WIT	
	1	PROPORTIONAL AIR REGULATOR	PARKER	P31PA92AD2VP1A
	2	PARTICULATE FILTER	PARKER	P31FA92EMBN
	1	COALESCING & ABSORBER FILTER	PARKER	P31FA929MMN
	3	T-BRACKET	PARKER	P31KA00MT
	3	MUFFLER	PARKER	045040004
	1	3-POS 4-WAY PNEUMATIC VALVE	NEUMATICS	L22BB452B0000061
	1	CLUTCH VALVE	SKINNER	04F48S2106A3F
	3	CONNECTOR	GRAINGER	3JCL8
	8	SOCKET HEAD CAP SCREW	ANY	3/8-16 UNC x 7 1/2, SS
	4	SOCKET HEAD CAP SCREW	ANY	3/4-16 UNF x 2

ltem	Qty	Description	Manufacturer	Part Number
	50	HEX HEAD CAP SCREW	ANY	HHCS, 7/16-14 UNC x 7/8, SS
	3	ADAPTER	PARKER	209P-16-4
	2	ADAPTER	PARKER	209P-16-8
	4	HHCS	ANY	HHCS, 3/4-10 UNC x 4
	4	HEX NUT	ANY	HEX NUT, 3/4-10 UNC
	4	HEX HEAD CAP SCREW	ANY	HHCS, 3/4-10 UNC x 1 1/4
	4	HEX HEAD CAP SCREW	ANY	HHCS, 5/8-11 UNC x 1 1/4
	4	HEX HEAD CAP SCREW	ANY	HHCS, 5/8-11 UNC x 1 1/2
	4	HEX HEAD CAP SCREW	ANY	HHCS, 3/8-16 UNC x 1, SS
	4	HEX HEAD CAP SCREW	ANY	HHCS, 3/8-16 UNC x 1 1/2, SS
	1	ADAPTER	PARKER	1 KMMOO-SS
	2	ADAPTER	PARKER	1/4 FF-SS
	2	CONNECTOR	PARKER	393000K822

ltem	Qty	Description	Manufacturer	Part Number
	1	TAGS	WIT	C11643



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Catalog Data for Basic Components



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Hydraulic Reservoir & Components



Page 2 of 2









Dipsticks available for some models. See Features section on assembly tables.

D

Chrome ABB Series Filler Breathers - Bayonet Style

Airflow to 30 cfm/850 lpm

Donaldson Part No.	Description	Features	Micron Rating
P562573	ABB-03-N	NYLON BASKET	3 µm
P562574	ABB-10	FLANGE, SCREWS & GASKET, NO BASKET	10 µm
P562575	ABB-10-3S	3" STAINLESS BASKET	10 µm
P562576	ABB-10-3S-LT	3" STAINLESS BASKET, LOCK TAB	10 µm
P562577	ABB-10-3S-R	3" STAINLESS BASKET, BUNA-N GASKET	10 µm
P562578	ABB-10-3S-SMB	3" STAINLESS BASKET, SIDE MOUNT KIT	10 µm
P562579	ABB-10-6S	6" STAINLESS BASKET	10 µm
P562580	ABB-10-6S-LT	6" STAINLESS BASKET, LOCK TAB	10 µm
P562581	ABB-10-6S-R	6" STAINLESS BASKET, BUNA-N GASKET	10 µm
P562582	ABB-10-8S	8" STAINLESS BASKET	10 µm
P562583	ABB-10-8S-D-IG	8" STAINLESS BASKET, DIPSTICK, INNER GUARD	10 µm
P562584	ABB-10-N	NYLON BASKET	10 µm
P562585	ABB-10-N-LT	NYLON BASKET, LOCK TAB	10 µm
P562587	ABB-10-N-R	NYLON BASKET, BUNA-N GASKET	10 µm
P562589	ABB-40	FLANGE, SCREWS & GASKET, NO BASKET	40 µm
P562590	ABB-40-3S	3" STAINLESS BASKET	40 µm
P562592	ABB-40-3S-R	3" STAINLESS BASKET, BUNA-N GASKET	40 µm
P562593	ABB-40-3S-SMB	3" STAINLESS BASKET, SIDE MOUNT KIT	40 µm
P562594	ABB-40-6S	6" STAINLESS BASKET	40 µm
P562595	ABB-40-6S-D	6" STAINLESS BASKET, DIPSTICK	40 µm
P562596	ABB-40-6S-LT	6" STAINLESS BASKET, LOCK TAB	40 µm
P562598	ABB-40-8S	8" STAINLESS BASKET	40 µm
P562599	ABB-40-8S-D	8" STAINLESS BASKET, DIPSTICK	40 µm
P562600	ABB-40-8S-LT	8" STAINLESS BASKET, LOCK TAB	40 µm
P562601	ABB-40-CW0F	CAP ONLY	40 µm
P562602	ABB-40-LT	LOCK TAB, NO BASKET	40 µm
P562603	ABB-40-N	NYLON BASKET	40 µm
P562605	ABB-40-N-LT	NYLON BASKET, LOCK TAB	40 µm
P562608	ABB-40-N-R	NYLON BASKET, BUNA-N GASKET	40 µm
P562609	ABB-40-N-SMB	NYLON BASKET, SIDE MOUNT KIT	40 µm

Switch Mounting & Junction Box ALJ series, Aluminum Junction Box

Description:

Heavy Duty aluminum electrical termination and inspection box. Inspect sensors fast without disassembly. Just remove plate mounting screws and lift all sensors out of tank. Confirm wiring and switch function quickly for inspectors and service technicians. Drill holes in tank for sensors using drill guide provided. Sensors thread into holes in 1/4" thick base plate. After assembly the cover protects the wiring. Cover can have 1/2" conduit threads or a quick disconnect connector to complete the installation. Thick thermoplastic rubber gaskets for the cover and mounting plate seal out debris.

Features:

- Heavy Duty Cast Aluminum cover
- 1/4" Aluminum mounting plate
- Mounting plate can have one, two or three threaded sensor holes
- Cover has a 1/2" conduit threaded hole as standard
- Cover can have connector installed and wired to sensors

Ordering Information:

Part Number: ALJK-8444,

includes the following;

- Cover with 1/2" conduit thread
- Base plate with three 1/4" NPT threaded sensor holes
- Cover and base plate gaskets

Covers and Base plate Modifications:

A.C.T. has complete machine shop in-house including eight New, 7 axis CNC turning centers to easily provide you with the exact parts for your application. We will modify or design the best solution for your needs.

Note All National, State and Local electrical codes must be followed, Fusing, GFCI, Disconnect etc. by installer.

For more Technical information or quantity discounts call us TOLL FREE at 1-877-800-8820 Advanced Control Technology Inc. • P.O. Box 385936 • Bloomington MN USA 55438-5936 • Phone (952) 882-0000 • Fax (952) 890-3644 Internet - www.actsensors.com • e-mail - sales@actsensors.com REV.02-08-07

Switch Mounting & Junction Box, AJL series, Aluminum Junction Box

PAGE 40.07



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ALJK Base Plate Modifications

Standard (3) 1/4" npt



One each 1/4" & 1/2" npt



Four 1/4" npt (requires customer to modify base gasket)



Heavy Duty Fluid Level Switches 20 series, Vertical mounting - 120 VA - female

Description:

Heavy Duty, Level Switch monitors liquid level. Switch can be wired to operate electric components such as valves, motor start-stop switches, alarms, warning lights and programmable logic circuits.

Features:

- Invert float to change switch function N.O. to N.C. or vice versa.
- 24" long, 18 gauge wires
- Heavy duty, solid Nylon or 316 stainless steel float, compatible with hydraulic oil, phosphate esters and additives.
- Hex I.D. float eliminates sticking like round I.D. floats.
- Metal stem, 1/4" npt female threads, large wrench flats
- Electrical load ratings,

Super duty switch120 VA, SPSTSwitching voltage250 VACSwitching current3.0 amps.

- All electrical specifications at 68°F and resistive load.
- Derate electrical limits with increase in temperature.
- Surge or voltage spike protection recommended for inductive load or premature switch failure will occur.



NPT Female

2.38"

3.78

S20043BFF3S

2.03"

2.06'

Options:

- Polypropylene floats.
- Float specific gravities from .55 to 1.50
- Unlimited mounting types and thread sizes.
- Switches: SPDT, DPST, Logic, Hall effect etc.
- Various lead wire types & lengths also cable
- A.C.T. will modify switches to provide the best solution for your application.

PAGE 20.05

Part Numbers:

B20043BFF2A, Brass stem, 1-3/16" hex i.d. Nylon float

S20043BFF3S, 316 Stainless stem and float

Local Mount Temperature Switches

Features

- Reliable & accurate
- Local sensing
- NEMA 4 & IP 65
- UL, CSA & CE approved
- Single or dual switching

Applications

- Oil & gas
- Mining
- Tanks and reservoirs
- Compressors
- Plastic machinery
- Factory automation
- Process equipment
- Machine tools and industrial equipment

General Specifications*

Accuracy:	$\pm 1\%$ of mid-60% of full range. At constant ambient $\pm 0.5\%$ of full scale.
Switch:	Single: 1 SPDT Dual switching: 2 independent SPDT circuits
Electrical Characteristics:	All models incorporate Underwriters' Laboratories, Inc. and CSA listed single pole double throw snap-action switching elements. Switches may be wired normally open or normally closed.
Wetted Parts:	Brass or 304 stainless steel
Electrical Connection:	Single: 3-pin terminal strip Dual: 6-pin terminal strip
Electrical Ratings:	AC value at 75% power factor —10 amps 125, 250 volts AC, 3 amps 480 volts AC. Automatically reset by snap-action of switch.
Enclosure/Housing:	Water-tight and dust-tight indoor and outdoor (NEMA 4) / oil-tight and dust-tight indoor (NEMA 13).
Local Mount:	Immersion length 2-1/16 inches

Approvals/Listings:	Underwriters' Laboratories, Inc. and Canadian Standard Assoc. are listed under temperature indicating and regulating equipment.
UL:	File No. E56247, Guide No. XAPX
CSA:	File No. LR34555, Guide 400-E-O Class 4813
Temperature Range:	See product configurator.
Adjustment:	Tamper resistant external adjustment. Turn knob clockwise to increase setpoint.
Weight:	Single: approximate 1.5 lbs. Dual: approximate 3.0 lbs.

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UL

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* See Product Configurator for additional options.

Wiring Code

Lead	Circuit #1	Circuit #2	
Normally Closed	Blue	Orange	
Common	Purple	Brown	
Normally Open	Red	Yellow	

Wiring Diagram



ML1H, L2H

Barksdale

CRANE Barksdale, Inc./Barksdale GmbH A Subsidiary of Crane Co.

Local Mount Temperature Switches

ML1H, L2H

2





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Needle Valves Mini, Hard Seat



100 SERIES

- Compact size valve built for maximum durability and robust performance in the toughest applications
- 100% helium leak tested to 1 x 10⁻⁴ ml/s for guaranteed performance and reliability
- Hard seat valves have a maximum pressure of 10,000 psi for stainless steel and steel models; 6,000 psi for brass
- Available in zinc-nickel plated steel, electropolished stainless steel, and brass
- FKM o-ring seal and PTFE back-up ring below the stem threads to protect from corrosion and galling; PTFE or Grafoil[®] packing optional
- All stems are 316 stainless steel
- · All stem threads are rolled for strength and ease of operation
- Patented body-to-bonnet, metal-to-metal seal is designed to significantly increase the pressure range of the valve (U.S. Patent 7,758,014)

	SPECIFICATIONS			
Materials	Zinc-nickel plated steel, electropolished 316 stainless steel, 360 brass			
Connections	1/8" NPT, 1/4" NPT, 7/16"-20 UNF-2B, 9/16"-18 UNF-2B Male-male, Male-female, Female-female, in-line and angled configurations			
Pressure ratings*	Brass: 6,000 psi @ 200 °F Steel: 10,000 psi @ 200 °F Stainless steel: 10,000 psi @ 200 °F			
Orifice size	0.172"			
Flow coefficient	C _V 0.42			
Stem seal & type	All 316 stainless steel stems with FKM o-ring and PTFE back-up ring below the threads, PTFE or Grafoil [®] packing optional			
Options	Panel mountings, o-ring materials, handles, packings, regulating stem and stem tips			

* If a packing option is chosen, maximum pressure rating is 6,000 psi. Refer to the "Pressure vs. Temperature: Packing Style with Compatible Fluid" chart at the back of this catalog.



ORDERING INFORMATION						
SERIES	1	100 Series, hard seat				
CONNECTION	01	1/8" NPT	42	7/16"- 20 UNF-2B*		
SIZES	02	1/4" NPT	43	9/16"- 18 UNF-2B*		
VALVE TYPES	MMB	Male-Male, Brass	MFC	Male-Female, Steel	MFS	Male-Female, Stainless Steel
	MFB	Male-Female, Brass	EMFC	Extended Male-Female, Steel	EMFS	Extended Male-Female, Stainless Steel
	FFB	Female-Female, Brass	FFC	Female-Female, Steel	FFS	Female-Female, Stainless Steel
	EFFB	Extended Female-Female, Brass	EFFC	Extended Female-Female, Steel	EFFS	Extended Female-Female, Stainless Steel
	MMAB	Male-Male Angle, Brass	MMAC	Male-Male Angle, Steel	MMAS	Male-Male Angle, Stainless Steel
	MFAB	Male-Female Angle, Brass	MFAC	Male-Female Angle, Steel	MFAS	Male-Female Angle, Stainless Steel
	FFAB	Female-Female Angle, Brass	FFAC	Female-Female Angle, Steel	FFAS	Female-Female Angle, Stainless Steel
	MMC	Male-Male, Steel	MMS	Male-Male, Stainless Steel		

Please consult your local NOSHOK Distributor or NOSHOK, Inc. for availability and delivery information.

* Available only on EFFB, EFFC and EFFS valve types.



To meet all of your specific application requirements, the following additional options are available for these needle valves. To order all or any of these options, simply add them to the part number as shown in the diagram below.

NOTE 1: The example shown includes ALL possible additional options. Please include ONLY the options required for your application when building your part number. (EXAMPLE: 102-MFC-HL3)

NOTE 2: When a packing option is selected, an o-ring option is NOT available.

ORDERING INFORMATION - Additional Options						
PACKINGS [†]	P1	PTFE	P2	Grafoil®		
STEM TIPS	T1 T5	Non-rotating (316 stainless standard) Ball (440C stainless)	T6 T7	Ball (carbide) Ball (ceramic)	Т8 Т9	Ball (Monel) Regulating hard
O-RINGS*	EM1	EPDM	KZ1	FFKM (Kalrez [®] 3018 or equivalent)	NB1	NBR
PANEL MOUNTINGS	PM1	Panel mount (1 nut)	PM2	Panel mount (2 nuts)		
HANDLES	HL2 HL3	2-1/2" "T" 1" Round knurled	HL4 HL5	1-3/8" Phenolic 1-3/4" Phenolic		

Please consult your local NOSHOK Distributor or NOSHOK, Inc. for availability and delivery information.

† If a packing option is chosen, maximum pressure rating is 6,000 psi. Refer to the "Pressure vs. Temperature: Packing Style with Compatible Fluid" chart at the back of this catalog.

* Other o-ring materials available on request.

Please note that the standard o-ring in all the NOSHOK mini valves is FKM and the standard handles are brass round knurled (HL3) handles, steel mini "T" handles (HL1), and 316SS mini "T" handles (HL1).

The handle material will always match the material of the valve, unless otherwise specified. For example, the round knurled (HL3) on a 102-FFB will be brass. When only the standard configuration is needed, no additional designations are necessary. Please consult the factory for special application requests.

EXAMPLE with Additional Options				
Series Connection size Valve type Packing Stem tip Panel mount Handle				



7

Needle Valves Dimensions



Male-Female



*Dimension on extended version is 2-1/4"





aerospace climate control electromechanical filtration fluid & gas handling hydraulics pneumatics process control sealing & shielding





KLT and KLS Series

Tank Top Return Line Filters





ENGINEERING YOUR SUCCESS.

KLT and KLS Series

How to Order

Select the desired symbol (in the correct position) to construct a model code. Example:

BOX 4: Seals

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8
KLT	7	10Q	В	Р	G	S24	1

BOX 1: I	Filter Series
Symbol	Description
KLT	Single port return-line filter
KLS	Dual port return-line filter (-7 and -8 models only)

BOX 2: I	Filter Model
Symbol	Description
2	30 GPM (115 I/m nominal flow)
4	50 GPM (190 I/m nominal flow)
_	

7	100 GPM (380 I/m nominal flow)
8	120 GPM (455 I/m nominal flow)

BOX 3: Me Symbol	dia Code Description
02Q	Microglass III, 2 micron
05Q	Microglass III, 5 micron
10Q	Microglass III, 10 micron
20Q	Microglass III, 20 micron
WR	Water Removal

Symbol	Description
В	Nitrile (NBR)
V	Fluorocarbon
*NOTE: Nitr supplied.	ile tank gasket always
BOX 5: Indi Symbol	icator Description
Р	No indicator; plugged pressure port(s)

G	Pressure gauge, 0-60 psig
S	Pressure switch

BOX 6: By	ypass
Symbol	Pressure Setting
G	25 psid (1.7 bar)

,	564	1
BOX 7:	Ports	
Symbol	Description	
	KLT-2/4	
S16	SAE-16 (1 5	/16"-12)
	KLT-7/8	
S24	SAE-24 (1 7/	8"-12)
	KLS-7/8	
S24	2 x SAE-24 (1 7/8"-12)
N24	2 x 1 1/2-NP	т

ions Description
None
Weld plate (KLT only)

Replacement Elements

Element		Nit	rile		Fluorocarbon				
Code	2	4	7	8	2	4	7	8	
20Q	936967Q	936971Q	936975Q	936979Q	937269Q	937273Q	937277Q	937281Q	
10Q	936966Q	936970Q	936974Q	936978Q	937268Q	937272Q	937276Q	937280Q	
05Q	936965Q	936969Q	936973Q	936977Q	937267Q	937271Q	937275Q	937279Q	
02Q	936964Q	936968Q	936972Q	936976Q	937266Q	937270Q	937274Q	937278Q	
WR	937258	937259	937260	937261	C.F.	C.F.	C.F.	C.F.	

C.F. = Consult Factory

Global products as identified are offered worldwide through all Parker locations and utilize a common ordering code.







Area of Application:

Reservoir installation for direct suction line connection

Characteristics:

- Suitable for mineral oil
- Threads forms BSP and NPT
- Filter material 60, 125 or 250 micron stainless steel
- Temperature range -20°C ... +100°C
- Optional bypass valve, opening pressure 0,2 bar (3 PSI)
 Threaded end caps made out of glass fiber reinforced Polyamide (P) or Aluminium (A) (see table below), other components steel zinc-plated

STAUFF-Suction Strainers SUS are available with an integrated bypass valve. Other special configurations on request.

Dimensions



Hydraulic Symbol



Group size			Dimensio	ons			available		
ø upper thread- element-					Ι.	Q max	end cap		
endcap code length	D1	D2	G	SW	L	I/min	material		
040 - B06F - 075	39,5	38,5	³ / ₈ BSP	22	75	8	Р		
050 - B06F - 067			³ / ₈ BSP		67	10	Р		
050 - N06F - 067]		3/2 NPT		07	10	A,P		
050 - N06F - 090	50	49	78111	26	90	11	Р		
050 - B08F - 105			1/2 BSP]	105	15	Р		
050 - N08F - 105			1/2 NPT		100	10	A,P		
068 - B12F - 105			³ / ₄ BSP	34	105	25	Р		
068 - N12F - 105	68	66	³ / ₄ NPT	54	105	25	A,P		
068 - B16F - 140	00		1 BSP	12	140	50	Р		
068 - N16F - 140			1 NPT	42	140	50	A,P		
088 - B20F - 140			1 1/4 BSP	50	1/10	65	Р		
088 - N20F - 140	88		1 1/. NPT		140	05	A,P		
088 - N20F - 195			1 74 111 1	60	195	88	A,P		
088 - B24F - 140		85	1 ¹ / ₂ BSP		140	95	Р		
088 - N24F - 140							A,P		
088 - N24F - 226			1 ¹ / ₂ NPT 2 NPT 70	1 1/2 NPT		226	120	A,P	
088 - N24F - 260							260	198	A,P
088 - N32F - 260				200	130	A			
102 - B24F - 200]		1 ¹ / ₂ BSP]	200	200	Р		
102 - N24F - 200			1 ¹ / ₂ NPT				Р		
102 - B32F - 200							Р		
102 - B32F - 225	102	102 100	2 BSP	72	225	225	Р		
102 - B32F - 260					260	260	Р		
102 - B32F - 300					300	300	Р		
102 - N32F - 260			2 NPT		260	260	Р		
131 - B40F - 191			2 1/2 BSP		191	290	Р		
131 - B40F - 212			2 72 001	86	212	300	Р		
131 - N40F - 212	131	128	2 1/2 NPT		212	300	Р		
131 - B48F - 272			3 BSP	96	272	380	Р		
131 - N48F - 272			3 NPT	50	212	000	Р		
150 - B32F - 151			2 BSP	70	151	260	Р		
150 - N40F - 213	150	145	2 ¹ / ₂ NPT	90	213	283	Α		
150 - N48F - 272			3 NPT	100	272	380	A		

Ordering Code

S	<u>SUS - P - 088 - B2</u>	24F - 140 - <u>125</u>	- <u>0</u>		
Тур				Вур	ass Option
SUS Suction Strainer			-	0 w	vithout bypass (standard)
Material Threaded End Cap				((0,2 bar / 3 PSI)
P glass fiber reinforced Polyamide (standa	ard)			Mic	ron Rating
A Aluminium (only for NP1 thread, see tab	ne)			060	60 µm (on request)
0				125	125 µm (standard)
Group Size				250	250 µm (on request)
see table above, column group size			-		

'BVAL' LOW PRESSURE

Ideal from suction to 400 PSI; NPT/SAE/6149/BSP ; PTFE Ball Seals Optimized for DMIC's "SSW" System - All sizes unrestricted bore.



Most large bore valves sold in the hydraulic market today are simply "plumbing" valves, suitable primarily for low pressure, cold water use. DMIC's 'BVAL' is the first ball valve of its kind, specifically designed for leak-free Hydraulic Suction, Vacuum to 29" & Return line durability to 6" full bore.

- Built to take the pressure spikes, temperatures, & elevated demands of hydraulic service
- Uses top grade ball seals, with O-Ring sealing throughout.
- Suitable for actuation and panel mounting and accepts the full range of DMIC Ball Valve Accessories & Actuation Packages
- A reliable choice for Phosphate Esters, Water Glycols and other unusual media (std model ships with Teflon ball seals / Buna-N O-rings)

Valve Cutaway View & Service Parts BOM

BVAL	SE	RVICE PARTS BOM			
Index	Qty	Description			
1	1	Valve Body			
2	1	Ball, Brass			
3	1	Spindle, Brass			
4	2	Ball Seal			
5	*	End Connection(s)			
6	*	End Connection O-Rings(s)			
7	1	Internal Thrust Washer			
8	1	Spindle O-Rings			
9	1	External Glide Washer			
10	1	Stop Pin			
11	1	Stop Washer			
12	1	Color Code Cap			
13	1	Top Cap Screw			
14	1	Handle			
15	1**	Тор Сар			
16	6**	Top Cap Mounting Bolts			
* - Quantity depends on size and combination of body ** - On Valve sizes 2-½ and larger					





DBV-1106B Page 16 Call Toll Free 1-800-248-3642 In Canada 1-800-320-3642





Note: Changes from Standard Materials may result in changes to temperature and/or pressure rating.

Due to our policy of continual product improvement, the specifications in this catalog may change without notice. When designing by spec, please request a certified print.



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'BVAL' LOW PRESSURE

BVAL valves with flange and socket weld connections are composite valves, built using threaded valves and "SSW" adapters. To harness the full capabilities of DMIC's "SSW" Power Unit Layout system please call DMIC Helpline at 1-800-248-3642 to obtain the SSW Catalog.

BVAL	Dependent Dimensions							
		Thread	ed Connec	tion				
Dimension (inches)	Α	E	F	G	Н		
Port Code(s)	Port Size	Overall Length	Overall Height	Bot to PortCtr	PortCtr to Top	Valve Height		
	1/4"	2.63	2.70	0.63	1.63	1.50		
	3/8"	2.63	2.70	0.63	1.63	1.50		
N	<u>1/2</u> "	2.63	2.70	0.63	1.63	1.50		
S	3/4"	3.28	3.77	0.76	1.86	1.75		
В	11/1	3.48	4.01	0.88	1.98	2.00		
IU	11/	3.90	5.19	1.19	2.53	2.61		
IA	172	4.32	5.05	1.39	2.74	3.10		
Threaded	21/"	4.90	0.41	1.02	5.07	5.05		
Connections	27/2	7.21	0.00	2.50	4.11	5.54		
		8.89	10.01	3.50	5.11	7.36		
	S	AE 4-Bolt	Flange Co	inection				
Dimension (inches)	Α	A	-	-	-		
Port Code(s)	Port Size	Overall Length FM/GM	Overall Length FL	Flg Pad Long	Flg Pad Short	UNC Bolt Thrd		
	3⁄4"	7.65	8.78	1.88	0.88	3/8"		
F 14	1"	7.78	9.02	2.06	1.03	3⁄8"		
FM GM	1¼"	8.45	9.56	2.31	1.19	716"		
FI	1 ½"	8.87	9.92	2.75	1.41	½"		
SAE 4-Bolt	2"	9.45	11.06	3.06	1.69	1⁄2"		
Comp/Std	2½ "	11.00	12.65	3.50	2.00	1⁄2"		
Fig Collin	3"	12.61	15.16	4.19	2.44	5 _{/8} "		
	4"	14.20	16.74	5.13	3.06	5⁄8"		
SAE Split Flange Connection								
Dimension (inches)	A	-	-	-	A _{CM}		
Port Code(s)	Port Size	Overall Length SM	O-Ring No.	DMIC Flang	: Split ge Kit	Length A (Combo) CM		
	3⁄4"	8.14	2-214	FSL-0	750SK	7.87		
	1"	8.28	2-219	FSL-10	000SK	8.03		
SM	1¼"	9.33	2-222	FSL-12	250SK	8.89		
CM	1 ½"	9.77	2-225	FSL-15	500SK	9.32		
Combo Flange	2"	10.85	2-228	FSL-20	000SK	10.15		
Connections	2½ "	12.36	2-232	FSL-2	500SK	11.68		
	3"	13.54	2-237	FSL-30	000SK	13.00		
	4"	15.77	2-245	FSL-40	000SK	15.83		
		ANSI	Flange Cor	1 n .				
Dimension (inches)	A	F L-	ANSI 150	# FLANGE	# D - It		
Port Code(s)	Size	Length	Diam	Diam	Dia	# Bolt Holes		
	<u>1/2</u> "	5.38	3.50	2.38	0.63	4		
	3⁄4"	7.02	3.88	2.75	0.63	4		
AA	1"	7.28	4.25	3.12	0.63	4		
ANSI 150#	1¼"	8.13	4.62	3.50	0.63	4		
Connections	<u>1½</u>	8.83	5.00	3.88	0.63	4		
(300PSI	2"	9.57	6.00	4.75	0.75	4		
nominal)	2½ "	11.24	7.00	5.50	0.75	4		
	3"	12.94	7.50	6.00	0.75	4		
	4"	14.76	9.00	7.50	0.75	8		
SAE Split Flange Connection								
Dimension (inches)	A	-	-				
Port Code(s)	Size	Length	OD	Depth				
	3⁄4"	5.78	1.05	0.38				
	1"	5.98	1.31	0.38				
W/ 4	1¼"	6.65	1.66	0.38				
Socket	1½"	6.95	1.91	0.38				
Weld	2"	7.65	2.38	0.38				
Connections	2½ "	9.00	2.88	0.38				
	3"	10.56	3.50	0.50				
	4"	12.14	4.50	0.50				

BVAL Block Body, ¼" – 1"





BVAL Round Body, 2 ½" – 4" (5" and up call Factory)



BVAL	Common Dimensions						
	Rated IN			imensio IN/mm	ensions //mm		
Part Number	Port Size	Pressure PSI (bar)	Valve Width B	Valve Bore C	Handle Length D		
BVAL-0250****	1⁄4"	400	1.50	0.25	3.35		
BVAL-0375****	‰	400	1.50	0.38	3.35		
BVAL-0500****	½"	400	1.50	0.50	3.35		
BVAL-0750****	3⁄4"	400	1.75	0.75	5.09		
BVAL-1000****	1"	400	2.00	1.00	5.09		
BVAL-1250****	1¼"	400	2.75	1.25	6.81		
BVAL-1500****	1½"	400	3.25	1.50	6.81		
BVAL-2000****	2"	400	4.00	2.00	6.81		
BVAL-2500****	2½"	400	5.00	2.50	8.61		
BVAL-3000****	3"	400	6.00	3.00	8.61		
BVAL-4000****	4"	400	7.00	4.00	8.61		



'BVAL' LOW PRESSURE

Flow Characteristic and Actuation Torque Curves





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					1									svuri		ITEM	NAME		MATER	RIAL
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		1														2	SEAT RING			
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		1			\searrow	/										5	RETAINER RING			
																6	PACKING			
																7	PACKING GLAND			
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	Î	G	-11 1				4				/					20	RETAINER BOLT			
	T 101						2)				(12 15 18 (7)			-5-16					
						DIN	MENSIE	INS										- Ale		С
VALV	e size									FLANC	SE DI	MENSION	MOUNTI	NG BA	4SE					Ś
INCH	MM	ØA	С	C1	D	ØF	G	ØН	К	B.C. 1	n	øh1	B.C. 2	n	Øh2					\mathcal{D}
2	50	1.85	4.92	3.94	1.69	4.02	1.25	.551	.374	4.75	4	5/8-11 UNC	3.25	4	,43			- 		
2.5	65	2.40	5.87	4.02	1.85	4.02	1.25	.626	.437	5.50	4	5/8-11 UNC	3.25	4	,43			<u>-</u>		
3	80	2.83	6.30	4.41	1.89	4.02	1.25	.626	.437	6.00	4	5/8-11 UNC	3,25	4	.43					
4	100	3.74	7.01	4.88	2.13	4.02	1.25	.748	.500	7.50	8	5/8-11 UNC	3.25	4	.43	AR7	Volves &	Control	5	
5	125	4.65	7.60	5.55	2.24	4.02	1.25	.748	.500	8.50	8	3/4-10 UNC	3.25	4	.43	HIGH	PERFORMANCE			
6	150	5.43	8.39	6.57	2.24	4.02	1.25	.748	.500	9.50	8	3/4-10 UNC	3.25	4	.43	2″-12″ DOUBL	FIGURE 402 VALNE OFFSET	/Ł		(
8	200	7.40	9.45	7.68	2.52	5.98	1.25	.874	.626	11.75	8	3/4-10 UNC	5.00	4	.55	CLASS STAND	150 ARD LUGGED PATTE	RN		/
10	250	9.25	11.03	8.66	2.83	5.98	2.05	1.126	1/4x1/4 KEY	14.25	12	7/8-9 UNC	5.00	4	.55		SIDNS SUBJECT TO			
12	300	10.83	12.20	10.43	3.19	5.98	2.05	1.126	1/4x1/4	17.00	12	7/8-9 UNC	5.00	4	.55	DATE: 05-31-0	REV: 2	DRA	WING ND.	-2

DRAWING ND. 2-12 150 FIG 402

ND. REQ'D

'SBE' Barb to S/F Head 90° Elbow A properly radiused adapter for tight access to pump inlets



DMIC 'SBE' 90° Split to Barb Elbows are typically used at the inlet of SAE Flange pumps to terminate a suction hose run. Rugged mechanical construction provides durability at a classic power unit "Achilles' Heel" point.

- Standard SAE Flange Head mounts with C.61 Split Flange Kit to your pump's 4-Bolt Companion Pad
- ☑ Smooth bend radius aids laminar flow and reduces pressure drop
- Optional oversize barb allows designers to preserve nominal line ID even on the hose segment



SBE	Barb to Split Flange, 90° Elbow									
Part	Port	DIMENSIONS inches (mm)								
Number	Size	A	В	С	D	Lbs/kg				
SBE-07HB-07SM	3⁄4"	2.38 60.3	0.75 19.1	1.50 38.1	3.31 84.1	0.7 0.3				
SBE-10HB-10SM	1"	2.75 69.9	1.00 25.4	1.75 44.5	3.69 93.7	1.1 0.5				
SBE-12HB-12SM	11⁄4"	3.13 79.4	1.25 31.8	2.00 50.8	4.63 117.5	1.5 0.7				
SBE-15HB-15SM	11⁄2"	3.50 88.9	1.50 38.1	2.38 60.3	5.00 127.0	2.0 0.9				
SBE-20HB-20SM	2"	4.25 108.0	2.00 50.8	2.81 71.4	6.19 157.2	3.2 1.5				
SBE-25HB-25SM	21/2"	5.50 139.7	2.50 63.5	3.31 84.1	7.50 190.5	5.7 2.6				
SBE-30HB-30SM	3"	6.37 161.8	3.00 76.2	4.00 101.6	8.75 222.3	8.6 3.9				
SBE-40HB-40SM	4"	7.75 196.9	4.00 101.6	5.00 127.0	10.75 273.1	13.8 6.3				



For sizes above 4 inch, please call Factory for specifications

SSW SYSTEN

'SBE' Ordering Template



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Page 13

In Canada 1-800-320-3642


Hydraulic Hose 341, 302, 471TC, 471ST

341

Hydraulic

SAE 100R9 TYPE AT

# Part Number	Hose I.D.		Hose I.D. Hose O.D.		A Minimum Bend Radius		Weight		Parkrimp		
	inch	mm	inch	mm	psi	MPa	inch	mm	lbs/ft	kg/m	43 Series
341-6	3/8	10	0.78	20	4500	31,5	5	130	0.50	0,74	•
341-8	1/2	12,5	0.89	23	4000	28,0	7	180	0.62	0,92	•
341-12	3/4	19	1.17	30	3000	21,0	9-1/2	240	0.92	1,37	•
341-16	1	25	1.51	38	3000	21,0	12	300	1.28	1,90	•
341-20	1-1/4	31,5	1.87	47	2500	17,5	16-1/2	420	1.79	2,66	•

302

Hydraulic Worldwide

ISO 1436-1 TYPE 2SN / SAE 100R2 TYPE AT / EN 853 TYPE 2SN

# Part				\bigcirc	Wor	king	Ş Mini) imum	۲ الا	S S S S S S S S S S S S S S S S S S S		Field	Application: Petroleum base hydraulic fluids and lubricating oils.
Number	Hos	e ID	Hose	e O.D.	Pres	ssure	Bend	Radius	We	ight	Parkrimp	Attachable	Inner Tube: Nitrile.
	inch	mm	inch	mm	psi	Мра	inch	mm	lbs/ft	kg/m	43 Series	30 Series	Reinforcement: Two braids
302-4	1/4	6,3	0.59	15,0	5800	40	4	100	0.26	0,39	•	•	steel wire.
302-5	5/16	8	0.65	16,6	5000	35	4-1/2	115	0.28	0,42	•		Cover: Synthetic rubber.
302-6	3/8	10	0.75	19,0	4750	33	5	130	0.37	0,55	•	•	Temperature Range: -40°F to
302-8	1/2	12,5	0.88	22,3	4000	28	7	180	0.45	0,67	•	•	+212°F (-40°C to +100°C).
302-10	5/8	16	1.00	25,5	3600	25	8	200	0.52	0,77	•	•	Fittings: 43 Series - pg. B-27.
302-12	3/4	19	1.16	29,4	3100	21,5	9-1/2	240	0.67	1,00	•	•	30 Series - pg. B-133
302-16	1	25	1.50	38,1	2400	16,5	12	300	1.00	1,49	•	٠	
302-20	1-1/4	31,5	1.86	47,1	1800	12,5	16-1/2	420	1.16	1,73	•	•	
302-24	1-1/2	38	2.14	54,5	1300	9	20	500	1.44	2,14	•	•	
302-32	2	51	2.64	67,2	1150	8	25	630	1.99	2,96	•	•	

471TC Hydraulic - TOUGH COVER

ISO 11237-1 TYPE 2SC / EN 857 TYPE 2SC

471ST

Hydraulic - SUPER 'I'OUGH

ISO 11237-1 TYPE 2SC / EN 857 TYPE 2SC

# Part Number	Hos	e I.D.	Hose	0.D.	Wor	king sure	,		We	୍ତ୍ର ight	Parkrimp
	inch	mm	inch	mm	psi	MPa	inch	mm	lbs/ft	kg/m	43 Series
471TC/ST-4	1/4	6,3	.51	13	5800	40,0	2	50	0.20	0,30	•
471TC/ST-6	3/8	10	.68	17	5000	35,0	2-1/2	65	0.28	0,42	•
471TC/ST-8	1/2	12,5	.80	20	4250	29,7	3-1/2	90	0.35	0,52	•
471TC/ST-10	5/8	16	.94	24	3625	25,0	4	100	0.44	0,66	•
471TC/ST-12	3/4	19	1.09	28	3125	21,5	4-3/4	120	0.58	0,86	•
471TC/ST-16	1	25	1.40	35	2500	17,5	6	150	0.79	1,17	•

• Field Attachable Assembly Instructions are in Section B with each Fitting Series.

• See Section C for Parkrimp Assembly Instructions.







Application: Petroleum base hydraulic fluids and lubricating oils.

Inner Tube: Synthetic rubber.

Reinforcement: Four spiral steel wire.

Cover: Synthetic rubber, MSHA accepted.

Temperature Range: -40°F to +212°F (-40°C to +100°C).

Fittings: 43 Series - pg. B-27.

arker WERLDWIDE 302/301



Hose Hydraulic

Fittings B

C Equipment

Accessories

D

Application: Petroleum base hydraulic fluids and lubricating oils.

Parker TOUGH COVER 471TC

Parker SUPER TOUGH 471ST

Inner Tube: Synthetic rubber. Reinforcement: Two braids

steel wire.

Cover: Synthetic rubber abrasion resistant, MSHA accepted.

Temperature Range: -40°F to +212°F (-40°C to +100°C).

Fittings: 43 Series - pg. B-27.



Western Integrated Technologies

MECHANICAL * FLUID POWER SYSTEMS * ELECTRICAL 8900 North Ramsey Portland, Oregon 97203 Phone (503)228-6666 Fax (503) 228-7318

HPU Skid





aerospace climate control electromechanical filtration fluid & gas handling hydraulics pneumatics process control sealing & shielding





P1/PD Series: 18cc to 140cc Medium Pressure Axial Piston Pumps

Variable Displacement – Service Information Bulletin HY28-2665-02/SVC/EN Effective: June 01, 2010





ENGINEERING YOUR SUCCESS.

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Contents

General Information	4
Start up procedure	5
Troubleshooting	6
Model code ordering information 018,028,045	8
Model code ordering information 060,075,100,140	9
Technical data	10

Parts Data

018 & 028 pump exploded view	
045 pump exploded view	
Parts list for 018, 028, 045	
060, 075, 100 & 140 pump exploded view	
Parts list for 060, 075, 100, 140	
Case to inlet check valves	
Volume stop	19
Seal and parts kits	
L-compensator	
C-compensator	
AE, AF, AL, AM,AN compensator	

Assembly/Disassembly information

Compensator disassembly/inspection	
Compensator assembly	27
018, 028, 045 disassembly	
018, 028, 045 Inspection	32
018, 028, 045 rework limits	33
018, 028, 045 assembly	
018, 028, 045 assembly tools	
018, 028, 045 test procedure	
060, 075, 100, 140 disassembly	42
060, 075, 100, 140 inspection	
060, 075, 100, 140 rework limits	45
060, 075, 100, 140 assembly	
060, 075, 100, 140 assembly tools	50
060, 075, 100, 140 test procedure	52
Conversions and formulas	55
Offer of sale	59



MOUNTING	These pumps are designed to operate in any position. The pump shaft must be in alignment with the shaft of the source driver and should be checked with a dial indicator. The mating pilot bore and coupling must be concentric. This concentricity is particularly important if the shaft is rigidly connected to the driven load without a flexible coupling.
SHAFT INFORMATION	Splined: The shafts will accept a maximum misalignment of 0.15mm, 0.005 inch, total indicator reading. Angular misalignment at the external and internal spline axis must be less than \pm 0,002 mm per mm of shaft radius, \pm 0.002 inches per inch of shaft radius. The coupling interface must be lubricated. PARKER recommends lithium molydisulfide or similar grease. The internal coupling should be hardened to Rc 27-34 and must conform to SAE-J498c, class 5 flat root side fit. Keyed: High strength heat treated keys must be used. Replacement keys must be hardened to 27-34 Rc. The key corners must be chamfered 0.81-1.0 mm, 0.032"-0.040", at 45° to clear radii that exist in the keyway.
SIDE LOAD CAPABILITY	The P1/PD series is designed for inline-drive. Side loading on the shaft is not recommended. If this is unavoidable consult your nearest PARKER representative.
FLUID CONNECTIONS	Connect inlet and outlet lines to the port block of the pump. The maximum case pressure is 2 bar (30 psi) continuous, 4 bar (60 psi) intermittent. The case pressure must never exceed inlet pressure by more than .5 bar (7 psi). When connecting case drain line make certain that drain plumbing passes above highest point of the pump before passing to the reservoir. The case leakage line must be of sufficient size to prevent back pressure in excess of 2 bar (30 psi) and returned to the reservoir below the surface of the oil as far from the supply inlet as possible. All fluid lines, whether pipe, tubing, or hose must be adequate size and strength to assure free flow through the pump. An undersize inlet line will prevent the pump from operating properly at full rated speed. An undersize outlet line will cause back pressure and cause heat generation and increased noise. Flexible hose lines are recommended. If rigid piping is used, the workmanship must be accurate to eliminate strain on the pump port block or to the fluid connections. Sharp bends in the lines must be eliminated wherever possible. All system piping must be cleaned and flushed before installing pump. Make sure the entire hydraulic system is free of dirt, lint, scale, or other foreign material. Caution: Do not use galvanized pipe. Galvanized coating can flake off with continued use.
SYSTEM RELIEF VALVES	Although the P1/PD series pumps have very fast off-stroke compensator response, system relief valves are recommended in all cases for safety considerations.
RECOMMENDED FLUIDS	The fluid recommended for use in these pumps has a petroleum base and contains agents which provide oxidation inhibition and anti-rust, anti-foam and de-aerating properties as described in PARKER standard HF-1. Where anti-wear additive fluids are specified, see PARKER standard HF-0.
VISCOSITY INDEX	90 V. I. minimum. Higher values extend the range of operating temperature but may reduce the service life of the fluid.
TEMPERATURE	Determined by the viscosity characteristics of the fluid used. Because high temperatures degrade seals, reduce the service life of the fluid and create hazards, fluid temperature should not exceed 110°C (230°F) at the case drain.
MAINTENANCE	The pump is self-lubricating and preventative maintenance is limited to keeping system fluid clean by changing filters frequently. Keep all fittings and screws tight. Do not operate at pressures and speeds in excess of the recommended limit. If the pump does not operate properly, check the troubleshooting chart before attempting to overhaul the unit. Overhauling may be accomplished by referring to the disassembly, rework limits of wear parts, and assembly procedures as provided in this service manual.
FLUID CLEANLINESS	Fluid must be cleaned before and continuously during operation, by filters that maintain a cleanliness level of ISO 20/18/14. Better cleanliness levels will significantly extend the life of the components. As contaminant generation may vary with each application, each must be analyzed to determine proper filtration to maintain the required cleanliness level.



STARTUP PROCEDURE FOR NEW INSTALLATIONS

- Read and understand the instruction manual.
- Identify components and their function.
- Visually inspect components and lines for possible damage.
- Insure that all necessary ports are properly connected.
- Check reservoir for cleanliness. Drain and clean as required.
- Check fluid level and fill as required with filtered fluid to a minimum ISO cleanliness level of 20/18/14.
- Fill pump case with clean oil prior to starting.
- If pump is mounted vertically with the shaft up, bleed the air out the D1 drain port located near the mounting flange.
- Check alignment of drive.
- Check oil cooler and activate it, if included in circuit. Check fluid temperature.
- Reduce pressure settings of compensator and relief valve. Make sure accurate pressure readings can be made at appropriate places.
- If solenoids in system, check for actuation.
- Jog the pump drive. Check for proper shaft rotation. Make sure pump fills properly.
- Start the pump drive.
- Bleed system of air. Recheck fluid level.
- Cycle unloaded machine at low pressure and observe actuation (at low speed, if possible).
- Increase pressure settings gradually in steps. Check for leaks in all lines especially in pump and motor inlet lines.
- Make correct pressure adjustments.
- Gradually increase speed. Be alert for trouble as indicated by changes in sounds, system shocks, and air in fluid.
- Equipment is operational.

Typical Ajustment Ranges and Initial Settings (unless customer specified at time of order)

Function	Adjustment range	Adjustment value	Recommended or Initial Setting
Load sense pressure	8 - 35 bar (116 - 500 psi)	28 bar (410 psi) per turn	24 bar (350 psi)
Pressure compensator High pressure	80 - 280 bar (1160 - 4060 psi)	40 bar (580 psi) per turn	Factory supplied at minimum
Pressure compensator Low pressure	20 - 80 bar (290 -1160 psi)	18.6 bar (260 psi) per turn	Factory supplied at minimum
Maximum volume stop	100 - 50%	Approximately 6% per turn	100 %
Minimum volume stop	0 - 25%	Approximately 4% per turn	0%
Differential pressure	37 bar (540 psi)	Adjustment not recommended	FACTORY SET DO NOT ADJUST



Component problems and circuit problems are often interrelated. An improper circuitmay operate with apparent success but will cause failure of a particular component within it. The component failure can be the effect, not the cause of the problem. This general guide is offered to help in locating and eliminating the cause of problems by studying their effects.

Effect of Trouble	Possible Cause	Fault Which Needs Remedy					
		leak in inlet line					
		low fluid level					
		turbulent fluid					
	air in fluid	return lines above fluid level					
		gas leak from accumulator					
		excessive pressure drop in the inlet line from a pressurized reservoir					
		inlet line strainer acting as air trap					
		fluid too cold					
		fluid too viscous					
		fluid too heavy					
	and the stars in	shaft speed to high					
	cavitation in	inlet line too small					
noisy pump		inlet strainer too small					
		inlet strainer too dirty					
		operating altitude too high					
		inlet pressure too low					
		faulty installation					
		distortion in mounting					
	misaligned shaft	axial interference					
		faulty coupling					
		excessive overhung loads					
		piston and shoe looseness or failure					
	machanical fault in nump	bearing failure					
		incorrect port plate rotation					
		eroded or worn parts in the displacement control					
erosion on barrel ports	air in fluid	see noisy pump above					
and port plate	cavitation	see noisy pump above					
	cogging load	mechanical considerations					
	worn relief valve	needed repairs					
	worn compensator	replace					
pressure shocks	slow response in check valves	replace or relocate					
	excessive decompression energy rates	improve decompression control					
	barrel blow-off	rotating group worn, excessive case pressure					
aamaaaatar instability	excessive line capacitance (line volume,	reduce line size or lengths					
compensator instability	line stretch, acumulator effects)	eliminate hose					



Effect of Trouble	Possible Cause	Fault Which Needs Remedy					
		reduce pressure settings					
	excessive loads	reduce speeds					
		improper filter maintenance					
		filters too coarse					
	contaminant particles	introduction of dirty fluid to system					
	in fluid	reservoir openings					
		improper reservoir breather					
		improper line replacement					
		fluid too thin or thick for operating temperature range					
high wear in pump	improper fluid	breakdown of fluid with time/temperature/heating effects					
		incorrect additives in new fluid					
		destruction of additive effectiveness with chemical aging					
	impropor ropair	incorrect parts					
		incorrect procedures, dimensions, finishes					
		condensation					
		faulty breather/strainer					
	unwanted water in fluid	heat exchanger leakage					
		faulty clean-up practice					
		water in makeup fluid					
		recheck case drain flow and repair as required					
	excessive pump leakage	fluid too thin					
		improper assembly, port timing					
	relief valve	set too low (compared to load or to compensator)					
		instability caused by back pressure, worn parts					
	compensator	set too high (compared to relief)					
		worn parts					
he ation of fluid	pump too large for fluid needs	select smaller pump displacement					
neating of fluid		water turned off or too little flow					
		water too hot					
	heat exchanger	fan clogged or restricted					
		efficiency reduced by mud or scale deposits					
		intermittent hydraulic fluid flow					
		too little fluid					
	reservoir	improper baffles					
		insulating air blanket that prevents heat rejection					
		heat pickup from adjacent equipment					



Bulletin HY28-2665-02/SVC/EN 018, 028, 045 Ordering Model Code

Medium Pressure Axial Piston Pumps P1/PD Maintenance



* Not a functional control as shipped . See control description on page 7.



Pump Series	Displacement	Shaft Shaft Options Seal Ports	Shaft Rotation Applicatio	Seal D Material	Design Level Con Opti	Addi Addi Con ions Opt	tiona ntrol	al M Port	Aechanical splacement djustment Pad & Coupling	Special Features
Code	Series	Code Sh	aft Rotation	Code	Desian Le	evel		Drientation I	n Case-to- Paint Inlet Check I	
P1	Mobile	R Clo	ockwise	A Cu	urrent Design	n Series			Valve	
PD	Industrial			Code Sea	I Material	1				
		Code	Shaft Seal	5 Fluc	procarbon	- 1	Ш			
Code	Displacement	S Sin	gle Shaft Seal	odo Ann	liestion	1	Ш		Code Paint	
060	60 cc/rev (3.66 in3/rev)			M Mobile	e (P1)		Ш		00 No Paint	
075	75 cc/rev (4.58 in ³ /rev)	Code T	ype	S Indust	trial (PD)		Ш		PB Black Paint	
100	100 cc/rev (6.41 ln³/rev	() Open	circuit,	U* Unive	rsal		Ш			
140		P variab	cement	ailable on "	S" Mounting	9	Ш		Code Special Eastures	1
				Port Option	Pumps only	/.	Ш		00 No Special Features	-
	Mounting	g & Ports See Catalog	Table for Complete	e Informatio	n 140 1	140	Ш		M2 Special Modification	-
Code	Mount Flange Aux	Mount Flange Aux	Mount Flange	Aux Mount	Flange	Aux	Ш			_
	SAE mounting with SA	E ports		orts			Ш	Code	Thru-Drive Mounting Pad/Counling	# Teeth
s	127-4 50/25 SAE	127-4 50/25 SAE	127-4 63/32 S	SAE 152-4	63/32	SAE	Ш	0	None (only valid for end or side ported)	-
	(C) 61 4/10	(C) 61 4/10	(C) 61/62 4	1/12 (D)	61/62	4/16	Ш	A	SAE 82-2 (A) & 16 (A) Coupling	9T
	SAE mounting with BSF	PP drain, pilot, & gage p	orts, and metric 4-b	olt inlet/outle	et ports		Ш	Н	SAE 82-2 (A) & 19 () Coupling	11T
A	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	127-4 Code 1/4"- (C) 61 3/4"	127-4 Code 1 (C) 61/62 3	1/4"- 152-4 3/4" (D)	Code	1/4"- 1"	Ш	В	SAE 101-2 (B) & 22 (B) Coupling	13T
	ISO mounting with me	tric ports	01/02		01/02		Ш	Q	SAE 101-2 (B) & 25 (B-B) Coupling	15T
М	ISO 50/25 M12/ DN51 M22	ISO 50/25 M12/ DN51 M22	ISO 63/32 N	112/ 127 ISO	63/32 N	M12/	Ш	C	SAE 127-4 (C) & 32 (C) Coupling	14T
_	ISO mounting with BS	PP ports			10110 //02 1		Ш		SAE 127-4 (C) & 38 (C-C) Coupling	1/1 12T
В	ISO 50/25 1/4"- DN51 3/4"	ISO 50/25 1/4"- DN51 3/4"	ISO 63/32 1 DN64/32 3	1/4"- 3/4" ISO	63/32 DN64/32	1/4"- 1"		J***	SAE 101-2 (B) rotated 45 degrees,	13T
C*	127-2 50/25 SAE (C) Code 4/10	127-2 50/25 SAE (C) Code 4/10	N/A N/A M	N/A N/A	N/A	N/A		K***	SAE 101-2 (B) rotated 45 degrees, 25 (B-B) coupling	15T
	*SAE C 2 bolt mtg w/	BSPP auxiliary ports			<u> </u>		Ш	* Availab	le on 100 thru 140 models.	
D*	127-2 (C) 50/25 Code 1/4"- 3/4"	127-2 (C) 50/25 Code 3/4"	N/A N/A M	N/A N/A	N/A	N/A		** Availa *** Availa	ble on 140 models. able on "S" Mounting & Port Option Pr	umps only.
* 60cc/r	and 75cc/r only						111'			
_							Ш	Code	4 Bolt Elange / No Case Check Value	(0
Code	060 Shaft Options	075 Shaft Options	100 Shaft Optio	ons 140	Shaft Optio	ons	Ш		4 Bolt Flange / With Case Check Val	lve
01	SAE C 14T Spline	SAE C 14T Spline	SAE C-C 17T Spl	ine SAE I	D 13T Splin	ne	IIL			
02	SAE C 32-1 Key	SAE C 32-1 Key	SAE C-C 38-1 Ke	y SAE I	D 44-1 Key		11	Code	Mechanical Displacement Adjust	ment
04	ISO\DIN Key 32mm Dia.	ISO\DIN Key 32mm Dia.	ISO\DIN Key 40mm	Dia. ISO\D	IN Key 50mm	n Dia.		0	None	
06	-	-	SAE C 141 Spline	e -				1*	Adjustable Maximum Displacement	
								2*	Adjustable Minimum Displacement	
								3*	Adjustable Max & Min Displacement	
Code		Control Op	otions					* Displace	ement adjustment not available on thru	u-drive.
C0	Pressure Limiter, 80-2	280 bar Adjustment Ran	ge				15			
C1	Pressure Limiter, 20-80 bar Adjustment Range Code Port Orientation									
	Load sensing, 10-30 bar ∆P and Pressure Limiter 80-280 bar							E E	ind Ports	
AF	Pilot Operated Press	ure Limiter Control with F	Proportional Flectro	nic Adjustme	ent (12V)			5 S	ide Ports	
AF	Pilot Operated Press	are Limiter Control with F	Proportional Electron	nic Adiustme	ent (24V)			1 5		
AN*	Pilot Operated Contro	l with ISO-4401 (NG6) I	nterface and Shippi	ng Cover	(,					
AM	Pilot Operated Pressu	ure Limiter Control with N	Mechanical Adjustm	ent and Ven	t Port	С	ode	Ade	ditional Control Options	
AL	Load Sense and Pres	sure Limiter (P'060 Torq	ue Limiter Pumps o	only)			0	None		
* Not a	functional control as shippe	ed . See control descriptio	n on page 7.				т	Torque	limiter used w/ AM, AL (060)	
								∝ LU (U		



Technical Data

Model	P1/PD 018	P1/PD 028	P1/PD 045	P1/PD 060	P1/PD 075	P1/PD 100	P1/PD 140			
Maximum Displacement, cm ³ /rev	18	28	45	60	75	100	140			
cu.in./rev	1.10	1.71	2.75	3.66	4.58	6.01	8.54			
Outlet Pressure – Continuous, bar				280						
psi				4000						
psi				4500						
Peak, bar				350						
psi				5000						
P1 Maximum Speed – Boosted Inlet, rpm	3200	3200	3000	2800	2700	2500	2400			
P1 (1.0 bar abs inlet), rpm	3200	3200	2600	2500	2300	2100	2000			
P1 (0.8 bar abs inlet), rpm	2700	2800	2200	2000	1900	1800	1800			
PD Maximum Speed (1.0 bar abs inlet), rpm				1800						
PD (0.8 bar abs inlet), rpm				1800						
Minimum Speed, rpm				600						
Inlet Pressure – Maximum, bar				10 (gage)						
psi				145						
Rated, bar			1.0	absolute (0.0 g	age)					
psia			0.0.	14.5						
psia			0.8 8	11.6	11.6					
Case Pressure – Peak, bar			4.0	absolute (3.0 g	age)					
			and less than	0.5 bar above	inlet pressure					
Rated, bar			2.0	absolute (1.0 g	age)					
			and less than	0.5 bar above	inlet pressure					
Fluid Temperature Range, °C				-40 to +95						
Eluid Viscosity – Bated, cSt				6 to 160						
Max Intermittent cSt			500	0 (for cold start	ina)					
Min Intermittent cSt				5						
Fluid Contamination – Rated, ISO				20/18/14						
Maximum ISO				21/19/16						
SAE Mounting – Flange	82-2 (A)	101-2 (B)	101-2 (B)	127-2 (C) c	or 127-4 (C)	127-4 (C)	152-4 (D)			
ISO Mounting - Flange	80 mm	100 mm	100 mm	125 mm	125 mm	125 mm	180 mm			
SAF Keved Shafts	19-1. A	25-1. BB	25-1. BB	32-1. C	32-1. C	38-1. CC	44-1. D			
ISO Keved Shafts	20 mm	25 mm	25 mm	32 mm	32 mm	40 mm	50 mm			
SAE Spline Shafts	9T, A	13T, B	13T, B	14T C	14T C	17T CC	13T D			
	11T, A	15T, BB	15T, BB	141, 0	141,0	171,00				
Weight – End Port, kg (lb)	13.4 (29.5)	17.7 (39.0)	23 (50)	29 (64)	30 (66)	51 (112)	66 (145)			
Side Port, kg (lb)	14.2 (31.3)	18.1 (40.0)	24 (52)	30 (67)	31 (68)	53 (117)	67 (147)			
Thru-Drive, kg (lb)			27 (59)	34 (75)	35 (77)	55 (121)	82 (180)			

*Intermittent pressure is defined as less than 10% of operation time, not exceeding 6 successive seconds.

Typical Control Reponse Times*

		Typical Control Response Time (ms)				s)		
Control Description	Pump Operating Condition	018	028	045	060	075	100	140
"O" Drosouro Limitor	Maximum Displacement to Zero	25	25	25	37	21	26	30
C Pressure Limiter	Zero Displacement to Maximum		80	106	119	89	108	125
"I" I and Consing	Maximum Displacement to Zero		40	30	54	40	43	45
L Load Sensing	Zero Displacement to Maximum	70	70	120	186	97	189	280
"A" Pilot Operated	Maximum Displacement to Zero	25	25	46	43	37	39	40
Control	Zero Displacement to Maximum	80	80	131	125	115	123	130

* Based on NFPA testing standards



For max volume stops:

Pump Size	% St	roke reduction	per turn
P*060	6.76	P*018	9
P*075	6.2	P*028	8.2
P*100	5.5	P*045	7.5
P*140	4.8		

Control Adjustment Sensitivity:

- Load Sense 28 Bar/Turn
- Pressure Compensator 80 to 280 bar range (C0) = 40 Bar/Turn
- Pressure Compensator 20 to 80 bar range (C1) = 18.6 Bar/Turn







ITEM #	QTY	018 PART #	028 PART #	045 PART #	DESCRIPTION
1	4	210 x209	210 x 211	361-12229-0	Socket head cap screw
3	1	Contact Factor	ry for port block order	ing information	Port Block
4*	1	2050V-7	2160V-7	675-00168-0	Port block O-Ring
5	2	108X2V	108X2V	108X2V	Boss Plug (not shown)
7	1	299X67	324-30014-0	324-30014-0	Port Plate Pin
8*	3	605-10077-0	605-10077-0	605-10077-0	O-Ring
		03E-94415-0	03E-94967-0	03E-94339-0	Port plate, clockwise, industrial (PD)
		03E-94414-0	03E-95968-0	03E-94340-0	Port plate, counter clockwise, industrial (PD)
		03E-94413-0	03E-94969-0	03E-94341-0	Port plate, clockwise, mobile (P1)
0		03E-94416-0	03E-94970-0	03E-94342-0	Port plate, counter clockwise, mobile (P1)
9		03E-94963-0	03E-94376-0	03E-94675-0	Port plate, CCW, industrial (PD), ripple chamber
		03E-94964-0	03E-94377-0	03E-95080-0	Port plate, CCW, industrial (PD), ripple chamber
		03E-94965-0	03E-94378-0	03E-95374-0	Port plate, clockwise, mobile (P1), ripple chamber
		03E-94966-0	03E-94379-0	03E-95375-0	Port plate, CCW, mobile (P1), ripple chamber
10*	2	**	**	695-00912-0	Bias and control rod O-ring
11	1	03E-9427-0	03E-94390-0	03E-94355-0	Bias Guide
12	1	03E-94428-0	03E-94391-0	03E-94354-0	Bias Piston
13	1	03E-94430-0	03E-94393-0	03E-94356-0	Bias Spring
14	1	03E-94427-0	03E-94390-0	03E-94353-0	Control guide
15	1	03E-94426-0	03E-94389-0	03E-94352-0	Control piston
19	1	256X521	256X525	356-65144-0	Retaining ring, internal
20	1	787635	03E-94387-0	03E-94350-0	Barrel hold down spring
21	2	786996	03E-94388-0	03E-94351-0	Barrel hold down washer
22	3	787000	03E-94386-0	03E-94349-0	Barrel hold down pin
23	1	03E-94717-0	03E-94375-0	03E-94338-0	Barrel
24	1	787002	03E-94385-0	03E-94348-0	Spherical washer
25	1	786994	03E-94384-0	03E-94347-0	Retainer plate
26	9	789519	S2E-18415-0	S2E-18413-0	Piston and shoe assembly
		03E-94409-0	03E-94372-0	03E-94335-0	01 shaft option, no thru drive
		**	03E-94374-0	03E-94337-0	01 shaft option with thru drive
		03E-94410-0	03E-94373-0	03E-94948-0	02 shaft option, no thru drive
		**	03E-94900-0	03E-94908-0	02 shaft option with thru drive
07		03E-94800-0	03E-94903-0	03E-94923-0	04 shaft option, no thru drive
21		**	03E-94904-0	03E-94922-0	04 shaft option with thru drive
		03E-94718-0	**	**	06 shaft option, no thru drive
		**	**	**	06 shaft option with thru drive
		03E-94804-0	03E-95166-0	03E-94990-0	08 shaft option, no thru drive
		**	03E-95492-0	03E-95197-0	08 shaft option with thru drive



ITEM #	QTY	018 PART #	028 PART #	045 PART #	DESCRIPTION
28	1	S2E-18416-0	S2E-18414-0	S2E-18412-0	Cam
31	2	03E-94432-0	03E-94395-0	03E-94395-0	Bearing retainer Orifice
32	2	03E-94432-0	03E-94395-0	03E-94358-0	Cam bearing
33	1	**	**	**	Housing (not sold seperatley)
		108X6	108X8	488-35055-0	Plug, SAE ORB
34	2		Consult Parker Rep.		Plug, BSPP
			Consult Parker Rep.		Plug, ISO
35*	2	695-00908-0	695-00908-0	695-00910-0	SAE O-ring
38*	1	787140	P2-060-3304	620-82125-0	Shaft Seal
39	1	256X535	256X544	356-65158-0	Seal Retainer
40	1	see separate	compensator orderir	ig information	Compensator
41	2	324-30024-0	324-30024-0	324-30014-0	Cover dowel pin
42	1	216-10013-0	789814	230-82227-0	Port block bushing
43	1	230-82514-0	789815	230-82516-0	Cylindrical roller bearing
44	1	256X222	256X221	356-65159-0	External retaining ring (shaft)
45	1	256X544	256X544	356-65144-0	Internal retaining ring (housing)
46	1	108X4	108X4	108X4	Boss plug
47*	1	695-00904-0	695-00904-0	695-00904-0	O-ring
* denotes	Item is in	cluded in the seal kit			•







ITEM #	QTY	060 PART #	075 PART #	100 PART #	140 PART #	DESCRIPTION
1	4 (2:075)	361-13250-0	361-13270-0	361-14290-0	361-15270-0	Socket head cap screw
2	0 (2:075)	**	361-13250-0	**	**	Socket head cap screw (075 only)
3	1	Contact	factory for port b	lock ordering info	Port Block	
4*	1	675-00164-0	675-00165-0	675-00169-0	675-00173-0	Port block O-Ring
5	2	488-35061-0	488-35061-0	488-35061-0	488-35061-0	Boss Plug (not shown)
6*	2	695-00904-0	695-00904-0	695-00904-0	695-00904-0	O-ring boss plug
7	1	324-30014-0	324-30014-0	324-30014-0	324-30014-0	Port Plate Pin
8*	3	605-10077-0	605-10077-0	605-10070-0	605-10070-0	O-Ring
		03E-94038-0	03E-93169-0	03E-93785-0	03E-93252-0	Port plate, clockwise, industrial (PD)
		03E-94039-0	03E-93170-0	03E-93786-0	03E-93253-0	Port plate, counter clockwise, industrial (PD)
9	1	03E-94040-0	03E-93171-0	03E-93787-0	03E-93254-0	Port plate, clockwise, mobile (P1)
		03E-94041-0	03E-93172-0	03E-93788-0	03E-93255-0	Port plate, counter clockwise, mobile (P1)
10*	2	695-00912-0	695-00912-0	695-00914-0	695-00916-0	Bias and control rod O-ring
		03E-94054-0	03E-93150-0	03E-93800-0	03E-93248-0	Bias Guide
11	1	**	03E-94498-0	03E-94827-0	03E-94743-0	Bias Guide, Overcenter Order Code Option "X"
		03E-94053-0	03E-94149-0	03E-93799-0	**	Bias Piston
12	1	**	**	**	03E-93247-0	Bias piston no minumum volume stop
		**	**	**	03E-94658-0	Bias piston with minimum volume stop
		03E-94055-0	03E-93151-0	03E-93801-0	03E-93963-0	Bias Spring
13	1	**	03E-94499-0	03E-94829-0	03E-94752-0	Bias Spring, Overcenter Order Code Option "X"
		03E-94052-0	03E-93148-0	03E-93798-0	03E-93246-0	Control guide
14	1	**	03E-94608-0	03E-94828-0	03E-93246-0	Control guide, Overcenter Order Code Option "X"
		03E-94051-0	03E-93147-0	03E-93797-0	03E-94252-0	Control piston
15	1	**	03E-93147-0	03E-93797-0	03E-94751-0	Control piston, Overcenter Order Code Option "X"
16	1	230-82237-0	230-82237-0	230-82244-0	230-82239-0	Tapered roller bearing cup
17	1		INCLUDED	IN ITEM 16		Tapered roller bearing cone
18	1	S2E-18591-0K	S2E-18591-0K	S2E-18640-0K	S2E-18527-0K	Bearing Shim Kit (includes all standard shim sizes)
19	1	356-65152-0	356-65144-0	356-65146-0	356-65147-0	Retaining ring, internal
20	1	03E-94049-0	03E-93145-0	03E-93795-0	03E-93959-0	Barrel hold down spring
21	1	03E-94050-0	03E-93146-0	03E-93796-0	03E-93244-0	Barrel hold down washer
22	1	03E-94048-0	03E-93263-0	03E-93845-0	03E-93267-0	Barrel hold down pin
23	1	03E-94036-0	03E-93129-0	03E-93783-0	03E-93242-0	Barrel
24	1	03E-94047-0	03E-93142-0	03E-93794-0	03E-93241-0	Spherical washer
25	1	03E-94046-0	03E-93139-0	03E-93793-0	03E-93240-0	Retainer plate
26	9	S2E-18296-0	S2E-17003-0	S2E-17912-0	S2E-17323-0	Piston and shoe assembly



ITEM #	QTY	060 PART #	075 PART #	100 PART #	140 PART #	DESCRIPTION	
		03E-94032-0	03E-93999-0	03E-93779-0	03E-93227-0	01 shaft option, no thru drive	
		03E-94033-0	03E-94000-0	03E-93780-0	03E-93228-0	01 shaft option with thru drive	
		03E-94034-0	03E-94001-0	03E-93781-0	03E-93231-0	02 shaft option, no thru drive	
07		03E-94035-0	03E-94002-0	03E-93782-0	03E-93232-0	02 shaft option with thru drive	
27		03E-94768-0	03E-94003-0	03E-94006-0	03E-93233-0	04 shaft option, no thru drive	
		03E-94767-0	03E-93127-0	03E-94007-0	03E-93234-0	04 shaft option with thru drive	
		**	**	03E-94500-0	03E-95070-0	06 shaft option, no thru drive	
		**	**	03E-94462-0	**	06 shaft option with thru drive	
28	1	S2E-18411-0	S2E-17443-0	S2E-17961-0	S2E-17957-0	Cam	
29	1	230-82236-0	230-82236-0	230-82245-0	230-82241-0	Tapered roller bearing cone (and cup on 100 and 140)	
30	1	230-82235-0	230-82235-0	**	**	Tapered roller bearing cup	
31	2	03E-93763-0	03E-93763-0	03E-93763-0	03E-93763-0	Bearing retainer Orifice	
32	2	03E-94057-0	03E-93950-0	03E-93952-0	03E-93953-0	Cam bearing	
33	1	**	**	**	**	Housing (not sold seperatley)	
		488-35014-0	488-35014-0	488-35014-0	488-35024-0	Plug, SAE ORB	
34	2	447-01056-2	447-01056-2	447-01056-2	477-01068-2	Plug, BSPP	
		447-01065-5	447-01065-5	447-01065-5	477-01066-5	Plug, ISO	
05*	0	695-00910-0	695-00910-0	695-0912-0	695-0916-0	SAE O-ring	
35	2	605-10064-5	605-10064-5	605-10064-5	605-10064-5	BSPP O-ring	
		488-35061-0	488-35061-0	488-35061-0	488-35061-0	Plug, SAE ORB	
36	1	447-01053-2	447-01053-2	447-01053-2	447-01053-2	Plug, BSPP	
		447-01061-5	447-01061-5	447-01061-5	447-01061-5	Plug, ISO	
07*	4	695-0904-0	695-0904-0	695-0904-0	695-0904-0	SAE O-ring	
37		605-10064-5	605-10061-5	605-10061-5	605-10061-5	BSPP O-ring	
38*	1	620-82118-5	620-82118-5	620-82121-5	620-82120-5	Shaft Seal	
39	1	356-65146-0	356-65146-0	356-65147-0	356-65148-0	Seal Retainer	
40	1	See se	parate compensa	ator ordering infor	mation.	Compensator	
* denotes	Item is ir	ncluded in the sea	l kit				





	CASE TO INLET CHECK VALVE										
Item No	Qty	018, 028, 045	060, 075, 100, 140	Description							
50	1	314-10002-0	314-10000-0	Hollow Set Screw							
51	1	03E-94720-0	03E-93931-0	Check Valve Poppet							
52	1	03E-94721-0	03E-93987-0	Spring							
53	1	03E-94722-0	03E-93988-0	Check Valve Stop							





Minimum and Maximum Volume Stop										
Item No.	Qty	018	028	045	060 & 075	100 & 140	Description			
54	1		362-11045-0		311-50009-0	311-50011-0	Adjusting Screw			
55	1		334-00013-0		334-00	0011-0	Locknut, Adjusting Screw			
56	1		03E-93181-0		03E-9	3181-0	Volume Stop Plug			
57	1		695-00908-0		695-00	0908-0	O-Ring, Volume Stop Plug			
58	1		618-15023-0		618-1	5023-0	Back-up Ring			
59	1		695-00011-0		695-00011-0		O-Ring, Volume Stop Rod			
60	1	03E-94736-0	03E-95170-0	03E-93262-0	03E-9	3262-0	Volume Stop Rod			
61	1		488-35018-0		488-35018-0		Plug (No Volume Stop Control)			
Not Shown	1	03E-95217-0	03E-95358-0	03E-93262-0	*	*	Minimum Volume Stop Rod			
Kit		S2E-19203-5	S2E-19204-5	S2E-18988-5K	S2E-18987-5K	S2E-18988-5K	Adjustable Manual Stop			

Maximum and minimum volume stops use the same components except where noted.





Thru Drive Pad and Coupling Item #70 (see drawing)				Thru Drive Co	uplings			
	018	028	045	060	075	100	140	O-Ring
SAE A, 9 Tooth	**	03E-95163-0	03E-94942-0	03E-93278-0	03E-93278-0	03E-94274-0	03E-93947-0	695-00237-0
SAE A, 11 Tooth	**	03E-95164-0	03E-94943-0	03E-93724-0	03E-93724-0	03E-94657-0	**	695-00287-0
SAE B, 13 Tooth	**	03E-95165-0	03E-94945-0	03E-93277-0	03E-93277-0	03E-94273-0	03E-93946-0	695-00243-0
SAE BB, 15 Tooth	**	**	03E-94361-0	03E-93279-0	03E-93279-0	03E-94272-0	03E-93945-0	695-00243-0
SAE C, 14 Tooth	**	**	**	03E-93276-0	03E-93276-0	03E-94271-0	03E-93944-0	695-00251-0
SAE CC, 17 Tooth	**	**	**	**	**	03E-94270-0	03E-93943-0	695-00251-0
SAE D&E, 13 Tooth	**	**	**	**	**	**	03E-93942-0	695-00259-0

Seal Kits	018	028	045	060	075	100	140	
	S2E-18709-5K	S2E-19118-5K	S2E-19066-5K	S2E-18697-5K	S2E18004-5K	S2E-18460-5K	S2E-18158-5K	
Note: Seal kits contain all the seals required for any pump configuration.								



Rotating Group Kits	018	028	045	060	075	100	140
CW Mobile P1	S2E-18710-0K	S2E-19119-0K	S2E-19067-0K	S2E-18698-0K	S2E-18032-0K	S2E-18485-0K	S2E-18489-0K
CW Mobile P1 with Ripple Chamber	S2E-19205-0K	S2E-19209-0K	S2E-19235-0K	**	**	**	**
CCW Mobile P1	S2E-18711-0K	S2E-19120-0K	S2E-19068-0K	S2E-18699-0K	S2E-18033-0K	S2E-18486-0K	S2E-18490-0K
CCW Mobile P1 w/ Ripple Chamber	S2E-19206-0K	S2E-19210-0K	S2E-19236-0K	**	**	**	**
CW Industrial PD	S2E-18712-0K	S2E-19121-0K	S2E-19069-0K	S2E-18700-0K	S2E-18483-0K	S2E-18487-0K	S2E-18491-0K
CW Industrial PD w/ Ripple Chamber	S2E-19207-0K	S2E-19211-0K	S2E-19126-0K	**	**	**	**
CCW Industrial PD	S2E-18713-0K	S2E-19122-0K	S2E-19070-0K	S2E-18701-0K	S2E-18484-0K	S2E-18488-0k	S2E-18492-0K
CCW Industrial PD w/ Ripple Chamber	S2E-19208-0K	S2E-19212-0K	S2E-19127-0K	**	**	**	**

Rotating Group Kit includes barrel s/a, pistons, retainer, washer, pins, port plate

Torque Limiter Control Kits	045	060	075	100	140
Torque Limiter Kit for AMT Control	S2E-19102-5	S2E-19033-5	S2E-18720-5	S2E-18888-5	S2E-18963-5
Torque Limiter Kit for ALT Control	See Note		**	**	**
Torque Limiter Kit for L0T	**	**	S2E-18721-5	S2E-18759-5	S2E-18739-5

Torque Limiter Kits includes cartridge assembly, tubing and fittings. **Note:** AM control can be converted to an AL control with conversion kit S2E-19117-0.





Compensator Part Number

Port	Rotation	L0 80 - 280bar (1150 - 4000 psi)	L1 20-80 bar (300-1150 psi)	L2 80 - 280bar (1150 - 4000 psi)	L3 20-80 bar (300-1150 psi)
SAE	CW	S2E-17823-5T	S2E-18245-5T	S2E-18584-5 T	N/A
SAE	CCW	S2E-17824-5T	S2E-18244-5T	S2E-18586-5 T	N/A
100	CW	S2E-17939-5T	N/A	N/A	N/A
150	CCW	S2E-17938-5T	N/A	N/A	N/A
	CW	S2E-17937-5T	N/A	N/A	N/A
DSPP	CCW	S2E-17936-5T	N/A	N/A	N/A

Item No.	Qty	Description	NOTES / Tightening Torque
1	1	Compensator Body	
2	1	Main Compensator Spool	
3	1	Main Compensator Spring Seat	
4	1	Main Compenator Outer Spring	
5	1	Main Compensator Inner Spring	
6	1	Main Compensator Spring Seat & Piston	L0 & L2 versions only
7	2	Compensator Seal Piston O-ring	





Item No.	Qty	Description	NOTES / Tightening Torque		
8	1	Main Compensator Spring cap o-ring			
9	1	Main Compensator Spring cap	115 ± 7 N-m (85 ± 5	ft-lbs)	
10	2	Adjusting screw locknut	7.9 ± 0.8 N-m (70 ±7	7 in-lbs)	
11	2	Adjusting screw			
12	1	Load Sense Compensator Spring cap	36.5 ± 1.5 N-m (27 ±	⊧ 1 ft-lbs)	
13	1	Load Sense Compensator Spring cap oring			
14	1	Load Sense Compensator Piston backup ring			
15	1	Load Sense Compensator Piston Oring			
16	1	Load Sense Compensator Seal Piston			
17	1	Load sense compensator spring			
18	1	Load sense compensator spring seat			
19	1	Load sense compensator spool			
20	1	Socket set screw	(Loctite 242) 3.4 ± 0	.4 N-m (30 ± 3 in-lbs)	
01	4	Socket set screw	L0 & L1 versions	(Loctite 242) 3.4 ± 0.4 N-m	
21	I	Orifice	L2 & L3 versions	(30 ± 3 in-lbs)	
22	3	SAE #2 o-ring boss plug	4.0 ± 0.6 N-m (35 ±	5 in-lbs)	
23	5	SAE #2 o-ring			
24	2	Hardened SAE #2 o-ring boss plug	4.0 ± 0.6 N-m (35 ±	5 in-lbs)	
25	4	Teflon O-ring			
26	1	Roll pin			
27	4	Hex mounting screw	5.0 ± 0.3 N-m (45 ±	3 in-lbs)	





Rotation	C0 80 - 280 bar (1150 - 4000 psi)	C1 20 - 80 bar (300 - 1150 psi)		
CW	S2E-17904-5 T	S2E-18285-5 T		
CCW	S2E-17905-5 T	S2E-18286-5 T		

ltem no.	Quantity	Description	NOTES / Tightening Torque
-1	-1	Compensator body CW rotation	
I	I	Compensator body CCW rotation	
2	1	Spool	
3	1	Spring seat	
4	1	Outer spring	C0 versions only
5	1	Inner spring	
6	1	Spring seat & piston	
7	1	Seal piston o-ring	
8	1	Spring cap o-ring	
9	1	Spring cap	115 ± 7 N-m (85 ± 5 ft-lbs)
10	1	Adjusting screw	
11	1	Adjusting screw locknut	7.9 ± 0.8 N-m (70 ±7 in-lbs)
12	1	Socket set screw	(Loctite 242) 3.4 ± 0.4 N-m (30 ± 3 in-lbs)
13	4	Hex mounting screw	5.0 ± 0.3 N-m (45 ± 3 in-lbs)
14	1	SAE #2 o-ring	
15	1	Hardened SAE #2 o-ring boss plug	4.0 ± 0.6 N-m (35 ± 5 in-lbs)
16	1	Orifice plug	(Loctite 242) 3.4 ± 0.4 N-m (30 ± 3 in-lbs)
17	4	Teflon O-ring	
18	1	Roll pin	
19	1	Teflon O-ring	



NOTE: Individual parts are not available.

The compensator is sold as a complete assembly only.

Compensator Part Number

Rotation	AM*	AN*	AL*	AE*	AF*
CW	S2E-18745-5T	S2E-18743-5T	S2E-19107-5T	S2E-18747-5T	S2E-18749-5T
CCW	S2E-18746-ST	S2E-18744-5T	S2E-19108-5T	S2E-18748-5T	S2E-18750-5T

Note: To convert "AM*" to "AL*", use conversion kit S2E-19117-0





COMPENSATOR DISASSEMBLY	NOTES: Access plugs on end of compensator spool bores are hardened plugs. Do not interchange with other plugs in the control.				
	For rotation change, the complete compensator assembly will need to be replaced.				
	Compensator Disassembly:1. Measure and record the extension of the two pressure adjusting screws.				
	2. Carefully remove the main compensator spring cap. Remove the two springs. Remove the seal piston and spring seat. Remove the o-ring boss access plug on the opposite side of the compensator. Remove the compensator spool. NOTE: the compensator spool and inner spring are not interchangeable with the load sense compensator spool and spring.				
	3. For "L" series compensators: Carefully remove the load sense com- pensator spring cap with spring seat/seal piston. Remove the spring. Remove the spring seat. Remove the o-ring boss access plug on the opposite side of the compensator. Remove the load sense compensa- tor spool. NOTE: the load sense compensator spool and spring are not interchangeable with the main compensator spool and inner spring of the main compensator.				
	4. Remove all SAE o-ring boss access plugs.				

COMPENSATOR INSPECTION

NOTE: The compensator is supplied as an assembly. Individual parts are not available. If there is significant damage to any of the parts, the complete compensator will need to be replaced.

- 1. Inspect the main compensator spool and the load sense spool for scratches or other damage.
- 2. Inspect the springs for proper free extension length (see chart).
- 3. Inspect the spool bores for damage. Apply a light oil film on the appropriate spool and check its fit in the bore. The spool should fit snugly in housing and not have any radial play.

CHART 2 COMPENSATOR SPRING FREE LENGTH							
Туре	ltem Number	Component	Tolerances				
C*/L*	5	Main compensator spring - inner	Free height: 25.9±0.5mm (1.020±0.020 in.)				
C0/L0/L2	4	Main compensator spring - outer	Free height: 39±0.7mm (1.535±0.028 in.)				
L*	17	Load Sense spring	Free height: 14±0.4mm (0.551±0.016 in.)				
R*	6	Bias spring					



COMPENSATOR ASSEMBLY

NOTE: instructions are for load sense compensator. For other compensator types disregard steps related to extra spool assembly.



Carefully clean and dry all parts prior to assembly. Use caution to insure that spools and other parts are not damaged during cleaning process. Use clean oil to lubricate seals and spools for easier assembly.

- 1. Remove and discard all o-rings. Install new o-rings on SAE boss plugs and seal pistons.
- 2. Apply a light film of oil to the o-ring on the main compensator seal piston. Install the main compensator seal piston in the main compensator spring cap.
- Place inner compensator spring on seal piston. Install the outer compensator spring over the inner spring on the seal piston. Position the spring seat over the springs. Insert this assembly into the main compensator housing bore. Torque the main compensator spring cap to 169-183 Nm (125-135 ft.-lb.).
- 4. Apply a light film of oil on the main compensator spool (the longer of the 2 spools). Insert the spool into the spool bore opposite the main compensator spring assembly in the compensator body. The rounded end of the spool should be installed first so it will contact the spring seat. Install a new o-ring on the hardened SAE boss fitting and place it into the port. Torque fitting to 4 ± 0.5 Nm (37 ± 5 in-lb).
- 5. Apply a light film of oil to the o-ring on the load sense seal piston. Install the load sense compensator seal piston seat in the load sense spring cap. Install the load sense spring over the seal piston. Position the spring seat over the spring. Install this assembly into the load sense bore of the compensator housing. Torque the load sense spring cap to 35-38 Nm (26-28 ft. lb.).
- 6. Apply a light film of oil to the load sense compensator spool (the shorter of the 2 spools). Insert the spool into the spool bore opposite the load sense spring assembly. The spool should be installed with the rounded end in first so it will contact the load sense spring seat. Install a new o-ring on the hardened SAE boss fitting and place it into the port. Torque fitting to 4 ± 0.5 Nm (37 \pm 5 in-lb).
- 7. Install o-rings on remaining SAE boss fittings and install into housing. Torque SAE-2 fittings to 4 ± 0.5 Nm (37 ± 5 in-lb).



Main Compensator Spool





PUMP DISASSEMBLY

Pump disassembly for inspection should be limited to the following cases: a) Malfunction or oil leakage resulting from damage or wear and tear. b) Trouble-shooting procedures previously listed do not solve the problem.

For rotation change or shaft conversion, disassembly should be done only as far as necessary to complete conversion.

Disassembly and reassembly should be performed in a clean environment.

Caution: Spring assemblies in the pump are normally set under high compression and bodily injury may occur if caution is not taken during disassembly.

It is usually not necessary to replace spring (20) fitted in cylinder barrel. Do not replace the spring unless absolutely necessary.

After disassembly, the internal parts should be coated with a film of clean oil and protected from dirt and moisture.

It is recommended that the length of the protruding portion of the compensator adjusting screws, on the control 38 be measured and noted as this information will prove useful during assembly.

Care must be taken to avoid dropping, damaging or contaminating the machined parts and the control valve.

For complete overhaul, all o-rings and seals should be discarded and replaced.

1. Identify the pump from information on the data tag. Figure 1



Figure 1



PUMP DISASSEMBLY	2.	Drain fluid from housing. Fluid drained from pump should be disposed of properly.
Continued	3.	Mount pump in fixture to prevent movement while removing main housing bolts
	4.	Remove bolts holding the compensator assembly on the pump housing. Additional fluid may drain out of the passages when the compensator is removed. Set compensator aside for later disassembly and inspection
	5.	Remove the bolts attaching the port block to the main housing.
	6.	Carefully remove the port block. Use caution to avoid dropping the port plate. Note the location of the bias spring - piston assembly and the control piston assembly. The control piston, bias piston and bias spring may remain in pump when port block is removed. Remove and discard the three white Teflon seals on the port block. These seals should be replaced each time the pump is disassembled.
	7.	Remove the control piston and the bias piston - spring assembly. NOTE: For rotation change only, do not disassemble further, proceed to step 14.
	8.	Position the pump horizontally and remove the rotating group. Avoid separating the pistons from the barrel if possible. This will assist in identifying damage between an individual piston and bore during component inspection.

9. Remove cam from housing. See Figure 2







PUMP DISASSEMBLY	10. Remover cam bushing screws and cam bushings from pump.
Continued	11. Remove snap ring in housing and shaft bearing assembly.
	12. If completing a seal change or complete overhaul, turn the housing over and remove the snap ring and shaft seal from the housing. Note: Install a new seal do not reuse the shaft seal.
	 If there is excessive wear on the port block bushing; remove the bushing from the port block.
	 If complete overhaul or rotation change, remove control piston and bias piston guides. (45 Size only)
COMPENSATOR DISASSEMBLY	NOTES: Access plugs on end of compensator spool bores are hardened plugs. Do not interchange with other plugs in the control. For rotation change, the complete compensator assembly will need to be replaced.
	1. Measure and record the extension of the two pressure adjusting screws.
	2. Carefully remove the main compensator spring cap. Remove the two springs. Remove the seal piston and spring seat. Remove the o-ring boss access plug on the opposite side of the compensator. Remove the compensator spool. NOTE: the compensator spool and inner spring are not interchangeable with the load sense compensator spool and spring.
	3. Load sense compensator: Carefully remove the load sense compensator spring cap with spring seat/seal piston. Remove the spring. Remove the spring seat. Remove the o-ring boss access plug on the opposite side of the compensator. Remove the load sense compensator spool. NOTE: the load sense compensator spool and spring are not interchangeable with the main compensator spool and inner spring of the main compensator.
	4. Remove all SAE o-ring boss access plugs.

Proceed to inspection section of this manual.



PUMP INSPECTION PROCEDURES	Carefully clean and dry all parts prior to inspection. Refer to chart 1 for dimension information regarding allowable tolerances.			
	1.	Examine piston diameters for scratches or gouges. If any piston is severely- damaged, note which piston bore it came out of. Extra attention should begiven to that bore in step 2. Check end play of piston shoe assembly. Checkthe bottom surface of the shoes for damage. The shoe surface should besquare and flat. Measure the depth of the pocket of the shoe. Shoes may belapped as a set if the pocket depth is within allowable limits. Confirm pocketdepth after lapping to insure it is still within limits.		
	2.	Examine bores in cylinder for scratches Check diameter of bores in 4different locations, including near the bottom of the barrel where the pistondoes not travel. If the dimensions vary by more than 0.0102 mm (0.0004 in.)or any dimension exceeds the allowable limit, the barrel needs to bereplaced. Examine the barrel face for scratches and gouges. The barrel canbe reworked if dimensions are with specifications listed in chart 1.		
	3.	The port plate can be lapped lightly if the face is only lightly scratched, otherwise it should be replaced.		
	4.	Examine the retainer plate in the area of contact with the piston shoes. Any- marks beyond light polishing indicate that replacement is necessary. Check the surface of the spherical area of the retainer plate and the spherical guide ball. Inspect the back surface of the spherical guide ball where the load pins make contact. If indentations are present replace the guide ball.		
	5.	Examine cam on top and bottom surface. If scratches or gouges appear to penetrate the surface treatment, the cam must be replaced.		
	6.	The cam bearings cannot be reworked and should be replaced if worn through the Teflon surface.		
	7.	Both the bias piston and the compensator piston should move freely in their respective bores. The pistons and bores should be free of scratches or gouges.		
	8.	The seal area of the drive shaft should be smooth and not have marks due to seal wear. Keyed shafts should be inspected for signs of brinelling and damage to the key area. Splined shafts may have a contact wear pattern but should not show excessive wear on the spline area. NOTE: Spinning on shaft for P1/PD-018, 028 and 045 the cylindrical bearing should not have any signs of roller spalling, brinelling or discoloration. The bearing should be free to rotate without bind or rough feel.		
COMPENSATOR INSPECTION	NO	TE: The compensator is supplied as an assembly. Individual parts are not available. If there is significant damage to any of the parts, the complete compensator will need to be replaced.		
	1.	Inspect the main compensator spool and the load sense spool for scratches or other damage.		
	2.	Inspect the springs for proper free extension length (see chart).		
	3.	Inspect the spool bores for damage. Apply a light oil film on the appropriate spool and check its fit in the bore. The spool should fit snugly in housing and not have any radial play.		



Bulletin HY28-2665-02/SVC/EN 018, 028, 045 Pump Maintenance

Rework Limits							
Item Number	Component	018 Part No	028 Part No	045 Part No	Tolerances		
13	Bias Spring	03E-94430-0 78.3 mm	03E-94393-0 87.5 mm	03E-94356-0 116.4 mm	Free Height +/- 0.2mm		
20	Barrel Spring	787635	03E-94387-0 39.5 mm	03E-94350-0 48.3 mm	Free Height +/- 0.2mm		
	Distor	789519 Max End Play 0.10 mm	S2E-18415-0 Max End Play 0.07 mm	S2E-184130-0 Max End Play 0.10 mm	Measure OD in 3 places, top, middle and bottom. Measurement should not vary by more than		
20	Piston	Viston Min Shoe Min Shoe Min Shoe Min Shoe Flange Flange Flang Thickness Thickness Thickness 4.98	Min Shoe Flange Thickness 4.98mm	End Play between piston and shoe should not exceed value shown			
23	Barrel	03E-94717-0	03E-94375-0	03E-94338-0	Measure piston bore ID in 3 places , top, middle, bottom. Measurement should not vary by more than 0.01 mm. Max material to be removed by lapping is		
					.0051 mm		
CO	P Max Compensator Spring-Outer		03E-93158-0 39 mm		Free Height : +/- 0.7mm		
CO	P Max Compensator Spring- Inner		03E-93159-0 26 mm		Free Height : +/- 0.5mm		
LO	Load Sense Spring		03E-93825-0 14 mm		Free Height : +/- 0.4mm		



PUMP ASSEMBLY PROCEDURES

For major overhauls, all plugs should be removed, and the seals replaced. Prior to assembly, all parts should be thoroughly cleaned. Assembly should be performed in a clean work environment.

Do not use bearing grease during installation. Grease does not dissolve in hydraulic oil and may plug orifices or filters in the system. Clean petroleum jelly is preferred to lubricate o-rings and seals, and to adhere parts for assembly.

NOTE: For fluids other than petroleum based hydraulic oil, insure that petroleum jelly is compatible with the fluid. If not compatible, another product should be used instead.

Inspect all bearing surfaces and seal areas to insure that they are free from nicks, dings, scratches, and rust.

- 1. The P1/PD-018, 028 and 045 assembly will use step 2 to install the shaft seal. For P1/PD-018, 028 and 045 front bearing installation go to step 3.
- 2. Turn housing over. Using installation tool T1, press the shaft seal in the seal bore. Install the snap ring into the groove in the seal housing bore.
- Install cylindrical bearing on pump shaft (slip fit). Install external retaining ring to hold bearing in place on the shaft. Insert shaft assembly into the pump housing with the bearing sliding into the bearing diameter in the housing. Install internal retaining ring into the housing. (See drawing)
- 4. If barrel hold down spring was removed during disassembly process, install three pins to slots in barrel spline (45 Size only). Petroleum jelly can be used to hold pins in place while installing remaining parts. (Figure 4) Place barrel on fixture with pin side down. Install backup washer and hold down spring and second back up washer. Compress spring in press and install snap ring. Caution: Make sure snap ring is properly seated in groove prior to removing barrel from press.





5. Apply a light film of oil into the piston bores. Lightly lubricate the spherical surface of the guide ball. Install the nine pistons into the bores in the hold down plate. Install the spherical guide ball into the hold down plate. While holding the guide ball against the hold down plate, install the pistons into the barrel.



Cylindrical Bearing


PUMP ASSEMBLY PROCEDURES Continued

Chart 3						
Pump	Control and bias					
019	Brocc Eit					
010	Pross Fit					
020	140 Nm (105 ft lba)					
045	142 NM (105 π lbs)					

- 6. Install the locating pin on the port block face.
- 7. For 045: Apply Loctite Primer Grade T to guide threads and allow to dry. Install unlubricated o-rings on the control guide and bias guide. Apply Loctite 271 to guide threads. For left hand rotation the bias guide is installed nearest to the dowel pin (figure 5A.) For right hand rotation the control guide is installed nearest to the dowel pin (figure 5B.) Torque the control and bias guides as specified in Chart 3. For 018, 028: The guides are identical and press fit into the holes. (Not shown in picture below)



- 8. Apply light oil film to control piston and install it in the control guide bore.
- 9. Apply light oil film to the bias piston. Install the bias spring and the bias piston in the bias piston guide bore.
- 10. Apply a light layer of petroleum jelly to the back surface of the port plate. Install the port plate on the port block, lining up the slot on the port plate with the locating pin. (Refer to Figure 6)



11. Install the large o ring in the groove on the port block. Install the three teflon o rings on the pressure communication ports of the port block.



PUMP ASSEMBLY PROCEDURES Continued

Chart 4						
Pump Housing bolt						
torque						
018	51 Nm (38 ft lbs)					
028	70 Nm (52 ft lbs)					
045	85 Nm (63 ft lbs)					

- 12. Install the cam bearings in the cradle area of the housing. The chamfer on the back of the bearing must face the outer wall of the housing. Use Loctite Primer Grade "T" or other suitable primer on screws and mating threads in housing. Apply Loctite #242 (use sparingly) to screw threads and install orifice screws to hold bearings in place. Torque screws to 3.4 ± 0.25 Nm (33 ± 3 in-lb).
- 13. Place thin film of clean oil on cam bearing surfaces. Install cam in housing. For 045, the cam must be tilted to permit entry into the housing. (Figure 2) NOTE: The large pocket on the bottom surface of the cam must be on the same side as the three pressure communication holes on the main housing. Pump rotation does not affect the assembly of the cam.
- 14. Install the drive shaft into the pump housing. Position pump horizontally. Install the rotating group over the pump shaft. Rotate the barrel to insure that it is seated against the cam. Insure that the pump shaft is seated properly in the front bearing.
- 15 Confirm that compensator rotation, port plate rotation, control and bias piston location indicate same direction of rotation.
- 16 Carefully install the assembled port block on the pump housing. Press the port block to compress the bias spring and install housing bolts. Tighten the bolts in a cross pattern to insure the port block does not get cocked on the housing. When port block is seated on the housing, torque bolts in a cross pattern as specified in chart 4.
- 17. Install o-ring seals and assembled compensator on side of pump housing. Pump rotation is indicated by arrow on compensator housing. Torque bolts to 5 ± 0.25 Nm (45 ± 3 in-lb). (See Figure 7)





Bulletin HY28-2665-02/SVC/EN 018, 028, 045 Assembly Tools

T1 Seal Installation Tool



T1 Seal installation tool	А	В	С	D
(018)	2.250	1.62	1.18	0.406
(028)	2.250	2.00	1.378	0.447
(045)	2.250	1.600	1.142	0.579



Pump Model	Α	В	С	D	E	F
018	76.20 mm	50.80 mm	19.05 mm	15°	28.82 mm	20.45 mm
"01", "02", "04" Shafts	3.00 in.	2.00 in.	0.75 in.		1.135 in.	0.805 in.
018	76.20 mm	50.80 mm	19.05 mm	15°	28.82 mm	16.76 mm
"06" Shaft	3.00 in.	2.00 in.	0.75 in.		1.135 in.	0.66 in.
028 / 045	76.20 mm	50.80 mm	19.05 mm	15°	38.10 mm	26.00 mm
"01", "02", "04" Shafts	3.00 in.	2.00 in.	0.75 in.		1.50 in.	1.024 in.
018/028/045	76.20 mm	50.80 mm	19.05 mm	15°	28.82 mm	22.50 mm
"08" Shaft	3.00 in.	2.00 in.	0.75 in.		1.135 in.	0.885 in.



T2 Front Bearing P1/PD045 Installation Tool



T5 Rear Bushing Installation Tool





PUM	P TEST PROCEDURE	Test criteria based on hydraulic oil ISO 32 per Parker HF-0 specifications. Oil temperature: $50^{\circ}C \pm 2^{\circ}C$ ($120^{\circ}F \pm 10^{\circ}F$). NOTE: insure that the hydraulic system does not overheat during this test procedure. Operating speed: 0 - 2300 rpm ± 30 rpm. Case pressure: Maximum 14.5 psi (1 bar)						
		1. N t	. Mount pump on test fixture. Insure that shaft alignment is within specified tolerances.					
		2. F r	Fill cas	e with clean oil. Conne ions. Insure other drair	ect upper drain port to r n ports are properly plu	eservoir with no gged.		
		 Connect inlet and pressure lines. Insure that lines are filled with oil. I circuit below. For units with "L" compensators, connect a suitable pil- from port "X" to the pump discharge pressure line, down stream of th non-compensating flow valve. 						
		4. 0	Confirr	n direction of rotation f	or pump and drive are o	correct.		
		5. F c t	 Reduce the main compensator setting to minimum. For units with "L" compensators, advance the load sense compensator adjustment until it bottoms out, and lock into position. 					
		 Set maximum volume stop (if included) to full displacement. If minimum volume stop is included, back adjustment all of the way out. If possible, gradually increase pump speed to 1800 ± 30 rpm with no load. Screw in compensator adjusting screw until it bottoms out, with no pressure on system load-relief valve. 						
		9. E v c c	Break- valve to compe cause and off	in pump at times and p o the pressure listed fo nsator setting to 280 b pump to compensate th stroke properly.	ressures listed below. , r the times indicated. A ar (4060 psi), and adjus hree times to verify that	Adjust the load-relief fter break-in, reduce st system load relief to t pump compensates on		
		Time		30 seconds	30 seconds	30 seconds		
	TEST CIRCUIT	Press	sure	62-69 Bar 900-1000 psi	200-207 Bar 2900-3000 psi	269-276 Bar. 3900-4000 psi		
1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12.	Test pump Test stand prime mover Pump pressure gauge Non-compensating flow control Load pressure gauge Load relief valve Safety bypass relief valve Main flow meter Case drain pressure gauge Case drain flow meter Filter assembly with bypass Cooler assembly with bypass Reservoir)		

NOTE: Items 4 and 5 are required for load sense pump test.



Circuit 1

10

PERFORMANCE SPECIFICATIONS PUMP WITH PRESSURE COMPENSATOR							
STEP REFERENCE	CONDITION	028	045				
1	Rated Speed	1800	1800	1800			
4	Output Flow at minimum pressure	32 lpm minimum	49 lpm minimum	80 lpm minimum			
5	Output Flow at rated pressure of 280 bar	30 lpm minimum	47 lpm minimum	77 lpm minimum			
6	Case leakage at rated pressure of 280 bar	1.6 lpm	2.3 lpm	5.3 lpm			
9	Case leakage when compensated at 280 bar	3.75 lpm	3.95 lpm	6.7 lpm			
10	Input Torque when compensated at 280 bar	17.5 Nm	21.2 Nm	42 Nm			
11	Output Flow when pressure reduced to 273 bar with compensator set at 280 bar	30 lpm minimum	47 lpm minimum	77 lpm minimum			

TEST PROCEDURE PUMP WITH PRESSURE COMPENSATOR							
STEP REFERENCE	CONDITION	REQUIRED VALUE	MEASURED VALUE				
1	Set the pump speed to 1800 RPM	1800 rpm					
2	Increase pump pressure compensator adjustment to maximum.	n/a					
3	Record input oil temperature	43-54 ° C (110 – 130 °F)					
4	Set output load pressure to minimum. Record output flow	see performance chart					
5	Set output load pressure to 280 ± 2 bar (4060 ± 30 psi). Record output flow	see performance chart					
6	Record case leakage	see performance chart					
7	Set output pressure to 290 ± 2 bar (4200 ± 30 psi)	n/a					
8	Set pressure compensator to 280 ± 2 bar (4060 ± 30 psi)	n/a					
9	Record case leakage	see performance chart					
10	Record input torque	see performance chart					
11	Reduce output pressure to 273 ± 2 bar (3960 ± 30 psi). Record output flow	see performance chart					
12	Verify no external leaks	No leakage permitted					





PUMP DISASSEMBLY NOTES	A.	Pump disassembly for inspection should be limited to the following cases: a) Malfunction or oil leakage resulting from damage or wear and tear. b) Trouble-shooting procedures previously listed do not solve the problem.
		Caution: Spring assemblies in the pump are normally set under high compression and bodily injury may occur if caution is not taken during disassembly.
	В.	For rotation change or shaft conversion, disassembly should be done only as far as necessary to complete conversion.
	C.	Disassembly and reassembly should be performed in a clean environment.
	D.	It is usually not necessary to replace spring (20) fitted in cylinder barrel. Do not replace the spring unless absolutely necessary.
	E.	After disassembly, the internal parts should be coated with a film of clean oil and protected from dirt and moisture.
	F.	It is recommended that the length of the protruding portion of the compensa- tor adjusting screws, be measured and noted, as this information will prove useful during assembly.
	G.	Care must be taken to avoid dropping, damaging or contaminating the ma- chined parts and the control valve.
	H.	For complete overhaul, all o-rings and seals should be discarded and re- placed.
PUMP DISASSEMBLY PROCEDURE	1.	Identify the pump from information on the data tag. Figure 1
	2.	Drain fluid from housing. Fluid drained from pump should be disposed of

- Drain huid from housing. Fluid drained from pump should be disposed of properly.
- 3. Mount pump in fixture to prevent movement while removing main housing bolts
- 4. Remove bolts holding the compensator assembly on the pump housing. Additional fluid may drain out of the passages when the compensator is removed. Set compensator aside for later disassembly and inspection
- 5. Remove the bolts attaching the port block to the main housing.



Figure 1 Pump Data Tag



PUMP DISASSEMBLY PROCEDURE 6. Carefully remove the port block. Use caution to avoid dropping the port plate. Note the location of the bias spring - piston assembly and the control piston (continued) assembly. The control piston, bias piston and bias spring may remain in pump when port block is removed. Remove and discard the three white Teflon seals on the port block. These seals should be replaced each time the pump is disassembled. 7. Remove the control piston and the bias piston - spring assembly. NOTE: For rotation change only do not disassemble further, proceed to step 16. Remove the tapered roller bearing cone and shim from the end of the shaft. 8. 9. Position the pump horizontally and remove the rotating group. Avoid separating the pistons from the barrel if possible. This will assist in identifying damage between an individual piston and bore during component inspection. 10. Remove the drive shaft. NOTE : For shaft change only, no further disassembly is required. Proceed to assembly procedure step 5. 11. Remove the cam by rotating it 90 degrees and carefully extracting it from the pump housing. Note the large pocket under the cam fits on the pressure control side of the pump housing (same side as the three seals on the housing flange). Figure 2 12. Remove the front tapered roller bearing cone.

- 13. If there is excessive wear or damage, remove the tapered roller bearing cup from the bottom of the housing.
- 14. If completing a seal change or complete overhaul, turn the housing over and remove the snap ring and shaft seal from the housing. Note: do not reuse the shaft seal.
- 15. If there is excessive wear on the port block bearing cup, cone, or both; remove the tapered roller bearing cup from the port block.
- 16. If complete overhaul or rotation change, remove control piston and bias piston guides. The control piston and bias piston guides are installed with anerobic thread lock. Place the port block wih piston guides in oven at 163° C (325° F) NOTE: To prevent annealing of heat treated surfaces: DO NOT USE A TORCH TO HEAT PISTON GUIDES.





PUMP INSPECTION PROCEDURE	Carefully clean and dry all parts prior to inspection.					
	Ref	er to chart 1 for dimensional information regarding allowable tolerances.				
	1.	Examine piston diameters for scratches or gouges. If any piston is severely damaged, note which piston bore it came out of. Extra attention should be given to that bore in step 2. Check end play of piston shoe assembly. Check the bottom surface of the shoes for damage. The shoe surface should be square and flat. Measure the thickness of the shoe. Shoes may be lapped as a set if the thickness is within allowable limits. Confirm shoe thickness after lapping to insure it is still within limits.				
	2.	Examine bores in cylinder for scratches Check diameter of bores in 4 differ- ent locations, including near the bottom of the barrel where the piston does not travel. If the dimensions vary by more than 0.0102 mm (0.0004 in.) or any dimension exceeds the allowable limit, the barrel needs to be replaced. Ex- amine the barrel face for scratches and gouges. The barrel can be reworked if dimensions are with specifications listed in chart 1.				
	3.	The port plate can be lapped lightly if the face is only lightly scratched, other- wise it should be replaced.				
	4.	Examine the retainer plate in the area of contact with the piston shoes. Any marks beyond light polishing indicate that replacement is necessary. Check the surface of the spherical area of the retainer plate and the spherical guide ball. Inspect the back surface of the spherical guide ball where the load pins make contact. If indentations are present replace the guide ball.				
	5.	Examine cam on top and bottom surface. If scratches or gouges appear to penetrate the surface treatment, the cam must be replaced.				
	6.	The cam bearings cannot be reworked and should be replaced if worn through the Teflon surface.				
	7.	Both the bias piston and the compensator piston should move freely in their respective bores. The pistons and bores should be free of scratches or gouges.				
	8.	The seal area of the drive shaft should be smooth and not have marks due to seal wear. The bearing surfaces should not have any indication of the bearing cone spinning on the shaft. Keyed shafts should be inspected for signs of bri- nelling and damage to the key area. Splined shafts may have a contact wear pattern but should not show excessive wear on the spline area.				



CHART 1 REWORK LIMITS								
Item	Component		Part n	umber		Toloropoo		
Number	Component	060	075	100	140	Tolerances		
13	Bias spring	03E-94055-0	03E-93151-0 141.5 mm (5.57 in.)	03E-93801-0 174.6 mm (6.87 in.)	03E-93963-0 212.3 mm (8.36 in.)	Free height: ± 0.51mm (± 0.020 in.)		
20	Barrel hold down spring	03E-94049-0	03E-93145-0 63.7 mm (2.50 in.)	03E-93795-0 72.2 mm (2.84 in.)	03E-93959-0 68.6 mm (2.70 in.)	Free height: ± 0.51 mm (± 0.020 in.)		
23	Barrel	03E-94036-0	03E-93129-0	03E-93783-0	03E-93242-0	Measure piston bore diameters in 3 places at the top, middle, and bottom. The measure- ments should not vary by not more than 0.010 mm (0.0004 in.) Maximum material to be removed when lapping is 0.0051 mm (0.0002 in.)		
26	Piston and shoe assembly Sold in sets only	03E-94036-0 Maximum end play 0.10 mm (0.004 in.) Minimum shoe flange thickness 5.91 mm (0.233 in.)	S2E-17003-0 Maximum end play 0.10 mm (0.004 in.) Minimum shoe flange thickness 5.91 mm (0.233 in.)	S2E-17912-0 Maximum end play 0.13 mm (0.005 in.) Minimum shoe flange thickness 6.41 mm (0.252 in.)	S2E-17323-0 Maximum end play 0.13 mm (0.005 in.) Minimum shoe flange thickness 6.41 mm (0.252 in.)	Measure piston outside diamter in 3 places at the top, middle, and bottom. The measure- ments should not vary by more than 0.0102 mm (0.0004 in) End play between pis- ton and shoe should not exceed values shown. Total material allowed to be removed from shoe face when lapping is 0.076mm (0.003 in)		



PUMP ASSEMBLY PROCEDURE	For i asse in a	major overhauls, all plugs should be removed, and the seals replaced. Prior to embly, all parts should be thoroughly cleaned. Assembly should be performed clean work environment.				
	Do r lic oi ferre	not use bearing grease during installation. Grease does not dissolve in hydrau- il and may plug orifices or filters in the system. Clean petroleum jelly is pre- ed to lubricate o-rings and seals, and to adhere parts for assembly.				
	NOTE: For fluids other than petroleum based hydraulic oil, insure that pe- troleum jelly is compatible with the fluid. If not compatible, another product should be used instead.					
	Insp ding	ect all bearing surfaces and seal areas to insure that they are free from nicks, s, scratches, and rust.				
	1.	Using installation tool T2, press the front bearing cup into the bottom of the housing. Make sure the cup is seated firmly against the bottom of the housing.				
	2.	Turn housing over. Using installation tool T1, press the shaft seal in the seal bore. Install the snap ring into the groove in the seal housing bore.				
	3.	Using installation tool T5, press the rear bearing cup into the port block. Insure that the cup is seated firmly against the bottom of the housing.				
	4.	Install the front bearing cone and shaft into the housing.				
	5.	Install the rear bearing cone on the shaft.				
	6.	Install the port block onto the housing using housing bolts and tighten to 27 \pm 1.3 Nm (20 \pm 1 ft. lb.).				
	7.	Position the pump so shaft end is up.				
	8.	Lay a parallel bar on the pump pilot.				
	9.	Press down on the shaft and rotate it 3-5 times then measure the height of the shaft end to the parallel bar using dial calipers or a dial indicator.				
	10.	Grasp the shaft and pull it up and rotate it 3-5 times. Measure the height of the shaft end to the parallel bar. Note: if the shaft slips or falls, the steps must be repeated to get an accurate measurement. Figure 3				
	11.	Subtract the larger from the smaller to get the differential gap.				
	12.	Repeat the procedure three times. Once recorded, take the average of the three measurements.				
	13.	With the average, use chart 2 to determine the correct shim to install in the pump.				
	14.	Rebuild the pump with the shaft bearings, and selected shim. Check end play, then disassemble port block and continue with pump assembly.				
	15.	If barrel hold down spring was removed during disassembly process, install three pins to slots in barrel spline. Petroleum jelly can be used to hold pins in place while installing remaining parts. Place barrel on fixture with pin side down. Install backup washer and hold down spring. Compress spring in press and install snap ring. Caution: Make sure snap ring is properly seated in the groove prior to				
		removing the barel from the press.				



PUMP ASSEMBLY PROCEDURE Continued



Figure 3

CHART 2 Shim Thicknes Selection							
Measured	differential	Shim		Part N	umber		
minimum	maximum	thickness	060	075	100	140	
3.30mm (0.130 in)	3.36 mm (0.132 in)	3.28 mm (0.1291 in)	03E-93180-0	03E-93180-0	03E-94148-0	03E-93260-0	
3.37 mm (0.133 in)	3.44 mm (0.135 in)	3.36 mm (0.1323 in)	03E-93566-0	03E-93566-0	03E-94149-0	03E-93970-0	
3.45 mm (0.136 in)	3.51 mm (0.138 in)	3.44 mm (0.1354 in)	03E-93567-0	03E-93567-0	03E-94150-0	03E-93971-0	
3.52 mm (0.139 in)	3.62 mm (0.142 in)	3.52 mm (0.1386 in)	03E-93568-0	03E-93568-0	03E-94151-0	03E-93972-0	
3.63 mm (0.143 in)	3.70 mm (0.145 in)	3.60 mm (0.1417 in)	03E-93569-0	03E-93569-0	03E-94152-0	03E-93973-0	
3.71 mm (0.146 in)	3.77 mm (0.148 in)	3.68 mm (0.1449 in)	03E-93570-0	03E-93570-0	03E-94153-0	03E-93974-0	
3.78 mm (0.149 in)	3.85 mm (0.151 in)	3.76 mm (0.1480 in)	03E-93571-0	03E-93571-0	03E-94154-0	03E-93975-0	
3.86 mm (0.152 in)	3.92 mm (0.154 in)	3.84 mm (0.1512 in)	03E-93572-0	03E-93572-0	03E-94155-0	03E-93976-0	
3.93 mm (0.155 in)	4.00 mm (0.157 in)	3.92 mm (0.1539 in)	03E-93573-0	03E-93573-0	03E-94156-0	03E-93977-0	
4.01 mm (0.158 in)	4.10 mm (0.161 in)	4.00 mm (0.1575 in)	03E-93574-0	03E-93574-0	03E-94157-0	03E-93978-0	
4.11 mm (0.162 in)	4.18 mm (0.164 in)	4.08 mm (0.1606 in)	03E-93575-0	03E-93575-0	03E-94158-0	03E-93979-0	
4.19 mm (0.165 in)	4.25 mm (0.167 in)	4.16 mm (0.1638 in)	03E-93576-0	03E-93576-0	03E-93864-0	03E-97980-0	



PUMP ASSEMBLY PROCEDURE Continued

Chart 3			
Pump	Control and Bias Guide Torque		
060	142 ± 6.5 Nm (105 ± 5 ft-lbs)		
075	142 ± 6.5 Nm 105 ± 5 ft-lbs)		
100	184 ± 8 Nm (136 ± 6 ft-lbs)		
140	203 ± 8 Nm (170 ± 6 ft-lbs)		

- 16. Apply a light film of oil into the piston bores. Lightly lubricate the spherical surface of the guide ball. Install the nine pistons into the bores in the hold down plate. Install the spherical guide ball into the hold down plate. While holding the guide ball against the hold down plate, install the pistons into the barrel.
- 17. Install the locating pin on the port block face.
- 18. Apply Loctite Primer 7469 to the guide threads and allow to dry. Install unlubricated o-rings on the control guide and bias guide. Apply Loctite 272 to the guide threads. For right hand rotation the control guide is installed nearest to the dowel pin (figure 4A). For left hand rotation the bias guide is installed nearest to the dowel pin (figure 4B). Torque the control and bias guides as specified in Chart 3



Figure 4A Port block with Right Hand configuration Figure 4B Port Block with Left Hand configuration

- 19. Apply light oil film to control piston and install it in the control guide bore. NOTE: The 140 size has a lubrication hole in the piston. Confirm that the hole is facing the port block. The control guide has nonsymmetrical lubrication grooves. The end with the closest grooves must be installed towards the port block.
- 20. Apply light oil film to the bias piston. Install the bias spring and the bias piston in the bias piston guide bore.
- 21. Apply a light layer of petroleum jelly to the back surface of the port plate. Install the port plate on the port block, lining up the slot on the port plate with the locating pin.



PUMP ASSEMBLY PROCEDURE

Continued

Chart 4				
Pump	Housing Bolt Torque			
060	135.6 ± 5 Nm (100 ± 4 ft-lbs)			
075	135.6 ± 5 Nm (100 ± 4 ft-lbs)			
100	229 ± 7 Nm (170 ± 5 ft-lbs)			
140	278 ± 7 Nm (205 ± 5 ft-lbs)			

- 22. Install the large o-ring in the groove on the pump housing. Install the three white Teflon o-rings in the pressure communication ports on the pump housing.
- 23. Install the cam bearings in the cradle area of the housing. The chamfer on the back of the bearing must face the outer wall of the housing. Use Loctite Primer Grade "T" or other suitable primer on screws and mating threads in housing. Apply Loctite #242 (use sparingly) to screw threads and install orifice screws to hold bearings in place. Torque screws to 3.4 ± 0.25 Nm (33 ± 3 in-lb).
- 24. Place thin film of clean oil on cam bearing surfaces. Install cam in housing. The cam must be tilted to permit entry into the housing. (Figure 2) NOTE: The large pocket on the bottom surface of the cam must be on the same side as the three pressure communication holes on the main housing. Pump rotation does not affect the assembly of the cam.
- 25. Install the drive shaft into the pump housing. Position pump horizontally. Install the rotating group over the pump shaft. Rotate the barrel to insure that it is seated against the cam. Insure that the pump shaft is seated properly in the front bearing.
- 26. Install bearing spacer as determined from the chart (see step 11.) Install the rear bearing on the drive shaft.
- 27. Confirm that compensator rotation, port plate rotation, control and bias piston location indicate same direction of rotation.
- 28. Carefully install the assembled port block on the pump housing. Press the port block to compress the bias spring and install housing bolts. Tighten the bolts in a cross pattern to insure the port block does not get cocked on the housing. When port block is seated on the housing, torque bolts in a cross pattern as specified in chart 4.
- 29. Install o-ring seals and assembled compensator on side of pump housing. Pump rotation is indicated by arrow on compensator housing. Torque bolts to 5 ± 0.25 Nm (45 ± 3 in-lb).



Bulletin HY28-2665-02/SVC/EN 060, 075, 100, 140 Assembly Tools

Medium Pressure Axial Piston Pumps P1/PD Maintenance



Pump Model	Part Number	Α	В	С	D
060 & 075	213-0-004194	69.9 mm (2.750 in)	50.3 mm (1.980 in)	34.9 mm (1.375 in)	20.3 mm (0.800 in)
100	213-0-004208	63.5 mm (2.50 in)	56.6 mm (2.230 in)	43.3 mm (1.703 in)	14.0 mm (0.550 in)
140	213-0-004199	85.7 mm (3.375 in)	70.6 mm (2.780 in)	53.4 mm (2.10 in)	19.1 mm (0.750 in)



Pump Model	Part Number	Α	В	С	D	E	F
060 & 075	213-0-004195	108 mm (4.25 in)	57.1 mm (2.25 in)	25.4 mm (1.00 in)	10°	34.90 mm (1.373 in)	31.75 mm (1.250 in)
100 SAE	213-0-004206	108 mm (4.25 in)	70.6 mm (2.78 in)	25.4 mm (1.00 in)	10°	43.26 mm (1.703 in)	38.1 mm (1.500 in)
100 ISO	213-0-004207	114 mm (4.50 in)	76.2 mm (3.00 in)	22.4 mm (0.88 in)	15°	43.26 mm (1.703 in)	40.06 mm (1.577 in)
140 SAE	213-0-004200	108 mm (4.25 in)	70.6 mm (2.78 in)	25.4 mm (1.00 in)	10°	53.04 mm (2.088 in)	44.48 mm (1.751 in)
140 ISO	213-0-004201	114 mm (4.50 in)	76.2 mm (3.00 in)	22.4 mm (0.88 in)	15°	53.04 mm (2.088 in)	50.04 mm (1.970 in)



Bulletin HY28-2665-02/SVC/EN 060, 075, 100, 140 Assembly Tools



Pump Model	Part Number	Α	В	С
060 & 075	213-0-004192	71.4 mm (2.812 in)	66.0 mm (2.60 in)	12°
100	213-0-004204	92.1 mm (3.623 in)	86.1 mm (3.390 in)	15°
140	213-0-004197	93.7 mm (3.687 in)	89.3 mm (3.515 in)	15°



Pump Model	Part Number	Α	В	С
060 & 075	213-0-004193	53.8 mm (2.120 in)	48.7 mm (1.918 in)	12°
100	213-0-004205	65.1 mm (2.562 in)	59.3 mm (2.335 in)	15°
140	213-0-004198	71.1 mm (2.80 in)	65.1 mm (2.562 in)	15°



PUMP TEST PROCEDURE	Test criteria based on hydraulic oil ISO 32 per Parker HF-0 specifications. Oil temperature: $50^{\circ}C \pm 2^{\circ}C$ ($120^{\circ}F \pm 10^{\circ}F$). NOTE: insure that the hydraulic system does not overheat during this test procedure. Operating speed: 0 - 2300 rpm ± 30 rpm. Case pressure: Maximum 14.5 psi (1 bar)				
	1. Moun tolera	t pump on test fixture. In nces.	nsure that shaft alignme	ent is within specified	
	2. Fill ca restric	se with clean oil. Conne tions. Insure other drain	ect upper drain port to r n ports are properly plu	reservoir with no Igged.	
	3. Conne circuit from p non-c	ect inlet and pressure li below. For units with "I port "X" to the pump disc ompensating flow valve	nes. Insure that lines an -" compensators, conn charge pressure line, d	re filled with oil. Refer to ect a suitable pilot line own stream of the	
	4. Confi	m direction of rotation f	or pump and drive are	correct.	
	5. Reduc compo bottor	ce the main compensat ensators, advance the I ns out, and lock into po	or setting to minimum. oad sense compensato sition.	For units with "L" or adjustment until it	
 Set maximum volume stop (if ir volume stop is included, back a 			if included) to full displacement. If minimum k adjustment all of the way out.		
	7. If possible, gradually increase pump speed to 1800 ± 30 rpm with no load				
	 Screw in compensator adjusting screw until it bottoms out, with no pre on system load-relief valve. 				
	9. Break valve comp cause and o	-in pump at times and p to the pressure listed fo ensator setting to 280 b pump to compensate t ff stroke properly.	pressures listed below. or the times indicated. <i>A</i> ar (4060 psi), and adju hree times to verify tha	Adjust the load-relief After break-in, reduce st system load relief to t pump compensates on	
	Time	30 seconds	30 seconds	30 seconds	
TEST CIRCUIT	Pressure	62-69 Bar 900-1000 psi	200-207 Bar 2900-3000 psi	269-276 Bar 3900-4000 psi	
 Test pump Test stand prime mover Pump pressure gauge Non-compensating flow control Load pressure gauge Load relief valve Safety bypass relief valve Main flow meter Case drain pressure gauge Case drain flow meter Filter assembly with bypass Cooler assembly with bypass Reservoir 	5 (3) (2) (EM)	

NOTE: Items 4 and 5 are required for load sense pump test.



Circuit 1

10

PERFORMANCE SPECIFICATIONS PUMP WITH PRESSURE COMPENSATOR					
STEP REFERENCE	CONDITION	060	075	100	140
1	Rated Speed (RPMK	1800	1800	1800	1800
4	Output Flow at minimum pressure	102 - 108 lpm	132 - 135 lpm	174 - 182 lpm	243 - 257 lpm
5	Output Flow at rated pressure of 280 bar	95 lpm min.	126 lpm min.	165 lpm min.	233 lpm min.
6	Case leakage at rated pressure of 280 bar	4.5 lpm min.	7.5 lpm min.	9 lpm min.	14 lpm min.
9	Case leakage when compensated at 280 bar	10.5 lpm max.	11.5 lpm max.	11 lpm max.	16.2 lpm max.
10	Input Torque when compensated at 280 bar	38.9 Nm max.	49.6 Nm max.	67 Nm max.	96.6 Nm max.
11	Output Flow when pressure reduced to 273 bar with compensator set at 280 bar	99 lpm min.	126 lpm min.	165 lpm min.	233 lpm min.

TEST PROCEDURE PUMP WITH PRESSURE COMPENSATOR				
STEP REFERENCE	CONDITION	REQUIRED VALUE	MEASURED VALUE	
1	Set the pump speed to 1800 RPM	1800 rpm		
2	Increase pump pressure compensator adjustment to maximum.	n/a		
3	Record input oil temperature	43-54 ° C (110 – 130 °F)		
4	Set output load pressure to minimum. Record output flow	see performance chart		
5	Set output load pressure to 280 ± 2 bar (4060 ± 30 psi). Record output flow	see performance chart		
6	Record case leakage	see performance chart		
7	Set output pressure to 290 ± 2 bar (4200 ± 30 psi)	n/a		
8	Set pressure compensator to 280 ± 2 bar (4060 ± 30 psi)	n/a		
9	Record case leakage	see performance chart		
10	Record input torque	see performance chart		
11	Reduce output pressure to 273 ± 2 bar (3960 ± 30 psi). Record output flow	see performance chart		
12	Verify no external leaks	No leakage permitted		



PERFORMANCE SPECIFICATIONS PUMP WITH LOAD SENSE COMPENSATOR					
STEP REFERENCECONDITION060075100					
1	Rated Speed (RPM)	1800	1800	1800	1800
4	Load sense output flow setting at 50 \pm 2 bar (725 \pm 30 psi)	60-63 lpm	77-79 lpm	103 - 105 lpm	145-147 lpm
5	Allowable flow variation from 50 to 260 \pm 2 bar (725 to 3770 \pm 30 psi)	56-66 lpm	73-83 lpm	99-109 lpm	136-156 lpm

TEST PROCEDURE PUMP WITH LOAD SENSE COMPENSATOR				
STEP REFERENCE	CONDITION	REQUIRED VALUE	MEASURED VALUE	
1	Set the pump speed to 1800 RPM	1800 rpm		
2	Record input oil temperature	43-54 ° C (110 – 130 °F)		
ЗA	Set output load prssure to 50 ± 2 bar (725 \pm 30 psi)	n/a	n/a	
3B	Adjust throttle valve and adjust differential setting until pressure at pump outlet is 20 ± 2 bar (290 ± 30 psi) higher than the load pressure gage	n/a	n/a	
4	Adjust throttle valve to required flow raqte. Adjust output load presure valve if necessary to maintain 50 ± 2 bar (725 ± 30 psi)	See performance chart		
5	Increase the output pressure to 260 ± 2 bar (3770 ± 30 psi). Verify that the flow remains within specified limits.	See performance chart		
6	Lock the load sense adjustment screw. Confirm differential pressure at 20 ± 2 bar (290 ± 30 psi).	n/a	n/a	
7	Verify no external leaks	No leakage permitted		



CONVERSION FACTORS

DEFINITION & UNIT		
displacement	in ³ /rev x 16.387 = cm ³ /rev	cm ³ /rev x 0.06102 = in ³ /rev
flow	gpm x 3.78 = L/min	L/min x 0.2642 = gpm
power	hp x 0.7457 = kW	kW x 1.341 = hp
torque	lb-ft x 1.3567 = Nm	Nm x 0.7376 = lb-ft
pressure	lbs/in² (psi) x 0.06895 = bar lbs/in² (psi) x 6.895 = kPa	bar x 14.50 = lbs/in² (psi) kPa x 0.1450 = lbs/in² (psi)
weight	lb x 0.4536 = kg	kg x 2.205 = lbs
force	lb x 4.448 = N	N x 0.2248 = lbs
volume	in ³ x 16.387 = cm ³	cm ³ x 0.06102 = in ³
area	$in^2 x 6.452 = cm^2$	cm ² x 0.1550 = in ²
length	in x 25.4 = mm	mm x 0.03937 = in
temperature	degree F-32 = °C 1.8	1.8 x C+32 = °F
viscosity	cSt x 1.0 = mm²/sec SSU = cSt x 4.25 + 14	mm²/sec x 1.0 = cSt 20 cSt = 99 SSU

FLUID POWER FORMULAS

Pump input torque	lbs. in.	pressure(psi) x displacement (in ³ /rev) 2π x mech. eff.
Pump input power	hp	<u>rpm x (in³/rev) x (psi)</u> 395934 x overall eff.
Pump output flow	U.S. gpm	<u>rpm x (in³/rev) x volumetric eff.</u> 231
Fluid motor speed	rpm	231 x flow rate(U.S. gpm) x volumetric eff. displacement (in ³ /rev)
Fluid motor torque	lbs. in.	pressure(psi) x displacement (in ³ /rev) x mech. eff. 2π
Fluid motor power	hp	<u>rpm x (in³/rev) x (psi) x overall eff.</u> 395934
(metric) Pump input torque	Nm	<u>pressure(bar) x displacement (cm³/rev)</u> 20π x mech. eff.
Pump input power	kW	<u>rpm x (cm³/rev) x (bar)</u> 600000 x overall eff.
Pump output flow	Lpm	<u>rpm x (cm³/rev) x volumetric eff.</u> 1000
Fluid motor speed	rpm(min ⁻¹) (tr/mn)	1000 x flow rate (Lpm) x volumetric eff. displacement (cm ³ /rev)
Fluid motor torque	Nm	pressure(bar) x displacement (cm ³ /rev) x mech. eff. 20π
Fluid motor power	kW	<u>rpm x (cm³/rev) x (bar) x overall eff.</u> 600000









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9. Loss to Buyer's Property. Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which become Buyer's property, may be considered obsolete and may be destroyed by Seller after two consecutive years have elapsed without Buyer placing an order for the items which are manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

10. Special Tooling. A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture Products. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the Products, even if such apparatus has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

11. Buyer's Obligation; Rights of Seller. To secure payment of all sums due or otherwise, Seller shall retain a security interest in the goods delivered and this agreement shall be deemed a Security Agreement under the Uniform Commercial Code. Buyer authorizes Seller as its attorney to execute and file on Buyer's behalf all documents Seller deems necessary to perfect its security interest. Seller shall have a security interest in, and lien upon, any property of Buyer in Seller's possession as security for the payment of any amounts owed to Seller by Buyer.

12. Improper Use and Indemnity. Buyer shall indemnify, defend, and hold Seller harmless from any claim, liability, damages, lawsuits, and costs (including attorney fees), whether for personal injury, property damage, patent, trademark or copyright infringement or any other claim, brought by or incurred by Buyer, Buyer's employees, or any other person, arising out of: (a) improper selection, improper application or other misuse of Products purchased by Buyer from Seller; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of patterns, plans, drawings, or specifications furnished by Buyer to manufacture Product; or (d) Buyer's failure to comply with these terms and conditions. Seller shall not indemnify

Buyer under any circumstance except as otherwise provided. **13. Cancellations and Changes.** Orders shall not be subject to cancellation or change by Buyer for any reason, except with Seller's written consent and upon terms that will indemnify, defend and hold Seller harmless against all direct, incidental and consequential loss or damage. Seller may change product features, specifications, designs and availability with notice to Buyer.

14. Limitation on Assignment. Buyer may not assign its rights or obligations under this

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17. Termination. This agreement may be terminated by Seller for any reason and at any time by giving Buyer thirty (30) days written notice of termination. In addition, Seller may by written notice immediately terminate this agreement for the following: (a) Buyer commits a breach of any provision of this agreement (b) the appointment of a trustee, receiver or custo-dian for all or any part of Buyer's property (c) the filing of a petition for relief in bankruptcy of the other Party on its own behalf, or by a third party (d) an assignment for the benefit of creditors, or (e) the dissolution or liquidation of the Buyer

18. Governing Law. This agreement and the sale and delivery of all Products hereunder shall be deemed to have taken place in and shall be governed and construed in accordance with the laws of the State of Ohio, as applicable to contracts executed and wholly performed therein and without regard to conflicts of laws principles. Buyer irrevocably agrees and consents to the exclusive jurisdiction and venue of the courts of Cuyahoga County, Ohio with respect to any dispute, controversy or claim arising out of or relating to this agreement. Disputes between the parties shall not be settled by arbitration unless, after a dispute has

 arisen, both parties expressly agree in writing to arbitrate the dispute has arisen, both parties expressly agree in writing to arbitrate the dispute.
 19. Indemnity for Infringement of Intellectual Property Rights. Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Section. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets ("Intellectual Property Rights"). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that a Product sold pursuant to this Agreement infringes the Intel-lectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If a Product is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using the Product, replace or modify the Product so as to make it noninfringing, or offer to accept return of the Product and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to Products delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any Product sold hereunder. The foregoing provisions of this Section shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights. 20.Taxes. Unless otherwise indicated, all prices and charges are exclusive of excise, sales,

use, property, occupational or like taxes which may be imposed by any taxing authority upon the manufacture, sale or delivery of Products.

21. Equal Opportunity Clause. For the performance of government contracts and where dollar value of the Products exceed \$10,000, the equal employment opportunity clauses in Executive Order 11246, VEVRAA, and 41 C.F.R. §§ 60-1.4(a), 60-741.5(a), and 60-250.4, are hereby incorporated.



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Parker Hannifin Corporation **Hydraulic Pump Division** 14249 Industrial Parkway Marysville, OH 43040 USA phone 937 644 4435 fax 937 642 3639 www.parker.com Bulletin HY28-2665-02/SVC/EN Effective: 6-10



Motor Dampening Bars



Features:

- Reduces noise and vibrations
- Available to accommodate NEMA frame sizes 056C thru 405TC
- Strong vulcanized rubber-to-metal bond results in no metal-to-metal contact
- Bolt down or weld in place for easy installation directly to tank top
- Weld pads are available for simple safe mounting option
- Supplied in sets of two (2) bars for each motor





SECTION A-A

Part	Motor		Dampening Bar Dimensions (inches)										
Number	Frame	L	\sim	Н	A	В	X	C1 for	T1				
MDB056-B	056C	7.25	1.97	1.57	5.75	3.0	.875	1/2-13	5/16-18				
MDB143-B	143TC	7.75	1.97	1.57	6.25	4.0	.812	1/2-13	5/16-18				
MDB145-B	145TC	8.75	1.97	1.57	7.25	5.0	.812	1/2-13	5/16-18				
MDB182-B	182TC	8.75	1.97	1.57	7.25	4.5	.938	1/2-13	3/8-16				
MDB184-B	184TC	9.75	1.97	1.57	8.25	5.5	.938	1/2-13	3/8-16				
MDB213-B	213TC	10.0	1.97	1.57	8.50	5.5	.938	1/2-13	3/8-16				
MDB215-B	215TC	11.5	1.97	1.57	10.0	7.0	.938	1/2-13	3/8-16				
MDB254-B	254TC	13.0	1.97	1.77	11.5	8.25	.938	1/2-13	1/2-13				
MDB256-B	256TC	14.75	1.97	1.77	13.25	10.0	.938	1/2-13	1/2-13				
MDB284-B	284TC/TSC	14.5	2.76	2.36	12.75	9.5	1.125	5/8-11	1/2-13				
MDB286-B	286TC/TSC	16.0	2.76	2.36	14.25	11.0	1.125	5/8-11	1/2-13				
MDB324-B	324TC/TSC	16.0	3.00	2.36	14.0	10.5	1.562	3/4-10	5/8-11				
MDB326-B	326TC/TSC	17.5	3.00	2.36	15.5	12.0	1.562	3/4-10	5/8-11				
MDB364-B	364TC/TSC	17.0	3.00	2.36	15.0	11.25	1.562	3/4-10	5/8-11				
MDB365-B	365TC/TSC	18.0	3.00	2.36	16.0	12.25	1.562	3/4-10	5/8-11				
MDB404-B	404TC/TSC	19.5	3.94	2.36	17.25	12.25	2.0	1-8	3/4-10				
MDB405-B	405TC/TSC	21.0	3.94	2.36	18.75	13.75	2.0	1-8	3/4-10				
MDB444-B	444TC/TSC	23.0	4.72	2.36	20.75	14.5	2.375	1-8	3/4-10				
MDB445-B	445TC/TSC	26.0	4.72	2.36	23.75	16.5	2.375	1-8	3/4-10				
MDB447-B	447TC/TSC	29.5	4.72	2.36	26.75	20.0	2.375	1-8	3/4-10				
MDB449-B	449TC/TSC	34.5	4.72	2.36	31.75	25.0	2.375	1-8	3/4-10				



5

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Horizontal Welded Steel Mounts

MAGNALOY'S WELDED STEEL MOUNTS are available for

special mounting requirements where the standard aluminum mount is not available or where a steel mount is required. These mounts are manufactured with the same quality and precision of the standard aluminum mounts and are guaranteed to meet Magnaloy's minimum quality measurements shown in Illustration A, page 19. Magnaloy's Welded Steel Mounts are available for horizontal, vertical and engine applications in a nearly limitless choice of lengths in 1/4 inch increments. **MOUNTING KITS** are included as with aluminum mounts.

Magnaloy Horizontal Welded Steel Pump/Motor Mounts

MAGNALOY'S HORIZONTAL WELDED STEEL MOUNTS are available for metric motor and metric pump dimensions in addition to NEMA motors and SAE pumps listed, consult factory for special requirements. To select a welded steel horizontal mount follow the selection method detailed on page 20. The length determined will be the minimum length recommended, additional length can be added depending upon coupling selection, consult factory for further assistance.

TABLE 19 - NEMA 56C, 143TC/145TC, 182UC/184UC

AJ I	BF BD						RADIA	AL CLEARANCE '	'Z'' = 4.03
	\checkmark	ΧΑΚ	XAJ2	XBF2	XAJ4	XBF4	XBD	MOUNT NO.	(METRIC SIZES ALSO AV
USA4F17	4 Bolt	1.782			2.84	5/16-18	5.25	S056 4F	
SAE AA	2 Bolt	2.001	3.25	3/8-16			5.25	S056 2AA	
SAE A	2(4) Bolt	3.251	4.19	3/8-16	4.12	3/8-16	5.25	S056 2A	
SAE B	2(4) Bolt	4.001	5.75	1/2-13	5.00	1/2-13	7.00	S056 2B	
SAE C	2(4) Bolt	5.001	7.12	5/8-11	6.38	1/2-13	8.25	S056 2C	
PUMP FI	ANGE			PUMP EI	ND DAT	A			•

TABLE 20 - NEMA 182TC - 256TC, 254UC/256UC

MOTOR END DATA AJ BF BD AK

 $\land \land \land \land$

	12/1/3/	10/15							
	\bigvee	\checkmark	ΧΑΚ	XAJ2	XBF2	XAJ4	XBF4	XBD	MOUNT NO.
	USA4F17	4 Bolt	1.782			2.84	5/16-18	5.25	\$182 4F
	SAE AA	2 Bolt	2.001	3.25	3/8-16			5.25	\$182 2AA
	SAE A	2(4) Bolt	3.251	4.19	3/8-16	4.12	3/8-16	5.25	\$182 2A
	SAE B	2(4) Bolt	4.001	5.75	1/2-13	5.00	1/2-13	7.00	\$182 2B
	SAE C	2(4) Bolt	5.001	7.12	5/8-11	6.38	1/2-13	8.25	\$182 2C
	SAE D	2(4) Bolt	6.001	9.00	3/4-10	9.00	3/4-10	10.50	\$182 2D
Î									

PUMP FLANGE

PUMP END DATA



RADIAL CLEARANCE "Z" = 5.04





(METRIC SIZES ALSO AVAILABLE)



Horizontal Welded Steel Mounts



TABLE 21 - NEMA 284TC/TSC - 286TC/TSC, 284UC/286UC

MOTOR END DATA AJ BF BD AK

2

RADIAL CLEARANCE "Z" = 6.06

RADIAL CLEARANCE "Z" (See Below)

RADIAL CLEARANCE "Z" = 10.02

(METRIC SIZES ALSO AVAILABLE)

	69/1/3	///;?	7						
١	\bigvee	\bigvee	ΧΑΚ	XAJ2	XBF2	XAJ4	XBF4	XBD	MOUNT NO.
1	SAE A	2(4) Bolt	3.251	4.19	3/8-16	4.12	3/8-16	7.00	\$284 2A
	SAE B	2(4) Bolt	4.001	5.75	1/2-13	5.00	1/2-13	7.00	\$284 2B
	SAE C	2(4) Bolt	5.001	7.12	5/8-11	6.38	1/2-13	8.25	\$284 2C
ſ	SAE D	2(4) Bolt	6.001	9.00	3/4-10	9.00	3/4-10	10.50	\$284 2D
	SAE E	2(4) Bolt	6.501	12.50	1-8	12.50	3/4-10	15.00	S284 2E
ſ	SAE F	2(4) Bolt	7.001	13.78	1-8	13.78	1-8	16.00	S284 2F
	PUMP F	LANGE			PUMP E	ND DAT	A		

TABLE 22 - NEMA 324TC/TSC - 405TC/TSC, 324UC/USC - 405UC/USC

MOTOR END DATA

AJ BF BD AK

\bigtriangledown	\bigcirc	ХАК	XAJ2	XBF2	XAJ4	XBF4	XBD	Z	MOUNT NO.
SAE A	2(4) Bolt	3.251	4.19	3/8-16	4.12	3/8-16	9.25	7.98	\$324 2A
SAE B	2(4) Bolt	4.001	5.75	1/2-13	5.00	1/2-13	9.25	7.98	\$324 2B
SAE C	2(4) Bolt	5.001	7.12	5/8-11	6.38	1/2-13	9.25	7.98	\$324 2C
SAE D	2(4) Bolt	6.001	9.00	3/4-10	9.00	3/4-10	10.50	7.98	\$324 2D
SAE E	2(4) Bolt	6.501	12.50	1-8	12.50	3/4-10	15.00	7.98	\$324 2E
SAE F	2(4) Bolt	7.001	13.78	1-8	13.78	1-8	16.00	9.00	\$324 2F

(METRIC SIZES ALSO AVAILABLE)

(METRIC SIZES ALSO AVAILABLE)

PUMP FLANGE

PUMP END DATA

TABLE 23 - NEMA 444TC/TSC - 449TC/TSC, 444UC/TSC - 445UC/USC

MOTOR END DATA AJ BF BD AK

6/6/6/6

INV INV	h // h							
	\bigvee \bigvee	ХАК	XAJ2	XBF2	XAJ4	XBF4	XBD	MOUNT NO.
SAE A	2(4) Bolt	3.251	4.19	3/8-16	4.12	3/8-16	11.25	\$444 2A
SAE B	2(4) Bolt	4.001	5.75	1/2-13	5.00	1/2-13	11.25	S444 2B
SAE C	2(4) Bolt	5.001	7.12	5/8-11	6.38	1/2-13	11.25	\$444 2C
SAE D	2(4) Bolt	6.001	9.00	3/4-10	9.00	3/4-10	11.25	S444 2D
SAE E	2(4) Bolt	6.501	12.50	1-8	12.50	3/4-10	15.00	S444 2E
SAE F	2(4) Bolt	7.001	13.78	1-8	13.78	1-8	16.00	S444 2F

PUMP FLANGE

PUMP END DATA

30

Dimensional Specifications



Magnaloy Coupling Dimensional Specifications

Models 100, 200, 300, 400

	100	200	300	400
Α	2.54	3.10	3.58	4.24
В	2.600	2.900	3.450	3.980
С	2.00	2.25	2.90	3.05
D	0.56	0.68	0.78	1.00
Ε	0.68	0.84	0.96	1.06
F	0.42	0.42	0.44	0.54
G	0.31	0.43	0.56	0.73
W	1/16	1/16	1/16	1/16
X	0.90	0.90	0.98	1.20
Т	1/4-20	5/16-18	5/16-18	3/8-16



TOLERANCES: 2 Place Decimals ± .01 3 Place Decimals ± .001



Model 500

	500
Α	4.67
В	4.800
С	4.00
D	1.04
Ε	1.23
F	0.64
G	0.70
W	1/16
Χ	1.41
Т	3/8-16

- X*: Maximum Space between shaft ends to allow full shaft engagement in Hub Bore.
- W*: Minimum spacing between shaft ends.

* Given for reference only.



3 Place Decimals ± .001



Models 600, 700, 800, 900

	600	700	800	900
Α	5.98	6.99	7.99	10.15
В	5.975	6.900	8.600	11.400
С	4.50	5.19	7.00	8.30
D	1.60	2.08	2.25	2.75
Ε	1.33	1.32	1.62	2.20
F	0.62	0.89	1.00	1.32
G	1.13	1.13	1.58	1.88
W	1/16	1/16	1/16	1/16
X	1.36	1.97	2.25	2.89
Т	3/8-16	1/2-13	1/2-13	3/4-10



TOLERANCES: 2 Place Decimals ± .01 3 Place Decimals ± .001

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Magna	lagnaloy "Standard" Bore & Key Combinations							s	Ν	lagna	loy "Stan	dard"	Bor	e 8	K	ey	С	om	bi	na	tic	n	5			
Model	Bore/Key	Mode		1	20	30	5	60	70	8	9	ſ	Model	Bore/Key	Moc	lel –		1	20	S S	4	50	6	2	8) 6
Code	Code	Bole	Ney	ŏ	ŏ	õõ	ŏ	õ	õ	ŏ	õ		Code	Code	Боге	n	ey	ŏ	ð	S	S	S	S	5 ð	B	ŏ
Μ	01203	3/8 x	3/32	•	•							N	Λ	12414	1 3/4	x 7/	/16				•	•	• •	•	•	
М	01403	7/16 x	3/32	•	•							N	/	12816	1 7/8	x 1/	/2				•	•	•	•	•	•
Μ	01404	7/16 x	1/8	•	•							N	/	13016	1 15/16	x 1/	/2					•	•		\perp	
М	01604	1/2 x	1/8	•	•	•						N	/	20016	2	x 1/	/2					•	•	•	•	•
Μ	01804	9/16 x	1/8	•	•	•						N	/	20416	2 1/8	x 1/	/2				-	•	• •	•	•	•
М	02005	5/8 x	5/32	•	•	•						N	/	20816	2 1/4	x 1/	/2					•	•	•	•	•
М	02006	5/8 x	3/16	•	•	• •	_					N	/	21220	2 3/8	x 5/	/8					•	• •	•	•	•
M	02206	11/16 x	3/16	•	•	• •						N	/	21620	2 1/2	x 5/	/8						• •	•	•	•
M	02404	3/4 x	1/8	•	•	•						N	/	22020	2 5/8	x 5/	/8						• •	•	•	•
М	02406	3/4 x	3/16	•	•	• •	•	•				N	∧	22420	2 3/4	x 5/	/8							•	•	•
M	02806	7/8 x	3/16	•	•	• •	•	•			_	N	<u> </u>	22824	2 7/8	x 3/	/4			_	_			•	•	•
M	02808	7/8 x	1/4	•	•	• •	•	•				N	<u> </u>	30024	3	x 3/	4								•	•
M	03008	15/16 x	1/4		•	•					_	N	<u> </u>	30824	3 1/4	x 3/	4				_				-	•
M	10006	1 x	3/16	•	•	• •	•	•				N	<u> </u>	31228	3 3/8	x 7/	/8								•	•
M	10008	1 X	1/4	-	•	• •	•	•				N	<u> </u>	31628	3 1/2	x 7/	/8				_				-	•
M	10408	1 1/8 X	1/4	-	•	• •	•	•				N	<u> </u>	32028	3 5/8	x 7/	/8			_	_			_	-	•
M	10608	1 3/16 x	1/4		-	•	•					N	<u> </u>	32428	3 3/4	X 7/	8			_	_				-	•
M	10808	1 1/4 X	1/4		•	• •	•	•			_	N	<u> </u>	32832	3 7/8	x 1					_				-	•
M	10810	1 1/4 X	5/16		•	• •	•	•	•	•		N	<u> </u>	40032	4	x 1				_	_			_	_	•
M	11210	13/8 X	5/16		•	• •	•	•	•	•	_	N	<u> </u>	40432	4 1/8	x 1					_				\rightarrow	-
M	11212	1 3/8 X	3/8			•						N	<u> </u>	40832	4 1/4	x 1				_					—	•
IVI	11412	1 //16 X	3/8	\square		-					_	I N	<u> </u>	41232	4 3/8	x 1		<u> </u>		-+	_	_		+	+	-
M	11610	1 1/2 X	5/16			-						N	<u> </u>	41632	4 1/2	x 1	4/4			_	_			_	_	-
IVI	11612	1 1/2 X	3/8	\vdash					-	•		N	/	41640	4 1/2	x 1	1/4								4	-
M	12012	1 5/8 X	3/8	\vdash		• •	-		•	•		N	<u> </u>	42040	4 5/8	x 1	1/4	L		_	_			_	\rightarrow	-
M	12412	13/4 x	3/8			•		-	•	•		N	//	42440	4 3/4	x 1	1/4									•

Standard Bore and Keyway Combinations

Shaded Area: AGMA semi-standard bore key combinations.

Part Number Usage: Magnaloy Coupling Hub part numbers may be specified using the following format: Start with letter "M" designating Magnaloy, followed by 3 digit Model Code (100, 200, etc.), then the specific 5 digit Bore Key Code.

Example: Model 500 hub with a 1 3/8 bore and 5/16 keyway would be specified as: M50011210 - No bore hubs are designated as 'R' code, ie: M500R.

Model Number 100 200 300 400 500 600 700 800 900 1-1/8 1-3/8 1-5/8 1-7/8 2-3/8 2-5/8 2-7/8 3-7/8 4-3/4 Maximum Bore Complete Coupling Approx. Wght. 3/4 1 2 3 4 7 12 18 38 (Solid Hub) 3 Number of Drive Lugs 3 3 3 4 6 6 6 6 **Hub Movement for Insert Removal** .74 .74 .75 .98 1.12 1.02 1.50 1.63 2.27 **Basic Insert Number** 170 270 370 470 570 670 770 870 970

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Additional Coupling Specifications

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Bore Tolerances

magnaloy

Over	Include	Tolerance
	1	+.0008/ +.0003
1	2	+.0013/ +.0005
2	3	+.0018/ +.0008
3	4	+.0020/ +.0010
4	5	+.0023/ +.0010

5

Splined Couplings





Magnaloy couplings are available with a variety of special features which include splined bores. The "Splined Coupling Specifications" chart on page 7 shows several "in-house" splines available for quick delivery. Many additional splined bores are available upon contacting the factory, including straight side 'PTO' type splines and metric splines.



The Clamp-Type Coupling utilizes the basic Magnaloy coupling with the addition of the clamp feature. Developed to compensate for variations in spline formation methods and tolerances. Assures centering of the coupling and positive retention on the shaft. The clamp feature is suggested for all splined couplings, but is also available in smooth bored and keyed models.



Magnaloy's Steel Bushed Splined Bore* Coupling combines all the design and lightweight features of the Magnaloy Coupling with the added spline tooth strength and wear resistance of steel. Under normal conditions the standard "Splined Bore" coupling will perform satisfactorily and the addition of the "Clamp Feature" compensates for various fit conditions. When heavy cyclic loads, reverse loading and high torque loads exist in combination with fit variations, spline tooth failures and fretting can be corrected by utilizing Magnaloy's steel bushed coupling. Of course, to achieve optimum benefits, Magnaloy's clamp feature is recommended - assuring accurate centering and positive retention of the coupling on the shaft.

*Although the steel bushing feature was designed primarily for spline bores, it is also available smooth bored and keyed.

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6

Spline Size		Pressure		Major	Std. Coupling	Steel Bushed Coupling		
Number of Teeth	Pitch	Spline Code	Angle (Degrees)	SAE Design	Diameter (Inches)	Available Model Sizes	Bushing Ø	Available Model Sizes
9	16/32	0916	30 [°]	А	.625	100-900	1.250	200-900
13	8/16	1308	30 [°]	D,E	1.750	400-900	2.625	600-900
13	16/32	1316	30°	В	.875	100-900	1.500	300-900
14	12/24	1412	30°	С	1.250	200-900	2.250	500-900
15	8/16	1508	30 [°]	F	2.000	500-900	3.500	800-900
15	16/32	1516	30°	BB	1.000	100-900	1.750	400-900
17	12/24	1712	30°	CC	1.500	300-900	2.250	500-900
21	16/32	2116	30 [°]		1.375	300-900	2.250	500-900
23	16/32	2316	30°		1.500	300-900	2.250*	500-900
27	16/32	2716	30°		1.750	400-900	2.625	600-900
40	16/32	4016	30 [°]		2.562	600-900	3.875	800-900

Splined Coupling Specifications

*NOTE: With Model 600-900 Bushing O.D. is 2.625 Spline Type Identifier Code – A = Spline B = Steel Bushing Spline C = Clamp Type

Part Number Usage: Magnaloy Splined Coupling part numbers may be specified using the following format: Start with letter 'M' designating Magnaloy, follow with 3 digit model code (100, 200, etc.), next use single letter Spline Type Identifier Code ('A' for regular spline or 'B' for steel bushing) then the specific 4 digit spline code.

If a clamp type coupling is specified - use the letter code 'C' after the spline code. Example: Model 300 hub with 13 tooth 16/32 splined bore, M300A1316; same as above with steel bushing, M300B1316; same as above with steel bushing and clamp, M300B1316C.

Clamp Type Coupling Specifications

Coupling	Bolt Location		U		
Model	Z	Y	Bolt Size	Torque Spec.	
100	.31	.68	1/4-20	130-140 in. lbs.	
200	.43	.75	1/4-20	130-140 in. lbs.	
300	.47	.95	5/16-18	210-220 in. lbs.	
400	.69	1.06	5/16-18	210-220 in. lbs.	
500	.72	1.25	3/8-16	300-310 in. lbs.	
600	1.13	1.50	7/16-14	35-36 ft. lbs.	
700	1.13	1.75	7/16-14	35-36 ft. lbs.	
800	1.44	2.56	1/2-13	49-50 ft. lbs.	
900*	.75 & 2.19	3.00	3/4-10	100-110 ft. lbs.	

* Model 900 utilizes two bolt clamp design.



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Magnaloy Coupling's full range of flexible inserts permit custom design performance for a wide range of applications. All insert materials offer complete electrical insulation, as Magnaloy's design eliminates all metal-to-metal contact.



ignaloy



Part Number Usage: Magnaloy Coupling Insert part numbers may be specified using the following format: Start with letter 'M' designating Magnaloy followed by 3 digit insert model size (170, 270, etc.) then the specific material code letter. If an optional durometer is being specified, after the material code letter supply the durometer number divided by 10.

EXAMPLES: Urethane insert for Model 300, M370U; 80 Duro Neoprene for Model 200, M270N8. Neoprene (Code N) - Black material -Standard material with Magnaloy Coupling. Good general purpose material offering good resiliency and load capabilities. Temp range -30°F to +250°F (-34°C to =121°C) optional 80A durometer (painted gold) and 90A durometer (painted silver) are available for slight increased load capability and less resiliency.

Nitrile (Buna N) (Code B) - Painted blue -Excellent material with petroleum products. Excellent compression set and abrasion resistance characteristics. Temp range -60°F to +250°F (-51°C to +121°C). Urethane (Code U) - Yellow Excellent mechanical and physical properties. Offers good medium duty durability and resiliency. Urethane tends to soften in higher temperatures and humid conditions. Temp Range -30°F to +150°F (-34°C to +66°C).

Viton (Fluorocarbon) (Code V) - Red material -Excellent fluid compatibility and high temperature characteristics. Good compression set and resiliency. Temp range -20°F to +350°F (-29°C to +177°C).

Hytrel (Code H) - Blue-green material - Superior physical and mechanical properties and excellent fluid compatibility and high temperature characteristics. Hardness (50D) approaches that of plastic and offers little resiliency. Excellent performance under heavy duty conditions. Temp range -65°F to +300°F (-54°C to +149°C).

Other materials are available for special applications. Consult factory for recommendations and availability.

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989-356-2186



Service Factors - Load Characteristics

	Type of Prime Mover				
Load Classification	Standard Motor or Turbine	High Torque Motor	I.C. Engine 6 or more cyl.	I.C. Engine less than 6 cyl.	
Uniform (U)	1.0	1.5	1.5	2.0*	
Moderate (M)	1.5	2.0	2.0*	2.5*	
Heavy (H)	2.0*	2.5*	2.5*	3.0*	

Uniform Load: Steady loading, non-reversing, torque does not exceed rating. Moderate Load: Uneven loading with moderate shock, frequent starts, infrequent reversals, peak torque may exceed average rate of prime mover by 125%.

Heavy Load: Uneven loading with heavy shock, frequent reversals, peak torque may exceed average rating of prime mover by 150%. *Recommend use of Urethane or Hytrel Insert.

Drive Unit	Load Sym.	Selection Method
Agitators	U	1. Several specifics must be considered to make the best
Blowers	U	choice of couplings:
Compressors • Centrifugal	U	A Type of prime mover and load characteristics
Rotary Designeesting	M LI *	(soo tablo abovo)
Reciprocating		(see lable above).
Reciprocating	M	B. Shall alameter and key size of spline conliguration
Screw	M	(No. of teeth, pitch ratio, pressure angle).
 Shaker 	н	C. Horsepower rating of loads to be transmitted.
Cranes & Hoists	М	D. Maximum operating speed (rpm).
Crushers	H*	E. Maximum operating misalignment.
Elevators	M	E. Clearance limitations.
• Freight & Pass	. H^	2 Calculate effective bp/100 rpm by use of table above
Fans • Centrifugal	U	z. Colouide elective hp/100 pm by use of table above
Cooling Tower	H H	and select the minimum size couplings recommended.
Generators	U	3. VERIFY YOUR SELECTION:
Welding	Ĥ	A. Check for maximum bore size.
Mills	H*	B. Check dimensions for adequate clearance.
Machine Tools	М	C. Indicate any special insert specification and/or
Mixers	М	coupling coating for environmental protection, if
Paper Mill Machinery	М	required
Pumps • Centrifugal	U	Foundation Effective LIP new 100 DDM - rated LIP v Convice
Rotary	M	
Reciprocating On Injection		Factor x 100/RPM
Molding Equip.		Example: 150 HP 4 cyl. Diesel Engine Driving
Screens • Air & Water	U	Reciprocating Irrigation Pump operating
Washing	_	at 3250 RPM
Freight & Pass	. Н	Service Factor = 3.0 (Hytrel Insert recommended)
Stokers	U	Eff. HP per 100 PPM = $150 \text{ HP x } 3.0 \times 100/3250$
Textile Machinery	M	DDM = 12.95 HP/100 DDM Model 600 ratio a with
Woodworking Machinery	M	
Winches	H*	Hyfrei Insert is 23.7 HP/100 RPM

NOTE: Above service factors are intended for use as a general guide only. * Recommend use of Steel Bushing and Clamp with Splined Bores.

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Shaft spacing should be within range given by dimensions 'W' and 'X' as shown in charts on page 4. Position each hub on proper size shaft - Magnaloy couplings are bored to standard "push fit" tolerances, if a tight fit exists check shaft for burrs.

Maximum benefits are obtained with hubs positioned to allow complete shaft engagement within bore. However, some equipment designs do not permit this condition - maximum shaft engagement should be utilized in any case.

Alignment - Place a straight edge (scale) at top and side of coupling. Use a .005 inch feeler gauge under scale for final inspection. This will indicate accurate parallel and angular alignment.

Magnaloy's precision tooled outside surfaces permit this simple, but accurate alignment method.





Secure equipment mounts and recheck alignment for movement.

Install the insert in the coupling positioning hubs in contact with lip around outside of insert.

Before tightening set screws, run the coupling and check for separation of hubs or creep. Recheck alignment and tighten set screws.

With the Steel Bushed/Clamp type couplings, to facilitate installation on the shaft, it may be necessary to slightly loosen the set-screw over the keystock. When securing the coupling to the shaft, first tighten the clamp bolt, then tighten the set--screw against the keystock.
Mis-Alignment Capabilities

Magnaloy couplings offer four-way flexibility (parallel, angular, axial and torsional) and require no lubrication. They are easily installed and properly aligned without use of special tools or equipment - a straight edge and hex wrench are the only tools required. Magnaloy's insert reduces noise and vibration and permits needed flexibility for proper operation within alignment capabilities.

Recommended Torques for Fasteners

Model	Set Screw	Clamp Screw
100	60-70 in. lbs.	130-140 in. lbs.
200	130-140 in. lbs.	130-140 in. lbs.
300	130-140 in. lbs.	210-220 in. lbs.
400	190-200 in. lbs.	210-220 in. lbs.
500	190-200 in. lbs.	300-310 in. lbs.
600	190-200 in. lbs.	35-36 ft. lbs.
700	300-310 in. lbs.	35-36 ft. lbs.
800	300-310 in. lbs.	49-50 ft. lbs.
900	100-110 ft. lbs.	100-110 ft. lbs.

Intended as a general guide for fastener torques with Magnaloy Couplings.

Perfect alignment of equipment shafts, in most cases, is impractical to obtain or maintain, and misaligned equipment produces excess stress on bearings and coupling. Magnaloy's insert design will accept misalignment strain and, when excessive, will cause insert wear as a visual and audible indication of misalignment problems. However, Magnaloy's inserts are inexpensive and easily replaced; under normal conditions the insert seldom requires replacement.





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Interference Potential exists when shaft diameters are greater than shown in this chart

Model Size	Shaft Diameter	Key Size
100	7/8	1/4
200	1 - 3/16	1/4
300	1 - 5/16	5/16
400	1 - 1/2	3/8
500	1 - 15/16	1/2
600	2 - 1/2	5/8
700	2 - 3/4	5/8
800	3 - 1/2	7/8
900	4 - 1/2	1 - 1/4



drive lugs, there is a potential for interference with the keystock of the drive lugs and the driver lugs of the driven hub. Interference will result when ALL the following conditions exist:

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Keystock Interference with Drive Lug









aerospace climate control electromechanical filtration fluid & gas handling hydraulics pneumatics process control sealing & shielding





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A new standard in 7,000 psi pressure filters





ENGINEERING YOUR SUCCESS.



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- **P**reserve the environment. *Minimize waste and promote energy efficiency.*
- Achieve worldwide filtration solutions. *Build global confidence.*
- Redefine new limits. Forge ahead with advanced technology.
- Keep contamination under control. *Reduce maintenance costs.*
- Enhance total system reliability. Focus on customer satisfaction.
- **R**each optimum potential. *Drill to greater depths.*

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Parker engineers have developed what soon will be the industry standard in high pressure hydraulic filtration. The new 7,000 psi WPF series incorporates many advanced features designed for one reason: to improve your bottom line.

Typical Applications

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- Mining
- Mobile Ag
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- Oil & Gas Exploration
- Power Generation
- Primary Metals
- Refuse Trucks



There is no better high pressure filter available today for durability and performance. The reduction of your operating costs is our primary concern, and we are committed to contributing towards your success.





WPF Series Features



WPF Series

SurgeGuard Elements



WPF Series WPF1 Element Performance



Capacity 100 150 SUS (32 cSt) 5Q 6.0 **-**10Q 80 5.0 60 4.0 PSID BAR 3.0 40 2.0 20 1.0 0 0.0 0 2 4 6 8 Grams

Flow vs. Pressure Drop*



Results typical from Multi-pass tests run per test standard ISO 16889 @ 10 gpm to 50 psid terminal - 10 mg/L BUGL.

WPF2 Element Performance



Results typical from Multi-pass tests run per test standard ISO 16889 @ 25 gpm to 50 psid terminal - 10 mg/L BUGL.

WPF3 Element Performance



Flow vs. Pressure Drop*





Capacity 100 150 SUS (32 cSt) 5Q 6.0 10Q 80 5.0 60 4.0 PSID BAR 3.0 40 2.0 20 1.0 0 0.0 10 20 30 40 0 Grams

Results typical from Multi-pass tests run per test standard ISO 16889 @ 45 gpm to 50 psid terminal - 10 mg/L BUGL.

WPF4 Element Performance



Results typical from Multi-pass tests run per test standard ISO 16889 @ 90 gpm to 50 psid terminal - 10 mg/L BUGL.

WPF5 Element Performance



Results typical from Multi-pass tests run per test standard ISO 16889 @ 100 gpm to 50 psid terminal - 10 mg/L BUGL.

WPF Series Specifications



A ELEMENT SERVICE CLEARANCE

T-PORT DIMENSIONS mm (inch)

Filter Model	А	В	С	D	E	F	G	н	I	J	К	L	М
WPF1	70 (2.76)	180 (7.09)	69.5 (2.74)	23 (.91)	15 (.59)	27 (1.06)	60 (2.36)	30 (1.18)	90 (3.54)	92 (3.62)	46 (1.81)	30 (1.18)	15 (.59)
WPF2	79 (3.11)	293 (11.53)	75 (2.95)	32 (1.26)	26 (1.02)	30 (1.18)	80 (3.15)	40 (1.57)	98 (3.86)	110 (4.33)	55 (2.17)	40 (1.57)	20 (.78)
WPF3	88 (3.47)	345 (13.58)	93 (3.66)	40 (1.57)	29 (1.14)	35 (1.38)	90 (3.54)	55 (2.17)	120 (4.72)	126 (4.96)	63 (2.48)	45 (1.77)	27.5 (1.08)
WPF4	100 (3.94)	445 (17.52)	128 (5.04)	49 (1.93)	39 (1.54)	48 (1.89)	120 (4.72)	50 (1.97)	160 (6.30)	163 (6.42)	81.5 (3.21)	60 (2.36)	25 (.98)
WPF5	100 (3.94)	561 (22.09)	128 (5.04)	61 (2.40)	51 (2.01)	48 (1.89)	140 (5.51)	80 (3.15)	160 (6.30)	183 (7.20)	91.5 (3.60)	70 (2.76)	40 (1.57)

WPF Series Specifications



A ELEMENT SERVICE CLEARANCE

MANIFOLD DIMENSIONS mm (inch)

Filter Model	А	В	С	D	Е	F	G	н	I	J	к	L	М	N	0	Р
WPF2	79 (3.11)	348 (13.70)	75 (2.95)	24 (.94)	39 (1.53)	100 (3.94)	116 (4.57)	50 (1.97)	6 (.24)	110 (4.33)	80 (3.15)	40 (1.48)	110 (4.33)	121 (4.76)	17 (.67)	30 (1.18)
WPF4	100 (3.94)	532 (20.94)	128 (5.04)	38 (1.50)	57 (2.24)	140 (5.51)	150 (5.91)	75 (2.95)	13 (.51)	142 (5.91)	100 (3.94)	50 (1.97)	166.5 (6.56)	161 (6.34)	21 (.83)	31.7 (1.25)
WPF5	100 (3.94)	627 (24.69)	128 (5.04)	38 (1.50)	57 (2.24)	140 (5.51)	150 (5.91)	75 (2.95)	13 (.51)	142 (5.91)	100 (3.94)	50 (1.97)	166.5 (6.56)	161 (6.34)	21 (.83)	31.7 (1.25)

WPF Series Indicator Specifications



Torque: 30-33 ft-lb (40-45 N-m) Indicator setting: 50 psid

INDICATOR DIMENSIONS mm (inch)

Option	Description	Connection/Power	Wiring	"A"	"B"
M2	Visual Auto Reset	N/A	N/A	N/A	49 (1.73)
E2	Electrical - Visual	Din 43650 3 Pole +Earth 5A@125/250 VAC, 3A@28VDC	Pin 1 - Common Pin 2 - Normally Closed Pin 3 - Normally Open	73.7 (2.90)	54 (2.13)

WPF Series

Service & Maintenance Instructions

- 1 Stop system power and vent captive pressure.
- 2 Drain filter assembly.
- 3 Remove bowl and element assembly.
- Push down to squeeze tangs and lift element.
- **5** Twist to remove core.
- 6 Retain reusable core.
- 7 Discard used element.
- 8 Insert reusable core into new element until it snaps.
- 9 Push element assembly into bowl, snap tangs.
- 10 Inspect o-ring and anti-extrusion ring.
- Install bowl with new element.
- 12 Torque bowl, vent and drain plugs.
- 13 Power up and inspect.













WPF Series Parts List

T-Port

Index	Part Description	Part Number
1	WPF1 Head SAE-8	940986
	WPF2 Head 3/4" Flange	940989
	WPF2 Head SAE-12	940988
	WPF3 Head 1" Flange	940992
	WPF3 Head SAE-16	940991
	WPF4 Head 1-1/4" Flange	940923
	WPF4 Head SAE-20	940924
	WPF5 Head 1-1/2" Flange	940773
	WPF5 Head SAE-24	940921
2	Element	See chart on page 16
3	WPF1 Reusable Core	941175
	WPF2 Reusable Core	941176
	WPF3 Reusable Core	941177
	WPF4 Reusable Core	941178
	WPF5 Reusable Core	941179
4	WPF1 Bowl O-ring	V92141
	WPF2 Bowl O-ring	V92144
	WPF3 Bowl O-ring	V92042
	WPF4 Bowl O-ring	V92157
	WPF5 Bowl O-ring	V92157
5	WPF1 Anti-extrusion Ring	941185
	WPF2 Anti-extrusion Ring	934798
	WPF3 Anti-extrusion Ring	941186
	WPF4 Anti-extrusion Ring	941187
	WPF5 Anti-extrusion Ring	941187
6	WPF1 Bowl	941153
	WPF2 Bowl	941154
	WPF3 Bowl	941155
	WPF4 Bowl	941156
	WPF5 Bowl	941157
7	Drain Plug	934320
8	Indicator Plug	941172
9	Electrical Indicator	941173
10	Visual Indicator	941174
11	Name Plate	920928
Not Shown	Drive Screw (2 required)	900028











WPF Series Parts List

Manifold

Index	Part Description	Part Number
1	WPF2 Manifold Mount Head	941273
	WPF4 Manifold Mount Head	940982
	WPF5 Manifold Mount Head	940982
2	WPF2 Manifold Mount O-rings (2 req'd)	V92119
	WPF4 Manifold Mount O-rings (2 req'd)	V92127
	WPF5 Manifold Mount O-rings (2 req'd)	V92127
3	Element See chart	on page 16
4	WPF2 Reusable Core	941176
	WPF4 Reusable Core	941178
	WPF5 Reusable Core	941179
5	WPF2 Bowl O-ring	V92144
	WPF4 Bowl O-ring	V92157
	WPF5 Bowl O-ring	V92157
6	WPF2 Anti-extrusion Ring	934798
	WPF4 Anti-extrusion Ring	941187
	WPF5 Anti-extrusion Ring	941187
7	WPF2 Bowl	941154
	WPF4 Bowl	941156
	WPF5 Bowl	941157
8	Drain Plug	934320
9	Vent Plug	928882
10	WPF Indicator Plug	941172
11	Electrical Indicator	941173
12	Visual Indicator	941174
Not Shown	Name Plate	920928
Not Shown	Drive Screw (2 required)	900028



WPF Series

How to Order

Select the desired symbol (in the correct position) to construct a model code. Example:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8
WPF	2	10QE	V	M2	К	512	1

BOX 1: Filte	er Series
Symbol	Description
WPF	High Pressure Filter
BOX 2: Mo	del
Symbol	Description
1	¹ /2" Nominal ports
2	³ / ₄ " Nominal ports
3	1" Nominal ports
4	1 ¹ / ₄ " Nominal ports
5	1 ¹ /2" Nominal ports
BOX 3: Me Symbol	dia Code Description
02QE	Ecoglass III (bypass only)
05QE	Ecoglass III (bypass only)
10QE	Ecoglass III (bypass only)
	High Collapse
02QH	Microglass III (no bypass only
10QH	Microglass III (no bypass only
BOX 4: Sea Symbol	lls Description
В	Nitrile (NBR)
V	Fluorocarbon (FKM)

Symbol	Description
Р	Plugged indicator port
M2	Visual Automatic Reset
E2	Electrical/ Visual (DIN43650 style connection)
Note: When the indicator shipped as a	the "M2" or "E2" option is selected, port is plugged and the indicator is loose part.
BOX 6: By Symbol	/pass Description
BOX 6: By Symbol K	/pass Description 50 PSID (3.5 bar)
BOX 6: By Symbol K X	pass Description 50 PSID (3.5 bar) No Bypass and No Indicator (port plugged)
BOX 6: By Symbol K X Note: When Box 8) 50 psic	Pass Description 50 PSID (3.5 bar) No Bypass and No Indicator (port plugged) an indicator and no bypass ("2" in is selected, the indicator setting is d (3.5 bar).

< label{eq:started_startes	512	1
DOX 7.	Deute	
Symbol	Description	
-,	WPF1	
S08	SAE-8 Ports	;
	WPF2	
S12	SAE-12 Port	ts
Y12	³ /4" SAE Code	e 62 Flange face
X12	Manifold	
	WPF3	
S16	SAE-16 Port	ts
Y16	1" SAE Code	62 Flange face
	WPF4	
S20	SAE-20 Port	ts
Y20	1 ¹ /4" SAE Coc	le 62 Flange face
X20	Manifold	
	WPF5	
S24	SAE-24 Port	ts
Y24	1 1/2" SAE Coc	le 62 Flange face
X24	Manifold	

BOX 8: Options					
Symbol	Description				
1	With Bypass				
	(for use with standard element only)				
2	No Bypass				
	(for use with high collapse element only)				

Replacement Elements:

	Media	WPF1	WPF2	WPF3	WPF4	WPF5
Standard Collapse	Ecoglass III, 02QE	941029Q	941032Q	941035Q	941038Q	941041Q
(300 psid/21 bar)	Ecoglass III, 05QE	941030Q	941033Q	941036Q	941039Q	941042Q
(000 point)	Ecoglass III, 10QE	941031Q	941034Q	941037Q	941040Q	941043Q
High Collapse	Microglass III, 02QH	941044Q	941046Q	941048Q	941050Q	941052Q
(2000 psid/138 bar)	Microglass III, 10QH	941045Q	941047Q	941049Q	941051Q	941053Q



Parker Hannifin Corporation **Hydraulic Filter Division** 16810 Fulton County Road #2 Metamora, OH 43540 Phone: (800) 253-1258 Phone: (419) 644-4311 Fax: (419) 644-6205 http://www.parker.com/hydraulicfilter 2300-465 06/08

Parker DT Series Check Valves Offer the Features of a Compact Body Size, and 5000 PSI Maximum Operating Pressure

The DT Series check valves utilize the dependable, internal design features found in Parker check valves, but with the added benefit and convenience of compact design. Sizes are available from 1/4" to 1-1/4" with six different Fitting Styles.

The DT Series expands Parker's high quality product line of versatile and efficient check valves.

Features

- 1. Compact Design. Easy to plumb into tight circuits.
- 2. All steel construction. No internal gaskets or seals to wear out.
- **3.** One-piece body eliminates threads and seals that may be potential leakage points.
- 4. Smooth flow stream. Poppet spring is isolated from flow stream.
- 5. Heat treated poppet to resist damage from shocks and surges.



- 6. Variety of end fittings.
- 7. Optional crack pressures available from 1 to 200 PSI.
- 8. Chromium-6 Free plated exterior finish.
- 9. Nitrile O-Ring included on MO and MS fittings.
- **10.** Captive O-Ring Groove is standard on MS end fittings.



DT-MFMF Male Flare 37° JIC Inlet to Male Flare 37° JIC Outlet



DT-MFMO Male Flare 37° JIC Inlet to Male O-Ring Boss Outlet



DT-MOMF Male O-Ring Boss Inlet to Male Flare 37° JIC Outlet







 $\begin{array}{c} \textbf{DT-MSMS} \\ \text{Male Seal-Lok}^{\texttt{R}} \text{ Inlet to Male Seal-Lok}^{\texttt{R}} \text{ Outlet} \end{array}$



Specifications

The DT Series check valves have a Maximum Operating Pressure of 5000 PSI. Standard crack pressures are 1, 5, and 65 PSI depending on the port size and configuration. Other crack pressures up to 200 PSI in 5 PSI increments are available upon request.

DT-MFMF Male Flare 37° JIC Inlet to Male Flare 37° JIC Outlet



Valve Size (inch)	Part Number	Inlet Port Thread	Dim	nension	s (in)	Outlet Port Thread	Hex Size (inch)	** Std Crack Pressures (PSI)
		Α	В	С	D	E	F	
3/8	DT-370-MFMF-**	9/16-18 UNF	.56	.44	.56	9/16-18 UNF	.75	1, 5, 65
1/2	DT-500-MFMF-**	3/4-16 UNF	.66	.50	.66	3/4-16 UNF	.88	5, 65
5/8	DT-620-MFMF-**	7/8-14 UNF	.76	.50	.76	7/8-14 UNF	1.06	5
3/4	DT-750-MFMF-**	1-1/16 - 12 UN	.86	.50	.86	1-1/16 - 12 UN	1.25	1, 5, 65
1	DT-1000-MFMF-**	1-5/16 - 12 UN	.91	.62	.91	1-5/16 - 12 UN	1.50	5, 65
1-1/4	DT-1250-MFMF-**	1-5/8 - 12 UN	.96	1.06	.96	1-5/8 - 12 UN	1.88	1,5

DT-MFMO Male Flare 37° JIC Inlet to Male O-Ring Boss Outlet



Valve Size (inch)	Part Number	Inlet Port Thread	Dim	ension	s (in)	Outlet Port Thread	Hex Size (inch)	** Std Crack Pressures (PSI)
		Α	В	С	D	E	F	
1/4	DT-250-MFMO-**	7/16-20 UNF	.55	.44	.43	7/16-20 UNF	.62	5
3/8	DT-370-MFMO-**	9/16-18 UNF	.56	.44	.47	9/16-18 UNF	.75	1, 5, 65
1/2	DT-500-MFMO-**	3/4-16 UNF	.66	.50	.55	3/4-16 UNF	.88	5, 65
5/8	DT-620-MFMO-**	7/8-14 UNF	.76	.50	.63	7/8-14 UNF	1.06	5
3/4	DT-750-MFMO-**	1-1/16 - 12 UN	.86	.50	.73	1-1/16 - 12 UN	1.25	1, 5, 65
1	DT-1000-MFMO-**	1-5/16 - 12 UN	.91	.62	.73	1-5/16 - 12 UN	1.50	5, 65
1-1/4	DT-1250-MFMO-**	1-5/8 - 12 UN	.96	1.06	.73	1-5/8 - 12 UN	1.88	1, 5

DT-MOMF Male O-Ring Boss Inlet to Male Flare 37° JIC Outlet



Valve Size (inch)	Part Number	Inlet Port Thread	Dim	ension	s (in)	Outlet Port Thread	Hex Size (inch)	** Std Crack Pressures (PSI)
		Α	В	С	D	E	F	
1/4	DT-250-MOMF-**	7/16-20 UNF	.43	.44	.55	7/16-20 UNF	.62	5
3/8	DT-370-MOMF-**	9/16-18 UNF	.47	.44	.56	9/16-18 UNF	.75	1, 5, 65
1/2	DT-500-MOMF-**	3/4-16 UNF	.55	.50	.66	3/4-16 UNF	.88	5, 65
5/8	DT-620-MOMF-**	7/8-14 UNF	.63	.50	.76	7/8-14 UNF	1.06	5
3/4	DT-750-MOMF-**	1-1/16 - 12 UN	.73	.50	.86	1-1/16 - 12 UN	1.25	1, 5, 65
1	DT-1000-MOMF-**	1-5/16 - 12 UN	.73	.62	.91	1-5/16 - 12 UN	1.50	5, 65
1-1/4	DT-1250-MOMF-**	1-5/8 - 12 UN	.73	1.06	.96	1-5/8 - 12 UN	1.88	1, 5



DT-MOMS Male O-Ring Boss Inlet to Male Seal-Lok[®] Outlet



Valve Size (inch)	Part Number	Inlet Port Thread	Dim	ension	s (in)	Outlet Port Thread	Hex Size (inch)	** Std Crack Pressures (PSI)
		A	В	С	D	E	F	
1/4	DT-250-MOMS-**	7/16-20 UNF	.43	.45	.39	9/16-18 UNF	.62	5
3/8	DT-370-MOMS-**	9/16-18 UNF	.47	.44	.44	11/16-16 UN	.75	1, 5, 65
1/2	DT-500-MOMS-**	3/4-16 UNF	.55	.50	.51	13/16-16 UN	.88	5, 65
5/8	DT-620-MOMS-**	7/8-14 UNF	.63	.50	.62	1-14 UNS	1.06	5
3/4	DT-750-MOMS-**	1-1/16 - 12 UN	.73	.50	.68	1-3/16 - 12 UN	1.25	1, 5, 65
1	DT-1000-MOMS-**	1-5/16 - 12 UN	.73	.62	.70	1-7/16 - 12 UN	1.50	5, 65
1-1/4	DT-1250-MOMS-**	1-5/8 - 12 UN	.73	1.06	.70	1-11/16 - 12 UN	1.88	1, 5

DT-MSMO Male Seal-Lok $^{\textcircled{\sc 8}}$ Inlet to Male O-Ring Boss Outlet



Valve Size (inch)	Part Number	Inlet Port Thread	Dim	ensions	s (in)	Outlet Port Thread	Hex Size (inch)	** Std Crack Pressures (PSI)
		Α	в	С	D	E	F	
3/8	DT-370-MSMO-**	11/16-16 UN	.44	.44	.47	9/16-18 UNF	.75	1, 5, 65
1/2	DT-500-MSMO-**	13/16-16 UN	.51	.50	.55	3/4-16 UNF	.88	5, 65
5/8	DT-620-MSMO-**	1-14 UNS	.62	.49	.63	7/8-14 UNF	1.06	5
3/4	DT-750-MSMO-**	1-3/16 - 12 UN	.68	.50	.73	1-1/16 - 12 UN	1.25	1, 5, 65
1	DT-1000-MSMO-**	1-7/16 - 12 UN	.70	.62	.73	1-5/16 - 12 UN	1.50	5, 65
1-1/4	DT-1250-MSMO-**	1-11/16 - 12 UN	.70	1.06	.73	1-5/8 - 12 UN	1.88	1, 5

 $\textbf{DT-MSMS} \text{ Male Seal-Lok}^{\texttt{R}} \text{ Inlet to Male Seal-Lok}^{\texttt{R}} \text{ Outlet}$



Valve Size (inch)	Part Number	Inlet Port Thread	Dim	nensions	s (in)	Outlet Port Thread	Hex Size (inch)	** Std Crack Pressures (PSI)
		Α	В	С	D	E	F	
3/8	DT-370-MSMS-**	11/16-16 UN	.44	.44	.44	11/16-16 UN	.75	1, 5, 65
1/2	DT-500-MSMS-**	13/16-16 UN	.51	.50	.51	13/16-16 UN	.88	5, 65
5/8	DT-620-MSMS-**	1-14 UNS	.62	.50	.62	1-14 UNS	1.06	5
3/4	DT-750-MSMS-**	1-3/16 -12 UN	.68	.50	.68	1-3/16 - 12 UN	1.25	1, 5, 65
1	DT-1000-MSMS-**	1-7/16 - 12 UN	.70	.62	.70	1-7/16 - 12 UN	1.50	5, 65
1-1/4	DT-1250-MSMS-**	1-11/16 - 12 UN	.70	1.06	.70	1-11/16 - 12 UN	1.88	1, 5



Check Valves

Flow Data



Valves

ш



1250 - 1-1/4"

BVH & BVAH 6000 PSI

The benchmark of quality and value ~ Made in U.S.A. Widest array of sizes, connections and accessories



- Strictly carbon steel construction rated to 6000 PSI for continual/normal operation. Stainless Steel available in all sizes but rated at 6000 PSI for ¼" through ¾" and 3000 PSI for 1" and up. (see BVHS for 6000 PSI)
- DMIC's **BVH** Block Body & **BVAH** Round Body offered in largest range of ball orifice diameters. (¼"-6")
- Unrestricted bore offered, in Carbon Steel Balls, for minimal system pressure drop
- Widest array of connection types available
- Standard Delrin Ball Seals & Buna-N Elastomer Seals. Other materials available, for full fluid compatibility range. Standard Black Oxide finish on all Carbon Steel Valves. Other finishes are available upon request.
- Temperature Range: -60°F to 400°F (Depending on material combinations)
- Extensive variety of additional accessories available
- Fast delivery on any valve contained in this series

*Please note: For valves larger than 2", large pressure differentials may make the valve difficult to open and the pressure balance option may be required. Ask your DMIC sales Associate for more info!

Service Parts BOM

BVH/ BVAH	SERVICE PARTS BOM					
Index	Qty	Description				
1	1	Valve Body				
2	1	Ball				
3	1	Spindle				
4	2	Ball Seal				
5	*	End Connection(s)				
6	*	End Connection O-Ring				
7	1	Internal Thrust Washer				
8	1	Spindle O-Rings				
9	1	External Glide Washer				
10	1	Stop Pin				
11	1	Stop Washer				
12	1	Color Coded Top Cap				
13	1	Top Cap Screw				
14	1 Handle					
* - Quantity de	epends o	n size and combination of body				









Note: Changes from Standard Materials may result in changes to temperature and/or pressure rating.

Due to our policy of continual product improvement, the specifications in this catalog may change without notice. When designing by spec, please request a certified print.

DBV-1106B Page 33 'BVH' & 'BVAH' 6000 PSI

BVH/ BVAH			Dim	ens	ions	(1 0	f 2)		
Dimens all	ions B, I BVH d	,C,D,E,F,C and BVAI	G, & H ar H Valves	e comm indepe	on dime ndent of	nsions s ⁻ Connec	hared b tion Ty	etween pe	
		Thread	led Con	nectio	ns (600	0 PSI)			
Dimension (Inc	hes)	Α	В	С	D	E	F	G	Н
Port Code(s)	Port Size	Overall Length	Body Diameter	Bore Size	Handle Length	Overall Height	Bottom to Port Center	Port Center to Top	Width
	1/4"	2.74	1.38	0.31	4.50	2.99	0.61	1.38	1.38
N	3/8″ 1⁄2″	2.8/	1.50	0.38	4.50	3.12	0.64	1.50	1.50
S	3/4"	3.79	2.25	0.75	7.00	4.73	1.00	2.25	2.25
В	1"	4.49	2.50	0.94	7.00	4.98	1.14	2.50	2.50
IU	11/4"*	5.24	2.50	0.94	7.00	4.98	1.14	2.50	2.50
Threaded	1½ ^{**}	5.4/	2.50	1 25	9.85	4.98	1.14	2.50	2.50
Connections	1½"	5.33	3.75	1.50	9.85	6.82	1.64	3.64	3.75
*Denotes BVH 1"	2"	6.54	4.50	1.88	9.85	7.49	2.01	4.30	4.50
reduced ball with 1-1/4" or 1-1/2"	2½"	7.50	6.94	2.50	14.50	10.24	3.29	6.61	6.94
connections	3" //"	9.29	7.50	3.00	14.50	12.64	4.35	8.3/	7.50
			3.34 1 4-Bo	It Flan	ze Conn	ection	<u>J.11</u>	10.94	5.54
Dimension (in	ches)	-	A	C	J	К	L	1	A N
Port Code(s)	Port Size	Working PSI	Overall Length	Bore Size	Flange Diameter	Flg Pad Short	Flange Pad	UNC Bolt	Metric Bolt
	1/2"		4.26	0.50	2.13	0.69	1.50	5/16"	M8
	3⁄4"		4.77	0.75	2.75	0.88	1.88	3/8"	M10
FM/GM	1"	3000	5.27	0.94	3.00	1.03	2.06	3/8"	M10
SAE C.61	1 <u>4</u> " 11/4"	151	5.90	1.25	3.38	1.19	2.31	1/16"	M10 M12
Comp	2"		8.06	1.88	4.50	1.69	3.06	1/2"	M12
Connections	2½ "	2500 PSI	11.25	2.50	5.00	2.00	3.50	½"	M12
	3"	2000 PSI	13.65	3.00	7.00	-	-	1/2"	M16
		62 4 P	16.22	4.00	8.50	-		%	MIG
Dimension (inc	SAE C.62 4-Bolt Flange Connections (6,000 PSI)								л
Port Code(s)	Port	Overall	Bore	Flange) Jiameter	Flg Pad	Fig Pad	UNC	Metric
	Size	Length	Size	7	25	Short 072	Long	BoltThr	BoltThr
	3/4"	4.77	0.75	2.	75	0.94	2.00	3/8"	M10
FH/GH	1"	5.27	0.94	3.	38	1.09	2.25	7/16"	M10
SAE C.62 4-Bolt	1¼" 11⁄/"	6.90	1.25	3.	75	1.25	2.63	1/2"	M12
Comp	172 2 "	8.06	1.50	4.	50	1.44	3.81	5/8 3/4"	M20
Connections	<u>_</u> 2½"	11.25	2.50	6.	44	-	-	-	-
	3"	13.67	3.00	8.	50	-	-	-	-
	4"	16.11	4.00	<u>9.</u>	94	-	-	-	-
Dimonsion (in	ahos)	SAE C.		c Flang	e Conne	ections			Δ
Port Code(s)	Port	Working	Overall Length	Bore	O-Ring	D	– MIC Spli	t	Overall Length
	1/"	-21	(SM)		2 210	ECI	OF OF	SK.	(CM)
	72 3/4"		6 38	0.50	2-210	FSL	-0750	SK	5.58
	1"	3000	6.99	0.94	2-219	FSI	L-1000	SK	6.00
SM/CM	1¼"	PSI	7.50	1.25	2-222	FS	L-1250	SK	7.20
SAFC 61	1½"		9.09	1.50	2-225	FS	L-1500	SK	8.09
Split & Combo	2"	2500.001	9.10	1.88	2-228	FSL	2000	SK	8.58
•	2½ [~] 2"	2500 PSI	14.10	2.50	2-232	FSI	-2500	SK	14.83
	4"	500 PSI	18.26	4.00	2-245	FSL	-4000	SK	17.44
	SAE	C.62 Sp	olit Flan	ge Con	nection	s (600	0 PSI)		
Dimension (inc	hes)	Α	С	I	N		-		Α
Port Code(s)	Port Size	Overall Length (SH)	Bore Size	0-I N	Ring Io.	D	MIC Spli lange Kit	t	Overall Length (CH)
	½"	5.95	0.50	2-2	210	FSF	1-0500)SK	5.11
SH/CH	3⁄4"	6.86	0.75	2-2	214	FSF	1-0750	SK	5.82
	1"	7.79	0.88	2-2	219	FSF	1-1000	SK	6.53
C 4 F 6 66	11/1	077	1 25	2 -	177	EC.	1 1250	CV	707
SAE C.62	1¼" 1½"	8.77	1.25	2-2	222	FSI	<u>1-1250</u> 1-1500	SK SK	7.83

N, S, B, IU THREADED CONNECTIONS



FM/FH, GM/GH SAE 4-Bolt Flange(COMP)



SH/SM SAE SPLIT-FLANGE HEAD





CH/CM SAE 4-BOLT & SPLIT "COMBO" FLANGE







CALL TOLL FREE 1-800-248-3642 IN CANADA 1-800-320-3642

'BVH' & 'BVAH' 6000 PSI

BVH/ BVAH	Dimensions (2 of 2)								
Fixed Socket Weld Connections (6000 PSI)									
Dimension (Inc	hes)	Α	С	Р	Q	R			
Port Code(s)	Port Size	Overall Length	Bore Size (Ball)	Socket Depth	Connection Inside Diameter	Inside Socket Outer Diameter			
W/*	½"	6.26	0.50	0.75		0.87			
*4-SCH 40	3⁄4"	7.46	0.75	0.75	Based	1.08			
4-3CH 40 *8 CCH 80	1"	7.67	0.88	1.00	Unon Bino	1.34			
*E-SCH 160	1¼"	8.40	1.25	1.00	Cabadada	1.69			
*G-XXS	1 ½"	9.47	1.50	1.00	Scheaule	1.94			
U-XXJ	2"	10.60	1.75	1.00		2.41			
More Sizes	2½ "	Call Factory							
Available Upon Request	3"			Call Facto	ry				
Request	4"	Call Factory							
	Fixed Bu	tt-Weld Co	nnections	(6000 PS	I)				
Dimension (inc	hes)	Α	С	Т	(2			
Port Code(s)	Port Size	Overall Length	Bore Size (Ball)	Weld Neck Outside Diameter	Connection In	side Diameter			
WR*	½"	4.26	0.50	0.84					
*4 CCU 40	3⁄4 "	6.35	0.75	1.05					
*4-5CH 40	1"	7.67	0.88	1.31	Based U	pon Pipe			
*5-5CH 80	1¼"	8.35	1.25	1.66	Sche	dule			
*F-SCH 160	1½"	9.47	1.50	1.91					
G-VV2	2"	10.60	1.75	2.38					
More Sizes	2½ "	Call Factory							
Available Upon	3"			Call Facto	ry				
Request	4"			Call Facto	ry				

W(*) FIXED SOCKET WELD (*) PIPE SCHEDULE CHARACTER



WB(*) FIXED BUTT WELD (*) PIPE SCHEDULE CHARACTER



*Please Note:

Always operate System Pressure according to Pipe Schedule. DMIC **BVH/AH** Ball Valves are rated at 6000 PSI which may exceed Maximum Allowable due to Pipe Schedule.

Flow Characteristic and Actuation Torque Curves



Due to our policy of continual product improvement, the specifications in this catalog may change without notice. When designing by spec, please request a certified print.



DBV-1106B Page 35



General Description

Pilot Operated Spool-Type Relief Valve. For additional information see Technical Tips on pages PC1-PC6.

Features

- Low override curve
- Ball-type pilot for added stability
- High accuracy pilot operated design
- Hardened, precision ground parts for durability
- Compact size for reduced space requirements
- All external parts have yellow zinc dichromate. This coating is ideal for salt spray applications.





Specifications

Maximum Flow	302.8 LPM (80 GPM)
Maximum Inlet Pressure	380 Bar (5500 PSI)
Maximum Pressure Setting	350 Bar (5000 PSI)
Reseat Pressure	80% of crack pressure
Leakage at 150 SSU (32 cSt)	82 cc/min. (5 cu. in./min.) @ 75% of crack pressure
Cartridge Material	All parts steel. All operating parts hardened steel.
Operating Temp. Range (Ambient)	-40°C to +93.3°C (Nitrile) (-40°F to +200°F) -31.7°C to +121.1°C (Fluorocarbon) (-25°F to +250°F)
Filtration	ISO Code 16/13, SAE Class 4 or better
Fluids	Mineral-based or synthetic with lubricating properties at viscosities of 45 to 2000 SSU (6 to 420 cSt)
Approx. Weight	0.9 kg (2.0 lbs.)
Cavity	C16-2
Form Tool	Rougher None Finisher NFT16-2F

Performance Curve

Flow vs. Inlet Pressure

(Pressure rise through cartridge only)



rah161.pm6.5, bl, 6/04



Dimensions Millimeters (Inches)



Ordering Information



rah161.pm6.5, bl, 6/04





MODEL NQEB-XAN



CONFIGURATION

x	Control	Not Adjustable				
Α	Adjustment Range	-				
Ν	Seal Material	Buna-N				
(none)	Material/Coating	Standard Material/Coating				

Air bleed and start-up valve CAPACITY: 4 - 50 gpm | CAVITY: T-3A



Air-bleed and start-up cartridges are used to purge air trapped in the system to help reduce power requirements and facilitate pump priming during the start-up of blocked center circuits.

TECHNICAL DATA

Cavity	Т-ЗА
Series	2
Capacity	4 - 50 gpm
Maximum Operating Pressure	5000 psi
Valve Hex Size	1 1/8 in.
Valve Installation Torque	45 - 50 lbf ft
Seal kit - Cartridge	Buna: 990-203-007
Seal kit - Cartridge	Polyurethane: 990-003-002
Seal kit - Cartridge	Viton: 990-203-006
Model Weight	0.39 lb.

TECHNICAL FEATURES

- Air-bleed and start-up valves require a minimum of 4 gpm (15 L/min.) flow rate and 80 psi (5,5 bar) system pressure.
- The valve will re-open when system pressure falls below 25 psi (1,7 bar)
- After air has been purged, closing times vary from approximately 12 seconds at 4 gpm (15 L/min.) to 0.5 seconds at 50 gpm 200 L/min.).
- Incorporates the Sun floating style construction to minimize the possibility of internal parts binding due to excessive installation torque and/or cavity/cartridge machining variations.

PERFORMANCE CURVES





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MODEL NSAB-KXV-AS



Adjustable gauge snubber, male SAE-4 to female 1/4 NPTF



SUN adjustable gage snubbers are throttling and shut-off devices used to isolate and protect hydraulic gages from line pressure transients and the resulting gage pointer pulsations.

TECHNICAL DATA	
Maximum Operating Pressure	6000 psi
Adjustment - Number of Counterclockwise Turns - Fully Closed to Fully Open	3.75
Effective Orifice Size	.035 in.
Port Configuration	SAE 4 (Male), .250 NPTF (Female)
Seal Material	Viton
Material	Stainless Steel
Model Weight	0.21 lb.

TECHNICAL FEATURES

- Snubbers with a male SAE thread are adjustable allowing the knob to be pointed in any direction.
- Zero leakage at shutoff.
- Gage snubber backup seals are "PTFE" (Teflon®, product of E. I. DuPont Co.).
- Material: 303 and 416 stainless. Knobs are glass-filled nylon.

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Pressure Gauges SPG



Area of Application: mechanical pressure measurement

Characteristics:

- suitable for hydraulic oil and gaseous media that do not attack any copper base alloy
- available in nominal sizes 63 and 100
- standard thread form: BSP
- housing made out of stainless steel (1.4301)
- sight glass made out of acrylic
- glycerine filled
- standard dual scales with pressure indication in bar and PSI
- U-bolt or flange mounting kit on request

Please consult our office before you use SPG with other media.

Technical Data:

Options (on request):

- additional scale readings including personilisation
- thread form NPT
- U-bolt and flange mounting kits are available separately as spare parts
- additional pressure ranges up to 1000 bar max

Dimensions SPG 063





Bulletin HY14-2006-M1/US Service Bulletin

VP170 Load-Sense Directional Control Valve

Effective: October 15, 2006





Dimensions SPG 100



Ordering Code

pressure gauge IPT connection IPT connection IPT connec	Type ACcessories SPG Stainless steel pressure gauge 063 63 mm with G1/4 or 1/4 NPT connection 100 100 mm with G1/2 or 1/2 NPT connection 100 100 mm with G1/2 or 1/2 NPT connection Pressure range Image: Code Code Pressure range (-1)00001 (-1) - 1,5 bar / 21 PSI (-1)00003 (-1)00003 (-1) - 1,5 bar / 21 PSI (-1)0003 (-1)00003 (-1) - 1,5 bar / 230 PSI 00025 00025 0 - 25 bar / 360 PSI 00040 00040 0 - 400 bar / 580 PSI 00250 00250 0 - 250 bar / 3600 PSI 00250 00400 0 - 400 bar / 5800 PSI 00600 00400 0 - 400 bar / 5800 PSI 00600 00400	
pressure gauge (none) no accessory (none) no accessory U U-bolt assembly F front flange assembly IPT connection IPT connection IPT connection U U U-bolt assembly IPT connection IPT connection IPT connection UF U U-bolt assembly IPT connection UF U U-bolt assembly IPT connection UF U U-bolt and front flange assembly IPT connection IPT connection IPT connection IPT conly SPG 063)<	SPG Stainless steel pressure gauge Size (none) no accessory 063 63 mm with G ¼ or ¼ NPT connection Pressure range F front flange assembly 100 100 mm with G ½ or ½ NPT connection U U-bolt assembly F Pressure range U U-bolt and front flan assembly Code Pressure range U U-bolt and front flan assembly (-1)00001 (-1) - 1,5 bar / 21 PSI (-1)00003 (-1) - 3 bar / 42 PSI 00010 0.4 ¼" BSPP (only SPG 063) No8 ¼" NPT (only SPG 063) 00010 0 - 16 bar / 230 PSI 00025 0 - 25 bar / 360 PSI 00040 0.4 0 bar / 1450 PSI 00060 No8 ¼" NPT (only SPG 100) Note: Other thread types on request 00250 0 - 250 bar / 360 PSI 00250 0 - 250 bar / 360 PSI 00250 Sterm mounting P Panel mounting 00100 0 - 100 bar / 1450 PSI 00250 0 - 680 bar / 10000 PSI 00680 0 - 680 bar / 10000 PSI 00680 0 - 680 bar / 10000 PSI 005 01 BAR/PSI (BAR outside / PSI inside - Stan 02 BAR 00200 0 - 1000 bar / 14500 PSI 00500 0.5 PSI / BAR (PSI outside / BAR inside) Note: Other pressure ranges on request	
IPT connection IV U-bolt assembly IPT connection F front flange assembly IPT connection IV U-bolt and front flange assembly IPT connection UF U-bolt and front flange assembly IPT connection IV IV IPT connection IV IV IP IPT conly SPG 063) IV ID bar / 1450 PSI IV IV IP Panel mounting IV IP Panel mounting IV IP IP IV IV ID bar / 10000 PSI IV IV </th <th>Size U U-bolt assembly 63 mm with G 1/2 or 1/2 NPT connection IUF U-bolt assembly 100 100 mm with G 1/2 or 1/2 NPT connection IVF U-bolt and front flange assembly Pressure range U U-bolt assembly IVF U-bolt and front flange assembly Code Pressure range IVF U-bolt and front flange assembly IVF U-bolt and front flange assembly (-1)00001 (-1) - 1,5 bar / 21 PSI IVF U-bolt and front flange assembly (-1)00003 (-1) - 3 bar / 42 PSI IVF U-bolt and front flange assembly 00010 0 10 bar / 145 PSI IVF U-bolt and front flange assembly 00025 0 25 bar / 360 PSI IVF <t< th=""><th></th></t<></th>	Size U U-bolt assembly 63 mm with G 1/2 or 1/2 NPT connection IUF U-bolt assembly 100 100 mm with G 1/2 or 1/2 NPT connection IVF U-bolt and front flange assembly Pressure range U U-bolt assembly IVF U-bolt and front flange assembly Code Pressure range IVF U-bolt and front flange assembly IVF U-bolt and front flange assembly (-1)00001 (-1) - 1,5 bar / 21 PSI IVF U-bolt and front flange assembly (-1)00003 (-1) - 3 bar / 42 PSI IVF U-bolt and front flange assembly 00010 0 10 bar / 145 PSI IVF U-bolt and front flange assembly 00025 0 25 bar / 360 PSI IVF IVF <t< th=""><th></th></t<>	
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IPT connection R rear flange assembly IPT connection UF U-bolt and front flange assembly UF U-bolt and front flange assembly IPT connection IF U-bolt and front flange assembly IF UF U-bolt and front flange assembly IF UF U-bolt and front flange assembly IF IF IF UF U-bolt and front flange assembly IF IF IF IF IF IF IF IF IF IF IF IF IF IF IF IF IF IF IF IF IF IF <td>63 mm with G 1/4 or 1/4 NPT connection 100 mm with G 1/2 or 1/2 NPT connection Pressure range Code Pressure range Code Pressure range (-1)00001 (-1) - (-1) - 1,5 bar / (-1)00003 (-1) - (-1) - 1,5 bar / 21 PSI (-1)00003 (-1) - (-1) - 1,5 bar / 21 PSI (0010 0 - 0010 0 - 0010 0 - 00025 0 - 00040 0 - 0010 0 - 0010 0 - 0010 0 - 0010 0 - 0010 0 - 0010 0 - 0010 0 - 00100 0 - 0 - 1450 PSI 00160 0 - 0 - 10 bar / 00100 0 - 0 - 10 bar / 00100 0 - 0 -<!--</td--><td>nblv</td></td>	63 mm with G 1/4 or 1/4 NPT connection 100 mm with G 1/2 or 1/2 NPT connection Pressure range Code Pressure range Code Pressure range (-1)00001 (-1) - (-1) - 1,5 bar / (-1)00003 (-1) - (-1) - 1,5 bar / 21 PSI (-1)00003 (-1) - (-1) - 1,5 bar / 21 PSI (0010 0 - 0010 0 - 0010 0 - 00025 0 - 00040 0 - 0010 0 - 0010 0 - 0010 0 - 0010 0 - 0010 0 - 0010 0 - 0010 0 - 00100 0 - 0 - 1450 PSI 00160 0 - 0 - 10 bar / 00100 0 - 0 - 10 bar / 00100 0 - 0 - </td <td>nblv</td>	nblv
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	Note: Other pressure ranges on request 10 KPa / PSI (KPa outside / PSI inside)	
	Note: Other pressure ranges on request 10 KPa / PSI (KPa outside / PSI Inside)	St



Item	Part Number	Qty	Description
1	396 2681 021	2	Back-Up Ring
2	391 2881 236	2	Seal, O-Ring (1.50 OD x 1.36 ID)
3	396 3384 057	2	Seal Retainer
4	391 2881 242	4	Seal, O-Ring (1.44 OD x 1.24 ID)
5	391 1401 450	1	Stripper Bolt
6	391 3782 133	2	Washer
7	391 3384 300	1	Tube
8	391 3581 764	1	Spring
9	391 3581 765	1	Spring
10	391 3384 216	2	Tube
11	341 6010 100	2	End Cap
12	391 2281 012	2	Tube Plug, 3/8 OD
13	391 1401 355	4	Capscrew, Hex Socket (4.50 lg.)



- C Tightening Torque ± 10%
- Locking Fluid per H.E. Std. 35-20
- A Parker "O-Lube"

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Part Number	ID Number	Voltage	Connector	Pressure	Spool Bleed	Manual Override	On/Off Diode	Viton
3767729	61901	24V	AMP Jr.	25/50 Bar	yes	no	no	yes
3767646	61802	12V	Deutsch	25/50 Bar	yes	no	no	no
3767647	<mark>61801</mark>	<mark>24V</mark>	Deutsch	25/50 Bar	yes	no	no	<mark>no</mark>
396 4101 033	61302	12V	AMP Jr.	25/50 Bar	yes	no	no	no
396 4101 032	61301	24V	AMP Jr.	25/50 Bar	yes	no	no	no
396 4101 031	58401	24V	AMP Jr.	25/50 Bar	yes	yes	no	no
396 4101 030	58402	12V	AMP Jr.	25/50 Bar	yes	yes	no	no
396 4101 024	63802	12V	AMP Jr.	25/50 Bar	no	no	yes	no

Solenoid Valves

Solenoid Pilot Orifice

Orifice Dia.	Part Number	ID Spots
0.45 mm	3764310	11
0.6 mm	3762396	1
0.7 mm	3764762	12
0.8 mm	3762397	2
0.9 mm	3762910	10
1.0 mm	3762398	3
1.1 mm	3762609	4

Orifice Dia.	Part Number	ID Spots
1.2 mm	3762399	5
1.3 mm	3762610	6
1.4 mm	3762400	7
1.5 mm	3762611	8
2.0 mm	3762612	9
3.0 mm	3763308	-

Jumper Kit 396 1823 417

Kit will connect a solenoid with an AMP connector to a Weatherpack connector on a machine.



NOTES:

- 1 Use crimp tools 391 4101 381 and 391 4101 382 for assembly of AMP Jr. timer connector.
- 2 Use crimp tool 391 4101 261 for assembly of Packard connector.

Item	Part Number	Qty	Description
1	391 4101 378	1	Conn / Elec / Hsg, Plastic
2	391 4101 379	2	Conn / Elec / Terminal
3	391 4101 394	2	18 Ga. Wire, 6 in. lg.
4	391 4101 380	2	Wire Grommet
5	391 4101 191	2	Male Wire Terminal
6	391 4101 189	2 Wire Grommet	
7	391 4101 190	1	Plastic Housing

bul HY14-2006-M1.indd, m&a


Technical Information	
General Description, Operation, Benefits	1-2
Specifications, Weights, Connections	3
Definitions, Conversion Factors	4
Valve Options	5
Schematics	6-8
Control of Workport Flow	9
Setting of Pressures	10
Spool Direction, Work Section End Types	11
Service Parts Breakdown	
Tie Rod Kits	
Inlet Section	
Seal Kit Reference	
Std or EH Inlets	
Inlet with Blocks	
Block Seal Kits	
Screen Kit	
Clipper Relief Valve / Steel Plug	
Load-Sense Vent Valves	19
Outlet Section	
Seal Kit Reference	
PCLS and Load-Sense Outlets	
Load-Sense Relief Valve	
Load-Sense IN Shuttle Check Valve	
Work Sections	
Service and Seal Kit Reference	
PCLS and Load-Sense Work Sections	
Positioner Service Kits	
Positioner Seal Kits	
Check Valves (Reverse Flow, Load-Sense, Anti-Cavitation)	45-46
Relief Valves (RV + AC, RV with screw or shim adjust)	
Section Interface Seals	
Troubleshooting Guide	
Assembly Configuration Form	
Offer of Sale	53

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General Description

The VP170 can be configured either as pressure compensated load-sense (PCLS) or as load-sense (LS). Both have the flexibility of sectional construction. The PCLS work section has its own compensator, so that speed control of multiple functions is achieved, regardless of changes in pressure or engine rpms. The key technology integrated into the VP170 is flowsharing. In pump over-demand conditions, flow-sharing benefits machine productivity by maintaining the speed relationship of the selected functions, but at a reduced speed. Thus, the operator can maintain the rhythm of the machine.

The design of the VP170 is modular, allowing for content to be added or taken out of the valve to better match its value to varying machine requirements. For example, it is available as a load-sense pressure compensated, load-sense only, and with and without induced-load protection.

The valve can be operated manually, pneumatically, hydraulic remote or with solenoids. The same solenoid is used for on/off and proportional control. A bypass unloader is available for use with fixed-displacement pumps. Also, a new, low-pressure regeneration feature has been designed to overcome the damaging affects of cavitation – premature component wear and spongy operation.

The VP170 uses the same spool positioners and port accessories as its open-center counterpart – VA/VG20. The standard spool types are 3-way, 4-way and 4-position float. The standard flow limited spools are 8, 16, 24, 32 and 45 GPM based upon a margin pressure of 250 PSI. There is also a standard spool that is not flow limited.



Operation

The VP170 (PCLS) is an individually compensated load-sense directional control valve. For optimum horsepower utilization and heat generation, it is normally used with a piston pump. However, it does have the flexibility to be interfaced with a fixed (gear or vane) displacement pump.

During single function use, the pump control will determine the flow to the valve, based upon the area opening of the spool notch and the load-sense signal being sent back to the pump.

During multi-function operation, the pump control will determine the flow for the highest loaded function, while the section compensator will control the flow for the lighter loaded function.





Bulletin HY14-2006-M1/US
Technical Information



Benefits

- Excellent machine controllability individual pressure compensation in each work section delivers predictable metering with single and multi-function operation, regardless of changes in pressure or input flow. This enhances machine control, improves productivity and helps to make every operator an "expert" operator -- all of which saves money. Also, this valve type lends itself to closed-loop control.
- Improved system efficiency optimized horsepower utilization and heat management are inherent with loadsense pressure compensated valves. This is because of a closer match between horsepower consumption and horsepower demand. Fuel savings between 30-50% can be achieved vs. open-center type systems. Also, better horsepower utilization may enable the use of a smaller, less costly engine.
- Enhanced machine productivity the VP170 incorporates flow-sharing technology. This means that during a pump over-demand condition the valve will automatically apportion the available pump flow to the selected functions, based upon control spool area openings. The selected functions will maintain their speed relationship, but at a lower overall speed. This automatic adjusting by the valve can improve machine productivity as much as 20% and reduce operator fatigue.

- Flexible design the modular design of the VP170 enables the machine designer to add or remove content to achieve a better "value match" with the machine requirements. For example, the VP170 is available as load-sense pressure compensated, load-sense only, and with or without induced-load protection. Also, a full line of spool positioners and port accessories is available.
- Wide flow range offers application potential across a family of machines. The VP170 can handle a pump input of 230 LPM (60 GPM) and work sections flows from 30-190 LPM (8-50 GPM).
- Induced-load protection is available for machines whose duty cycles might generate induced loads greater than the load-sense relief valve setting. This is an important option for valves with flow-sharing technology and has the benefit of maintaining machine productivity.
- Addresses cavitation and maintains system responsiveness – a unique, optional low-pressure regeneration feature combats cavitation and the damage it causes to hydraulic components -- reducing warranty costs as much as 15%. This device assures there is hydraulic oil in the loop at all times.
- Ease of service the load-sense check, compensator and transition check are located on top of each work section making it a "service friendly" design.



Specifications

Pressures	Pump inlets: 350 Bar (5000 PSI) Service Ports: 350 Bar (5000 PSI) Pilot (input or internal supply): 35 Bar (508 PSI) Tank Return: 15 Bar (220 PSI) Solenoid Drain: 2 Bar (29 PSI)
Flow Rates	Maximum Input: 227 LPM (60 US GPM) Maximum Flow out of Service Ports: 190 LPM (50 US GPM) Max. Return to Service Port: 280 LPM (75 US GPM)
Leakage Performance With mineral oil, 100 SUS @ 120°F at 1100 PSI differential	Workport w/Steel Plug or no Accessory: 20 cc/min max. Workport w/RV or RV+AC: 24 cc/min max. Thru Reverse Flow Check: 180 cc/min max. Thru Compensator Only (no Reverse Flow Check): 1100 cc/min max.
Hydraulic Fluid	Mineral base oil. For other fluids consult factory. Viscosity, working range: 15-380mm ² /s (15-380 cSt).
Hydraulic Oil Temperature	Recommended Operating Range without Solenoid Operation: -30° to 90°C (-22° to 194°F) Recommended Operating Range with Solenoid Operation: -20° to 80°C (-4° to 176°F)
Filtration (ISO 4406)	20/18/14 in Main Flow Paths 18/16/13 Pilot Supply

Weights

Inlet w/o Bolt-on Block	9.53 kg (21 lb)
Inlet with Bolt-on Block	12.25 kg (27 lb)
Work Sections Manual Hydraulic Remote EH	9.10 kg (20 lb) 9.53 kg (21 lb) 9.98 kg (22 lb)
Outlets Standard LP Regen LS Unloader	8.62 kg (19 lb) 10.43 kg (23 lb) 10.43 kg (23 lb)

Mounting Surface

There is no restriction on orientation. Flatness should be at least 0.5 mm (0.020") Surface must be stable and not put stress on valve.

Connections

O-ring boss ports SAE-J1926-1 BSPP ports ISO 1179-1 Pump gage port standard o-ring boss 9/16"-18 UNF, BSPP ports 1/4"-19

		Thread	l Size
Description	SAE #	O-ring Boss (UNF)	BSPP
inlet, top	16	1 ⁵ / ₁₆ -12	1"-11
inlet, top	12	1 ¹ / ₁₆ -12	³ / ₄ "-14
inlet, side	16	1 ^{5/} 16-12	1"-11
inlet, side	12	1 ¹ / ₁₆ -12	³ / ₄ "-14
EH inlet, pilot	6	^{9/} 16-18	¹ / ₄ "-19
All block ports	6	^{9/} 16-18	¹ /4" -1 9
outlet, top	16	1 ⁵ / ₁₆ -12	1"-11
outlet, top	12	1 ¹ / ₁₆ -12	³ / ₄ "-14
outlet, side	16	1 ⁵ / ₁₆ -12	1"-11
outlet, side	12	1 ¹ / ₁₆ -12	³ / ₄ "-14
outlet, side	20	1 ⁵ /8-12	1 ¹ /4"-11
work section	8	³ / ₄ -16	(none)
work section	10	⁷ / ₈ -14	¹ /2" -1 4
work section	12	1 ¹ / ₁₆ -12	³ / ₄ "-14

Solenoid Specifications

Voltage	12 or 24 VDC		
Pilot	35 Bar (508 PSI), 15-23 LPM (4-6 GPM))
Current Input (I)	1.5A for 12 VDC 0.75A for 24 VDC		
Current (mA) for Spool Shift	Start Shift Full Shift	12V 500 1250	24V 250 625
Insulation Material	Class H		
Duty Cycle	100%		
R20 Ohm	5.3 (±5%) for 12 VDC 21.2 (±5%) for 24 VDC		C
Fluid Cleanliness	17/14 per ISO 4406		
Ambient Temperature	-30° to 80°C (-22° to 176°F)		176°F)
Fluid Temperature	-20° to 80°C (-4° to 176°F)		76°F)



Definitions

PCLS = Pressure Compensated Load-Sense, or load-sensing with individual pressure compensation. Individual pressure compensation means each circuit (work section) has a pressure compensator. These pressure compensators reduce pressure to individual circuit needs resulting in flows for each circuit being proportional to spool stroke.

LS = Load-Sensing (no individual pressure compensators). Flow is proportional to spool stroke in the highest loaded function only.

LSRV = Load-Sense Relief Valve – normally a small RV that sets maximum LS pressure.

Clipper RV = "Clips" or reduces pressure spikes normally caused when flow demand decreases faster than the pump flow output can decrease.

$$\label{eq:margin_valve} \begin{split} & \mbox{Margin}_{valve} = \mbox{Pressure at valve inlet} - \mbox{pressure at valve LS port} = \mbox{M}_v. \end{split}$$

 $Margin_{pump}$ = Pressure at pump outlet – pressure at pump LS port = M_{p} .

 $\mbox{Margin}_{\mbox{neutral}} = M_{\nu} \mbox{ or } M_{p}$ when all value spools are in neutral.

 $Margin_{stall} = M_v$ or M_p when one valve function is deadheaded and the LSRV relieves.

FLO = Flow Limit Orifice, limits flow over LSRV. Normally it is 0.045" diameter.

Over-demand = When functions demand flow in excess of pump capacity.

EH = Electrohydraulic or solenoid controlled spool positioning.

Induced load = Occurs when an actuator tries to force fluid into a valve workport.

PRRV = Pressure Reducing and Relieving Valve.

Q = Flow or Flow rate.

LS vent = A small connection (0.014"/0.017" diameter) of the LS gallery to tank to "bleed down" the LS pressure to the tank level when LS pressure is not required.

LS check = Helps decide which circuit has the highest LS pressure.

Flow sharing = A valve arranged so available flow is shared between active circuits – also known as "post compensated".

Conversion Factors:

1 kg = 2.2 lbs. 1 N = 0.225 lbs. force 1 Bar = 14.5 PSI 1 liter = 0.22 UK gallon 1 liter = 0.264 US gallon 1 cm³ = 0.061 in³ 1 m = 3.28 feet 1 mm = 0.039 inches

9/5 °C + 32 = °F



Major Valve Options

I Circuits:

- A) LS when individual pressure compensation isn't needed.
- B) PCLS without reverse flow check when "induced loads"* are not anticipated. Also, the check may be eliminated when load drift is not required.
- C) PCLS with reverse flow check when "induced loads"* are anticipated. Also, the check serves as a low leak transition check.

* Induced loads are actuators trying to force fluid back into valve – of particular concern is when pressure exceeds the setting of the LS RV.

II Inlets:

- A) Standard all spool operators except solenoid
- B) "EH" "external supply" to solenoids port for connecting external supply to solenoids and drain port 1.7 Bar (25 PSI) max
- C) Inlet + block 1, 2, 3
 - Block 1: "Internal supply" reduced PSI to solenoids via internal pilot gallery Internal supply to solenoid positioners.
 - Block 2: "Joystick supply" reduced PSI to external port to supply joystick(s) No internal pilot supply.
 - Block 3: "Kidney loop" reduced PSI to an external pilot port. The signal can then be routed to a filter and back into the valve. The signal is then routed to the solenoids via internal pilot gallery.
 - All 3 blocks have:
 - a) PRRV and screen upstream of it
 - b) Accumulator port and check valve
 - c) Drain port for connection of solenoid drains and PRRV spring to tank 1.7 Bar (25 PSI) max





Load-Sense Valve How VP170 May Be Arranged Load-Sense Vent Load-Sense Check В В -¥.-⊘ ţ ò LSRV Clipper RV <u>_</u> _ Ē FLO Ø (n)Α Α (I)**Transition Check** Ŷ Pressure Compensated Load-Sense (PCLS) without Reverse Flow check Load-Sense Check Load-Sense Vent В в -0 LSRV Clipper RV - 🖆 ^ Ū. FLO Ħ \diamond \mathcal{T} Α Α Compensator **Compensator Orifice** q Pressure Compensated Load-Sense (PCLS) with Reverse Flow Check* (Protects against Induced Loads) Load-Sense Check Load-Sense Vent B В Ι. ÷x-∕> LSRV Clipper RV · \geq · 🛈 ^ <u>-</u>۵~ FLO \diamond (r)Α Α (Ŧ Reverse Flow Check* Compensator Ŷ **Compensator Orifice**



How to Arrange Two VP170 Valves





How to Arrange VP170 with Priority Valve



How to Arrange VP170 + QDL (Spinner/Auger)



2) LSRV controls both valves.



Control of Workport Flow Rate [61A, B] and [70]



$$Q = CA \sqrt{\Delta P}$$

Where C = Number derived by experiment, constant for a spool position A = Area of flow notches $\Delta P\approx P_{IN}$ - $P_{LS}\approx M_v$

Or, at any spool position, Q is proportional to A, as long as M_v is constant.

[61A, B] Q Set @ A, B

Given above that Q is proportional to A, Q may be set by setting stroke length of spool. This may be done with screw in positioner codes PCA and ECA.

[70] Spool Flow Rate @ A, B

Given above that Q is porportional to A, notch geometry can be sized so that when at full stroke, a certain A/Q may be achieved.

Notch geometries may be selected to give these flows at both 'A' & 'B' workports:

LPM	GPM
30	8
61	16
91	24
121	32
170	45
Full	Up to 50

The full flow spool (shown at right) has the 45 GPM notches.



Full Flow Spool



Setting of Pressures







Tie Rod Kits



# Work Sections	Tie Rod Kit Number	Length (in)
1	391 9425 108	6.75
2	391 9425 107	8.50
3	391 9425 085	10.25
4	391 9425 109	12.00
5	391 9425 111	13.75
6	391 9425 121	15.50
7	391 9425 122	17.25
8	391 9425 123	19.00
9	391 9425 124	20.75

NOTES:

- 1 Ensure proper torque on all tie rods to prevent spools from binding and section seals from extruding. Before applying final torque, align sections on a flat surface.
- 2 Do not lubricate section seals prior to installation.
- 3 Torque all tie-rods evenly to ensure proper alignment of surfaces and avoid spool bind.
- 4 If using special outlets that unload a fixed displacement pump or use low pressure regeneration, consult factory for stud kit.

bul HY14-2006-M1.indd, m&a



VP170 Service/Seal Kits – Inlet Section

Description	Complete Service Kit	Seals Included in Complete Kit*	Seal Subkit #	See Page
Inlets: Std and EH	396 1823 214			14
		standard section seals	206 1902 175	50
		section seals for EH operation	390 1823 175	50
		seals for vent plug	396 1823 226	19
		seal for clipper RV+AC	396 1823 108	18
		seals for clipper RV+AC steel plug	396 1823 179	19
Inlet + Blocks 1, 2, or 3	396 1823 215			15
		standard section seals	206 1902 175	50
		section seals for EH operation	390 1823 175	50
		block service kit	396 1823 224	16
		seals for vent plug	391 1823 226	19
		seal for clipper RV+AC	396 1823 108	18
		seals for clipper RV+AC steel plug	396 1823 179	19
		seals in blocks	396 1823 225	17

* Discard seals not required



Standard or EH Inlet Service Kit 396 1823 214



Item	Part Number	Qty	Description
1	396 1823 175	1	Section Seal Kit
2	396 1823 179	1	Clipper RV Plug Seal Kit
3	396 1823 226	1	Vent Plug Seal Kit



Optional Inlet Port Plug

Port Type	Port Size	Plug Type	Torque
SAE	1 ^{5/} 16"-12	O 5/8"	75 ft-lbs
BSPP	1-11	🔘 17mm	50 ft-lbs

Optional Gage Port Plug

Port Type	Port Size	Plug Type	Torque
SAE	9/16"-18	O 1/4"	410 in-lbs
BSPP	1/4	🔘 6mm	105 in-lbs

See Page 18 for RV Options Chart.

bul HY14-2006-M1.indd, m&a



Inlet with Blocks Service Kit 396 1823 215



Item	Part Number	Qty	Description
1	396 1823 175	1	Section Seal Kit
2	396 1823 179	1	Clipper RV Plug Seal Kit
3	396 1823 226	1	Vent Plug Seal Kit
4	391 2881 362	1	O-Ring (0.57 OD x 0.46 ID)
5	391 2881 209	1	O-Ring (0.69 OD x 0.55 ID)
6	06884001	1	O-Ring (0.50 OD x 0.36 ID)
7	463 9000 008	1	Screen Assembly
8	396 1823 224	1	Block Service Kit



Parker "O-Lube"

Optional Inlet Port Plug

Port Type	Port Size	Plug Type	Torque
SAE	1 ⁵ / ₁₆ "-12	0 5/8"	75 ft-lbs
BSPP	1-11	🔘 17mm	50 ft-lbs

Optional Gage Port Plug

Port Type	Port Type Port Size		Torque
SAE	9/16"-18	O 1/4"	410 in-lbs
BSPP	1/4	🔘 6mm	105 in-lbs

See Page 18 for RV Options Chart.

bul HY14-2006-M1.indd, m&a



Block Service Kit 396 1823 224



NOTES:

- 1 Assemble per 2.003.335
- 2 Assembler to stamp "X" approximately 0.25" high to indicate that the 1/4"-20 plug has been installed. (Blocks 2, 3 only)

Seal Service Kit 396 1823 225 includes items in bold text.

Item	Part Number	Qty	Description
1	355 0500 034	1	Housing
2	396 2282 028	1	3/8 O.D. Tube Plug (Special)
3	391 2881 834	1	Seal, O-Ring (0.62 OD x 0.47 ID)
4	91264368-02	1	Spool
5	91273200-18	1	Spring Guide
6	91273200-14	1	Spring
7	396 2282 029	1	Plug
8	06814002	1	O-Ring, AS018 70 DUR Nitrile
9	391 2282 314	1	Expander Plug
10	396 1401 010	1	1/4-20 Plug, Set Screw
11	391 2282 242	1	Expander Plug
12	001839	1	Poppet
13	1300173	1	Spring
14	396 1642 025	1	Spring Retainer
15	391 2281 012	2	Tube Plug, 3/8 OD
16	391 1401 446	2	Capscrew, 5/16-18 x 2.75 Lg.



Block Seal Kit 396 1823 225



Item	Part Number	Qty	Description	1
1	391 2881 834	1	Seal, O-Ring (0.62 OD x 0.47 ID)	
2	06814002	1	O-Ring, AS018 70DUR Nitrile	Qı Re



Screen Kit 463 9000 008

This kit helps keep contaminates out of PRRV and pilot accumulator seat. Clean contaminate from outside. Can blow air from inside to assist cleaning.

Lubricate seals with Parker O-Lube prior to installation of sub-assembly.



Item	Part Number	Qty	Description
1	396 3384 060	1	Tube
2	391 2881 324	1	Seal, O-Ring (0.38 OD x 0.24 ID)



Inlet Clipper Relief Valve

Pressure setting is "factory only" and is not adjustable. Flow rate at factory setting is 20 LPM (5.3 GPM). Should you require a pressure setting not listed in the table, or require the pressure setting to be made at a flow different to standard, please contact your Parker Hannifin representative.



Part Number	Setting Bar	Setting PSI
9120 0292 53	80	1160
9120 0292 54	100	1450
9120 0292 55	125	1813
9120 0292 56	140	2030
9120 0292 57	160	2320
9120 0292 58	175	2538
9120 0292 59	190	2755
9120 0292 60	210	3045
9120 0292 61	230	3335
9120 0292 62	250	3625
9120 0292 63	280	4060
9120 0292 64	300	4350
9120 0292 65	330	4785
9120 0292 66	350	5075
9120 0292 67	380	5510
9120 0292 68	400	5800

Clipper RV Seal Kit 396 1823 108



Lubricate seal with Parker O-Lube prior to installation.

Item	Part Number	Qty	Description
1	91256889	1	Seal, O-Ring (1.00 OD x 0.86 ID)

bul HY14-2006-M1.indd, m&a



Steel Plug Seal Kit 396 1823 179



Lubricate seals with Parker O-Lube prior to installation.

Item	Part Number	Qty	Description
1	391 2882 228	1	Seal, O-Ring (1.00 OD x 0.86 ID)
2	396 2881 028	1	Seal, O-Ring (0.39 ID x 0.55 OD)
3	396 2681 020	1	Ring, Back-Up (0.55 OD x 0.44 ID)

LS Vent Seal Kit 396 1823 226



Item	Part Number	Qty	Description
1	391 2681 593	1	Ring, Back-Up (0.34 OD x 0.25 ID) Peek
2	391 2882 192	1	Seal, O-Ring (0.35 OD x 0.21 ID)
3	396 2881 027	1	Seal, O-Ring (0.50 OD x 0.35 ID)



VP170 Service/Seal	Kits –	Outlet	Section
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Description	Complete Seal Kit	Seals Included in Complete Kit	Seal Subkit #	See Page
PCLS Outlets	396 1823 217	LS RV or its steel plug	396 1823 112	22
(see belo	(see below)	LS IN shuttle check	396 1823 216	22
LS Outlets	396 1823 227	LS RV or its steel plug	396 1823 112	22
(see next page)		LS IN shuttle check	396 1823 216	22

PCLS Outlet Service/Seal Kit 396 1823 217



Item	Part Number	Qty	Description
1	396 1823 112	1	Seal Kit for LS RV or Plug
2	396 1823 216	1	Seal Kit for LS "IN" Shuttle Check

Outlet Port Plug

Port Type	Port Size	Plug Type	Torque
BSPP	1-11	🔘 17mm	50 ft-lbs
SAE	1 ^{5/} 16"-12	O 5/8"	75 ft-lbs
BSPP	1 ¹ / ₄ "-11	() 22mm	75 ft-lbs
SAE	1 ⁵ /8-12	O 3/4"	75 ft-lbs



Load-Sense Outlet Service/Seal Kit 396 1823 227



Item	Part Number	Qty	Description
1	396 1823 112	1	Seal Kit for LS RV or Plug
2	396 1823 216	1	Seal Kit for LS "IN" Shuttle Check

Outlet Port Plug

Port Type	Port Size	Plug Type	Torque
BSPP	1-11	🔘 17mm	50 ft-lbs
SAE	1 ⁵ / ₁₆ "-12	O 5/8"	75 ft-lbs
BSPP	1 ¹ /4"-11	🔘 22mm	75 ft-lbs
SAE	1 ⁵ /8-12	O 3/4"	75 ft-lbs



Load-Sense RV or Steel Plug Seal Kit 396 1823 112



Item	Part Number	Qty	Description
1	391 2882 213	1	Seal, O-Ring (0.43 OD x 0.30 ID)
2	391 2881 363	1	Seal, O-Ring (0.63 OD x 0.49 ID)
3	396 2681 019	1	Ring, Back-Up (0.63 OD x 0.53 ID) Peek
4	391 2881 197	2	Seal, O-Ring, (0.82 OD x 0.64 ID)
6	396 2881 029	1	Seal, O-Ring (0.50 OD x 0.36 ID)

Load-Sense IN Shuttle Check Valve Seal Kit 396 1823 216



Item # 6 Quantity A Required

0.22 Internal Hex — Torque to 100 ±10 in-lbs

Lubricate seals with Parker O-Lube prior to installation.

-			
Item	Part Number	Qty	Description
1	391 2681 593	1	Ring, Back-Up (0.34 OD x 0.25 ID) Peek
2	391 2882 192	1	Seal, O-Ring (0.35 OD x 0.21 ID)
3	391 2881 322	1	Seal, O-Ring (0.31 OD x 0.18 ID)
4	396 2681 018	1	Ring, Back-Up (0.31 OD x 0.22 ID) Peek
5	391 2881 324	1	Seal, O-Ring (0.38 OD x 0.24 ID)
6	391 2681 594	1	Ring, Back-Up (0.37 OD x 0.28 ID) Peek



VP170 Service Kits – Work Section Positioners

Service Kit Description	Section	Complete Service Kit	See Page	Seal Kit Only
Manual operation, spring return,	work - type 1 end	463 9000 009 (positioner)	27	
3-position	work - type 2 end	463 9000 021 (positioner)	28	
Manual operation, spring return,	work - type 1 end	463 9000 010 (positioner)	29	
detent 4th position (float)	work - type 2 end	463 9000 022 (positioner)	30	
Manual approxime datant 2 position	work - type 1 end	463 9000 011 (positioner)	31	
Manual operation, detent, 3-position	work - type 2 end	463 9000 023 (positioner)	32	
Special manual operation, spring return	work - type 1 end	463 9000 012 (positioner)	33	See
spool out, detent spool in, 3-position	work - type 2 end	463 9000 024 (positioner)	34	25-26
Air appretion (applymetic)	work - type 1 end	463 9000 013 (positioner)	35	for seal
All operation (prieumatic)	work - type 2 end	463 9000 025 (positioner)	36	kit
Hydraulic remote pilot, 3-position	work	463 9000 014 (positioner)	37	locations.
Hydraulic remote pilot, 3-position, spool stroke limiters	work	463 9000 015 (positioner)	38	
Hydraulic remote pilot, 4th-position (float)	work	463 9000 016 (positioner)	39	
Solenoid – 3-position	work	463 9000 017 (positioner)	40	
Solenoid – 3-position w/stroke limiter	work	463 9000 026 (positioner)	41	

VP170 Seal Kits – Work Section – PCLS or LS, Type 1 or Type 2 Ends

Description	Complete Seal Kit	Included in Complete Kit	Seal Subkit	See Page
Manual, 3 or 4-position	396 1823 218	section seals	396 1823 175	50
		LS check	396 1823 111	45
		reverse flow check or its plug	396 1823 110	45
		seal for compensator cap	391 2881 933	25
		seal for LS check cap	391 2881 933	26
		seal for SAE 8 LS plug	391 2881 197	26
		boot + spool seals	396 1823 174	43
		Grommet	391 1203 002	—
Pneumatic 3-position	396 1823 219	section seals	396 1823 175	50
		LS check	396 1823 111	45
		reverse flow check or its plug	396 1823 110	45
		seal for compensator cap	391 2881 933	25
		seal for LS check cap	391 2881 933	26
		seal for SAE 8 LS plug	391 2881 197	26
		boot, spool, endcap seals	396 1823 178	43
		back-up ring	391 2681 378	—
Hydraulic remote,	396 1823 220	section seals	396 1823 175	50
3 or 4-position		LS check	396 1823 111	45
		reverse flow check or its plug	396 1823 110	45
		seal for compensator cap	391 2881 933	25
		seal for LS check cap	391 2881 933	26
		seal for SAE-8 LS plug	391 2881 197	26
		seals for std or stroke limiter endcaps	396 1823 176	44
Solenoid operated,	396 1823 221	section seals	396 1823 175	50
3 or 4-position		LS check	396 1823 111	45
		reverse flow check or its plug	396 1823 110	45
		seal for compensator cap	391 2881 933	25
		seal for LS check cap	391 2881 933	26
		seal for SAE-8 LS plug	391 2881 197	26
		seals for std or stroke limiter endcaps	396 1823 177	44
Reverse flow check	396 1823 110			45
Work section LS check	396 1823 111			45
Anti-cavitation check	396 1823 116			46
Workport RV + AC	396 1823 172			47
Workport steel plug	396 1823 116			47
RV1, RV2, RV3 – screw adj.	396 1823 158			48
RV4, RV5, RV6 – shim adj.	391 1823 173			49
Section seals	396 1823 175			50



PCLS Work Section Seal Kit Detail



Description	Positioner Kit	Seal Kit	Pages
Spring Return – Type 1 End	463 9000 009	396 1823 174	27, 43
Spring Return – Type 2 End	463 9000 021	396 1823 174	28, 43
4th Position Detent – Type 1 End	463 9000 010	396 1823 174	29, 43
4th Position Detent – Type 2 End	463 9000 022	396 1823 174	30, 43
3-Position Detent – Type 1 End	463 9000 011	396 1823 174	31, 43
3-Position Detent –Type 2 End	463 9000 023	396 1823 174	32, 43
Spring Return, Detent IN – Type 1 End	463 9000 012	396 1823 174	33, 43
Spring Return, Detent IN – Type 2 End	463 9000 024	396 1823 174	34, 43
Pneumatic – Type 1 End	463 9000 013	396 1823 178	35, 43
Pneumatic – Type 2 End	463 9000 025	396 1823 178	36, 43
Hydraulic Remote, 3-Position	463 9000 014	396 1823 176	37, 44
Hydraulic Remote, 3-Position Adj. Screw	463 9000 015	396 1823 176	38, 44
Hydraulic Remote, 4-Position	463 9000 016	396 1823 176	39, 44
Solenoid, 3-Position	463 9000 017	396 1823 177	40, 44
Solenoid, 3-Position with Stroke Limiters	463 9000 026	396 1823 177	41, 44

	Wrench
\mathbb{O}°	Phillips Screw
\bigcirc	Slotted Screw
0	Hex Head
\bigcirc	Socket Head
Ċ	Tightening Torque ± 10%
6	Locking Fluid per H.E. Std. 35-20
0	Oiled
1	Greased
8	Parker "O-Lube"

Work Port Plug

Port Type	Port Size	Plug Type	Torque
SAE	3/4"-16		60 ft-lbs
SAE	7/8"-14	O 3/8"	100 ft-lbs
SAE	1-1/16"-12	Ø/16"	135 ft-lbs
BSPP	1/2-14	🔘 10mm	20 ft-lbs
BSPP	3/4-14	🔘 12mm	35 ft-lbs



Load-Sense Work Section Seal Kit Detail



Work Port Plug

Port Type	Port Size	Plug Type	Torque
SAE	3/4"-16		60 ft-lbs
SAE	7/8"-14	O 3/8"	100 ft-lbs
SAE	1-1/16"-12	Ø/16"	135 ft-lbs
BSPP	1/2-14	🔘 10mm	20 ft-lbs
BSPP	3/4-14	🔘 12mm	35 ft-lbs





Item	Part Number	Qty	Description
1	396 2681 021	2	Back-Up Ring
2	391 2881 236	2	Seal, O-Ring (1.50 OD x 1.36 ID)
3	396 3384 057	2	Seal Retainer
4	391 2881 242	4	Seal, O-Ring (1.44 OD x 1.24 ID)
5	391 1401 450	1	Stripper Bolt
6	391 3782 133	2	Washer
7	391 3384 300	1	Tube
8	391 3581 764	1	Spring
9	391 3581 765	1	Spring
10	391 3384 216	2	Tube
11	341 6010 100	2	End Cap
12	391 2281 012	2	Tube Plug, 3/8 OD
13	391 1401 355	4	Capscrew, Hex Socket (4.50 lg.)



- C Tightening Torque ± 10%
- Locking Fluid per H.E. Std. 35-20
- A Parker "O-Lube"



Item	Part Number	Qty	Description
1	396 2681 021	2	Back-Up Ring
2	391 2881 236	2	Seal, O-Ring (1.50 OD x 1.36 ID)
3	396 3384 057	2	Seal Retainer
4	391 2881 242	4	Seal, O-Ring (1.44 OD x 1.24 ID)
5	391 1401 450	1	Stripper Bolt
6	391 3782 133	2	Washer
7	391 3384 300	1	Tube
8	391 3581 764	1	Spring
9	391 3581 765	1	Spring
10	391 3384 216	2	Tube

Item	Part Number	Qty	Description
11	341 6011 933	2	End Cap
12	391 2281 012	2	Tube Plug, 3/8 OD
13	391 1401 355	4	Capscrew, Hex Socket (4.50 lg.)
14	391 0681 256	2	Cartridge
15	391 2881 246	2	Seal, O-Ring (0.95 OD x 0.76 ID)
16	391 2383 160	1	Plunger
17	396 2383 038	1	Plunger
18	391 2881 156	2	Seal, O-Ring (0.44 OD x 0.30 ID)
19	391 1431 116	2	Setscrew, 1/2-20 x 1.25 lg.
20	391 1453 035	2	Jam Nut



Part Number	ID Number	Voltage	Connector	Pressure	Spool Bleed	Manual Override	On/Off Diode	Viton
3767729	61901	24V	AMP Jr.	25/50 Bar	yes	no	no	yes
3767646	61802	12V	Deutsch	25/50 Bar	yes	no	no	no
3767647	61801	24V	Deutsch	25/50 Bar	yes	no	no	no
396 4101 033	61302	12V	AMP Jr.	25/50 Bar	yes	no	no	no
396 4101 032	61301	24V	AMP Jr.	25/50 Bar	yes	no	no	no
396 4101 031	58401	24V	AMP Jr.	25/50 Bar	yes	yes	no	no
396 4101 030	58402	12V	AMP Jr.	25/50 Bar	yes	yes	no	no
396 4101 024	63802	12V	AMP Jr.	25/50 Bar	no	no	yes	no

Solenoid Valves

Solenoid Pilot Orifice

Orifice Dia.	Part Number	ID Spots
0.45 mm	3764310	11
0.6 mm	3762396	1
0.7 mm	3764762	12
0.8 mm	3762397	2
0.9 mm	3762910	10
1.0 mm	3762398	3
1.1 mm	3762609	4

Orifice Dia.	Part Number	ID Spots
1.2 mm	3762399	5
1.3 mm	3762610	6
1.4 mm	3762400	7
1.5 mm	3762611	8
2.0 mm	3762612	9
3.0 mm	3763308	_

Jumper Kit 396 1823 417

Kit will connect a solenoid with an AMP connector to a Weatherpack connector on a machine.



NOTES:

- 1 Use crimp tools 391 4101 381 and 391 4101 382 for assembly of AMP Jr. timer connector.
- 2 Use crimp tool 391 4101 261 for assembly of Packard connector.

Item	Part Number	Qty	Description
1	391 4101 378	1	Conn / Elec / Hsg, Plastic
2	391 4101 379	2	Conn / Elec / Terminal
3	391 4101 394	2	18 Ga. Wire, 6 in. lg.
4	391 4101 380	2	Wire Grommet
5	391 4101 191	2	Male Wire Terminal
6	391 4101 189	2	Wire Grommet
7	391 4101 190	1	Plastic Housing



Seal Kit 396 1823 174, All 3 and 4-Position Manual Positioners



Apply 2-3 drops of Loctite "262" (Red) to female threads of capscrews before assembly.

Item	Part Number	Qty	Description
1	391 1985 014	2	Quad Seal
2	391 2681 378	2	Back-Up Ring (Spare for Type 2 End)
3	396 4041 013	1	Boot, Spool
4	391 1203 002	1	Grommet (4th Pos. Float)

Seal Kit 396 1823 178, All Pneumatic Positioners



Item	Part Number	Qty	Description
1	391 1985 014	2	Quad Seal
2	391 2681 378	2	Back-Up Ring (Spare for Type 2 End)
3	391 2883 165	1	Wiper Seal
4	391 2883 164	2	Wiper Seal
5	391 2881 625	2	Seal, O-Ring (1.51 OD x 1.30 ID)
6	396 4041 013	1	Boot



Seal Kit 396 1823 176 All Hydraulic Remote Pilot Positioners

NOTE: Stroke limiters available only on 3 position operators.



O-Rings typical both caps.

Item	Part Number	Qty	Description
1	391 2881 625	2	Seal, O-Ring (1.51 OD x 1.30 ID)
2	391 2881 242	4	Seal, O-Ring (1.44 OD x 1.24 ID)
3	391 2881 246	2	Seal, O-Ring (0.95 OD x 0.76 ID)
4	391 2881 156	2	Seal, O-Ring (0.44 OD x 0.30 ID)

Seal Kit 396 1823 177 All Solenoid (EH) Positioners



Item	Part Number	Qty	Description
1	396 2681 021	2	Back-Up Ring
2	346 0510 660	2	Seal, O-Ring (0.52 OD x 0.33 ID)
3	346 0510 659	2	Seal, O-Ring (0.59 OD x 0.40 ID)
4	391 2881 246	2	Seal, O-Ring (0.95 OD x 0.76 ID)
5	346 0510 658	2	Seal, O-Ring (0.79 OD x 0.60 ID)
6	391 2881 242	4	Seal, O-Ring (1.44 OD x 1.24 ID)
7	391 2881 236	2	Seal, O-Ring (1.51 OD x 1.30 ID)
8	391 2881 156	2	Seal, O-Ring (0.44 OD x 0.30 ID)



Reverse Flow Check Seal Kit 396 1823 110



Item	Part Number	Qty	Description
1	396 2681 017	1	Ring, Backup (0.88 OD x 0.78 ID) Peek
2	346 0500 222	1	Seal, O-Ring (0.88 OD x 0.74 ID)
3	391 2881 207	1	Seal, O-Ring (1.07 OD x 0.86 ID)

Load Sense Check Seal Kit 396 1823 111

NOTE:

It is strongly recommended that instead of servicing seals, the entire check be replaced.



Install with continuous clockwise motion. Do not rachet.

> Lubricate seals with Parker O-Lube prior to installation.

Item	Part Number	Qty	Description
1	391 2681 593	1	Ring, Back-Up (0.34 OD x 0.25 ID)
2	391 2882 192	1	Seal, O-Ring (0.35 OD x 0.21 ID)
3	391 2881 322	1	Seal, O-Ring (0.31 OD x 0.18 ID)
4	396 2681 018	1	Ring, Back-Up (0.31 OD x 0.22 ID) Peek





Item	Part Number	Qty	Description	
1	391 2881 333	1	Seal, O-Ring (0.94 OD x 0.74 ID)	
2	391 2681 542	1	Back-Up Ring, Peek	
3	391 2881 204	1	Seal, O-Ring (1.15 OD x 0.92 ID)	



RV + AC Seal Kit 396 1823 172



Lubricate seals with Parker O-Lube prior to installation.

Item	Part Number	Qty	Description	
1	391 2881 801	1	Seal, O-Ring (0.69 OD x 0.55 ID)	
2	291 2881 204	1	Seal, O-Ring (1.15 OD x 0.92 ID)	
3	391 2681 542	1	Back-Up Ring, Peek	
4	391 2881 333	1	Seal, O-Ring (0.94 OD x 0.74 ID)	

RV Plug Seal Kit 396 1823 116



Item	Part Number	Qty	Description	
1	391 2881 204	1	Seal, O-Ring (1.15 OD x 0.92 ID)	
2	391 2681 542	1	Back-Up Ring, Peek	
3	391 2881 333	1	Seal, O-Ring (0.94 OD x 0.74 ID)	

Relief Valves with Screw Adjustment Seal Kit 396 1823 158



NOTES:

- 1 Torque cap to 45 ft-lbs.
- 2 Reference Locknut to be torqued to 35 ± 5 in-lbs when setting RV.

ltem	Part Number	Qty	Description	
1	391 2881 211	1	1 O-Ring	
2	391 2881 333	1	Seal, O-Ring (0.74 ID x 0.94 OD)	
3	391 2681 542	1	Back-Up Ring, Peek	
4	391 2881 204	1	Seal, O-Ring (1.15 oD x 0.92 ID)	
5	391 2881 246	1	Seal, O-Ring (0.95 OD x 0.76 ID)	

Adjustment

Pressure Range	PSI per Turn	Bar per Turn
500-1250 PSI (35-86 Bar)	380	26
1251-2650 PSI (86-183 Bar)	522	36
2651-3900 PSI (183-269 Bar)	752	52


Relief Valves with Shim Adjustment Seal Kit 391 1823 173



NOTES:

- 1 Press seat, Item #5 into cartridge, Item #1 with 400 lbs of force.
- 2 Seat poppet, Item #4 into seat, Item #5 with 2000 lbs of force.
- 3 Torque to 600 ± 60 in-lbs.
- 4 Item #6, 391 2681 533, is a 2-piece seal consisting of a "Shamban" glyd-ring and o-ring.
- 5 All seals must be installed using a bullet guide.
- 6 External seals must be protected with plastic mesh tube.
- 7 Do not use above 150 LPM (40 GPM).

Item	Part Number	Qty	Description
1	391 0681 055	1	Cartridge
2	391 0585 070	1	Сар
3	391 2383 116	1	Plunger
4	391 2383 117	1	Poppet, Floating
5	391 2383 034	1	Seat, Poppet
6	391 2681 533	1	Ring, Glyd
7	391 2681 542	1	Ring, Back-Up, Peek
8	391 2881 204	1	Seal, O-Ring
9	391 2881 333	1	Seal, O-Ring
10	391 2881 246	1	Seal, O-Ring

Adjustment

Setting Range	Shim (Slug) Thickness	PSI/Shim	Bar/Shim
500-1000 PSI (35-69 Bar)	0.005" 0.015" 0.062"	40 122 502	2.8 8.4 34.6
1001-2500 PSI (69-172 Bar)	0.005" 0.015" 0.062"	56 168 694	3.9 11.6 47.9
2501-3500 PSI (172-241 Bar)	0.005" 0.015" 0.062"	74 222 918	5.1 15.3 63.3

bul HY14-2006-M1.indd, m&a



Interface Seal Kit 396 1823 175



ltem	Part Number	Qty	Description
1	391 2881 206	2	Square Section Seal (1.50 OD x 1.30 ID)
2	396 2881 023	1	Seal, O-Ring (1.38 OD x 1.17 ID)
3	396 2881 022	5	Seal, O-Ring (0.44 OD x 0.24 ID)
4	391 2881 328	1	Seal, O-Ring (0.63 OD x 0.42 ID)
5	391 2881 642	2	Seal, O-Ring (1.00 OD x 0.80 ID)
6	391 2881 329	2	Seal, O-Ring (0.69 OD x 0.49 ID)
7	391 2881 330	2	Seal, O-Ring (0.76 OD x 0.55 ID)

bul HY14-2006-M1.indd, m&a



Symptom	Likely Cause(s)	What to Do to Correct the Problem
	No orifice in vent plug in inlet	Install orifice plug
Valve will not	No ball in LS check	Replace checks
build pressure	Spool not fully stroked	Check pilot signal, check spool stroke, if EH clean/replace 463 9000 008
Valve stays on pressure	Orifice in vent plug in inlet restricted	Clean or replace orifice or vent plug
Insufficient	RV (workport, LS, clipper, other) set too low	Reset/clean or replace
	AC will not fully close	Clean/replace
	Spool not fully stroked	Check pilot signal, check spool stroke, if EH clean/replace 463 9000 008
	Low margin pressure	Check/increase if possible
Insufficient flow	LS signal not getting to pump	Check PSI at both ends of line
	LS signal to pump line leak	Check PSI at both ends of line – should be same, eliminate pump vent
	Workport accessory leak.	Check/clean or replace
Function drift down prior to raise	Poppet does not seat well – reverse flow or comp. (PCLS) or load check (LS)	Check/clean or replace poppet/section
	Spool position error	Check pilot signal, check spool stroke if possible
	Workport accessory leak.	Check/clean or replace
Function drift down	Spool position error	Check pilot signal, check spool stroke if possible
	Spool or bore quality	Visual inspection
Function does not stop completely	Spool position error	Check pilot signal, check spool stroke if possible
	Slow spool actuation	Check pilot strength
	Slow LS signal creation	Check that LS checks have balls, check/clean replace LS vent
Claurennan	Slow LS signal transmission	Check/replace LSRV, FLO. Check that there is no psi drop in LS line.
Slow response	Slow workport accessory closure	Check/clean or replace
	Main spool sticky	Check/clean or replace section
	Compensator, reverse flow, or load check poppets sticky	Check/clean or replace section
Slow steering or other added function	Excessive internal LS leakage	Check/clean/replace LS RV, LS checks, LS vent
Noise	More than one RV active (chatter)	Clean/replace, change setting(s)
	Main spool sticky	Check/clean or replace section
Function movement	AC will not fully close	Check/clean or replace
erratic	Compensator, reverse flow, or load check poppets sticky	Check/clean or replace section
Valve pressure exceeds LS RV setting	LS RV screen plugged or FLO plugged	Check/clean or replace

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Parker Hannifin Corporation Hydraulic Valve Division 520 Ternes Avenue Elyria, Ohio 44035 USA Tel: (440) 366-5200 Fax: (440) 366-5253 www.parker.com/hydraulicvalve Bulletin HY14-2006-M1/US, 3M, 9/06, PPI



MODEL CBGGLCN-YKQ





CARTRIDGE CONFIGURATION

L	Control	Standard Screw Adjustment
c	Functional Setting Range	2000 - 5000 psi w/4 psi Check (140 - 350 bar w/0,3 bar Check), 3000 psi (210 bar) Standard Setting
Ν	Seal Material	Buna-N
(none)	Material/Coating	Standard Material/Coating

MANIFOLD CONFIGURATION		
(none)	Modifier	6061-T651 Aluminum, Buna-N

PORT HEADINGS AND SIZES

Model	Port Heading	Size
YKQ	Ports C1, C2, V1, V2	1 1/4" Code 61
YKQ	Shuttle Port	SAE 4

NOTES

Important: Carefully consider the maximum system pressure. The pressure rating of the manifold is dependent on the manifold material, with the port type/size a secondary consideration. Manifolds constructed of aluminum are not rated for pressures higher than 3000 psi (210 bar), regardless of the port type/size specified.

4.5:1 pilot ratio, standard capacity counterbalance valve CAPACITY: 60 gpm | **CAVITY:** T-17A



Counterbalance valves with pilot assist are meant to control an overrunning load. The check valve allows free flow from the directional valve (port 2) to the load (port 1) while a direct-acting, pilot-assisted relief valve controls flow from port 1 to port 2. Pilot assist at port 3 lowers the effective setting of the relief valve at a rate determined by the pilot ratio.

Other names for this valve include motion control valve and over center valve.

CARTRIDGE TECHNICAL DATA

Cavity	T-17A
Series	3
Capacity	60 gpm
Pilot Ratio	4.5:1
Maximum Recommended Load Pressure at Maximum Setting	3850 psi
Maximum Setting	5000 psi
Factory Pressure Settings Established at	2 in³/min.
Maximum Valve Leakage at Reseat	5 drops/min.
Adjustment - Number of Counterclockwise Turns to Increase Setting	3.75
Operating Characteristic	Standard
Reseat	>85% of setting
Valve Hex Size	1 1/4 in.
Valve Installation Torque	150 - 160 lbf ft
Adjustment Screw Internal Hex Size	5/32 in.
Locknut Hex Size	9/16 in.
Locknut Torque	80 - 90 lbf in.
Seal kit - Cartridge	Buna: 990-017-007

Seal kit - Cartridge	Polyurethane: 990-017-002
Seal kit - Cartridge	Viton: 990-017-006
Model Weight	0.00 lb.

MANIFOLD TECHNICAL DATA

Body Type Li	ine mount
Interface N	lone
Body Features C	cross pilot with shuttle
Open Cavities 2	
Cavity T-	-17A
Port Size 1	. 1/4" Code 61
Model Weight 6.	.82 lb.

CARTRIDGE TECHNICAL FEATURES

- Counterbalance valves should be set at least 1.3 times the maximum load induced pressure.
- Turn adjustment clockwise to decrease setting and release load.
- Full clockwise setting is less than 200 psi (14 bar).
- Backpressure at port 2 adds to the effective relief setting at a ratio of 1 plus the pilot ratio times the backpressure.
- Reseat exceeds 85% of set pressure when the valve is standard set. Settings lower than the standard set pressure may result in lower reseat percentages.
- Sun counterbalance cartridges can be installed directly into a cavity machined in an actuator housing for added protection and improved stiffness in the circuit.
- Two check valve cracking pressures are available. Use the 25 psi (1,7 bar) check unless actuator cavitation is a concern.
- This valve has positive seals between all ports.
- All 3-port counterbalance, load control, and pilot-to-open check cartridges are physically interchangeable (i.e. same flow path, same cavity for a given frame size).
- Incorporates the Sun floating style construction to minimize the possibility of internal parts binding due to excessive installation torque and/or cavity/cartridge machining variations.

MANIFOLD FACES



Face 2





















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Western Integrated Technologies

8900 North Ramsey Portland, Oregon 97203 Phone (503)228-6666 Fax (503) 228-7318

Hydraulic Motor & Brake



Features

- Knurled sleeve allows simple twist-to-connect operation without the use of tools
- Rugged design allows connect-under-pressure operation
 up to 5800 psi
- Maximum rated working pressure of 9000 psi exceeds the requirements of most applications
- Integral threaded dust cap protects the test point from damage and contamination
- EMA fittings are machined from solid barstock and protected with zinc plating and a dichromate finish for reliability and long life.
- · Stainless steel springs for corrosion resistance
- Elastomeric interface and valve seals provide leak free operation
- Compact design and optional high pressure hose assemblies provide flexibility for tight space requirements
- EMA3/14X1.SED nipple meets the ISO15171-2 standard

Male Pipe Thread





SAE Straight Thread





Metric Straight Thread





British Parallel Pipe





EMA couplings provide easy diagnostic connections for Parker SensoControl[®] equipment or mechanical gages. EMA test points are typically permanently plumbed into a fluid system at locations where pressure measurements are required for maintenance or testing. Integral pressure cap protects the test point from damage and prevents contamination of the fluid system. Proven twist-to-connect design allows the test points to be connected even when the system is in operation and the test points are pressurized. EMA's compact design and optional high pressure hose assemblies allow extra flexibility for the location of system test points.

Although designed primarily for diagnostic applications, EMA fittings and hose assemblies are idea for a wide range of applications that require compact high pressure connections and limited flow rates.

Specifications

Body Size	1/8
Rated Pressure (PSI)	9000 psi
Max Connect-Under-Pressure (PSI)	5800
Rated Flow (GPM)	0.8
Body Material	Carbon Steel
Seal Material (std.)	Nitrile
Temperature Range (std. seals)	-40° to +250° F

Part No.	Port Thread Size	Hex Size	Interface Thread Size	Overall Length	Wt. (LB.) P/Piece
	Α	В	С	D	
EMA3/1/8NPT	1/8-27NPT	0.67	M16X2.0	1.81	0.15
EMA3/1/4NPT	1/4-18NPT	0.67	M16X2.0	1.98	0.16
EMA3/1/4NPT71 Stainless Steel	1/4-18NPT	0.67	M16X2.0	1.95	0.16

Part No.	Port Thread Size	Hex Size	Interface Thread Size	Overall Length	Wt. (LB.) P/Piece
	Α	В	С	D	
EMA3/7/16-20UNF-2A*	7/16-20UNF-2A	0.67	M16X2.0	1.88	0.15
EMA3/9/16-18UNF-2A*	9/16-18UNF-2A	0.75	M16X2.0	1.88	0.17
* O-Ring seal on port					

Part No.	Replaces Part No.	Port Thread Size	Hex Size	Interface Thread Size	Overall Length	Wt. (LB.) P/Piece
		Α	В	С	D	
EMA3/M8X1OR*	NEW	M8X1	0.67	M16X2.0	1.81	0.15
EMA3/10X1ED**	NEW	M10X1	0.67	M16X2.0	1.85	0.15
EMA3/12X1.5ED**	EMA3/12X1.5	M12X1.5	0.67	M16X2.0	1.94	0.16
EMA3/14X1.5ED**	NEW	M14X1.5	0.75	M16X2.0	1.94	0.16
* O-Ring seal on port						

** Molded seal on port

Part No.	Replaces Part No.	Port Thread Size	Hex Size	Interface Thread Size	Overall Length	Wt. (LB.) P/Piece
		Α	В	С	D	
EMA3/1/8ED**	EMA3/R1/8	1/8 BSPP	0.75	M16X2.0	1.77	0.15
EMA3/1/4ED**	EMA3/R1/4	1/4 BSPP	0.75	M16X2.0	1.94	0.16
EMA3/3/8ED**	NEW	3/8 BSPP	0.87	M16X2.0	1.94	0.16

* Molded seal on port

F-25

EMA Gauge Adapter





Part No.	Port Thread Size	Hex Size	Port Thread Size	Overall Length	Wt. (LB.) P/Piece
	Α	В	С	D	
MAV1/4NPT-MA3	1/4-18NPT	0.75	M16X2.0	2.22	0.16
MAV1/4NPT-MA3-KM Includes Dust Cap	1/4-18NPT	0.75	M16X2.0	2.22	0.23





Part No.	Port Thread Size	Hex Size	Port Thread Size	Overall Length	Wt. (LB.) P/Piece
	Α	В	С	D	
MAVMD1/4NPT-MA3	1/4-18NPT	0.75	M16X2.0	2.22	0.18

Union





Part No.	Port Thread Size	Hex Size	Port Thread Size	Overall Length	Wt. (LB.) P/Piece
	Α	В	С	D	
EMA3VS	M16X2.0	0.67	M16X2.0	1.65	0.11

Flexible Hose



	Length	Length	Thread Size
Part No.	(in.)	(mm)	Α
SMA3-200	7.90	200	M16x2.0
SMA3-400	15.75	400	M16x2.0
SMA3-800	31.50	800	M16x2.0
SMA3-2000	78.75	2000	M16x2.0
SMA3-4000	157.50	4000	M16x2.0

Note: Other lengths available upon request. Maximum pressure rating for test hose is 9000 psi.



When ordering Parker coupler bodies and nipples, please state the part number of each type of coupler body and each type of nipple desired. List coupler bodies and nipples as separate items rather than in combinations. Be sure to double check thread or hose sizes of items required.

Many of Parker's coupling products are available with unique non-standard options well suited to very specific applications. Examples of unusual end use applications might include: high temperatures (above 250° F), extremely caustic/corrosive solutions passing through the coupling, external/environmental corrosion situations, or other high wear and tear situations such as dragging the product along the ground. Please see the Fluid Compatibility Chart at the end of the catalog for a guide in selecting material for various media. It is always recommended that the Quick Coupling Division be contacted with any questions concerning specific product application needs.

Typically, a prefix or suffix is added to the base part number to specify a non-standard O-ring seal, or special option. The Optional Seals Suffix chart illustrates the designations.

Please Note: Certain couplings series have additional "Special Order Information" which should be referred to in ordering those products. If applicable to the product, "Special Order Information" is found next to the Features and Specifications charts.

Coupler/Nipple Material

- Prefix "B" for Brass body
- Prefix "SS" for Stainless Steel body
- Standard body material is Steel

Optional Seals Suffix*

No suffix is required when ordering products with the standard Buna-N (Nitrile) seals. When specifying an optional seal, refer to the following chart to determine the appropriate suffix.**

Coupling Series	Ethylene Propylene	Flouro- carbon	Neoprene	Perfluoro- elastomer
PD Series	W	Y	Z	
PDP Series	W	Y	Z	
EMA3 Series	W	Y	Z	

*To select proper seal materials, see Fluid Compatibility Chart in Appendices section, or contact your Parker Quick Coupling Distributor.

**N/A = Not Available; STD = Standard (No Suffix Needed)

Diagnostic Products

Test Port Coupling-Selection Guide

	Valving	Body Size	M Br	late SS	rial S	* P	Locking Mechanism	Std. Seal Material	Temp Range**	Rated Pressure
Test Port										
PD Series	Flush Face	1/8"	•	•	•		Ball	Buna-N (Nitrile)	-40° to +250° F	6000 PSI
PDP Series	Poppet	1/8"			•		Ball	Buna-N (Nitrile)	-40° to +250° F	6000 PSI
EMA3 Series	Poppet	1/8"			•		Threads	Buna-N (Nitrile)	-40° to +250° F	9000 PSI

* See Fluid Compatibility chart and/or consult factory for questions regarding proper material for specific applications.

CODE: Br = Brass; SS = Stainless Steel; S = Steel; P = Plastic

**Temperature Range for standard seal material.

Note: See the Specifications Table for PD and PDP Series for more information.

PD16-40 Piloted 3-Way Spool, External Vent



SYMBOLS



PERFORMANCE (Cartridge Only)



DESCRIPTION

A screw-in, cartridge-style, pilot-operated, spool-type, hydraulic directional valve for three-way circuits requiring remote pilot actuation.

OPERATION

In neutral (unpiloted), the **PD16-40** allows flow passage from ③ to ② bidirectionally, while flow is blocked at ④. V is a spring chamber vent-to-atmosphere, which is internally O-ring sealed from the cartridge flow paths.

On remote pilot signal at 1 , the valve shifts to open from 3 to 4 , while blocking flow at 2.

The vented spring chamber allows PD16-40 to be fully pressurized at any port without affecting required pilot pressure.

FEATURES

- Hardened spool and cage for long life.
- Optional sealed pilot.
- Industry common cavity.

RATINGS

Operating Pressure: 240 bar (3500 psi)

Proof Pressure: 350 bar (5075 psi)

Flow: See Performance Chart

Internal Leakage: 164 cc/minute (10 cu. in./minute) max. at 207 bar (3000 psi)

Pilot Pressure Required:

To Spool Crossover: 7.6 bar (110 psi)

To Full Spool Shift: 9.0 bar (130 psi)

Oil Volume Required to Full Shift: 2.5 cc (0.15 cu. in.)

Temperature: -40 to 120°C with standard Buna seals

Filtration: See page 9.010.1

Fluids: Mineral-based or synthetics with lubricating properties at viscosities of

7.4 to 420 cSt (50 to 2000 sus); See Temperature and Oil Viscosity, page 9.060.1

Installation: No restrictions; See page 9.020.1

Cavity: VC16-4; See page 9.116.1

Cavity Tool: CT16-4XX; See page 8.600.1

Seal Kit: SK16-4X-MMM; See page 8.650.1

Cap Vent Seal: 6003125

Note: This valve is designed with a dynamic oil-to-atmosphere seal in the vent section. Ambient conditions will cause this vent seal to degrade which will reduce the valve's cycle life. If this could cause a problem, we suggest that a non-vented model be selected. Consult factory for assistance.

PD16-40





MATERIALS

Cartridge: Weight: 0.52 kg. (1.15 lbs.) Steel with hardened work surfaces. Zinc-plated exposed surfaces. Buna N O-rings and polyester elastomer back-ups standard.

Standard Ported Body: Weight: 1.5 kg. (3.3 lbs.); Anodized highstrength 6061 T6 aluminum alloy, rated to 207 bar (3000 psi). Ductile iron bodies available; dimensions may differ. See page 8.016.1

TO ORDER





MODEL

DCCC-XYN



CONFIGURATION

x	Control	Standard Pilot
Y	Spool Configuration	A and B to T Center
Ν	Seal Material	Buna-N
(none)	Material/Coating	Standard Material/Coating

4-way, 3-position, pilot-to-shift directional valve CAPACITY: 7 - 10 gpm | CAVITY: T-61A



Three-position, 4-way directional cartridges are spring-centered, 6-port directional valves that can be configured from a choice of spool options. The supply port is port 3 and all ports will accept 5000 psi (350 bar). Capacity for these pilot-to-shift valves is dependent on the spool type specified.

Cavity	T-61A
Series	1
Capacity	7 - 10 gpm
Minimum Pilot Pressure Required to Shift Valve	175 psi
Maximum Operating Pressure	5000 psi
Maximum Valve Leakage at 110 SUS (24 cSt)	2 in³/min.@1000 psi
Pilot Volume Displacement	.02 in ³
Valve Hex Size	7/8 in.
Valve Installation Torque	30 - 35 lbf ft
Seal kit - Cartridge	Buna: 990-061-007
Seal kit - Cartridge	Polyurethane: 990-061-002
Seal kit - Cartridge	Viton: 990-061-006
Model Weight	0.45 lb.

TECHNICAL FEATURES

- All ports will accept 5000 psi (350 bar), including the x and y pilot ports (port 5 and port 6).
- The reason for the different capacities, or performance limits, for the different spool configurations are flow forces. Flow forces are proportional to flow and pressure drop. Typically, they resist the opening of a passage. Spool configurations that open passages as they spring center are the most susceptible. If the flow forces due to the flow and pressure conditions exceed the centering spring force the valve may not shift completely. Higher flows may be used at lower pressures.
- Leakage listed in technical data is for each path.
- The pilot ports, 5 and 6, are positively sealed from the work ports.
- Hardened spool and sleeve provide consistent and low spool leakage rates and excellent wear characteristics.
- Incorporates the Sun floating style construction to minimize the possibility of internal parts binding due to excessive installation torque and/or cavity/cartridge machining variations.

PERFORMANCE CURVES



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Catalog HY15-3500/US Technical Information

Shuttle Valve Series CSH101B

General Description

Cartridge Style Shuttle Valve. For additional information see Technical Tips on pages CS1-CS4.

Features

- Hardened, precision ground parts for durability
- 5000 PSI rated

Performance Curve

Pressure Drop vs. Flow (Through cartridge only)



Specifications

Maximum Flow	3.75 LPM (10 GPM)
Maximum Inlet Pressure	350 Bar (5000 PSI)
Leakage at 150 SSU (32 cSt)	10 drops/min. (.67 cc/min.) at 350 Bar (5000 PSI)
Cartridge Material	All parts steel. All operating parts hardened steel.
Operating Temp. Range (Ambient)	-40°C to +93.3°C (Nitrile) (-40°F to +200°F) -31.7°C to +121.1°C (Fluorocarbon) (-25°F to +250°F)
Filtration	ISO code 16/13, SAE Class 4 or better
Fluids	Mineral-based or synthetic with lubricating properties at viscosities of 45 to 2000 SSU (6 to 420 cSt)
Approx. Weight	.14 kg (0.3 lbs.)
Cavity	C10-3
Form Tool	Rougher NFT10-3R Finisher NFT10-3F







Dimensions Millimeters (Inches)



Ordering Information



csh101b.pm6.5, bl, 6/04



SV08-30 Spool, 3-Way



SYMBOLS

USASI/ISO:



PERFORMANCE (Cartridge Only)





DESCRIPTION

A solenoid-operated, 3-way, direct-acting, spool-type, screw-in hydraulic directional valve.

OPERATION

When de-energized, the **SV08-30** allows flow from 2 to 1 while blocking flow at 3. When energized, the cartridge's spool shifts to open from 3 to 2, while blocking flow out 1. While port 1 may be fully pressurized, it is not intended to be used as the inlet.

Operation of Manual Override Option: To override, push button in and twist counterclockwise 180°. The internal spring will push the button out. In this position, the valve may be only partially shifted. To assure full override shift, pull the button out to its fullest extension and hold it in this position.

To return to normal valve function, push button in, twist clockwise 180°, and release. Override will be detented in this position.

FEATURES

- Continuous-duty rated solenoid.
- Hardened precision spool and cage for long life.
- Optional coil voltages and terminations.
- Efficient wet-armature construction.
- Cartridges are voltage interchangeable.
- All ports may be fully pressurized.
- Manual override option.
- Optional waterproof E-Coils rated up to IP69K.
- Unitized, molded coil design.
- Fully guided spool.
- Compact size.

RATINGS

Operating Pressure: 207 bar (3000 psi)

Flow: See Performance Chart

Internal Leakage:

- Port ③ (De-energized): 82 cc/minute (5 cu. in./minute) max. at 207 bar (3000 psi); Port ① (Energized): 164 cc/minute (10 cu. in./minute) max. at 207 bar (3000 psi)
- **Temperature:** -40 to 120 °C with standard Buna seals
- Coil Duty Rating: Continuous from 85% to 115% of nominal voltage
- **Response Time:** First indication of change of state with 100% voltage supplied at 80% of nominal flow rating: Energized: 22 ms; De-energized: 12 ms
- Initial Coil Current Draw at 20 °C: Standard Coil: 1.2 amps at 12 Vdc; 0.13 amps at 115 Vac (full wave rectified);
 - E-Coil: 1.4 amps at 12 Vdc; 0.7 amps at 24 Vdc
- Minimum Pull-in Voltage: 85% of nominal at 207 bar (3000 psi)

Filtration: See page 9.010.1

- Fluids: Mineral-based or synthetics with lubricating properties at viscosities of 7.4 to 420 cSt (50 to 2000 sus); See Temperature and Oil Viscosity, page 9.060.1
- Installation: See Note on Dimension Drawing

Cavity: VC08-3, Variation "A"; See page 9.108.1

Cavity Tool: CT08-3XX; See page 8.600.1

Seal Kit: SK08-3X-MM; See page 8.650.1

Coil Nut: Part No. 7004400;

For E-coils manufactured prior to 1-1-04, see page 3.400.1 for coil nut info.



SV08-30

DIMENSIONS





MATERIALS

- **Cartridge:** Weight: 0.13 kg (0.28 lb); Steel with hardened work surfaces. Zinc-plated exposed surfaces; Buna N O-rings and back-ups standard.
- Standard Ported Body: Weight: 0.27 kg (0.60 lb); Anodized high-strength 6061 T6 aluminum alloy, rated to 207 bar (3000 psi); Ductile iron bodies available; dimensions may differ. See page 8.008.1.
- Standard Coil: Weight: 0.11 kg (0.25 lb); Unitized thermoplastic encapsulated, Class H high temperature magnet wire. See page 3.200.1.
- **E-Coil:** Weight: 0.14 kg (0.3 lb); Perfect wound, fully encapsulated with rugged external metal shell; Rated up to IP69K with integral connectors.

See page 3.400.1 for all E-Coil retrofit applications.

TO ORDER





Vane motors Service information

vane-type motor / flügelzellen Motor moteur à palettes / motore a palette

motore de paletas M4DC - M4SDC - M4DC1 - M4SDC1



Publ. S2 - ML1504 - A 03 / 2003 / FB

Replace : S2 - ML 154 - C

L25 - 21504 - 1



Recommended repair kits and assy's are bold printed Empfohlene Austausch - Baugruppen sind fett gedruckt Les pochettes de rechange recommandées sont imprimées en caractères gras

I kit di ricambio consigliati sono indicati in grassetto

Los juegos de reparacion recommendados y los conjuntos, estan en negrita





Mounting torque	٠	102 11.11	7511.105
Anziehdrehmoment	÷	102 N.m	75 ft.lbs
Couple de serrage	1	102 N.m	75 ft.lbs
Coppia di serragio	1	102 N.m	75 ft.lbs
Par de apriete	÷	102 N.m	75 ft.lbs

wounting torque	: 210 N.M	155 π.IDS
Anziehdrehmoment	: 210 N.m	155 ft.lbs
Couple de serrage	: 210 N.m	155 ft.lbs
Coppia di serragio	: 210 N.m	155 ft.lbs
Par de apriete	: 210 N.m	155 ft.lbs
i ui ue upriete	. 210 11.111	100 11.10



M4DC - M4SDC

Shuttle valve parts are the same for both "C" and "D" port plates Das Rückschlagventil Pos. 41 ist für die "C" und "D" -Seite identisch Les pièces du clapet rep. 41 sont identiques du côté "C" et "D" Le parti della valvola Pos. 41 sono identiche sul lato "C" e "D"



ltem Pos. Réf. Pos. Pos.	Description Descrizione	Benennung Descripcion	Description	Part N° Teil Nr. Code N° Cod. N° Referencia M4DC-M4DC1	Part N° Teil Nr. Code N° Cod. N° Referencia M4SDC-M4SDC1	Qty Stück Qté Q.tà Cant.
1	Plug (M4DC1 - M4SDC1) Tappo (M4DC1 - M4SDC1)	Stopfen (M4DC1 - M4SDC1) Tapon (M4DC1 - M4SDC1)	Bouchon (M4DC1 - M4SDC1)	446.01004.2	446.01004.2	1
2	Copper seal Rondella	Kupferdichtung	Bague cuivre	612.00001.3	612.00001.3	1
3	Needle bearing Cuscinetto a rulli	Nadellager Cojinete de agujas	Roulement à aiguilles	230.82008	230.82008	1
4	Sq. section seal <i>Guarnizione</i>	Dichtring Junta seccion cuadrada	Joint section carrée	691.10242	691.10242	1
5	Vane Paletta	Flügel Paleta	Palette	034.49977	034.49977	10
6	Spring vane <i>Molla</i>	Feder für Flügel <i>Muelle paleta</i>	Ressort de palette	034.49978	034.49978	30
7	Sq. section seal Guarnizione	Dichtring Junta seccion cuadrada	Joint section carrée	691.10238	691.10238	1
8	Sq. section seal Guarnizione	Dichtring Junta seccion cuadrada	Joint section carrée	691.10250	691.10250	1
9	Spring vane <i>Molla</i>	Feder für Flügel <i>Muelle paleta</i>	Ressort de palette	034.49743	034.49743	30
10	Vane Paletta	Flügel Paleta	Palette	034.49746	034.49746	10
11	O.ring <i>Guarnizione torica</i>	Runddichtring Anillo tòrico	Joint torique	691.00246	691.00246	1
12	Port plate pressure Piatto distributore anter.	Steuerplatte Plato de presion	Plaque pression	034.59852	034.59852	1
13	Retaining ring Anello elastico	Sicherungsring Aro retencion	Circlips	356.32283	356.32283	1
14	Housing Corpo	Gehäuse Cuerpo	Carter	034.49756	034.49756	1
15	Ball bearing Cuscinetto a sfere	Kugellager Cojinete de bolas	Roulement à billes	230.00207	230.00207	1
16	Felt wiper Raschiatore	Filzring	Joint feutre	605.10020	605.10020	1
17	Key (code 1) Chiavetta (codice 1)	Paßfeder (Typ 1) Chaveta (codigo 1)	Clavette (code 1)	034.49676	034.49676	1
18a	Shaft (keyed) (code 1) Albero a chiavetta (codice 1)	Paßfederwelle (Typ 1) Eje chaveteado (codigo 1)	Arbre à clavette (code 1)	034.59004	034.59004	1
18b	Shaft (splined) (code 3) Albero scanalato (codice 3)	Vielkeilwelle (Typ 3) Eje estriado (codigo 3)	Arbre à cannelures (code 3)	034.59003	034.59003	1
19	Shaft seal Paraolio	Simmerring <i>Retén eje</i>	Joint d'arbre	637.00003	637.00003	1
20	Round section ring Anello elastico	Sicherungsring Anillo tórico	Anneau	034.70853	034.70853	1

ltem Pos. Réf. Pos. Pos.	Description Descrizione	Benennung Descripcion	Description	Part N° Teil Nr. Code N° Cod. N° Referencia M4DC-M4DC1	Part N° Teil Nr. Code N° Cod. N° Referencia M4SDC-M4SDC1	Qty Stück Qté Q.tà Cant.
21	Sq. section seal <i>Guarnizione</i>	Dichtring Junta seccion cuadrada	Joint section carrée	691.10335	691.10335	1
22	Belleville washer <i>Rondella</i>	Scheibe	Rondelle éventail	034.59843	034.59843	1
23	Rotor Rotore	Rotor <i>Rotor</i>	Rotor	034.49747	034.49747	1
24	Dowel pin S <i>pina</i>	Fixierstift Pasador	Goupille	324.21612	324.21612	1
	Cam ring 062 Anello camma 062	Hubring 062 <i>Aro volumetrico 062</i>	Came 062	034.59680	034.59687	1
	Cam ring 074 Anello camma 074	Hubring 074 <i>Aro volumetrico 074</i>	Came 074	034.59681	034.59688	1
	Cam ring 088 Anello camma 088	Hubring 088 <i>Aro volumetrico 088</i>	Came 088	034.59682	034.59689	1
25	Cam ring 102 <i>Anello camma 102</i>	Hubring 102 <i>Aro volumetrico 102</i>	Came 102	034.59683	034.59690	1
	Cam ring 113 Anello camma 113	Hubring 113 Aro volumetrico 113	Came 113	034.59684	034.59691	1
	Cam ring 128 Anello camma 128	Hubring 128 <i>Aro volumetrico 128</i>	Came 128	034.59685	034.59692	1
	Cam ring 138 <i>Anello camma 138</i>	Hubring 138 <i>Aro volumetrico 138</i>	Came 138	034.59686	034.59693	1
26	Dowel pin S <i>pina</i>	Fixierstift Pasador	Goupille	324.22414	324.22414	1
27	Needle bearing Cuscinetto a rulli	Nadellager Cojinete de agujas	Roulement à aiguilles	230.82002	230.82002	1
28	Housing <i>Corpo</i>	Gehäuse <i>Cuerpo</i>	Carter	034.66469	034.66469	1
29	Sq. section seal Guarnizione	Dichtring Junta seccion cuadrada	Joint section carrée	691.10226	691.10226	1
30	Port plate pressure Piatto distributore anter.	Steuerplatte <i>Plato de presion</i>	Plaque pression	034.53342	034.53342	1
	Cam ring 024 Anello camma 024	Hubring 024 <i>Aro volumetrico 024</i>	Came 024	034.71871	034.71871	1
	Cam ring 031 Anello camma 031	Hubring 031 <i>Aro volumetrico 031</i>	Came 031	034.48641	034.48641	1
31	Cam ring 043 Anello camma 043	Hubring 043 Aro volumetrico 043	Came 043	034.48642	034.48642	1
	Cam ring 055 Anello camma 055	Hubring 055 Aro volumetrico 055	Came 055	034.48643	034.48643	1
	Cam ring 067 Anello camma 067	Hubring 067 Aro volumetrico 067	Came 067	034.46809	034.46809	1
	Cam ring 075 Anello camma 075	Hubring 075 Aro volumetrico 075	Came 075	034.71126	034.71126	1

ltem Pos. Réf. Pos. Pos.	Description Descrizione	Benennung Descripcion	Description	Part N° Teil Nr. Code N° Cod. N° Referencia M4DC-M4DC1	Part N° Teil Nr. Code N° Cod. N° Referencia M4SDC-M4SDC [,]	Qty Stück Qté Q.tà Cant. 1
32	Rotor Rotore	Rotor <i>Rotor</i>	Rotor	034.49976	034.49976	1
33	Dowel pin S <i>pina</i>	Fixierstift Pasador	Goupille	324.21210	324.21210	2
	End cap 4-bolts UNC (SAE drain) (M4DC - M4SDC) Coperchio UNC 4 fori (drenaggio SAE) (M4DC - M4SDC)	Deckel UNC Flansch (SAE Leckölanschluß) (M4DC - M4SDC) Tapa UNC 4 agujeros (drenaje SAE) (M4DC - M4SDC)	Chapeau 4 trous UNC (drain SAE) (M4DC - M4SDC)	034.	034.	1
	End cap str. thd. UNC (SAE drain) (M4DC - M4SDC) Coperchio filettature UNC (drenaggio SAE) (M4DC - M4SDC)	Deckel UNC Gewinde (SAE Leckölanschluß) (M4DC - M4SDC) Tapa rosca UNC (drenaje SAE) (M4DC - M4SDC)	Chapeau taraudage UNC (drain SAE) (M4DC - M4SDC)	034.	034.	1
34	End cap 4-bolts UNC (BSPP drain) (M4DC - M4SDC) Coperchio UNC 4 fori (drenaggio BSP) (M4DC - M4SDC)	Deckel UNC Flansch (R Leckölanschluß) (M4DC - M4SDC) Tapa UNC 4 agujeros (drenaje BSP) (M4DC - M4SDC)	Chapeau 4 trous UNC (drain BSPP) (M4DC - M4SDC)	034.	034.	1
	End cap 4-bolts Metric (BSPP drain) (M4DC - M4SDC) Coperchio metrica 4 fori (drenaggio BSP) (M4DC - M4SDC)	Deckel Metrisch Flansch (R Leckölanschluß) (M4DC - M4SDC) Tapa metrico 4 agujeros (drenaje BSP) (M4DC - M4SDC)	Chapeau 4 trous métriques (drain BSPP) (M4DC - M4SDC)	034.	034.	1
	End cap 4-bolts UNC (SAE drain) (M4DC1 - M4SDC1) Coperchio UNC 4 fori (drenaggio SAE) (M4DC1 - M4SDC1)	Deckel UNC Flansch (SAE Leckölanschluß) (M4DC1 - M4SDC1) Tapa UNC 4 agujeros (drenaje SAE) (M4DC1 - M4SDC1)	Chapeau 4 trous UNC (drain SAE) (M4DC1 - M4SDC1)	034.	034.	1
	End cap str. thd. UNC (SAE drain) (M4DC1 - M4SDC1) Coperchio filettature UNC (drenaggio SAE) (M4DC1 - M4SDC1	Deckel UNC Gewinde (SAE Leckölanschluß) (M4DC1 - M4SDC1)) <i>Tapa rosca UNC (drenaje SAE) (M4DC1 - M4SDC1)</i>	Chapeau taraudage UNC (drain SAE) (M4DC1 - M4SDC1)	034.	034.	1
35	Plug (M4DC1 - M4SDC1) Tappo (M4DC1 - M4SDC1)	Stopfen (M4DC1 - M4SDC1) Tapon (M4DC1 - M4SDC1)	Bouchon (M4DC1 - M4SDC1)	312.35056	312.35056	2
36	Adaptor valve Adattatore	Kugel ventil Valvula adaptadora	Adapteur valve	034.53346	034.53346	2
37	Ball Sfera	Kugel <i>Bola</i>	Bille d'acier	201.06001	201.06001	2
38	Screw Vite	Schraube Tornillo	Vis			4
39	Plug (M4DC1 - M4SDC1) Tappo (M4DC1 - M4SDC1)	Stopfen (M4DC1 - M4SDC1) Tapon (M4DC1 - M4SDC1)	Bouchon (M4DC1 - M4SDC1)			1
40	Screw Vite	Schraube Tornillo	Vis	358.24300	358.24300	4
41	Check valve (M4DC1 - M4SDC1) Valvola di ritegno (M4DC1 - M4SDC1)	Rückschlagventil (M4DC1 - M4SDC1) Valvula de retención (M4DC1 - M4SDC1)	Clapet (M4DC1 - M4SDC1)	S14.01257	S14.01257	2
	REPAIR KIT KIT DI RICAMBIO	AUSTAUSCH-BAUGRUPPEN CONJUNTO REPARACION	POCHETTES RECHANGES			
А	Kit 024 Cartuccia 024	Pumpeneinsatz 024 <i>Ju</i> ego 024	Cartouche 024	S14.45081	S14.	1
А	Kit 031 Cartuccia 031	Pumpeneinsatz 031 Juego 031	Cartouche 031	S14.27027	S14.	1
Α	Kit 043 Cartucia 043	Pumpeneinsatz 043 <i>Juego 043</i>	Cartouche 043	S14.27028	S14.	1
А	Kit 055 Cartuccia 055	Pumpeneinsatz 055 <i>Ju</i> ego 055	Cartouche 055	S14.27029	S14.	1
А	Kit 067 Cartuccia 067	Pumpeneinsatz 067 Juego 067	Cartouche 067	S14.27030	S14.	1

ltem Pos. Réf. Pos. Pos.	Description Descrizione	Benennung Descripcion	Description	Part N° Teil Nr. Code N° Cod. N° Referencia M4DC-M4DC1	Part N° Teil Nr. Code N° Cod. N° Referencia M4SDC-M4SDC1	Qty Stück Qté Q.tà Cant.
А	Kit 075 Cartuccia 075	Pumpeneinsatz 075 <i>Juego 0</i> 75	Cartouche 075	S14.41505	S24.	1
В	Kit 062 Cartuccia 062	Pumpeneinsatz 062 <i>Juego 062</i>	Cartouche 062	S24.10620	S24.	1
в	Kit 074 Cartuccia 074	Pumpeneinsatz 074 <i>Juego 074</i>	Cartouche 074	S24.10621	S24.	1
в	Kit 088 Cartucia 088	Pumpeneinsatz 088 <i>Juego 088</i>	Cartouche 088	S24.10622	S24.	1
в	Kit 102 Cartuccia 102	Pumpeneinsatz 102 Juego 102	Cartouche 102	S24.10623	S24.	1
В	Kit 113 Cartuccia 113	Pumpeneinsatz 113 <i>Juego 113</i>	Cartouche 113	S24.10624	S24.	1
В	Kit 128 Cartuccia 128	Pumpeneinsatz 128 <i>Juego 128</i>	Cartouche 128	S24.10625	S24.	1
В	Kit 138 <i>Cartuccia 138</i>	Pumpeneinsatz 138 <i>Juego 138</i>	Cartouche 138	S24.10626	S24.	1
С	Shaft and bearing ass'y (code 1) Ins. albero (codice 1)	Baugruppe (Welle u. Lager) (Typ 1) <i>Conjunto eje (codigo 1)</i>	Arbre à clavette et roulement ass. (code 1)	S24.10001	S24.10001	1
D	Shaft and bearing ass'y (code 3) Ins. albero (codice 3)	Baugruppe (Welle u. Lager) (Typ 3) Conjunto eje (codigo 3)	Arbre à cannelures et roulement ass. (code 3)	S24.10000	S24.10000	1
Е	Seal kit (S1) (M4DC - M4DC1) Serie guarnizioni (S1) (M4DC - M4DC1)	Dichtringsatz (S1) (M4DC - M4DC1) Juego de juntas (S1) (M4DC - M4DC1)	Pochette de joints (S1) (M4DC - M4DC1)	S24.10957		1
F	Seal kit (S5) (M4SDC - M4SDC1) Serie guarnizioni (S5) (M4SDC - M4SDC1)	Dichtringsatz (S5) (M4SDC - M4SDC1) Juego de juntas (S5) (M4SDC - M4SDC1)	Pochette de joints (S5) (M4SDC - M4SDC1)		S24.	1
G	Port plate-pressure ass'y Ins. piatto distributore anter.	Steuerplatte Conjunto plato dist.	Plaque pression ass.	S14.29880	S14.29880	1
н	Port plate-pressure ass'y Ins. piatto distributore anter.	Steuerplatte Conjunto plato dist.	Plaque pression ass.	S24.10905	S24.10905	1
	End cap ass'y Ins. coperchio	Gehäuse baugruppe <i>Conjunto tapa</i>	Chapeau arrière ass.			
	4-bolts UNC (SAE drain) (M4DC - M4SDC) UNC 4 fori (drenaggio SAE) (M4DC - M4SDC)	UNC Flansch (SAE Leckölanschluß) (M4DC - M4SDC) UNC 4 agujeros (drenaje SAE) (M4DC - M4SDC)	4 trous UNC (drain SAE) (M4DC - M4SDC)	S24.	S24.	1
	Str. thd. UNC (SAE drain) (M4DC - M4SDC) Filettature UNC (drenaggio SAE) (M4DC - M4SDC)	UNC Gewinde (SAE Leckölanschluß) (M4DC - M4SDC) Rosca UNC (drenaje SAE) (M4DC - M4SDC)	Taraudage UNC (drain SAE) (M4DC - M4SDC)	S24.	S24.	1
J	4-bolts UNC (BSPP drain) (M4DC - M4SDC) UNC 4 fori (drenaggio BSP) (M4DC - M4SDC)	UNC Flansch (R Leckölanschluß) (M4DC - M4SDC) UNC 4 agujeros (drenaje BSP) (M4DC - M4SDC)	4 trous UNC (drain BSPP) (M4DC - M4SDC)	S14.	S14.	1
	4-bolts Metric (BSPP drain) (M4DC - M4SDC) Metrica 4 fori (drenaggio BSP) (M4DC - M4SDC)	Metrisch Flansch (R Leckölanschluß) (M4DC - M4SDC) Metrico 4 agujeros (drenaje BSP) (M4DC - M4SDC)	4 trous métriques (drain BSPP) (M4DC - M4SDC)	S24.	S24.	1
	4-bolts UNC (SAE drain) (M4DC1 - M4SDC1) UNC 4 fori (drenaggio SAE) (M4DC1 - M4SDC1)	UNC Flansch (SAE Leckölanschluß) (M4DC1 - M4SDC1) UNC 4 agujeros (drenaje SAE) (M4DC1 - M4SDC1)	4 trous UNC (drain SAE) (M4DC1 - M4SDC1)	S24.	S24.	1
	Str. thd. UNC (SAE drain) (M4DC1 - M4SDC1) Filettature UNC (drenaggio SAE) (M4DC1 - M4SDC1)	UNC Gewinde (SAE Leckölanschluß) (M4DC1 - M4SDC1 Rosca UNC (drenaje SAE) (M4DC1 - M4SDC1)) Taraudage UNC (drain SAE) (M4DC1 - M4SDC1)	S24.	S24.	1

Model Code	Typenschlüssel	Designation - type									
Model number :	Typenbezeichnung :	Numéro du modèle :	M4*DC1 M4*DC	- 138 - - 138 -	031 - 031 -	N N	00 00	- B - B	1 02 1 02	2 00 2 00) 0
Series external drain	Baureihe externer Leckölanschluß	Série drain externe				- Т	Т	T	ТΠ		ΞT
Series internal drain	Baureihe interner Leckölanschluß	Série drain interne									
Torque for A1 and B1 (Nm/bar) 062 = 1.04 074 = 1.22 088 = 1.45 102 = 1.68 113 = 1.86 128 = 2.11 138 = 2.30	Drehmoment für A1 und B1 (Nm/bar) 062 = 1.04 074 = 1,22 088 = 1,45 102 = 1,68 113 = 1,86 128 = 2,11 138 = 2,30	Couple A1 et B1 (Nm/bar) 062 = 1,04 074 = 1,22 088 = 1,45 102 = 1,68 113 = 1,86 128 = 2,11 138 = 2,30									
Torque for A2 and B2 (Nm/bar) 024 = 0,39 027 = 0,45 031 = 0,55 043 = 0,74 055 = 0,93 067 = 1,13 075 = 1,27	Drehmoment für A2 und B2 (Nm/bar) 024 = 0,39 027 = 0,45 031 = 0,55 043 = 0,74 055 = 0,93 067 = 1,13 075 = 1,27	Couple A2 et B2 (Nm/bar) 024 = 0.39 027 = 0.45 031 = 0.55 043 = 0.74 055 = 0.93 067 = 1,13 075 = 1,27									
Type of shaft 1 = keyed (SAE C) 3 = splined (SAE C)	Art der Welle 1 = Paßfederwelle (SAE C) 3 = Vielkeilwelle (SAE C)	Type d'arbre 1 = à clavette (SAE C) 3 = à cannelures (SAE C)									
Direction of rotation N = bi-directional	N = Rechts und Linkslauf	N = Bi-directionnel									
Porting combination	Lage der Anschlüsse	Combinaison des orifices									
Design letter	Ausführungsbuchstabe	Conception									
Seal class 1 = S1 - M4DC 5 = S5 - M4SDC	Dichtungsklasse 1 = S1 - M4DC 5 = S5 - M4SDC	Classe de joint 1 = S1 - M4DC 5 = S5 - M4SDC									
Mounting w/connection variables 01 = SAE threaded port SAE drain 02 = SAE 4 bolts flange UNC threaded - SAE drain 04 = SAE 4 bolts flange UNC threaded - BSPP drain	Gehäuse-Anschlußgröße 01 = SAE-Gewinde Leckölanscluß SAE 02 = 4 Loch-Flansch SAE UNC-Gewinde - Leckölanschluß SAE 04 = 4 Loch-Flansch SAE UNC-Gewinde - R-Leckölanschluß	Option sur orifices 01 = taraudage SAE drain SAE 02 = bride SAE 4 trous taraudage UNC - drain SAE 04 = bride SAE 4 trous taraudage UNC - drain BSPP									
No control	Regelung	Pas de contrôle									
Modifications	Modifikationen	Modifications									

Designazione	Clave de designación												
Sigla :	Referencia modelo :	M4*DC1 M4*DC	2	138 - 138 -	03 ⁻ 03 ⁻	-	1 N 1 N	0	0 - 0 -	B 1 B 1	02 02	00 00	
Serie drenaggio esterno Serie drenaggio interno	Serie			Τ			Π	_		T		ΤŢ	
Coppia A1 B1 (Nm/bar) 062 = 1,04 074 = 1,22 088 = 1,45 102 = 1,68 113 = 1,86 128 = 2,11 138 = 2,30	Aro volumetrico A1 B1 (Nm/bar) 062 = 1,04 074 = 1,22 088 = 1,45 102 = 1,68 113 = 1,86 128 = 2,11 138 = 2,30												
Coppia A2 B2 (Nm/bar) 024 = 0,39 027 = 0,45 031 = 0,55 043 = 0,74 055 = 0,93 067 = 1,13 075 = 1,27	Aro volumetrico A2 B2 (Nm/bar) 024 = 0.39 027 = 0.45 031 = 0.55 043 = 0.74 055 = 0.93 067 = 1.13 075 = 1.27												
Tipo di albero 1 = a chiavetta (SAE C) 3 = scanalato (SAE C)	Tipo de eje 1 = chaveteado (SAE C) 3 = estriado (SAE C)						1						
Senso di rotazione N = bidirezionale	N = bi-direccional												
Orientamento delle bocche	Posición de bocas								l				
Disegno	Letra de diseño												
Tipo di guarnizioni 1 = S1 - M4DC 5 = S5 - M4SDC	Clase de juntas 1 = S1 - M4DC 5 = S5 - M4SDC												
Dimensioni delle bocche 01 = filettature SAE drenaggio SAE 02 = flange SAE 4 fori - filettature UNC drenaggio SAE 04 = flange SAE 4 fori - filettature UNC drenaggio BSP	Opciones de las bocas 01 = rosca SAE drenaje SAE 02 = SAE 4 agujeros - rosca UNC drenaje SAE 04 = SAE 4 agujeros - rosca UNC drenaje BSP												
Senza controlli	Modificaciones												



Western Integrated Technologies

MECHANICAL * FLUID POWER SYSTEMS * ELECTRICAL 8900 North Ramsey Portland, Oregon 97203 Phone (503)228-6666 Fax (503) 228-7318

Controls



REV.	DESCRIPTION	DATE
A JCH	CHANGED ROCKER SWITCH CONNECTOR ECR #787	08-24-99



NDTES: 1) VOLTAGE SUPPLY IS TO BE 10-30VDC. 2) CONTROL HANDLE IS SPRUNG TO CENTER POSITION. 3) SLIDE LOCK IS SPRUNG TO LOCKED POSITION. 4) THE DUTPUTS (FWD, REV, 2ND & 3RD) ARE RATED @ 3.5 AMPS CONTINUOUS AND 8 AMPS PEAK.

WARNING: P-Q Controls, products are intended as general pur switches. They are NOT safety des		P-Q Controls, 95 Dolphin Rd.	Inc.	ржс. NO. B—1	0275	REV. A
and as with any general purpose devi malfunctions may occur. If P-Q produ- are used to initiate an operation with		PHONE: (860) 583-60 FAX: (860) 583-60	-6994 011	SHEET	5	scale 1:2
false operation could be dangerd POINT-OF-OPERATION GUARDING DEVI	s, es M120	-1633 IN	STALI	ATION	DWG	,
must be installed and maintained to n all appropriate OSHA and ANSI mach safety standards, P-Q Controls, Inc. s	ne THREE	SPEED CONT	ACTLES	S		
not accept responsibility for installat application or safety of systems.	on, draftsman JCH	CHECK	PROJEC	ENGINEER	07-1	3–98











MODEL 115 SINGLE AXIS JOYSTICK



The Model 115 provides a weather-resistant, heavyduty mechanism to convert operators' manual commands into electrical output over and extended life.

What makes the Model 115 unique is its low profile below-panel mounting design, which saves space in an already compact package. The aluminum frame resists deformation due to extreme temperature changes, and allows our valve drive boards to be mounted on the side for added convenience. The simple design of the 115 provides a sturdy foundation, while offering a wide array of mechanical and electrical options. A choice of several other hand grip styles are also available.

MECHANICS

Like all of our joysticks, the Model 115 uses thickwalled glass-reinforced nylon components, which provides an extremely high tensile strength, with excellent resistance to corrosion and wear. A helical compression spring centering mechanism has been opted for in place of torsion springs, which compensates for wear and eliminates the center-stop of a torsion spring-centering lever. The .375 inch diameter shaft is made of a special relief annealed seamless steel tubing that has been hardened and treated to resist corrosion. The shaft pivot is an oversized .75 inch diameter oil-impregnated bronze bushing, which further adds rigidity to the mechanism, making the Model 115 among the most durable control in its class.

ELECTRONICS

The Model 115 of course uses Hall Effect sensors as a standard (potentiometric and switched outputs are also available), which eliminates any contact between moving electrical parts while further improving overall precision. Silicone dipping and potting further protects the electronics from direct exposure to the environmental corrosives.

KEY ADVANTAGES

- Contactless Hall Effect Technology
- Below-Panel Mounted, Low Profile Design
- Robust Weather-Resistant Construction
- Friction Options Available
- > EMI & RFI resistant

ADDITIONAL OPTIONS

Please see our web site for more information on our product line (<u>www.pqcontrols.com</u>)



SHOWN WITH BALL KNOB

SPECIFICATIONS

Electrical: 5 VDC or 10-30 VDC Contactless Hall Effect (see Input: electrical options page for other options) Max (+) Travel: 4.0 V DC Output: Max (-) Travel: 1.0 V DC Centered: 2.5 VDC Output Impedance: 220 OHMS All inputs & outputs fully protected. Other outputs: (see page 2 for other options available) Mechanical. Travel: Bidirectional ± 30° Unidirectional + 60° 1.73 lb Operating Force*: Light spring: Standard spring: 3.92 lb Heavy spring: 4.88 lb * Force values are based on a 4.38" Moment Arm Friction and neutral detent available; friction drag approximately 3 lbs force. **Environmental:**

Temperature: - 40° to 85° C (-40° to 185° F) Weather Resistance: Control is weather tight when mounted to panel using gasket supplied. Electronics are epoxy potted or silicone dipped. Material is UV protected.

Data Sheet 115, P-Q Controls, Inc. 95 Dolphin Road, Bristol, CT, USA 06010 Tel: 860-583-6994, Fax: 860-583-6011, email: info@pqcontrols.com www.pqcontrols.com








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OPTION 56 (30%) EQUIVALENT OUTPUT M212 = OUTPUTS X2





1) VOLTACE SUPPLY IS TO BE 5VDC. 2) CURRENT CONSUMPTION: 14mA © 5VDC. OUTPUT: CENTERED - 2.50Y ±0.05V. FULL POSITIVE DEFLECTION - 4.50V ± 0.2V. FULL NEGATIVE DEFLECTION - 0.50V ± 0.2V.





OPTION 57 (25%) EQUIVALENT OUTPUT M212 = OUTPUTS X2

1) VOLTAGE SUPPLY IS TO BE 10–30VDC. 2) CURRENT CONSUMPTION: 20mA @ 12VDC. OUTPUT: CENTERED – 2.50V ±0.05V. FULL POSITIVE DEFLECTION – 3.75V ± 0.12V. FULL NEGATIVE DEFLECTION – 1.25V ± 0.12V. SJAUX A CUTPUT SWITCHES ON @ APPROX. 2.22V WITH THE POSITIVE ANALOG OUTPUTS (X+, Y+). AUX B OUTPUT SWITCHES ON @ APPROX. 2.2V WITH THE NEGATIVE ANALOG OUTPUTS (X-, Y-).











OPTION 63 EQUIVALENT OUTPUT M212 = OUTPUTS X2

- 1) VOLTAGE SUPPLY IS TO BE 10-30VD0
- NOLTAGE SUPPLY IS TO BE 10-30VDC.
 CURRENT CONSUMPTION: 20mA @ 12VDC.
 OUTPUT: CENTERED 0.00V ±0.5V.
 FULL POSITIVE DEFLECTION 10.00V ± 1.00V.
 FULL NEGATIVE DEFLECTION 10.00V ± 1.00V.
 AUX A OUTPUT SWITCHES ON @ APPROX. 2.00V WITH THE POSITIVE ANALOG OUTPUTS (X+, Y+). AUX B
 OUTPUT SWITCHES ON @ APPROX. 2.00V WITH THE NEGATIVE ANALOG OUTPUTS (X-, Y-).



OPTION 58 (30%) EQUIVALENT OUTPUT M212 = OUTPUTS X2

1) VOLTAGE SUPPLY IS TO BE 5VDC. ② 2) CURRENT CONSUMPTION: 14mA ◎ 5VDC, OUTPUT: CENTERED - 2.50V ±0.05V. FULL POSITIVE DEFLECTION - 4.00V ± 0.15V. FULL NEGATIVE DEFLECTION - 1.00V ± 0.15V.



OPTION 61 (40%) EQUIVALENT OUTPUT M212 = OUTPUTS X2

IVOLTAGE SUPPLY IS TO BE 10-30VDC.
 2) CURRENT CONSUMPTION: 20mA Φ 12VDC.
 2) CURRENT CONSUMPTION: 20mA Φ 12VDC.
 OUTPUT: CENTERED - 2.50V ±0.05V.
 FULL POSITIVE DEFLECTION - 4.50V ± 0.2V.
 FULL NEGATIVE DEFLECTION - 0.50V ± 0.2V.
 3) AUX A OUTPUT: SUTCHES ON Φ APPROX. 2.282V WITH THE POSITIVE ANALOG OUTPUTS (X+, Y+). AUX B
 OUTPUT SWITCHES ON Φ APPROX. 2.22V WITH THE NEGATIVE ANALOG OUTPUTS (X-, Y-).



OPTION 64 (30% SWING, 50% AUX) OUTPUT M212 = OUTPUTS X2

- $\label{eq:constraint} \begin{array}{l} \text{The form of the form of$





OPTION 65 (PWR PAK) EQUIVALENT OUTPUT M212 = OUTPUTS X2

1)VOLTACE SUPPLY IS TO BE 18-60VDC. 2)DURRENT CONSUMPTION: 20mA @ 12VDC. OUTPUT: CENTERED - 4.505-4.35VDC. CW & CCW TRIP - 3.3-3.6VDC. CW & CCW TRIP - 3.3-3.6VDC. 3)UX A OUTPUT SWITCHES ON WITH THE POSITIVE ANALOG OUTPUTS (X+, Y+). AUX B OUTPUT SWITCHES ON WITH THE NEGATIVE ANALOG OUTPUTS (X-, Y-).







OPTION 67 EQUIVALENT OUTPUT M212 = OUTPUTS X2

1) VOLTAGE SUPPLY IS TO BE 10-30VDC. 2) CURRENT CONSUMPTION: 20mA \oplus 12VDC. OUTPUT: CENTERED - 0.00V ±0.25V. FULL POSITIVE DEFLECTION - 5.00V ± 0.50V. FULL NEGATIVE DEFLECTION - 5.00V ± 0.50V. 3) AUX A OUTPUT SWITCHES ON \oplus APPROX. 1.00V WITH THE POSITIVE ANALOG OUTPUTS (X+, Y+). AUX B OUTPUT SWITCHES ON \oplus APPROX. 1.00V WITH THE NEGATIVE ANALOG OUTPUTS (X-, Y-).













1)VOLTAGE SUPPLY IS TO BE 10-30VDC. 2)CURRENT CONSUMPTION: 20mA @ 12VDC. OUTPUT: CENTERED - 2.50V ±0.05V. FULL POSITIVE DEFLECTION - 4.50V ± 0.2V. FULL NEGATIVE DEFLECTION - 0.50V ± 0.2V. 3)AUX A OUTPUT SWITCHES ON @ APPROX. 3.30V WITH THE POSITIVE ANALOG OUTPUTS (X+, Y+). AUX B OUTPUT SWITCHES ON @ APPROX. 1.70V WITH THE NEGATIVE ANALOG OUTPUTS (X-, Y-).



OPTION 71 EQUIVALENT OUTPUT M212 = OUTPUTS X2

1) VOLTAGE SUPPLY IS TO BE 10-30VDC. 2) CURRENT CONSUMPTION: 20mA @ 12VDC. OUTPUT: CENTERED - 4.0mA ±0.8mA. FULL NEGATIVE DEFLECTION - 18.4mA ± 1.6mA. FULL NEGATIVE DEFLECTION - 18.4mA ± 1.6mA. 3) AUX A OUTPUT SWITCHES ON @ APPROX. 7.2mA WITH THE POSITIVE ANALOG OUTPUTS (X+, Y+). AUX B OUTPUT SWITCHES ON @ APPROX. 7.2mA WITH THE NEGATIVE ANALOG OUTPUTS (X-, Y-).



IQAN-MC2 Instruction book

Publ no HY33-8388-IB/UK Edition 2013-12-11







ENGINEERING YOUR SUCCESS.

1	Introduction
	Overview of relevant documentation2
2	Precautions
3	Product description
4	Safety 8 Internal diagnostics 8 CAN-bus interruption 8 Current check 8 Emergency stop 8
5	Mounting
6	Installation10Supply voltage12Addressing/terminating13Diagnostic interfaces14Reference voltage, VREF16Voltage inputs17Digital inputs20Frequency inputs22Proportional outputs23Connecting loads to proportional outputs23Digital outputs24Low-side digital outputs25
7	Start-up 26 Start-up procedures 26
8	System Diagnostics27Safe mode28Appendix A29IQAN-MC2 Technical Overview29Appendix B34Error codes, messages and actions34Appendix C35Dimensioning of the IQAN module35

1 Introduction

These instructions are to be used as a reference tool for the vehicle manufacturer's design, production, and service personnel.

The user of these instructions should have basic knowledge in the handling of electronic equipment.

Warnings

Sections marked with a symbol in the left margin, must be read and understood by everyone using the system, carrying out service work, or making changes to hardware and software.

The different symbols used in this manual are defined below.



WARNING

Sections labeled *WARNING* with a caution symbol in the left margin, indicate that a hazardous situation exists. We use warnings, marked with the warning symbol, in two ways.

- As a strong recommendation about work practices when using the product in the machine (e.g. routines when updating an application). This use is common to the term 'hazardous situation', that a person is exposed to a hazard.
- As a way of pointing out important information for the machine designer that in some way relates to safety. This includes the design of the physical machine, and also the application program being developed for the control system.

Not all document sections that contain information about safety are marked with a warning symbol (there would be warnings everywhere). Failure to comply with the recommendations can cause unintentional, and unexpected behavior of the control system. This can potentially cause death, serious injury or property damage.



NOTICE

Sections labeled *NOTICE* with a notice symbol in the left margin, indicate there is important information about the product. Ignoring this could result in less than optimal performance, or damage to the product.

Contact the manufacturer if there is anything you are not sure about or if you have any questions regarding the product and its handling or maintenance.

The term "manufacturer" refers to Parker Hannifin Corporation.

Overview of relevant documentation

The following publications are relevant for users of this product. The main documentation contains information that is not found elsewhere. The additional documentation contains product information in a compact format, for details on the information found in those documents, consult this manual.



The IQAN module documentation system.

2 Precautions

Work on the hydraulics control electronics may only be carried out by trained personnel who are well-acquainted with the control system, the machine and its safety regulations.



WARNING

Make sure that you have sufficient knowledge before designing, modifiying or servicing the control system.

Read the relevant sections of this document before conducting any work on the control system.



WARNING

This product is not field repairable.

Νοτιςε

As much as possible of the welding work on the chassis should be done before the installation of the system. If welding has to be done afterwards, the electrical connections on the system must be disconnected from other equipment. The negative cable must always be disconnected from the battery before disconnecting the positive cable. The ground wire of the welder shall be positioned as close as possible to the place of the welding. The cables on the welding unit shall never be placed near the electrical wires of the control system.

Read This

Design of control system



WARNING

Risk of injury may be introduced by design of control system!

This product is designed to control hydraulic outputs. The control application must be designed using basic safety principles so that unintentional movement is avoided. The machine must be equipped with an emergency stop that stops all movement. Please refer to section "Supply voltage".

Before you start

Read this document. Read the IQANdesign software user manual section on 'application safety'.

Start-up, maintenance, and diagnostics

For all personnel carrying out installation, commissioning, maintenance or troubleshooting.



WARNING

Work on the hydraulics control electronics may only be carried out by trained personnel who are well-acquainted with the control system, the machine and its safety regulations.

Before you start,

Read section "Start-up".

Additional information for service

Mounting and maintenance instruction book.

Additional information for diagnosing the system

Read section "System diagnostics", and see "Appendix B", in this document. Use the IQANrun software user manual as a reference.

3 Product description

IQAN-MC2

The IQAN-MC2 is designed for controlling hydraulic systems in vehicles and machinery, using 12/24 Vdc power supply.

IQAN-MC2 is a master unit capable of running applications created by IQANdesign. The MC2 has local I/O for input/output use and has two CAN busses that support ICP (IQAN CAN Protocol), SAE J1939 and Generic CAN.

By supporting SAE J1939 and Generic CAN the MC2 can act as a sub-master when there is a need of higher performance in a sub-circuit or when there is an OEM supplied overall machine master.

This product is designed for the outdoor environment and comes with an IP6K9K protection for applications where high-pressure water and steam jet cleaning is used.



The IQAN-MC2 module.

I/O overview



Inputs

The IQAN-MC2 module has five (5) *voltage inputs* VIN-A thru VIN-E for connection of 0-5 Vdc signals. The inputs are multi-purpose and for flexibility may be configured in other ways. The input pins VIN-A and VIN-E can be configured as *on/off inputs* for switches or as *frequency inputs* for measuring frequency. *Voltage inputs, on/off inputs* and *frequency inputs* share positions, see list.

(5) Voltage inputs VIN-A thru VIN-E

or

(5) Frequency inputs FIN-A thru FIN-E use positions VIN-A thru VIN-E.

or

(5) Digital inputs DIN-A thru DIN-E use positions VIN-A thru VIN-E.

Proportional outputs

The MC2 module has eight (8) double *proportional outputs* for controlling proportional valves. These outputs can control eight bi-directional valve sections or eight single solenoid devices (ie. proportional cartridge valves). The proportional outputs can be used in two different modes. Either *Current mode* (current closed loop) or *PWM mode* (voltage open loop) signals can be selected and the parameters configured using IQAN software.

For flexibility these outputs may also be configured as up to eight (8) *on/off outputs* and up to eight (8) *on/off inputs or voltage inputs*. Additional functionality for these positions is as up to sixteen (16) *low-side on/off outputs*. The proportional outputs, on/ off outputs, on/off or voltage inputs and low-side on/off outputs share positions, see below.

(8) double proportional outputs COUT-A thru COUT-H

or

(8) double proportional outputs PWMOUT-A thru PWMOUT-H

or

(8) on/off outputs DOUT-A thru DOUT-H.

Each pair of return pins may then be used as: (2) low-side digital output switches (16) total, DOUT(LS)-I thru DOUT(LS)-X. It is recommended to use one or more of DOUT-A thru DOUT-H as source if used in this manner, for safety.

The pairs of return pins associated with DOUT-E thru DOUT-H may also be used as:

(2) on/off inputs, (8) total, DIN-F thru DIN-M.

(2) voltage inputs, (8) total, VIN-F thru VIN-M.

In order to increase the performance of the proportional outputs when controlling proportional valves, the *dither frequency* can be adjusted.

CAN related functions

The IQAN-MC2 uses a CAN-bus (CAN = Controller Area Network) to communicate with IQAN expansion modules and other systems. The CAN-bus is a robust communication protocol that is widely used and well proven within the automotive industry.

The unit has two (2) CAN buses, CAN-A and CAN-B. The buses may be configured using IQAN software to be ICP (ICP = IQAN CAN Protocol), SAE J1939 or Generic user defined CAN protocol (e.g. CANopen).

Communication

The communication interfaces are used for uploading/downloading applications or diagnostics and typically are connected to a computer.

CAN

The IQAN-MC2 has 2 CAN buses. Either of the CAN buses may be used for communication and diagnostics. A CAN communication card is required to be installed in your PC to use this feature.

USB

The IQAN-MC2 has a USB1.1 (device only) connection in connector C1, for maximum voltage on USB pins, see Appendix A.

4 Safety

Internal diagnostics

The module performs a number of self-checks that improve safety. Checks include monitoring of voltage supplies, checksums on memory and a watchdog that monitors software execution. The module is using a real time operating system which supervises software execution.

If a critical error is detected, the module is stopped, with CAN-bus and outputs off.

CAN-bus interruption

The IQAN modules communicate on a CAN-bus. Both the master module and expansion modules check for any interruptions in CAN-bus communication. If an error occurs the master will use zero or an application defined error value for the module inputs, and the module outputs will be off.

The error will be presented on the master/display module, if there is one, and with a related blink code on the IQAN module status LEDs.

Current check

For the proportional outputs when used in current mode, a current check is performed. If an error is detected, this will be indicated on the master module, and the output will shut off.

The module can detect open-circuit, short-circuit to +BAT/-BAT or short-circuit to other proportional output and return pins.

Emergency stop



WARNING

Risk of injury!

The emergency stop must disconnect the power supply to the module; do not connect the emergency stop as a signal input only.

The emergency stop must be installed so that the risk of reverse feed of the module is avoided, see section "Supply voltage".

5 Mounting

Mounting the module

The IQAN module should be mounted according to the following instructions:

- Locate the module eliminating the risk for the cabling to be folded, crushed or damaged in any way. Ensure the cabling cannot pull, twist or induce sideload on the connector.
- Locate the module so that severe physical impact is avoided, e.g impact from falling objects or the module being used as a step.
- Locate the module so that air can circulat to eliminate excess heat. Ensure that no external heat, e.g. from the engine or heater, is transferred to the module.
- Locate the module to protect it from high pressure washing or similar.
- Locate the module so that the cable connector is facing down .
- Locate the module so that the LEDs are visible.



Non approved placing.



NOTICE

The IQAN module must not be placed in any marine related or similar continuously damp, salt-spray environment without external protection.

Assembling of the ID-Tag

The ID-Tag will be placed in the connector in order to address/ terminate the module. For IQAN master modules, the use of an ID-tag is application dependant. All IQAN expansion modules require an ID-tag, ref section "Addressing/terminating". The ID-Tag will be mounted under the connector casing. Bend the ID-Tag's wires toward the opposite side of where the other wires enter the connector.



Assembling of the Id-Tag.

6 Installation

Connector C1

Connector kit	Parker no. 5031063	42 29
Housing	Amp no. 1-963226-1	
Casing	Amp no. 0-965643-1	*= The connector contains two types
Plane sealing, 42 p	Amp no. 963225-1	of terminals; MT (Micro Timer) and JPT (Junior Power Timer).
Pin types*	Amp no. 963711-2 (MT)	Amp no. 929938-1 (JPT)
Cables	0,75-1,0 mm² (MT)	1,5-2,5 mm² (JPT)
Seals	Amp no. 963530-1 (MT)	Amp no. 828905-1 (JPT)
Plugs (empty pos.)	Amp no. 963531-1 (MT)	Amp no. 828922 (JPT)
IQAN crimping tool references	Blue handle, pos. A use blue extraction tool	Red handle, pos. B use yellow extraction tool
IQAN tool kit	Parker no. 5031061	

Connector pin assignments



Symbol	Pin No.	In Out	Function
+BAT	28	-	Power supply
-BAT	15	-	Power supply
+RTC	6	-	Power supply for RTC.
+VREF	42	-	Voltage reference for external sensors. Sourcing +5V.
-VREF	29	-	Voltage reference for external sensors. Return (0V).
ADDR-H	1	-	IdTag interface. High side to address tag. Sourcing +5V.
ADDR-L	14	-	IdTag interface. Low side to address tag. Return signal.

Symbol	Pin No.	In Out	Function				
CAN-A-H	27	-	CAN high voltage bus line, will be HIGH in dominant state.				
CAN-A-L	41	-	CAN low voltage bus line, will be LOW in dominant state.				
CAN-B-H	26	-	CAN high vo	oltage bus line, will	be HIGH in domin	ant state.	
CAN-B-L	40	-	CAN low vol	ltage bus line, will b	be LOW in domina	nt state.	
USB-D+	12	-	USB high vo USB shield	oltage bus line. and gnd connects t	o -VREF or -BAT.		
USB-D-	13	-	USB low vol USB shield	ltage bus line. and gnd connects t	o -VREF or -BAT.		
P0			P0 is an 5pi	n input port with alt	ernative functions.		
			VIN	DIN	FIN		
P0.0 P0.1 P0.2 P0.3 P0.4	20 21 34 35 7	 	VIN-A VIN-B VIN-C VIN-D VIN-E	DIN-A DIN-B DIN-C DIN-D DIN-E	FIN-A FIN-B FIN-C FIN-D FIN-E		
P1			P1 is an 24p	oin input/output por	t with alternative fu	inctions.	
			соит	PWMOUT	DOUT	VIN	DIN
P1.0 P1.1 P1.2	2 16 30	0 0/I 0/I	COUT-A RET-A+ RET-A-	PWMOUT-A RET-A+ RET-A-	DOUT-A DOUT(LS)-I DOUT(LS)-J	-	- -
P1.3 P1.4 P1.5	3 17 31	0 0/I 0/I	COUT-B RET-B+ RET-B-	PWMOUT-B RET-B+ RET-B-	DOUT-B DOUT(LS)-K DOUT(LS)-L	- - -	- - -
P1.6 P1.7 P1.8	4 18 32	0 0/I 0/I	COUT-C RET-C+ RET-C-	PWMOUT-C RET-C+ RET-C-	DOUT-C DOUT(LS)-M DOUT(LS)-N	- -	- -
P1.9 P1.10 P1.11	5 19 33	0 0/I 0/I	COUT-D RET-D+ RET-D-	PWMOUT-D RET-D+ RET-D-	DOUT-D DOUT(LS)-O DOUT(LS)-P	- -	-
P1.12 P1.13 P1.14	8 22 36	0 0/I 0/I	COUT-E RET-E+ RET-E-	PWMOUT-E RET-E+ RET-E-	DOUT-E DOUT(LS)-Q DOUT(LS)-R	- VIN-F VIN-G	- DIN-F DIN-G
P1.15 P1.16 P1.17	9 23 37	0 0/I 0/I	COUT-F RET-F+ RET-F-	PWMOUT-F RET-F+ RET-F-	DOUT-F DOUT(LS)-S DOUT(LS)-T	- VIN-H VIN-I	- DIN-H DIN-I
P1.18 P1.19 P1.20	10 24 38	0 0/I 0/I	COUT-G RET-G+ RET-G-	PWMOUT-G RET-G+ RET-G-	DOUT-G DOUT(LS)-U DOUT(LS)-V	- VIN-J VIN-K	- DIN-J DIN-K
P1.21 P1.22 P1.23	11 25 39	0 0/I 0/I	COUT-H RET-H+ RET-H-	PWMOUT-H RET-H+ RET-H-	DOUT-H DOUT(LS)-W DOUT(LS)-X	- VIN-L VIN-M	- DIN-L DIN-M
			Note: If a COUT or PWMOUT block (COUT-x/PWMOUT-x, RET-x+, RET-x-) is used, all three pins are configured as COUT (or PWMOUT).				
			Note: VIN-F to VIN-M (or DIN-F to DIN-M) can only be configured in pairs. Each pair can only be either inputs (VIN, DIN), or outputs (DOUT-LS)				
			VIN-F to VIN-M (or DIN-F to DIN-M) are equipped with clamping diodes, risk for 'backending'. See section "Connecting switches to digital inputs".				

Shaded positions are Junior Power Timer pins. Unshaded positions are Micro Timer pins. See above for wire, seal, pin number and crimping tool information. The IQAN tool kit is found in the 'IQAN accessories' datasheet.

Supply voltage

Before any installation of the IQAN system can take place, make sure the ignition lock is turned off and the battery is disconnected.

Emergency stop

Make sure an *Emergency Stop* disconnecting the power supply, is easily accessible at any time. The figure below shows how to connect the emergency stop.

Connecting of Supply Voltage

The supply voltage, should be within the operating interval, see Appendix A. Connect the supply voltage to +BAT and -BAT. Protect the module by using a fuse. For requisite fuse level, see Appendix A.

RTC supply

IQAN master modules have a clock that is used for date/time stamping when logging data. The *real time clock*, +RTC, requires a separate positive power connection. Connect the supply voltage to +RTC through a 1.5K ohm resistor. The resistor should be as close to the battery as possible for safety. Expansion modules do not have +RTC.



WARNING

Risk of injury!

To reduce the risk for uncontrolled supply of an IQAN master module, i.e., a short circuit between the +RTC cable and +BAT, a resistor must be connected between the battery and the +RTC input. This is important as this line is not controlled by an emergency stop.

The resistor should be placed close to the battery, as the 'protected' part is the cable between the resistor and the unit.

This will prevent the +RTC wire from powering up the unit if shorted to +BAT. The same possibility exists from a short to CRET wires when they are used as digital inputs; refer to section "DIN that share pin with RET".



Connecting the emergency stop and voltage supply.



NOTICE

Do not use the chassis as the negative terminal.

Polarity reversal

The module is protected against power supply polarity reversal and over-voltage, provided an external fuse is being used.

If this fuse is not used, polarity reversal can damage the unit.

Addressing/terminating

IQAN-MC2 use of an ID-Tag

In IQANdesign 3.0 and higher software, more than one IQAN master module can be used together in a multi-master system. The master modules are each given a unique address by using an ID-Tag. The value of the ID-Tag identifies the master and will enable a single project application to be loaded into more than one master module over the CAN bus. The functionality needed for each master is loaded based on the ID-tag address. By default, if no ID-tag is installed, the MC2 will be address 0.

Identification of an IQAN-MC2 by address

For normal operation of an IQAN-MC2 in a single master system, the ID-Tag is not used. It is only needed when the IQAN-MC2 is used in a multi-master system, and an address other than '0' is needed. The connection of an ID-Tag between ADDR-H and ADDR-L will assign an address to the IQAN-MC2 master module. The desired functionality based on address is built into the project file using IQANdesign software. For more information, please refer to the IQANdesign user manual.

It is the combination of *address* and *type* that gives each master module a unique identification. The maximum number of MC2 addresses is 8, denoted as addresses 0, 1, 2, 3, 4, 5, 6, 7 respectively.

In order to assign any IQAN-MC2 a unique address other than '0', an *ID-Tag* will have to be connected to the positions ADDR-H and ADDR-L.



Connecting of Id-Tag.

Terminating

To eliminate interference in the communications through the CAN bus, the CAN bus must be terminated. By default, the MC2 is terminated internally on all of its CAN buses. When an IQANdesign application is loaded, it can set individual buses to be non-terminated.

To give an IQAN-MC2 a unique address, you may use an addressing ID-tag, or an IDtag having a combined address and terminating function. The 'T' values of ID-tags are ignored, i.e. an ID-tag 3T is equivalent to ID-tag 3.

If the module is located at the end of the CAN-bus, then leave the bus default terminated in the MC2.



NOTICE

The CAN-bus should not be terminated at the MC2 using an external regular terminating resistor, due to the fact that terminating is made from within the MC2 module by default.

Diagnostic interfaces

IQAN software includes many tools for tuning, measuring, accessing logs and otherwise checking the performance or troubleshooting your control system. To use the diagnostic tools with an IQAN master module you may choose between different ways to connect to the unit.

CAN diagnostics connection

One of the CAN buses of the IQAN master module may be dedicated for diagnostics. Reserving a bus for diagnostics ensures that signals are not interrupted by other bus traffic. A high-speed CAN interface is needed to use this feature. Contact Parker for information about supported CAN interfaces.

A termination resistor is usually required at the CAN interface on the PC. Parker part number 5030082 or 5030182, or an equivalent 120 ohm resistor may be used. A flying lead cable may be connected to the IQAN master to provide a connector interface. The connection from IQAN master module to diagnostic CAN interface can then be made quite easily. It is recommended that the connector be a sealed, automotive type. When not being used this connector should be protected from the environment with a cover or mating blank plug.

The recommended wiring to the IQAN master module connector is shown below.



Connecting for CAN communication.

USB connection

This IQAN master module has an *USB interface* for communicating with the programming software, IQANdesign and for diagnostics. A flying lead cable, 5030124 may be connected to the master module to provide an USB type B connector interface. The connection from the module to PC can be made with a standard USB Type A male to Type B male cable.

Connection of Parker cable 5030124 is shown below.



Connecting for USB communication.



NOTICE

It is recommended that the two data wires, *DATA*+ and *DATA*-, be a twisted pair, 15 twists/meter. Use -*VREF* for the ground connection as shown.

USB and "ground loops" (differences in ground potential)

When systems consisting of machines, modules, computers and other devices with different ground potentials are connected by a USB cable, a ground loop may be created. The grounds may only differ by a few millivolts, or by much more. This can be significant when compared to the low level voltage signals that are used in USB data transmission.



NOTICE

Protect the PC and unit from damage due to ground loops and surges! Ground loops can cause problems in communicating and in extreme cases the amount of current flow can damage the USB transceiver in the PC or the module.

A recommended way to prevent ground loops is to ensure that your system includes isolation. Isolation protects your PC from damage and preserves the integrity of your data by physically separating the electrical connections between the PC and the unit. *Good*: Using a battery-powered laptop can prevent the formation of accidental ground loops and short circuits. This protection only holds true, however, as long as the laptop is not also connected to self-powered devices such as printers.

Better: Isolation can be provided by adding an isolated USB hub between the PC and the unit.

Best: Use a CAN-USB interface with galvanic isolation and communicate with unit via CAN bus. This setup is used in the automotive industry for diagnostics.

Reference voltage, VREF

The IQAN module is internally equipped with a voltage regulator to generate the reference voltage *VREF*. The standard reference voltage will feed different kinds of sensors and potentiometers.



VREF positions.



NOTICE

It is strongly recommended to use the module's -VREF and +VREF to all sensors and potentiometers that are connected to the module inputs. This will reduce bad measurement based on potential fault (i.e. different ground points for other supplies in relation to the IQAN module ground, -BAT).

Maximum load for the *VREF* is different according to 12/24 Vdc power supply, see "Appendix A".

Voltage inputs

Connecting sensors to the voltage inputs

The sensor signal range must be 0-5 Vdc. To detect signal errors such as short circuits or interruptions the active signal range be within 0.5-4.5 Vdc.



Active signal range.

The current consumption related to the voltage input is negligible. The positive terminal of the sensor is connected to the +VREF position and the corresponding negative terminal to the -VREF position. The sensor signal is connected to appropriate VIN position.

EXAMPLE

Connect the positive and negative terminals of the position sensor to +VREF, and -VREF, respectively. Then connect the sensor signal to VIN-X.





NOTICE

The negative terminal of the sensor must not be connected to the chassis. Maximum load for VREF position: see Appendix A.

Connecting other 3 wire sensors

The same type of connection shown for potentiometers is used for other 3 wire sensors supplied with power from the regulated 5VDC supply, VREF. This includes active temperature sensor IQAN-ST, pressure sensor IQAN-SP and Hall-effect levers IQAN-LST or IQAN-LSL.

Connecting a 2-wire temperature sensor to voltage in

When you connect a PTC (positive temperature coefficient) temperature sensor you may need to use a pull up resistor on the input signal. Please check the technical data for your specific temperature sensor.

EXAMPLE

Connect the negative terminal of the temperature sensor to -VREF, and the signal to VIN-X. The pull up resistor will be connected between VIN-X, and +VREF.



Connecting -VREF and temperature sensor signal VIN-X.

The pull up resistor value for a $R_{25}{=}2000\Omega,$ PTC sensor is 4,7 K $\Omega.$

Connecting switches to the voltage inputs using VREF

Switches could be connected to the voltage inputs, to create a digital on/off signal. The switches should be connected to +VREF and VIN/DIN respectively for 5V signal. The current consumption for the input is negligible.

EXAMPLE

Connect the positive and negative terminals of the switch to +VREF, and VIN-X, respectively.



Connecting a switch to VIN-X and VREF.



NOTICE

Maximum load for VREF position, see "Appendix A".

Connecting switches to the voltage inputs using +BAT

It is recommended to connect system voltage +BAT to the input through a switch in order to reserve 5Vdc VREF for sensors and potentiometers.

EXAMPLE

Connect the positive and negative terminals of the switch to supply or the unit's +BAT, and DIN-X, respectively.



Digital inputs

DIN that share pins with VIN

These digital inputs share pins with the module voltage inputs and have high impedance characteristics. The preceding switch examples apply to these inputs.

DIN that share pins with CRET

These digital inputs share pins with the return pins of the proportional output channels, e.g. CRET and PWMRET. These pins have an internal power clamping diode. If used as inputs they must be connected in a way that prevents 'backending', that is, supplying power to the module from a source other than its power pin (+BAT). Carefully read the following section for more information.

Connecting switches to the digital inputs

When connecting switches to the digital inputs, DIN, that share pins with CRET, extra precautions should be taken.



WARNING

The DIN that share pins with the CRET positions of the proportional outputs have a possibility of 'backending' the IQAN module when using those pins as digital inputs. The internal circuitry has power clamping diodes between CRET pins and the internal power supply. This arrangement creates a risk of inadvertently supplying power to the unit.

You can safely connect using +VREF for the supply, as shown in the preceding *"Connecting switches to the voltage inputs"* example.

If you would like to preserve +VREF for sensors and joysticks, then there are two additional methods:

1 The switches could be powered by one of the module's DOUT pins.

EXAMPLE

Connect the supply of the switch to DOUT-X, and the signal to DIN-X, respectively.



Connecting a switch to DOUT-X and DIN-X.

2 The switch supply could be connected through a high impedance resistor.

EXAMPLE

Connect the supply of the switch to +BAT through a high impedance resistor, and the signal to DIN-X , respectively.



Connecting a switch to DIN-X and supply through a resistor.



WARNING

Do not exceed 35Kohm for 12 Vdc systems and 50Kohm for 24 Vdc systems! The DIN signal will not be detected by the module.

Remember that these flexible I/O pins must be configured in pairs of the same type, VIN, DIN or DOUT-LS.

Frequency inputs

Connecting sensors to the frequency inputs

Frequency inputs can operate in 2 modes. *Speed* which is frequency and *position* which is a pulse count. For the frequency ranges and trigger levels, see Appendix A.

Simple frequency sensor

The positive terminal of the frequency sensor is connected to the +VREF and the negative terminal to the -VREF respectively. The sensor signal is connected to the FIN position.

If the current consumption for the sensor exceeds the maximum load for the VREF, the sensor could be connected to the +BAT/-BAT positions.

EXAMPLE

Connect the positive and negative terminals of the frequency sensor to +VREF, and -VREF, respectively. Then connect the sensor signal to FIN-X.



NOTICE

The negative terminal of the sensor must not be connected to the chassis. Maximum load for VREF position, see Appendix A.

Proportional outputs

The current /PWM outputs control proportional valves and devices. For the current range and loads, see Appendix A.

Frequency

To obtain the best performance from proportional valves the controller produces a PWM current mode (closed loop) output signal or a PWM voltage (open loop) output signal. The type of output is selectable in IQAN software. The module has an adjustable frequency which can be changed using IQAN software. For the possible frequencies, see Appendix A.

Connecting loads to proportional outputs

Connecting a load, e.g. one proportional valve section, to the current mode or PWM mode outputs is done by using the COUT/CRET paired positions.

EXAMPLE

Positive direction:

Connect the proportional valve to the COUT-X, and the CRET-X+, respectively. *Negative direction*:

Connect the proportional valve to the COUT-X, and the CRET-X-, respectively.



Connecting a load to a proportional output.



NOTICE

DO NOT install diodes across coils for Current or PWM modes!

Digital outputs

The digital outputs control relays and on/off valves. For the maximum load per output see Appendix A.

Connecting loads to digital outputs

Connecting of loads to the digital outputs such as on/off valves is done by using the DOUT positions and the negative battery terminal as ground.

Protection against voltage transients

A clamping diode must be placed between the digital output and ground, as close to the load as possible. This protects the output against high voltage transients. For example, use diode: 1N5408 (3A/1000V).

Depending on the load, other clamping diodes might be used instead.

EXAMPLE

Connect the on/off valve to the digital output using the DOUT-X, and the negative battery terminal as ground.

A clamping diode must be placed as close to the load as possible



Connecting a load to the digital output.



NOTICE

If the load is controlled in parallel with another system, the digital output must be protected with a diode.



Digital output protected with a diode.

Low-side digital outputs

The low-side digital outputs may control relays and on/off valves. For the maximum load per output see Appendix A.

Connecting loads to low-side digital outputs

Connecting of loads to the low-side digital outputs such as on/off valves is done by using the DOUT(LS) positions and one or more DOUT channels as supply.

Protection against voltage transients

A clamping diode must be placed between the source and low-side digital output, as close to the load as possible. This protects the output against high voltage transients. For example, use diode: 1N5408 (3A/1000V).

Depending on the load, other clamping diodes might be used instead.

EXAMPLE

Connect the on/off valves to the low-side digital outputs using a pair of the DOUT(LS) positions, and the DOUT-X, as supply.

A clamping diode must be placed as close to the load as possible, see figure below.



Connecting loads to the low-side digital outputs.



WARNING

Loads on DOUT with Low-Side switch (DOUT[LS]) must always be controlled on the high-side by connection to a digital output with High-Side switch (DOUT-X) for safe function. The total sum of current supplied to the loads controlled by a number of DOUT[LS] is limited to 2000mA.

Remember that these flexible I/O pins must be configured in pairs of the same type, VIN, DIN or DOUT-LS.

7 Start-up

Start-up procedures

This chapter contains instructions for action to be taken in connection with the initial start.



WARNING

Risk of injury!

If the control system is not fitted properly, the machine could move uncontrollably. The machine's engine shall not be started before the control system is completely fitted and its signals are verified.

Starting the control system

Start the control system as follows:

- Prior to start, all modules and cables are to be fitted correctly.
- Check fuses, i.e. make sure that the supply voltage to the modules is equipped with the correct fuse.
- Make sure that connections for supply voltage and return lines are correct in the cable's conductor joint.
- Make sure an emergency stop is installed. The emergency stop should disconnect the supply voltage to all modules. Alternatively, the emergency stop may also shut off the diesel engine or a dump valve, and with that, depressurize the hydraulic system.

Prepare for system start



WARNING

Make sure no one is in dangerous proximity to the vehicle to avoid injuries when it starts.

Prepare for the initial system start as follows:

- The engine for the hydraulic system's pump shall be in off position.
- Make sure that all connectors are properly connected.
- Turn on the control system.
- Make sure that voltage is being supplied to all modules; the power/status diode shall be illuminated on all modules. Also, make sure that the master is in contact with all modules by reading the master's display.
- Make sure the emergency stop is functioning properly.

Start the system

Start the system as follows:

• Start the engine for the hydraulic system's pump, assuming that the above mentioned inspections have been carried out and shown correct values.

Calibrate and adjust input and output signals according to the instructions related to the master menu system and check each and every output function carefully.

8 System Diagnostics

The yellow blinking LED on the top of the module indicates normal status. If there is an error detected, the IQAN module will indicate *error status* through the red blinking LED.

This gives an immediate diagnosis as to the nature of the error that has occurred.



The location of the LED indicators on the IQAN module.

The green LED indicates power on. The yellow/red LED, will be blinking red when an error has been detected. To get further information about the error messages, see Appendix B.

Safe mode

If the ADDR_L voltage > 3.00V (ADDR_L pin shorted to ADDR_H) is detected when the module starts (during power up) the application will not be loaded. This is a special start-up mode that is used for master modules and puts the unit in a safe state without starting any application.

When 'safe mode' is desired, a jumper is put across pins 1 and 14, in place of an ID-Tag.

Appendix A

IQAN-MC2 Technical Overview

Absolute Maximum Ratings^a

Parameter	Limit values			Unit	Bemark	
	min.	typ.	max.			
Ambient temperature, T_A	- 40		+70	°C		
Storage temperature T_{ST}	- 40		+100			
Voltage supply on +BAT	6		36	V	Reverse polarity pro- tected with 20A fuse.	
Voltage on any pin with respect to -BAT			36	V		
Power driver load			20	А		

a.The "Absolute Maximum Ratings" table lists the maximum limits to which the device can be subjected without damage. This doesn't imply that the device will function at these extreme conditions, only that, when these conditions are removed and the device operated within the "Recommended Operating Conditions", it will still be functional and its useful life wonft have been shortened.

Environmental ratings

Parameter	Remark
EMC Radiated emission Conducted emission Conducted susceptability Radiated susceptability Conducted transients susceptability	ISO 13766:2010/ISO 14982:2009 EN 55025:2003, 0.15-108 MHz ISO 11452-2:1995, 20-1000 MHz ISO 11452-4:2001, 1-200 MHz ISO 7637-3:2007, Level 3 ISO 7637-2:2004, Pulse1,2a,2b,3a,3b,4,Level 3,Pulse 5,Level 1
ESD Operation Handling	ISO 10605:2001, 8 kV contact, 15 kV air ISO 10605:2001, 4 kV contact
Mechanical environment Random vibration Shock	IEC 60068-2-64:2008 Fh, 15-250 Hz, 9.7 grams, 3x10 hours IEC 60068-2-27:2008 Ea, 40 g. 6 ms, 1000*6 directions
Climate environment Enclosure, water and dust protection Enclosure, water and dust protection Salt mist Damp heat, cyclic Damp heat, steady state Heat, operation Cold Change of temperature	IEC 600529:2001, IP65 DIN 40050 Part 9:1993, IP6K9K IEC 68-2-52:1996 Kb, 72 hours IEC 60068-2-30:2005 Db, +55°C, 95% RH, 6 cycles IEC 60068-2-78:2001 Cab, +40°C, 93% RH, 21 days IEC 60068-2-78:2007 Bb, 70°C, 72 hours IEC 60068-2-1:1993 Ab, -40°C, 16 hours IEC 60068-2-14:1984 Nb, -30°C to +55°C, 10x8 hours

System

 T_A = +25 °C (unless otherwise specified)

Parameter	Remark
Ambient temperature, T _{ROC}	-40 to 70 °C
Voltage supply, V _{BAT}	9 to 32 V
Current supply V_{BAT} =14V V_{BAT} =28V	typical 200 mA typical 160mA
System

 T_A = +25 °C (unless otherwise specified)

Parameter	Remark
Current supply RTC	
+ <i>RTC</i> =14V	typical 4 mA
+ <i>RTC</i> =28V	typical 8 mA
Start-up delay	typical 600 ms with small application
System cycle time	3 to 100 ms
Application flash memory	832 kB
Application RAM memory	832 kB
Data log memory	typical 40,000 records
CAN	
CAN specification	CAN 2.0A, CAN 2.0B
CAN speed	125 to 500 kbits
Protection	SCB, SCG
USB	
USB device	USB 1.1 full speed

VREF sensor supply

Parameter	Remark
Output voltage	5 V ±50 mV, -40 to 70 °C
Output voltage temperature drift	0.25 mV/°C, -40 to 70 °C
Maximum load current	150 mA
Protection	overload, SCB, SCG
Diagnostics	under/over voltage
Under/over voltage threshold	±150 mV from nominal value

I/O

 T_A = +25 °C (unless otherwise specified)

Parameter	Remark	
VIN (Voltage input)		
Full scale	5000 mV ±100 mV	
Resolution	12 bits (1.22 mV)	
Input impedance	36 Kohm pull-down in parallel with 10 nF	
Accuracy with external sensor supply with VREF sensor supply	±(0.8 % + 5 mV), -40 to 70 °C ±(0.2 % + 5 mV), -40 to 70 °C	
Sample rate	same as system cycle time T_{SC}	
Protection	SCB, SCG	
Diagnostics	Defined in application	

I/O

 T_A = +25 °C (unless otherwise specified)

Parameter	Remark	
DIN (On/off input)		
Input signal low	<1 V	
Input signal high	>4 V	
Input hysteresis	typ. 1 V	
Input impedance	36 Kohm pull-down in parallel with 10 nF	
Sample rate	same as system cycle time T_{SC}	
Diagnostics	Defined in application	
FIN (Frequency input)/DFIN (Direction	onal Frequency Input)	
Input signal low	<1 V	
Input signal high	>4 V	
Input hysteresis	>0.3 V	
Input impedance	36 Kohm pull-down in parallel with 10 nF	
Frequency range FIN	1 to 20,000 Hz (>20 Hz in Fast response)	
	1 to 20,000 Hz (>20 Hz in Fast response)	
Minimum pulse width	10 us for 5 V signal	
Step response	400 ms, 10% to 90% step	
Diagnostics defined in application		
PCNT (Pulse Count)/DPCNT (Directi	onal Pulse Count)	
Input signal low	<1 V	
Input signal high	>4 V	
Input hysteresis	>0.3 V	
Input impedance	36 Kohm pull-down in parallel with 10 nF	
Frequency range	1 to 20 000 Hz	
DPCNT	1 to 20,000 Hz	
Minimum pulse width	10 us for 5 V signal	
Diagnostics	defined in application	
COUT (current closed-loop mode) p	ower driver	
COUT range		
Low High	100 mA 2000 mA	
COUT resolution	0.1 mA	
Power driver voltage drop		
750 mA	typ. 0.45 V @ saturation	
	typ. 0.90 V @ saturation	
	>50 % of commanded output $(2.9) + 15 \text{ mA} = 40 \text{ to } 70 \text{ °C}$	
	±(2 % + 13 MA) , -40 t0 /0 °C	
	see table	
Supply rejection	±2 mA, V _{BAT} change 9 to 18V or 18 to 32V	
Load rejection	±2 mA, load change ±50 %	

I/O

 T_A = +25 °C (unless otherwise specified)

Parameter	Remark
Maximum load $V_{BAT} = 14V$ and $F_{DITH} \ge 200$ Hz $V_{BAT} = 14V$ and $F_{DITH} \le 167$ Hz $V_{BAT} = 28V$ and $F_{DITH} \ge 200$ Hz $V_{BAT} = 28V$ and $F_{DITH} \le 167$ Hz	5 ohm + 10 mH 5 ohm + 20 mH 10 ohm + 30 mH 20 ohm + 60 mH
Protection	overload, SCB, SCG
Diagnostics	open load, overload, saturation
PWMOUT (voltage open-loop mode)	power driver
PWMOUT range	0% to 95%
PWMOUT resolution	0.1 %
Dither frequency, F _{DITH}	see table
Power driver voltage drop	typ. 0.9 V @ 1.5 A load
Maximum load	2 A
Maximum allowable load inductance 1.0 A 1.5 A	500 mH 200 mH
Protection	overload, SCB, SCG
Diagnostics	none
Overload threshold	typ. 2.5 A
DOUT (on/off output) power driver	
Maximum load DOUT-A to DOUT-H (high side) DOUT-I to DOUT-X (low side)	2 A 2 A
Power driver voltage drop DOUT-A to DOUT-H (high side) DOUT-I to DOUT-X (low side)	typ. 0.3V @ 1.5 A load typ. 0.6V @ 1.5 A load
Leakage current in off-state DOUT-A to DOUT-H (high side) DOUT-I to DOUT-X (low side)	< 100 uA typ. 0.1 mA
Maximum allowable load inductance 1.0 A 1.5 A	500 mH 200 mH
Protection Overload threshold (high side) Overload threshold (low side)	typ. 2.5 A typ. 5 A
Diagnostics DOUT-A to DOUT-H (high side) DOUT-I to DOUT-X (low side)	none none

Frequency

The table below shows the PWM frequency possibilities. Any frequency may be entered in your application and is translated according to this table. The bold values are the actual frequencies in Hz output by the module for proportional valve control.

Frequency (Hz) entered in appl.	Frequency (Hz) out- put by module
25	25
26	26

Frequency (Hz) entered in appl.	Frequency (Hz) out- put by module
27	27
28	28
29	29
30	30
31	31
32	32
33	33
34-35	34
36	36
37	37
38-39	38
40-41	40
42	42
43-44	43
45-47	45
48-49	48
50-52	50
53-55	53
56-58	56
59-62	59
63-66	63
67-70	67
71-76	71
77-82	77
83-90	83
91-99	91
100-110	100
111-124	111
125-142	125
143-166	143
167-199	167
200-249	200
250-332	250
333+	333

Appendix B

Error codes, messages and actions

If one of the following error is detected, a message will be presented with an error code on the module. In some cases, the module will turn off or at least shut down the outputs, to increase safety.



The location of the LED indicators on the IQAN-MC2 module.



WARNING Don't use the machi

Don't use the machine if an error message or error code is activated.

LED indicator showing different MC2 modes

Status	Flash (yellow)
Normal operation	
Application not loaded	
No application available	
Waiting for restart	

Error code	Error	Primary Flash (red) Error category	Secondary Flash (yellow) Error description
1:1	Output		
1:2	Input		
1:3	VREF		
2:1	Power supply		
2:2	Temperature		
2:3	Clock		
3:1	CAN, no contact		
3:2	IDtag error		
3:3	System mismatch		
3:4	CAN error (bus off)		
4:1	Internal error/OSE		

Appendix C



For the latest information visit our website www.iqan.com

Information in this instructionbook is subject to change without notice

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Parker Hannifin Electronic Controls Division SE-435 35 Mölnlycke Sweden Tel +46 31 750 44 00 Fax +46 31 750 44 21 www.parker.com

Parker Hannifin Electronic Controls Division 1651 N. Main Street Morton, IL 61550 USA Tel +1 309 266 2200 Fax +1 309 266 6674





Western Integrated Technologies

MECHANICAL * FLUID POWER SYSTEMS * ELECTRICAL 8900 North Ramsey Portland, Oregon 97203 Phone (503)228-6666 Fax (503) 228-7318

Air Control Valves



P31P mounting brackets

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	J			.9	
	Description	Part number	\sim	Description	Part number
	L-bracket mounting kit	P3HKA00ML		L-bracket mounting kit	P3KKA00ML
623	Foot bracket mounting kit	P3HKA00MC	and the second s	Foot bracket mounting k	it P3KKA00MC
L-bracket			L-bracket		
Foot bracket			Foot bracket	2	
Cables					
Part number	Description				
CB-M12-4P-2M	2 mtr. cable with moulded straig	ght M12x1 connecto	 		
Most popular.			For Flow Curve Cha	rts please see page E39.	
			E23	Parker Han	nifin Corporation

Proportiona Precision

Bulk Liquid Separators

Catalog PDN1000-3US

Parker Pneumatic

Technical information

Working medium

Compressed air or inert gasses, filtered to 40μ .

Supply pressure

	Max. operating pressure
2 bar unit:	3 bar (43.5 PSIG)

10 bar unit:10.5 bar (152 PSIG)

Min. Operating Pressure P2 pressure + 0.5 bar (7.3 PSIG)

Pressure control range

Available in three pressure ranges, 0-2 bar (0-29 PSIG), 0-7 bar (0-101.5 PSIG) or 0-10 bar (0-145 PSIG). Pressure range can be changed through the software at all times. (parameter 19)

Temperature range

0°C up to +50°C (32°F up to 122°F)

Weights:

P31P = 0.291 kg (0.64 lbs)

P32P = 0.645 kg (1.42 lbs)

Air consumption

No consumption in stable regulated situation.

Display

P31P

The regulator is provided with a digital display, indicating the output pressure, either in bar or PSIG.

The factory setting is as indicated on the label, can be changed through to software at all times (parameter 14)

WARNING Product rupture can cause serious injury. Do not connect regulator to bottled gas. Do not exceed maximum primary pressure rating.

General Industrial

Stainless Precisio Steel Proportio









Supply voltage

24 VDC +/- 10%

Power consumption

Max. 1.1W with unloaded signal outputs

Control signals

The electronic pressure regulator can be externally controlled through an analogue control signal of either 0-10V or 4-20mA. (parameter 4).

Output signals

As soon as the output pressure is within the signal band a signal is given of 24VDC, PNP Ri = 1 kOhm Outside the signal band this connection is 0V.

Connections

(In case of output signal (Option D)

Central M12 connector 4-pole

The electrical connections are as follows:

4 pin M12 Connector

Pin N	о.	Function	Color	
1	24 V	Supply	Brown	
0	0 to 10 V	Control Signal Ri = 100k Ω	White	
2	4 to 20mA	Control Signal Ri = 500 Ω		
3	0 V (GND)	Supply	Blue	
4	24 V	Alarm Output Signal	Black	









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Air Preparation Products

Global

Prep-Air II

Miniature

P3N

Pneumatic Division

Richland, Michigan USA

www.parker.com/pneumatics



PROPORTIONAL REGULATOR

Bulletin Number			Bulletin Description
	407659		P3P-R Installation Instructions
	2R210	Rev. 2	P3HP Proportional Regulator
	V630CP	Rev. 4	PAR-15 Installation
	V635P	Rev. 1	PAR-15 Level "A" to "B" Solenoid Conversion
	V633P		PAR-15 Repair Tool
	V632P		PAR-15 Replacement Operators
	V631P		PAR-15 Service
	V634BP	Rev. 2	PAR-15 with TE Solenoids Service
	Safety Guide		PDN Safety Guide

Pneumatic Division

Richland, Michigan 49083 269-629-5000

To avoid unpredictable system behavior that can cause personal injury and property damage:

- Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- · Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

Product rupture can cause serious injury. Do not connect regulator to bottled gas. Do not exceed maximum primary pressure rating.

Safety Guide

For more complete information on recommended application guidelines, see the Safety Guide section of Pneumatic Division catalogs or you can download the **Pneumatic Division Safety Guide** at: www.parker.com/safety

Introduction

Follow these instructions when installing, operating, or servicing the product.

Technical Information

These products are intended for use in general purpose compressed air systems only.

Pneumatics

Working Media: Compressed air or inert gasses, filtered to 40µ.

Operating Pressure:

Min. Operating Pressure P2 Pressure + 0.5 bar (7.3 PSI)

Pressure Control Range: Available in two pressure ranges, 0-2 bar (0-29 PSI) or 0-10 bar (0-145 PSI). Pressure range can be changed through the software at all times. (parameter 19)

Air Consumption: No consumption in stable regulated situation.

Display: The regulator is provided with a digital display, indicating the output pressure, either in PSI or bar. The factory setting is

Installation & Service Instructions 2R210 40mm & 60mm Proportional Regulator

ISSUED: September, 2008 Supersedes: May, 2005 Doc. # 2R210, EN #080690, Rev 2

as indicated on the label, can be changed through the software at all times (parameter 14).

Mounting Position: Preferably vertical, with the cable gland on top.

Electronics

Supply Voltage:	24 VDC +/- 10%
-----------------	----------------

Power Consumption: 1.1 W

Current Consumption: Max. 200 mA with no load

Control Signals: The electronic pressure regulator can be externally controlled through an analog control signal of 0-10 V, adjustable to 4-20 mA via parameter 4.

Connections:	Central M12 connector 4-pole
The electrical connections are as	follows:

Pin No.	Function	Description	Color	
1	24 V	Supply	Brown	4
2	0 to 10 V or 4 to 20mA	Control Signal Ri = 100k Ω	White	
3	0 V (GND)	Supply	Blue	
4	24 V	Alarm Output Signal	Black	

Dead Band: The dead band is preset at 1.3% F.S.*, adjustable via parameter 13.

Accuracy:Linearity: = < 0.3% F.S.*

Proportional Band: The proportional band is preset at 10% F.S.*

Fail-safe Operation: After interrupting the **power supply voltage**, the present output pressure is maintained at approximately the same level. After switching the power supply on again, the pressure can be adjusted immediately by giving a new control signal.

Full Exhaust: Complete exhaust of the regulator is defined as $P2 \le 1\%$ F.S.*

Degree of Protection:IP65

* Full Scale

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

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40mm & 60mm Proportional Regulator

- 2. Connect the device to the Air Supply Port 1 and 2.
- 3. Connect Female M12 Connector on the Male Connector of the device.
- Apply 24V = (10 second time delay for initialization of unit).
- 5. Air Supply to Port 1.
- 6. Give desired Set Point Signal.
- 7. Secondary Pressure will now be displayed.

How to Change Parameters

Pressing the Accept key for 3 to 6 seconds, will activate parameter change mode. The user can then select the parameters by pressing up or down key (display will show Pxx). When parameter number is correct, pressing accept again will enter parameter number (display will show parameter value).

Pressing the up or down key will change the parameter itself (display will flash indicating parameter editing mode). Pressing the accept key will accept the new parameter value (all digits will flash while being accepted).

After releasing all keys, the next parameter number will be presented on the display (you may step to the next parameter). When no key is pressed, after 3 seconds the display will show the actual output pressure.

Only parameter numbers 0, 4, 9, 14, 18, 19, 20, 12, 13, and 21 are accessible to edit. All other parameters are fixed.

Manual Mode

When keys DOWN and UP are pressed during startup, (connecting to the 24 V power supply) manual mode is activated. This means that the user is able to in/decrease the output pressure of the regulator, by pressing the UP or DOWN key. During this action the display will blink, indicating that the manual mode is activated.

Back to Factory Setting

After start up. (Power is on)

Parameter 0 = 3

Entering this value in parameter 0 will store the calibrated factory data into the working parameters. (Default calibration data is used)

Parameter Number 0 – Reset Back to Factory Settings								
Step	1	2	3	4	5			
Press	acc 3-6 seconds	or	acc	or	acc			
Until Display Reads	$P_{\times \times}$	<i>P</i>	Flashing Decimal	Flashing Decimal	Flashing	P0		
Description	Accesses changeable parameters.	Accesses parameter no. 0.	Displays current parameter value.	Edits parameter. 3 = standard factory settings. If other than 3, use Up or Down Arrow and accept 3	Accepts and saves new parameter setting.	Sequences to next parameter.		

Set Control Signal

The unit is factory set for 0-10 V control signal. If 4-20 mA control signal is required, change parameter 4.

Parameter Number 4 – Set Control Signal in Volts or Milliamps							
Step	1	2	3	4	5		
Press	3-6 seconds	or	acc	or	acc		
Until Display Reads	$P_{\times \times}$	P04	Flashing Decimal	Flashing Decimal	Flashing	P05	
Description	Accesses changeable parameters.	Accesses parameter no. 4.	Displays current parameter value. 1 = V, 0 = mA	Edits parameter.	Accepts and saves new parameter setting.	Sequences to next parameter.	

Paramet	Parameter Number 6 – Set Output Signal								
Step	1	2	3	4	5				
Press	acc 3-6 seconds	or	acc	or	acc				
Until Display Reads	$P_{\times \times}$	<i>P0</i> 5	Flashing Decimal	#### Flashing Decimal (Value 0, 1 or 2)	# # # . Flashing	<i>P</i> <u>0</u> 7			
Description	Accesses changeable parameters.	Accesses parameter no. 6.	Displays current parameter value. 1 = m factory default for P3H with analog options	Edits parameter. 0 = digital (NPN or PNP) 1 = analog 010V 2 = analog 420 mA	Accepts and saves new parameter setting.	Sequences to next parameter.			

Paramet	Parameter Number 8 – Adjust Span Analog Output Signal								
Step	1	2	3	4	5				
Press	acc 3-6 seconds	or	acc	or	acc				
Until Display Reads	$P_{\times \times}$	<i>P</i> 08	Flashing Decimal (For 2 bar versions value = 92)	Flashing Decimal (Value between 0 and 130)	# # # .	pnq			
Description	Accesses changeable parameters.	Accesses parameter no. 8.	Displays current parameter value.	Edits parameter.	Accepts and saves new parameter setting and implements the new analog signal span.	Sequences to next parameter.			

Adjust Digital Display

If necessary, adjustments can be made to the digital display when using an external pressure sensor.

Parameter Number 9 – Adjust Digital Display Value (Pressure Calibration)									
Step	1	2	3	4	5				
Press	acc	or	acc	or	acc				
	3-6 seconds								
Until Display Reads	Pxx	<i>P</i> [] <i>q</i>	# # # . Flashing Decimal	####. Flashing Decimal	# # #	P ID			
Description	Accesses changeable parameters.	Accesses parameter no. 9.	Displays current digital display	Use up or down arrows and accept to adjust the display value if using an external pressure sensor.	Accepts and saves new parameter setting.	Sequences to next parameter.			

Set Pressure Scale

Units with NPT port threads are supplied with a factory set PSI pressure scale. Use parameter 14 to change scale to bar.

Parameter Number 14 – Set Pressure Scale in PSI or bar								
Step	1	2	3	4	5			
Press	3-6 seconds	or	acc	or	acc			
Until Display Reads	$P_{\times \times}$	P 4	Flashing Decimal	Flashing Decimal	Flashing	P 15		
Description	Accesses changeable parameters.	Accesses parameter no. 14.	Displays current parameter value. 1 = PSI, 0 = bar	Edits parameter.	Accepts and saves new parameter setting.	Sequences to next parameter.		

Preset Minimum Pressure

If there is a need for a pre-set minimum pressure, use parameter 18. (Note: preset pressure is affected by % P19.)

Parameter Number 18 – Set Minimum Preset Pressure									
Step	1	2	3	4	5				
Press	acc	or	acc	or	acc				
	3-6 seconds								
Until Display Reads	Pxx	P 18	<i>000</i> .	# # # Flashing Decimal (value between	###	P¦9			
			Flashing Decimal	0 and 200)	Flashing				
Description	Accesses changeable	Accesses parameter no.	Displays current parameter value. Incremental value is: <u>2 bar unit:</u> x 2 mbar x % P19		Accepts and saves new parameter	Sequences to			
	parameters.	18.	<u>10 bar unit: x</u> 10 mbar x % P19	Edits parameter.	setting.	next parameter.			

Set Pressure Correction

Pressure correction allows the user to set a maximum pressure as a percentage of secondary pressure F.S.

Example: If F.S. is 10 bar, set parameter 19 to 50 for maximum preset pressure of 5 bar.

Pressure correction also affects the minimum preset pressure in parameter 18.

Example: If F.S. is 10 bar and parameter 18 is set to a value of 100 (1 bar), and parameter 19 is set to 50%, then the actual minimum preset pressure seen is 0.5 bar.

Parameter Number 19 – Set Maximum Preset Pressure

Step	1	2	3	4	5	
Press	acc 3-6 seconds	or	acc	or	acc	
Until Display Reads	$P_{\times \times}$	P	Flashing Decimal	# # # Flashing Decimal (value between 0 and 100)	# # #	<i>P20</i>
Description	Accesses changeable parameters.	Accesses parameter no. 19.	Displays current parameter value. Incremental value is: % of F.S.	Edits parameter.	Accepts and saves new parameter setting.	Sequences to next parameter.

4

Behavior Control

The regulation speed of the pressure regulator can be modified by means of one parameter. (P 20) The value in this parameter has a range from 0-5. A higher value indicates slower regulation speed, but will be more stable.

Parameter Number 20 – Set Behavior Control						
Step	1	2	3	4	5	
Press	acc 3-6 seconds	or	acc	or	acc	
Until Display Reads	<i>P20</i>	003.	# # # .	Flashing Decimal (value between 0 and 5)	Flashing	
Description	Accesses changeable parameters.	Accesses parameter no. 20.	Displays current parameter value.	Edits parameter 0 = custom set* 1 = fastest (narrow proportional band) 2 = fast, 3 = normal, 4 = slow, 5 = slowest (proportional band is broad)	Accepts and saves new parameter setting.	Sequences to next parameter.

* When the value 0 is entered, you are able to create your own custom settings true parameters 12, 13 and 21.

Fine Settings Set Proportional Band

Proportional band is used for setting the reaction sensitivity of the regulator. The displayed value is X 10 mbar and has a range between 50 (0.5 bar) and 250 (2.5 bar).

Parameter Number 12 – Set Proportional Band (P20 Must be Set to 0)						
Step	1	2	3	4	5	
Press	acc 3-6 seconds	or	acc	or	acc	
Until Display Reads	P××	P 12	Flashing Decimal	Flashing Decimal (value between 50 and 250)	# # #	P 13
Description	Accesses changeable parameters.	Accesses parameter no. 12.	Displays current parameter value. Incremental value is: x 10 mbar	Edits parameter.	Accepts and saves new parameter setting.	Sequences to next parameter.

Set Deadband

Deadband is the minimum limit of accuracy at which the regulator is set for normal operation. The displayed value is X 10 mbar and has a range between 4 (40 mbar) and 40 (400 mbar).

Parameter Number 13 – Set Deadband (P20 Must be Set to 0)						
Step	1	2	3	4	5	
Press	acc 3-6 seconds	or	acc	or	acc	
Until Display Reads	P××	P 13	Flashing Decimal	Flashing Decimal (value between 4 and 40)	# # #	P 14
Description	Accesses changeable parameters.	Accesses parameter no. 13.	Displays current parameter value. Incremental value is x 10 mbar	Edits parameter.	Accepts and saves new parameter setting.	Sequences to next parameter.

Proportional Effect

Sets the speed at which the regulator adjusts either filling or exhausting. The displayed value has a range between 5 (fastest regulation) and 100 (slowest regulation).

Parameter Number 21 – Set Proportional Effect (P20 Must be Set to 0)						
Step	1	2	3	4	5	
Press	acc 3-6 seconds	or	acc	or	acc	
Until Display Reads	P××	<i>P2</i> (Flashing Decimal	Flashing Decimal (value between 5 and 100)	# # #	<i>655</i>
Description	Accesses changeable parameters.	Accesses parameter no. 21.	Displays current parameter value.	Edits parameter. 5 = fastest regulation 100 = slowest regulation.	Accepts and saves new parameter setting.	Sequences to next parameter.

Parameter Number 39 – Displays Current Software Version					
Step	1	2	3		
Press	acc 3-6 seconds	or	acc		
Until Display Reads	Pxx	<i>P</i> 39	# # #		
			Displays current		
Description	Accesses changeable parameters.	Accesses parameter no. 39.	parameter value. XXX = current software version		

Problem	Possible Reason	Solution
Display will not light up	No 24 volts power supply	Check if the wiring is connected according to the schematic wiring diagram
Unit will not, or not correctly respond to given setpoint	Wrong current applied (I.e. Volt instead of mA or mA instead of Volt	Change setpoint current or re configure the setpoint current through the software by changing parameter 4
		Check wiring if the setpoint signal lead is connected to the right pin within the male M12 connector (should be pin 2)
	Setpoint signal is not stable enough	Stabilize setpoint signal input
Display shows NoP.	Unit detects that required output pressure is higher than the supplied pressure	Adjust the inlet pressure to a higher value, preferably 0,5 bar higher than requested output pressure
		Give lower setpoint value which corresponds to a output pressure lower than the inlet pressure
	No inlet pressure at all	Connect port 1 to the supply pressure
Unit behavior is not considered normal	Faulty settings made in the parameters	Reset the unit to factory settings by using the green key function under parameter 0
Desired pressure can not be reached	Setpoint value to low	Increase setpoint value
	Pre-set pressure limit has been changed to a lower max. outlet pressure	Change max. outlet pressure back to required pressure by changing parameter 19
	Supply pressure is to low	Increase supply pressure
Secondary side stays pressurized	Setpoint value is higher than 0,1 Volt	Lower your setpoint value, preferably to 0 Volts
		Reset parameter 18 to 0
	Pre-set pressure has been enabled to a certain pressure	
Display shows unrealistic value	Display maybe configured in the wrong value (bar instead of psi)	Check through parameter 14, if the display value is set on either psi or bar, if necessary change it to the required setting
Unit response time too slow or too quick	Volume behind the unit is either too big or too small	Adjust the regulating speed of the unit through parameter 20
Unit gives too much overshoot	Relation between volume and response me is out of balance	Adjust response time to a higher value through parameter 20, to achieve more accurate behavior
Unit is adjusting/regulating constantly	Air leakage in the system behind the unit	Resolve leakage
	Constant changing volume behind the unit	Unit needs to regulate to keep required pres- sure at the same level
		Try to minimize the volume changes
	"Deadband "area is set too small	Enlarge deadband setting through parameter 13 in the software (parameter 20 has to be set to 0 before changing parameter 13)
Can not enter software through touchpad	Unit is currently working/processing	Make sure that the unit is in steady state while activating the software
	Activating time is too short	Hold the accept button for at least 3 seconds
Display indicates 'OL'	Wiring not according to diagram (24 volt connected on the setpoint connection pin)	Rewire so that on the setpoint connection pin will be either 0-10v or 4-20mA
	Wrong setpoint value given in relation to programmed setpoint value acceptance	Change over setpoint value to either V or mA or Reprogram the unit to the correct setpoint value via parameter 4
Any other problem	Please consult factory	

40mm Bottom Exhaust Version



60mm Bottom Exhaust Version



Foot Bracket



DIN Rail Bracket



Dimensions are in mm (Inches)

Dimensions are in mm (Inches)

L Bracket



Foot Bracket





Bulletin 407659 Part No 494689

Installation & Setting Instructions

Rev. 0 Page 1/8 Date 13.03.1999

P3P-R Pressure Regulator

BSP Series :	P3P – RP11C100G
	P3P – RP11C106D
	P3P – RP11C107D
	P3P – RP11C400G
	P3P – RP11C406D
	P3P – RP12T100G
	P3P – RP12T106D
	P3P – RP12T107D
	P3P – RP12T400G
	P3P – RP12T406D
	P3P – RJ12C100G
	P3P – RJ12C106D
	P3P – RJ12C107D
	P3P – RJ12C400G
	P3P – RJ12C406D
	P3P – RJ14C100G
	P3P – RJ14C106D
	P3P – RJ14C107D
	P3P – RJ14C400G
	P3P – RJ14C406D
NPT Series :	P3P - RP91C100G
	P3P – RP91C106D
	P3P – RP91C107D
	P3P – RP91C400G
	P3P – RP91C406D
	P3P – RP92T100G
	P3P – RP92T106D
	P3P - RP921107D
	P3P – RP92T400G
	P3P – RP921107D P3P – RP92T400G P3P – RP92T406D
	P3P – RP921107D P3P – RP92T400G P3P – RP92T406D P3P – RJ92C100G
	P3P – RP921107D P3P – RP92T400G P3P – RP92T406D P3P – RJ92C100G P3P – RJ92C106D
	P3P – RP921107D P3P – RP92T400G P3P – RP92T406D P3P – RJ92C100G P3P – RJ92C106D P3P – RJ92C107D
	P3P – RP921107D P3P – RP92T400G P3P – RP92T406D P3P – RJ92C100G P3P – RJ92C106D P3P – RJ92C107D P3P – RJ92C400G
	P3P – RP92T107D P3P – RP92T400G P3P – RP92T406D P3P – RJ92C100G P3P – RJ92C106D P3P – RJ92C107D P3P – RJ92C400G P3P – RJ92C406D
	P3P – RP92T107D P3P – RP92T400G P3P – RP92T406D P3P – RJ92C100G P3P – RJ92C106D P3P – RJ92C107D P3P – RJ92C400G P3P – RJ92C406D P3P – RJ94C100G
	P3P – RP92T107D P3P – RP92T400G P3P – RP92T406D P3P – RJ92C100G P3P – RJ92C106D P3P – RJ92C107D P3P – RJ92C400G P3P – RJ92C400D P3P – RJ94C100G P3P – RJ94C106D
	P3P – RP921107D P3P – RP92T400G P3P – RP92T406D P3P – RJ92C100G P3P – RJ92C106D P3P – RJ92C107D P3P – RJ92C400G P3P – RJ92C400G P3P – RJ94C100G P3P – RJ94C106D P3P – RJ94C107D
	P3P – RP921107D P3P – RP92T400G P3P – RP92T406D P3P – RJ92C100G P3P – RJ92C106D P3P – RJ92C107D P3P – RJ92C400G P3P – RJ92C400G P3P – RJ94C100G P3P – RJ94C107D P3P – RJ94C400G





CONNECTION DIAGRAMS



P3P-R.....6D









Remark : All special calibrations, even the analog output signal calibration, have to be asked and made by the factory.

POSITION OF POTENTIOMETERS

P3P-R.....0G



BASE PRINTED BOARD ASSEMBLY

P3P-R.....6D



BASE PRINTED BOARD ASSEMBLY

P3P-R.....7D





OUTPUT SIGNAL MODULE



PORT CONNECTIONS

RECOMMENDED MOUNTING POSITION Upright, electronic on the top



ELECTRICAL CONNECTIONS



In case of rectified voltage supply (from AC to DC) The residual ripple should be smaller than 1 V.

SPARE PARTS KITS



INSTALLATION AND ELECTRICAL CONNECTIONS

INSTALLATION

Before connecting the regulator P3P-R, pay attention to the following instructions: - Connect the regulator as close as possible to the apparatus which will be regulated (resulting in higher precision and shorter response times);

- Piping section of pressure supply should be sufficiently large;

Connect the air filter (25-50µ, Dew point 2 °C) upstream from the regulator, and a lubrificator if necessary, downstream;
It is recommended to mount the regulator in a vertical position, electronic on top. With a flat mounting plate or an angle mounting plate (accessories), connect the regulator to the pneumatic network.

Connect the pressure supply on the inlet port P and the regulation circuit with the outlet port A.

It is recommended to use a silencer in the exhaust R of types P3P-RJ.....

ELECTRICAL CONNECTIONS

The P3P-R program offers two connection possibilities:

by means of a cable gland Pg 13.5 and screw terminals on the printed circuit plate;
by means of a DIN circular plug-in connector with crimp contacts.
A wire section of 0.75 mm2 is recommended for the 24 V = power supply, a shielded cable for the control signal.

Power supply

Direct current $24V \pm 15\%$ (details see page 4).

Electrical connection diagrams See page 2.

Ensure that both "supply" and "control" groundings are not interconnected outside the P3P-R as they are already connected internally.

Wire colours

 $\begin{array}{l} \mbox{Pole } (1) = \mbox{BK} (black, \mbox{supply voltage -}) \\ \mbox{Pole } (2) = \mbox{YE} (yellow, \mbox{output signal} \\ \mbox{I / alarm +}) \\ \mbox{Pole } (3) = \mbox{RD} (red, \mbox{supply voltage +}) \\ \mbox{Pole } (4) = \mbox{BN} (brown, \mbox{output signal} \mbox{U + }) \\ \mbox{Pole } (5) = \mbox{BN} (white, \mbox{control signal -}) \\ \mbox{Pole } (5) = \mbox{BU} (blue, \mbox{control signal + }) \end{array}$

1.0. Pg 13.5 CABLE GLAND CONNECTION

To access the screw terminals, first remove the plastic cover by unscrewing both cross-head tapping screws.
Pass the cable through the cable gland Pg 13.5.

 Connect the wires on the screw terminals according to the electrical diagram. Put on the cover and fasten it with the tapping screws. Screw in the first turn of the thread by hand, then with a screw-driver screw down with a torque of 1 Nm.

Position the cable and fasten it by the cable gland screw.Set up the inlet pressure (max. 12 bar).

1.1. Serie P3P-R.....G

Supply voltage 24 V-DC: Pole (-) on terminal Gnd Pole (+) on terminal 24 V Control signal U or I: Pole (-) on terminal Gnd Pole (+) on terminal CTRL

2.0. CIRCULAR PLUG-IN CONNECTION (for series P3P-R......D)

The electrical connection of the pressure regulator is obtained by a 6-pole circular plug-in connector with crimp contacts.
It is not necessary to remove the cover. The P3P-R is equipped with a mounted plug-in connector.

- The contact positions are marked with (1) to (6) on the pin socket (6 poles + grounding).

 Crimp the pin-contacts and insert them in the pin socket according to the electrical diagrams.

Position the cable, fasten it by the cable gland and mount the plug on the regulator.
Set up the inlet pressure (max.12 bar).

2.1. Serie P3P-R.....6D with output module

(0 - 10 V and 4 - 20 mA) Supply voltage 24 V-DC: Pole (-) pin ① Pole (+) pin ③ Control signal U or I: Pole (-) pin ⑤ Pole (+) pin ⑥ Sensor output signal 0 - 10 V: Pole (-) pin ④ Pole (+) pin ④ Sensor output signal 4 - 20 mA: Pole (-) pin ⑤ Pole (+) pin ③

2.2. Serie P3P-R.....7D with output module

(0 - 10 V and alarm 0/24 V) Supply voltage 24 V-DC: Pole (-) pin ① Pole (+) pin ③ Control signal U or I: Pole (-) pin ⑤ Pole (+) pin ⑥ Sensor output signal 0 - 10 V: Pole (-) pin ⑤ Pole (+) pin ④ Alarm output signal 0/24 V-DC: Pole (-) pin ⑤ Pole (+) pin ⑤

P3P-R Pressure Regulator

Recommended load resistances

Sensor output signal 0-10 V: 10 k Ω min. Sens. output signal 4-20 mA: 500 Ω max. Alarm output signal 0/24 V: 1.2 k Ω min.

P3P-R SETTING INSTRUCTIONS

The P3P-R regulators are fully adjusted and quality controlled at the factory to obtain standard specifications.

Control signal:

0 to 10 Volt or 4 to 20 mA corresponding to an output pressure range of 0.2 to 10 bar (1 V resp. 5.6 mA corresponds to 1 bar).

Hysteresis:

~ 100 mbar. This value is adjusted in order to obtain an inaudible correction of the two 2-way solenoid pilots when there is no change of the control signal.

Setting corrections:

In case where the original calibration would not fully correspond to the required setting (e.g.: variation due to the temperature), a correction may be made by the user. To access the base circuit plate and its potentiometers, first remove the plastic cover.

Base printed board assembly:

P1 = Calibration of control signal 0 - 10 V / 4 - 20 mA

P2 = Zero pressure offset

P3 = Hysteresis Setting up all other sealed potentiometers is strictly forbidden. Any action on the sealed potentiometers would be subject to a loss of warranty. Parker Pneumatic reserves all rights to modify the position of the potentiometers on the electronic packages.

Output signal module:

P6 = Output signal 0 - 10 V (correction of amplitude) P7 = Offset correction 0 - 10 V P8 = Offset shifting correction for 4 - 20 mA P9 = Alarm setting up 0/24 V The setting of the output signal module is only possible within certain limits.

Attention: Take care to set up only the indicated potentiometers on page 3, according to instructions. For carrying out the set up, it is necessary to have a Voltage and/or Current Multimeter as well as a precision manometer or a pressure sensor with digital display. The P3P-R. should be pressurized and energized except when setting up the alarm.

MAINTENANCE

The P3P-R does not need any maintenance. However the quality of used air should be checked periodically. For revision use spare parts kits as follows:

Kit	P3P-R Type	Order N°
a*	P3P-RJC P3P-RPC	481203-193
	P3P-RPT	481203-215
b*	P3P-JC	481203-194

Before carrying out the replacement of spare parts with the help of Kits "b", please contact the factory for agreement. It needs Know How and special test apparatus. Furthermore the warranty conditions should be re-defined.

See page 4

SET UP METHOD

Modifications of setting up are permitted only for:

- hysteresis;

- alarm level.

However if a correction of the calibration or a zero offset correction cannot be avoided, proceed first to the calibration set up and then to the pressure offset. Position of set up potentiometers on the printed circuit plates are as shown on page 3.

All P3P-R base circuit plates are equipped with the same potentiometers. The following instructions are therefore valid for the ranges P3P-R..00G, 06D and 07D.

To access the base circuit plate, first remove the plastic cover by unscrewing off both cross-head screws. For the series with integrated output module - types P3P-R..06D and 07D -first pull out the upper outlet signal plate from its guide slot. The base electronic package is now accessible. Do not displace this printed board assembly during the set up of the potentiometers. The factory set up of the hysteresis corresponds to approx. 100 mbar. After carrying out the set up, reset the output module in the guide slots and screw on the plastic cover.

Forced exhaust

The P3P-R regulator is equipped with an electronic safety circuit which automatically drops the output pressure at 0 bar when the control signal is below 130 mV \pm 30 mV or 4.26 mA \pm 0.06 mA. Therefore no setting up should be done when the control signal is below the above-mentioned value. Any modification of zero pressure offset should be done accordingly.

Time lag relay

To neutralize the alarm output signal during the control signal changes, the use of a synchronized time lag relay is necessary. The duration of the time lag has to be defined by the customer in function of each pneumatic installation.

Attention: It is compulsory to set the control signal at 0 V or 4 mA each time an installation is turned off (during the night or the weekend) if the inlet pressure is equally shut down. When the installation cannot be fully exhausted, it is necessary to assure that the deviation between the control value and the inlet pressure remains smaller than 1 bar.

It is recommended to reset the control signal at 0 V or 4 mA respectively **before** re-connecting the supply voltage (24 VDC).

	DASIC CIRCUIT
Start	
Apply the maximum control	signal <
correct pressure?	If yes If no
Adjust P1 <	
Apply a control signal = 0	←────
Apply a control signal = $1 V$	or 4.5 mA
Correct pressure? If yes	If no Adjust P2
LIIU	

This loop should be repeated as many times as necessary (average 5 to 6 times)

NEVER TOUCH P4 AND P5

	OPTIONS
Start 0-1	0 V voltage output
Apply th	e maximum control signal
Is the ou	tput voltage correct? If yes)
Adjust P	6 (calibration
Apply a	control signal = 0
Apply a	control signal = 1 V or 4.5 mA
Is the ou If yes	tput voltage correct ? If no Adjust P7 (offset)
Alạrm o	vtput option 4-20 mA output option
 Discharg in which	e the inlet pressure and vent the circuit the P3P-R is installed
ا Apply a the requ	control signal corresponding to <
Adjust P	9 to check the alarm signal activation
 Reduce to check	the control signal level and slowly increase it again the alarm activation at the required level
Correct ' Yes —	? No End
Apply a	control signal = 0 V or 4 mA <
 Adjust P output c	8 (offset of 4-20 mA) to get a corresponding urrent of 4 mA.

End



Parker Hannifin plc Pneumatic Division Walkmill Lane, Bridgtown Cannock, Staffs, WS11 3LR Tel: 01543 456000 Fax: 01543 456001 Parker Pneumatic Division Richland, Michigan, USA Phone: (616) 629 5000 Fax: (616) 629 5385



Pneumatic Division Richland, Michigan 49083

Installation & Service Instructions V-630CP

PAR™-15 Valve

ISSUED: August, 2002 Supersedes: May, 2001

Doc.# V-630P, ECN# 020330, Rev. 4

To avoid unpredictable system behavior that can cause personal injury and property damage:

- Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

Installation

The valve should be installed with reasonable accessibility for service whenever possible – repair service kits are available. Keep pipe or tubing lengths to a minimum with inside clean and free of dirt and chips. Pipe joint compound should be used sparingly and applied only to the male pipe – never into the female port. Do not use PTFE tape to seal pipe joints – pieces have a tendency to break off and lodge inside the unit, possibly causing malfunction.

Application Limits

Operating Pressure Range:

	kPa	psig	bar
Maximum Inlet	1034	150	10.3
Minimum Output	42	6	0.4

Ambient Temperature Range: 0°C to 60°C (32°F to 140°F) Voltage Range: +10%, -10% of Rating

Materials

Body, Bottom and Top Plates	Aluminum
Divider	Aluminum
Piston	Acetal
Poppet	Aluminum
Poppet Seal	Fluorocarbon
Seals	Nitrile
Spring	Stainless Steel

Standard Operation

- 1. Blow out the pipe line to remove scale, residue and other contaminants prior to the installation of the unit.
- 2. Install the supply of air to the 1/2" (other port sizes available) port marked IN. It is recommended to use a 1/2" filter upstream of the valve for maximum protection against foreign matter such as rust and scale. Install the filter as close as practical to the valve. Also, if pressure fluctuation is a common problem at your location, a regulator placed upstream of the inlet will eliminate this problem.
- 3. Install a 1/2" (other port sizes available) muffler in the exhaust port marked EXH to reduce the noise level.

- 4. Connect the 1/2" (other port sizes available) outlet port marked OUT to the supply side of the system requiring multiple pressures. If desired, a pressure gauge can be installed downstream of the outlet port. A gauge isolator should be used to protect the gauge from pulsating pressures.
- 5. If the valve is solenoid operated verify that the solenoid piloting is the option desired (internally piloted vs. externally piloted), if not perform one of the following conversions:

CONVERSION FROM INTERNAL SOLENOID PILOT SUPPLY TO EXTERNAL SOLENOID PILOT SUPPLY. Remove the 3/8" pipe plug from the bottom of the unit and the 1/8" pipe plug from port X1 or X2. Install 1/8" plug and then 3/8" pipe plug in bottom of unit.

CONVERSION FROM EXTERNAL SOLENOID PILOT SUPPLY TO INTERNAL SOLENOID PILOT SUPPLY. Remove the 3/8" pipe plug and 1/8" pipe plug from the bottom of the unit. Install the 1/8" pipe plug in port X1 on units with Normally Closed Solenoid Operators or X2 on units with Normally Open Solenoid Operators.

6. Connect the pilot signal/supply as follows:

REMOTE PILOT SIGNAL OPERATED VALVES. Connect port 2 of a 1/8" or smaller 3-Way valve (normally closed or normally open) to each remote pilot port on top of the valve (numbered 1, 2, 4, and 8). Skip steps 7 and 8.

INTERNALLY PILOTED SOLENOID OPERATED VALVES. Pilot supply is internal. No additional connections are necessary.

EXTERNALLY PILOTED SOLENOID OPERATED VALVES. Connect pilot supply air to port X1 for units with normally closed solenoid operators or X2 for units with normally open solenoid operators. A filter is recommended upstream of the X port and if pressure fluctuation is a problem a regulator is also recommended.

- **Note:** Port C is used with cascading described later in this bulletin. It must be left unplugged if this feature is not desired. On solenoid operated valves one of the X ports serves as the pilot exhaust and should not be plugged. This is X2 for valves with normally closed solenoid operators and X1 for valves with normally open solenoid operators.
- Select the mode of electrical connection that you ordered no enclosure, enclosure without 6-Pin receptacle, enclosure with 6-Pin receptacle, or enclosure with 6-Pin receptacle and lamps. Follow instructions shown on following page.

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

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UNITS WITH NO ENCLOSURE

Connect input and common signals to each one of the solenoids marked with the binary inputs 1, 2, 4 and 8, using the 3-Pin female connector kits shown in the catalog. Follow the installation instructions included with the 3-Pin female connector kits for the proper installation.

If you elect not to use the 3-Pin female connector kits, you may use three female spade connectors per solenoid and connect the wires as shown on the figure.

Wiring - Follow all local and national electrical codes.

UNITS WITH ENCLOSURE AND WITHOUT 6-PIN RECEPTACLE

Connect input and common signals to the terminal block on the circuit board labelled TB1. Connect each solenoid input (1, 2, 4, & 8) to the respective label on the circuit board. Connect each common to the input labelled C on the circuit board.

UNITS WITH ENCLOSURE AND 6-PIN MICRO RECEPTACLE These units use the following brand names for 6-Pin micro connectors:

Brand Name	Receptacle	Connector w/ 6 Foot Cord
Brad Harrison	7R6006A19A120	706000D02F060
Joy	5000127-41	5000127-2

Connection is made as shown in the chart below.

	Pin	Wire Color	Function
$\begin{array}{c} 1 \\ 2 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0$	1	Red-White	Input 1
	2	Red	Input 2
	3	Green	Equipment Ground
	4	Red-Yellow	Common
	5	Red-Black	Input 8
	6	Red-Blue	Input 4



UNITS WITH ENCLOSURE AND 6-PIN MINI CONNECTOR These units use either one of the following brand names for 6-Pin mini connectors:

Brand Name	Receptacle	Connector w/ 6 Foot Cord
Brad Harrison	42605	42602
Joy	X8987-2	X8987-4

Connection is made as shown in the chart below.

	Pin	Wire Color	Function
	1	Orange	Input 1
	2	Blue	Input 2
	3	Black	Input 4
	4	White	Common
	5	Red	Input 8
	6	Green	Equipment Ground

UNITS WITH ENCLOSURE, 6-PIN CONNECTOR AND INDICATOR LAMPS

Each indicator lamp signals when the corresponding solenoid operator is actuated. Lamps that fail to light may need to be replaced or a check made to see if a connection has become loose.

Follow the service kit instructions included with the repair kits for proper installation of replacement lamps.

For units with DC solenoids and indicator lamps red wire is (+) positive black wire is (-) negative.

Caution: DC solenoids with indicator lamps are polarity sensitive. Observe polarities indicated above.

AVAILABLE LAMPS

Description	Part Number
Lamp (120/60AC) with spring clip	K352428C
Lamp (24VDC) with spring clip	K352429C

WIRING DIAGRAMS:





24 VDC Mini Connector

24 VDC Micro Connector

 Reorientation of the 6-Pin electrical connector and cover is possible by removing the two screws on top of the cover and rotating the cover 180°. See diagram below. Replace the cover and screws.



Narrow Band Control Operation

The valve can also be used to provide a narrower band of output pressures with the lowest selected pressure greater than zero.

REMOTE PILOT SIGNAL OPERATED VALVES

- 1. Connect the output of a 1/8" relieving regulator to port 1 of each of the four 3-way valves.
- 2. Connect the output of a 1/8" relieving regulator to port 3 of each of the 3-way valves.

SOLENOID OPERATED VALVE

- Convert the valve to external pilot operation as mentioned above under standard operation. Skip this step if the valve was ordered externally piloted from the factory.
- 2. Two 1/8" relieving regulators will be required. If 0 PSIG pressure is needed then a 3-way normally closed solenoid valve is also required.
- 3. Connect the output of one regulator to the 1/8" port marked X1. See Narrow Band Control diagram.

NARROW BAND CONTROL DIAGRAM



- 4. Connect the output of the second regulator to the 1/8" port marked X2. If 0 PSIG pressure is needed then connect the output of the second regulator to the inlet of the 3-way normally closed valve, and connect the outlet of the 3-Way normally closed valve to the 1/8" port marked X2. See Narrow Band Control diagram.
- 5. Do not plug the 1/8" port marked C.

Cascading Operation

Two valves can also be used in conjunction to provide 240 steps (versus 15 steps from one valve), therefore, providing more output pressures.

INTERNALLY PILOTED SOLENOID OPERATED VALVES ONLY*

- 1. Follow steps 1, 2 & 3 above under Standard Operation for each valve.
- 2. Connect the outlet port marked OUT of the valve upstream to either of the 1/8" ports marked C of the valve downstream. See Cascading diagram below. A port/pipe reducer(s) must be used to accomplish this task. If desired, a pressure gauge can be installed between these two points. A gauge isolator should be used to protect the gauge from pulsating pressures.

CASCADING DIAGRAM



- Connect the outlet port marked OUT of the valve downstream to the supply side of the system requiring multiple pressures. If desired, a pressure gauge can be installed downstream of the outlet port. A gauge isolator should be used to protect the gauge from pulsating pressures.
- 4. Do not plug the 1/8" ports marked C and X2 on the valve upstream and X2 on the valve downstream.
- 5. Follow steps 6 & 7 above under Standard Operation to finish the installation.

* For remote pilot operated or solenoid operated with external pilot supply consult factory.

Life Expectancy – Normal multi-million cycle life expectancy of these valves is based on the use of properly filtered air at room temperature.

Lubrication – Although the valve does not require lubrication for a normal service life, use of SAE 10 mineral base oil is recommended to extend component life. This should be supplied using a 1/2" full flow lubricator located upstream of the valve inlet port.

Caution: Do not use synthetic, reconstituted, or oils with an alcohol content.

Operation and Service Standard Operation

1. Select the mode of operation you want to use - remote pilot, internal pilot or external pilot.

REMOTE PILOT SIGNAL OPERATED ONLY

Actuation of each 3-way valve selectively divides any input pressure into any of 15 equally spaced pressures plus zero. See Truth Table.

INTERNALLY PILOTED SOLENOID OPERATED ONLY

Four solenoids are controlled by on/off signals that selectively divide any input pressure into any of 15 equally spaced pressures plus zero. See the Truth Table.

EXTERNALLY PILOTED SOLENOID OPERATED ONLY

Four solenoids are controlled by on/off signals that selectively divide any input pressure to the X1 port into any of 15 equally spaced pressures plus zero, independent of mainline supply pressure to the IN port so long as the X1 port pressure is set at a pressure below the mainline supply pressure. See the Truth Table.

Caution: An interruption of 10 milliseconds or greater to the power supplied to the solenoid of a solenoid operated valve may cause the valve to shift. Provision must be made to prevent power interruption of this duration to avoid unintended, potentially hazardous, consequences.

Truth Table

Normally Closed Valves/ Solenoids	Normally Open Valves/ Solenoids				
Binary Input*	Binary Input*	Proportion	PSIG Output	PSIG	
Pin Number †	Pin Number †	of Inlet	@ 75 PSIG	Output @ 90	
5321	5321	Pressure	Inlet ''	PSIG Inlet	
0000	1 1 1 1	0	0	0	
0001	1 1 1 0	1/15	5	6	
0010	1 1 0 1	2/15	10	12	
0011	1100	3/15	15	18	
0100	1011	4/15	20	24	
0101	1010	5/15	25	30	
0110	1001	6/15	30	36	
0111	1000	7/15	35	42	
1000	0111	8/15	40	48	
1001	0110	9/15	45	54	
1010	0101	10/15	50	60	
1011	0100	11/15	55	66	
1 1 0 0	0011	12/15	60	72	
1 1 0 1	0010	13/15	65	78	
1 1 1 0	0001	14/15	70	84	
1 1 1 1	0000	15/15	75	90	

Table above illustrates available output pressures for inlet pressures of 75 PSIG and 90 PSIG. Inlet pressure may be any value between 15 and 150 PSIG. Output pressure increment will be 1/15 of inlet pressure.

- *0 = Voltage "OFF"
- 1 = Voltage "ON"
 - + Available only on units with 6-Pin connector.
- tt Shaded output pressures shown are theoretical and are below the minimum operating range of the valve and should not be used. Please refer to the Engineering Specifications for minimum output.
- 2. The valve is available with two types of output pressure regulation: increasing output and decreasing output. Follow the instructions that pertain to the type of solenoids that you ordered - normally closed or normally open.

NORMALLY CLOSED SOLENOIDS ONLY

In the increasing output pressure regulation type, normally closed solenoid operators are used to divide the input pressure into 15 equal steps, ranging from 0 PSIG (all solenoid operators 3. A formula can be used to calculate the output pressure of the valve de-energized) to full line pressure (all solenoid operators energized). Continue with step 3.

NORMALLY OPEN SOLENOIDS ONLY

In the decreasing output pressure regulation type, normally open solenoid operators are used to divide the input pressure into 15 equal steps, starting with full line pressure (all solenoid operators de-energized) and ending with 0 PSIG (all solenoid operators energized).

- $\stackrel{/!}{\square}$ Caution: Interruption of the electrical signal to a decreasing output pressure regulation type valve will cause full line pressure to be present at the output port.
- 3. Full flow exhaust permits instant reduction to any lower selected pressure or zero. High relief capacity quickly vents downstream overpressure. The output pressure will begin to change within 20 milliseconds after a change in the electrical input to one or more of the solenoids. However, the time which elapses until the output pressure reaches the new level will depend upon the volume of air, the size of the connection from the unit and the magnitude of the pressure change.
- 4. For reliable performance, adherence to the rated minimum output pressure is recommended.

Narrow Band Control Operation

- 1. Set the regulator connected to Port 1 of the 3-Way valves (remote pilot only) or to the X1 port to the upper pressure of the range that you have selected.
- 2. Set the regulator connected to Port 3 of the 3-Way valves (remote pilot only) or to the X2 port to the lower pressure of the range that you have selected.

3. A formula can be used to calculate the value of one step.

One Step = Upper Pressure (PSIG) — Lower Pressure (PSIG)

4. If a 3-way normally closed valve was installed as mentioned above to attain a 0 PSIG reading, then for:

NORMALLY CLOSED SOLENOIDS ONLY

Simultaneously de-energize the 3-way valve and all four solenoids at the binary valve to exhaust all air supply to the solenoids and get a 0 PSIG reading at the output of the binary valve. Energize the 3-way valve in order to operate the binary valve at the lower pressure of the range selected.

NORMALLY OPEN SOLENOIDS ONLY

Simultaneously de-energize the 3-way valve and energize all four solenoids at the binary valve to exhaust all air supply to the solenoids and get a 0 PSIG reading at the output of the binary valve. Energize the 3-way valve in order to operate the binary valve at the lower pressure of the range selected.

Example:

Line pressure in the plant equals 150 PSIG. The customer is interested in operating the binary valve between 25 PSIG and 100 PSIG in order to reduce the value of one step, i.e. at full line pressure one step equals 150/15 or 10 PSIG, and have more flexibility within the range. What is the value of one step between this pressure range?

Solution:

Set regulator connected to the X1 port to 100 PSIG. Set regulator connected to the X2 port to 25 PSIG. One step is now equal to:

One Step =
$$\frac{100 - 25}{15} = \frac{75}{15} = 5$$
 PSIG

Cascading Operation

- 1. Operation of the valves is the same as mentioned above under the Standard Operation for internal pilot valves.
- 2. See Cascading Truth Table for the proper input signal to each solenoid, and the resulting proportion of inlet pressure for an output pressure.



Where:

Line Pressure is the supply pressure to both valves and it must be equal.

BINARY INPUT UPSTREAM VALVE is the binary number, a number from 0 to 15 depending on which solenoids are energized (normally closed solenoids) or de-energized (normally open solenoids) on the valve upstream.

BINARY INPUT DOWNSTREAM VALVE is the binary number, a number from 0 to 15 depending on which solenoids are energized (normally closed solenoids) or de-energized (normally open solenoids) on the valve downstream.

Example:

Assume the line pressure is 120 PSIG, the valve upstream has inputs 1 and 2 energized, and the valve downstream has inputs 1 and 8 energized. Also, assume normally closed solenoids. What is the output pressure of the valve downstream?

Solution:

Binary Input valve upstream = 1+2=3 Binary Input valve downstream = 1+8=9

Output Pressure =
$$\frac{120}{15} * \left(\frac{3}{16} + 9\right) = 8 * 9.1875 = 73.5 \text{ PSIG}$$

Maintenance Service Kit					
Service Kit	K352413				

Cascading Truth Table

	Normally Clos	sed Solenoids	Normally Open Solenoids					
	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream		
	Valve	Valve	Valve	Valve	Valve	Valve		
	Valve		Valve		Valve	Valve		
	Binary	Input *	Binary	Input *				
	8421	8421	8421	8421	Proportion	Proportion	PSIG Output	PSIG Output
Step	PIN Nu	mber †	PIN Nu	mber †	of Inlet +	of Inlet	@ 60 PSIG	@ 120 PSIG
	5321	5321	5321	5321	Pressure	Pressure	Inlet ^{††}	Inlet **
0	0000	0000	1 1 1 1	1111	0	0	0.00	0.00
1	0000	0000	1 1 1 1	1110	0	1/2/0	0.00	0.00
	0000	0001		1110	0	1/240	0.25	0.50
2	0000	0010	1111	1101	0	2/240	0.50	1.00
3	0000	0011	1111	1100	0	3/240	0.75	1.50
4	0 0 0 0	0100	1111	1011	0	4/240	1.00	2.00
5	0000	0101	1111	1010	0	5/240	1.25	2.50
6	0 0 0 0	0110	1111	1001	0	6/240	1.50	3.00
7	0000	0111	1111	1000	0	7/240	1.75	3.50
8	0000	1000	1111	0111	0	8/240	2.00	4.00
9	0000	1001	1111	0110	0	9/240	2 25	4 50
10	0 0 0 0	1010	1 1 1 1	0101	ů ů	10/240	2.50	5.00
11	0000	1010	1 1 1 1	0100	Ő	11/2/0	2.00	5.50
12	0000	1100	1 1 1 1	0 1 0 0	0	12/240	2.75	5.50
12	0000	1100		0011	0	12/240	3.00	0.00
13	0000	1101		0010	0	13/240	3.25	6.50
14	0000	1110	1 1 1 1	0001	0	14/240	3.50	7.00
15	0000	1111	1111	0000	0	15/240	3.75	7.50
16	0001	0000	1110	1111	1/15	0	4.00	8.00
17	0001	0001	1110	1110	1/15	1/240	4.25	8.50
18	0001	0010	1110	1 1 0 1	1/15	2/240	4.50	9.00
19	0001	0011	1110	1100	1/15	3/240	4.75	9.50
20	0 0 0 1	0100	1110	1011	1/15	4/240	5.00	10.00
21	0 0 0 1	0101	1110	1010	1/15	5/240	5.00	10.00
21	0001	0101	1110	1010	1/15	6/240	5.25	11.00
22	0001	0110	1110	1001	1/15	0/240	5.50	11.00
23	0001	0111	1110	1000	1/15	7/240	5.75	11.50
24	0001	1000	1110	0111	1/15	8/240	6.00	12.00
25	0001	1001	1110	0110	1/15	9/240	6.25	12.50
26	0001	1010	1110	0101	1/15	10/240	6.50	13.00
27	0001	1011	1110	0100	1/15	11/240	6.75	13.50
28	0001	1100	1110	0011	1/15	12/240	7.00	14.00
29	0001	1101	1110	0010	1/15	13/240	7.25	14.50
30	0 0 0 1	1110	1110	0 0 0 1	1/15	14/240	7 50	15 00
31	0 0 0 1	1 1 1 1	1110	0 0 0 0	1/15	15/240	7 75	15 50
				0000	1/10	10/210	1.10	10.00
32	0.01.0	0000	1101	1 1 1 1	2/15	0	8.00	16.00
22	0010	0000	1 1 0 1	1 1 1 0	2/15	1/2/0	0.00	16.00
33	0010	0001	1101	1110	2/15	1/240	0.25	10.50
34	0010	0010		1101	2/15	2/240	8.50	17.00
35	0010	0011	1101	1100	2/15	3/240	8.75	17.50
36	0010	0100	1101	1011	2/15	4/240	9.00	18.00
37	0010	0101	1101	1010	2/15	5/240	9.25	18.50
38	0010	0110	1101	1001	2/15	6/240	9.50	19.00
39	0010	0111	1 1 0 1	1000	2/15	7/240	9.75	19.50
40	0010	1000	1 1 0 1	0111	2/15	8/240	10.00	20.00
41	0010	1001	1 1 0 1	0110	2/15	9/240	10.25	20.50
42	0010	1010	1101	0101	2/15	10/240	10.50	21.00
43	0010	1011	1101	0100	2/15	11/240	10.75	21.50
44	0010	1100	1 1 0 1	0011	2/15	12/240	11.00	22.00
45	0 0 1 0	1101	1 1 0 1	0 0 1 0	2/15	13/240	11.25	22.50
16	0010	1110	1 1 0 1	0 0 0 1	2/15	14/240	11.50	22.00
40	0010	1 1 1 1	1101	0001	2/15	14/240	11.50	23.00
47	0010	1 1 1 1	1101	0000	2/15	15/240	11.75	23.50
40	0.0.4.4		1100		0/45	0	10.00	04.00
48	0011	0000	1100	1111	3/15	0	12.00	24.00
49	0011	0001	1100	1110	3/15	1/240	12.25	24.50
50	0011	0010	1100	1 1 0 1	3/15	2/240	12.50	25.00
51	0011	0011	1100	1100	3/15	3/240	12.75	25.50
52	0011	0100	1100	1011	3/15	4/240	13.00	26.00
53	0011	0101	1100	1010	3/15	5/240	13.25	26.50
54	0011	0110	1100	1001	3/15	6/240	13.50	27.00
55	0011	0111	1100	1000	3/15	7/240	13.75	27.50
56	0 0 1 1	1000	1100	0111	3/15	8/240	14.00	28.00
57	0 0 1 1	1 0 0 1	1100	0110	3/15	9/2/0	14.25	28.50
57	0.011	1010	1100	0104	2/15	10/240	14.20	20.00
58					3/15	10/240	14.50	29.00
59	0011	1011	1100	0100	3/15	11/240	14.75	29.50
60	0011	1100	1100	0011	3/15	12/240	15.00	30.00
61	0011	1101	1100	0010	3/15	13/240	15.25	30.50
62	0011	1110	1100	0001	3/15	14/240	15.50	31.00
63	0011	1111	1100	0000	3/15	15/240	15.75	31.50
	1		1		I		I	

Cascading Truth Table (Continued)

	Normally Clos	sed Solenoids	Normally Op	en Solenoids				
	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream		
	Valve	Valve	Valve	Valve	Valve	Valve		
	Binory	Input *	Binony	Innut *				
	Dillary		Dillary		Duon ontion	Description		
_	8421	8421	8421	8421	Proportion	Proportion	PSIG Output	PSIG Output
Step	PIN Nu	imber †	PIN Nu	mber †	of Inlet +	of Inlet	@ 60 PSIG	@ 120 PSIG
	5321	5321	5321	5321	Pressure	Pressure	Inlet ^{††}	Inlet ^{††}
64	0100	0000	1011	1111	4/15	0	16.00	32.00
65	0100	0001	1011	1110	4/15	1/240	16.25	32.50
66	0100	0010	1011	1101	4/15	2/240	16.50	33.00
67	0100	0011	1011	1100	4/15	3/240	16.75	33.50
68	0100	0100	1011	1011	4/15	4/240	17.00	34.00
69	0100	0101	1011	1010	4/15	5/240	17.25	34.50
70	0100	0110	1011	1001	4/15	6/240	17.50	35.00
71	0100	0111	1011	1000	4/15	7/240	17.75	35.50
72	0100	1000	1011	0111	4/15	8/240	18.00	36.00
73	0100	1001	1011	0110	4/15	9/240	18.25	36.50
74	0100	1010	1011	0101	4/15	10/240	18.50	37.00
75	0100	1011	1011	0100	4/15	11/240	18.75	37.50
76	0100	1100	1011	0011	4/15	12/240	19.00	38.00
77	0100	1101	1011	0010	4/15	13/240	19.25	38.50
78	0100	1110	1011	0001	4/15	14/240	19.50	39.00
79	0100	1111	1011	0 0 0 0	4/15	15/240	19.75	39.50
80	0101	0000	1010	1 1 1 1	5/15	0	20.00	40.00
81	0101	0001	1010	1110	5/15	1/240	20.25	40.50
82	0101	0010	1010	1101	5/15	2/240	20.50	41.00
83	0101	0011	1010	1100	5/15	3/240	20.75	41.50
84	0101	0100	1010	1011	5/15	4/240	21.00	42.00
85	0101	0101	1010	1010	5/15	5/240	21.25	42.50
86	0101	0110	1010	1001	5/15	6/240	21.50	43.00
87	0101	0111	1010	1000	5/15	7/240	21.75	43.50
88	0101	1000	1010	0111	5/15	8/240	22.00	44.00
89	0101	1001	1010	0110	5/15	9/240	22.25	44.50
90	0101	1010	1010	0101	5/15	10/240	22.50	45.00
91	0101	1011	1010	0100	5/15	11/240	22.75	45.50
92	0101	1100	1010	0011	5/15	12/240	23.00	46.00
93	0101	1101	1010	0010	5/15	13/240	23.25	46.50
94	0101	1110	1010	0001	5/15	14/240	23.50	47.00
95	0101	1111	1010	0000	5/15	15/240	23.75	47.50
					0/15	•		40.00
96	0110	0000	1001		6/15	0	24.00	48.00
97	0110	0001	1001	1110	6/15	1/240	24.25	48.50
98	0110	0010	1001	1101	6/15	2/240	24.50	49.00
99	0110	0011	1001	1100	6/15	3/240	24.75	49.50
100	0110	0100	1001	1011	6/15	4/240	25.00	50.00
101			1001	1010	0/15 C/15	5/240	25.25	50.50
102			1001	1001	0/15 C/15	0/240	25.50	51.00
103			1001	0111	6/15	7/240 9/240	25.75	51.50
104	0110	1000	1001	0110	6/15	0/240	20.00	52.00
105	0110	1010	1001	0101	6/15	10/240	26.50	53.00
100	0110	1010	1001	0100	6/15	11/240	26.30	53 50
108	0110	1100	1 0 0 1	0 0 1 1	6/15	12/240	27.00	54 00
109	0110	1 1 0 1	1001	0 0 1 0	6/15	13/240	27.25	54 50
110	0110	1110	1001	0 0 0 1	6/15	14/240	27.50	55.00
111	0110	1 1 1 1	1001	0000	6/15	15/240	27.75	55 50
					0,10	10/210	2	00.00
112	0111	0000	1000	1111	7/15	0	28.00	56.00
113	0111	0001	1000	1110	7/15	1/240	28.25	56.50
114	0111	0010	1000	1101	7/15	2/240	28.50	57.00
115	0111	0011	1000	1100	7/15	3/240	28.75	57.50
116	0111	0100	1000	1011	7/15	4/240	29.00	58.00
117	0111	0101	1000	1010	7/15	5/240	29.25	58.50
118	0111	0110	1000	1001	7/15	6/240	29.50	59.00
119	0111	0111	1000	1000	7/15	7/240	29.75	59.50
120	0111	1000	1000	0111	7/15	8/240	30.00	60.00
121	0111	1001	1000	0110	7/15	9/240	30.25	60.50
122	0111	1010	1000	0101	7/15	10/240	30.50	61.00
123	0111	1011	1000	0100	7/15	11/240	30.75	61.50
124	0111	1100	1000	0011	7/15	12/240	31.00	62.00
125	0111	1101	1000	0010	7/15	13/240	31.25	62.50
126	0111	1110	1000	0001	7/15	14/240	31.50	63.00
127	0111	1111	1000	0000	7/15	15/240	31.75	63.50
1	1	1	1	1	1		1	1

Cascading Truth Table (Continued)

	Normally Clos	sed Solenoids	Normally Op	en Solenoids				
	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream		
	Valvo	Valvo	Valvo	Valvo	Valvo	Valvo		
	Valve	vaive	Valve		Valve	Valve		
	Binary	Input *	Binary	Input *				
	8421	8421	8421	8421	Proportion	Proportion	PSIG Output	PSIG Output
Sten	PIN Nu	mber †	PIN Nu	mber †	of Inlet +	of Inlet	@ 60 PSIG	@ 120 PSIG
- Clop	5321	5321	5321	5321	Prossuro	Prossuro	Inlet tt	Inlet tt
400	3321	3321	0.1.1.1	5521	0/45	riessure		04.00
128	1000	0000	0111		8/15	0	32.00	64.00
129	1000	0001	0111	1110	8/15	1/240	32.25	64.50
130	1000	0010	0111	1101	8/15	2/140	32.50	65.00
131	1000	0011	0111	1100	8/15	3/240	32.75	65.50
132	1000	0100	0111	1011	8/15	4/240	33.00	66.00
133	1000	0101	0111	1010	8/15	5/240	33.25	66.50
134	1000	0110	0111	1001	8/15	6/240	33.50	67.00
135	1000	0111	0111	1000	8/15	7/240	33.75	67.50
136	1000	1000	0111	0111	8/15	8/240	34.00	68.00
137	1000	1001	0111	0110	8/15	9/240	34.25	68.50
138	1000	1010	0111	0101	8/15	10/240	34 50	69.00
139	1000	1011	0 1 1 1	0100	8/15	11/240	34 75	69.50
140	1000	1100	0 1 1 1	0 0 1 1	8/15	12/240	35.00	70.00
140	1000	1 1 0 1	0111	0010	9/15	12/240	25.25	70.00
141	1000	1101	0111		0/15	13/240	35.25	70.50
142	1000				8/15	14/240	35.50	71.00
143	1000	1 1 1 1 1	0111	0000	8/15	15/240	35.75	71.50
	1001		0.1.1.0		0/15	0	20.00	70.00
144					9/15	U	36.00	72.00
145	1001	0001	0110	1110	9/15	1/240	36.25	72.50
146	1001	0010	0110	1101	9/15	2/240	36.50	73.00
147	1001	0011	0110	1100	9/15	3/240	36.75	73.50
148	1001	0100	0110	1011	9/15	4/240	37.00	74.00
149	1001	0101	0110	1010	9/15	5/240	37.25	74.50
150	1001	0110	0110	1001	9/15	6/240	37.50	75.00
151	1001	0111	0110	1000	9/15	7/240	37.75	75.50
152	1001	1000	0110	0111	9/15	8/240	38.00	76.00
153	1001	1001	0110	0110	9/15	9/240	38.25	76.50
154	1001	1010	0110	0 1 0 1	9/15	10/240	38.50	77.00
155	1001	1011	0110	0100	9/15	11/240	38 75	77.50
156	1001	1100	0110	0 0 1 1	9/15	12/240	39.00	78.00
150	1001	1 1 0 1	0110	0011	0/15	12/240	20.25	78.50
157	1001	1110	0110	0010	0/15	14/240	33.23	70.00
100	1001		0110		9/15	14/240	39.50	79.00
159	1001		0110	0000	9/15	15/240	39.75	79.50
100	1010	0 0 0 0	0 1 0 1		10/15	0	40.00	00.00
160	1010	0000	0101		10/15	0	40.00	80.00
161	1010	0001	0101	1110	10/15	1/240	40.25	80.50
162	1010	0010	0101	1101	10/15	2/240	40.50	81.00
163	1010	0011	0101	1100	10/15	3/240	40.75	81.50
164	1010	0100	0101	1011	10/15	4/240	41.00	82.00
165	1010	0101	0101	1010	10/15	5/240	41.25	82.50
166	1010	0110	0101	1001	10/15	6/240	41.50	83.00
167	1010	0111	0101	1000	10/15	7/240	41.75	83.50
168	1010	1000	0101	0111	10/15	8/240	42.00	84.00
169	1010	1001	0101	0110	10/15	9/240	42.25	84.50
170	1010	1010	0101	0101	10/15	10/240	42.50	85.00
171	1010	1011	0101	0100	10/15	11/240	42.75	85.50
172	1010	1100	0101	0011	10/15	12/240	43.00	86.00
173	1010	1101	0101	0010	10/15	13/240	43.25	86.50
174	1010	1110	0101	0 0 0 1	10/15	14/240	43.50	87.00
175	1010	1 1 1 1	0 1 0 1	0000	10/15	15/240	43 75	87.50
	1010				10,10	10/210	10.10	07.00
176	1011	0000	0100	1111	11/15	0	44.00	88.00
177	1011	0 0 0 1	0100	1110	11/15	1/240	44 25	88.50
178	1011	0 0 1 0	0 1 0 0	1 1 0 1	11/15	2/240	44 50	89.00
170	1011	0 0 1 1	0100	1100	11/15	3/240	11.00	89.50
180	1011	0100	0100	1 0 1 1	11/15	4/2/0	45.00	90.00
191	1011	0101	0100	1010	11/15	5/240	45.00	90.00
101	1011		0100	1001	11/15	J/240	40.20	01.00
102				1001	11/10	0/240	40.00	31.00
183				1000	11/15	7/240	45./5	91.50
184		1000	0100		11/15	8/240	46.00	92.00
185	1011	1001	0100	0110	11/15	9/240	46.25	92.50
186	1011	1010	0100	0101	11/15	10/240	46.50	93.00
187	1011	1011	0100	0100	11/15	11/240	46.75	93.50
188	1011	1100	0100	0011	11/15	12/240	47.00	94.00
189	1011	1101	0100	0010	11/15	13/240	47.25	94.50
190	1011	1110	0100	0001	11/15	14/240	47.50	95.00
191	1011	1111	0100	0000	11/15	15/240	47.75	95.50
	1	1	1	1	1		1	

Cascading Truth Table (Continued)

	Normally Clos	sed Solenoids	Normally Open Solenoids					
	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream		
	Valve	Valve	Valve	Valve	Valve	Valve		
	Binary	Innut *	Binary	Input *				
	0 4 2 4	0 4 2 4	0 4 2 4	0 4 2 4	Bronortion	Broportion		DELC Output
	8421	8421	8421	8421	Proportion	Proportion		
Step	PIN Nu	imber †	PIN Nu	mber †	of Inlet +	of Inlet	@ 60 PSIG	@ 120 PSIG
	5321	5321	5321	5321	Pressure	Pressure	Inlet ^{††}	Inlet ^{††}
192	1100	0 0 0 0	0011	1 1 1 1	12/15	0	48.00	96.00
193	1100	0001	0011	1 1 1 0	12/15	1/240	48.25	96.50
194	1100	0010	0011	1 1 0 1	12/15	2/240	48.50	97.00
195	1100	0011	0011	1 1 0 0	12/15	3/240	48.75	97.50
196	1100	0100	0011	1011	12/15	4/240	49.00	98.00
197	1100	0101	0011	1010	12/15	5/240	49.25	98.50
198	1100	0110	0011	1001	12/15	6/240	49.50	99.00
199	1100	0111	0011	1000	12/15	7/240	49.75	99.50
200	1100	1000	0011	0111	12/15	8/240	50.00	100.00
201	1100	1001	0011	0110	12/15	9/240	50.25	100.50
202	1100	1010	0011	0101	12/15	10/240	50.50	101.00
203	1100	1011	0011	0100	12/15	11/240	50.75	101.50
204	1100	1100	0011	0011	12/15	12/240	51.00	102.00
205	1100	1101	0011	0010	12/15	13/240	51.25	102.50
206	1100	1110	0011	0001	12/15	14/240	51.50	103.00
207	1100	1111	0011	0 0 0 0	12/15	15/240	51.75	103.50
208	1101	0000	0010	1111	13/15	0	52.00	104.00
209	1101	0001	0010	1110	13/15	1/240	52.25	104.50
210	1101	0010	0010	1 1 0 1	13/15	2/240	52.50	105.00
211	1101	0011	0010	1100	13/15	3/240	52.75	105.50
212	1101	0100	0010	1011	13/15	4/240	53.00	106.00
213	1101	0101	0010	1010	13/15	5/240	53.25	106.50
214	1101	0110	0010	1001	13/15	6/240	53.50	107.00
215	1101	0111	0010	1000	13/15	7/240	53.75	107.50
216	1101	1000	0010	0111	13/15	8/240	54.00	108.00
217	1101	1001	0010	0110	13/15	9/240	54.25	108.50
218	1101	1010	0010	0101	13/15	10/240	54.50	109.00
219	1101	1011	0010	0100	13/15	11/240	54.75	109.50
220	1101	1100	0010	0011	13/15	12/240	55.00	110.00
221	1101	1101	0010	0010	13/15	13/240	55.25	110.50
222	1101	1110	0010	0001	13/15	14/240	55.50	111.00
223	1101	1111	0010	0000	13/15	15/240	55.75	111.50
224	1110	0000	0001	1 1 1 1	14/15	0	56.00	112.00
225	1110	0001	0001	1 1 1 0	14/15	1/240	56.25	112.50
226	1110	0010	0001	1 1 0 1	14/15	2/240	56.50	113.00
227	1110	0011	0001	1 1 0 0	14/15	3/240	56.75	113.50
228	1110	0100	0001	1011	14/15	4/240	57.00	114.00
229	1110	0101	0001	1010	14/15	5/240	57.25	114.50
230	1110	0110	0001	1001	14/15	6/240	57.50	115.00
231	1110	0111	0001	1000	14/15	7/240	57.75	115.50
232	1110	1000	0001	0111	14/15	8/240	58.00	116.00
233	1110	1001	0001	0110	14/15	9/240	58.25	116.50
234	1110	1010	0001	0101	14/15	10/240	58.50	117.00
235	1110	1011	0001	0100	14/15	11/240	58.75	117.50
236	1110	1100	0001	0011	14/15	12/240	59.00	118.00
237	1110	1101	0001	0010	14/15	13/240	59.25	118.50
238	1110	1110	0001	0001	14/15	14/240	59.50	119.00
239	1110	1111	0001	0000	14/15	15/240	59.75	119.50
240	1111	0000	0000	1111	15/15	U	60.00	120.00

Table above illustrates available output pressures for inlet pressures of 75 PSIG and 90 PSIG. Inlet pressure may be any value between 15 and 150 PSIG. Output pressure increment will be 1/15 of inlet pressure.

*0 = Voltage "OFF"

1 = Voltage "ON"

[†] Available only on units with 6-Pin connector.

++ Shaded output pressures shown are theoretical and are below the minimum operating range of the valve and should not be used.

Please refer to the Engineering Specifications for minimum output.



Pneumatic Division Richland, Michigan 49083

To avoid unpredictable system behavior that can cause personal injury and property damage:

- Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

Introduction:

Follow these instructions when installing, operating, or servicing the product.

Application Limits:

Operating Pressure Range:

	kPa	psig	bar
Maximum Inlet	1034	150	10.34
Minimum Output	42	6	0.4

Ambient Temperature Range: 0°C to 60°C (32°F to 140°F) Voltage Range: +10 to -10% of Rating

Service Instructions:

Disassembly:

- 1. Loosen two Phillips head screws located on top of black electrical enclosure and remove enclosure from valve (units with enclosure only with or without lamps).
- 2. Remove green lead wire by unscrewing green colored ground screw.
- 3. Remove wire leads from the four solenoids by sliding the flag receptacles off the solenoid tabs.
- 4. Remove and set aside the four #10-32 socket head cap screws located at each of the four corners of the valve.
- **NOTE:** Do not remove the #10-32 screws found in the center of the valve at this time.
- 5. Separate top assembly unit from body. This unit will include the four solenoids, two manifold blocks, adaptor plate, stepped divider, and black piston.
- 6. Remove and set aside remaining two #10-32 socket head cap screws mentioned in step 4.
- 7. Separate top assembly into three sub-assembles:
 - a. Solenoid sub-assembly including two manifold bars.
 - b. Adaptor plate.
 - c. Piston and divider sub-assembly.

Service Instructions: V-631P

PAR[™]-15 Regulating Valve

ISSUED: November, 2001 Supersedes: August, 1999

ECN# 28397

Solenoid Sub-Assembly – *Disassembly and Assembly*

- 1. Loosen all four brass screws from manifold block until manifold separates from solenoids.
- 2. Remove each brass screw from the manifold block to replace the washer (item #1) and the two o-rings (item #2).
- 3. Lightly grease the two o-rings and replace the screw in the bore. Be sure the threaded end of the screw is on the counterbore side of the manifold block.
- 4. If replacing solenoids go to step 5, if not go to step 10.
- 5. Remove the two screws holding each solenoid assembly in place.
- 6. Remove the existing coil, o-ring and plunger.
- Replace with new solenoid assembly. Make sure new o-ring remains in o-ring groove located on bottom of coil, during assembly.
- 8. Replace two screws and tighten 0.8 to 1.1 Nm (7 to 10 in-lbs).
- 9. Repeat steps 5 through 8 for each solenoid assembly.
- 10. Replace upper manifold bar, screwing the four brass screws into the end of each of four solenoids, and tighten to 60 to 80 in-oz.
 - A CAUTION: Be sure the surface with the threaded hole on the manifold block is facing same direction as engraved numbers 1, 2, 4 and 8 on opposite manifold block.

Adaptor Plate Sub-Assembly – Disassembly

- 1. Remove and replace six small o-rings (item #3) and two large o-rings (item #4).
- 2. Remove rubber gasket (item #5) and any remaining adhesive on adaptor plate.
- 3. Peel paper off back of new gasket and place gasket on adaptor plate, adhesive side down.

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Piston and Divider Sub-Assembly – *Disassembly and Assembly*

- 1. Remove black piston (item #6) from stepped divider.
- 2. Remove and replace seven o-rings on divider (items #7 through #12).
- Lightly grease (in kit) new o-rings on divider and inside diameters of new piston (item #6)
- 4. Slide piston over divider, being careful not to let o-rings roll out of the o-ring grooves.
- 5. Remove and replace six o-rings (item #3), and one rubber washer (item #13) on top surface of divider. Note the location of the rubber washer for either internal or external pilot supply air, refer to diagram for correct placement.

Top Half Sub-Assembly – Assembly

- 1. Place solenoid sub-assembly on adaptor plate surface with o-rings. Make sure manifold bar with engraved numbers 1, 2, 4 and 8 is placed over group of five small o-rings (item #3) on adaptor plate. Align these two sub-assemblies using two #10-32 socket head cap screws located in the center of the solenoid sub-assembly.
- Locate group of five small o-rings on top surface of divider under engraved numbers on manifold block as in step 1. Align and attach divider to adaptor plate and solenoid assembly using the two #10-32 screws.
- 3. Tighten two #10-32 socket head cap screws 3.9 to 4.5 Nm (35 to 40 in-lbs).

Bottom Plate – Disassembly and Assembly

If you have access to the bottom plate and have a special repair tool (part number K352412), the poppet and related parts can be replaced without removing the valve from its application. Otherwise, it will be necessary to repair the valve at a workbench. In either case, the special repair tool will be a valuable aid.

- 1. Remove bottom plate by removing the three 1/4 20 socket head cap screws.
- 2. Remove poppet guide (item #18), poppet (item #15), and spring by gripping the inside diameter of the poppet with an expanding tool (such as snap ring pliers) and pull out parts. If you have the special repair tool, depress the handle button, insert tool fully into inside diameter of poppet, release button, and withdraw tool.
- 3. Place new washer (item #19) on new poppet (item #15).
- 4. Install o-ring (item #14) and quad ring (item # 21) on new poppet (item #15). Verify that quad ring is not rolled or twisted in its groove.
- 5. Install large o-ring (item #16) on new poppet guide (item #18).
- 6. Lightly grease inside diameter of poppet guide and the two seals on this new poppet using the grease provided in the repair kit.
- 7. If you do not have the special repair tool:
 - a. Place valve body on workbench with bottom side of valve facing up.
 - b. Place new poppet with washer in center of 2 inch bore with rubber side down.
 - c. Place new spring (item #20) on poppet.
 - d. Slide poppet guide into 2 inch bore until flush with valve body.
 - e. Replace o-ring seal (item #17) on bottom surface.
 - f. Replace bottom plate and tighten three 1/4-20 socket head cap screws 7.9 to 8.4 Nm (70 to 75 in-lbs).

- 8. If you have the special repair tool:
 - a. Depress the handle button and stack the new poppet guide, spring, washer, and poppet onto the tool shank and release the button. Confirm that the poppet will stroke fully by squeezing the poppet and poppet guide together and observing that the small end of the poppet is flush with the end of the poppet guide. If not flush, remove and re-assemble parts.
 - b. Grasp the tool by the T-handle and insert parts into body until poppet guide is flush with the body.
 - c. Depress handle button and withdraw tool.
 - d. Replace o-ring seal (item #17) on bottom surface. If the valve is mounted vertically, use grease to hold the o-ring in place.

Top Assembly Replacement

- 1. Turn valve over so bottom plate is resting on workbench.
- Put top assembly back on valve body using four #10-32 socket head cap screws to align top assembly to body. Be careful not to roll o-rings out of o-ring grooves on divider.
- 3. Torque four #10-32 socket head cap screws 3.9 to 4.5 Nm (35 to 40 in-lbs.)

Electrical and Enclosure Assembly

(For units with enclosure without lamps)

- 1. Reattach electrical lead wires to solenoids in the following orientation: one white lead to each of the four solenoids, the red lead wire to solenoid 8, the black lead wire to solenoid 4, the blue lead wire to solenoid 2, and the orange lead wire to solenoid 1.
- 2. Reattach green lead wire to manifold block using green slotted screw.
- 3. Return electrical enclosure to valve and tighten two Phillips head screws 0.6 to 1.1 Nm (5 to 10 in-lbs). to secure enclosure to gasket.

Lamp Replacement Instructions:

The following instructions are used when replacing one or more lamps:

- 1. Remove enclosure as described in Disassembly, steps 1 through 3.
- Unscrew wire nut from white lead wiring harness, white lead from multi-pin connector, and lamp leads (black for 120/60 or white for 24VDC). Twist bundle of leads to loosen.
- Snap open splice connector and pry clip out of splice. Slide lamp lead out of the "blind" side of the splice connector, leaving splice connector on lead from multi-pin connector.
- Using needle nose pliers press together tangs on the spring clip holding the lamp to the enclosure. Slide spring clip off lamp body and lamp leads.
- 5. Gently pry up lamp and remove from enclosure. Discard lamp and spring clip.
- 6. Install replacement lamp into enclosure, pressing firmly to seat.
- 7. With needle nose pliers depress tangs on the spring clip and slip over lamp leads and down onto lamp body until firmly contacting enclosure. Lamp should not be loose.
- Slide unstripped lamp lead (black for 120/60 or red for 24VDC) into "blind" side of splice connector. Replace clip and press flush with top of splice. Snap housing shut.
- 9. Twist stripped lamp leads, white lead from multi-pin connector and white lead from wiring harness together and cap with wire nut. Screw wire nut down until all leads are secured and covered.
PAR[™]-15 Regulating Valve

- 10. Reattach electrical lead wires to solenoids as follows: one white lead to each of the four solenoids from the wiring harness, the red lead wire to solenoid 8, black lead wire to solenoid 4, the blue lead wire to solenoid 2, and the orange lead wire to solenoid 1.
- 11. Reattach green lead wire to manifold block using green slotted screw. See wiring diagrams to assist in reconnecting wiring.
- 12. Reassemble enclosure in reverse order of assembly. Ensure that all leads are not in a position to be pinched by enclosure. Orient multi-pin connector while looking down from the top 90° clockwise from the inlet port. This is the quadrant 2-Position.

For units with DC solenoids and indicator lamps red wire is (+) positive white wire is (-) negative.

- CAUTION: DC solenoids with indicator lamps are polarity sensitive. Observe polarities indicated above.
- **NOTE:** In addition to the above instructions, follow all requirements for local and national electrical codes.



Available Lamps:

Description	Part Number
Lamp (120/60 AC) with spring clip	K352428
Lamp (24VDC) with spring clip	K352429

Wiring Diagrams:



Service Kit:

Bar

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The following components are included in the service kit K352413, please identify all items at this point.



Item	Qty	Description	ltem	Qty	Description
1	4	Washer	12	2	2.864 ID x .070 W O-ring
2	8	.176 ID x .070 W O-ring	13	1	Rubber Plug
3	12	.245 ID x .070 W O-ring	14*	1	.926 ID x .070 W O-ring
4	2	1.301 ID x .070 W O-ring	15*	1	Molded Poppet
5	1	Gasket	16*	1	1.799 ID x .103 W O-ring
6	1	Piston	17*	1	2.739 ID x .070 W O-ring
7	1	.551 ID x .070 W O-ring	18*	1	Poppet Guide
8	1	1.051 ID x .070 W O-ring	19*	1	Washer
9	1	1.239 ID x .070 W O-ring	20*	1	Spring
10	1	2.175 ID x .103 W O-ring	21*	1	.551 ID x .070 W Quad Ring
11	1	2.550 ID x .103 W O-ring	22*	1	Tube of Grease

* Components included in kit K352414



Pneumatic Division North America Richland, Michigan 49083

\land WARNING

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- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Disconnect electrical supply before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, voltage and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed on these instructions.
- Installation, service and conversion of these products must be performed by
- knowledgeable personnel who understand how pneumatic products are to be applied. After installation, servicing, or conversion, air and electrical supplies should be connected and the understallation of the servicing for the service of the servi
- and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
 Warnings and specifications on the product should not be covered by paint, etc. If masking
- is not possible, contact your local representative for replacement labels.

Application Limits

These products are intended for use in general purpose compressed air systems only.

Operating Pressure Range:	kPa	psig	bar
Minimum (CN/BW Series)*	172	25	1.72
Minimum (W215 Series)*	103	15	1.03
Maximum (CN/BW Series	414	60	4.14
1.2 Watt Operator)			
Maximum (CN Series all others)	689	100	6.89
Maximum (W215 Series)	1034	150	10.34
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* These values are minimum shift pressures for the valves piloted.

Operating Temperature Range:

Minimum	0°C (32°F)
Maximum (CN/BW Series)*	52°C (125°F)
Maximum (W215 Series)*	60°C (140°F)

* These values are based on maximum recommended temperatures for the valves piloted.

Voltage Range: +10%, -15% of Rating



Operator Replacement (CN/BW Series)

- 1. Loosen screw holding cable plug to operator and pull off connector (plug-in style only).
- 2. Remove the two slotted head screws on top of the operator and retain. Remove and discard operator.
- Place new operator on top of valve and tighten the screws to 112 to 120 in-ozs.(Make certain o-ring and plunger do not dislodge from bottom of operator.)
- 4. Reconnect cable plug and tighten screw.

3-Pin Female Connector Kit

Female connector and gaskets must be ordered as kits. Electric cable for use with 3-Pin connector should have an outside diameter of .236 to .315 in (6 to 8mm).

- Without Indicator Light Kit# PS2429P
- With Indicator Light (12V, 60Hz, 12VDC) Kit# PS243075P
- With Indicator Light (24V, 60Hz, 24VDC) Kit# PS243079P
- With Indicator Light (120V, 60Hz) Kit# PS243083P
- With Indicator Light (240V, 60Hz) Kit# PS243087P

Service Instructions: V-632P Replacement Operators for W215 and CN/BW Series

ISSUED: November, 1998 Supersedes: K583-301, June, 1993 ECN# 8976

Wiring Instructions for Cable Plug (CN/BW Series)

- 1. Remove the holding screw (A) from the cable plug and pry the contact holder (B) from the plug case (C). (Figure 1).
- Remove the gland nut (D), thrust washer (E) and gland (F) from the plug case and slide each part over the multiconductor cable in the order removed. Insert cable through the plug case. (Figure 2)
- 3. Strip the cable as shown in Figure 2.
- Insert conductors into contacts in contact holder as shown in the wiring schematic and securely tighten the contact screws to retain the conductors. (Figure 3)
- 5. Work contact holder back into the plug case and snap it into place.
- 6. Slide the gland, thrust washer and gland nut into the plug case. Tighten the gland nut to provide strain relief for the conductors.
- 7. Reinsert the holding screw.
- 8. To connect the cable plug to the solenoid operator, push the plug onto the male terminals and tighten the holding screw.

Note: In addition to above instructions, follow all requirements for local and national electrical codes.

Operator Replacement (W215 Series)

- 1. Loosen two phillips pan head screws (A) and remove cover assembly (B).
- 2. Pull flag receptacles (C) off of operators (H).
- 3. Remove the three socket head cap screws (D) securing the exhaust manifold (F).
- Loosen the four exhaust adaptors (E) and remove the exhaust manifold (F).
- 5. Remove the two slotted head screws (G) securing each operator and retain.
- 6. Remove and discard operator.
- 7. Clean and seat areas in manifold block (J) with mineral spirits or equivalent cleaning solution.
- Assemble new operators to manifold block (J) and tighten the screws to 7 to 10 in-lbs (make certain o-ring and plunger do not dislodge from bottom of operator.)
- Place exhaust manifold (F) on top of plate, align exhaust adaptors (E) and screw each in 2 to 4 turns. (The four small drilled holes must be facing downward.)

WARNING

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Replacement Operators

- 10. Reassemble the three socket head cap screws (D) and tighten to 35 to 40 in-lbs.
- 11. Tighten the exhaust adaptors to 30 to 50 in-ozs.
- 12. Refer to the wiring diagram at right and the solenoid numbers marked on the top of the manifold block (J). Slide the pair of flag receptacles (C) with the proper colored wires onto the two parallel tabs on top of each operator (H). The operators are not polarity sensitive. If unit was purchased without cover and 5-pin plug, refer to Wiring instructions for Cable Plug found on front of this sheet.
- 13. Reassemble the cover assembly (B) and tighten phillips pan head screws (A) 5 to 10 in-lbs.

Wiring Instructions (W215 Series)

If unit is equipped with 6-pin male receptacle, convert to female connector (Brad Harrison 42602 or Cam-Lok E2118-625). Wire per following table:



Pin	Wire Color	Function
1	Orange	Input 1
2	Blue	Input 2
3	Black	Input 4
4	White	Common
5	Red	Input 8
6	Green	Equipment
		Ground

If unit is not equipped with 6-pin male receptacle, use cable plugs or other similar wiring devices approved by local and national electrical codes. Wire each solenoid operator per Wiring Instructions for Cable Plug found on front of this sheet. Solenoid operator numbers are found on top of the manifold block (J).

Note: In addition to above instructions, follow all requirements for local and national electrical codes.



With Lamps





Caution: DC solenoids with indicator lamps are polarity sensitive. Observe polarities indicated.

Without Lamps



Replacement Operators

Voltage/ Hertz	Operator Normally Closed Plug-in	Operator Normally Closed 18" Leads	Operator Normally Closed 72" Leads	Operator Normally Open Plug-In †
24V/60Hz	H172 150	—	—	H172 155
120V/60Hz 110V/60Hz	H172 146	H172 161	H172 162	H172 151
240V/60Hz 220V/50Hz	H172 149	—	—	H172 154
12VDC	H172 147	—	—	H172 152
24VDC	H172 148	H172 159	H172 160	H172 153
24VDC (1.2W)	H172 156	—	—	—
120VDC	H172 157			H172 158

† Used only with W215 Series.



Pneumatic Division North America 8676 East M-89 Richland, MI 49083

WARNING

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- Disconnect electrical supply before installation, servicing or conversion.
- Operate within the manufacturer's specified pressure, temperature, voltage and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed on service instructions sheets.
- Installation, service and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

Instructions: V-633P Repair Tool K352412 for PAR[™]-15 Valve

ISSUED: November, 1998

SUPERSEDES: K583424, July, 1997 ECN #8976

- 1. Depress button and stack parts onto tool as shown.
- 2. Release button to capture parts.
- 3. Depress button to release parts.

FOR FULL SERVICE INSTRUCTIONS SEE V-631P.



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- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed in these instructions.
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- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

Introduction:

Follow these instructions when installing, operating, or servicing the product.

Application Limits:

Operating Pressure Range:

	kPa	psig	bar
Maximum Inlet	1034	150	10.34
Minimum Output	42	6	0.4

Ambient Temperature Range: 0°C to 60°C (32°F to 140°F) Voltage Range: +10 to -10% of Rating

Service Instructions:

Disassembly:

- 1. Loosen two Phillips head screws located on top of black electrical enclosure and remove enclosure from valve (units with enclosure only with or without lamps).
- 2. Remove green lead wire by unscrewing green colored ground screw.
- 3. Remove wire leads from both terminal blocks by loosening the wire crimp screws and removing the wires.
- 4. Remove and set aside the four #10-32 socket head cap screws located at each of the four corners of the valve.
- **NOTE:** Do not remove the #10-32 screws found in the center of the valve at this time.
- 5. Separate top assembly unit from body. This unit will include the four solenoids, circuit board, adaptor plate, stepped divider, and black piston.
- 6. Remove the circuit board from the two solenoids by removing the two #6-32 screws and lifting the circuit board off.
- 7. Remove the four solenoids by loosening the two screws on each solenoid.
- 8. Remove and set aside remaining two #10-32 socket head cap screws mentioned in step #4.

Service Instructions: V-634BP PAR[™]-15 Regulating Valve with Telepneumatic Solenoids ISSUED: August, 2002 Supersedes: November, 2001 Doc. # V-634P, ECN# 020330, Rev.2

- Separate top assembly into three sub-assembles:
 a. Four solenoids.
 - b. Adaptor plate.
 - c. Piston and divider sub-assembly.

Adaptor Plate Sub-Assembly – Disassembly

- 1. Remove and replace four gaskets (item #1).
- 2. Remove rubber gasket (item #3) and any remaining adhesive on adaptor plate.
- 3. Peel paper off back of new gasket and place gasket on adaptor plate, adhesive side down.

Piston and Divider Sub-Assembly – *Disassembly and Assembly*

- 1. Remove black piston (item #4) from stepped divider.
- 2. Remove and replace seven o-rings on divider (items #5 through #10).
- 3. Lightly grease (in kit) new o-rings on divider and inside diameters of new piston (item #4)
- 4. Slide piston over divider, being careful not to let o-rings roll out of the o-ring grooves.
- 5. Remove and replace six o-rings (item #2), and one rubber washer (item #11) on top surface of divider. Note the location of the rubber washer for either internal or external pilot supply air, refer to diagram for correct placement.

Top Half Sub-Assembly – Assembly

- 1. Align and attach divider to adapter plate using the center two #10-32 socket head cap screws 3.9 to 4.5Nm (35 to 40 in-lb). The short screw is to be used in the counterbored hole.
- 2. Attach each of the four solenoids on the adapter plate with the original screws provided. Orient the solenoids with the pins away from you while reading the 1, 2, 8, 4 engraving.

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PAR[™]-15 Regulating Valve with Telepneumatic Solenoids

3. Align circuit board with the solenoid terminals. Attach the two #6-32 screws to the side of the circuit board through the spacer and into the adapter plate.

Bottom Plate – Disassembly and Assembly

If you have access to the bottom plate and have a special repair tool (part number K352412), the poppet and related parts can be replaced without removing the valve from its application. Otherwise, it will be necessary to repair the valve at a workbench. In either case, the special repair tool will be a valuable aid.

- 1. Remove bottom plate by removing the three 1/4 20 socket head cap screws.
- 2. Remove poppet guide (item #16), poppet (item #13), and spring (item #18) by gripping the inside diameter of the poppet with an expanding tool (such as snap ring pliers) and pull out parts. If you have the special repair tool, depress the handle button, insert tool fully into inside diameter of poppet, release button, and withdraw tool.
- 3. Place new washer (item #17) on new poppet (item #13).
- 4. Install new o-ring (item #12) and quad ring (item # 19) on new poppet (item #13). Verify that quad ring is not rolled or twisted in its groove.
- 5. Install large o-ring (item #14) on new poppet guide (item #16).
- 6. Lightly grease inside diameter of poppet guide and the two seals on this new poppet using the grease provided in the repair kit.
- 7. If you do not have the special repair tool:
 - a. Place valve body on workbench with bottom side of valve facing up.
 - b. Place new poppet with washer in center of 2 inch bore with rubber side down.
 - c. Place new spring (item #18) on poppet.
 - d. Slide poppet guide into 2 inch bore until flush with valve body.
 - e. Replace o-ring seal (item #15) on bottom surface. If the valve is mounted vertically, use grease to hold the o-ring in place.
 - f. Replace bottom plate and tighten three 1/4-20 socket head cap screws 7.9 to 8.4Nm (70 to 75 in-lb).
- 8. If you have the special repair tool:
 - a. Depress the handle button and stack the new poppet guide, spring, washer, and poppet onto the tool shank and release the button. Confirm that the poppet will stroke fully by squeezing the poppet and poppet guide together and observing that the small end of the poppet is flush with the end of the poppet guide. If not flush, remove and re-assemble parts.
 - b. Grasp the tool by the T-handle and insert parts into body until poppet guide is flush with the body.
 - c. Depress handle button and withdraw tool.
 - d. Replace o-ring seal (item #15) on bottom surface. If the valve is mounted vertically, use grease to hold the o-ring in place.
 - e. Replace the bottom plate and tighten three 1/4-20 socket head cap screws 7.9 to 8.4Nm (70 to 75 in-lb.)

Top Assembly Replacement

- 1. Turn valve over so bottom plate is resting on workbench.
- Put top assembly back on valve body using four #10-32 socket head cap screws to align top assembly to body. Be careful not to roll o-rings out of o-ring grooves on divider.
- 3. Torque four #10-32 socket head cap screws 3.9 to 4.5Nm (35 to 40 in-lb.)

Electrical and Enclosure Assembly (See Wiring Diagram)

(For units with enclosure without lamps)

1A. With mini receptacle -

Reattach electrical lead wires to terminal block TB1 in the following orientation: the white lead wire to the "C" terminal, the red lead wire to the "8" terminal, the black lead wire to the "4" terminal, the blue lead wire to the "2", and the orange lead wire to the "1" terminal.

1B. With micro receptacle -

Reattach electrical lead wires to terminal block TB1 in the following orientation: the red/yellow lead wire to the "C" terminal, the red/black lead wire to the "8" terminal, the red/blue lead wire to the "4" terminal, the red lead wire to the "2", and the red/white lead wire to the "1" terminal.

- 2. Reattach green lead wire to manifold block using green slotted screw.
- 3. Return electrical enclosure to valve and tighten two Phillips head screws 0.6 to 1.1Nm (5 to 10 in-lb) to secure enclosure to adapter plate.

Lamp Replacement Instructions (See Wiring Diagram)

The following instructions are used when replacing one or more lamps:

- 1. Remove enclosure as described in Disassembly, step 1.
- 2. Remove the two lamp lead wires (red and white for 24VDC or black and black for 120/60) from the terminal block TB2.
- 3. Using needle nose pliers press together tangs on the spring clip holding the lamp to the enclosure. Slide spring clip off lamp body and lamp leads.
- 4. Gently pry up lamp and remove from enclosure. Discard lamp and spring clip.
- 5. Install replacement lamp into enclosure, pressing firmly to seat.
- With needle nose pliers depress tangs on the spring clip and slip over lamp leads and down onto lamp body until firmly contacting enclosure. Lamp should not be loose.
- Insert stripped lamp leads (red and white for 24VDC or black and black for 120/60) into terminal block TB2 (red = (+) and white = (-) for 24VDC).
- Reassemble enclosure in reverse order of assembly. Ensure that all leads are not in a position to be pinched by enclosure. Orient multi-pin receptacle while looking down from the top either 90° clockwise or 90° counterclockwise from the inlet port. This is the quadrant 2 and quadrant 4 position respectively.

For units with DC solenoids and indicator lamps red wire is (+) positive, white wire is (-) negative.

A CAUTION: DC solenoids with indicator lamps are polarity sensitive. Observe polarities indicated above.

NOTE: In addition to the above instructions, follow all requirements for local and national electrical codes.



PAR[™]-15 Regulating Valve with Telepneumatic Solenoids Available Lamps:

Description	Part Number
Lamp (120/60 AC) with spring clip	K352428C
Lamp (24VDC) with spring clip	K352429C

Wiring Diagrams:



120 VAC Mini Connector



24 VDC Mini Connector



120 VAC Micro Connector



24 VDC Micro Connector

PAR[™]-15 Regulating Valve with Telepneumatic Solenoids **Service Kit:**



ltem	Qty	Description	Item	Qty	Description
1	4	Gasket	11	1	Rubber Plug
2	6	.145 ID x .070 W O-ring	12*	1	.926 ID x .070 W O-ring
3	1	Gasket	13*	1	Molded Poppet
4	1	Piston	14*	1	1.799 ID x .103 W O-ring
5	1	.551 ID x .070 W O-ring	15*	1	2.739 ID x .070 W O-ring
6	1	1.051 ID x .070 W O-ring	16*	1	Poppet Guide
7	1	1.239 ID x .070 W O-ring	17*	1	Washer
8	1	2.175 ID x .103 W O-ring	18*	1	Spring
9	1	2.550 ID x .103 W O-ring	19*	1	.551 ID x .070 W Quad Ring
10	2	2.864 ID x .070 W O-ring	20*	2	Tube of Grease (Not Shown)

* Components included in kit K352414



Pneumatic Division North America Richland, Michigan 49083

Conversion Instructions: V-635P

PAR[™]-15 Regulating Valve Level "A" Solenoids to Level "B" Solenoids

ISSUED: December, 2000

REV. 1, NPR 6967

To avoid unpredictable system behavior that can cause personal injury and property damage:

- Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

Introduction:

Follow these instructions when converting 120V/60Hz normally open, old style solenoid operators, to newer design Telepneumatic solenoids. "Mini" connector wiring instructions are included. Valves with lamps are not covered in this conversion kit.

Conversion Instructions:

Disassembly:

- 1. Remove cover screws located on top of black electrical enclosure and discard. Remove enclosure from valve.
- 2. Remove green lead wire by unscrewing green colored ground screw. Discard ground screw.
- 3. Remove wire leads from the four solenoids by sliding the flag receptacles off the solenoid tabs.

NOTE: Flag receptacle are no longer needed.

- 4. Remove and discard the four #10-32 socket head cap screws located at each of the four corners of the valve.
- **NOTE:** Do not remove the two #10-32 screws found in the center of the valve at this time.
- 5. Separate top assembly unit from body. This unit will include the four solenoids, two manifold blocks, adapter plate, stepped divider, and black piston.
- 6. Remove and discard remaining two #10-32 socket head cap screws mentioned in step 4.
- 7. Discard solenoid sub-assembly including two manifold bars, and adapter plate. Set aside piston and divider subassembly.

Adapter Plate Sub-Assembly

- 1. Install four gaskets (item #1) (see Section A-A).
- 2. Peel paper off back of gasket (item #3) and place gasket on adapter plate, adhesive side down.
- 3. Factory installed pipe plugs in ports 'X2' and 'C' are for normally open function.

Divider Seals

1. Remove and replace six o-rings (item #2), and one rubber isolation plug (item #17) on top surface of divider. Note the location of the rubber plug for normally open pilot supply. Refer to Section B-B for correct placement.

Top Half Sub-Assembly – Assembly

- 1. Align and attach divider to adapter plate using the center two #10-32 socket head cap screws. The short screw (item #11) is to be used in the counterbored hole. Torque screws 3.9 to 4.5Nm (35 to 40 in-lb).
- Put adapter plate assembly back on valve body using four #10-32 socket head cap screws (item #10) to align adapter plate assembly to body. Be careful not to roll o-rings out of o-ring grooves on divider. Torque screws 3.9 to 4.5Nm (35 to 40 in-lb.)
- 3. Attach each of the four solenoids on the adapter plate with screws (item #6). Torque screws .56 to .70Nm (80 to 100 in-oz). Orient the solenoids with the pins away from you while reading the 1, 2, 8, 4 engraving.
- 4. Align circuit board with the solenoid terminals. Attach the two #6-32 screws (item #8) to the side of the circuit board through the circuit board spacer (item #7) and into the adapter plate. Torque screws .68 to .90Nm (96 to 128 in-oz).

Electrical and Enclosure Assembly

(See Wiring Diagram)

- 1. With mini receptacle -
 - Attach electrical lead wires to terminal block TB1 in the following orientation: the white lead wire to the "C" terminal, the red lead wire to the "8" terminal, the black lead wire to the "4" terminal, the blue lead wire to the "2", and the orange lead wire to the "1" terminal. Replace new wiring decal (item #15) over old wiring decal inside cover.
- 2. Attach green lead wire to manifold block using green slotted screw (item #12). Torque screw 1.1 to 2.3Nm (10 to 20 in-lb).

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from Parker Hannifin Corporation, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application, including consequences of any failure and review the information concerning the product or systems in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

PAR™-15 Regulating Valve, Level "A" Solenoids to Level "B" Solenoids

- 3. Assemble thread seal (item #14) to #10-32x3" long screws (item #13).
- 4. Install screws in Electrical Enclosure and apply o-rings (item #2) to ends of screws as shown.
- Return electrical enclosure to valve and tighten two screws 0.6 to 1.1Nm (5 to 10 in-lb) to secure enclosure to adapter plate.
- **NOTE:** In addition to the above instructions, follow all requirements for local and national electrical codes.

Wiring Diagram



120 VAC Mini Connector

Conversion Kit:

The following components are included in the service kit K322017, please identify all items at this point.



Item	Qty	Description	Item	Qty	Description
1	4	Gasket	10	5	#10-32 x 1 Long Screw
2	8	.145 ID x .070 W O-ring	11	1	#6-32 x 3/4 Long Screw
3	1	Gasket	12	1	Ground Screw
4	1	Circuit Board	13	2	#10-32 x 3 Long Screw
5	4	Solenoid Operator	14	2	Thread Seal
6	8	Screw - Solenoid Operator	15	1	Wiring Diagram (120V/60Hz)
7	2	Circuit Board Spacer	16	2	Pipe Plug
8	2	#6-32 x 1-1/4 Long Screw	17	1	Rubber Isolation Plug
9	1	Adapter Plate	18	1	Instruction Sheet (Not Shown)



PDNSG-1 Pneumatic Division Safety Guide ISSUED: August 1 , 2006 Supersedes: June 1, 2006

Safety Guide For Selecting And Using Pneumatic Division Products And Related Accessories

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF PNEUMATIC DIVISION PRODUCTS, ASSEMBLIES OR RELATED ITEMS ("PRODUCTS") CAN CAUSE DEATH, PERSONAL INJURY, AND PROPERTY DAMAGE. POSSIBLE CONSEQUENCES OF FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THESE PRODUCTS INCLUDE BUT ARE NOT LIMITED TO:

- Unintended or mistimed cycling or motion of machine members or failure to cycle
- Work pieces or component parts being thrown off at high speeds.
- Failure of a device to function properly for example, failure to clamp or unclamp an associated item or device.
- Explosion
- Suddenly moving or falling objects.
- Release of toxic or otherwise injurious liquids or gasses.
- Before selecting or using any of these Products, it is important that you read and follow the instructions below.

1. GENERAL INSTRUCTIONS

- **1.1. Scope:** This safety guide is designed to cover general guidelines on the installation, use, and maintenance of Pneumatic Division Valves, FRLs (Filters, Pressure Regulators, and Lubricators), Vacuum products and related accessory components.
- **1.2. Fail-Safe:** Valves, FRLs, Vacuum products and their related components can and do fail without warning for many reasons. Design all systems and equipment in a fail-safe mode, so that failure of associated valves, FRLs or Vacuum products will not endanger persons or property.
- **1.3 Relevant International Standards:** For a good guide to the application of a broad spectrum of pneumatic fluid power devices see: ISO 4414:1998, Pneumatic Fluid Power General Rules Relating to Systems. See www.iso.org for ordering information.
- 1.4. Distribution: Provide a copy of this safety guide to each person that is responsible for selection, installation, or use of Valves, FRLs or Vacuum products. Do not select, or use Parker valves, FRLs or vacuum products without thoroughly reading and understanding this safety guide as well as the specific Parker publications for the products considered or selected.
- **1.5. User Responsibility:** Due to the wide variety of operating conditions and applications for valves, FRLs, and vacuum products Parker and its distributors do not represent or warrant that any particular valve, FRL or vacuum product is suitable for any specific end use system. This safety guide does not analyze all technical parameters that must be considered in selecting a product. The user, through its own analysis and testing, is solely responsible for:
 - Making the final selection of the appropriate valve, FRL, Vacuum component, or accessory.
 - Assuring that all user's performance, endurance, maintenance, safety, and warning requirements are met and that the application presents no health or safety hazards.
 - Complying with all existing warning labels and / or providing all appropriate health and safety warnings on the equipment on which the valves, FRLs or Vacuum products are used; and,
 - · Assuring compliance with all applicable government and industry standards.
- 1.6. Safety Devices: Safety devices should not be removed, or defeated.
- 1.7. Warning Labels: Warning labels should not be removed, painted over or otherwise obscured.
- **1.8. Additional Questions:** Call the appropriate Parker technical service department if you have any questions or require any additional information. See the Parker publication for the product being considered or used, or call 1-800-CPARKER, or go to www.parker.com, for telephone numbers of the appropriate technical service department.

2. PRODUCT SELECTION INSTRUCTIONS

- **2.1. Flow Rate:** The flow rate requirements of a system are frequently the primary consideration when designing any pneumatic system. System components need to be able to provide adequate flow and pressure for the desired application.
- 2.2. Pressure Rating: Never exceed the rated pressure of a product. Consult product labeling, Pneumatic Division catalogs or the instruction sheets supplied for maximum pressure ratings.
- 2.3. Temperature Rating: Never exceed the temperature rating of a product. Excessive heat can shorten the life expectancy of a product and result in complete product failure.
- 2.4. Environment: Many environmental conditions can affect the integrity and suitability of a product for a given application. Pneumatic Division products are designed for use in general purpose industrial applications. If these products are to be used in unusual circumstances such as direct sunlight and/or corrosive or caustic environments, such use can shorten the useful life and lead to premature failure of a product.
- 2.5. Lubrication and Compressor Carryover: Some modern synthetic oils can and will attack nitrile seals. If there is any possibility of synthetic oils or greases migrating into the pneumatic components check for compatibility with the seal materials used. Consult the factory or product literature for materials of construction.
- 2.6. Polycarbonate Bowls and Sight Glasses: To avoid potential polycarbonate bowl failures:
 - Do not locate polycarbonate bowls or sight glasses in areas where they could be subject to direct sunlight, impact blow, or temperatures outside of the rated range.
 - Do not expose or clean polycarbonate bowls with detergents, chlorinated hydro-carbons, keytones, esters or certain alcohols.
 - Do not use polycarbonate bowls or sight glasses in air systems where compressors are lubricated with fire resistant fluids such as phosphate ester and di-ester lubricants.

- 2.7. Chemical Compatibility: For more information on plastic component chemical compatibility see Pneumatic Division technical bulletins Tec-3, Tec-4, and Tec-5
- 2.8. Product Rupture: Product rupture can cause death, serious personal injury, and property damage.
 - Do not connect pressure regulators or other Pneumatic Division products to bottled gas cylinders.
 - · Do not exceed the maximum primary pressure rating of any pressure regulator or any system component.
 - Consult product labeling or product literature for pressure rating limitations.

3. PRODUCT ASSEMBLY AND INSTALLATION INSTRUCTIONS

- **3.1. Component Inspection:** Prior to assembly or installation a careful examination of the valves, FRLs or vacuum products must be performed. All components must be checked for correct style, size, and catalog number. DO NOT use any component that displays any signs of nonconformance.
- **3.2. Installation Instructions:** Parker published Installation Instructions must be followed for installation of Parker valves, FRLs and vacuum components. These instructions are provided with every Parker valve or FRL sold, or by calling 1-800-CPARKER, or at www.parker.com.
- **3.3. Air Supply:** The air supply or control medium supplied to Valves, FRLs and Vacuum components must be moisture-free if ambient temperature can drop below freezing

4. VALVE AND FRL MAINTENANCE AND REPLACEMENT INSTRUCTIONS

- **4.1. Maintenance:** Even with proper selection and installation, valve, FRL and vacuum products service life may be significantly reduced without a continuing maintenance program. The severity of the application, risk potential from a component failure, and experience with any known failures in the application or in similar applications should determine the frequency of inspections and the servicing or replacement of Pneumatic Division products so that products are replaced before any failure occurs. A maintenance program must be established and followed by the user and, at minimum, must include instructions 4.2 through 4.10.
- 4.2. Installation and Service Instructions: Before attempting to service or replace any worn or damaged parts consult the appropriate Service Bulletin for the valve or FRL in question for the appropriate practices to service the unit in question. These Service and Installation Instructions are provided with every Parker valve and FRL sold, or are available by calling 1-800-CPARKER, or by accessing the Parker web site at www.parker.com.
- 4.3. Lockout / Tagout Procedures: Be sure to follow all required lockout and tagout procedures when servicing equipment. For more information see: OSHA Standard 29 CFR, Part 1910.147, Appendix A, The Control of Hazardous Energy (Lockout / Tagout)
- **4.4. Visual Inspection:** Any of the following conditions requires immediate system shut down and replacement of worn or damaged components:
 - Air leakage: Look and listen to see if there are any signs of visual damage to any of the components in the system. Leakage is an indication of worn or damaged components.
 - Damaged or degraded components: Look to see if there are any visible signs of wear or component degradation.
 - Kinked, crushed, or damaged hoses. Kinked hoses can result in restricted air flow and lead to unpredictable system behavior.
 - Any observed improper system or component function: Immediately shut down the system and correct malfunction.
 - Excessive dirt build-up: Dirt and clutter can mask potentially hazardous situations.

Caution: Leak detection solutions should be rinsed off after use.

4.5. Routine Maintenance Issues:

- · Remove excessive dirt, grime and clutter from work areas.
- Make sure all required guards and shields are in place.
- **4.6. Functional Test:** Before initiating automatic operation, operate the system manually to make sure all required functions operate properly and safely.
- 4.7. Service or Replacement Intervals: It is the user's responsibility to establish appropriate service intervals. Valves, FRLs and vacuum products contain components that age, harden, wear, and otherwise deteriorate over time. Environmental conditions can significantly accelerate this process. Valves, FRLs and vacuum components need to be serviced or replaced on routine intervals. Service intervals need to be established based on:
 - Previous performance experiences.
 - Government and / or industrial standards.
 - When failures could result in unacceptable down time, equipment damage or personal injury risk.
- **4.8. Servicing or Replacing of any Worn or Damaged Parts:** To avoid unpredictable system behavior that can cause death, personal injury and property damage:
 - Follow all government, state and local safety and servicing practices prior to service including but not limited to all OSHA Lockout Tagout procedures (OSHA Standard – 29 CFR, Part 1910.147, Appendix A, The Control of Hazardous Energy – Lockout / Tagout).
 - Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
 - Disconnect air supply and depressurize all air lines connected to system and Pneumatic Division products before installation, service, or conversion.
 - Installation, servicing, and / or conversion of these products must be performed by knowledgeable personnel who understand how
 pneumatic products are to be applied.
 - After installation, servicing, or conversions air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or if the product does not operate properly, do not put product or system into use.
 - Warnings and specifications on the product should not be covered or painted over. If masking is not possible, contact your local representative for replacement labels.
- **4.9. Putting Serviced System Back into Operation:** Follow the guidelines above and all relevant Installation and Maintenance Instructions supplied with the valve FRL or vacuum component to insure proper function of the system.

Global Modular Particulate Filters

- Integral 1/4", 3/8", 1/2", or 3/4" ports (NPT, BSPP & BSPT)
- High efficiency 5 micron element as standard
- Excellent water removal efficiency
- · Robust but lightweight aluminum construction
- Positive bayonet latch to ensure correct & safe fitting





Global

Prep-Air

Miniature

P3N

-Park

P33

Operating information P33 (Standard) P31 (Mini) P32 (Compact) Supply pressure (max): 10 bar (150 PSIG) 10 bar (150 PSIG) Plastic Bowl 10 bar (150 PSIG) 17 bar (250 PSIG) Metal Bowl 17 bar (250 PSIG) 17 bar (250 PSIG) Operating temperature: -10°C to 52°C (14°F to 25°F) -25°C to 52°C (-13°F to 25°F) -25°C to 52°C (-13°F to 25°F) Plastic Bowl Metal Bowl -10°C to 65.5°C (14°F to 150°F) -25°C to 65.5°C (-13°F to 150°F) -25°C to 65.5°C (-13°F to 150°F) Standard filtration: 5 micron 5 micron 5 micron Flow Capacity*: 1/412 dm3/s (25 SCFM)* 18 dm3/s (38 SCFM)* _ 3/8 30 dm3/s (64 SCFM)* 38 dm³/s (80 SCFM)* 40 dm3/s (85 SCFM)* 1/2 48 dm3/s (102 SCFM)* 3/4 *Inlet pressure 6.3 bar (91.3 PSIG), pressure 0.34 bar (4.9 PSIG). For Flow Curve Charts please see page E34.

Ordering information





Particulate Filters



Port	Bowl	Drain	Flement	Part number		
size	type	type	type	P31	P32	P33
1/4"	Poly	Manual	5 micron	P31FA92EGMN	P32FA92EGMN	
1/4"	Poly	Pulse	5 micron	P31FA92EGBN		
1/4"	Poly	Auto	5 micron		P32FA92EGAN	
1/4"	Metal	Manual	5 micron	P31FA92EMMN	P32FA92ESMN	
1/4"	Metal	Pulse	5 micron	P31FA92EMBN		
1/4"	Metal	Auto	5 micron		P32FA92ESAN	
3/8"	Poly	Manual	5 micron		P32FA93EGMN	
3/8"	Poly	Auto	5 micron		P32FA93EGAN	
3/8"	Metal	Manual	5 micron		P32FA93ESMN	
3/8"	Metal	Auto	5 micron		P32FA93ESAN	
1/2"	Poly	Manual	5 micron		P32FA94EGMN	P33FA94EGMN
1/2"	Poly	Auto	5 micron		P32FA94EGAN	P33FA94EGAN
1/2"	Metal	Manual	5 micron		P32FA94ESMN	P33FA94ESMN
1/2"	Metal	Auto	5 micron		P32FA94ESAN	P33FA94ESAN
3/4"	Poly	Manual	5 micron			P33FA96EGMN
3/4"	Poly	Auto	5 micron			P33FA96EGAN
3/4"	Metal	Manual	5 micron			P33FA96ESMN
3/4"	Metal	Auto	5 micron			P33FA96ESAN

Service kits

Description		P31	P32	P33
Plastic bowl / bowl guard	Manual drain	P31KA00BGM	P32KA00BGM	P33KA00BGM
	Pulse drain	P31KA00BGB		
	Auto drain		P32KA00DA	P32KA00DA
Metal bowl w/o sight gauge	Manual drain	P31KA00BMM		
	Pulse drain	P31KA00BMB		
	Auto drain		P32KA00DA	P32KA00DA
Metal bowl / sight gauge	Manual drain		P32KA00BSM	P33KA00BSM
	Auto drain		P32KA00DA	P32KA00DA
Filter element	5µ particulate	P31KA00ESE	P32KA00ESE	P33KA00ESE
C-bracket	Fits to body	P31KA00MW		
L-bracket	Fits to body		P32KA00ML	P33KA00ML
T-bracket	Fits to body connector		P32KA00MB	P32KA00MB
	With body connector	P31KA00MT	P32KA00MT	P33KA00MT
Body connector		P31KA00CB	P32KA00CB	P32KA00CB
Differential pressure indicator (replacement)		P31KA00RQ	P32KA00RQ	P32KA00RQ

Prep-Air II

Most popular.







Material specifications

Description		P31	P32	P33
Body		Aluminum	Aluminum	Aluminum
Body cap		N/A	N/A	ABS
Doud	Plastic bowl	Polycarbonate	Polycarbonate	Polycarbonate
DOMI	Metal bowl	Aluminum	Aluminum	Aluminum
Bowl guard		Nylon	Nylon	Nylon
Deflector		N/A	Polypropylene	Polypropylene
Element retainer / baffle		Acetal	Acetal	Acetal
Filter element		Sintered Polyethylene	Sintered Polyethylene	Sintered Polyethylene
Seals		Nitrile	Nitrile	Nitrile
Sight gauge	Metal bowl	N/A	Polycarbonate	Polycarbonate

rker File

P31

Air Preparation Products Global Modular Particulate Filters

Ε

Air Preparation Products

Global

Prep-Air II

Miniature

P3N

General Industrial

Stainless Steel

Bulk Liquid Precision / Separators Proportional



Parker Hannifin Corporation Pneumatic Division Richland, Michigan www.parker.com/pneumatics

Richland, Michigan USA

www.parker.com/pneumatics



PARTICULATE FILTERS

Bu	lletin Number		Bulletin Description
	3F200	Rev. 1	02F Miniature In-line Filter
	2F101H	Rev. 13	05F Economy, Installation & Service
	2F101H	Rev. 13	06F "B&C" Compact, Installation & Service
	1F701B		06F / 07F Filter with Adsorber Element, Installation & Service
	2F101H	Rev. 13	07F "C" Standard, Installation & Service
	1F501D	Rev. 2	08F Elements
	1F800C	Rev. 6	09F "B" Hi-Flow, Installation & Service
	1F501D	Rev. 2	14F Miniature, 40 Micron Element
	1M103G	Rev. 9	14F Miniature, Installation & Service
	1M301	Rev. 3	14F Miniature, Installation & Service
	1M105C	Rev. 1	8AF Miniature, Installation & Service
	2F400	Rev. 2	35F and 43F Large Ported, Installation & Service
	1F201F	Rev. 8	Auto Drain Installation
	1FL101H	Rev. 9	Bowl, Sight Gauge, Manual Drain, Service Procedure
	1F301C	Rev. 4	Drip Leg Drain Installation & Service
	2F102C	Rev. 4	Electronic DPI Installation & Service
	IS-F602	Rev. 3	F602 Hi-Flow, Installation & Service
	5FRL100	Rev. 3	Global Air Preparation Systems
	1FL301	Rev. 2	Mini Modular Bowl Kits
	2F300E	Rev. 2	P3N Hi-Flow, Installation & Service
	3F101	Rev. 1	PF602 Hi-Flow, Installation & Service
	1F107B		Prep-Air I Auto Drain Installation & Service
	1F105C	Rev. 1	Prep-Air I Filter Installation & Service
	Safety Guide		PDN Safety Guide

Richland, Michigan 49083 269-629-5000

To avoid unpredictable system behavior that can cause personal injury and property damage:

- Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

Introduction

Follow these instructions when installing, operating, or servicing the product.

Application Limits

These products are intended for use in general purpose compressed air systems only.

Operating Pressure Range:	kPa	PSIG	bar
PLASTIC BOWL			
w/ Manual Drain			
Minimum	69	10	.69
Maximum	1034	150	10.34
w/ Internal Auto Drain			
Minimum	207	30	2.07
Maximum	1034	150	10.34
w/ External Auto Drain			
Minimum	345	50	3.45
Maximum	1034	150	10.34
METAL BOWL			
w/ Manual Drain			
Minimum	69	10	.69
Maximum	1724	250	17.24
w/ Internal Auto Drain			
Minimum	207	30	2.07
Maximum	1207	175	12.07
w/ External Auto Drain			
Minimum	345	50	3.45
Maximum	1034	150	10.34

Maximum Recommended Pressure Drop: 10 PSIG (Element should be cleaned)

Operating Temperature Range:

Filters w/ Plastic Bowls

-29°C * to 49°C (-20°F to 120°F)

Filters w/ Metal Bowls	
Manual Drains	-29°C * to 74°C (-20°F to 165°F)
Automatic Drains	-29°C * to 49°C (-20°F to 120°F)

* Temperatures below 0°C (32°F) require moisture free air.

Installation & Service Instructions: 1F105C

Prep-Air® I Air Line Filter

ISSUED: November, 2003 Supersedes: December, 2001

Doc.# 1F105, ECN# 030539, Rev.1

Installation

- Filter should be installed with reasonable accessibility for service whenever possible — repair service kits are available. Keep pipe or tubing lengths to a minimum with inside clean and free of dirt and chips. Pipe joint compound should be used sparingly and applied only to the male pipe — never into the female port. Do not use PTFE tape to seal pipe joints — pieces have a tendency to break off and lodge inside the unit, possibly causing malfunction. Also new pipe or hose should be installed between the filter and equipment being protected.
- 2. The upstream pipe work must be clear of accumulated dirt and liquids.
- 3. Select a filter location as close as possible to the equipment being protected and upstream of any pressure regulator.
- 4. Install filter so that air flows from "IN" to "OUT" as marked on the filter.
- 5. Install filter vertically with bowl drain mechanism at the bottom. Free moisture will thus drain into the sump ("quiet zone") at the bottom of the bowl.
- Verify that lock ring is installed properly. If it is not, install lock ring and turn clockwise until it clicks into place. (See Bowl Replacement for more details.)

ANSI Symbols



Operation

First Stage Filtration: Air enters at inlet port and flows through deflector **(G)** which causes a swirling action. Liquids and coarse particles are forced to the bowl interior wall **(H)** by the centrifugal action of the swirling air. They are then carried down the bowl by the force of gravity. The baffle **(J)** separates the lower portion of the bowl into a "quiet zone" **(K)** where the removed liquid and particles collect, unaffected by the swirling air, and are therefore not reentrained into the flowing air.

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Prep-Air® I Air Line Filter

Second Stage Filtration: After liquids and large particles are removed in the first stages of filtration, the air flows through element (C) where smaller particles are filtered out. The filtered air then passes downstream. Collected liquids and particles in the "quiet zone" (K) should be drained before their level reaches a height where they would be reentrained in the flowing air. This can be accomplished by unscrewing the drain valve (L) slightly until the liquid begins to drain.

Cleaning of Filter Element

- 1. Depress button on lock ring (A), turn counterclockwise and remove along with bowl assembly (B).
- 2. Remove the filter element (C) by turning it counterclockwise.
- 3. Clean the filter element (C) and bowl assembly (B) with MILD SOAP AND WATER ONLY! See CAUTION.
- 4. Reinstall the filter element (C) by turning it clockwise until it flexes slightly.
- 5. Reinstall the bowl assembly **(B)** and lock ring **(A)**. Turn lock ring clockwise until it clicks into place.

Polycarbonate bowls, being transparent and tough, are ideal for use with Filters and Lubricators. They are suitable for use in normal industrial environments, but should not be located in areas where they could be subjected to direct sunlight, an impact blow, nor temperatures outside of the rated range. As with most plastics, some chemicals can cause damage. Polycarbonate bowls should not be exposed to chlorinated hydro-carbons, ketones, esters and certain alcohols. They should not be used in air systems where compressors are lubricated with fire-resistant fluids, such as phosphate ester and di-ester types.

Metal bowls are recommended where ambient and/or media conditions are not compatible with polycarbonate bowls. Metal bowls resist the action of most such solvents, but should not be used where strong acids or bases are present or in salt laden atmospheres. Consult the factory for specific recommendations where these conditions exist.

TO CLEAN POLYCARBONATE BOWLS, USE MILD SOAP AND WATER ONLY! DO NOT use cleansing agents such as acetone, benzene, carbon tetrachloride, gasoline, toluene, etc., which are damaging to this plastic.

Bowl guards are recommended for added protection of polycarbonate bowls where chemical attack may occasionally occur.

Bowl Conversion / Replacement

- 1. Depress button on lock ring (A), turn counterclockwise and remove along with bowl assembly (B).
- 2. Install new bowl assembly **(B)** and lock ring **(A)**. Turn lock ring clockwise until it clicks into place.
- WARNING: Conversion or replacement of an old metal bowl with a new plastic bowl will reduce the product pressure / temperature rating. Be certain that the circuit and environment does not exceed the lower rating; and that rating labels elsewhere on the product are replaced with one describing the lower rating. Failure to do so may cause property damage, injury or death.

Bowl Guard Installation

- 1. Depress button on lock ring (A), turn counterclockwise and remove.
- Filters with External Automatic Drains Remove float. Screw drain out bottom of bowl assembly while holding adapter with a screw driver from above.
- 3. Slip guard (F) over bowl.
- 4. Filters with External Automatic Drains Screw drain into bottom of bowl assembly while holding adapter with a screw driver from above. Reinstall float into bowl assembly.
- 5. Reinstall the bowl assembly **(B)** and lock ring **(A)**. Turn lock ring clockwise until it clicks into place.



Internal Automatic Drain Conversion

- 1. Depress button on lock ring (A), turn counterclockwise and remove along with bowl assembly (B).
- 2. Unscrew nut (D) and remove manual drain assembly (E).
- 3. Install internal automatic drain in bowl and tighten nut (D) from below.
- 4. Reinstall the bowl assembly and lock ring. Turn lock ring clockwise until it clicks into place.
- ▲ WARNING: Conversion of a filter from a manual drain to an automatic drain will reduce the product pressure / temperature rating. Be certain that the circuit and environment does not exceed the lower ratings; and that rating labels elsewhere on the product are replaced with one describing the lower rating. Failure to do so may cause property damage, injury or death.

Service Kits / Parts

External Automatic Drain Service Kit - 03332 0208 (Standard and Full Size Filters ONLY)

Body Size	Port Size Inch	Lock Ring Assembly (A)	O-Ring (M)	Deflector (G)
Compact	1/8, 1/4	-	02709 7202B	—
Standard	1/4, 3/8, 1/2	03582 7502B	03454 7240B	03532 7002B
Full Size	3/4, 1	03586 7501B	03454 7247B	_

Accessories

Model	Compact Filter	Standard Filter	Full Size Filter
	03530	03532	03536
	03531	03533	03538
		03534	
Bowl Guards	03530 0100B	03532 0100B	03536 0100B
Bowl Kits w/Manual Drain			
Polycarbonate	03530 0500B	03532 0500B	03536 0500B
Metal	03530 0400B	03532 0400B	03536 0400B
Drains			
Auto Drain - External	N/A	03332 0205B	03332 0205B
Auto Drain - Internal	PS506P	PS506P	PS506P
Manual Drain	PS512P	PS512P	PS512P
Elements			
5 Micron	N/A	03532 7203	03536 7203
10 Micron	03530 7203	N/A	N/A
30 Micron	03530 7030B	03532 7030B	03536 7030B
40 Micron	03530 7040	03532 7040	03536 7040
Pipe Mounting Bracket	00902 0400B	00902 0400B	00906 0400B

Richland, Michigan 49083 269-629-5000

To avoid unpredictable system behavior that can cause personal injury and property damage:

- Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

Introduction

Follow these instructions when installing, operating, or servicing the product.

Application Limits

These products are intended for use in general purpose compressed air systems only.

Operating Pressure Range:

	kPa	PSIG	bar
Minimum	345	50	3.45
Maximum	1034	150	10.34

Operating Temperature Range:

-29°C * to 49°C (-20°F to 120°F)

* Temperatures below 0°C (32°F) require moisture free air.

External Automatic Drain Conversion

- 1. Depress button on lock ring, turn counterclockwise and remove along with bowl assembly.
- 2. Unscrew nut and remove manual drain assembly.
- Install the larger of the two o-rings (5/8" outside diameter) on the adapter and insert into bowl from above. If the bowl has a flat bottom, assemble the smaller o-ring (9/16" outside diameter) from below.
- Screw drain into place on outside of bowl while holding adapter in place with a screw driver. Install float on drain stem.
- 5. Reinstall the bowl assembly and lock ring. Turn lock ring clockwise until it clicks into place.
- ▲ WARNING: Conversion of a filter/coalescer from a manual drain to an automatic drain will reduce the product pressure / temperature rating. Be certain that the circuit and environment does not exceed the lower ratings; and that rating labels elsewhere on the product are replaced with one describing the lower rating. Failure to do so may cause property damage, injury or death.
- 6. Remove port protector from 1/4" female drain port. If desired, connect piping to drain port.

Installation & Service Instructions: 1F107B

Prep-Air[®] I External Auto Drain

ISSUED: November, 2003 Supersedes: August, 2001 Doc.# 1F107, ECN# 030539, Rev. 1



🕂 WARNING

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Prep-Air® I External Auto Drain

Automatic Drain Service

- 1. Remove nut on opposite end of drain from manual override. Remove bottom plug gasket (1) from nut and discard. Shake out disc spring (2) and inner valve assembly (3) and discard.
- Remove nut on manual override end of drain. Remove bonnet gasket (4) and discard. Push override button out of nut. Remove and discard o-ring (5).
- 3. Remove diaphragm retainer using a spanner socket. If this tool is not available, insert a flat bladed screw driver into one of the slots and lightly tap it with a plastic mallet in the counterclockwise direction. Take care to avoid damage to the threads in the drain body.
- 4. Push diaphragm assembly (6) and diaphragm gasket (7) through from back side and discard.
- 5. Clean all retained parts with MILD SOAP AND WATER ONLY. See CAUTION at lower right.
- 6. Install diaphragm assembly (6), and diaphragm gasket (7). The sintered bronze plug should face the manual override end. Screw the diaphragm retainer into the body. Use a spanner socket to tighten the diaphragm retainer. If this tool is not available, insert a flat bladed screw driver into one of the slots and lightly tap it with a plastic mallet in the clockwise direction.
- 7. Install o-ring (5) onto override button and reinstall into nut. Install new bonnet gasket (4) onto nut and screw into drain body.
- Insert inner valve assembly (3) into drain body making sure it is properly aligned with hole in diaphragm assembly (6). NOTE: This is easier if you push in the override button in first and can be verified by looking through the 1/4" drain hole.
- 9. Install disc spring (2) onto inner valve assembly (3). Install bottom plug gasket (1) onto nut and nut into drain body.

Service Kits / Parts:

External Automatic Drain Service Kit - 03332 0208 (Standard and Full Size Filters ONLY)

Body Size	Port Size Inch	Lock Ring Assembly (8)	O-Ring (9)	Deflector (10)
Compact	1/8, 1/4	_	02709 7202B	—
Standard	1/4, 3/8, 1/2	03582 7502B	03454 7240B	03532 7002B
Full Size	3/4, 1	03586 7501B	03454 7247B	_

Accessories

Model	Compact Filter	Standard Filter	Full Size Filter
	03530	03532	03536
	03531	03533	03538
		03534	
Bowl Guards	03530 0100B	03532 0100B	03536 0100B
Bowl Kits w/Manual Drain			
Polycarbonate	03530 0500B	03532 0500B	03536 0500B
Metal	03530 0400B	03532 0400B	03536 0400B
Drains			
Auto Drain - External	N/A	03332 0205	03332 0205
Auto Drain - Internal	PS506P	PS506P	PS506P
Manual Drain	PS512P	PS512P	PS512P
Elements			
5 Micron	N/A	03532 7203	03536 7203
10 Micron	03530 7203	N/A	N/A
30 Micron	03530 7030B	03532 7030B	03536 7030B
40 Micron	03530 7040	03532 7040	03536 7040
Grade 6 Coalescing	N/A	03532 7021	03536 7521
Pipe Mounting Bracket	00902 0400B	00902 0400B	00906 0400B



Polycarbonate bowls, being transparent and tough, are ideal for use with Filters and Lubricators. They are suitable for use in normal industrial environments, but should not be located in areas where they could be subjected to direct sunlight, an impact blow, nor temperatures outside of the rated range. As with most plastics, some chemicals can cause damage. Polycarbonate bowls should not be exposed to chlorinated hydro-carbons, ketones, esters and certain alcohols. They should not be used in air systems where compressors are lubricated with fire-resistant fluids, such as phosphate ester and di-ester types.

Metal bowls are recommended where ambient and/or media conditions are not compatible with polycarbonate bowls. Metal bowls resist the action of most such solvents, but should not be used where strong acids or bases are present or in salt laden atmospheres. Consult the factory for specific recommendations where these conditions exist.

TO CLEAN POLYCARBONATE BOWLS, USE MILD SOAP AND WATER ONLY! DO NOT use cleansing agents such as acetone, benzene, carbon tetrachloride, gasoline, toluene, etc., which are damaging to this plastic.

Bowl guards are recommended for added protection of polycarbonate bowls where chemical attack may occasionally occur.

Richland, Michigan 49083 269-629-5000

Installation & Service Instructions: 1F201F Automatic Drain for Filters Ref: PS506, PS795 ISSUED: September, 2006 Supersedes: November, 2003 Doc.# 1F201, ECN# 060870, Rev. 8

WARNING

To avoid unpredictable system behavior that can cause personal injury and property damage:

- Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

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Bowl guards are recommended for added protection of polycarbonate bowls where chemical attack may occasionally occur.

To avoid polycarbonate bowl rupture that can cause personal injury or property damage, do not exceed bowl pressure or temperature ratings. Polycarbonate bowls have a 150 PSIG pressure rating and a maximum temperature rating of 125°F.

Safety Guide

For more complete information on recommended application guidelines, see the Safety Guide section of Pneumatic Division catalogs or you can download the **Pneumatic Division Safety Guide** at: www.parker.com/safety

Introduction

Follow these instructions when installing, operating, or servicing the product.

Application Limits

These products are intended for use in general purpose compressed air systems only.

Operating Pressure Range:

Polycarbonate Bowl	10 to 150 PSIG	(70 to 1030 kPa)
Metal Bowl	10 to 250 PSIG	(70 to 1720 kPa)

Ambient Temperature Range:

Polycarbonate Bowl	32°F to 125°F	(0°C to 52°C)
Metal Bowl	32°F to 175°F	(0°C to 80°C)

ANSI Symbol



Filter w/Automatic Drain

Installation

To install the Auto Drain, SHUT OFF AiR SUPPLY and depressurize the unit.

- 1. Remove bowl by unscrewing bowl or collar, turning unlocking ring, or turn bayonet lock 1/8 turn.
- 2. Remove manual drain assembly from bowl. Be careful not to scratch or damage the inside surfaces of the bowl.
- 3. Clean or replace filter element. Clean bowl and all internal parts. See Polycarbonate bowl cleaning section.
- 4. Install Automatic Drain on inside of bowl (be sure O-ring is in place between drain and bowl).
- 5. Install retaining nut loosely just to hold the drain in place.

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- Replace bowl seal. Lightly lubricate seal to assist with retaining it in position. Use only mineral based oils or grease. Do NOT use synthetic oils such as esters, and Do NOT use silicones.
- 7. Reassemble bowl into body. If using a 06F or 11F collar, tighten collar from 28 to 32 in-lbs (3.2 to 3.6 Nm) torque. If using a 07F or 12F collar, tighten collar from 48 to 52 in-lbs (5.4 to 5.9 Nm) torque.
- 8. Apply system pressure and tighten retaining nut by fingers DO NOT over tighten.
- 9. Check for air leaks around bowl joints, on top and bottom, plus discharge hole of drain. Repeat all steps (including shutoff and depressurization) if leaks occur.

Parts Identification List

Item #	Description
1	Automatic Drain
2	O-ring - see step 4 of Installation section
3	Retaining Nut

PS795 Automatic Drain with fluoroelastomer seals must be used with metal bowl.

Richland, Michigan 49083 269-629-5000

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- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

Introduction

Follow these instructions when installing, operating, or servicing the product.

Application Limits

These products are intended for use in general purpose compressed air systems only.

	kPa	PSIG	bar
Operating Pressure Minimum	68	10	0.68
Operating Pressure Maximum	1700	250	17.0

Operating Temperature Maximum:

Installation

1. The automatic drip leg drain is 1/4" or 1/2" NPT ported and should be installed vertically in the lowest areas of a pneumatic system.

80°C (175°F)

- It is suggested that a globe valve be installed in front of the drip leg drain so the unit can be serviced without shutting off all air lines.
- 3. The auto-drain is ported 1/8" NPT on the bottom to pipe away any liquid discharged.

Maintenance

The automatic drip-leg drain can be easily serviced without removal of entire unit. Tools are not required.

- 1. Before servicing, shut off air supply and depressurize the unit.
 - a. Unscrew the body from the cap.
 - b. To remove auto-drain, unscrew the insert nut.
 - c. Thoroughly clean the interior of the body.
 - d. Install automatic drain on inside of body (be sure o-ring is in place between drain and body).
 - e. Thread knurled insert nut into position and tighten to 25-30 inch-pounds torque.
 - f. Replace body to cap o-ring seal; lubricate seal to assist in retaining it in position. NOTE: Use only mineral base oils or grease. Do not use synthetic oils such as esters.

Installation and Service Instructions: 1F301C

Automatic Drip-Leg Drain

ISSUED: November, 2003 Supersedes: January, 1999 Doc.# 1F301, ECN# 030539, Rev. 4

- g. Screw body onto the cap, engaging all threads to the shoulder stop.
- h. Turn on air supply and check for air leaks around body joints, on top and bottom, plus discharge hole of drain. Repeat all steps (including shutoff and depressurization) if leak is experienced.



Dimensions

Α		В			С
2.50	63.5mm	2.37	60.2mm	.87	22.1mm

Kits Available

Kit No. Description

PS506

Automatic Drain Kit

🕂 WARNING

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Richland, Michigan 49083 269-629-5000

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- Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- · Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

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Metal bowls are recommended where ambient and/or media conditions are not compatible with polycarbonate bowls. Metal bowls resist the action of most such solvents, but should not be used where strong acids or bases are present or in salt laden atmospheres. Consult the factory for specific recommendations where these conditions exist.

TO CLEAN POLYCARBONATE BOWLS USE MILD SOAP AND WATER ONLY! DO NOT use cleansing agents such as acetone, benzene, carbon tetrachloride, gasoline, toluene, etc., which are damaging to this plastic.

Bowl guards are recommended for added protection of polycarbonate bowls where chemical attack may occasionally occur.

Introduction

Follow these instructions when installing, operating, or servicing the product.

Application Limits

These products are intended for use in general purpose compressed air systems only.

Installation and Service Instructions: 1F501D

Filter Kits

ISSUED: November, 2003 Supersedes: September, 2003 Doc.# 1F501, ECN# 030539, Rev. 2

Operation

- 1. Both free moisture and solids are removed automatically by the filter. There are no moving parts.
- Manual drain filter must be drained regularly before the separated moisture and oil reaches the bottom of the lower baffle. Automatic drain models will collect and dump liquids automatically.

Maintenance

- 1. The filter element should be removed and replaced when the pressure differential across the filter unit exceeds 10 PSIG.
- 2. To service the filter element; **SHUT OFF AIR SUPPLY** and depressurize the unit.
 - a. Unscrew threaded bowl.
 - b. Unscrew lower filter retainer and remove filter element (and two gaskets if present).
 - c. Clean all internal parts and bowl before reassembling. See polycarbonate bowl cleaning **CAUTION**.
 - d. (Applies to units with filter post design). If filter is removed from body replace o-ring on filter post with o-ring found in kit; lubricate o-ring with grease included in kit. Screw filter post into body.
 - e. Install new element (and two new gaskets if found in kit).
 - f. Screw on lower filter retainer and tighten firmly.
 - g. Replace bowl seal; lubricate seal to assist in retaining it in position. Use only mineral base oils or grease included in kit. **DO NOT** use synthetic oils such as esters, and **DO NOT** use silicones.
 - h. Screw bowl into body.
 - i. Apply pressure and check for leaks. If leaks occur, shut off air supply, depressurize the unit and correct leaks.

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Richland, Michigan 49083 269-629-5000

Installation & Service Instructions: 1F701B 06F & 07F Filter with Adsorber Element ISSUED: January, 2004 Supersedes: January, 1993 Doc.# 1F701, ECN# 030539

To avoid unpredictable system behavior that can cause personal injury and property damage:

- Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- · Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

Polycarbonate bowls, being transparent and tough, are ideal for use with Filters and Lubricators. They are suitable for use in normal industrial environments, but should not be located in areas where they could be subjected to direct sunlight, an impact blow, nor temperatures outside of the rated range. As with most plastics, some chemicals can cause damage. Polycarbonate bowls should not be exposed to chlorinated hydrocarbons, ketones, esters and certain alcohols. They should not be used in air systems where compressors are lubricated with fireresistant fluids such as phosphate ester and diester types.

Metal bowls are recommended where ambient and/or media conditions are not compatible with polycarbonate bowls. Metal bowls resist the action of most such solvents, but should not be used where strong acids or bases are present or in salt laden atmospheres. Consult the factory for specific recommendations where these conditions exist.

TO CLEAN POLYCARBONATE BOWLS USE MILD SOAP AND WATER ONLY! DO NOT use cleansing agents such as acetone, benzene, carbon tetrachloride, gasoline, toluene, etc., which are damaging to this plastic.

Bowl guards are recommended for added protection of polycarbonate bowls where chemical attack may occasionally occur.

Introduction

Follow these instructions when installing, operating, or servicing the product.

Application Limits

These products are intended for use in general purpose compressed air systems only.

Adsorption techniques are **not effective** on: carbon monoxide, carbon dioxide, methane, ethane, ethylene or hydrogen. For a more complete list of vapors that can and cannot be adsorbed effectively by activated charcoal adsorbers consult the factory.

With Polycarbonate Bowl

	кра	PSIG	bar
Operating Pressure Maximum	1000	150	10.3
Operating Temperature Maximu	um:	52°C (125°F)

With Metal Bowl

	kPa	PSIG	bar	
Operating Pressure Maximum	1700	250	17.0	
Operating Temperature Maximu	um:	80	°C (175°F)

ANSI Symbol



Installation

- 1. The equipment to which the filter is attached should be internally cleaned to remove all traces of accumulated oil and dirt. Also, new pipe or hose should be installed between the filter and equipment being protected.
- 2. Blow all upstream pipe work clear of accumulated dirt and liquids.
- 3. A standard particle filter and a coalescing filter should be installed upstream of adsorber for best results.
- 4. Select a location as close as possible to the equipment being protected and upstream of any pressure regulator.
- 5. Install filter so that air flows in the direction of arrow on body.
- 6. Install filter vertically with the bowl drain mechanism at the bottom.

🕂 WARNING

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06F & 07F Filter with Adsorber Element

Operation and Service

- 1. Adsorber elements are designed to adsorb vaporous contaminants. The relative efficiency of an adsorber varies depending on the vapor to be adsorbed and the environmental temperature. At higher temperatures, adsorbers become less efficient.
- 2. Adsorber cartridges are not particle filters, per se, all particulates and aerosols should be removed prior to adsorbing vaporous contaminants. The initial pressure drop across an adsorber element (1.5 PSID maximum), therefore, should never increase. The presence of any liquids, aerosols, or particulate matter in an adsorber indicates that the effective life of the element has been exceeded and the element should be replaced and the system cleaned.
- 3. The most effective method of testing whether an element needs to be replaced or not is to smell the air coming from the adsorber. Offensive odors will be present well before oil levels become detectable.
- 4. To replace the adsorber element:
 - a. SHUT OFF THE AIR SUPPLY and depressurize the unit.
 - b. Unscrew the bowl from the filter body.
 - c. Unscrew the adsorber element.
 - d. If contaminants have migrated downstream from the prefilters: clean the adsorber bowl, the air lines from the prefilters to the adsorber, the prefilter bowls and replace the prefilter elements.
 - e. Install the new adsorber element.
 - f. Replace the bowl seal; lubricate the seal sparingly to assist in retaining it in position. Use only mineral based oils or grease. Do NOT use synthetic oils such as esters and Do NOT use silicones.
 - g. Screw bowl into body.
 - h. Apply pressure to the system and check for leaks. If leaks occur, shut off the air supply, depressurize the system and make adjustments necessary to eliminate leakage.

Replacement Adsorber Element Kits

Model	Kit Number
06F	PS156P
07F	PS256P



BOWL ASSEMBLY

MANUAL DRAIN

Richland, Michigan 49083 269-629-5000

To avoid unpredictable system behavior that can cause personal injury and property damage:

- · Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- · Service according to procedures listed in these instructions.
- · Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- · After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

Introduction

Follow these instructions when installing, operating, or servicing the product.

Application Limits

These products are intended for use in general purpose compressed air systems only.

Maximum Operating Pressure*:

Inlet Pressure	kPa	PSIG	bar
Metal Bowl	1035	150	10.3
* When using with an Automati	c Drain, i	minimum inlet	pressure
is 10 PSIG (0.1 bar & 69 kPa).			-

Maximum Ambient Temperature: 66°C (150°F)

ANSI Symbols



Filter w/Manual Drain

Installation

1. Filter unit should be installed with reasonable accessibility for service whenever possible - repair service kits are available. Keep pipe or tubing lengths to a minimum with inside clean and free of dirt and chips. Pipe joint compound should be used sparingly and applied only to the male pipe - never into the female port. Do not use PTFE tape to seal pipe joints - pieces could break off from the outlet port and lodge inside units which are located downstream, possibly causing malfunction.

Installation & Service Instructions: 1F800C

2" Basic Filter

ISSUED: November, 2003 Supersedes: August, 2001 Doc.# 1F800, ECN # 030539, Rev. 6

- 2. Blow all upstream pipe work clear of accumulated dirt and liquids.
- 3. Select a filter location as close as possible to the equipment being protected and upstream of any pressure regulator.
- 4. Install filter so that air flow is in the direction of the arrow.
- 5. Install filter vertically with the bowl drain mechanism at the bottom. Free moisture will thus drain into the sump ("quiet zone") at the bottom of the bowl (automatic drain models are recommended as standard equipment).
- 6. A drain line with 1/8" NPT connection may be attached to the drain port if desired. Drain line should be 1/4" tubing or larger, as short as possible, and crimp-free.

Operation

Both free moisture and solids are removed automatically by the filter. There are no moving parts.

Manual drain filters must be drained regularly before the separated moisture and oil reaches the bottom of the filter element. Automatic drain models will collect and dump the liquid automatically.

EXCEPT as otherwise specified by the manufacturer, this product is specifically designed for compressed air service only, and use with any other fluid (liquid or gas) is a misapplication. For example, use with or injection of certain hazardous liquid or gases in the system (such as alcohol or liquid petroleum gas) could be harmful to the unit or result in a combustible condition or hazardous external leakage. Manufacturer's warranties are void in the event of misapplication, and manufacturer assumes no responsibility for any resulting loss.

Before using with fluids other than air, or for nonindustrial applications, or for life support systems, consult manufacturer for written approval.

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Maintenance Procedures

- A Caution: Shut off air supply and exhaust the pressure trapped within the filter bowl before servicing unit.
- TO CLEAN OR REPLACE FILTER ELEMENT Shut off air supply and reduce pressure in the unit to zero, remove the 8 screws form the filter housing, unscrew the filter support and remove filter element.
- 1a. IF THE UNIT HAS A RIGID FILTER ELEMENT Remove and clean periodically by tapping on a hard surface, and blowing off with an air gun. Torque element to 50 ± 5 in. lb. when replacing element. Element should be cleaned/ replaced when the Differential Pressure Indicator is completely red.
- 2. IF THE UNIT HAS A MANUAL DRAIN, DRAIN THE UNIT ONCE EVERY 8 HOURS MINIMUM. If the unit is equipped with an automatic drain, clean the screen around the drain. Clean screen by blowing off with air gun.
- 3. When the bowl becomes dirty, clean with a dry clean cloth.
- 4. Before placing the unit in service, make sure that the bowl is properly reinstalled, and securely bolted in place.

Kits and Parts Available

<u>Kit No.</u>	Description
PS618	Filter Element Kit
	(includes filter element and o-rings)
PS619	Differential Pressure Indicator (Standard)
PS620	Internal Drains:
	Automatic Mechanical Drain (Fluorocarbon
	seals with 1/8" NPT stem)

Richland, Michigan 49083 269-629-5000

Installation & Service Instructions: 1FL101H

Servicing Procedures for Bowls, Sight Gauges, & Manual Drains

ISSUED: November, 2003 Supersedes: July, 1995 Doc.# 1FL101, ECN# 030539, Rev. 9

FOR USE WITH FILTERS, LUBRICATORS AND FILTER / REGULATORS

To avoid unpredictable system behavior that can cause personal injury and property damage:

- Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

Introduction

Follow these instructions when installing, operating, or servicing the product.

Application Limits

These products are intended for use in general purpose compressed air systems only. Pressure and temperature ranges for bowls are given below. Specific units may differ; follow applicable ranges as specified for the units you are servicing. Consult the instruction sheet which came with the unit for more details.

Bowl Pressure & Ambient Temperature Ranges

Polycarbonate Bowls:

0 to 150 PSIG (0 to 1,030 kPa) 32°F to 125°F (0°C to 52°C)

Metal Bowls:

0 to 250 PSIG (0 to 1,720 kPa) 32°F to 175°F (0°C to 80°C)

Servicing Bowls & Sight Gauges

- 1. Turn off air supply and depressurize the unit before removing any parts.
- $\underline{\land}$ Caution: Be certain that pressure is relieved on both sides of any regulator in a system.
- Lubricators with auto fill devices require oil system shut-off and disconnection. Filters with automatic drains require disconnection.
- 3. Unscrew bowl until its threads are completely disengaged.
- 4. Remove the old parts and clean the bowl and *sight gauge*, especially their respective sealing surfaces. Fit the large o-ring into the sight gauge groove such that the gripping

nibs in the groove hold the o-ring in place. Then place the sight gauge in position and add the screws and their sealing o-rings. Secure gauge to bowl using 12 to 16 in-lbs (1.4 to 1.8 Nm) of torque.

- 5. Remove the *body to bowl seal* and thoroughly clean the sealing surface in the body. Also check for damage in the sealing area and threads. Replace the entire unit if this condition exists.
- 6. Place the new seal onto the end of the bowl or into the groove/ledge of the body. The choice of location depends on the design of the parts. If the bowl has a slight retaining ridge on the groove edge, put the new seal onto the bowl. If the body has a slight recess above the threads, put the seal into that groove, dry. If neither of these conditions are present, the seal should be placed dry onto the body ledge above the threads.
- 7. Lubricate the edge of the bowl where it will contact the seal before reinstalling.

Note: Use only mineral based oils or grease (a package is supplied with kits); do not use synthetic lubricants such as esters and do not use silicone lubricants.

- 8. Screw the bowl into the body until it reaches a positive stop; then reverse it about 1/8 turn. Metal bowls with sight gauges can be reversed about 3/4 turn to position the sight gauge as desired.
- ▲ Caution: Inlet pressure ratings for Polycarbonate bowls are less than those for metal bowls. If replacing a metal bowl with a Polycarbonate bowl, affix "Max Inlet" label provided over similar label on body.
- 9. Pressurize the assembled unit and check for leaks. If any occur, turn off the air supply, de-pressurize the system and fix the leak before resuming operation.

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Servicing Procedures for Bowls, Sight Gauges, & Manual Drains

Servicing Manual Drains

1. Removing Bowl and Old Drain

a. Turn off air supply and de-pressurize the unit.

⚠ Caution: Be certain that pressure is relieved on both sides of any regulator in a system.

b. Unscrew threaded bowl.

c. Remove manual drain assembly from bowl. Be careful not to scratch or damage the inside surface of the bowl.

2. Installing New Manual Drain

Note: Clean the bowl before installing manual drain and reassembling the bowl to the body. See cleaning of bowls in the *Safety: Transparent Bowls* section.

a. Installation of PS512 drain kit:

Install manual drain body through the bowl opening with the threads protruding downwards and the o-ring seals on the inside of the bowl. Then assemble drain nut and tighten it from 10 to 15 in-lbs (1.1 to 1.7 Nm) of torque.

b. Installation of PS513 drain kit:

Install Push–N–Drain by pushing through the bowl opening so that the raised bead of the drain assembly seals on the inside of the bowl.

3. Installing bowl and Leak Testing:

- a. Screw the bowl into the body until it reaches a positive stop; then reverse it about 1/8 turn. Metal bowls with sight gauges can be reversed about 3/4 turn to position the sight gauge as desired.
- b. Apply system pressure; then check for air leaks. If leaks occur, shut off the air supply, depressurize the system and make necessary adjustments to eliminate leakage.

If you have questions concerning how to service these units, contact your local authorized dealer or your customer service representative.

Safety: Transparent Bowls

Polycarbonate bowls, being transparent and tough, are ideal for use with Filters and Lubricators. They are suitable for use in normal industrial environments, but should not be located in areas where they could be subjected to direct sunlight, an impact blow, nor temperatures outside of the rated range. As with most plastics, some chemicals can cause damage. Polycarbonate bowls should not be exposed to chlorinated hydro-carbons, ketones, esters, and certain alcohols. They should not be used in air systems where compressors are lubricated with fire resistant fluids such as phosphate ester and di-ester types.

Metal bowls are recommended where ambient and/or media conditions are not compatible with polycarbonate bowls. Metal bowls resist the action of most such solvents, but should not be used where strong acids or bases are present or in salt laden atmospheres. Consult the factory for specific recommendations where these conditions exist.

TO CLEAN POLYCARBONATE BOWLS USE MILD SOAP AND WATER ONLY! DO NOT use cleaning agents such as acetone, benzene, carbon tetrachloride, gasoline, toluene, etc., which are damaging to this plastic.

Bowl guards are recommended for added protection of polycarbonate bowls where chemical attack may occur.

To avoid polycarbonate bowl rupture that can cause personal injury or property damage, do not exceed bowl pressure or temperature ratings. Polycarbonate bowls have a 150 psig (1030 kPa) pressure rating and a maximum temperature rating of 125°F (52°C).

Service Kits Available

Twist Drain Kit	PS512
Push-N-Drain	PS513



PS512



Richland, Michigan 49083 269-629-5000

Installation & Service Instructions: 1FL301

Mini Modular Bowl Kits

ISSUED: November, 2003 Supersedes: May, 2003 Doc.# 1FL301, ECN# 030539, Rev. 2

To avoid unpredictable system behavior that can cause personal injury and property damage:

- Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- · Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

Safety: Transparent Bowls

Polycarbonate bowls, being transparent and tough, are ideal for use with Filters and Lubricators. They are suitable for use in normal industrial environments, but should not be located in areas where they could be subjected to direct sunlight, an impact blow, nor temperatures outside of the rated range. As with most plastics, some chemicals can cause damage. Polycarbonate bowls should not be exposed to chlorinated hydro-carbons, ketones, esters, and certain alcohols. They should not be used in air systems where compressors are lubricated with fire resistant fluids such as phosphate ester and di-ester types.

Metal bowls are recommended where ambient and/or media conditions are not compatible with polycarbonate bowls. Metal bowls resist the action of most such solvents, but should not be used where strong acids or bases are present or in salt laden atmospheres. Consult the factory for specific recommendations where these conditions exist.

TO CLEAN POLYCARBONATE BOWLS USE MILD SOAP AND WATER ONLY! DO NOT use cleaning agents such as acetone, benzene, carbon tetrachloride, gasoline, toluene, etc., which are damaging to this plastic.

Bowl guards are recommended for added protection of polycarbonate bowls where chemical attack may occur.

To avoid polycarbonate bowl rupture that can cause personal injury or property damage, do not exceed bowl pressure or temperature ratings. Polycarbonate bowls have a 150 psig (1030 kPa) pressure rating and a maximum temperature rating of 125°F (52°C).

Introduction

Follow these instructions when installing, operating, or servicing the product.

Application Limits

These products are intended for use in general purpose compressed air systems only.

Operating Pressure	kPa	PSIG	bar
Maximum Inlet	800	120	8

Temperature Range (Ambient)

32°F to 125°F (0°C to 52°C)

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Manual Drain

Auto Drain

Servicing

- 1. To remove the bowl assembly: SHUT OFF AIR SUPPLY and depressurize the unit.
- 2. Unscrew threaded bowl.
- 3. Replace the bowl gasket, lubricate gasket to assist in retaining it in position. Use only mineral base oils or grease. Do NOT use synthetic oils such as esters and do NOT use silicones.
- 4. To replace the lubricator bowl, fill to fill line on the bowl (DO NOT OVERFILL) with oil of 100 to 200 SSU viscosity at 100°F and an aniline point greater than 200°F same as SAE No. 10 (petroleum base hydraulic oils are good examples). DO NOT USE OILS WITH ADHESIVES OR TACKY ADDITIVES. COMPOUNDED OILS CONTAINING SOLVENTS, GRAPHITE, SOAPS, OR DETERGENTS (automotive oils generally contain detergents) ARE NOT RECOMMENDED.
- 5. Screw bowl into body and tighten firmly.
- 6. Repressurize the unit.

Richland, Michigan 49083 269-629-5000

/!\WARNING

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- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

Introduction

Follow these instructions when installing, operating, or servicing the product.

Application Limits

These products are intended for use in general purpose compressed air systems only.

Operating Inlet Pressure:

	kPa	PSIG	bar
with Polycarbonate Bowl	1000	150	10.3
with Metal Bowl	1700	250	17.0
NOTE. The maximum recomm	anded pressure	drop for	

The maximum recommended pressure drop for a particulate filter is 70 kPa (10 psig, 0.7 bar)

Ambient Temperature Range:

with Polycarbonate Bowl	0°C to 52°C (32°F to 125°F)
with Metal Bowl	0°C to 80°C (32°F to 175°F)

Symbols



Particulate Filter

Mist Lubricators (Figure 1)

Description

These mist lubricators are designed to deliver an atomized oil mist to air operated tools, motors, and other pneumatic equipment. Units are equipped with full-view sight glass for visual indication of oil drop rate, needle valve feed adjustment to regulate oil drop rate, and a venturi bypass disc to compensate for changes in air flow demands.

Installation of Lubricator

Lubricator should be installed with reasonable accessibility for 1. service whenever possible - repair service kits are available. Keep pipe and tubing lengths to a minimum with inside clean and free of dirt and chips. Pipe joint compounds should be used sparingly and applied only to the male pipe - never into the female port. Do not use PTFE tape to seal pipe joints - pieces have a tendency to break off and lodge inside the unit, possibly causing malfunction.

Installation & Service Instructions: 1M301 Miniature Series Mist Lubricators & Particulate Filters ISSUED: April, 2013 Supersedes: November, 2003

Doc# 1M301, EN# 130068, Rev. 3

- 2. Install lubricator so that air flow is in the direction of arrow on body.
- Installation should be upstream from, and as close as possible, to 3. the device it is to lubricate (valve, cylinder, tool, etc.). Whenever possible, avoid locations that require air-borne oil to move in an upward direction to reach the device to be lubricated.
- The installation of an individual lubricator for each air consuming 4. device provides best assurances of proper lubrication.
- In new installations, it is good practice to "wet down" the inside 5. diameter of piping and/hose with oil before making final connections. Although your lubricator delivers oil to the line, pre-coating the inside diameter with oil helps insure that proper amounts of oil are delivered to the point of application.

Operation & Service of Lubricator

Warning: Before filling, inlet pressure must be eliminated and then de-pressurize system pressure.

- FILLING After de-pressurizing system, remove bowl to refill 1. lubricator. Fill bowl to fill line indicated on the bowl with oil of 150 to 200 SSU at 100°F viscosity - same as SAE No. 10 (petroleum based hydraulic oils or spindle oils are good examples). DO NOT USE OILS WITH TACKY ADDITIVES, COMPOUND OILS CONTAINING SOLVENTS, GRAPHITE, SOAPS OR DETERGENTS. (Automotive oils generally contain detergents and are not recommended.
- 2. Replace the bowl and seat firmly. Excessive torque is not necessary. The lubricator is now ready for setting.
- OIL DELIVERY ADJUSTMENT To adjust oil delivery, turn the 3. adjusting needle on top of the lubricator.

Leaner - Clockwise Richer - Counterclockwise

By counting the number of drops per minute in the sight dome, you can adjust lubricator to your required setting.

Generally, one drop per minute downstream for every 10-15 SCFM flow is satisfactory. 25 drops per minute equals one ounce per hour - volume of oil passing through the sight dome.

NOTE: This is a constant density type lubricator which delivers a constant ratio of oil to air flow. Therefore, if air flow increases or decreases, oil delivery will be effected proportionately. ONLY IF DIFFERENT RATIO IS DESIRED SHOULD YOUR ADJUSTMENT KNOB SETTING BE CHANGED AFTER YOUR INITIAL SETTING.

WARNING

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Service Kits - Lubricator

Kit#	Description
PS420 Polycarbonate Bowl with Manual Drain - consists of item 18 (open bottom), 15, 16, 17 & 32	
P5421	18 (closed bottom) & 15
PS740	Drip Control (Polycarbonate)
PS740N	Drip Control (Nylon)

Parts Identification List - Lubricator

ltem#	Description	ltem#	Description
1	Knob	11	Spring
2	Drip Control Body	12	Ball, Check
3	Needle	13	Body
4	O-ring	14	Tube
5	Drip Tube	15	O-ring (Body to Bowl)
6	Seal Plate	16	Twist Drain
7	O-ring	17	O-ring (Drain)
8	By-pass Plate	18	Bowl
9	By-pass	32	Twist Drain Knob
10	Ball, Check		

Particulate Filter (Figure 2)

Description

These air line filters are heavy-duty units used to remove airborne impurities from air supply lines by means of centrifugal force and filter element. Units are equipped with vane-type deflectors and drain valves. Deflector plate creates swirling action to the air stream assuring entrainments separation at all flow rates. Filter element with extra large surface assures fine filtration with low pressure drop. Turn manual drain clockwise to open and counterclockwise to close.

Installation of Filter

- 1. Filter should be installed with reasonable accessibility for service whenever possible - repair service kits are available. Keep pipe and tubing lengths to a minimum with inside clean and free of dirt and chips. Pipe joint compounds should be used sparingly and applied only to the male pipe - never into the female port. Do not use PTFE tape to seal pipe joints - pieces have a tendency to break off and lodge inside the unit, possibly causing malfunction.
- Install unit so that air flow is in the direction of arrow. Installation must 2 be upstream of and close to devices it is to service (valve, cylinder, tool, etc.). Position unit vertically with the bowl drain mechanism at the bottom. Free moisture will thus drain into the sump ("quiet zone") at the bottom of the bowl.

Operation of the Filter

- Both free moisture and solids are removed automatically by 1. the filter
- Manual drain filters must be drained regularly before the separated 2. moisture and oil reaches the bottom of the element holder. Automatic drain models (pulse drain) will collect and dump liquids automatically. They are actuated when a pressure drop occurs within the filter.
- The filter element should be removed and replaced when the 3. pressure differential across the filter exceeds 70 kPa (10 psig, 0.7 bar).

Service

∧ Caution: SHUT OFF AIR SUPPLY and exhaust the primary and secondary pressure before dis-assembling unit. (Units may be serviced without removing them from the air line.)

Servicing Filter Element

- Unscrew threaded bowl and element holder. Then remove filter 1. element, deflector, and gaskets.
- 2. Clean all internal parts, bowl, and body before re-assembling unit. See Polycarbonate bowl cleaning section.
- Install deflector, filter element, and gaskets. 3.
- Attach element holder. Torque from 0.9 to 1.4 Nm (8 to 12 in-lbs). 4.
- 5. To assist with retaining bowl's o-ring while installing bowl, lubricate the o-ring (with a mineral based oil or grease). Then place on the bowl.
- Screw bowl into the body until it is stopped by body; then back off 6. bowl 1/8 turn.
- Apply pressure to the system and check for leaks. If leaks occur, shut 7. off the air supply, de-pressurize the system and make necessary adjustments to eliminate leakage.

If you have questions concerning how to service this unit, contact your local dealer or your customer service representative.

Service Kits- Filter

Kit#	Description		
PS404	Polycarbonate Bowl with Manual Drain - consists of items: 19, 24, 26 & 27		
PS408	Polycarbonate Bowl with Automatic Drain - consists of items: 19, 24, 26, 28, 29, 30 & 31		
PS447B	Metal Bowl with Manual Drain - consists of items: 19, 24, 26 & 27		
PS451	Metal Bowl with Automatic Drain - consists of items: 19, 24, 26, 28, 29, 30 & 31		
PS403	5 Micrometer Element Kit - consists of items: 20, 21 & 24		
PS407	5 Micrometer Element Cartridge Kit - consists of items: 20, 21, 22, 23 & 24		
PS401	40 Micrometer Element Kit - consists of items: 20, 21 & 24		

Parts Identification List - Filter Units

ltem#	Description	ltem#	Description
19	Bowl	27	Manual Drain (twist style)
20	Gasket	28	O-ring - pulse drain
21	Filter Element	29	Drain (body of pulse
22	Filter Holder		drain shown)
23	Deflector	30	Diaphragm
24	O-ring (body to bowl)	31	Pin
25	Body	32	Twist Drain Knob
26	O-ring (drain to bowl)		

Safety: Transparent Bowls

Polycarbonate bowls, being transparent and tough, are ideal for use with Filters and Lubricators. They are suitable for use in normal industrial environments, but should not be located in areas where they could be subjected to direct sunlight, an impact blow, nor temperatures outside of the rated range. As with most plastics, some chemicals can cause damage. Polycarbonate bowls should not be exposed to chlorinated hydrocarbons, ketones, esters and certain alcohols. They should not be used in air systems where compressors are lubricated with fire-resistant fluids such as phosphate ester and diester types

Metal bowls are recommended where ambient and/or media conditions are not compatible with polycarbonate bowls. Metal bowls resist the action of most such solvents, but should not be used where strong acids or bases are present or in salt laden atmospheres. Consult the factory for specific recommendations where these conditions exist.

TO CLEAN POLYCARBONATE BOWLS USE MILD SOAP AND WATER ONLY! DO NOT use cleansing agents such as acetone, benzene, carbon tetrachloride, gasoline, toluene, etc., which are damaging to this plastic.

/1\ WARNING

To avoid polycarbonate bowl rupture that can cause personal injury or property damage, do not exceed bowl pressure or temperature ratings. Polycarbonate bowls have a 150 PSIG pressure rating and a maximum temperature rating of 125°F.



Figure 1: Mist Lubricator

1M301
Richland, Michigan 49083 269-629-5000

To avoid unpredictable system behavior that can cause personal injury and property damage:

- Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- · Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

Polycarbonate bowls, being transparent and tough, are ideal for use with Filters and Lubricators. They are suitable for use in normal industrial environments, but should not be located in areas where they could be subjected to direct sunlight, an impact blow, nor temperatures outside of the rated range. As with most plastics, some chemicals can cause damage. Polycarbonate bowls should not be exposed to chlorinated hydrocarbons, ketones, esters and certain alcohols. They should not be used in air systems where compressors are lubricated with fireresistant fluids such as phosphate ester and diester types.

Metal bowls are recommended where ambient and/or media conditions are not compatible with polycarbonate bowls. Metal bowls resist the action of most such solvents, but should not be used where strong acids or bases are present or in salt laden atmospheres. Consult the factory for specific recommendations where these conditions exist.

TO CLEAN POLYCARBONATE BOWLS USE MILD SOAP AND WATER ONLY! DO NOT use cleansing agents such as acetone, benzene, carbon tetrachloride, gasoline, toluene, etc., which are damaging to this plastic.

Bowl guards are recommended for added protection of polycarbonate bowls where chemical attack may occasionally occur.

Introduction

Follow these instructions when installing, operating, or servicing the product.

Application Limits

These products are intended for use in general purpose compressed air systems only.

With Polycarbonate Bowl

	kPa	PSIG	bar
Operating Pressure Maximum	830	120	8.3
Operating Temperature Maximum:	52°C (125°F)		F)

Installation & Service Instructions: 1M105C

1/8" & 1/4" P3A-F Mini Modular Filter (Screen Type)

ISSUED: November, 2003 Supersedes: January, 2000 Doc.# 1M105, ECN# 030539, Rev. 1



Installation

- 1. The equipment to which the filter is attached should be internally cleaned to remove all traces of accumulated oil and dirt. Also, new pipe or hose should be installed between the filter and equipment being protected.
- 2. Blow all upstream pipe work clear of accumulated dirt and liquids.
- 3. Select a filter location as close as possible to the equipment being protected and upstream of any pressure regulator.
- 4. Install filter so that air flows in the direction of arrow on body.
- 5. Install filter vertically with bowl drain mechanism at the bottom. Free moisture will thus drain into the sump "quiet zone" at the bottom of the bowl (automatic drain models are recommended as standard equipment).

🕂 WARNING

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from The Company, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application, including consequences of any failure and review the information concerning the product or systems in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by The Company and its subsidiaries at any time without notice.

Operation & Service

- 1. Both free moisture and solids are removed automatically by the filter. There are no moving parts.
- 2. Manual drain filters must be drained regularly before the separated moisture and oil reaches the bottom of the lower baffle. Automatic drain models will collect and dump liquids automatically.
- 3. The filter element should be removed and replaced when the pressure differential across the filter is 10 PSIG.
- 4. To remove the filter element: SHUT OFF AIR SUPPLY and depressurize the unit.
 - a. Unscrew threaded bowl.
 - b. Unscrew element assembly.
 - c. Clean bowl and internal parts before cleaning reassembling. See polycarbonate bowl cleaning section.
 - d. Attach clean element assembly and tighten firmly.
 - e. Replace bowl gasket; lubricate gasket to assist in retaining it in position. Use only mineral base oils or grease. Do NOT use synthetic oils such as esters, and do NOT use silicones.
 - f. Screw bowl into body and tighten firmly.

Kits Available

Kit No.

Description

P3A-KA00EEN P3A-KA00RFN Element Kit Filter Repair Kit

Richland, Michigan 49083 269-629-5000

To avoid unpredictable system behavior that can cause personal injury and property damage:

- Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

Introduction

Follow these instructions when installing, operating, or servicing the product.

Application Limits

These products are intended for use in general purpose compressed air systems only.

Operating Inlet Pressure:

	kPa	PSIG	bar
with Polycarbonate Bowl	1000	150	10.3
with Metal Bowl	1700	250	17.0

NOTE: The maximum recommended pressure drop for a particulate filter is 70 kPa (10 psig, 0.7 bar)

Ambient Temperature Range:

with Polycarbonate Bowl

with Metal Bowl

0°C to 80°C (32°F to 175°F)

0°C to 52°C (32°F to 125°F)



Particulate Filter

Mist Lubricators (Figure 1)

Description

Symbols

These mist lubricators are designed to deliver an atomized oil mist to air operated tools, motors, and other pneumatic equipment. Units are equipped with full-view sight glass for visual indication of oil drop rate, needle valve feed adjustment to regulate oil drop rate, and a venturi bypass disc to compensate for changes in air flow demands.

Installation of Lubricator

 Lubricator should be installed with reasonable accessibility for service whenever possible - repair service kits are available. Keep pipe and tubing lengths to a minimum with inside clean and free of dirt and chips. Pipe joint compounds should be used sparingly and applied only to the male pipe – never into the female port. Do not use PTFE tape to seal pipe joints - pieces have a tendency to break off and lodge inside the unit, possibly causing malfunction. Installation & Service Instructions: 1M301 Miniature Series Mist Lubricators

Miniature Series Mist Lubricators & Particulate Filters

ISSUED: November, 2003 Supersedes: July, 2003

Doc# 1M301, ECN# 030539, Rev. 2

- 2. Install lubricator so that air flow is in the direction of arrow on body.
- 3. Installation should be upstream from, and as close as possible, to the device it is to lubricate (valve, cylinder, tool, etc.). Whenever possible, avoid locations that require air-borne oil to move in an upward direction to reach the device to be lubricated.
- 4. The installation of an individual lubricator for each air consuming device provides best assurances of proper lubrication.
- 5. In new installations, it is good practice to "wet down" the inside diameter of piping and/hose with oil before making final connections. Although your lubricator delivers oil to the line, pre-coating the inside diameter with oil helps insure that proper amounts of oil are delivered to the point of application.

Operation & Service of Lubricator

- ▲ Warning: Before filling, inlet pressure must be eliminated and then de-pressurize system pressure.
- FILLING After de-pressurizing system, remove bowl to refill lubricator. Fill bowl to fill line indicated on the bowl with oil of 150 to 200 SSU at 100°F viscosity - same as SAE No. 10 (petroleum based hydraulic oils or spindle oils are good examples). DO NOT USE OILS WITH TACKY ADDITIVES, COMPOUND OILS CONTAINING SOLVENTS, GRAPHITE, SOAPS OR DETERGENTS. (Automotive oils generally contain detergents and are not recommended.
- 2. Replace the bowl and seat firmly. Excessive torque is not necessary. The lubricator is now ready for setting.
- 3. OIL DELIVERY ADJUSTMENT To adjust oil delivery, turn the adjusting needle on top of the lubricator.

Leaner - Clockwise Richer - Counterclockwise

By counting the number of drops per minute in the sight dome, you can adjust lubricator to your required setting.

Generally, one drop per minute downstream for every 10-15 SCFM flow is satisfactory. 25 drops per minute equals one ounce per hour - volume of oil passing through the sight dome.

NOTE: This is a constant density type lubricator which delivers a constant ratio of oil to air flow. Therefore, if air flow increases or decreases, oil delivery will be effected proportionately. ONLY IF DIFFERENT RATIO IS DESIRED SHOULD YOUR ADJUSTMENT KNOB SETTING BE CHANGED AFTER YOUR INITIAL SETTING.

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

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Mist Lubricator & Particulate Filters Series

Service Kits - Lubricator

Kit#DescriptionPS420Polycarbonate Bowl with Manual Drain - consists of items:
18 (open bottom), 15, 16 & 17PS421Polycarbonate Bowl without Drain - consists of items:
18 (closed bottom) & 15PS740Drip Control (Polycarbonate)PS740NDrip Control (Nylon)Parts Identification List - LubricatorItem#Description

em#	Description	ltem#	Description
1	Knob	10	Ball, Check
2	Drip Control Body	11	Spring
3	Needle	12	Ball, Check
4	O-ring	13	Body
5	Drip Tube	14	Tube
6	Seal Plate	15	O-ring (Body to Bowl)
7	O-ring	16	Twist Drain
8	By-pass Plate	17	O-ring (Drain)
9	By-pass	18	Bowl

Particulate Filter (Figure 2)

Description

These air line filters are heavy-duty units used to remove airborne impurities from air supply lines by means of centrifugal force and filter element. Units are equipped with vane-type deflectors and drain valves. Deflector plate creates swirling action to the air stream assuring entrainments separation at all flow rates. Filter element with extra large surface assures fine filtration with low pressure drop. Turn manual drain counterclockwise to open and clockwise to close.

Installation of Filter

- Filter should be installed with reasonable accessibility for service whenever possible - repair service kits are available. Keep pipe and tubing lengths to a minimum with inside clean and free of dirt and chips. Pipe joint compounds should be used sparingly and applied only to the male pipe - never into the female port. Do not use PTFE tape to seal pipe joints - pieces have a tendency to break off and lodge inside the unit, possibly causing malfunction.
- Install unit so that air flow is in the direction of arrow. Installation must be upstream of and close to devices it is to service (valve, cylinder, tool, etc.). Position unit vertically with the bowl drain mechanism at the bottom. Free moisture will thus drain into the sump ("quiet zone") at the bottom of the bowl.

Operation of the Filter

- 1. Both free moisture and solids are removed automatically by the filter.
- 2. Manual drain filters must be drained regularly before the separated moisture and oil reaches the bottom of the element holder. Automatic drain models (pulse drain) will collect and dump liquids automatically. They are actuated when a pressure drop occurs within the filter.
- The filter element should be removed and replaced when the pressure differential across the filter exceeds 70 kPa (10 psig, 0.7 bar).

Service

▲ Caution: SHUT OFF AIR SUPPLY and exhaust the primary and secondary pressure before dis-assembling unit. (Units may be serviced without removing them from the air line.)

Servicing Filter Element

- 1. Unscrew threaded bowl and element holder. Then remove filter element, deflector, and gaskets.
- 2. Clean all internal parts, bowl, and body before re-assembling unit. See Polycarbonate bowl cleaning section.
- 3. Install deflector, filter element, and gaskets.
- 4. Attach element holder. Torque from 0.9 to 1.4 Nm (8 to 12 in-lbs).
- To assist with retaining bowl's o-ring while installing bowl, lubricate the o-ring (with a mineral based oil or grease). Then place on the bowl.
- Screw bowl into the body until it is stopped by body; then back off bowl 1/8 turn.
- 7. Apply pressure to the system and check for leaks. If leaks occur,

shut off the air supply, de-pressurize the system and make necessary adjustments to eliminate leakage.

If you have questions concerning how to service this unit, contact your local dealer or your customer service representative.

Service Kits- Filter

Kit# Description

- PS404 Polycarbonate Bowl with Manual Drain consists of items: 19, 24, 26 & 27
- PS408 Polycarbonate Bowl with Automatic Drain consists of items: 19, 24, 26, 28, 29, 30 & 31
- PS447B Metal Bowl with Manual Drain consists of items: 19, 24, 26 & 27
- PS451 Metal Bowl with Automatic Drain consists of items: 19, 24, 26, 28, 29, 30 & 31
- PS403 5 Micrometer Element Kit consists of items: 20, 21 & 24
- PS407 5 Micrometer Element <u>Cartridge</u> Kit consists of items: 20, 21, 22, 23 & 24
- PS401 40 Micrometer Element Kit consists of items: 20, 21 & 24

Parts Identification List - Filter Units

ltem#	Description	ltem#	Description
19	Bowl	26	O-ring (drain to bowl)
20	Gasket	27	Manual Drain (twist style)
21	Filter Element	28	O-ring - pulse drain
22	Filter Holder	29	Drain (body of pulse
23	Deflector		drain shown)
24	O-ring (body to bowl)	30	Diaphragm
25	Body	31	Pin

Safety: Transparent Bowls

\land Caution

Polycarbonate bowls, being transparent and tough, are ideal for use with Filters and Lubricators. They are suitable for use in normal industrial environments, but should not be located in areas where they could be subjected to direct sunlight, an impact blow, or temperatures outside of the rated range. As with most plastics, some chemicals can cause damage. Polycarbonate bowls should not be exposed to chlorinated hydro-carbons, ketones, esters, and certain alcohols. They should not be used in air systems where compressors are lubricated with fire-resistant fluids such as phosphate ester and di-ester types.

Metal bowls are recommended where ambient and/or media conditions are not compatible with Polycarbonate bowls. Metal bowls resist the action of most solvents, but should not be used where strong acids or bases are present or in salt laden atmospheres. Consult the factory for specific recommendations where these conditions exist.

TO CLEAN POLYCARBONATE BOWLS, USE MILD SOAP AND WATER ONLY! DO NOT use cleansing agents such as acetone, benzene, carbon tetrachloride, gasoline, toluene, etc., which are damaging to this plastic.

Metal bowls are recommended where ambient and/or media conditions are not compatible with polycarbonate bowls. If you have questions regarding bowl application, contact your customer service representative.

\land WARNING

To avoid Polycarbonate bowl rupture that can cause personal injury or property damage, do not exceed bowl pressure or temperature ratings. Polycarbonate bowls have a 1030 kPa (150 psig) pressure rating and a maximum temperature rating of 52°C (125°F).



Richland, Michigan 49083 269-629-5000

To avoid unpredictable system behavior that can cause personal injury and property damage:

- Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- · Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

Polycarbonate bowls, being transparent and tough, are ideal for use with Filters and Lubricators. They are suitable for use in normal industrial environments, but should not be located in areas where they could be subjected to direct sunlight, an impact blow, nor temperatures outside of the rated range. As with most plastics, some chemicals can cause damage. Polycarbonate bowls should not be exposed to chlorinated hydrocarbons, ketones, esters and certain alcohols. They should not be used in air systems where compressors are lubricated with fire-resistant fluids such as phosphate ester and diester types.

Metal bowls are recommended where ambient and/or media conditions are not compatible with polycarbonate bowls. Metal bowls resist the action of most such solvents, but should not be used where strong acids or bases are present or in salt laden atmospheres. Consult the factory for specific recommendations where these conditions exist.

TO CLEAN POLYCARBONATE BOWLS USE MILD SOAP AND WATER ONLY! DO NOT use cleansing agents such as acetone, benzene, carbon tetrachloride, gasoline, toluene, etc., which are damaging to this plastic.

Bowl guards are recommended for added protection of polycarbonate bowls where chemical attack may occasionally occur.

To avoid polycarbonate bowl rupture that can cause personal injury or property damage, do not exceed bowl pressure or temperature ratings. Polycarbonate bowls have a 150 PSIG pressure rating and a maximum temperature rating of 125°F.

Safety Guide

For more complete information on recommended application guidelines, see the Safety Guide section of Pneumatic Division catalogs or you can download the **Pneumatic Division Safety Guide** at: www.parker.com/safety Installation and Service Instructions: 2F101H 1/4" & 3/8" Economy 1/4", 3/8" & 1/2" Compact 1/2" & 3/4" Standard Particulate and Adsorber ISSUED: September, 2012 Supersedes: September, 2006 Doc.# 2F101, EN# 120039, Rev. 14

Introduction

Follow these instructions when installing, operating, or servicing the product.

Application Limits

These products are intended for use in general purpose compressed air systems only.

Adsorber Filters are **not effective** on: Carbon monoxide, carbon dioxide, methane, ethane, ethylene or hydrogen. For a complete list of vapors that can and cannot be adsorbed effectively by activated charcoal adsorbers consult the factory.

Maximum Recommended Pressure Drop:

	kPa	PSIG	bar
Particulate Filter	70	10	0.7
With Polycarbonate Bowl			_
	kPa	PSIG	bar
Operating Pressure Maximum	1000	150	10.3
Operating Temperature Maximum	5	2°C (125	°F)
Operating Temperature Minimum	0	°C (32°F)
With Metal Bowl			

	кра	P51G	bar
Operating Pressure Maximum	1700	250	17.0
Operating Temperature Maximum	80	0°C (175	°F)
Operating Temperature Minimum	0	°C (32°F)

ANSI Symbols



🖳 WARNING

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This document and other information from The Company, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application, including consequences of any failure and review the information concerning the product or systems in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by The Company and its subsidiaries at any time without notice.

Economy, Compact & Standard Particulate and Adsorber



Installation

- The filter should be installed with reasonable accessibility for service whenever possible – repair service kits are available. Keep pipe or tubing lengths to a minimum with inside clean and free of dirt and chips. Pipe joint compound should be used sparingly and applied only to the male pipe – never into the female port. Do not use PTFE tape to seal pipe joints – pieces have a tendency to break off and lodge inside the unit, possibly causing malfunction. Also, new pipe or hose should be installed between the filter and equipment being protected.
- 2. The upstream pipe work must be clear of accumulated dirt and liquids.
- Select a filter location as close as possible to the equipment being protected and upstream of any pressure regulator.
- 4. Install filter so that air flows in the direction of arrow on body.
- 5. Install filter vertically with bowl drain mechanism at the bottom. Free moisture will thus drain into the sump "quiet zone" at the bottom of the bowl.

Operation and Service

- 1. Manual drain filters must be drained regularly before the separated moisture and oil reaches the bottom of the lower baffle.
- 2. The particulate filter element should be removed and replaced when pressure differential across the filter is 10 PSIG.
- Adsorber elements are designed to adsorb vaporous contaminates. The relative efficiency of an adsorber varies depending on the vapor to be adsorbed and the environmental temperature. At higher temperatures, adsorbers become less efficient.

Adsorber elements are not particle filters. All particles and aerosols should be removed prior to adsorbing vaporous contaminants. The initial pressure drop across an adsorber element (1.5 PSIG maximum) should never increase. The presence of any liquids, aerosols or particulate matter in an adsorber indicates that the effective life of the element has been exceeded and the element should be replaced and the system cleaned.

The most effective method of testing whether an element needs to be replaced is to smell the air coming from the adsorber. Offensive odors will be present well before oil levels become detectable.

- 4. The differential pressure indicator, located on top of the filter body, gives a visual indication of the pressure differential across the filter element. Change the filter element when half or more of the orange piston is above the retaining ring when air is flowing. For units without a differential pressure indicator, pressure differential gauges should be used to determine when the maximum recommended pressure differential has been reached.
- 5. Shut off air supply and depressurize the unit, before servicing.
- After servicing, apply system pressure and check for air leaks. If leakage occurs, **Do Not Operate** — conduct servicing again.

Kits Available

Description	Economy 1/4" & 3/8"	Compact 1/4", 3/8" & 1/2"	Standard 1/2" & 3/4"
Element Kits*			
5 Micron	PS902	PS702	PS802
40 Micron	PS901	PS701	PS801
Adsorber	PS931	PS731	PS831
Porous Bronze	PS988	PS788	PS888
DPI Repair Kit	PS781	PS781	PS781

*Element kits include body / bowl seal.

() Lightly grease with provided lubricant.

Inspect for nicks, scratches, and surface imperfections. If present, reduced service life is probable and future replacement should be planned.

(C) Clean with lint-free cloth.

Richland, Michigan 49083 269-629-5000

To avoid unpredictable system behavior that can cause personal injury and property damage:

- Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

Introduction

Follow these instructions when installing, operating, or servicing the product.

Application Limits

These products are intended for use in general purpose compressed air systems only.

Electrical Rating:

5 Amps - 12/24VDC, 125/250VAC

With Polycarbonate Bowl

	kPa	PSIG	bar
Operating Pressure Maximum	1000	150	10.3
Operating Temperature Maximu	um	52°C (125°F)
Operating Temperature Minimu	ım	0°C (32°F)	

With Metal Bowl

	kPa	PSIG	bar
Operating Pressure Maximum	1700	250	17.0
Operating Temperature Maximu	um 8	80°C (175°F)	
Operating Temperature Minimu	m ()°C (32°F)	

Operation and Service

- 1. The particulate and coalescing filter element should be removed and replaced when pressure differential across the filter is 10 PSID.
- 2. Adsorber elements are designed to adsorb vaporous contaminates. The relative efficiency of an adsorber varies depending on the vapor to be adsorbed and the environmental temperature. At higher temperatures, adsorbers become less efficient.

Installation and Service Instructions: 2F102C 1/4" & 3/8" 05F/15F 1/4", 3/8" & 1/2" 06F/11F 3/8", 1/2" & 3/4" 07F/12F 3/4", 1" & 1-1/2" P3N Electronic DPI ISSUED: November, 2003 Supersedes: January, 2003 Doc.# 2F102, ECN# 030539, Rev. 4

Adsorber elements are not particle filters. All particles and aerosols should be removed prior to adsorbing vaporous contaminants. The initial pressure drop across an adsorber element (1.5 PSIG maximum) should never increase. The presence of any liquids, aerosols or particulate matter in an adsorber indicates that the effective life of the element has been exceeded and the element should be replaced and the system cleaned.

The most effective method of testing whether an element needs to be replaced is to smell the air coming from the adsorber. Offensive odors will be present well before oil levels become detectable.

- 3. If the electronic differential pressure indicator, located on top of the filter body is wired as normally open, it sends an electrical signal when the differential is greater than the specified range. If the electronic differential pressure indicator is wired as normally closed, there will be a signal until the differential exceedes the specified range. Change the filter element when this happens. For units without a differential pressure indicator, pressure differential gauges should be used to determine when the maximum recommended pressure differential has been reached.
- 4. Shut off air supply and depressurize the unit, before servicing.
- After servicing, apply system pressure and check for air leaks. If leakage occurs, **Do Not Operate** — conduct servicing again.

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Orientation / Assembly for (05F) Electronic DPI



Orientation / Assembly for (06F / 07F / P3N) Electronic DPI

Item 1: Screws (2) for mounting Electronic DPI Item 2: Electronic DPI with two seals - Preset at 10 PSID



Orientation / Assembly for (15F) Electronic DPI



Orientation / Assembly for (11F / 12F / P3N Coalescing) Electronic DPI

Item 3A: Adapter, 05F/15F Item 3B: Adapter, 06F/07F/11F/12F/P3N Item 6: Screw (2) for mounting adapter

Wiring Code

Pin 1: Common Pin 2: Normally Closed Pin 3: Normally Open





Adjusting Screw. Preset at 10 PSID. 1 turn is approx. 10 PSID. Turning screw clockwise until stopped is 20 PSID.

Cable Grip for Cables 1/4" to 9/32"

Kits Available

Description	05F/15F 1/4" & 3/8"	06F/11F 1/4", 3/8" & 1/2"	07F/12F 3/8", 1/2" & 3/4"	P3N 3/4", 1" & 1-1/2"
Element Kits*				
5 Micron	PS902	PS702	PS802	P3NKA00ESE
40 Micron	PS901	PS701	PS801	P3NKA00ESG
Coalescing Grade 6	PS924	PS724	PS824	P3NKA00ESC
Coalescing Grade 10	PS930	PS730	PS830	P3NKA00ES9
Adsorber	PS931	PS731	PS831	P3NKA00ESA
Porous Bronze	PS988	PS788	PS888	—
DPI Repair Kit	PS781	PS781	PS781	PS781
Electronic DPI Kit	PS764	PS764	PS764	PS764

*Element kits include body / bowl seal.

Richland, Michigan 49083 269-629-5000

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- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- · Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

Safety Guide

For more complete information on recommended application guidelines, see the Safety Guide section of Pneumatic Division catalogs or you can download the **Pneumatic Division Safety Guide** at: www.parker.com/safety

Introduction

Follow these instructions when installing, operating, or servicing the product.

Application Limits

These products are intended for use in general purpose compressed air systems only.

Adsorber Filters are not effective on: Carbon monoxide, carbon dioxide, methane, ethane, ethylene or hydrogen. For a complete list of vapors that can and cannot be adsorbed effectively by activated charcoal adsorbers consult the factory.

Maximum Recommended Pressure Drop:

	kPa	PSIG	bar
Particulate Filter	70	10	0.7
Operating Pressure Maximum	1700	250	17.0
Operating Temperature Maximum	n 80°C (175°F)		F)
Operating Temperature Minimum	C)°C (32°F)

ANSI Symbols



Installation & Service Instructions: 2F300E 1" Particulate, Adsorber & Coalescing Filter

ISSUED: October, 2006 Supersedes: March, 2005 Doc.# 2F300, ECN# 061068, Rev. 9

Installation

- The filter should be installed with reasonable accessibility for service whenever possible – repair service kits are available. Keep pipe or tubing lengths to a minimum with inside clean and free of dirt and chips. Pipe joint compound should be used sparingly and applied only to the male pipe – never into the female port. Do not use PTFE tape to seal pipe joints – pieces have a tendency to break off and lodge inside the unit, possibly causing malfunction. Also, new pipe or hose should be installed between the filter and equipment being protected.
- 2. The upstream pipe work must be clear of accumulated dirt and liquids.
- 3. Select a filter location as close as possible to the equipment being protected and upstream of any pressure regulator.
- 4. Install filter so that air flows in the direction of arrow on body.
- Install filter vertically with bowl drain mechanism at the bottom. Free moisture will thus drain into the sump "quiet zone" at the bottom of the bowl.

Operation and Service

- 1. Manual drain filters must be drained regularly before the separated moisture and oil reaches the bottom of the lower baffle.
- 2. The particulate filter element should be removed and replaced when pressure differential across the filter is 10 PSIG.
- 3. Adsorber elements are designed to adsorb vaporous contaminates. The relative efficiency of an adsorber varies depending on the vapor to be adsorbed and the environmental temperature. At higher temperatures, adsorbers become less efficient.

Adsorber elements are not particle filters. All particles and aerosols should be removed prior to adsorbing vaporous contaminants. The initial pressure drop across an adsorber element (1.5 PSIG maximum) should never increase. The presence of any liquids, aerosols or particulate matter in an adsorber indicates that the effective life of the element has been exceeded and the element should be replaced and the system cleaned.

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Particulate, Adsorber & Coalescing Filter

The most effective method of testing whether an element needs to be replaced is to smell the air coming from the adsorber. Offensive odors will be present well before oil levels become detectable.

- 4. For Coalescing filter, a 5 micrometer pre-filter is recommended to protect the high efficiency filter and to prolong the elements life.
- 5. The differential pressure indicator, located on top of the filter body, gives a visual indication of the pressure differential across the filter element. Change the filter element when half or more of the orange piston is above the retaining ring when air is flowing. For units without a differential pressure indicator, pressure differential gauges should be used to determine when the maximum recommended pressure differential has been reached.
- 6. Shut off air supply and depressurize the unit, before servicing.
- 7. After servicing, apply system pressure and check for air leaks. If leakage occurs, Do Not Operate conduct servicing again.

Service Kits Available

Description	Kit Number	Contains Items
Element Kits -		
5 Micron	P3NKA00ESE	
40 Micron	P3NKA00ESG	
Adsorber	P3NKA00ESA	(5) Bowl Seal and
25 Micron Porous Bronze	P3NKA00ESJ	(2) Element
Coalescing / Element Grade 6	P3NKA00ESC	
Coalescing / Element Grade 10	P3NKA00ES9	
DPI Repair Kit	PS781	(6) DPI components (not all shown)
Auto Drain Kit	PS506	(7) Auto Drain Assembly



Richland, Michigan 49083 269-629-5000

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- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

Polycarbonate bowls and sight domes, being transparent and tough, are ideal for use with Filters and Lubricators. They are suitable for use in normal industrial environments, but should not be located in areas where they could be subjected to direct sunlight, an impact blow, nor temperatures outside of the rated range. As with most plastics, some chemicals can cause damage. Polycarbonate bowls and sight domes should not be exposed to chlorinated hydrocarbons, ketones, esters and certain alcohols. They should not be used in air systems where compressors are lubricated with fire-resistant fluids such as phosphate ester and diester types.

Metal bowls are recommended where ambient and/or media conditions are not compatible with polycarbonate bowls. Metal bowls resist the action of most such solvents, but should not be used where strong acids or bases are present or in salt laden atmospheres. Consult the factory for specific recommendations where these conditions exist.

TO CLEAN POLYCARBONATE BOWLS USE MILD SOAP AND WATER ONLY! DO NOT use cleansing agents such as acetone, benzene, carbon tetrachloride, gasoline, toluene, etc., which are damaging to this plastic.

Bowl guards are recommended for added protection of polycarbonate bowls where chemical attack may occasionally occur.

To avoid polycarbonate bowl rupture that can cause personal injury or property damage, do not exceed bowl pressure or temperature ratings. Polycarbonate bowls have a 150 PSIG pressure rating and a maximum temperature rating of 125°F.

Safety Guide

For more complete information on recommended application guidelines, see the Safety Guide section of Pneumatic Division catalogs or you can download the **Pneumatic Division Safety Guide** at: www.parker.com/safety

Installation

- 1. Refer to WARNINGS and CAUTIONS.
- 2. Purge downstream air line of oil.
- 3. Install the unit with the air flowing in the direction indicated by the arrow on the body and / or the DP2 indicator.

Installation & Service Instructions 2F400 Large Ported Particulate Filters 35F & 43F with Variations and Accessories ISSUED: August, 2011 Supersedes: May, 2011 Doc. #2F400, EN#110617, Rev. 2

- 4. The drain line connection is dependent on the type of drain that is selected.
- Maximum inlet pressure and operating temperature ratings are: units with DP2 150 psig (10,3 bar) 150°F (66°C); units without DP2: 300 psig (20 bar) 150°F (66°C).

Maintenance

- 1. TO CLEAN OR REPLACE FILTER ELEMENT: Shut off air supply andreduce pressure in the unit to zero, remove the 8 screws from the filterhousing, unscrew the filter support and remove filter element.
 - a. IF THE UNIT HAS A RIGID FILTER ELEMENT: remove and clean period-ically by tapping on a hard surface, and blowing off with air blow gun.Torque element support to 8 ±1 FT.-LB. when replacing element. Element should be cleaned/replaced when the DP2 pressure indicator iscompletely red or when the DP3 reads 7 psi (0,5 bar).
- 2. When the bowl becomes dirty, clean by wiping with dry, clean cloth.
- Before placing the unit in service, make sure that the bowl is properly reinstalled, and securely bolted in place using the noted torque specifications.

Repair Kits And Replacement Parts

Filter Element kit (35F)	
(includes filter element, o-ring / gasket)	FRP-95-505
Filter Element Kit (43F)	
(includes filter element, o-ring / gasket)	FRP-95-508
Drain Plate Kits:	
Drain Plate 9/16 diameter (use with internal automatic	mechanical
float drain no. P32KA00DA)	GRP-95-391
Drain Plate (1/2 NPT)	GRP-95-393
Drain Plate (1/2 BSPP)	GRP-95-395
Bowl O-ring Kit (43F)	GRP-95-290
Bowl O-ring Kit (35F)	GRP-95-291
Differential Pressure Gauge	DP3-01-000
Differential Pressure Indicator (Standard)	DP2-01-001
Differential Pressure Removal Cap Kit	GRP-95-022
Internal Drains:	
Automatic Mechanical Drain	
(Fluorocarbon Seals)	P32KA00DA

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Large Ported Particulate Filters 35F and 43F with Variations and Accessories

Automatic Electric Drain Valves

Model Number Kit	Port Size NPT	Voltage	Operating Pressure
WDV3-G14BL	1/2"	115 VAC	232 PSIG
WDV3-G24BL	1/2"	230 VAC	232 PSIG
WDV3-G34BL	1/2"	24 VDC	232 PSIG

Zero Air Loss Condensation Drain

Model Number Kit	Port Size NPT	Voltage	Operating Pressure
ED3002N115-KL	1 x 3/8, 3/8	115 VAC	232 PSIG
ED3004N115-KL	1 x 1/2, 3/8	115 VAC	232 PSIG
ED3007N115-KL	2 x 1/2, 3/8	115 VAC	232 PSIG
ED3030N115-KL	2 x 1/2, 3/8	115 VAC	232 PSIG
ED3100N115-KL	2 x 1/2, 3/8	115 VAC	232 PSIG

DP3 Differential Pressure Gauge Installation Instructions on 3x / 4x Series Filters

- 1. Remove and discard the plastic cap, screws and O-rings from top of unit.
- 2. To install the new DP3 Differential Pressure Gauge, pry the cap out of the housing and separate the mounting block from the DP3 by removing the 2 screws under the cap. Make sure that air flow direction arrows on DP3 match flow arrows (same direction) on filter unit. Make sure O-Rings are properly seated on bottom of DP3, and attach DP3 to filter, using the special 60mm mounting screws (2 required) with flat ground on threads.

CAUTION! Overtightening the screws may damage the Differential Pressure Gauge.



- * CAUTION: Use special 60 mm (long) screw to mount gauge to filter only.
 - 3. Replace coalescing element when differential pressure reaches the **red** band.

35F / 43F



Automatic Mechanical Float Drain



Richland, Michigan 49083 269-629-5000

PF602 Series Filters

ISSUED: November, 2003 Supersedes: August, 2002 Doc.# 3F101, ECN# 030539, Rev. 1

🕂 WARNING

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- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

Introduction

Follow these instructions when installing, operating, or servicing the product.

Application Limits

These products are intended for use in general purpose compressed air systems only.

Maximum Recommended Pressure Drop:

	kPa	PSIG	bar
Particulate Filter	70	10	0.7
	kPa	PSIG	bar
Operating Pressure Maximum	2069	200	20.7
Operating Pressure Maximum	2000	300	20.7
with Automatic Drain*	1207	175	12.0

*When using an Automatic Drain, minimum inlet pressure is 69kPa (15 PSIG & 0 bar)

Operating Temperature Range:

Manual Drain	0°C to 82°C (32°F to 180°F)
Automatic Drain	0°C to 49°C (32°F to 120°F)

Symbols



Filter w/Manual Drain

Installation

- Filter unit should be installed with reasonable accessibility for service whenever possible - repair service kits are available. Keep pipe or tubing lengths to a minimum with inside clean and free of dirt and chips. Pipe joint compound should be used sparingly and applied only to the male pipe never into the female port. Do not use PTFE tape to seal pipe joints - pieces could break off from the outlet port and lodge inside units which are located downstream, possibly causing malfunction.
- 2. Blow all upstream pipe work clear of accumulated dirt and liquids.
- 3. Select a filter location as close as possible to the equipment being protected and upstream of any pressure regulator.
- 4. Install filter so that air flow is in the direction of the arrow.
- 5. Install filter vertically with the bowl drain mechanism at the bottom. Free moisture will thus drain into the sump "quiet zone" at the bottom of the bowl (automatic drain models are recommended as standard equipment).

Operation

Both free moisture and solids are removed automatically by the filter. There are no moving parts.

The filter element should be changed when pressure differential across the filter is 69 kPA (10 PSIG). Pressure differential gauges should be used to determine when the maximum recommended pressure differential has been reached. (See **Service Procedure** section.)

▲ Caution: DO NOT EXCEED THE RATED RECOMMENDED FLOWS. The minimum flow is ten percent of the normal rating.

Manual drain filters must be drained regularly before the separated moisture and oil reaches the bottom of the filter element. Automatic drain models will collect and dump the liquid automatically.

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Service Procedure - (Refer to Figure 1)

A Caution: Shut off air supply and exhaust the pressure trapped within the filter bowl before servicing unit.

- 1. Unscrew threaded collar and remove the bowl from the body.
- 2. To install a new filter element, use the following procedure:
 - a. Unscrew the lower baffle and remove filter element.
 - b. This element can not be cleaned and should be replaced when a pressure differential across the filter unit becomes excessive.
 - c. Clean all internal parts and bowl before reassembling.
 - d. Install element.
 - e. Attach lower baffle and tighten.
 - f. Lubricate bowl seal to assist with retaining it in position.
- A Caution: Use only mineral based oils or grease. Do not use synthetic oils such as esters and do not use silicones.
 - g. Place new bowl seal into the groove in the body.
- 3. Place bowl into collar and position bowl against the body and tighten collar.

If you have questions concerning how to service this unit, contact your local authorized dealer or your customer service representative.



PF602 Filter Unit with Twist Drain Figure 1

Service Kits Available



() Lightly grease with provided

lubricant.



Torque: Nm (In.-Lb.)



PF602 Filter Unit with Automatic Drain Figure 2

Richland, Michigan 49083 269-629-5000

ENGLISH

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- Medium must be moisture-free if ambient temperature is below freezing.
- · Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
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EXTRA COPIES OF THESE INSTRUCTIONS ARE AVAILABLE FOR INCLUSION IN EQUIPMENT / MAINTENANCE MANUALS THAT UTILIZE THESE PRODUCTS. CONTACT YOUR LOCAL REPRESENTATIVE.

Installation

- 1. Refer to WARNINGS.
- 2. Install as close as possible to point where air is being used.
- 3. Install so that air flows into the body and out to the adapter.
- Maximum pressure rating is 200 PSIG (14 bar). Temperature range is 32°F to 150°F (0°C to 65.5°C).

Maintenance

- 1. Service unit at least every 6 months.
- 2. Replace filter element periodically, or when pressure drop exceeds 10 PSIG.

Repair Kits and Replacement Parts

Filter KitPS436

Installation and Service Instructions: 3F200

1/4" 02F Particulate Filter

ISSUED: March, 2006

Supersedes: None

Doc.# 3F200, NPR# 060050, Rev. 1

FRENCH

FICHE D'INSTALLATION ET D'ENTRETIEN Filtre modèle 02F

Afin d'éviter un fonctionnement imprévu du système pouvant occasionner des blessures aux personnes et des dommages matériels :

- Débrancher l'alimentation électrique (si nécessaire) avant toute installation, entretien ou conversion.
- Débrancher l'alimentation en air et dépressuriser toutes les canalisations d'air connectées à cet appareil avant installation, entretien ou conversion.
- Utiliser l'appareil conformément aux normes de pression, température, et autres conditions spécifiées par le fabricant dans ces instructions.
- Le médium doit être exempt d'humidité si la température descend en dessous de 0°C.
- · L'entretien doit se faire conformément aux procédures décrites ici.
- L'installation, l'entretien, et la conversion de ces appareils doivent être effectués par des personnels qualifiés, au fait des techniques pneumatiques.
- Après installation, entretien, ou conversion, les alimentations en air et en électricité (si nécessaire) seront connectées et l'appareil testé pour vérifier son fonctionnement correct et l'absence de fuites. Si l'appareil présente une fuite audible ou ne fonctionne pas correctement, ne pas l'utiliser.
- Les inscriptions concernant les avertissements et spécifications sur l'appareil ne devront pas être recouvertes de peinture, etc. Si le masquage est impossible, contactez votre représentant local pour des étiquettes de remplacement.

1 AVERTISSEMENT

LA DEFAILLANCE, LE CHOIX ERRONE OU L'USAGE NON CONFORME DES PRODUITS ET/OU SYSTEMES ICI DECRITS, OU PRODUITS Y AFFERANT, PEUVENT ENTRAINER LA MORT, DES BLESSURES AUX PERSONNES ET DES DOMMAGES MATERIELS.

Ce document et autres informations de « The Company », ses filiales et distributeurs autorisés offre des options complémentaires d'utilisation du produit et/ou système pour des utilisateurs ayant l'expertise technique requise. Il est important que vous analysiez tous les aspects de l'usage prévu, y compris les conséquences de toute défaillance, et que vous passiez en revue les informations concernant les produits et systèmes dans le catalogue actuel des produits. En raison de la diversité des conditions de fonctionnement et d'utilisation de ces produits ou systèmes, l'utilisateur, et lui seul, selon ses propres analyses et tests, porte la responsabilité du choix final des produits et systèmes. Il est aussi de sa responsabilité pleine et entière de s'assurer que les produits soient utilisés conformément aux normes de sécurité et avertissements d'usage.

Les produits décrits ici, y compris, mais non exclusivement, les caractéristiques des produits, spécifications, aspects, disponibilité et prix, sont susceptibles de modification à tout moment et sans préavis par « The Company » et ses filiales.

DES EXEMPLAIRES SUPPLEMENTAIRES DE CES INSTRUCTIONS SONT DISPONIBLES POUR ACCOMPAGNER LES APPAREILS/MANUELS D' EN-TRETIEN CORRESPONDANT A CES PRODUITS. CONTACTEZ VOTRE RE-PRESENTANT LOCAL.

Installation

- 1. Lire L'AVERTISSEMENTS ci-haut avant l'installation.
- 2. Installer le dispositif aussi près que possible du point d'utilisation de l'air.
- 3. Installer le dispositif de manière à ce que l'air entre par le corps et sorte par l'adaptateur.
- La pression maximale d'utilisation est de 14 bars (200 PSIG). La température d'utilisation se situe entre 0°C et 65,5°C (de 32°F à 150°F).

Entretien

- 1. Effectuer l'entretien du dispositif au moins tous les six mois.
- 2. Remplacer l'élément filtrant périodiquement ou lorsque la pression baisse de plus de 10 PSIG.

Trousses de Rèparation et Pièces de Rechange

Trousse de filtre	PS436
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SPANISH

HOJA DE INSTALACION Y MANTENIMIENTO Filtro Modelo 02F

ADVERTENCIA

Para evitar un comportamiento impredecible del sistema que pueda ocasionar lesiones personales y daños a la propiedada

- Antes de instalar, reparar o convertir, desconecte el suministro eléctrico (cuando sea necesario).
- Antes de instalar, reparar o convertir, desconecte el suministro de aire y despresurice todas las líneas de aire que están conectadas a este producto.
- Haga funcionar dentro de la presión, temperatura y demás condiciones especificadas por el fabricante y que se incluyen en estas instrucciones.
- El medio debe estar libre de humedad si la temperatura ambiente se encuentra por debajo del punto de congelación.
- Repare de acuerdo con los procedimientos que se incluyen en estas instrucciones.
- La instalación, reparación y conversión de estos productos debe ser realizada por personal competente que entienda la manera en que se deben aplicar los productos neumáticos.
- Después de la instalación, reparación y conversión, se debe conectar los suministros eléctricos y de aire (cuando sea necesario), y el producto se debe poner a prueba para determinar que funciona correctamente y no tiene pérdidas. Si se detecta una pérdida audible, o si el producto no funciona correctamente, no lo ponga en funcionamiento.
- Las advertencias y especificaciones que aparecen en el producto no deben estar cubiertas por pintura, etc. Si no resulta posible colocarlo con cinta adhesiva, póngase en contacto con su representante local para obtener etiquetas de repuesto.

ADVERTENCIA

EL FALLO O LA SELECCIÓN INCORRECTA O EL USO INCORRECTO DE LOS PRODUCTOS Y/O SISTEMAS AQUÍ DESCRITOS U OTROS AR-TÍCULOS RELACIONADOS PUEDE RESULTAR EN MUERTE, LESIONES PERSONALES Y DAÑO A LA PROPIEDAD.

Este documento y demás información de la compañía, sus subsidiarias y distribuidores autorizados ofrecen opciones de productos y sistemas para mayor investigación por parte de los usuarios que cuentan con conocimientos técnicos. Es importante que analice todos los aspectos de su aplicación, incluyendo las consecuencias de cualquier fallo y que revise la información concerniente al producto o los sistemas que se encuentran en el catálogo actual de productos. Debido a la variedad de condiciones de funcionamiento y aplicaciones para estos productos o sistemas, el usuario, mediante su propio análisis y pruebas, es únicamente responsable por la selección final de los productos y sistemas, y por garantizar que se cumpla con todos los requisitos de funcionamiento, seguridad y advertencia de la aplicación.

Los productos aquí descritos, incluyendo pero sin limitarse, a las caracterís-ticas del producto, las especificaciones, los diseños, la disponibilidad y los precios, están sujetos a cambios por parte de la compañía y de sus subsidiarias en cualquier momento sin aviso.

SE PUEDE OBTENER COPIAS ADICIONALES DE ESTAS INSTRUCCIONES PARA INCLUIR CON EL EQUIPO / LOS MANUALES DE MANTENIMIENTO QUE UTILIZAN ESTOS PRODUCTOS. COMUNIQUESE CON SU REPRESENTANTE LOCAL.

Instalacion

- 1. Remítase a la ADVERTENCIAS.
- 2. Efectúe la instalación lo más cerca posible del punto donde se está utilizando el aire.
- 3. Efectúe la instalación de modo que el aire circule dentro del cuerpo y fuera del adaptador.
- 4. La clasificación de presión máxima es de 14 bar (200 PSIG). El rango de temperatura es de 0°C a 65,5°C (32°F a 150°F).

Mantenimiento

- 1. De servicio a la unidad por lo menos cada seis meses.
- 2. Reemplace el elemento del filtro periódicamente, o cuando la caída de presión exceda 10 PSIG.

Juegos de Reparacion y Repuestos

Juego de filtrosPS436

- Filter Model 02F
- Filtre modèle 02F
- Filtro Modelo 02F



1 ADAPTER ADAPTATEUR ADAPTADOR



JUNTA TORICA FILTER ELEMENT



4 BAFFLE CHICANE DESVIADOR

5 BODY CORPS CUERPO



of 125°F (52°C).

EXTRA COPIES OF THESE INSTRUCTIONS ARE AVAILABLE

FOR INCLUSION IN EQUIPMENT / MAINTENANCE MANUALS THAT UTILIZE THESE PRODUCTS. CONTACT YOUR LOCAL REPRESENTATIVE.

(FR) Λ MISE EN GARDE Afin de prévenir tout comportement imprévisible du système pouvant entraîner des accidents et des dommages matériel Débrancher l'alimentation électrique (s'il y a lieu) avant de procéder à l'installation, à l'entretien ou à la tran Débrancher l'approvisionnement en air et mettre hors pression toutes les conduites d'air de ce produit avant de procéder à l'installation, à l'entretien ou à la transformation. Faire fonctionner dans les conditions de pression, de température et autres qui sont indiquées dans ces instructions Si la température ambiante est inférieure au point de congélation, le fluide doit être exempt d'humidité. Effectuer l'entretien conformément aux procédures qui sont indiquées dans ces instructions.

L'installation, l'entretien et la transformation de ces produits doivent être effectués par des personnes familiarisées avec les produits nneumatiques.

Après l'installation, l'entretien ou la transformation, rétablir l'alimentation électrique ainsi que l'approvisionnement en air (s'il y a lieu) ettester le produit afin de s'assurer qu'il fonctionne bien et qu'il n'y a pas de fuites. Si une fuite s'entend ou si le produit ne fonctionne pas correctement, ne pas le mettre en service.

Les mises en garde et les indications portées sur le produit ne doivent pas être recouvertes par de la peinture, etc. Si le masquage n'est pas possible, contacter le représentant local pour obtenir des étiquettes de remplacement.

Les mises en garde et les indications portées sur le produit ne doiven pas être recouvertes par de la peinture, etc. Si le masquage n'est pas possible, contacter le représentant local pour obtenir des étiquettes de remplacement

(FR) Λ MISE EN GARDE

LA NON OBSERVATION D'INSTRUCTIONS OU LA SÉLECTION IMPROPRE OU L'USAGE INAPPROPRIÉ DES PRODUITS ET/OU DES SYSTÈMES DÉCRITS AUX PRÉSENTES OU ARTICLES CONNEXES, PEUVENT ENTRAÎNER LA MORT, DES PRÉJUDICES CORPORELS ET/OU DES DOMMAGES MATÉRIELS.

Le présent document et toute autre information provenant de la Société, de ses filiales et distributeurs agréés se référent à des produits et/ou des systèmes pouvant faire l'objet de tests et de contrôles de la part d'utilisateurs compétents, possédant une expertise technique. Il est important que vous analysiez tous les aspects de votre application, notamment les conséquences d'une défaillance, et étudiiez les informations concernant le produit ou les systèmes qui figurent dans le catalogue actuel. Compte tenu de la variété des conditions d'exploitation et les applications inhérentes à ces produits et/ou systèmes, l'utilisateur est, par le biais de ses propres analyses et tests, seul responsable de la sélection finale desdits produits et/ou systèmes et s'engage à ce que son application réponde à tous les critères relatifs aux performances, à la sécurité et aux mises en garde

Les produits décrits aux présentes, y compris et sans limitation, les caractéristiques produit, les spécifications, les conceptions, la disponibilité et les prix, peuvent faire l'objet de modifications par la Société et ses filiales, à tout moment et sans préavis

(FR)

如需多份涉及这些产品维修/操作指南的使用说明书。请联系当

地办事处。

Durs et transparents, les bols en polycarbonates sont parfaitement indiqués pour l'utilisation dans les filtres et les lubrificateurs. Ils sont compatibles avec les milieux industriels normaux mais ne doiv ent pas être placés dans des lieux où ils pourraient être exposés à la lumière directe du soleil, à des chocs ou à des températures situées en-dehors de leur plage d'utilisation nominale. Comme la plupart des plastiques, cette matière peut être endommagée par certains produits chimiques. Les bols en polycarbonate ne doivent pas être exposés aux hydrocarbures chlorés. aux cétones, aux éthers et à certains alcools. Ils ne doivent pas être utilisés dans des systèmes pneumatiques dont les compresseurs sont lubrifiés par des fluides résistant au feu tels que les esters et diesters de phosphate.

Les bols métalliques sont recommandés lorsque le milieu et/ou le fluide sont incompatibles avec les bols en polycarbonates. Les bols métalliques sont résistants à la plupart de ces solvants mais ne doivent pas être utilisés en milieu fortement acide ou basique, ou en atmosphère salée. Si de telles conditions prévalent, adressez-vous au fabricant afin d'obtenir des recommandations spécifiques.

NETTOYER LES BOLS EN POLYCARBONATE UNIQUEMENT À L'EAU ET AU SAVON DOUX ! NE PAS utiliser d'agents nettoyants tels que l'acétone, le benzène, le tétrachlorure de carbone. l'essence, le toluène, etc., qui endommageraient ce plastique

(FR) Guide de sécurité

Pour obtenir de plus amples informations sur les directives à appliquer recommandées prière de vous reporter à la section Guide de sécurité des catalogues de la Pneumatic Division ou de télécharger le Guide de sécurité de la Pneumatic Division sur le site : www.parker.com/safety

(FR) Λ MISE EN GARDE

Pour éviter que le bol de polycarbonate se rompe et provoque des préjudices corporels ou des dommages matériels, ne pas dépasser les limites maximales de pression et de température, à savoir 150 PSIG (10 bar) et 125 °F (52°C).

DES EXEMPLAIRES DE CES INSTRUCTIONS SONT DISPONIBLES POUR INSERTION DANS LE MATÉRIEL OU LES MANUELS D'ENTRETIEN QUI UTILISENT CES PRODUITS. VEUILLEZ CONTACTER VOTRE REPRÉSENTANT LOCAL

(DE) Æ WARNUNG

Als Schutz vor unvorhersehbarem Systemverhalten, das zu Verletzungen und Sachschäden führen kann, sind folgende Maßnahmen zu ergreifen

- Vor Einbau, Servicearbeiten oder Umbau gegebenenfalls die orgung unterbrechen
- Vor Einbau, Servicearbeiten oder Umbau die Druckluftversorgung unterbrechen und alle an das Produkt angeschlossen Luftleitungen vom Druck befreien
- Im Betrieb sind die vom Hersteller angegebenen Druck- und Temperaturbereiche und die übrigen in der Betriebsanleitung aufgeführten Betriebsbedingungen einzuhalten.
- Das Betriebsmedium muss bei Umgebungstemperaturen ur dem Gefrierpunkt absolut trocken sein.
- Servicearbeiten sind gemäß den in diesem Handbuch aufgeführten Vorgehensweisen durchzuführen
- Einbau, Servicearbeiten und Umbau dieser Produkte dürfer nur von geschulten Mitarbeitern vorgenommen werden, die über gute Kenntnisse beim Einsatz von Pneumatikprodukte verfügen.
- Nach Finhau, Servicearbeiten oder Umbau ist die Strom- und Druckluftversorgung bei Bedarf wieder anzuschließen und das Produkt einer sorafältigen Dichtigkeits- und Funktionsprüfung zu unterziehen. Wenn eine hörbare Undichtigkeit vorliegt oder das Produkt nicht einwandfre funktioniert, darf es nicht in Betrieb geno
- Warntexte und technische Angaben auf dem Produkt dürfen nicht durch Farbe oder dgl. verdeckt sein. Wenn sich die Schilder nicht abdecken lassen, hält der Händler vor Ort neue Schilder bereit.

MARNUNG (DE)

DUBCH DAS VERSAGEN ODER DIE UNSACHGEMÄSSE AUSWAHL ODER VERWENDUNG DER HIER BESCHRIEBENEN PRODUKTE UND/ODER SYSTEME ODER DAMIT IN VERBINDUNG STEHENDER GERÄTE KANN ES ZU TODESFÄLLEN, VERLETZUNGEN UND SACHBESCHÄDIGUNGEN KOMMEN.

Dieses Dokument und andere Information der Parker Hannifin Corporation ihrer Niederlassungen und autorisierten Händler stellt Produkt- und/oder Systemoptionen zur Verfügung, die durch einen Anwender mit entsprechenden technischen Kenntnissen vor dem Einsatz auf Eignung überprüft werde müssen. Es ist wichtig, dass alle Aspekte der Anwendung analysiert und die produkt- oder systemrelevanten Angaben dieses Produktkatalogs überprüft werden. Aufgrund der Vielfältigkeit von Betriebsbedingungen und Einsatzbereichen dieser Produkte oder Systeme ist der Anwender, in Form von eigenen Analysen und Tests, allein verantwortlich für die endgültige Auswahl des Produkts bzw. Systems. Er muss sicherstellen, dass alle Leistungsmerkmale Sicherheits- und Warnhinweise für den jeweiligen Einsatzbereich erfüllt sind.

Die hier beschriebenen Produkte, einschließlich aller Angaben zu Produktmerkmalen, Snezifikationen, Konstruktionen, Verfügbarkeit und eisgestaltung, können jederzeit, ohne Ankündigung und uneingeschränkt von der Parker Hannifin Corp. und ihren Niederlassungen geändert werden.



Transparente und robuste Behälter aus Polycarbonat eignen sich bestens für Filter und Schmiergeräte. Sie sind für den Einsatz unter normalen Industriebedingungen vorgesehen, sollten iedoch nicht direkter Sonneneinstrahlung oder Stößen ausgesetzt und nur innerhalb des angegebenen Temperaturbereichs benutzt werden. Wie alle Kunststoffe können sie durch gewisse Chemikalien beschädigt werden. Rehälter aus Polycarbonat sollten weder Chlorkohlenwasserstoffen noch Ketonen. Estern oder gewissen Alkoholen ausgesetzt werden. Sie sollten auch nicht in Druckluftsystemen eingesetzt werden, deren Kompressoren mit feuerfesten Flüssigkeiten wie z.B. Phosphatester oder Di-Ester geschmiert werden

Metallhehälter werden empfohlen, wenn Polycarbonathehälter aufgrund der Umgebungsbedingungen und der verwendeten Medien nicht verwendet werden dürfen. Metallbehälter widerstehen den meisten dieser Lösungsmittel, sollten jedoch keinen starken Säuren ode Basen ausgesetzt oder in salzhaltigen Umgebungen eingesetzt werden. Setzen Sie sich bei Einsätzen unter diesen Umgebungsbedingungen bitte mit dem Hersteller in Verbindung.

ZUR REINIGUNG VON POLYCARBONAT-BEHÄLTERN DÜRFEN AUSSCHLIESSLICH MILDE SEIFENLÖSUNGEN UND WASSER VERWENDET WERDEN! KEINE Reinigungsmittel wie Azeton, Benzol, Tetrachlorkohlenstoff, Benzin, Methylbenzol und dgl. verwenden, da diese den Kunststoff angreifer

(DE) Sicherheitshinweise

Ausführlichere Informationen über Richtlinien in Bezug auf die empfohlenen Einsatzbereiche siehe Sicherheitshinweise der Kataloge der Pneumatic Division, die hier auch heruntergeladen werden können: www.parker.com/safety

(DE) / WARNUNG

Damit der Polycarbonatbehälter nicht platzt und Verletzungen oder Sachbeschädigungen verursacht, sind die Richtwerte für Behälterdruck und Temperatureinstellung nicht zu überschreiten. Polycarbonatbehälter sind für einen Nenndruck von 10 bar und eine Höchsttemperatur von 52°C ausgelegt.

DES EXEMPLAIRES DE CES INSTRUCTIONS SONT DISPONIBLES POUR INSERTION DANS LE MATÉRIEL OU LES MANUELS D'ENTRETIEN OUILLITH ISENT CES PRODUITS VEHILLEZ CONTACTER VOTRE REPRÉSENTANT LOCAL

A ATTENZIONE Per evitare comportamenti imprevedibili del sistema che

possono provocare lesioni personali e danni alle cose Scollegare l'alimentazione elettrica (se necessario)

prima di installazione, manutenzione o conversione. Scollegare l'alimentazione dell'aria e depressurizzare tutte le condutture collegate al prodotto prima di

- installazione, manutenzione o conversione Utilizzare il prodotto alla pressione, alla temperatura e alle altre condizioni specificate in queste istruzioni
- Il mezzo deve essere privo di condensa se la temperatura
- mbiente è inferiore al punto di cong Effettuare la manutenzione secondo le procedure

 (\mathbf{T})

- specificate in queste istruzioni. Installazione manutenzione e conversione di questi
- prodotti devono essere effettuate da personale compe nente al funzionamento dei prodotti pneumatici

Dopo installazione, manutenzione o conversione, ricollegare le alimentazioni dell'aria ed elettrica (se necessario) e verificare che il prodotto funzioni correttamente e non vi siano perdite. In caso di perdita o funzionamento anomalo del prodotto, non utilizzarlo. Le avvertenze e le specifiche sul prodotto non devono

essere coperte da vernice ecc. Qualora siano illeggibili, contattare il proprio rappresentante locale per le targhette di ricambio.

(IT) ATTENZIONE

LA SCELTA OPPURE L'UTILIZZO ERRATO DEI PRODOTTI E/O SISTEMI IVI DESCRITTI OPPURE DEGLI ARTICOLI CORRELATI PUÒ PROVOCARE GRAVI LESIONI PERSONALI. MORTE E DANNI ALLE COSE.

Il presente documento ed altre informazioni fornite dall'azienda, relative affiliate e distributori autorizzati propongono opzioni di prodotti e/o sistemi il cui utilizzo deve essere valutato da utenti in possesso delle ompetenze tecniche necessarie. E' importante analizzare ogni aspetto della propria applicazione, comprese le conseguenze in caso di guasto. nonché valutare le informazioni relative al prodotto o sistema contenute nel presente catalogo di prodotti. In seguito alla varietà di condizioni di esercizio ed applicazioni per questi prodotti o sistemi. l'utente, con le proprie valutazioni ed i propri test, è l'unico responsabile della scelta finale di prodotti e sistemi nonché di accertarsi che tutti i requisiti d prestazioni, sicurezza e normativi dell'applicazione siano soddisfatti. I prodotti ivi descritti, inclusi ma non limitati a, caratteristiche dei prodotti, specifiche, design, disponibilità e prezzo, sono soggetti a

modifiche senza preavviso da parte dell'azienda e delle relative affiliate.

(TT) ▲ ATTENZIONE

Le vaschette in policarbonato, trasparenti e robuste, sono ideali per l'uso con filtri e lubrificatori. Sono indicate per l'uso in normali ambienti industriali, ma non devono essere collocate in aree esposte a luce solare diretta, urti o temperature al di fuori del range indicato. Come molte plastiche, alcune sostanze chimiche possono provocare danni. Le vaschette in policarbonato non devono essere esposte a idrocarburi, chetoni, esteri e determinati alcool. Non devono essere utilizzate in impianti pneumatici con compressori lubrificati con fluidi ignifughi come esteri e diesteri di fosfati.

Qualora le condizioni ambientali e/o il mezzo non siano compatibili con le vaschette in policarbonato, si raccomanda l'uso di vaschette metalliche. Le vaschette metalliche resistono alla maggior parte di questi solventi, ma non devono essere utilizzate in presenza di acidi o basi forti oppure in ambienti estremamente salini. Consultare la fabbrica per le eventuali accomandazioni specifiche.

PER LA PULIZIA DELLE VASCHETTE IN POLICARBONATO, UTILIZZARE ESCLUSIVAMENTE ACOUA E SAPONE NEUTROL NON utilizzare detergenti guali acetone, benzene, tetracloruro di carbonio. benzina, toluene ecc. che possono danneggiare la plastica.

(IT) Guida alla sicurezza

Per informazioni più complete sulle linee guida di applicazione raccomandate, consultare la sezione Guida alla sicurezza dei cataloghi Pneumatic Division o scaricare la guida all'indirizzo: www.parker.com/safety

(IT) ATTENZIONE

Per evitare la rottura delle vaschette in policarbonato e consequenti lesioni personali o danni alle cose, non superare la pressione o la temperatura nominale della vaschetta. Le vaschette in policarbonato hanno una pressione nominale di 150 PSIG (10 bar) e una temperatura massima di 125°F (52°C).

ULTERIORI COPIE DI QUESTE ISTRUZIONI SONO DISPONIBILI A INTEGRAZIONE DEL MANUALI DI USO / MANUTENZIONE PER GLI UTENTI DI QUESTI PRODOTTI. CONTATTARE IL PROPRIO RAPPRESENTANTE LOCALE

警告 Λ

(JA)

人が確実を負う危険が生じる、また物的確実が起こりうる予想外のシ ステム障害を避けるために:

- 機器の取り付け、取り扱いもしくは交換の前に電源を落としてくだ さい、
- 機器の取り付け、取り扱いもしくは交換前に全ラインの圧縮空気の 供給を止め、ライン内の圧縮空気を排出してください。
- 圧力、使用温度やコネクション等が説明書に記載されている範囲で 機器を使用ください。
- 外気が0度以下の場合、完全に乾燥した空気を供給してください。
- 説明書の記載通りに機器の操作を行ってください。
- 機器の取り付け、取り扱い、交換は空気圧機器の十分な知識と経験 を持った人が行ってください。
- 機器の取り付け、取り扱い、交換後に電源、圧縮空気を入れ機器が 正しく作動するか、空気漏れがないかを確認してください。もし空気 漏れが聞こえる場合や機器が適切に作動しない場合、電源、圧縮空気 を止めてください。

*警告"や仕様の詳細は機器に記載されていません。もし必要な場 合は最寄りの Parker、当社子会社にラベルを依頼してください。

(JA) 警告 /N

本文書に記載した製品、あるいは関連した物品を、正 しく選定しなかったり、使い方を誤ったりすれば死亡 事故や、怪我、そして物的損害を引き起こす可能性が あります。

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(JA) /八 注意

透明で頑丈なポリカーボネート製ボウルはフィルタとルプリケータとの使用 が理想です。プラスチックボウルは一般的な工業環境に適していますが、直 射日光が当たる環境、強風の環境、仕様範囲外の温度での使用は避けてくた さい。多くのプラスチックと同じようにいくつかの化学物質はボウルの損傷 させます。ポリカーボネイトボウルは塩素化炭化水素、ケトン、エステル、 いくつかのアルコール物質の環境では使用できません。ボウルはホスファタ ーゼエステルやジェステルタイプの耐火性潤滑油を使用したコンプレッサか らの供給エアを使用ください。

メタルボウルはポリカーボネイト製ボウルと使用温度、使用流体状況が同じ でないことを奨励します。メタルボウルは大概の溶剤に耐性がありますが、 強酸や塩の環境での使用は避けてください。そのような環境がある場合当社 までお問合せください。

ポリカーボネートボウルの洗浄には中性石鹸や水を使用ください。アセト ン、ベンジン、炭素四塩化物、ガソリン、トルエン等の洗浄液の使用はし ないでください。プラスチック不具合発生の可能性があります。

(JA) 注意事項

より詳細の奨励されるアプリケーションの指針は当社カタログの注意事項 をご参照ください。もしくは以下から空気圧機器注意事項がダウンロード できます。www.parker.com/safety

▲ 警告 JA

人が障害を負う、また物的損害の可能性があるポリカーボネートボウルの 破損を避ける為に、使用範囲圧力、温度範囲以上での使用はしないでくだ さい。 ポリカーボネートボウルの最高使用圧力は 1MPa、最高使用温度は 52°Cです。

上記以外のメンテナンスマニュアルを含む説明書が必要な場 合最寄の Parker 、そして当社の子会社や正規販売業者に連 絡してください。

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 (R) Adsorber Filter (P) アブソーバフィルク (R) 転射式过速 (R) 着 21球 習后 (R) Filter adsorbart (B) Filter adsorbartete (P) Adsorbartifiter (P) Filter ad assorbimento 	P31KA00ESA	P32KA00ESA	P33KA00ESA	
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Image: Server / Server (Server Server Serv	P31KA00BGB	-	-	UK Torque Values (P) 契加 トルク (w) 扭矩値 (N) たろ임 토르크 (帝 Couples (E) Valores del par de torsión (DE Drehmomentwerte (SE Åtdragningsmoment P31 Mini P32 Compact P33 Standard
(W) Mexical Boord / without Sight Gauge (W) ###### (W) ####################################	P31KA00BMM	P32KA00BMM	P33KA00BMM	(W)Bottom Plug (W) Bottom Plug (W) 成語 増発 (R) Bouchon de fond (B) Bouchon de fond (D) Tappo inferiore (D) ズブラグ (M) 荷手 音건コ (B) Tapón de fondo (W) Bratenolume
WP means or wanning without segment usage P Anticipation of the anticipa	P31KA00SGM	-	-	(w)Bonnet (の) 育り葉母 (市)Capotage
UT) Vascnetta metallica / Senza indicatore Drenaggio ad impulso				120 in. lbs. 480 in. lbs. 480 in. lbs.





(KR) 경고 Λ

예상하지 못한 인체의 위해나 제품의 치명적인 손상을 미연에 방지하기 위한 목적입니다

필요에 의해 조립이나 수리 또는 개조를 할 때는 공급전원을 차단하여 주십시요

 필요에 의해 조립이나 수리 또는 개조를 할 때는 에어공급을 차단하여 주십시요

동결을 방지하기 위해 완전 건조된 공기를 사용하여 주십시요.

 동결을 방지하기 위해 완전 건조된 공기를 사용하여 주십시요.. 수리를 위해 분해를 할 경우 취급설명서에 따라 주십시요..

 조립이나 수리 또는 개조는 공기압에 대한 충분한 지식과 경험을 가진 사람이 해 주십시요.

 조립이나 수리 또는 개조 후에는 압축공기와 전기를 접속하여 적절한 기능 검사 및 누설검사를 형해 주십시요. 만약 소리가 들릴 정도의 누설이 발생하거나 기기가 몰바르게 작동하지 않는 경우는 사용하지 말고 바르게 조립되어 있는지 확인해 주십시요.

제품에 명시된 경고나 사양은 훼손되거나 가려져서는 안됩니다. 만약 불가피한 경우 담당 책임자에게 연락하여 주십시요

\land 경고 (KR)

적절하지 못한 제품의 선정이나 사용으로 치명적인 손상을 주거나 인체에 위해 할 수 있으며 사망에 이를

수도 있습니다.

취급설명서에 게재되어 있는 제품은 사용 조건이 다양하므로 그 시스템에서의 적합성의 결정은 시스템의 설계자 또는 사양을 결정하는 사람이 필요에 따라 분석과 테스트를 행한 후 결정해 주십시요. 이 시스템의 소기 성능, 안전성의 보증은 시스템의 적합성을 결정한 사람의 책임이 됩니다. 앞으로도 최신의 제품 카탈로그와 자료에 따라 모든 사양 내용을 검토하여 기기의 고장 가능성에 대한 상황을 고려하여 시스템을 구성하여 주십시요. 취급설명서에 게재되어 있는 제품의 특성, 사양, 디자인, 성능 그리고 가격은 예고 없이 언제라도 변경될 수 있습니다.

(KR) //\ 주의

폴리카보네이트 보용은 투명하고 견고하여 필터나 루브리케이터에 사용하기에 이상적이며 일반 산업용에 적용하기에 적합합니다만 직사광선어 노출되거나 충격이 가해지는 장소와 온도범위를 벗어나는 곳에서의 사용은 피해야 합니다. 대부분의 플라스틱과 같이 일부 화학약품은 제품 손상의 원인이 될 수 있습니다. 폴리카보네이트 보울은 사영화탄소, 케톤, 초산 에스테르, 알콜에 노출되어서는 안되며 인산과 같은 내화성 유채로 은활된 컴프레셔 에어 시스템에서 사용을 피해야 합니다.

메탈 보울은 폴리카보네이트 보울을 적용할 수 없는 환경에 권장됩니다. 메탈 보울은 대부분의 솔벤트에 대해 견딜 수 있지만 강산성이나 염도가 높은 환경은 피해 주십시요. 이런 환경에서 사용할 경우 공장 설비담당자와 권장 사양에 대해 상의하여 주십시요.

폴리카보네이트 보울의 세척은 약 알칼리성 세제나 물을 사용하시고 절대

플라스틱에 손상을 줄 수 있는 아세톤, 벤젠, 카본 영화물, 가솔린, 돌루엔 동은 사용하지 말아 주십시요

(KR) 안전지침

보다 많은 제품정보와 올바른 취급 사례에 대해서는 공압사업부 카탈로그의 "안전한 사용을 위한 안내"나 Parker 홈페이지에서 자료를 다운 받을 수 있습니다. www.parker.com/safety

\land 경고 (KR)

인체에 위해나 제품의 손상을 가져올 수 있는 폴리카보네이트 보울의 파손을 피하기 위해 과도한 압력이나 온도범위에서 사용하지 마십시요.

폴리카보네이트 보울은 150 PSIG (10bar)의 압력범위와 최대 125% (52℃)에서 사용 가능합니다.

이 취급설명서를 장비에 첨가하거나 보전 매뉴얼을 위해 복사하여 사용하십시요. 필요한 경우 제품 취급점에 문의해 주십시요.

🗥 ADVERTENCIA

(ES)

- Para evitar comportamientos del sistema que puedar causar accidentes y daños materiales:
- Cuando proceda, desconectar la electricidad antes de la instalación, servicio o modificación
- Desconectar el aire y despresurizar todas las líneas conectadas a este producto antes de la instalación, servicio o modificación
- Trabajar con la presión, temperatura y demás condiciones recomendadas aquí por el fabricante.
- El aire no debe ser húmedo si la temp. ambiente es inferior a 0° C.
- Servicio según se indicada en estas instrucciones
- La instalación, el servicio y la modificación de estos productos deben ser realizados por personal calificado con conocimientos de los productos neumáticos.
- Después de realizada la instalación, el servicio o la modificación, se debe conectar el aire y la electricidad (cuando proceda) y el producto probado para verificar un funcionamiento correcto sin fugas. Si se escucha una fuga o si el producto no funciona normalmente, no incorporar al uso normal
- Las advertencias y especificaciones no deben ser tapadas con pintura o similar. Si no es posible protegerlas, contacte con el representante local para cambiar las etiquetas.

(ES)

LA SELECCIÓN ERRÓNEA O INCORRECTA O EL **USO INCORRECTO DE LOS PRODUCTOS Y/O** SISTEMAS O DE OBJETOS RELACIONADOS, PUEDE CAUSAR MUERTES, HERIDAS Y AVERÍAS.

Este documento y demás información de La Compañía, sus filiales y distribuidores autorizados ofrece opciones de productos y sistemas para que los usuarios con los conocimientos técnicos necesario profundicen sus análisis. Es importante que Ud. analice todos los aspectos de su aplicación, inclusive las posibles consecuencias de cualquier fallo y revise la información del producto o sistemas en el catálogo de productos correspondiente. Debido a la variedad de condiciones de funcionamiento y aplicaciones de estos productos y sistemas, el usuario. mediante sus propios análisis y pruebas, es el único responsable de realizar la selección final de los productos y sistemas y de garantizar el rendimiento, la seguridad y las advertencias necesarias de la aplicación La Compañía y sus subsidiarias se reservan el derecho de

modificar en cualquier momento y sin previo aviso los productos descritos aquí, incluyendo sin limitación sus características y especificaciones, diseños, disponibilidad y precios

(ES)

Los recipientes de policarbonato, transparentes y robustos, son ideales para el uso con filtros y lubricadores. Son especiales para el uso en entornos industriales pero no deben ser colocados en lugares en que reciban luz solar directa, golpes de aire n emperaturas fuera del rango estipulado. Como con la mayoría de los plásticos, algunos productos químicos pueden ser nocivos. Los recipientes de policarbonato no deben ser expuestos a hidrocarburos clorinados, ketones (cetonas), ésteres y ciertos alcoholes. No deben ser usados en sistemas de aire donde los compresores son lubricados con fluidos antiinflamables como por ejemplo ésteres de fosfato y diésteres Usar recipientes de metal cuando las condiciones del entorno o del medio utilizado no sean compatibles con los de policarbonato. Los recipientes de metal resisten a la mayoría de los disolventes, pero no deben ser usados con ácidos ni álcalis fuertes o en atmósferas cargadas de sal. En estas condiciones consulte con la fábrica para recomendaciones especiales

PARA LIMPIAR RECIPIENTES DE POLICARBONATO USAR SOLAMENTE AGUA Y JABÓN SUAVE! NO USAR agentes limpiadores como acetona, benceno, tetracloruro de carbono, gasolina, tolueno, etc. que afectan este plástico.

(ES) Guía de Seguridad

Para una información más detallada consultar la sección Guía de Seguridad de los catálogos de la Pneumatic Division o descargue la guía desde: www.parker.com/safety



Evite la rotura de los recipientes de policarbonato que pueden causar heridas o averías respetando los límites de presión y temperatura. Los recipientes de policarbonato tienen un límite de presión de 10 bar (150 PSIG) y de temperatura de 52°C (125°F)

SE PUEDEN OBTENER COPIAS EXTRAS DE ESTAS INSTRUCCIONES PARA ADJUNTAR AL EQUIPO Y/O MANUALES DE MANTENIMIENTO QUE UTILIZAN ESTOS PRODUCTOS. TOME CONTACTO CON EL REPRESENTANTE LOCAL

A VARNING!

(SE)

- Undvika oförutsett systembeteende som kan leda till person- och sakskada
- Koppla vid behov ur strömförsörjningen innan installationsservice- eller ombyggnadsarbete påbörjas.
- Koppla ur tryckluftförsörjningen och tryckavlasta alla luftledningar som är anslutna till den här produkten innan installations-, service- eller ombyggnadsarbete påbörjas.

Se till att tillverkarens föreskrivna tryck, temperatur och andra förhållanden som definieras i de här instruktionerna fölis

- Mediet måste vara fuktfritt om omgivningstemperaturen är lägre än noll grader.
- Service skall utföras på det sätt som beskrivs i de här instruktionerna

Installation, service och ombyggnad av dessa produkter skall utförs av kunnig personal som förstår hur pneumatiska produkter används

När installations-, service- eller ombyggnadsarbetet är klart skall tryckluft- och strömförsörjning (när sådan krävs) kopplas in och produkten funktionsprovas och läcksökas. Produkten får inte tas i drift vid hörbart läckage eller om den inte fungerar korrekt.

Varningar och specifikationer på produkten får inte målas över. Om det inte är möjligt att maskera sådan märkning vid målning, bör du kontakta vår lokale representant för att få nya skyltar.

(SE)

FELAKTIGT ELLER OLÄMPLIGT VAL OCH OLÄMPLIG ANVÄNDNING AV PRODUKTER OCH/ELLER SYSTEM SOM BESKRIVS HÄRI ELLER AV KRINGUTRUSTNING, KAN ORSAKA PERSON- OCH SAKSKADA OCH T O M DÖDSFALL

Detta dokument och annan information från företaget, dess dotterbolag och auktoriserade återförsäljare innehåller förslag på produkter och system, för närmare analys av användare med tekniska specialkunskaper. Det är viktigt att analysera alla aspekter på din applikation, inklusive konsekvenserna av ett maskinfel, och noggrant läsa informationen om produkten eller systemet aktuell produktkatalog. Beroende på de olika driftförhållandena och tillämpningarnaför dessa produkter och system, så ansvarar användaren helt siälv, genom egna analyser och provning, för det slutgiltiga valet av system och komponenter, och för att förvissa sig om att uppfylla alla krav på funktion. hållbarhet, underhåll, säkerhet och varningstexter för den avsedda tillämpninger

De produkter som beskrivs häri, inklusive, dock utan att begränsas därtill. samtliga produktfunktioner, specifikationer och konstruktioner samt alla uppgifter om tillgänglighet och prissättning kan när som helst komma att ändras av företaget eller dess dotterbolag, utan föregående meddelande därom

∧ OBSERVERA! (SE)

Behållare och synglas av polykarbonat, som är både genomskinligt och starkt, är idealiska för användning på filter och dimsmörjare. De är lämpliga för användning i vanlig industrimiljö, men bör inte placeras på platser där de kan utsättas för direkt solljus, slag eller temperaturer utanför föreskrivet temperaturområde. Polykarbonat kan ta skada vid kontakt med vissa kemikalier, precis om de flesta andra plaster. Kärl och synglas av polykarbonat bör inte exponeras för klorerade kolväten, ketoner, estrar eller alkoholer. De bör inte användas i luftsystem där kompressorerna smörjs med brandbeständig vätska, t ex fosfatestrar eller diestrar.

Vi rekommenderar metallkärl när miljön och/eller mediet är sådant att kärl av polykarbonat kan ta skada. Metallkärl klarar de flesta sådana lösningsmedel, men bör inte användas vid förekomst av starka syror eller baser och inte i atmosfär med hög salthalt. Rekommendationer för sådana förhållanden kan fås från fabriken.

ANVÄND BARA MILDTVÅLI ÖSNING MED VATTEN VID RENGÖRING AVKÄRLAVPOLYKARBONAT! Använd INTE sådana rengöringsmedel som aceton, benzen, koltetraklorid, bensin, toluen eller liknande, som är skadliga för den här typen av plast.

Säkerhetsguide

(SE)

Lavsnitten om säkerhet i pneumatikdivisionens kataloger hittar du mer information och riktlinjer. Denna information och dessa riktlinjer finns även på vår webbsida på adressen: www.parker.com/safety



Förhindra polykarbonatkärl att gå sönder och orsaka person- eller sakskada genom att se till att föreskrivna tryck och temperaturer inte överskrids. Polykarbonatkärl är tryckklassade för 10 bar och en maxtemperatur på 52 °C.

DESSA INSTRUKTIONER KAN FÅS I SÄRTRYCK. FÖR ATT BIFOGAS DRIFT- OCH UNDERHÅLLSINSTRUKTIONER. KONTAKTA I SÅ FALL DIN LOKALE PARKERREPRESENTANT.



Richland, Michigan 49083 269-629-5000

To avoid unpredictable system behavior that can cause personal injury and property damage:

- Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

Polycarbonate bowls, being transparent and tough, are ideal for use with Filters and Lubricators. They are suitable for use in normal industrial environments, but should not be located in areas where they could be subjected to direct sunlight, an impact blow, nor temperatures outside of the rated range. As with most plastics, some chemicals can cause damage. Polycarbonate bowls should not be exposed to chlorinated hydrocarbons, ketones, esters and certain alcohols. They should not be used in air systems where compressors are lubricated with fire-resistant fluids such as phosphate ester and di-ester types.

Metal bowls are recommended where ambient and/or media conditions are not compatible with polyurethane bowls. Metal bowls resist the action of most such solvents, but should not be used where strong acids or bases are present or in salt laden atmospheres. Consult the factory for specific recommendations where these conditions exist.

TO CLEAN POLYCARBONATE BOWLS USE MILD SOAP AND WATER ONLY! DO NOT use cleansing agents such as acetone, benzene, carbon tetrachloride, gasoline, toluene, etc., which are damaging to this plastic.

Safety Guide

For more complete information on recommended application guidelines, see the Safety Guide section of Pneumatic Division catalogs or you can download the **Pneumatic Division Safety Guide** at: www.wattsfluidair.com

Introduction

Follow these instructions when installing, operating, or servicing the product.

Application Limits

These products are intended for use in general purpose compressed air systems only.

Installation & Service Instructions IS-F602

F602 Particulate Filter

ISSUED: June, 2009 Supersedes: July, 2005 Doc. #ISF602. EN #090316. Rev. 3

Maximum Recommended Pressure Drop:

Particulate Filter	kPa 70	PSIG 10	bar 0.7	
With Polycarbonate Bowl	1-0-	DOLO	b	
Operating Pressure Maximum	кра 1034	150	bar 10	
Operating Temperature Range		4°C (40°F t	c to 49°C o 120°F)	
With Aluminum Bowl Operating Pressure Maximum	kPa 2068	PSIG 300	bar 21	
Operating Temperature Range (40°F to 180°F)		4°C	to 82°C	

With Zinc Bowl with Sight Gauge

Operating Pressure Maximum	kPa	PSIG	bar
	1723	250	17.0
Operating Temperature Range 40°F to 150°F)		4° (C to 66°C

ANSI Symbols

(



🕂 WARNING

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from The Company, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application, including consequences of any failure and review the information concerning the product or systems in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by The Company and its subsidiaries at any time without notice.



C Lightly grease with provided lubricant.

Inspect for nicks, scratches, and surface imperfections. If present, reduced service life is probable and future replacement should be planned.

Clean with lint-free cloth.

Installation

- The filter should be installed with reasonable accessibility for service whenever possible – repair service kits are available. Keep pipe or tubing lengths to a minimum with inside clean and free of dirt and chips. Pipe joint compound should be used sparingly and applied only to the male pipe – never into the female port. Do not use PTFE tape to seal pipe joints – pieces have a tendency to break off and lodge inside the unit, possibly causing malfunction. Also, new pipe or hose should be installed between the filter and equipment being protected.
- 2. The upstream pipe work must be clear of accumulated dirt and liquids.
- 3. Select a filter location as close as possible to the equipment being protected and upstream of any pressure regulator.
- 4. Install filter so that air flows in the direction of arrow on body.
- 5. Install filter vertically with bowl drain mechanism at the bottom. Free moisture will thus drain into the sump "quiet zone" at the bottom of the bowl.

Operation and Service

- 1. To service the filter, it is not necessary to remove the unit from the airline. Manual drain filters must be drained regularly before the separated moisture and oil reaches the bottom of the lower baffle.
- 2. The particulate Filter Element should be removed and replaced when pressure differential across the filter is 10 PSIG.
- 3. Shut off air supply and depressurize the unit, before servicing.
- 4. Carefully remove Bowl by turning counterclockwise.
- 5. Remove Filter Element, Baffle, and Retainer.
- Wipe parts, clean with soapy water or denatured alcohol, but do not use denatured alcohol on plastic bowl or sight gauge. If using compressed air to blow dry, be sure to wear appropriate eye protection.
- After servicing, apply system pressure and check for air leaks. If leakage occurs, **Do Not Operate** — conduct servicing again.

Kits Available

Description	Product	Bowl	Port
•	Number	Туре	Size
Bowls	DICOODY	_	4/41 0/01
Polycarbonate Zine with Sight Cauge	BK602Y	B	1/4", 3/8"
Delveerhopete	BK603WT		1/4, 3/0
Aluminum	BK603A	Б	1/2
Zinc with Sight Gauge	BK605WA	Ŵ	1/2"
Aluminum	BK603B	F	3/4" thru 2-1/2"
Zinc with Sight Gauge	BK605WB	Ŵ	3/4" thru 2-1/2"
Element Kits			
5 Micron	EK602VY	—	1/4", 3/8"
40 Micron	EK602Y	—	1/4", 3/8"
5 Micron	EK602VA	—	1/2"
40 Micron	EK602A	_	1/2"
5 Micron	EK602VB	—	3/4" thru 1-1/2"
40 Micron	EK602B	_	3/4" thru 1-1/2"
5 Micron Bronze	EK602VB-BR	—	3/4" thru 1-1/2"
	EK602C		3/4 tillu 1-1/2
40 Micron	ENOUZG		2,2-1/2
Manual	SA600V7-1	Δ١Ι	All Sizes
Piston (Poly Bowl Only)	RK602SY	B	1/4". 3/8"
Piston (Poly Bowl Only)	RK602SA	В	1/2"
External Auto.(8 oz. Poly & Metal)	SA602D	В	1/2"
External Auto. (16 oz. Aluminum)	SA603D	Е	1/2"
Internal Auto.	SA602MD	All	1/2"
External Auto.(16 oz. Metal Bowl)	SA602D	W	3/4" thru 2-1/2"
External Auto. (32 oz. Aluminum)	SA603D	E	3/4" thru 2-1/2"
Internal Auto.	SA602MD	All	3/4" thru 2-1/2"
Mounting Bracket Kits	SAE602 0571		1/4" 2/0"
	SAF602-0571		1/4, 3/0
(2 more unit required)	SAF602-0572	_	1/2
(2 per unit required)	SA200AVV57	_	3/4
(2 per unit required)	SA200CW57	_	1.
Repair Kits	DICOODIC		4/48 0/08
Deflector, Baffle Assy, Retaining Rod	RK602Y	_	1/4", 3/8"
Deflector, Baffle Assy, Retaining Rod	RK602A	_	1/2"
Deflector, Baffle Assy, Retaining Rod	RK602B	_	3/4", 1"
Deflector, Baffle Assy, Retaining Rod	RK602C	_	1-1/4", 1-1/2"
Deflector, Baffle Assy, Retaining Rod	RK602G	—	2", 2-1/2"
External Auto Drain (Short Float 602)	RK602D	—	1/2" thru 2-1/2"
External Auto Drain (Tall Float 603)	RK603D	—	1/2" thru 2-1/2"
Internal Auto Drain	RK602MD	—	1/4" thru 2-1/2"
Metal Bowl with Sight Gauge	RKB605WY	—	1/4", 3/8"
Metal Bowl with Sight Gauge	RKB605WA	—	1/2"



PDNSG-1 Pneumatic Division Safety Guide ISSUED: August 1 , 2006 Supersedes: June 1, 2006

Safety Guide For Selecting And Using Pneumatic Division Products And Related Accessories

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF PNEUMATIC DIVISION PRODUCTS, ASSEMBLIES OR RELATED ITEMS ("PRODUCTS") CAN CAUSE DEATH, PERSONAL INJURY, AND PROPERTY DAMAGE. POSSIBLE CONSEQUENCES OF FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THESE PRODUCTS INCLUDE BUT ARE NOT LIMITED TO:

- Unintended or mistimed cycling or motion of machine members or failure to cycle
- Work pieces or component parts being thrown off at high speeds.
- Failure of a device to function properly for example, failure to clamp or unclamp an associated item or device.
- Explosion
- Suddenly moving or falling objects.
- Release of toxic or otherwise injurious liquids or gasses.
- Before selecting or using any of these Products, it is important that you read and follow the instructions below.

1. GENERAL INSTRUCTIONS

- **1.1. Scope:** This safety guide is designed to cover general guidelines on the installation, use, and maintenance of Pneumatic Division Valves, FRLs (Filters, Pressure Regulators, and Lubricators), Vacuum products and related accessory components.
- **1.2. Fail-Safe:** Valves, FRLs, Vacuum products and their related components can and do fail without warning for many reasons. Design all systems and equipment in a fail-safe mode, so that failure of associated valves, FRLs or Vacuum products will not endanger persons or property.
- **1.3 Relevant International Standards:** For a good guide to the application of a broad spectrum of pneumatic fluid power devices see: ISO 4414:1998, Pneumatic Fluid Power General Rules Relating to Systems. See www.iso.org for ordering information.
- 1.4. Distribution: Provide a copy of this safety guide to each person that is responsible for selection, installation, or use of Valves, FRLs or Vacuum products. Do not select, or use Parker valves, FRLs or vacuum products without thoroughly reading and understanding this safety guide as well as the specific Parker publications for the products considered or selected.
- **1.5. User Responsibility:** Due to the wide variety of operating conditions and applications for valves, FRLs, and vacuum products Parker and its distributors do not represent or warrant that any particular valve, FRL or vacuum product is suitable for any specific end use system. This safety guide does not analyze all technical parameters that must be considered in selecting a product. The user, through its own analysis and testing, is solely responsible for:
 - Making the final selection of the appropriate valve, FRL, Vacuum component, or accessory.
 - Assuring that all user's performance, endurance, maintenance, safety, and warning requirements are met and that the application presents no health or safety hazards.
 - Complying with all existing warning labels and / or providing all appropriate health and safety warnings on the equipment on which the valves, FRLs or Vacuum products are used; and,
 - · Assuring compliance with all applicable government and industry standards.
- 1.6. Safety Devices: Safety devices should not be removed, or defeated.
- 1.7. Warning Labels: Warning labels should not be removed, painted over or otherwise obscured.
- **1.8. Additional Questions:** Call the appropriate Parker technical service department if you have any questions or require any additional information. See the Parker publication for the product being considered or used, or call 1-800-CPARKER, or go to www.parker.com, for telephone numbers of the appropriate technical service department.

2. PRODUCT SELECTION INSTRUCTIONS

- **2.1. Flow Rate:** The flow rate requirements of a system are frequently the primary consideration when designing any pneumatic system. System components need to be able to provide adequate flow and pressure for the desired application.
- 2.2. Pressure Rating: Never exceed the rated pressure of a product. Consult product labeling, Pneumatic Division catalogs or the instruction sheets supplied for maximum pressure ratings.
- 2.3. Temperature Rating: Never exceed the temperature rating of a product. Excessive heat can shorten the life expectancy of a product and result in complete product failure.
- **2.4. Environment:** Many environmental conditions can affect the integrity and suitability of a product for a given application. Pneumatic Division products are designed for use in general purpose industrial applications. If these products are to be used in unusual circumstances such as direct sunlight and/or corrosive or caustic environments, such use can shorten the useful life and lead to premature failure of a product.
- 2.5. Lubrication and Compressor Carryover: Some modern synthetic oils can and will attack nitrile seals. If there is any possibility of synthetic oils or greases migrating into the pneumatic components check for compatibility with the seal materials used. Consult the factory or product literature for materials of construction.
- 2.6. Polycarbonate Bowls and Sight Glasses: To avoid potential polycarbonate bowl failures:
 - Do not locate polycarbonate bowls or sight glasses in areas where they could be subject to direct sunlight, impact blow, or temperatures outside of the rated range.
 - Do not expose or clean polycarbonate bowls with detergents, chlorinated hydro-carbons, keytones, esters or certain alcohols.
 - Do not use polycarbonate bowls or sight glasses in air systems where compressors are lubricated with fire resistant fluids such as phosphate ester and di-ester lubricants.

- 2.7. Chemical Compatibility: For more information on plastic component chemical compatibility see Pneumatic Division technical bulletins Tec-3, Tec-4, and Tec-5
- 2.8. Product Rupture: Product rupture can cause death, serious personal injury, and property damage.
 - Do not connect pressure regulators or other Pneumatic Division products to bottled gas cylinders.
 - · Do not exceed the maximum primary pressure rating of any pressure regulator or any system component.
 - Consult product labeling or product literature for pressure rating limitations.

3. PRODUCT ASSEMBLY AND INSTALLATION INSTRUCTIONS

- **3.1. Component Inspection:** Prior to assembly or installation a careful examination of the valves, FRLs or vacuum products must be performed. All components must be checked for correct style, size, and catalog number. DO NOT use any component that displays any signs of nonconformance.
- **3.2. Installation Instructions:** Parker published Installation Instructions must be followed for installation of Parker valves, FRLs and vacuum components. These instructions are provided with every Parker valve or FRL sold, or by calling 1-800-CPARKER, or at www.parker.com.
- **3.3. Air Supply:** The air supply or control medium supplied to Valves, FRLs and Vacuum components must be moisture-free if ambient temperature can drop below freezing

4. VALVE AND FRL MAINTENANCE AND REPLACEMENT INSTRUCTIONS

- **4.1. Maintenance:** Even with proper selection and installation, valve, FRL and vacuum products service life may be significantly reduced without a continuing maintenance program. The severity of the application, risk potential from a component failure, and experience with any known failures in the application or in similar applications should determine the frequency of inspections and the servicing or replacement of Pneumatic Division products so that products are replaced before any failure occurs. A maintenance program must be established and followed by the user and, at minimum, must include instructions 4.2 through 4.10.
- 4.2. Installation and Service Instructions: Before attempting to service or replace any worn or damaged parts consult the appropriate Service Bulletin for the valve or FRL in question for the appropriate practices to service the unit in question. These Service and Installation Instructions are provided with every Parker valve and FRL sold, or are available by calling 1-800-CPARKER, or by accessing the Parker web site at www.parker.com.
- 4.3. Lockout / Tagout Procedures: Be sure to follow all required lockout and tagout procedures when servicing equipment. For more information see: OSHA Standard 29 CFR, Part 1910.147, Appendix A, The Control of Hazardous Energy (Lockout / Tagout)
- **4.4. Visual Inspection:** Any of the following conditions requires immediate system shut down and replacement of worn or damaged components:
 - Air leakage: Look and listen to see if there are any signs of visual damage to any of the components in the system. Leakage is an indication of worn or damaged components.
 - Damaged or degraded components: Look to see if there are any visible signs of wear or component degradation.
 - Kinked, crushed, or damaged hoses. Kinked hoses can result in restricted air flow and lead to unpredictable system behavior.
 - Any observed improper system or component function: Immediately shut down the system and correct malfunction.
 - Excessive dirt build-up: Dirt and clutter can mask potentially hazardous situations.

Caution: Leak detection solutions should be rinsed off after use.

4.5. Routine Maintenance Issues:

- · Remove excessive dirt, grime and clutter from work areas.
- Make sure all required guards and shields are in place.
- **4.6. Functional Test:** Before initiating automatic operation, operate the system manually to make sure all required functions operate properly and safely.
- 4.7. Service or Replacement Intervals: It is the user's responsibility to establish appropriate service intervals. Valves, FRLs and vacuum products contain components that age, harden, wear, and otherwise deteriorate over time. Environmental conditions can significantly accelerate this process. Valves, FRLs and vacuum components need to be serviced or replaced on routine intervals. Service intervals need to be established based on:
 - Previous performance experiences.
 - Government and / or industrial standards.
 - When failures could result in unacceptable down time, equipment damage or personal injury risk.
- **4.8. Servicing or Replacing of any Worn or Damaged Parts:** To avoid unpredictable system behavior that can cause death, personal injury and property damage:
 - Follow all government, state and local safety and servicing practices prior to service including but not limited to all OSHA Lockout Tagout procedures (OSHA Standard – 29 CFR, Part 1910.147, Appendix A, The Control of Hazardous Energy – Lockout / Tagout).
 - Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
 - Disconnect air supply and depressurize all air lines connected to system and Pneumatic Division products before installation, service, or conversion.
 - Installation, servicing, and / or conversion of these products must be performed by knowledgeable personnel who understand how
 pneumatic products are to be applied.
 - After installation, servicing, or conversions air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or if the product does not operate properly, do not put product or system into use.
 - Warnings and specifications on the product should not be covered or painted over. If masking is not possible, contact your local representative for replacement labels.
- **4.9. Putting Serviced System Back into Operation:** Follow the guidelines above and all relevant Installation and Maintenance Instructions supplied with the valve FRL or vacuum component to insure proper function of the system.

Global Modular Coalescing & Adsorber Filters

- Integral 1/4", 3/8", 1/2", 3/4" ports (NPT, BSPP & BSPT)
- Removes liquid aerosols and sub micron particles
- Oil free air for critical applications, such as air gauging, pneumatic instrumentation and control
- Positive bayonet latch to ensure correct & safe fitting
- Adsorbing activated carbon element removes oil vapors and most hydrocarbons
- Note: To optimize the life of coalescing element, it is advisable to install a pre-filter with a 5 micron element upstream of the coalescing filter. To optimize the life of an Adsorber it is advisable to install a Coalescing Filter upstream of the Adsorber. Adsorber element should be replaced approximately every 1000 hours of service.





Operating information

operating informatio	11		
	P31 (Mini)	P32 (Compact)	P33 (Standard)
Supply pressure (max):			
Plastic Bowl	10 bar (150 PSIG)	10 bar (150 PSIG)§	10 bar (150 PSIG)§
Metal Bowl	17 bar (250 PSIG)	10 bar (150 PSIG)§	10 bar (150 PSIG)§
Operating temperature:			
Plastic Bowl	-10°C to 52°C (14°F to 125°F)	-25°C to 52°C (-13°F to 125°F)	-25°C to 52°C (-13°F to 125°F)
Metal Bowl	-10°C to 65.5°C (14°F to 150°F)	-25°C to 65.5°C (-13°F to 150°F)	-25°C to 65.5°C (-13°F to 150°F)
Standard filtration:	1.0 and 0.01 micron	1.0 and 0.01 micron	1.0 and 0.01 micron
Flow Capacity:			
1.0 Micron Coalescing -			
Energy Efficient Flow*	3.8 dm³/s (8 SCFM)	17 dm³/s (36 SCFM)	32 dm³/s (68 SCFM)
Maximum Flow**	6 dm³/s (13 SCFM)	27 dm³/s (57 SCFM)	44 dm³/s (93 SCFM)
0.01 Micron Coalescing –			
Energy Efficient Flow*	2 dm³/s (4.2 SCFM)	11 dm³/s (23 SCFM)	20 dm³/s (42 SCFM)
Maximum Flow**	3.8 dm³/s (8 SCFM)	28 dm³/s (38 SCFM)	34 dm³/s (72 SCFM)
Activated Carbon Adsorber			
Rated Flow*:	6 dm³/s (13 SCFM)	27 dm³/s (57 SCFM)	44 dm³/s (93 SCFM)
* Inlet pressure 6.3 bar (91.3 PSI	G), pressure drop 0.2 bar (3 PSIG) saturate	ed element.	
** Inlet pressure 6.3 bar (91.3 PSI	G), pressure drop 0.4 bar (6 PSIG) saturate	ed element.	
6 Mithout pressure indicator (DDI)	many averally pressure for mostal baryly	released 17 her (050 nois)	

Without pressure indicator (DPI) - max. supply pressure for metal bowl version is 17 bar (250 psig).

For Flow Curve Charts please see page E35.

Ordering information





Global

Prep-Air II

Miniature

P3N

General Industrial

Stainless Steel

Proportional Separators

Precision /

Bulk Liquid

Air Preparation Products Global Modular Coalescing & Adsorber Filters

Coalescing and Adsorber Filters,

(1 micron and absorber elements available)

	Port	Bowl	Drain	Floment	Part number		
E	size	type	type	type	P31	P32	P33
	1/4"	Poly	Manual	0.01 micron	P31FA92CGMN	P32FA92DGMN	
1	1/4"	Poly	Pulse	0.01 micron	P31FA92CGBN		
1	1/4"	Poly	Auto	0.01 micron		P32FA92DGAN	
	1/4"	Metal	Manual	0.01 micron	P31FA92CMMN	P32FA92DSMN	
	1/4"	Metal	Pulse	0.01 micron	P31FA92CMBN		
	1/4"	Metal	Auto	0.01 micron		P32FA92DSAN	
1	3/8"	Poly	Manual	0.01 micron		P32FA93DGMN	
	3/8"	Poly	Auto	0.01 micron		P32FA93DGAN	
	3/8"	Metal	Manual	0.01 micron		P32FA93DSMN	
T	3/8"	Metal	Auto	0.01 micron		P32FA93DSAN	
	1/2"	Poly	Manual	0.01 micron		P32FA94DGMN	P33FA94DGMN
8	1/2"	Poly	Auto	0.01 micron		P32FA94DGAN	P33FA94DGAN
	1/2"	Metal	Manual	0.01 micron		P32FA94DSMN	P33FA94DSMN
1	1/2"	Metal	Auto	0.01 micron		P32FA94DSAN	P33FA94DSAN
	3/4"	Poly	Manual	0.01 micron			P33FA96DGMN
	3/4"	Poly	Auto	0.01 micron			P33FA96DGAN
T	3/4"	Metal	Manual	0.01 micron			P33FA96DSMN
	3/4"	Metal	Auto	0.01 micron			P33FA96DSAN

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Service kits

Description		P31	P32	P33
Plastic bowl / bowl guard	Manual drain	P31KA00BGM	P32KA00BGM	P33KA00BGM
	Pulse drain	P31KA00BGB		
	Auto drain		P32KA00DA	P32KA00DA
Metal bowl w/o sight gauge	Manual drain	P31KA00BMM		
	Pulse drain	P31KA00BMB		
	Auto drain		P32KA00DA	P32KA00DA
Metal bowl / sight gauge	Manual drain		P32KA00BSM	P33KA00BSM
	Auto drain		P32KA00DA	P32KA00DA
Filter element	1µ coalescing	P31KA00ES9	P32KA00ES9	P33KA00ES9
	0.01µ coalescing	P31KA00ESC	P32KA00ESC	P33KA00ESC
	Activated carbon adsorber	P31KA00ESA	P32KA00ESA	P33KA00ESA
C-bracket	Fits to body	P31KA00MW		
L-bracket	Fits to body		P32KA00ML	P33KA00ML
T-bracket	Fits to body connector		P32KA00MB	P32KA00MB
	With body connector	P31KA00MT	P32KA00MT	P32KA00MT
Body connector		P31KA00CB	P32KA00CB	P32KA00CB
Differential pressure indicator	(replacement)	P31KA00RQ	P32KA00RQ	P32KA00RQ

Most popular.



E

Air Preparation Products

General Industrial

Miniature

Catalog PDN1000-3US **Parker Pneumatic**







Automatic Drain

Material specifications

Precision / Bulk Liquid Proportional Separators

Description		P31	P32	P33
Body		Aluminum	Aluminum	Aluminum
Body cap		N/A	N/A	ABS
David	Plastic bowl	Polycarbonate	Polycarbonate	Polycarbonate
DOMI	Metal bowl	Aluminum	Aluminum	Aluminum
Bowl guard		Nylon	Nylon	Nylon
Filter element		Borosilicate cloth, 1.0 and .01 micron	Borosilicate cloth, 1.0 and .01 micron	Borosilicate cloth, 1.0 and .01 micron
Adsorber		Activated corbon	Activated corbon	Activated corbon
Seals		Nitrile	Nitrile	Nitrile
Sight gauge	Metal bowl	N/A	Polycarbonate	Polycarbonate



Parker Hannifin Corporation Pneumatic Division Richland, Michigan www.parker.com/pneumatics

Richland, Michigan USA

www.parker.com/pneumatics



COALESCING FILTERS

Bu	lletin Number		Bulletin Description
	1F601B	Rev. 3	10F / 13F Elements
	1C100J	Rev. 12	10F Miniature, Installation & Service
	2C100F	Rev. 10	11F "C" Compact, Installation & Service
	1C100J	Rev. 12	11F Conpact, Installation & Service
	2C100F	Rev. 10	12F "C" Standard, Installation & Service
	1C100J	Rev. 12	12F Standard, Installation & Service
	1C100J	Rev. 12	13F Hi-Flow, Installation & Service
	1C200F	Rev. 7	13F Hi-Flow, Installation & Service
	2C100F	Rev. 10	15F Economy, Installation & Service
	1C300B	Rev. 1	30F / 31F / 32F Main Line, Installation & Service
	2C400	Rev. 2	35F and 43F Large Ported, Installation & Service
	1C500	Rev. 1	ECS Installation & Service
	2F102C	Rev. 4	Electronic DPI Installation & Service
	IS-F700C	Rev. 1	F701, 3/4" and 1" High Efficiency Compressed Air Filters
	5FRL100	Rev. 3	Global Air Preparation Systems
	1M110C	Rev. 4	P3AF (8AC) Miniature, Coalescing Installation & Service
	1M105C	Rev. 1	P3AF Miniature, Installation & Service
	2F300E	Rev. 2	P3N Hi-Flow, Installation & Service
	1C105B	Rev. 1	Prep-Air I Coalescer (1/4"-1/2") Installation & Service
	1C106	Rev. 1	Prep-Air I Coalescer (3/4") Installation & Service
	Safety Guide		PDN Safety Guide

Richland, Michigan 49083 269-629-5000

Installation & Service Instructions: 1C100J

Mini & Hi-Flow Oil Removal Filters

ISSUED: December, 2008 Supersedes: October, 2006 Doc.# 1C100, EN# 081039, Rev. 12

To avoid unpredictable system behavior that can cause personal injury and property damage:

- Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

Polycarbonate bowls, being transparent and tough, are ideal for use with Filters and Lubricators. They are suitable for use in normal industrial environments, but should not be located in areas where they could be subjected to direct sunlight, an impact blow, nor temperatures outside of the rated range. As with most plastics, some chemicals can cause damage. Polycarbonate bowls should not be exposed to chlorinated hydrocarbons, ketones, esters and certain alcohols. They should not be used in air systems where compressors are lubricated with fire-resistant fluids such as phosphate ester and diester types.

Metal bowls are recommended where ambient and/or media conditions are not compatible with polycarbonate bowls. Metal bowls resist the action of most such solvents, but should not be used where strong acids or bases are present or in salt laden atmospheres. Consult the factory for specific recommendations where these conditions exist.

TO CLEAN POLYCARBONATE BOWLS USE MILD SOAP AND WATER ONLY! DO NOT use cleansing agents such as acetone, benzene, carbon tetrachloride, gasoline, toluene, etc., which are damaging to this plastic.

Bowl guards are recommended for added protection of polycarbonate bowls where chemical attack may occasionally occur.

To avoid polycarbonate bowl rupture that can cause personal injury or property damage, do not exceed bowl pressure or temperature ratings. Polycarbonate bowls have a 150 PSIG pressure rating and a maximum temperature rating of 125°F.

Safety Guide

For more complete information on recommended application guidelines, see the Safety Guide section of Pneumatic Division catalogs or you can download the **Pneumatic Division Safety Guide** at: www.parker.com/safety

Introduction

Follow these instructions when installing, operating, or servicing the product.

Application Limits

These products are intended for use in general purpose compressed air systems only.

With Polycarbonate Bowl

	kPa	PSIG	bar
Operating Pressure Maximum	1000	150	10.3
Operating Temperature Maximu	ım:	52°C (125°F)
Nith Metal Bowl			

	kPa	PSIG	bar
Operating Pressure Maximum	1700	250	17.0
Operating Temperature Maximu	ım:	80°C (175°F)	
With Automatic Drain			

	kPa	PSIG	bar
Operating Pressure Maximum	68	10	0.68

Installation

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- 1. The equipment to which the filter is attached should be internally cleaned to remove all traces of accumulated oil and dirt. Also, new pipe or hose should be installed between the filter and equipment being protected.
- 2. Blow all upstream pipe work clear of accumulated dirt and liquids.
- 3. Select a filter location as close as possible to the equipment being protected and downstream of any pressure regulator.
- 4. A 5 micrometer pre-filter is recommended to protect the high efficiency filter and to prolong the element life.
- 5. Install filter so that air flows in the direction of arrow on cover.
- 6. Install filter vertically with the bowl drain mechanism at the bottom. Free moisture will thus drain into the sump "quiet-zone" at the bottom of the bowl (automatic drain models are recommended as standard equipment).

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from The Company, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application, including consequences of any failure and review the information concerning the product or systems in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by The Company and its subsidiaries at any time without notice.



Operation

Manual drain filters must be drained regularly before the separated moisture and oil reaches the bottom of the filter element. Automatic drain models will collect and dump the liquids automatically.

Pressure differential gauges should be used to determine when the maximum recommended pressure differential of 10 PSI (0.7 KG/CM²) has been reached.

DO NOT EXCEED THE RATED RECOMMENDED FLOWS. THE MINIMUM FLOW IS TEN PERCENT OF THE NOMINAL RATING.

Maintenance

Hi Flow

To replace the element in the filter:

- 1. Shut off the air supply and relieve pressure within the filter bowl.
- Unscrew the bowl and unscrew the filter element. This element canno be cleaned and should be replaced when a pressure differential of 10 PSI (0.7 KG/CM²) is reached.

To install a new filter element:

 Hold the element by the bottom end cap, position the new o-ring over the top threaded cap end, turn the element gently into the body's threaded section and make sure it is screwed tightly into place.

Mini

- 1. Loosen and remove bowl. DO NOT use a pipe wrench on polycarbonate bowl.
- 2. Unscrew filter holder and used element from filter housing. Discard the used element.
- Lightly lubricate the new bowl seal included in the kit and replace the old seal. Use only mineral based oils or grease. DO NOT use synthetic oils such as esters, and DO NOT use silicones.
- 4. Install new element.
 - a. Place new element on filter holder
 - b. Place nylon washer on top of the element
 - c. Place body seal on top of the nylon washer
- 5. Install new filter element / holder assembly. Hand-tighten only DO NOT use a wrench.

- Thread bowl onto body (Torque bowl to bottom of body then back off 1/8 turn).
- 7. Pressurize and check for leaks.
- CAUTION: Touching or handling the element section may cause contamination, spotting or migration of oil.

Automatic drains should be checked to insure they are operating correctly.

Troubleshooting

(If oil aerosol appears downstream from the filter):

- 1. Examine downstream air lines to determine if they were cleaned out before installation of the filter. Residual oil will contaminate an installation from new pipe work if it is not initially cleaned.
- 2. Determine if the sealing gasket or o-ring is in place, and that it is not cut or otherwise damaged. (When checking the element, do not touch the element's body. Always handle the element by the bottom end cap.) When reinstalling the element, turn it gently to make sure that it is screwed tightly in place.
- 3. Check the rate of air being used. The air flow should not exceed the rated capacity of the element, nor be less than 10% of its rated flow.
- 4. Check the inlet air temperature; this should not exceed 65°C (150°F). Where higher temperatures are used, oil vapor may condense if the air cools downstream of the filter.
- 5. Check for acid fumes or other harmful gases being drawn into the compressor intake. The element may be attacked by certain chemicals.
- 6. Determine the type of oil used in the compressor. Some synthetic or high flash point oils are detrimental contact factory for advice.

Kits Available

Description	Kit No.
Element Assemblies: (Includes Seal)	
Grade 6	PS446
Grade 10	PS456
40 SCFM (Hi-Flow)	PS351B
100 SCFM (Hi-Flow)	PS350
Polycarbonate Bowl Kit	
(1) Polycarbonate Bowl with Manual Drain	
(1) Seal (Body to Bowl)	
Mini	PS404
Hi-Flow (Metal Bowl)	PS369

Accessories

Description	Kit No.		
Description	Mini	Hi-Flow	
Automatic Drain (Includes Seal)		PS506	
Mounting Bracket Kit*		PS309	
Polycarbonate Bowl (Automatic Drain)	PS408	N/A	
Metal Bowl (Manual Drain)	PS447B		
Metal Bowl (Automatic Drain)	PS451		
Twist Drain Knob	P05117		

* Not supplied with units, must be ordered separately.

Richland, Michigan 49083 269-629-5000

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- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

Introduction

Follow these instructions when installing, operating, or servicing the product.

Application Limits

These products are intended for use in general purpose compressed air systems only.

Operating Pressure Range:	kPa	PSIG	bar
PLASTIC BOWL			
w/ Manual Drain			
Minimum	69	10	.69
Maximum	1034	150	10.34
w/ Internal Auto Drain			
Minimum	207	30	2.07
Maximum	1034	150	10.34
w/ External Auto Drain			
Minimum	345	50	3.45
Maximum	1034	150	10.34
METAL BOWL			
w/ Manual Drain			
Minimum	69	10	.69
Maximum	1724	250	17.24
w/ Internal Auto Drain			
Minimum	207	30	2.07
Maximum	1207	175	12.07
w/ External Auto Drain			
Minimum	345	50	3.45
Maximum	1034	150	10.34

Maximum Recommended Pressure Drop:

10 PSIG (Element should be replaced.)

Operating Temperature Range:

Coalescers w/ Plastic Bowls

-29°C * to 49°C (-20°F to 120°F)

Installation & Service Instructions: 1C105B

Prep-Air[®] I Air Line Coalescer

ISSUED: November, 2003 Supersedes: August, 2001 Doc.# 1C105, ECN# 030539, Rev. 1

Coalescers w/ Metal Bowls

Manual Drains Automatic Drains -29°C * to 74°C (-20°F to 165°F) -29°C * to 49°C (-20°F to 120°F)

* Temperatures below 0°C (32°F) require moisture free air.

Installation

- Coalescer should be installed with reasonable accessibility for service whenever possible — repair service kits are available. Keep pipe or tubing lengths to a minimum with inside clean and free of dirt and chips. Pipe joint compound should be used sparingly and applied only to the male pipe — never into the female port. Do not use PTFE tape to seal pipe joints — pieces have a tendency to break off and lodge inside the unit, possibly causing malfunction. Also new pipe or hose should be installed between the coalescer and equipment being protected.
- 2. The upstream pipe work must be clear of accumulated dirt and liquids.
- Install a 5-micron pre-filter immediately upstream of the coalescer. This will extend the life of the coalescing element up to twice its normal life. A pre-filter is also recommended to remove large amount of liquid water and/or oil from entering the coalescer.
- 4. Select a coalescer location as close as possible to the equipment being protected and upstream of any pressure regulator.
- 5. Install coalescer so that air flows from "IN" to "OUT" as marked on the coalescer.
- Install coalescer vertically with bowl drain mechanism at the bottom. Free moisture will thus drain into the sump ("quiet zone" at the bottom of the bowl).
- 7. Verify that flow is within 20% and 120% of nominal rating of element to assure maximum efficiency.



🕂 WARNING

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Operation

The contaminated air enters the element interior (G) and is forced through a thick membrane of "borosilicate" glass fibers coated with epoxy. Flow then passes through the element, and at this stage 99.97% of the sub micronic particles have been removed from the air stream. The tiny droplets coalesce together and are collected from the coalescer element by the outer drain layer (H).

The clean, filtered air now passes through and out into the pneumatic system. The air line coalescing filter removes liquid aerosols and sub-micron particulate matter.

Collected liquids and particles in the "quiet zone" (J) should be drained before their level reaches a height where they would be reentrained in the flowing air.

Replacement of Coalescer Element:

- 1. Depress button on lock ring (A), turn counterclockwise and remove along with bowl assembly (B).
- 2. Remove and discard the coalescer element (C) by turning it counterclockwise.
- 3. Clean the bowl assembly **(B)** with MILD SOAP AND WATER ONLY! See CAUTION.
- 4. Install new coalescer element (C) by turning it clockwise until hand tight.
- 5. Reinstall the bowl assembly (B) and lock ring (A). Turn lock ring clockwise until it clicks into place.

Polycarbonate bowls, being transparent and tough, are ideal for use with Filters and Lubricators. They are suitable for use in normal industrial environments, but should not be located in areas where they could be subjected to direct sunlight, an impact blow, nor temperatures outside of the rated range. As with most plastics, some chemicals can cause damage. Polycarbonate bowls should not be exposed to chlorinated hydro-carbons, ketones, esters and certain alcohols. They should not be used in air systems where compressors are lubricated with fire-resistant fluids, such as phosphate ester and di-ester types.

Metal bowls are recommended where ambient and/or media conditions are not compatible with polycarbonate bowls. Metal bowls resist the action of most such solvents, but should not be used where strong acids or bases are present or in salt laden atmospheres. Consult the factory for specific recommendations where these conditions exist.

TO CLEAN POLYCARBONATE BOWLS, USE MILD SOAP AND WATER ONLY! DO NOT use cleansing agents such as acetone, benzene, carbon tetrachloride, gasoline, toluene, etc., which are damaging to this plastic.

Bowl guards are recommended for added protection of polycarbonate bowls where chemical attack may occasionally occur.

Bowl Conversion / Replacement

- 1. Depress button on lock ring **(A)**, turn counterclockwise and remove along with bowl assembly **(B)**.
- 2. Install new bowl assembly **(B)** and lock ring **(A)**. Turn lock ring clockwise until it clicks into place.
- WARNING: Conversion or replacement of an old metal bowl with a new plastic bowl will reduce the product pressure / temperature rating. Be certain that the circuit and environment does not exceed the lower ratings; and that rating labels elsewhere on the product are replaced with one describing the lower rating. Failure to do so may cause property damage, injury or death.



Internal Automatic Drain Conversion

- 1. Depress button on lock ring (A), turn counterclockwise and remove along with bowl assembly (B).
- 2. Unscrew nut (D) and remove manual drain assembly (E).
- 3. Install internal automatic drain in bowl and tighten nut (D) from below.
- 4. Reinstall the bowl assembly **(B)** and lock ring **(A)**. Turn lock ring clockwise until it clicks into place.
- WARNING: Conversion of a coalescer from a manual drain to an automatic drain will reduce the product pressure / temperature rating. Be certain that the circuit and environment does not exceed the lower ratings; and that rating labels elsewhere on the product are replaced with one describing the lower rating. Failure to do so may cause property damage, injury or death.

Bowl Guard Installation

- 1. Depress button on lock ring (A), turn counterclockwise and remove.
- 2. Coalescers with External Automatic Drains Remove float. Screw drain out bottom of bowl assembly while holding adapter with a screw driver from above.
- 3. Slip guard (F) over bowl.
- Coalescers with External Automatic Drains Screw drain into bottom of bowl assembly while holding adapter with a screw driver from above. Reinstall float into bowl assembly.
- 5. Reinstall the bowl assembly **(B)** and lock ring **(A)**. Turn lock ring clockwise until it clicks into place.

Service Kits / Parts

Body Size	Port Size Inch	Lock Ring Assembly	O-Ring	External Automatic Drain Service Kit
Standard	1/4	03582 7502B	03454 7240B	03332 0208
Full Size	3/4	03586 7501B	03454 7247B	03332 0208

Accessories

Model	Standard Coalescer	Full Size Coalescer
Bowl Guards	03532 0100B	03536 0100B
Bowl Kits Polycarbonate w/ Manual Drain Metal w/ Manual Drain	03532 0500B 03532 0400B	03536 0500B 03536 0400B
Drains Automatic Drain - External Automatic Drain - Internal Manual Drain	03332 0205 PS506P PS512P	03332 0205 PS506P PS512P
Grade 6 Coalescer Elements	03532 7521	03536 7521
Pipe Mounting Bracket	00902 0400B	00906 0400B

Richland, Michigan 49083 269-629-5000

Installation & Service Instructions: 1C106

Coalescing Filter, 3/4" NPTF

ISSUED: November, 2003 Supersedes: July, 1999 Doc.# 1C106, ECN# 030539, Rev. 1

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- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

Introduction

Follow these instructions when installing, operating, or servicing the product.

A 5 micrometer pre-filter installed immediately ahead of the filter, will greatly extend the life of the cartridge assembly up to twice the life expectancy in most cases. A pre-filter is also recommended to remove abnormally large amounts of liquid water and/or oil entering a coalescing filter.

Application Limits

These products are intended for use in general purpose compressed air systems only.

Maximum Operating Pressure:

	kPa	PSIG	bar
Plastic Bowl	1034	150	10.3
Metal Bowl			
w/ Manual Drain	1724	250	17.2
w/ Internal Auto Drain	1207	175	12.0

Maximum Ambient Temperature:

Metal Bowl w/ Manual Drain	74°C (165°F)
All Others	49°C (120°F)

Maximum Recommended Flow Rate:

50 SCFM @ 100 PSIG Inlet

The maximum recommended flow for other inlet pressures can be determined by the following formula:

Maximum Flow Rate (SCFM) = $50 \times \text{Inlet Pressure (PSIA)}$ 114.7

Maximum Recommended Flows

Inlet (PSIG)	Flow (SCFM)	Inlet (PSIG)	Flow (SCFM)
10	10.8	90	45.6
20	15.1	100	50.0
30	19.5	110	54.4
40	23.8	120	58.7
50	28.2	130	63.1
60	32.6	140	67.4
70	36.9	150	71.8
80	41.3		

ANSI Symbol



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Coalescing Filter 3/4" NPTF

Installation:

- 1. Determine if the flow requirement is within the limits recommended for the filter.
- 2. Do not install the filter in a location that would expose the polycarbonate bowl to harmful fumes or fluids (see Caution below).
- 3. Check downstream piping for cleanness.
- 4. Install the filter in a level (bowl down) position.

Polycarbonate bowls, being transparent and tough, are ideal for use with Filters and Lubricators. They are suitable for use in normal industrial environments, but should not be located in areas where they could be subjected to direct sunlight, an impact blow, nor temperatures outside of the rated range. As with most plastics, some chemicals can cause damage. Polycarbonate bowls should not be exposed to chlorinated hydro-carbons, ketones, esters and certain alcohols. They should not be used in air systems where compressors are lubricated with fire-resistant fluids, such as phosphate ester and di-ester types.

Metal bowls are recommended where ambient and/or media conditions are not compatible with polycarbonate bowls. Metal bowls resist the action of most such solvents, but should not be used where strong acids or bases are present or in salt laden atmospheres. Consult the factory for specific recommendations where these conditions exist.

TO CLEAN POLYCARBONATE BOWLS, USE MILD SOAP AND WATER ONLY! DO NOT use cleansing agents such as acetone, benzene, carbon tetrachloride, gasoline, toluene, etc., which are damaging to this plastic.

Bowl guards are recommended for added protection of polycarbonate bowls where chemical attack may occasionally occur.

Operation

After start-up – inspect points of delivery to insure that the filtration is effective. If there is evidence of airline contamination, check the following:

- 1. Downstream piping piping often contains residue from previous use or storage.
- 2. Flow exceeding the maximum recommended flow can drastically reduce the filter's efficiency.
- 3. Check to see that the filter is in a level position.
- 4. Inspect filter and cartridge assembly for damage.

Maintenance

- 1. Periodically drain filter. <u>Do not allow the liquid</u> to reach the cartridge assembly.
- 2. The life of the filter is dependent upon the amount of dirt in the air stream; replacing the cartridge assembly is recommended if the pressure drop exceeds 10 psi.
- 3. To replace cartridge assembly, remove lock ring and bowl. Unscrew cartridge assembly counter-clockwise. Remove o-ring and discard. Replace with new cartridge assembly Kit Part #035367522 (includes new o-ring). To reassemble, place o-ring into top of cartridge assembly and reassemble unit. Avoid gripping the sponge sleeve when installing a new cartridge assembly.
- 4. The polycarbonate bowl should be cleaned only with a mild household detergent or white kerosene.



Richland, Michigan 49083 269-629-5000

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- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

Application Limits

These products are intended for use in general purpose compressed air systems only.

Maximum Operating Pressure*:

	kPa	PSIG	bar	
Inlet Pressure	1720	250	17.2	
*When using with an	Automatic Drain,	minimum	inlet pressure is	s
69 kPa (0.1 bar & 10	PSIG).			

Maximum Ambient Temperature: 80°C (175°F)

ANSI Symbols





Installation

- Filter unit should be installed with reasonable accessibility for service whenever possible - repair service kits are available. Keep pipe or tubing lengths to a minimum with inside clean and free of dirt and chips. Pipe joint compound should be used sparingly and applied only to the male pipe - never into the female port. Do not use PTFE tape to seal pipe joints - pieces could break off from the outlet port and lodge inside units which are located downstream, possibly causing malfunction.
- 2. Blow all upstream pipe work clear of accumulated dirt and liquids.
- 3. Select a filter location as close as possible to the equipment being protected and upstream of any pressure regulator.
- 4. A 5 micrometer pre-filter is recommended to protect the high efficiency filter and to prolong the element's life.

Installation & Service Instructions 1C200F

Hi-Flow Series Coalescing Filters

ISSUED: October, 2003 Supersedes: September, 2000 Doc# 1C200F, ECN# 030539, Rev. 7

- 5. Install filter so that air flow is in the direction of the arrow.
- Install filter vertically with the bowl drain mechanism at the bottom. Free moisture will thus drain into the sump "quiet zone" at the bottom of the bowl (automatic drain models are recommended as standard equipment).

Operation

Manual drain filters must be drained regularly before the separated moisture and oil reaches the bottom of the filter element. Automatic drain models will collect and dump the liquid automatically.

The filter element should be changed when the *Differential Pressure Indicator* (DPI) displays the orange piston (item #9) when air is flowing. For units without a DPI, pressure differential gauges should be used to determine when the maximum recommended pressure differential has been reached. (See **Service Procedure** section.)

▲ Caution: DO NOT EXCEED THE RATED RECOMMENDED FLOWS. The minimum flow is ten percent of the normal rating.

Service Procedure

- Caution: Shut off air supply and exhaust the pressure trapped within the filter bowl before servicing unit.
- 1. Unscrew the bowl from the body.
- 2. To install a new filter element, use the following procedure:
 - a. Unscrew the lower baffle and remove coalescing element.
 - b. This element can not be cleaned and should be replaced when a pressure differential (across the filter unit) of 10 PSID (69 kPa) has been reached.
- A Caution: Touching or handling the new element section may cause contamination, spotting, or migration of oil.
 - c. Clean all internal parts and bowl before reassembling.
 - d. Install element.
 - e. Attach lower baffle and tighten firmly.
 - f. Lubricate bowl seal to assist with retaining it in position.

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Hi-Flow Series Coalescing Filters

⚠ Caution: Use only mineral based oils or grease. Do not use synthetic oils such as esters and do not use silicones.

- g. Place new bowl seal on bowl with the inner ridge on the seal located toward the top.
- Screw bowl into body; torque from 40 to 320 in-lbs (4.5 to 36 N•m). Automatic drains should be checked to insure that they are operating correctly.
- 4. If you are replacing the o-ring between the filter holder and the body, add the following steps when installing the element:
 - a. Assemble filter holder extension to filter holder using a torque of 10 to 15 in-lbs (1.1 to 1.7 N•m).
 - b. Install o-ring on filter holder and then screw holder into body. Torque: 10 to 15 in-lbs (1.1 to 1.7 N•m).
 - c. Install element to filter holder/body assembly and secure in place with lower baffle. Torque baffle from 6 to 8 in-lbs (.7 to .9 N•m).

If you have questions concerning how to service this unit, contact your local authorized dealer or your customer service representative.

Troubleshooting

If oil aerosol appears downstream from filter, investigate this condition as follows:

- 1. Examine downstream air lines to determine if they were cleaned out before installation of the filter. Residual oil will contaminate an installation from new pipe work if it is not initially cleaned.
- 2. Check the end seal surfaces on the element to insure that they are not cut or otherwise damaged.
- \triangle Caution: When checking the element, do not touch the element's body. Always handle the element by the end seal surfaces.
- 3. Check the rate of air being used. The air flow should not exceed the rated capacity of the element, nor be less than 10% of its rated flow.



Hi-Flow Filter Unit w/Twist Drain

- Check the inlet air temperature. If it exceeds 150°F (65°C) oil vapor may be condensing as the air cools downstream of the filter.
- Check for acid fumes or other harmful gases being drawn into the compressor intake. The element may be attacked by certain chemicals.
- Determine the type of oil being used in the compressor. Some synthetic or high flash point oils are detrimental to the filter unit - contact your customer service representative for advice.

Service Kits Available

Element Kit, grade 6	PS356
Element Kit, grade 10	PS357
Metal Bowl with sight gage (manual drain)	PS369
Metal Bowl with sight gage (automatic drain)	PS344C
Manual Drain	PS512
Automatic Drain (includes seal)	PS506
Mounting Bracket Kit*	PS309
OPI Repair Kit	PS781

* Not supplied with units, must be ordered separately.

Parts Identification List

tem#	Description
1	Metal Bowl (without sight gage)
2	Baffle
3	Element
4	Bowl Seal
5	O-ring - filter holder to body
6	Differential Pressure Indicator (DPI) Assembly
7	Shell
8	Spring - piston return
9	Piston
10	Diaphragm
11	Collar, DPI
12	Body
13	Element Holder
14	Extension for Element Holder
15	Drain Nut
16	Twist Drain Assembly
17	Metal Bowl (with Sight Gage)
18	Sight Gage
19	Automatic Drain Assembly


Richland, Michigan 49083 269-629-5000

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- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

Introduction

Follow these instructions when installing, operating, or servicing the product.

Application Limits

These products are intended for use in general purpose compressed air systems only.

Installation

The filter should be installed in a level pipeline, mounted vertically, the bowl downward with one bowl length clearance for element removal. The filter should be installed at the highest pressure point practical and as near to the equipment to be protected as possible. The equipment to which the filter is attached should be internally cleaned to remove all traces of accumulated oil and dirt. Also, new pipe or hose should be installed between the filter and equipment protected. Blow all upstream pipe work clear of accumulated dirt and liquids. A 5 micrometer pre-filter is recommended to protect the high efficiency filter and to prolong the element life.

The filter should be visible and easily accessible for periodic draining and maintenance. The filters should be plumbed in accordance with instruction tags, flow arrows or "IN" and "OUT". Should these tags become obliterated, plumb the filter so that flow passes through the filter elements from inside-to-outside for the coalescing filter and outside to inside for the adsorber filter. The position of the filters relative to other equipment should be as follows unless specific instructions are given to the contrary: The coalescing filter goes ahead of the dryer no matter what type dryer is used. A standard particle filter and a coalescing filter should be installed upstream of the adsorber filter for best results.

Operation

Maximum operating pressure: 250 PSI @ 175°F Coalescing Filters

Coalescing filtration of air is a continuous, balanced, steady-state condition occurring at or below a housing rated flow which depends on 2 factors for high performance: 1 - The bowl must be kept free of waste liquid buildup and 2 - The element must be replaced when its induced pressure drop reaches 6-8 PSID, 12 PSID maximum.

Installation and Service Instructions: 1C300B 30F Series Coalescing Filter 30F Series Adsorber Filter

ISSUED: November, 2003 Supersedes: February, 1999

Doc.# 1C300, ECN# 030539, Rev. 1

Differential pressure can be sensed at the inlet and outlet ports by 2 gauges, or by a differential pressure indicator, or by observing system characteristics. Bowl draining can be accomplished by simply opening the manual drain valve, provided standard on all coalescing filters, at least once every 8 hours or less depending on the liquid load. An auto-drain is a useful tool if it is kept clear of emulsions and other heavy liquids.

A coalescing filter, under normal system conditions, will operate for 6 to 12 months before reaching its maximum differential pressure. Should one clog sooner it is very likely that a particulate filter should be employed ahead of the coalescer to increases its life 4 to 6 times.

Coalescing filters are design for nominal operation with 10-20 wt. oil. Any viscosity increase over that of 20 wt. oil must be offset by a proportionate oversizing of the filter element.

Adsorber Filters

Adsorber elements are designed to adsorb vaporous contaminants. The relative efficiency of an adsorber varies depending on the vapor to be adsorbed and the environmental temperature. At higher temperatures, adsorbers become less efficient.

Adsorber cartridges are not particle filters, per se; all particulates and aerosols should be removed prior to adsorbing vaporous contaminants. The initial pressure drop across the adsorber element (1.5 PSID maximum), therefore, should never increase. The presence of any liquids, aerosols, or particulate matter in an adsorber indicates that the effective life of the element has been exceeded and the element should be replaced and the system cleaned.

The most effective method of testing whether an element needs to be replaced or not is to smell the air coming from the adsorber. Offensive odors will be present well before oil levels become detectable.

Element Replacement Procedure:

- 1. Depressurize system and drain bowl.
- 2. Unscrew bowl from body and set aside.
- 3. Remove element end cap.
- 4. Remove and discard clogged filter element only.
- 5. Place end cap on new filter element.
- Slide entire end-cap-element assembly over center rod. Head end of element should be squarely seated against serrations in head.
- 7. Holding element with one hand, start end cap on rod threads.
- 3. Tighten end cap.

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30F Series Coalescing & Adsorber Filters

- 9. If contaminants have migrated downstream from the prefilters: clean the adsorber bowl, the air lines from the prefilters to the adsorber, the prefilter bowls and replace the prefilter elements.
- 10. Reassemble bowl assembly with new O-Ring and tighten bowl to 12 foot-pounds torque.
- Repressurize the assembled unit and check for possible leaks. If leaks are present do not put into service. Repeat the disassembly and assembly procedure.

Kits Available:

Model	30F	31F83	31F8L	32F9
Drain Kits	PS506P	PS506P	PS506P	PS506P
Metal/Petcock	41618P	41619P	41620P	41621P
Differential Pressure Indicator	2003P	2003P	2003P	2003P
Differential Pressure Gauge	2111P	2111P	2111P	2111P

Repair Parts:

Filter Grade	Filter Model No.*	Element/O-Ring
	30F73EC —	9920-011X1
	31F83EC —	9920-012X1
#6	31F8LEC —	9920-013X1
	32F9LEC —	9920-014X1
	32FNLEC —	9920-014X1
	30F73HC —	9920-015X1
	31F83HC —	9920-016X1
#10	31F8LHC —	9920-017X1
	32F9LHC —	9920-018X1
	32FNLHC —	9920-018X1
	30F73ZC —	9920-019X1
	31F83ZC —	9920-020X1
Adsorber	31F8LZC —	9920-021X1
	32F9LZC —	9920-022X1
	32FNLZC —	9920-022X1

* Model numbers shown are for bowls with manual drain. Repair parts shown are same for bowls with automatic drain.

Troubleshooting:

Problem	Probable Cause	Solution
Initial Pressure	Air flow excessive for housing size.	Install larger filter.
Drop Too High	 Filter grade too tight. 	Install coarser element.
Premature Clogging (Air Flow Drops Off)	 Lubricant improperly selected for compressor, causing varnish or carbonizing of lubricant. 	Change to oil with higher flash point.
	 Excessive inlet particulate contamination. 	Pre-filter with particulate filter.
	 Excessive lubricants present on element caused by either high lubricant viscosity or very high inlet aerosol level. 	Pre-filter with particulate filter and oversize coalescing filter to compensate.
	 Oil/Water emulsion forming on element. 	Remove water by drip leg, aftercooler or dryer.
	 Ice forming or oil viscosity too high due to excessively low unit temperature. 	Raise Temperature.
Oil Present	 Bowl not properly drained of waste liquids. 	Drain regularly.
Downsteam of Filter	 Element clogged and inducing excessive differential pressure and velocity. 	Change element.
	 Bad seal causing bypass leakage. 	Repair seal.
	 Filter piped backwards. 	See "INSTALLATION" - re-pipe
	 Filter being bypassed by valving. 	Close valve.
	 Contaminated air entering system from second source downstream. 	Change pipe or relocate filter.
	Excessive inlet oil level.	Check sources and eliminate.
	 Element damaged, chemically attacked or not installed in housing. 	Change element and consult distributor or or factory for other than neutral PH.
	 Oil present to pre-contaminated downstream piping 	Clean piping.



ANSI Symbols





When coalescing filter or particulate differential pressure reaches clogged condition replace element immediately, DO NOT ATTEMPT TO CLEAN FILTER ELEMENT. System contamination can result. DO NOT BYPASS THE COALESCER unless the bypass line is also filtered.

Richland, Michigan 49083 269-629-5000

Installation and Service Instructions: 1F601B

Coalescing Element Kits

ISSUED: November, 2003 Supersedes: January, 1999 Doc.# 1F601, ECN# 030539, Rev. 3

To avoid unpredictable system behavior that can cause personal injury and property damage:

- Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

Polycarbonate bowls, being transparent and tough, are ideal for use with Filters and Lubricators. They are suitable for use in normal industrial environments, but should not be located in areas where they could be subjected to direct sunlight, an impact blow, nor temperatures outside of the rated range. As with most plastics, some chemicals can cause damage. Polycarbonate bowls should not be exposed to chlorinated hydrocarbons, ketones, esters and certain alcohols. They should not be used in air systems where compressors are lubricated with fireresistant fluids such as phosphate ester and diester types.

Metal bowls are recommended where ambient and/or media conditions are not compatible with polycarbonate bowls. Metal bowls resist the action of most such solvents, but should not be used where strong acids or bases are present or in salt laden atmospheres. Consult the factory for specific recommendations where these conditions exist.

TO CLEAN POLYCARBONATE BOWLS USE MILD SOAP AND WATER ONLY! DO NOT use cleansing agents such as acetone, benzene, carbon tetrachloride, gasoline, toluene, etc., which are damaging to this plastic.

Bowl guards are recommended for added protection of polycarbonate bowls where chemical attack may occasionally occur.

Introduction

Follow these instructions when installing, operating, or servicing the product.

Application Limits

These products are intended for use in general purpose compressed air systems only.

Operation

Manual drain filters must be drained regularly before the separated moisture and oil reaches the bottom of the filter element. Automatic drain models will collect and dump the liquids automatically.

Pressure differential gauges should be used to determine when the maximum recommended pressure differential of 69 kPa (10 PSIG) has been reached.

DO NOT EXCEED THE RATED RECOMMENDED FLOWS. THE MINIMUM RECOMMENDED FLOW IS TEN PERCENT OF THE NOMINAL RATING.

Maintenance

- 1. The filter element should be removed and replaced when the pressure differential across the filter unit exceeds 10 PSIG.
- 2. To service the filter element; **SHUT OFF AIR SUPPLY** and depressurize the unit.
 - a. Unscrew threaded bowl.
 - b. Unscrew coalescing element. **IMPORTANT:** Element cannot be cleaned and must be replaced.
 - c. Clean the bowl before reassembling. See polycarbonate bowl cleaning **CAUTION**.
 - d. To install a new element, hold it by the bottom end cap, position the new o-ring over the top threaded cap end, turn the element gently into the body's threaded section and make sure it is screwed tightly into place.

CAUTION: Handling the element mid-section may cause contamination, spotting or migration of oil.

- e. Automatic drains should be checked to insure they are operating correctly.
- f. Replace bowl seal; lubricate seal to assist in retaining it in position. Use only mineral base oils or grease included in kit. **DO NOT** use synthetic oils such as esters, and **DO NOT** use silicones.
- g. Screw bowl into body.
- h. Apply pressure and check for leaks. If leaks occur, shut off air supply, depressurize the unit and correct leaks.

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

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Richland, Michigan 49083 269-629-5000

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Installation & Service Instructions: 1C500

Exhaust Coalescing Silencer (ECS)

Issued: November, 2003 Supersedes: December, 2000 Doc.# 1C500, ECN# 030539, Rev. 1

- 3. Multiple small valve exhausts may be plumbed into one ECS providing that the maximum pressure rating of the ECS unit will not be exceeded. Use a pressure manifold (rated for the maximum pressure of your air supply) for this purpose.
- 4. Always use a wrench to tighten the element; tightening by hand could damage the filter element, or cause it to loosen in the end caps. Do not over tighten the ECS. Over tightening can crack the element end cap. <u>Never</u> operate the ECS with a cracked end cap or loose element. Injury and/or property damage may result!
- 5. The temperature of the air entering the ECS filter element must not exceed the maximum temperature rating of the ECS unit. The ECS <u>must not</u> be used on heat regenerated air dryers!
- 6. If coalescing filters are used to filter the inlet air, prior to a regulator and/or lubricator, the service life of the Exhaust Coalescing Silencer will be greatly increased. If sub-micronic filtration is not used, ECS element life will depend on the exhaust flow rate and exhaust air contamination. The ECS should be replaced periodically: for most applications, the differential pressure should not be allowed to exceed 25 PSID.

Introduction

Follow these instructions when installing, operating, or servicing the product.

Application Limits

These products are intended for use in general purpose compressed air systems only.

Operating Pressure	kPa	PSIG	bar	
Maximum	700	100	7	

Maximum Temperature: 125°F (51°C)

Installation

- 1. The ECS should be mounted vertically to take advantage of the oil-catching sump on the bottom of the filter element. Mount in a location that will allow easy access for draining sump.
- It may be necessary to add a flow control valve to the outlet of the air motor or valve exhaust port if motor or cylinder extension or retraction speeds need to be regulated.



Richland, Michigan 49083 269-629-5000

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Bowl guards are recommended for added protection of polycarbonate bowls where chemical attack may occasionally occur.

Introduction

Follow these instructions when installing, operating, or servicing the product.

Application Limits

These products are intended for use in general purpose compressed air systems only.

With Polycarbonate Bowl

	kPa	PSIG	bar
Operating Pressure Maximum	830	120	8.3
Operating Temperature Maximum:	52°C (125°F)		F)

Installation & Service Instructions: 1M105C

1/8" & 1/4" P3A-F Mini Modular Filter (Screen Type)

ISSUED: November, 2003 Supersedes: January, 2000 Doc.# 1M105, ECN# 030539, Rev. 1



Installation

- 1. The equipment to which the filter is attached should be internally cleaned to remove all traces of accumulated oil and dirt. Also, new pipe or hose should be installed between the filter and equipment being protected.
- 2. Blow all upstream pipe work clear of accumulated dirt and liquids.
- 3. Select a filter location as close as possible to the equipment being protected and upstream of any pressure regulator.
- 4. Install filter so that air flows in the direction of arrow on body.
- 5. Install filter vertically with bowl drain mechanism at the bottom. Free moisture will thus drain into the sump "quiet zone" at the bottom of the bowl (automatic drain models are recommended as standard equipment).

🕂 WARNING

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Operation & Service

- 1. Both free moisture and solids are removed automatically by the filter. There are no moving parts.
- 2. Manual drain filters must be drained regularly before the separated moisture and oil reaches the bottom of the lower baffle. Automatic drain models will collect and dump liquids automatically.
- 3. The filter element should be removed and replaced when the pressure differential across the filter is 10 PSIG.
- 4. To remove the filter element: SHUT OFF AIR SUPPLY and depressurize the unit.
 - a. Unscrew threaded bowl.
 - b. Unscrew element assembly.
 - c. Clean bowl and internal parts before cleaning reassembling. See polycarbonate bowl cleaning section.
 - d. Attach clean element assembly and tighten firmly.
 - e. Replace bowl gasket; lubricate gasket to assist in retaining it in position. Use only mineral base oils or grease. Do NOT use synthetic oils such as esters, and do NOT use silicones.
 - f. Screw bowl into body and tighten firmly.

Kits Available

Kit No.

Description

P3A-KA00EEN P3A-KA00RFN Element Kit Filter Repair Kit

Richland, Michigan 49083 269-629-5000

🕂 WARNING

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- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- · Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
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Metal bowls are recommended where ambient and/or media conditions are not compatible with polycarbonate bowls. Metal bowls resist the action of most such solvents, but should not be used where strong acids or bases are present or in salt laden atmospheres. Consult the factory for specific recommendations where these conditions exist.

TO CLEAN POLYCARBONATE BOWLS USE MILD SOAP AND WATER ONLY! DO NOT use cleansing agents such as acetone, benzene, carbon tetrachloride, gasoline, toluene, etc., which are damaging to this plastic.

Bowl guards are recommended for added protection of polycarbonate bowls where chemical attack may occasionally occur.

Introduction

Follow these instructions when installing, operating, or servicing the product.

Application Limits

These products are intended for use in general purpose compressed air systems only.

Maximum Operating Pres	ssure:	PSIG	bar	kPa
with Polycarbonate Bowl		120	8.3	827
Ambient Temperature Ra	nge:			
with Polycarbonate Bowl	20°F to 1	25°F (-	7°C to 52	°C)

Installation & Service Instructions: 1M110C

1/8" & 1/4" Mini Modular Filter (Coalescing)

ISSUED: October, 2003 Supersedes: September, 2000 Doc.# 1M110, ECN# 030539, Rev. 4

ANSI Symbol



Coalescing Filter

Installation

Coalescing Filter units should be installed with reasonable accessibility for service whenever possible - repair service kits are available. Keep pipe and tubing lengths to a minimum with inside clean and free of dirt and chips. Pipe joint compounds should be used sparingly and applied only to the male pipe - never into the female port. Do not use PTFE tape to seal pipe joints - pieces have a tendency to break off and lodge inside the unit, possibly causing malfunction.

Install Coalescing Filter unit so that air flow is in the direction of arrow. Installation must be upstream of and close to devices it is to service (valve, cylinder, tool, etc.), and downstream of any pressure regulator. Position unit vertically with the bowl drain mechanism at the bottom. Free moisture will thus drain into the sump ("quiet zone") at the bottom of the bowl.

A 5 micrometer pre-filter is recommended to protect the high efficiency filter and to prolong the element's life.

Operation & Service

- 1. Both liquid aerosols and sub-micron particles are removed automatically by this filter.
- ▲ Caution: Do not exceed the rated recommended flows. The minimum flow is ten percent of the nominal rating.
- Manual drain filters must be drained regularly before the separated moisture and oil reaches the bottom of the element. Automatic drain models ("pulse drain") will collect and dump liquids automatically. They are actuated when a pressure drop occurs within the filter. Check to insure that they are operating correctly.
- 3. This element can not be cleaned and should be replaced when the pressure differential across the filter exceeds 10 PSIG (70 kPa). Use a pressure differential gage to determine the pressure differential.

🕂 WARNING

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1/8" & 1/4" Mini Modular Filter (Coalescing)

- 4. To service the filter element:
- ▲ Caution: SHUT OFF AIR SUPPLY and exhaust the pressure within the filter bowl before removing bowl from body.
 - a. Unscrew the threaded bowl. Then remove coalescing filter element.
 - b. Clean all internal parts, bowl, and body before reassembling unit. See Polycarbonate bowl cleaning section.
- A Caution: Touching or handling the element section may cause contamination, spotting or migration of oil. Hold the element by the bottom end cap.
 - c. Position the new o-ring (item 5) onto the replacement element (see figure). The screw the element into the body's threaded section and make sure that it is secured tightly into place.
 - Screw bowl into body. Tighten bowl from 22 to 28 in-lbs (2.5 to 3.2 N•m) of torque.
 - e. Apply pressure to the system and check for leaks. If leaks occur, shut off the air supply, de-pressurize the system and make necessary adjustments to eliminate leakage.

Troubleshooting

(If oil aerosol appears downstream from the filter):

- 1. Examine downstream air lines to determine if they were cleaned out before installation of the filter unit. Residual oil from these pipes can contaminate the element.
- Determine if the sealing o-ring is in place, and that it is not cut or otherwise damaged. (When checking the element, do not touch the element's body. Always handle the element by the bottom end cap.) When reinstalling the element, turn it gently and make sure that it is screwed tightly in place.
- Check the rate of air being used. The air flow should not exceed the rated capacity of the element, nor be less than 10% of its rated flow.
- Check the rate the inlet air temperature; this should not exceed 150°F (65°C). Where higher temperatures are used, oil vapor may condense as the air cools downstream of the filter.
- Check for acid fumes or other harmful gasses being drawn into the compressor intake. The element may be attacked by certain chemicals.
- 6. Determine the type of oil used in the compressor. Some synthetic or high flash point oils are detrimental contact factory for advice.

Replacement Element Kits

Part Number
PS467
PS468

Part Identification List

ltem#	Description
1	Bowl
2	Filter Element
3	Seal - body to bowl
4	Body
5	O-ring - body to element
6	O-ring - bowl to drain

7 Twist Drain



Richland, Michigan 49083 269-629-5000

WARNING

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To avoid polycarbonate bowl rupture that can cause personal injury or property damage, do not exceed bowl pressure or temperature ratings. Polycarbonate bowls have a 150 PSIG pressure rating and a maximum temperature rating of 125°F.

Safety Guide

For more complete information on recommended application guidelines, see the Safety Guide section of Pneumatic Division catalogs or you can download the **Pneumatic Division Safety Guide** at: www.parker.com/safety Installation & Service Instructions: 2C100F

1/8", 1/4" & 3/8" Economy 1/4", 3/8" & 1/2" Compact 1/2" & 3/4" Standard Coalescing Filter

ISSUED: September, 2012 Supersedes: September, 2006 Doc# 2C100, EN# 120039, Rev. 10

Introduction

W

W

Follow these instructions when installing, operating, or servicing the product.

Application Limits

These products are intended for use in general purpose compressed air systems only.

Maximum Recommended I	Pressure Drop	:
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	kPa	PSIG	bar
Coalescing Filter	70	10	0.7
/ith Polycarbonate Bowl			
	kPa	PSIG	bar
Operating Pressure Maximum	1000	150	10.3
Operating Temperature Maxim	um 52	2°C (125°	F)
Operating Temperature Minimu	im (0°C (32°F)
/ith Metal Bowl			
	kPa	PSIG	bar
Operating Pressure Maximum	1700	250	17.0

Operating Temperature Maximum80°C (175°F)Operating Temperature Minimum0°C (32°F)

Economy Pulse Drain

	kPa	PSIG	bar
Operating Pressure Maximum	1000	150	10.3
Operating Temperature Maximu	um	80°C (175°F)	
Operating Temperature Minimu	m	0°C (32°F)	

ANSI Symbols

Coalescing w/Manual Drain

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Economy, Compact, & Standard, Coalescing Filters



() Lightly grease with provided lubricant.

 Inspect for nicks, scratches, and surface imperfections.
 If present, reduced service life is probable and future replacement should be planned.

C Clean with lint-free cloth.

Installation

- The filter should be installed with reasonable accessibility for service whenever possible – repair service kits are available. Keep pipe or tubing lengths to a minimum with inside clean and free of dirt and chips. Pipe joint compound should be used sparingly and applied only to the male pipe – never into the female port. Do not use PTFE tape to seal pipe joints – pieces have a tendency to break off and lodge inside the unit, possibly causing malfunction. Also, new pipe or hose should be installed between the filter and equipment being protected.
- 2. The upstream pipe work must be clear of accumulated dirt and liquids.
- 3. Select a filter location as close as possible to the equipment being protected and upstream of any pressure regulator.
- 4. Install filter so that air flows in the direction of arrow on body.
- Install filter vertically with bowl drain mechanism at the bottom. Free moisture will thus drain into the sump "quiet zone" at the bottom of the bowl.

Operation and Service

- 1. Both free moisture and solids are removed automatically by the filter. There are no moving parts.
- Manual drain filters must be drained regularly before the separated moisture and oil reaches the bottom of the lower baffle.
- 3. The coalescing filter element should be removed and replaced when pressure differential across the filter is 10 psid. The differential pressure indicator, located on top of the filter body, gives a visual indication of the pressure differential across the filter element. Change the filter element when half or more of the orange piston is above the retaining ring when air is flowing. For units without a differential pressure indicator, pressure differential gauges should be used to determine when the maximum recommended pressure differential has been reached.
- 4. Shut off air supply and depressurize the unit, before servicing.
- After servicing, apply system pressure and check for air leaks. If leakage occurs, **Do Not Operate** — conduct servicing again.

Service Kits Available

Description	Economy 1/8", 1/4" & 3/8"	Compact 1/4", 3/8" & 1/2"	Standard 1/2" & 3/4"
Element Kits*			
Grade 6	PS924	PS724	PS824
Grade 10	PS930	PS730	PS830
DPI Repair Kit	PS781	PS781	PS781
Electronic DPI Kit	PS965	PS764	PS764

*Element kits include body / bowl seal.

Richland, Michigan 49083 269-629-5000

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- Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

Polycarbonate bowls and sight domes, being transparent and tough, are ideal for use with Filters and Lubricators. They are suitable for use in normal industrial environments, but should not be located in areas where they could be subjected to direct sunlight, an impact blow, nor temperatures outside of the rated range. As with most plastics, some chemicals can cause damage. Polycarbonate bowls and sight domes should not be exposed to chlorinated hydrocarbons, ketones, esters and certain alcohols. They should not be used in air systems where compressors are lubricated with fire-resistant fluids such as phosphate ester and diester types.

Metal bowls are recommended where ambient and/or media conditions are not compatible with polycarbonate bowls. Metal bowls resist the action of most such solvents, but should not be used where strong acids or bases are present or in salt laden atmospheres. Consult the factory for specific recommendations where these conditions exist.

TO CLEAN POLYCARBONATE BOWLS USE MILD SOAP AND WATER ONLY! DO NOT use cleansing agents such as acetone, benzene, carbon tetrachloride, gasoline, toluene, etc., which are damaging to this plastic.

Bowl guards are recommended for added protection of polycarbonate bowls where chemical attack may occasionally occur.

To avoid polycarbonate bowl rupture that can cause personal injury or property damage, do not exceed bowl pressure or temperature ratings. Polycarbonate bowls have a 150 PSIG pressure rating and a maximum temperature rating of 125°F.

Safety Guide

For more complete information on recommended application guidelines, see the Safety Guide section of Pneumatic Division catalogs or you can download the **Pneumatic Division Safety Guide** at: www.parker.com/safety

Installation

- 1. Refer to WARNINGS and CAUTIONS.
- 2. Purge downstream air line of oil.
- 3. Install the unit with the air flowing in the direction indicated by the arrow on the body and / or the Differential Pressure Indicator.

Installation & Service Instructions 2C400 Large Ported Coalescing Filters 35F & 43F with Variations and Accessories ISSUED: August, 2011 Supersedes: May, 2011 Doc. #2C400, EN#110617, Rev. 2

- 4. The drain line connection is dependent on the type of drain that is selected.
- Maximum inlet pressure and operating temperature ratings are: units with Differential Pressure Indicator, 150 psig (10,3 bar) and 150°F (66°C); units without DP2 Differential Pressure Indicator or with DP3 Differential Pressure Gauge: 250 psig (17.2 bar)150°F (66°C).

Maintenance

- 1. The element operates effectively when it is saturated. The element's useful life will end only when the Differential Pressure Indicator is completely red. The element cannot be cleaned or reused and must be replaced at the end of its useful life.
- 2. When bowl becomes dirty, replace the bowl or clean by wiping with a clean, dry cloth.
- 3. Before placing the unit in service, make sure that the bowl is securely bolted in place per noted torque specification.

Repair Kits and Replacement Parts

Filter Element Kit (kit includes filter element, element o-ring, and retainer o-ring).

Element Types							
	1 micron 0.01 micron oil vapor, adsorption						
35F	MSP-95-502	MTP-95-502	MXP-95-502				
43F MSP-95-876 MTP-95-562 MXP-95-565							

Drain Plate Kits:

Drain Plate 9/16 diameter (use with internal automatic	
mechanical float drain no. P32KA00DA)	GRP-95-391
Drain Plate (1/2 NPT)	GRP-95-393
Drain Plate (1/2 BSPP)	GRP-95-395
Bowl O-ring Kit (43F)	GRP-95-290
Bowl O-ring Kit (35F)	GRP-95-291
Differential Pressure Gauge	DP3-01-000
Differential Pressure Indicator (Standard)	DP2-01-001
Differential Pressure Indicator Removal Cap Kit: (for 250 psig appl.)	GRP-95-022
Internal Drains:	
Automatic Mechanical Drain:	
(Fluorocarbon 1/8 NPT seals w/ stem)	P32KA00DA

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from The Company, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application, including consequences of any failure and review the information concerning the product or systems in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by The Company and its subsidiaries at any time without notice.

Large Ported Coalescing Filters 35F and 43F with Variations and Accessories

Automatic Electric Drain Valves

Model Number Kit	Port Size NPT	Voltage	Operating Pressure
WDV3-G14BL	1/2"	115 VAC	232 PSIG
WDV3-G24BL	1/2"	230 VAC	232 PSIG
WDV3-G34BL	1/2"	24 VDC	232 PSIG

Zero Air Loss Condensation Drain

Model Number Kit	Port Size NPT	Voltage	Operating Pressure
ED3002N115-KL	1 x 3/8, 3/8	115 VAC	232 PSIG
ED3004N115-KL	1 x 1/2, 3/8	115 VAC	232 PSIG
ED3007N115-KL	2 x 1/2, 3/8	115 VAC	232 PSIG
ED3030N115-KL	2 x 1/2, 3/8	115 VAC	232 PSIG
ED3100N115-KL	2 x 1/2, 3/8	115 VAC	232 PSIG

DP3 Differential Pressure Gauge Installation Instructions on 3x / 4x Series Filters

- Remove and discard the plastic cap, screws and O-rings from top of unit.
- 2. To install the new DP3 Differential Pressure Gauge, pry the cap out of the housing and separate the mounting block from the DP3 by removing the 2 screws under the cap. Make sure that air flow direction arrows on DP3 match flow arrows (same direction) on filter unit. Make sure O-Rings are properly seated on bottom of DP3, and attach DP3 to filter, using the special 60mm mounting screws (2 required) with flat ground on threads.

CAUTION! Overtightening the screws may damage the Differential Pressure Gauge.



- * CAUTION: Use special 60 mm (long) screw to mount gauge to filter only.
 - 3. Replace coalescing element when differential pressure reaches the **red** band.

35F / 43F



Automatic Mechanical Float Drain



Richland, Michigan 49083 269-629-5000

To avoid unpredictable system behavior that can cause personal injury and property damage:

- Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

Introduction

Follow these instructions when installing, operating, or servicing the product.

Application Limits

These products are intended for use in general purpose compressed air systems only.

Electrical Rating:

5 Amps - 12/24VDC, 125/250VAC

With Polycarbonate Bowl

	kPa	PSIG	bar
Operating Pressure Maximum	1000	150	10.3
Operating Temperature Maximu	um	52°C (125°F)
Operating Temperature Minimu	ım	0°C (32°F)	

With Metal Bowl

	kPa	PSIG	bar
Operating Pressure Maximum	1700	250	17.0
Operating Temperature Maximu	um 8	80°C (175°F)	
Operating Temperature Minimu	m ()°C (32°F)	

Operation and Service

- 1. The particulate and coalescing filter element should be removed and replaced when pressure differential across the filter is 10 PSID.
- 2. Adsorber elements are designed to adsorb vaporous contaminates. The relative efficiency of an adsorber varies depending on the vapor to be adsorbed and the environmental temperature. At higher temperatures, adsorbers become less efficient.

Installation and Service Instructions: 2F102C 1/4" & 3/8" 05F/15F 1/4", 3/8" & 1/2" 06F/11F 3/8", 1/2" & 3/4" 07F/12F 3/4", 1" & 1-1/2" P3N Electronic DPI ISSUED: November, 2003 Supersedes: January, 2003 Doc.# 2F102, ECN# 030539, Rev. 4

Adsorber elements are not particle filters. All particles and aerosols should be removed prior to adsorbing vaporous contaminants. The initial pressure drop across an adsorber element (1.5 PSIG maximum) should never increase. The presence of any liquids, aerosols or particulate matter in an adsorber indicates that the effective life of the element has been exceeded and the element should be replaced and the system cleaned.

The most effective method of testing whether an element needs to be replaced is to smell the air coming from the adsorber. Offensive odors will be present well before oil levels become detectable.

- 3. If the electronic differential pressure indicator, located on top of the filter body is wired as normally open, it sends an electrical signal when the differential is greater than the specified range. If the electronic differential pressure indicator is wired as normally closed, there will be a signal until the differential exceedes the specified range. Change the filter element when this happens. For units without a differential pressure indicator, pressure differential gauges should be used to determine when the maximum recommended pressure differential has been reached.
- 4. Shut off air supply and depressurize the unit, before servicing.
- After servicing, apply system pressure and check for air leaks. If leakage occurs, **Do Not Operate** — conduct servicing again.

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Orientation / Assembly for (05F) Electronic DPI



Orientation / Assembly for (06F / 07F / P3N) Electronic DPI

Item 1: Screws (2) for mounting Electronic DPI Item 2: Electronic DPI with two seals - Preset at 10 PSID



Orientation / Assembly for (15F) Electronic DPI



Orientation / Assembly for (11F / 12F / P3N Coalescing) Electronic DPI

Item 3A: Adapter, 05F/15F Item 3B: Adapter, 06F/07F/11F/12F/P3N Item 6: Screw (2) for mounting adapter

Wiring Code

Pin 1: Common Pin 2: Normally Closed Pin 3: Normally Open





Adjusting Screw. Preset at 10 PSID. 1 turn is approx. 10 PSID. Turning screw clockwise until stopped is 20 PSID.

Cable Grip for Cables 1/4" to 9/32"

Kits Available

Description	05F/15F 1/4" & 3/8"	06F/11F 1/4", 3/8" & 1/2"	07F/12F 3/8", 1/2" & 3/4"	P3N 3/4", 1" & 1-1/2"
Element Kits*				
5 Micron	PS902	PS702	PS802	P3NKA00ESE
40 Micron	PS901	PS701	PS801	P3NKA00ESG
Coalescing Grade 6	PS924	PS724	PS824	P3NKA00ESC
Coalescing Grade 10	PS930	PS730	PS830	P3NKA00ES9
Adsorber	PS931	PS731	PS831	P3NKA00ESA
Porous Bronze	PS988	PS788	PS888	—
DPI Repair Kit	PS781	PS781	PS781	PS781
Electronic DPI Kit	PS764	PS764	PS764	PS764

*Element kits include body / bowl seal.

Richland, Michigan 49083 269-629-5000

To avoid unpredictable system behavior that can cause personal injury and property damage:

- Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- · Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

Safety Guide

For more complete information on recommended application guidelines, see the Safety Guide section of Pneumatic Division catalogs or you can download the **Pneumatic Division Safety Guide** at: www.parker.com/safety

Introduction

Follow these instructions when installing, operating, or servicing the product.

Application Limits

These products are intended for use in general purpose compressed air systems only.

Adsorber Filters are not effective on: Carbon monoxide, carbon dioxide, methane, ethane, ethylene or hydrogen. For a complete list of vapors that can and cannot be adsorbed effectively by activated charcoal adsorbers consult the factory.

Maximum Recommended Pressure Drop:

	kPa	PSIG	bar
Particulate Filter	70	10	0.7
Operating Pressure Maximum	1700	250	17.0
Operating Temperature Maximum	80)°C (175°	F)
Operating Temperature Minimum	C)°C (32°F)

ANSI Symbols



Installation & Service Instructions: 2F300E 1" Particulate, Adsorber & Coalescing Filter

ISSUED: October, 2006 Supersedes: March, 2005 Doc.# 2F300, ECN# 061068, Rev. 9

Installation

- The filter should be installed with reasonable accessibility for service whenever possible – repair service kits are available. Keep pipe or tubing lengths to a minimum with inside clean and free of dirt and chips. Pipe joint compound should be used sparingly and applied only to the male pipe – never into the female port. Do not use PTFE tape to seal pipe joints – pieces have a tendency to break off and lodge inside the unit, possibly causing malfunction. Also, new pipe or hose should be installed between the filter and equipment being protected.
- 2. The upstream pipe work must be clear of accumulated dirt and liquids.
- 3. Select a filter location as close as possible to the equipment being protected and upstream of any pressure regulator.
- 4. Install filter so that air flows in the direction of arrow on body.
- Install filter vertically with bowl drain mechanism at the bottom. Free moisture will thus drain into the sump "quiet zone" at the bottom of the bowl.

Operation and Service

- 1. Manual drain filters must be drained regularly before the separated moisture and oil reaches the bottom of the lower baffle.
- 2. The particulate filter element should be removed and replaced when pressure differential across the filter is 10 PSIG.
- 3. Adsorber elements are designed to adsorb vaporous contaminates. The relative efficiency of an adsorber varies depending on the vapor to be adsorbed and the environmental temperature. At higher temperatures, adsorbers become less efficient.

Adsorber elements are not particle filters. All particles and aerosols should be removed prior to adsorbing vaporous contaminants. The initial pressure drop across an adsorber element (1.5 PSIG maximum) should never increase. The presence of any liquids, aerosols or particulate matter in an adsorber indicates that the effective life of the element has been exceeded and the element should be replaced and the system cleaned.

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Particulate, Adsorber & Coalescing Filter

The most effective method of testing whether an element needs to be replaced is to smell the air coming from the adsorber. Offensive odors will be present well before oil levels become detectable.

- 4. For Coalescing filter, a 5 micrometer pre-filter is recommended to protect the high efficiency filter and to prolong the elements life.
- 5. The differential pressure indicator, located on top of the filter body, gives a visual indication of the pressure differential across the filter element. Change the filter element when half or more of the orange piston is above the retaining ring when air is flowing. For units without a differential pressure indicator, pressure differential gauges should be used to determine when the maximum recommended pressure differential has been reached.
- 6. Shut off air supply and depressurize the unit, before servicing.
- 7. After servicing, apply system pressure and check for air leaks. If leakage occurs, Do Not Operate conduct servicing again.

Service Kits Available

Description	Kit Number	Contains Items
Element Kits -		
5 Micron	P3NKA00ESE	
40 Micron	P3NKA00ESG	
Adsorber	P3NKA00ESA	(5) Bowl Seal and
25 Micron Porous Bronze	P3NKA00ESJ	(2) Element
Coalescing / Element Grade 6	P3NKA00ESC	
Coalescing / Element Grade 10	P3NKA00ES9	
DPI Repair Kit	PS781	(6) DPI components (not all shown)
Auto Drain Kit	PS506	(7) Auto Drain Assembly





of 125°F (52°C).

EXTRA COPIES OF THESE INSTRUCTIONS ARE AVAILABLE

FOR INCLUSION IN EQUIPMENT / MAINTENANCE MANUALS THAT UTILIZE THESE PRODUCTS. CONTACT YOUR LOCAL REPRESENTATIVE.

(FR) Λ MISE EN GARDE Afin de prévenir tout comportement imprévisible du système pouvant entraîner des accidents et des dommages matériel Débrancher l'alimentation électrique (s'il y a lieu) avant de procéder à l'installation, à l'entretien ou à la tran Débrancher l'approvisionnement en air et mettre hors pression toutes les conduites d'air de ce produit avant de procéder à l'installation, à l'entretien ou à la transformation. Faire fonctionner dans les conditions de pression, de température et autres qui sont indiquées dans ces instructions Si la température ambiante est inférieure au point de congélation, le fluide doit être exempt d'humidité. Effectuer l'entretien conformément aux procédures qui sont indiquées dans ces instructions.

L'installation, l'entretien et la transformation de ces produits doivent être effectués par des personnes familiarisées avec les produits nneumatiques.

Après l'installation, l'entretien ou la transformation, rétablir l'alimentation électrique ainsi que l'approvisionnement en air (s'il y a lieu) ettester le produit afin de s'assurer qu'il fonctionne bien et qu'il n'y a pas de fuites. Si une fuite s'entend ou si le produit ne fonctionne pas correctement, ne pas le mettre en service.

Les mises en garde et les indications portées sur le produit ne doivent pas être recouvertes par de la peinture, etc. Si le masquage n'est pas possible, contacter le représentant local pour obtenir des étiquettes de remplacement.

Les mises en garde et les indications portées sur le produit ne doiven pas être recouvertes par de la peinture, etc. Si le masquage n'est pas possible, contacter le représentant local pour obtenir des étiquettes de remplacement

(FR) Λ MISE EN GARDE

LA NON OBSERVATION D'INSTRUCTIONS OU LA SÉLECTION IMPROPRE OU L'USAGE INAPPROPRIÉ DES PRODUITS ET/OU DES SYSTÈMES DÉCRITS AUX PRÉSENTES OU ARTICLES CONNEXES, PEUVENT ENTRAÎNER LA MORT, DES PRÉJUDICES CORPORELS ET/OU DES DOMMAGES MATÉRIELS.

Le présent document et toute autre information provenant de la Société, de ses filiales et distributeurs agréés se référent à des produits et/ou des systèmes pouvant faire l'objet de tests et de contrôles de la part d'utilisateurs compétents, possédant une expertise technique. Il est important que vous analysiez tous les aspects de votre application, notamment les conséquences d'une défaillance, et étudiiez les informations concernant le produit ou les systèmes qui figurent dans le catalogue actuel. Compte tenu de la variété des conditions d'exploitation et les applications inhérentes à ces produits et/ou systèmes, l'utilisateur est, par le biais de ses propres analyses et tests, seul responsable de la sélection finale desdits produits et/ou systèmes et s'engage à ce que son application réponde à tous les critères relatifs aux performances, à la sécurité et aux mises en garde

Les produits décrits aux présentes, y compris et sans limitation, les caractéristiques produit, les spécifications, les conceptions, la disponibilité et les prix, peuvent faire l'objet de modifications par la Société et ses filiales, à tout moment et sans préavis

(FR)

如需多份涉及这些产品维修/操作指南的使用说明书。请联系当

地办事处。

Durs et transparents, les bols en polycarbonates sont parfaitement indiqués pour l'utilisation dans les filtres et les lubrificateurs. Ils sont compatibles avec les milieux industriels normaux mais ne doiv ent pas être placés dans des lieux où ils pourraient être exposés à la lumière directe du soleil, à des chocs ou à des températures situées en-dehors de leur plage d'utilisation nominale. Comme la plupart des plastiques, cette matière peut être endommagée par certains produits chimiques. Les bols en polycarbonate ne doivent pas être exposés aux hydrocarbures chlorés. aux cétones, aux éthers et à certains alcools. Ils ne doivent pas être utilisés dans des systèmes pneumatiques dont les compresseurs sont lubrifiés par des fluides résistant au feu tels que les esters et diesters de phosphate.

Les bols métalliques sont recommandés lorsque le milieu et/ou le fluide sont incompatibles avec les bols en polycarbonates. Les bols métalliques sont résistants à la plupart de ces solvants mais ne doivent pas être utilisés en milieu fortement acide ou basique, ou en atmosphère salée. Si de telles conditions prévalent, adressez-vous au fabricant afin d'obtenir des recommandations spécifiques.

NETTOYER LES BOLS EN POLYCARBONATE UNIQUEMENT À L'EAU ET AU SAVON DOUX ! NE PAS utiliser d'agents nettoyants tels que l'acétone, le benzène, le tétrachlorure de carbone. l'essence, le toluène, etc., qui endommageraient ce plastique

(FR) Guide de sécurité

Pour obtenir de plus amples informations sur les directives à appliquer recommandées prière de vous reporter à la section Guide de sécurité des catalogues de la Pneumatic Division ou de télécharger le Guide de sécurité de la Pneumatic Division sur le site : www.parker.com/safety

(FR) Λ MISE EN GARDE

Pour éviter que le bol de polycarbonate se rompe et provoque des préjudices corporels ou des dommages matériels, ne pas dépasser les limites maximales de pression et de température, à savoir 150 PSIG (10 bar) et 125 °F (52°C).

DES EXEMPLAIRES DE CES INSTRUCTIONS SONT DISPONIBLES POUR INSERTION DANS LE MATÉRIEL OU LES MANUELS D'ENTRETIEN QUI UTILISENT CES PRODUITS. VEUILLEZ CONTACTER VOTRE REPRÉSENTANT LOCAL

(DE) Æ WARNUNG

Als Schutz vor unvorhersehbarem Systemverhalten, das zu Verletzungen und Sachschäden führen kann, sind folgende Maßnahmen zu ergreifen

- Vor Einbau, Servicearbeiten oder Umbau gegebenenfalls die orgung unterbrechen
- Vor Einbau, Servicearbeiten oder Umbau die Druckluftversorgung unterbrechen und alle an das Produkt angeschlossen Luftleitungen vom Druck befreien
- Im Betrieb sind die vom Hersteller angegebenen Druck- und Temperaturbereiche und die übrigen in der Betriebsanleitung aufgeführten Betriebsbedingungen einzuhalten.
- Das Betriebsmedium muss bei Umgebungstemperaturen ur dem Gefrierpunkt absolut trocken sein.
- Servicearbeiten sind gemäß den in diesem Handbuch aufgeführten Vorgehensweisen durchzuführen
- Einbau, Servicearbeiten und Umbau dieser Produkte dürfer nur von geschulten Mitarbeitern vorgenommen werden, die über gute Kenntnisse beim Einsatz von Pneumatikprodukte verfügen.
- Nach Finhau, Servicearbeiten oder Umbau ist die Strom- und Druckluftversorgung bei Bedarf wieder anzuschließen und das Produkt einer sorafältigen Dichtigkeits- und Funktionsprüfung zu unterziehen. Wenn eine hörbare Undichtigkeit vorliegt oder das Produkt nicht einwandfre funktioniert, darf es nicht in Betrieb geno
- Warntexte und technische Angaben auf dem Produkt dürfen nicht durch Farbe oder dgl. verdeckt sein. Wenn sich die Schilder nicht abdecken lassen, hält der Händler vor Ort neue Schilder bereit.

MARNUNG (DE)

DUBCH DAS VERSAGEN ODER DIE UNSACHGEMÄSSE AUSWAHL ODER VERWENDUNG DER HIER BESCHRIEBENEN PRODUKTE UND/ODER SYSTEME ODER DAMIT IN VERBINDUNG STEHENDER GERÄTE KANN ES ZU TODESFÄLLEN, VERLETZUNGEN UND SACHBESCHÄDIGUNGEN KOMMEN.

Dieses Dokument und andere Information der Parker Hannifin Corporation ihrer Niederlassungen und autorisierten Händler stellt Produkt- und/oder Systemoptionen zur Verfügung, die durch einen Anwender mit entsprechenden technischen Kenntnissen vor dem Einsatz auf Eignung überprüft werde müssen. Es ist wichtig, dass alle Aspekte der Anwendung analysiert und die produkt- oder systemrelevanten Angaben dieses Produktkatalogs überprüft werden. Aufgrund der Vielfältigkeit von Betriebsbedingungen und Einsatzbereichen dieser Produkte oder Systeme ist der Anwender, in Form von eigenen Analysen und Tests, allein verantwortlich für die endgültige Auswahl des Produkts bzw. Systems. Er muss sicherstellen, dass alle Leistungsmerkmale Sicherheits- und Warnhinweise für den jeweiligen Einsatzbereich erfüllt sind.

Die hier beschriebenen Produkte, einschließlich aller Angaben zu Produktmerkmalen, Snezifikationen, Konstruktionen, Verfügbarkeit und eisgestaltung, können jederzeit, ohne Ankündigung und uneingeschränkt von der Parker Hannifin Corp. und ihren Niederlassungen geändert werden.



Transparente und robuste Behälter aus Polycarbonat eignen sich bestens für Filter und Schmiergeräte. Sie sind für den Einsatz unter normalen Industriebedingungen vorgesehen, sollten iedoch nicht direkter Sonneneinstrahlung oder Stößen ausgesetzt und nur innerhalb des angegebenen Temperaturbereichs benutzt werden. Wie alle Kunststoffe können sie durch gewisse Chemikalien beschädigt werden. Rehälter aus Polycarbonat sollten weder Chlorkohlenwasserstoffen noch Ketonen. Estern oder gewissen Alkoholen ausgesetzt werden. Sie sollten auch nicht in Druckluftsystemen eingesetzt werden, deren Kompressoren mit feuerfesten Flüssigkeiten wie z.B. Phosphatester oder Di-Ester geschmiert werden

Metallhehälter werden empfohlen, wenn Polycarbonathehälter aufgrund der Umgebungsbedingungen und der verwendeten Medien nicht verwendet werden dürfen. Metallbehälter widerstehen den meisten dieser Lösungsmittel, sollten jedoch keinen starken Säuren ode Basen ausgesetzt oder in salzhaltigen Umgebungen eingesetzt werden. Setzen Sie sich bei Einsätzen unter diesen Umgebungsbedingungen bitte mit dem Hersteller in Verbindung.

ZUR REINIGUNG VON POLYCARBONAT-BEHÄLTERN DÜRFEN AUSSCHLIESSLICH MILDE SEIFENLÖSUNGEN UND WASSER VERWENDET WERDEN! KEINE Reinigungsmittel wie Azeton, Benzol, Tetrachlorkohlenstoff, Benzin, Methylbenzol und dgl. verwenden, da diese den Kunststoff angreifer

(DE) Sicherheitshinweise

Ausführlichere Informationen über Richtlinien in Bezug auf die empfohlenen Einsatzbereiche siehe Sicherheitshinweise der Kataloge der Pneumatic Division, die hier auch heruntergeladen werden können: www.parker.com/safety

(DE) / WARNUNG

Damit der Polycarbonatbehälter nicht platzt und Verletzungen oder Sachbeschädigungen verursacht, sind die Richtwerte für Behälterdruck und Temperatureinstellung nicht zu überschreiten. Polycarbonatbehälter sind für einen Nenndruck von 10 bar und eine Höchsttemperatur von 52°C ausgelegt.

DES EXEMPLAIRES DE CES INSTRUCTIONS SONT DISPONIBLES POUR INSERTION DANS LE MATÉRIEL OU LES MANUELS D'ENTRETIEN OUILLITH ISENT CES PRODUITS VEHILLEZ CONTACTER VOTRE REPRÉSENTANT LOCAL

A ATTENZIONE Per evitare comportamenti imprevedibili del sistema che

possono provocare lesioni personali e danni alle cose Scollegare l'alimentazione elettrica (se necessario)

prima di installazione, manutenzione o conversione. Scollegare l'alimentazione dell'aria e depressurizzare tutte le condutture collegate al prodotto prima di

- installazione, manutenzione o conversione Utilizzare il prodotto alla pressione, alla temperatura e alle altre condizioni specificate in queste istruzioni
- Il mezzo deve essere privo di condensa se la temperatura
- mbiente è inferiore al punto di cong Effettuare la manutenzione secondo le procedure

 (\mathbf{T})

- specificate in queste istruzioni. Installazione manutenzione e conversione di questi
- prodotti devono essere effettuate da personale compe nente al funzionamento dei prodotti pneumatici

Dopo installazione, manutenzione o conversione, ricollegare le alimentazioni dell'aria ed elettrica (se necessario) e verificare che il prodotto funzioni correttamente e non vi siano perdite. In caso di perdita o funzionamento anomalo del prodotto, non utilizzarlo. Le avvertenze e le specifiche sul prodotto non devono

essere coperte da vernice ecc. Qualora siano illeggibili, contattare il proprio rappresentante locale per le targhette di ricambio.

(IT) ATTENZIONE

LA SCELTA OPPURE L'UTILIZZO ERRATO DEI PRODOTTI E/O SISTEMI IVI DESCRITTI OPPURE DEGLI ARTICOLI CORRELATI PUÒ PROVOCARE GRAVI LESIONI PERSONALI. MORTE E DANNI ALLE COSE.

Il presente documento ed altre informazioni fornite dall'azienda, relative affiliate e distributori autorizzati propongono opzioni di prodotti e/o sistemi il cui utilizzo deve essere valutato da utenti in possesso delle ompetenze tecniche necessarie. E' importante analizzare ogni aspetto della propria applicazione, comprese le conseguenze in caso di guasto. nonché valutare le informazioni relative al prodotto o sistema contenute nel presente catalogo di prodotti. In seguito alla varietà di condizioni di esercizio ed applicazioni per questi prodotti o sistemi. l'utente, con le proprie valutazioni ed i propri test, è l'unico responsabile della scelta finale di prodotti e sistemi nonché di accertarsi che tutti i requisiti d prestazioni, sicurezza e normativi dell'applicazione siano soddisfatti. I prodotti ivi descritti, inclusi ma non limitati a, caratteristiche dei prodotti, specifiche, design, disponibilità e prezzo, sono soggetti a

modifiche senza preavviso da parte dell'azienda e delle relative affiliate.

(TT) ▲ ATTENZIONE

Le vaschette in policarbonato, trasparenti e robuste, sono ideali per l'uso con filtri e lubrificatori. Sono indicate per l'uso in normali ambienti industriali, ma non devono essere collocate in aree esposte a luce solare diretta, urti o temperature al di fuori del range indicato. Come molte plastiche, alcune sostanze chimiche possono provocare danni. Le vaschette in policarbonato non devono essere esposte a idrocarburi, chetoni, esteri e determinati alcool. Non devono essere utilizzate in impianti pneumatici con compressori lubrificati con fluidi ignifughi come esteri e diesteri di fosfati.

Qualora le condizioni ambientali e/o il mezzo non siano compatibili con le vaschette in policarbonato, si raccomanda l'uso di vaschette metalliche. Le vaschette metalliche resistono alla maggior parte di questi solventi, ma non devono essere utilizzate in presenza di acidi o basi forti oppure in ambienti estremamente salini. Consultare la fabbrica per le eventuali accomandazioni specifiche.

PER LA PULIZIA DELLE VASCHETTE IN POLICARBONATO, UTILIZZARE ESCLUSIVAMENTE ACOUA E SAPONE NEUTROL NON utilizzare detergenti guali acetone, benzene, tetracloruro di carbonio. benzina, toluene ecc. che possono danneggiare la plastica.

(IT) Guida alla sicurezza

Per informazioni più complete sulle linee guida di applicazione raccomandate, consultare la sezione Guida alla sicurezza dei cataloghi Pneumatic Division o scaricare la guida all'indirizzo: www.parker.com/safety

(IT) ATTENZIONE

Per evitare la rottura delle vaschette in policarbonato e consequenti lesioni personali o danni alle cose, non superare la pressione o la temperatura nominale della vaschetta. Le vaschette in policarbonato hanno una pressione nominale di 150 PSIG (10 bar) e una temperatura massima di 125°F (52°C).

ULTERIORI COPIE DI QUESTE ISTRUZIONI SONO DISPONIBILI A INTEGRAZIONE DEL MANUALI DI USO / MANUTENZIONE PER GLI UTENTI DI QUESTI PRODOTTI. CONTATTARE IL PROPRIO RAPPRESENTANTE LOCALE

警告 Λ

(JA)

人が確実を負う危険が生じる、また物的確実が起こりうる予想外のシ ステム障害を避けるために:

- 機器の取り付け、取り扱いもしくは交換の前に電源を落としてくだ さい、
- 機器の取り付け、取り扱いもしくは交換前に全ラインの圧縮空気の 供給を止め、ライン内の圧縮空気を排出してください。
- 圧力、使用温度やコネクション等が説明書に記載されている範囲で 機器を使用ください。
- 外気が0度以下の場合、完全に乾燥した空気を供給してください。
- 説明書の記載通りに機器の操作を行ってください。
- 機器の取り付け、取り扱い、交換は空気圧機器の十分な知識と経験 を持った人が行ってください。
- 機器の取り付け、取り扱い、交換後に電源、圧縮空気を入れ機器が 正しく作動するか、空気漏れがないかを確認してください。もし空気 漏れが聞こえる場合や機器が適切に作動しない場合、電源、圧縮空気 を止めてください。

*警告"や仕様の詳細は機器に記載されていません。もし必要な場 合は最寄りの Parker、当社子会社にラベルを依頼してください。

(JA) 警告 /N

本文書に記載した製品、あるいは関連した物品を、正 しく選定しなかったり、使い方を誤ったりすれば死亡 事故や、怪我、そして物的損害を引き起こす可能性が あります。

本文書、並びに Parker-Hannifin Corporation、そして当社の子会社、ならび に正規販売業者が発行しているその他の情報では、技術的専門知識を有し、 いるお客様が更なる調査を実施できるように、販売している製品やシステム についての情報を提供しています。お客様は、各自の解析や試験の結果に基 づきシステムや部品を最終的に選択し、さらには全ての特徴、耐久性、保 守、安全性、そして警告要件が満たされているかどうかに関して、唯一お客 様自身にて責任を負うものとします。 お客様は、アプリケーション全てを 解析し、該当する業界基準に従い、最新版の製品カタログ内の当該製品の情 幅、並びに Parker、そして当社の子会社や正規販売業者が提供するその他の 原材料全てに関する情報に従ってください。

この商品はこの文書で説明されている商品の特徴、仕様、デザイン A手の可能性、価格は Parker、そして当社の子会社や正規販売業者か らの通達なく変更される場合があります。

(JA) /八 注意

透明で頑丈なポリカーボネート製ボウルはフィルタとルプリケータとの使用 が理想です。プラスチックボウルは一般的な工業環境に適していますが、直 射日光が当たる環境、強風の環境、仕様範囲外の温度での使用は避けてくた さい。多くのプラスチックと同じようにいくつかの化学物質はボウルの損傷 させます。ポリカーボネイトボウルは塩素化炭化水素、ケトン、エステル、 いくつかのアルコール物質の環境では使用できません。ボウルはホスファタ ーゼエステルやジェステルタイプの耐火性潤滑油を使用したコンプレッサか らの供給エアを使用ください。

メタルボウルはポリカーボネイト製ボウルと使用温度、使用流体状況が同じ でないことを奨励します。メタルボウルは大概の溶剤に耐性がありますが、 強酸や塩の環境での使用は避けてください。そのような環境がある場合当社 までお問合せください。

ポリカーボネートボウルの洗浄には中性石鹸や水を使用ください。アセト ン、ベンジン、炭素四塩化物、ガソリン、トルエン等の洗浄液の使用はし ないでください。プラスチック不具合発生の可能性があります。

(JA) 注意事項

より詳細の奨励されるアプリケーションの指針は当社カタログの注意事項 をご参照ください。もしくは以下から空気圧機器注意事項がダウンロード できます。www.parker.com/safety

▲ 警告 JA

人が障害を負う、また物的損害の可能性があるポリカーボネートボウルの 破損を避ける為に、使用範囲圧力、温度範囲以上での使用はしないでくだ さい。 ポリカーボネートボウルの最高使用圧力は 1MPa、最高使用温度は 52°Cです。

上記以外のメンテナンスマニュアルを含む説明書が必要な場 合最寄の Parker 、そして当社の子会社や正規販売業者に連 絡してください。

(IK) Kits ○R) 维修包 FR Kits ○E) Sätze (T) Kit ③P キット KR え ES Juegos SE) Satser

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UT) Vascnetta metallica / Senza indicatore Drenaggio ad impulso				120 in. lbs. 480 in. lbs. 480 in. lbs.		





(KR) 경고 Λ

예상하지 못한 인체의 위해나 제품의 치명적인 손상을 미연에 방지하기 위한 목적입니다

필요에 의해 조립이나 수리 또는 개조를 할 때는 공급전원을 차단하여 주십시요

 필요에 의해 조립이나 수리 또는 개조를 할 때는 에어공급을 차단하며 주십시요

동결을 방지하기 위해 완전 건조된 공기를 사용하여 주십시요.

 동결을 방지하기 위해 완전 건조된 공기를 사용하여 주십시요.. 수리를 위해 분해를 할 경우 취급설명서에 따라 주십시요..

 조립이나 수리 또는 개조는 공기압에 대한 충분한 지식과 경험을 가진 사람이 해 주십시요.

 조립이나 수리 또는 개조 후에는 압축공기와 전기를 접속하여 적절한 기능 검사 및 누설검사를 형해 주십시요. 만약 소리가 들릴 정도의 누설이 발생하거나 기기가 몰바르게 작동하지 않는 경우는 사용하지 말고 바르게 조립되어 있는지 확인해 주십시요.

제품에 명시된 경고나 사양은 훼손되거나 가려져서는 안됩니다. 만약 불가피한 경우 담당 책임자에게 연락하여 주십시요

\land 경고 (KR)

적절하지 못한 제품의 선정이나 사용으로 치명적인 손상을 주거나 인체에 위해 할 수 있으며 사망에 이를

수도 있습니다.

취급설명서에 게재되어 있는 제품은 사용 조건이 다양하므로 그 시스템에서의 적합성의 결정은 시스템의 설계자 또는 사양을 결정하는 사람이 필요에 따라 분석과 테스트를 행한 후 결정해 주십시요. 이 시스템의 소기 성능, 안전성의 보증은 시스템의 적합성을 결정한 사람의 책임이 됩니다. 앞으로도 최신의 제품 카탈로그와 자료에 따라 모든 사양 내용을 검토하여 기기의 고장 가능성에 대한 상황을 고려하여 시스템을 구성하여 주십시요. 취급설명서에 게재되어 있는 제품의 특성, 사양, 디자인, 성능 그리고 가격은 예고 없이 언제라도 변경될 수 있습니다.

(KR) //\ 주의

폴리카보네이트 보용은 투명하고 견고하여 필터나 루브리케이터에 사용하기에 이상적이며 일반 산업용에 적용하기에 적합합니다만 직사광선어 노출되거나 충격이 가해지는 장소와 온도범위를 벗어나는 곳에서의 사용은 피해야 합니다. 대부분의 플라스틱과 같이 일부 화학약품은 제품 손상의 원인이 될 수 있습니다. 폴리카보네이트 보울은 사영화탄소, 케톤, 초산 에스테르, 알콜에 노출되어서는 안되며 인산과 같은 내화성 유채로 은활된 컴프레셔 에어 시스템에서 사용을 피해야 합니다.

메탈 보울은 폴리카보네이트 보울을 적용할 수 없는 환경에 권장됩니다. 메탈 보울은 대부분의 솔벤트에 대해 견딜 수 있지만 강산성이나 염도가 높은 환경은 피해 주십시요. 이런 환경에서 사용할 경우 공장 설비담당자와 권장 사양에 대해 상의하여 주십시요.

폴리카보네이트 보울의 세척은 약 알칼리성 세제나 물을 사용하시고 절대

플라스틱에 손상을 줄 수 있는 아세톤, 벤젠, 카본 영화물, 가솔린, 돌루엔 동은 사용하지 말아 주십시요

(KR) 안전지침

보다 많은 제품정보와 올바른 취급 사례에 대해서는 공압사업부 카탈로그의 "안전한 사용을 위한 안내"나 Parker 홈페이지에서 자료를 다운 받을 수 있습니다. www.parker.com/safety

\land 경고 (KR)

인체에 위해나 제품의 손상을 가져올 수 있는 폴리카보네이트 보울의 파손을 피하기 위해 과도한 압력이나 온도범위에서 사용하지 마십시요.

폴리카보네이트 보울은 150 PSIG (10bar)의 압력범위와 최대 125% (52℃)에서 사용 가능합니다.

이 취급설명서를 장비에 첨가하거나 보전 매뉴얼을 위해 복사하여 사용하십시요. 필요한 경우 제품 취급점에 문의해 주십시요.

🗥 ADVERTENCIA

(ES)

- Para evitar comportamientos del sistema que puedar causar accidentes y daños materiales:
- Cuando proceda, desconectar la electricidad antes de la instalación, servicio o modificación
- Desconectar el aire y despresurizar todas las líneas conectadas a este producto antes de la instalación, servicio o modificación
- Trabajar con la presión, temperatura y demás condiciones recomendadas aquí por el fabricante.
- El aire no debe ser húmedo si la temp. ambiente es inferior a 0° C.
- Servicio según se indicada en estas instrucciones
- La instalación, el servicio y la modificación de estos productos deben ser realizados por personal calificado con conocimientos de los productos neumáticos.
- Después de realizada la instalación, el servicio o la modificación, se debe conectar el aire y la electricidad (cuando proceda) y el producto probado para verificar un funcionamiento correcto sin fugas. Si se escucha una fuga o si el producto no funciona normalmente, no incorporar al uso normal
- Las advertencias y especificaciones no deben ser tapadas con pintura o similar. Si no es posible protegerlas, contacte con el representante local para cambiar las etiquetas.

(ES)

LA SELECCIÓN ERRÓNEA O INCORRECTA O EL **USO INCORRECTO DE LOS PRODUCTOS Y/O** SISTEMAS O DE OBJETOS RELACIONADOS, PUEDE CAUSAR MUERTES, HERIDAS Y AVERÍAS.

Este documento y demás información de La Compañía, sus filiales y distribuidores autorizados ofrece opciones de productos y sistemas para que los usuarios con los conocimientos técnicos necesario profundicen sus análisis. Es importante que Ud. analice todos los aspectos de su aplicación, inclusive las posibles consecuencias de cualquier fallo y revise la información del producto o sistemas en el catálogo de productos correspondiente. Debido a la variedad de condiciones de funcionamiento y aplicaciones de estos productos y sistemas, el usuario. mediante sus propios análisis y pruebas, es el único responsable de realizar la selección final de los productos y sistemas y de garantizar el rendimiento, la seguridad y las advertencias necesarias de la aplicación La Compañía y sus subsidiarias se reservan el derecho de

modificar en cualquier momento y sin previo aviso los productos descritos aquí, incluyendo sin limitación sus características y especificaciones, diseños, disponibilidad y precios

(ES)

Los recipientes de policarbonato, transparentes y robustos, son ideales para el uso con filtros y lubricadores. Son especiales para el uso en entornos industriales pero no deben ser colocados en lugares en que reciban luz solar directa, golpes de aire n emperaturas fuera del rango estipulado. Como con la mayoría de los plásticos, algunos productos químicos pueden ser nocivos. Los recipientes de policarbonato no deben ser expuestos a hidrocarburos clorinados, ketones (cetonas), ésteres y ciertos alcoholes. No deben ser usados en sistemas de aire donde los compresores son lubricados con fluidos antiinflamables como por ejemplo ésteres de fosfato y diésteres Usar recipientes de metal cuando las condiciones del entorno o del medio utilizado no sean compatibles con los de policarbonato. Los recipientes de metal resisten a la mayoría de los disolventes, pero no deben ser usados con ácidos ni álcalis fuertes o en atmósferas cargadas de sal. En estas condiciones consulte con la fábrica para recomendaciones especiales

PARA LIMPIAR RECIPIENTES DE POLICARBONATO USAR SOLAMENTE AGUA Y JABÓN SUAVE! NO USAR agentes limpiadores como acetona, benceno, tetracloruro de carbono, gasolina, tolueno, etc. que afectan este plástico.

(ES) Guía de Seguridad

Para una información más detallada consultar la sección Guía de Seguridad de los catálogos de la Pneumatic Division o descargue la guía desde: www.parker.com/safety



Evite la rotura de los recipientes de policarbonato que pueden causar heridas o averías respetando los límites de presión y temperatura. Los recipientes de policarbonato tienen un límite de presión de 10 bar (150 PSIG) y de temperatura de 52°C (125°F)

SE PUEDEN OBTENER COPIAS EXTRAS DE ESTAS INSTRUCCIONES PARA ADJUNTAR AL EQUIPO Y/O MANUALES DE MANTENIMIENTO QUE UTILIZAN ESTOS PRODUCTOS. TOME CONTACTO CON EL REPRESENTANTE LOCAL

A VARNING!

(SE)

- Undvika oförutsett systembeteende som kan leda till person- och sakskada
- Koppla vid behov ur strömförsörjningen innan installationsservice- eller ombyggnadsarbete påbörjas.
- Koppla ur tryckluftförsörjningen och tryckavlasta alla luftledningar som är anslutna till den här produkten innan installations-, service- eller ombyggnadsarbete påbörjas.

Se till att tillverkarens föreskrivna tryck, temperatur och andra förhållanden som definieras i de här instruktionerna fölis

- Mediet måste vara fuktfritt om omgivningstemperaturen är lägre än noll grader.
- Service skall utföras på det sätt som beskrivs i de här instruktionerna

Installation, service och ombyggnad av dessa produkter skall utförs av kunnig personal som förstår hur pneumatiska produkter används

När installations-, service- eller ombyggnadsarbetet är klart skall tryckluft- och strömförsörjning (när sådan krävs) kopplas in och produkten funktionsprovas och läcksökas. Produkten får inte tas i drift vid hörbart läckage eller om den inte fungerar korrekt.

Varningar och specifikationer på produkten får inte målas över. Om det inte är möjligt att maskera sådan märkning vid målning, bör du kontakta vår lokale representant för att få nya skyltar.

(SE)

FELAKTIGT ELLER OLÄMPLIGT VAL OCH OLÄMPLIG ANVÄNDNING AV PRODUKTER OCH/ELLER SYSTEM SOM BESKRIVS HÄRI ELLER AV KRINGUTRUSTNING, KAN ORSAKA PERSON- OCH SAKSKADA OCH T O M DÖDSFALL

Detta dokument och annan information från företaget, dess dotterbolag och auktoriserade återförsäljare innehåller förslag på produkter och system, för närmare analys av användare med tekniska specialkunskaper. Det är viktigt att analysera alla aspekter på din applikation, inklusive konsekvenserna av ett maskinfel, och noggrant läsa informationen om produkten eller systemet aktuell produktkatalog. Beroende på de olika driftförhållandena och tillämpningarnaför dessa produkter och system, så ansvarar användaren helt siälv, genom egna analyser och provning, för det slutgiltiga valet av system och komponenter, och för att förvissa sig om att uppfylla alla krav på funktion. hållbarhet, underhåll, säkerhet och varningstexter för den avsedda tillämpninger

De produkter som beskrivs häri, inklusive, dock utan att begränsas därtill. samtliga produktfunktioner, specifikationer och konstruktioner samt alla uppgifter om tillgänglighet och prissättning kan när som helst komma att ändras av företaget eller dess dotterbolag, utan föregående meddelande därom

∧ OBSERVERA! (SE)

Behållare och synglas av polykarbonat, som är både genomskinligt och starkt, är idealiska för användning på filter och dimsmörjare. De är lämpliga för användning i vanlig industrimiljö, men bör inte placeras på platser där de kan utsättas för direkt solljus, slag eller temperaturer utanför föreskrivet temperaturområde. Polykarbonat kan ta skada vid kontakt med vissa kemikalier, precis om de flesta andra plaster. Kärl och synglas av polykarbonat bör inte exponeras för klorerade kolväten, ketoner, estrar eller alkoholer. De bör inte användas i luftsystem där kompressorerna smörjs med brandbeständig vätska, t ex fosfatestrar eller diestrar.

Vi rekommenderar metallkärl när miljön och/eller mediet är sådant att kärl av polykarbonat kan ta skada. Metallkärl klarar de flesta sådana lösningsmedel, men bör inte användas vid förekomst av starka syror eller baser och inte i atmosfär med hög salthalt. Rekommendationer för sådana förhållanden kan fås från fabriken.

ANVÄND BARA MILDTVÅLI ÖSNING MED VATTEN VID RENGÖRING AVKÄRLAVPOLYKARBONAT! Använd INTE sådana rengöringsmedel som aceton, benzen, koltetraklorid, bensin, toluen eller liknande, som är skadliga för den här typen av plast.

Säkerhetsguide

(SE)

Lavsnitten om säkerhet i pneumatikdivisionens kataloger hittar du mer information och riktlinjer. Denna information och dessa riktlinjer finns även på vår webbsida på adressen: www.parker.com/safety



Förhindra polykarbonatkärl att gå sönder och orsaka person- eller sakskada genom att se till att föreskrivna tryck och temperaturer inte överskrids. Polykarbonatkärl är tryckklassade för 10 bar och en maxtemperatur på 52 °C.

DESSA INSTRUKTIONER KAN FÅS I SÄRTRYCK. FÖR ATT BIFOGAS DRIFT- OCH UNDERHÅLLSINSTRUKTIONER. KONTAKTA I SÅ FALL DIN LOKALE PARKERREPRESENTANT.



Richland, Michigan 49083 269-629-5000

To avoid unpredictable system behavior that can cause personal injury and property damage:

- Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

Polycarbonate bowls, being transparent and tough, are ideal for use with Filters and Lubricators. They are suitable for use in normal industrial environments, but should not be located in areas where they could be subjected to direct sunlight, an impact blow, nor temperatures outside of the rated range. As with most plastics, some chemicals can cause damage. Polycarbonate bowls should not be exposed to chlorinated hydrocarbons, ketones, esters and certain alcohols. They should not be used in air systems where compressors are lubricated with fire-resistant fluids such as phosphate ester and di-ester types.

Metal bowls are recommended where ambient and/or media conditions are not compatible with polycarbonate bowls. Metal bowls resist the action of most such solvents, but should not be used where strong acids or bases are present or in salt laden atmospheres. Consult the factory for specific recommendations where these conditions exist.

TO CLEAN POLYCARBONATE BOWLS USE MILD SOAP AND WATER ONLY! DO NOT use cleansing agents such as acetone, benzene, carbon tetrachloride, gasoline, toluene, etc., which are damaging to this plastic.

Bowl guards are recommended for added protection of polycarbonate bowls where chemical attack may occur.

Introduction

Follow these instructions when installing, operating, or servicing the product.

Application Limits

These products are intended for use with compressed air in industrial applications. For other applications, consult factory before use.

Maximum Recommended P	ressure	Drop:		
	kPa	PSIG	bar	
Coalescing Filter	70	10	0.7	
Operating Pressure:				
	kPa	PSIG	bar	
Maximum Inlet Pressure	2068	300	21.0	
Operating Temperature Ran	ge:	4°C to 82°0		
	•	(40°F 1	to 180°F)	

Internal Auto Drain Option limits temperature to a maximum of 52°C (125°F).

Installation & Service Instructions IS-F700C (06-08)

3/4" and 1" High Efficiency Compressed Air Filters (Coalescing, Particulate, Adsorber)

ISSUED: November, 2005

Doc. #ISF700C0608, ECN #051180, Rev. 1

ANSI Symbols



Installation

Proper installation of a filter in a compressed air system can have a considerable effect on the cost and efficiency of the filter. It is highly recommended that a particulate filter be installed upstream of the coalescing filter to remove 40 micron and larger size particles and separate large droplets of moisture from the air line. All filters must be installed with the bowl in a vertical orientation. The correct passage of air through a coalescing filter is for the air to flow from the inside of the element to the outside. The correct passage of air through a particulate or adsorber filter is for the air to flow from the outside of the element to the inside.

Maintenance

Never let the liquid level in bowl reach the base of the filter element. Because of the high degree of water and oil removal efficiency of high efficiency compressed air filters, it is recommended that an SA702MD internal automatic drain, external automatic drain, or electronic drain be used to automatically drain the bowl.

Differential Pressure Indicator Option

The differential pressure indicator option available on this unit is designed to provide early detection of a clogged, coalescing filter element. As the filter element becomes clogged, the red indicator will start to rise while air is flowing through the unit. When the pressure drop across the element reaches 10 to 12 PSI, the red indicator will be in full view and the element should be replaced. Failure to replace the element when the pressure drop exceeds 10 PSI can be costly, both in terms of reduced air quality due to contaminant reentrainment and the power cost associated with forcing compressed air through an obstructed filter.

Note: The Differential Pressure Pop-Up Indicator Option is only designed to be used with coalescing filter elements.

Draining Instructions

To drain, turn drain cock on bottom of bowl clockwise (from bottom). When all liquid is drained, turn drain cock counterclockwise (from bottom) to re-seal.

Filter Element Replacement

To replace the filter element, relieve all air pressure from the filter. Unscrew flange ring (counterclockwise from bottom) and remove bowl. Remove the bottom adapter and the filter element. To reassemble, install element, bottom adapter, bowl, and flange ring.

3/4" and 1" High Efficiency Compressed Air Filters (Coalescing, Particulate, Adsorber)



Optional Differential Pressure Gauge DP276-P

This gauge is available as an accessory to the F700 High Efficiency Filter series to aid in monitoring the condition of either a Particulate, Coalescing, or Adsorbing style element. It may be used on all filters not equipped with a Pop-Up style Differential Pressure Indicator.



Internal Auto Drain Option

IS-F700C (06-08)

If your filter is equipped with an internal automatic drain, it is designed to automatically drain any liquid that accumulates in the bottom of the bowl. However, the bowl may be drained manually by turning the drain cock clockwise (from bottom). If the auto drain is not functioning properly, remove the auto drain assembly from the filter bowl and clean the screen. Disassemble the lever actuation mechanism by snapping the lever out of the plastic retainer on the float and remove the pin. Remove the disc and float. Carefully break away the interface fit between the plastic housing and the brass body, and remove the piston and spring. Clean all parts thoroughly with soapy water or alcohol, and clean or replace all seals as necessary. Ensure that the small orifices in the housing and the piston are not clogged. Carefully reassemble all parts.

Service Kits / Parts Available

Description	Part Number
Bowl Kit	
"E" - Aluminum Bowl,	BK603B
300 PSI Maximum Pressure	
"L" - Aluminum Bowl,	BK603C
300 PSI Maximum Pressure	
Replacement Element Kits	
Particulate Filters with 0.9 Micron Element	
F702-06 with E Bowl (133 SCFM)	F702-P9-0773
F702-08 with E Bowl (167 SCFM)	F702-P9-0773
F702-08 with L Bowl (242 SCFM)	F702-P9-0774
Coalescing Filters with 0.7 Micron Element	
F701-06 with E Bowl (112 SCFM)	F701-C7-0773
F701-08 with E Bowl (140 SCFM)	F701-C7-0773
F701-08 with L Bowl (200 SCFM)	F701-C7-0774
Coalescing Filters with 0.3 Micron Element	
F701-06 with E Bowl (80 SCFM)	F701-C3-0773
F701-08 with E Bowl (100 SCFM)	F701-C3-0773
F701-08 with L Bowl (145 SCFM)	F701-C3-0774
Charcoal Adsorber Element	
F702-06 with E Bowl (80 SCFM)	F702-OA-0773
F702-08 with E Bowl (100 SCFM)	F702-OA-0773
F702-08 with L Bowl (145 SCFM)	F702-OA-0774
Manual Drain	
"E" Bowl	SA600Y7-1
"L" Bowl	SA600Y7
Pop-Up Indicator Repair Kit	
(Sight Dome, Indicator Cylinder, Vee Seal,	RK701P
Return Spring, Indicator Piston, O-Rings)	
Plug and O-Ring Assembly	SA508Y4
(For Units Wwithout Pop-Up indicator)	0,00014
Repair Kit for All Internal Auto Drains	RK602MD/M4

Accessories

Description	Part Number	Bowl Type
Internal Automatic Drain		
"T" Option, 250 PSI Max. Pressure	SA702MD	All
"R" Option, 175 PSI Max. Pressure	SA602MD	All
Mounting Bracket		
3/4" Port Size	SA200AW57	—
1" Port Size	SA200CW57	

🕂 WARNING

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE. This document and other information from The Company, its subsidiaries

and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application, including consequences of any failure and review the information concerning the product or systems in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application, product features, specifications, designs, availability and pricing, are subject to change by The Company and its subsidiaries at any time without notice.



PDNSG-1 Pneumatic Division Safety Guide ISSUED: August 1 , 2006 Supersedes: June 1, 2006

Safety Guide For Selecting And Using Pneumatic Division Products And Related Accessories

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF PNEUMATIC DIVISION PRODUCTS, ASSEMBLIES OR RELATED ITEMS ("PRODUCTS") CAN CAUSE DEATH, PERSONAL INJURY, AND PROPERTY DAMAGE. POSSIBLE CONSEQUENCES OF FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THESE PRODUCTS INCLUDE BUT ARE NOT LIMITED TO:

- Unintended or mistimed cycling or motion of machine members or failure to cycle
- Work pieces or component parts being thrown off at high speeds.
- Failure of a device to function properly for example, failure to clamp or unclamp an associated item or device.
- Explosion
- Suddenly moving or falling objects.
- Release of toxic or otherwise injurious liquids or gasses.
- Before selecting or using any of these Products, it is important that you read and follow the instructions below.

1. GENERAL INSTRUCTIONS

- **1.1. Scope:** This safety guide is designed to cover general guidelines on the installation, use, and maintenance of Pneumatic Division Valves, FRLs (Filters, Pressure Regulators, and Lubricators), Vacuum products and related accessory components.
- **1.2. Fail-Safe:** Valves, FRLs, Vacuum products and their related components can and do fail without warning for many reasons. Design all systems and equipment in a fail-safe mode, so that failure of associated valves, FRLs or Vacuum products will not endanger persons or property.
- **1.3 Relevant International Standards:** For a good guide to the application of a broad spectrum of pneumatic fluid power devices see: ISO 4414:1998, Pneumatic Fluid Power General Rules Relating to Systems. See www.iso.org for ordering information.
- 1.4. Distribution: Provide a copy of this safety guide to each person that is responsible for selection, installation, or use of Valves, FRLs or Vacuum products. Do not select, or use Parker valves, FRLs or vacuum products without thoroughly reading and understanding this safety guide as well as the specific Parker publications for the products considered or selected.
- **1.5. User Responsibility:** Due to the wide variety of operating conditions and applications for valves, FRLs, and vacuum products Parker and its distributors do not represent or warrant that any particular valve, FRL or vacuum product is suitable for any specific end use system. This safety guide does not analyze all technical parameters that must be considered in selecting a product. The user, through its own analysis and testing, is solely responsible for:
 - Making the final selection of the appropriate valve, FRL, Vacuum component, or accessory.
 - Assuring that all user's performance, endurance, maintenance, safety, and warning requirements are met and that the application presents no health or safety hazards.
 - Complying with all existing warning labels and / or providing all appropriate health and safety warnings on the equipment on which the valves, FRLs or Vacuum products are used; and,
 - · Assuring compliance with all applicable government and industry standards.
- 1.6. Safety Devices: Safety devices should not be removed, or defeated.
- 1.7. Warning Labels: Warning labels should not be removed, painted over or otherwise obscured.
- **1.8. Additional Questions:** Call the appropriate Parker technical service department if you have any questions or require any additional information. See the Parker publication for the product being considered or used, or call 1-800-CPARKER, or go to www.parker.com, for telephone numbers of the appropriate technical service department.

2. PRODUCT SELECTION INSTRUCTIONS

- **2.1. Flow Rate:** The flow rate requirements of a system are frequently the primary consideration when designing any pneumatic system. System components need to be able to provide adequate flow and pressure for the desired application.
- 2.2. Pressure Rating: Never exceed the rated pressure of a product. Consult product labeling, Pneumatic Division catalogs or the instruction sheets supplied for maximum pressure ratings.
- 2.3. Temperature Rating: Never exceed the temperature rating of a product. Excessive heat can shorten the life expectancy of a product and result in complete product failure.
- 2.4. Environment: Many environmental conditions can affect the integrity and suitability of a product for a given application. Pneumatic Division products are designed for use in general purpose industrial applications. If these products are to be used in unusual circumstances such as direct sunlight and/or corrosive or caustic environments, such use can shorten the useful life and lead to premature failure of a product.
- 2.5. Lubrication and Compressor Carryover: Some modern synthetic oils can and will attack nitrile seals. If there is any possibility of synthetic oils or greases migrating into the pneumatic components check for compatibility with the seal materials used. Consult the factory or product literature for materials of construction.
- 2.6. Polycarbonate Bowls and Sight Glasses: To avoid potential polycarbonate bowl failures:
 - Do not locate polycarbonate bowls or sight glasses in areas where they could be subject to direct sunlight, impact blow, or temperatures outside of the rated range.
 - Do not expose or clean polycarbonate bowls with detergents, chlorinated hydro-carbons, keytones, esters or certain alcohols.
 - Do not use polycarbonate bowls or sight glasses in air systems where compressors are lubricated with fire resistant fluids such as phosphate ester and di-ester lubricants.

- 2.7. Chemical Compatibility: For more information on plastic component chemical compatibility see Pneumatic Division technical bulletins Tec-3, Tec-4, and Tec-5
- 2.8. Product Rupture: Product rupture can cause death, serious personal injury, and property damage.
 - Do not connect pressure regulators or other Pneumatic Division products to bottled gas cylinders.
 - · Do not exceed the maximum primary pressure rating of any pressure regulator or any system component.
 - Consult product labeling or product literature for pressure rating limitations.

3. PRODUCT ASSEMBLY AND INSTALLATION INSTRUCTIONS

- **3.1. Component Inspection:** Prior to assembly or installation a careful examination of the valves, FRLs or vacuum products must be performed. All components must be checked for correct style, size, and catalog number. DO NOT use any component that displays any signs of nonconformance.
- **3.2. Installation Instructions:** Parker published Installation Instructions must be followed for installation of Parker valves, FRLs and vacuum components. These instructions are provided with every Parker valve or FRL sold, or by calling 1-800-CPARKER, or at www.parker.com.
- **3.3. Air Supply:** The air supply or control medium supplied to Valves, FRLs and Vacuum components must be moisture-free if ambient temperature can drop below freezing

4. VALVE AND FRL MAINTENANCE AND REPLACEMENT INSTRUCTIONS

- **4.1. Maintenance:** Even with proper selection and installation, valve, FRL and vacuum products service life may be significantly reduced without a continuing maintenance program. The severity of the application, risk potential from a component failure, and experience with any known failures in the application or in similar applications should determine the frequency of inspections and the servicing or replacement of Pneumatic Division products so that products are replaced before any failure occurs. A maintenance program must be established and followed by the user and, at minimum, must include instructions 4.2 through 4.10.
- 4.2. Installation and Service Instructions: Before attempting to service or replace any worn or damaged parts consult the appropriate Service Bulletin for the valve or FRL in question for the appropriate practices to service the unit in question. These Service and Installation Instructions are provided with every Parker valve and FRL sold, or are available by calling 1-800-CPARKER, or by accessing the Parker web site at www.parker.com.
- 4.3. Lockout / Tagout Procedures: Be sure to follow all required lockout and tagout procedures when servicing equipment. For more information see: OSHA Standard 29 CFR, Part 1910.147, Appendix A, The Control of Hazardous Energy (Lockout / Tagout)
- **4.4. Visual Inspection:** Any of the following conditions requires immediate system shut down and replacement of worn or damaged components:
 - Air leakage: Look and listen to see if there are any signs of visual damage to any of the components in the system. Leakage is an indication of worn or damaged components.
 - Damaged or degraded components: Look to see if there are any visible signs of wear or component degradation.
 - Kinked, crushed, or damaged hoses. Kinked hoses can result in restricted air flow and lead to unpredictable system behavior.
 - Any observed improper system or component function: Immediately shut down the system and correct malfunction.
 - Excessive dirt build-up: Dirt and clutter can mask potentially hazardous situations.

Caution: Leak detection solutions should be rinsed off after use.

4.5. Routine Maintenance Issues:

- · Remove excessive dirt, grime and clutter from work areas.
- Make sure all required guards and shields are in place.
- **4.6. Functional Test:** Before initiating automatic operation, operate the system manually to make sure all required functions operate properly and safely.
- 4.7. Service or Replacement Intervals: It is the user's responsibility to establish appropriate service intervals. Valves, FRLs and vacuum products contain components that age, harden, wear, and otherwise deteriorate over time. Environmental conditions can significantly accelerate this process. Valves, FRLs and vacuum components need to be serviced or replaced on routine intervals. Service intervals need to be established based on:
 - Previous performance experiences.
 - Government and / or industrial standards.
 - When failures could result in unacceptable down time, equipment damage or personal injury risk.
- **4.8. Servicing or Replacing of any Worn or Damaged Parts:** To avoid unpredictable system behavior that can cause death, personal injury and property damage:
 - Follow all government, state and local safety and servicing practices prior to service including but not limited to all OSHA Lockout Tagout procedures (OSHA Standard – 29 CFR, Part 1910.147, Appendix A, The Control of Hazardous Energy – Lockout / Tagout).
 - Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
 - Disconnect air supply and depressurize all air lines connected to system and Pneumatic Division products before installation, service, or conversion.
 - Installation, servicing, and / or conversion of these products must be performed by knowledgeable personnel who understand how
 pneumatic products are to be applied.
 - After installation, servicing, or conversions air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or if the product does not operate properly, do not put product or system into use.
 - Warnings and specifications on the product should not be covered or painted over. If masking is not possible, contact your local representative for replacement labels.
- **4.9. Putting Serviced System Back into Operation:** Follow the guidelines above and all relevant Installation and Maintenance Instructions supplied with the valve FRL or vacuum component to insure proper function of the system.

NUMATIC5[®] L2 Series

Solenoid Pilot, Air Pilot or Hand Lever Actuated Valves





www.numatics.com



L2 Series

Technical and Operating Data	3-4
How to Order	5
Valve Dimensions	6-7
Manifold Assemblies	8-9
Hand Lever Valves	10
Speed Control Kit	11
Valve Service Kits and Parts	12-13
Internal/External Pilot Selection	14
Blank Station Plate Kit	14
Adaptor Kit	14
Blocking Plug Kit	14
Solenoid Assemblies	14

5 Ported, 2 and 3 position, 4-way, Spool & Sleeve Cv: 1.7

- Solenoid air pilot or air pilot actuated
- Hand-lever valves available
- DIN plug-in solenoid and plug connector with indicator light
- Unlubricated or lubricated service
- In-line or manifold mounted
- Integral speed control available

Solenoid Air Pilot

single solenoid air 2 position 4-way





double solenoid air pilot 3 position 4-way open center



Air Pilot



double air pilot 3 position 4-way closed center no override



single air pilot 2 position 4-way w/override (B) (B)(A) (A) 12 2 4 14 M T T T



double air pilot 3 position 4-way open center w/override



double solenoid air pilot 2 position 4-way



double solenoid air pilot 3 position 4-way closed center





double air pilot 3 position 4-way open center no override (B) (B)(A) 12 2 4 (B)(A) 12 2 4



2 position 4-way w/override (B) (B)(A) 12 2 4



(B)

12/

double air pilot 3 position 4-way closed center w/override



(A)



double air pilot 2 position 4-way spring offset no override (B) (B)(A) 12 2 4 \bigcirc T \downarrow \downarrow \downarrow \downarrow \downarrow

> 3 1 5 (EB)(P) (EA)

double solenoid pilot 3 Position 4-Way (5/3), pressure center



Hand Lever Operated double air pilot

(A) 14

 \triangleleft

3 Position 4-Way (5/3), pressure center



hand lever 2 position 4-way w/spring return



hand lever 3 position 4-way open center w/spring center



hand lever 3 position 4-way closed center w/spring center



double air pilot 3 Position 4-Way (5/3), pressure center



hand lever 2 position 4-way w/detent



hand lever 3 position 4-way open center w/detent



hand lever 3 position 4-way closed center w/detent



Information subject to change without notice. For ordering information or regarding your local sales office visit www.numatics.com.



Technical Data

Valve Data	English		Metric				
Cv	1/4 = 1.7	3/8 = 1.7	1/4 = 1.7	3/8 = 1.7			
	79 SCFM		1674 NI/m				
Flow Capacity	Upstream pres atmosphere @	ssure to 280 PSIG	@ 6 bar upst downstream	ream/5 bar			
Main Valve Operating Pressure Range	28"Hg Vacuur PSIG	m to 150	Vacuum to 10 bar				
Pilot Pressure Range: Internal and External	14.5 to 150 P	SIG	1 to 10 bar				
Temperature range: Solenoid Pilot (ambient)	-10°F to +115	°F	-23°C to +46	юС			
Temperature Range: Air Pilot (ambient)	-10°F to +150	°F	-23°C to +66	i°C			

Operating Data

All Solenoids Ar	re Continuous Duty Rated	12 VDC	24 VDC	24 VAC 50 Hz	24 VAC 60 Hz	115 VAC 50 Hz	120 VAC 60 Hz	230 VAC 50 Hz	240 VAC 60 Hz
Power (Watts)		3.5	3.5	4.8	3.3	4.8	4.0	5.0	3.5
Holding Curren	t (Amps.)	0.30	0.15	0.380	0.280	0.064	0.054	0.030	0.023
Inrush Current	(Amps.)	N/A	N/A	0.500	0.420	0.087	0.082	0.042	0.036
	2-Position, Single, Spring Return	0.010	0.010	0.007	0.007	0.007	0.007	0.007	0.007
Energize in seconds	2-Position, Double, Detented	0.010	0.010	0.007	0.007	0.007	0.007	0.007	0.007
00001100	3-Position, Spring Centered	0.010	0.010	0.007	0.007	0.007	0.007	0.007	0.007
	2-Position, Single, Spring Return	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
De-energize	2-Position, Double, Detented	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	3-Position, Spring Centered	0.030	0.035	0.035	0.035	0.035	0.035	0.035	0.035

*A 1.4 Watt DC solenoid is available. Add "17G" to the model number. EXAMPLE: L22BA452B017G61. Maximum pilot pressure is reduced to 116 PSIG (8 bar).

How to Order



Mounting 52 = Line Mounted

NOTE: Plug connector is NOT included with DIN solenoid. Order plug-in connector assembly separately (see ordering information below)

Plug Connector Assemblies

Per DIN Spec. NO 43650. Accepts cable diameter 0.240 to 0.310 11mm Industry Standard DIN Form B

е -			
		Normal Pol: 1 = (+) Pos 2 = (-) Neg = Chassi	arity itive, Higł jative, Nei is Ground

Plug Connector Description Part No. Grey (14 end solenoid) Plug Assembly 230-363 Black (12 end solenoid) Plug Assembly 230-364 Plug Assembly with 24 V Light 230-365 Plug Assembly with 110 V Light 230-366 Plug Assembly with 220 V Light 230-367

ASSEMBLED

C	Dimens	ions: Inc	hes (mm)			
Normal Polarity 1 = (+) Positive, High	Α	В	C	D	E	F
$ = (\cdot) \text{ Negative, Neutral} $	1.12 (28.4)	0.83 (21.1)	1.57 (39.9)	0.40 (10.2)	1.10 (28.4)	0.06 (1.5)
Manifold Assembly <u>AK 0 3 D</u> C	0000 <u>3</u> <u>N</u>	STD				
Electrical/Electronics Type & Location 0 = Standard Valve Line 3 = L2 Series		c s P	Pptions td = Stand (Comr 19 = Comn Port Type	ard non Supply a non Supply, Ir	nd Exhaust) Idividual Exha	ust
Number of Valve Stations B = 2 F = 6 J = 10		G	= G Tap			
C = 3 G = 7 K = 11 D = 4 H = 8 L = 12		E 3	nd Plate Por = 3/8	t Size		
E = 5 I = 9	Examp	e order:				
	Assemb	ly Kit:	AK03D0000	3NSTD		
	Station	1	L23BB552C	000030		
	Station	2	L23BA452C	0000030		
	Station	3	L23PP452C	000000		
	Station	1	L23PA452O	000000		

Dimensions: Inches (mm)

Solenoid-Pilot Valve









Α	В	C	D	E	F	G	Н	I	J	К	L	М	N	0	Р	Q	R
2.72	2.28	1.85	1.41	0.97	0.08	0.75	3.53	5.99	5.38	2.89	1.27	2.00	0.17	1.00	4.66	8.78	9.32
(69.1)	(57.9)	(47.0)	(35.8)	(24.6)	(2.0)	(19.1)	(89.7)	(152.1)	(136.7)	(72.9)	(32.3)	(50.8)	(4.3)	(25.4)	(118.4)	(223.0)	(236.7)

Dimensions: Inches (mm)

Air-Pilot Valve - 2 Position L2_PA425, L2_JA452 Pilot Port 1/8 NPTF or G1/8 1 1/4 or 3/8 NPTF or G tap ports (5) M4 x 0.7 7 . 9 À. (numerics) 14 -5)-Μ Κ 4 Ð G ١ $\{1\}$ Н А В В В -3) С С D D 12 D Ę * * <-- N →-F I J

Α	В	C	D	E	F	G	Н	I	J	К	L	М	N
2.72	2.28	1.85	1.41	0.97	0.75	4.56	3.53	1.27	2.00	0.17	0.08	1.69	1.00
(69.1)	(57.9)	(47.0)	(35.8)	(24.6)	(19.1)	(115.8)	(89.7)	(32.3)	(50.8)	(4.3)	(2.1)	(42.9)	(25.4)

Air-Pilot Valve

L2_PP452, L2_PP552, L2_PP652 L2_PP752, L2_PM452, L2_JJ452 L2_JJ552, L2_JJ652, L2_JJ752



Α	В	C	D	E	F	G	Н	I	J	К	L	М	N
3.59	3.15	2.71	2.28	1.84	0.75	5.43	0.71	1.27	2.00	0.17	0.08	1.69	1.00
(91.2)	(79.9)	(68.8)	(57.8)	(46.6)	(19.1)	(137.9)	(18.0)	(32.3)	(50.8)	(4.3)	(2.1)	(42.9)	(25.4)

L2 SERIES

numatics

Dimensions: Inches (mm)



Α	В	C	D	E	F	G	Н	I	J	К	L	м	N	0	Р
See Chart	See Chart	0.08	1.26	5.99	5.38	5.43	4.01	1.85	1.69	1.25	0.16	0.88	4.05	7.58	8.10
Below	Below	(2.0)	(32.0)	(152.1)	(136.6)	(137.9)	(101.9)	(47.0)	(42.9)	(31.8)	(4.1)	(22.4)	(102.9)	(192.5)	(205.7)

Q	R	S	Т	U	V	W	X	Y	Z
8.78	9.32	4.66	4.35	0.72	1.20	1.48	3.48	0.88	2.78
(223.0)	(236.7)	(118.4)	(110.5)	(18.3)	(18.3)	(37.6)	(88.4)	(22.4)	(70.6)

Manifold # Stations	Dim A	Dim B	3/8 NPTF Part No.	G 3/8 Part No.	Manifold # Stations	Dim A	Dim B	3/8 NPTF Part No.	G 3/8 Part No.
2 Stations	4.16 (105.7)	2.64 (67.1)	106-704	106-715	8 Stations	11.72 (329.7)	10.20 (259.1)	106-710	106-721
3 Stations	5.42 (137.7)	3.90 (99.1)	106-705	106-716	9 Stations	12.98 (329.7)	11.46 (291.1)	106-711	106-722
4 Stations	6.68 (169.7)	5.16 (131.1)	106-706	106-717	10 Stations	14.24 (361.7)	12.72 (323.1)	106-712	106-723
5 Stations	7.94 (201.7)	6.42 (163.1)	106-707	106-718	11 Stations	15.50 (393.7)	13.98 (355.1)	106-713	106-724
6 Stations	9.20 (233.7)	7.68 (195.1)	106-708	106-719	12 Stations	16.76 (425.7)	15.24 (387.1)	106-714	106-725
7 Stations	10.46 (265.7)	8.94 (227.1)	106-709	106-720	Adaptor Kit	Order (1) adap station on the Includes all sea	tor kit for each manifold. als and screws.	239-3	12

L2 SERIES

Dimensions: Inches (mm)

Manifold Assembly

Common Supply and Individual Exhaust



Α	В	C	D	E	F	G	H	I	J	K	L	М	N	0	Р
See Chart Below	See Chart Below	1.03 (26.2)	0.08 (2.1)	5.99 (152.1)	5.38 (136.6)	5.43 (137.9)	4.01 (101.9)	1.85 (46.9)	1.69 (42.9)	0.38 (9.5)	0.88 (22.2)	4.05 (102.9)	7.58 (192.6)	8.10 (205.7)	8.78 (223.0)
Q	R	S	Т	U	V	W	X	Y							

Manifold # Stations	Dim A	Dim B	3/8 NPTF Part No.	G 3/8 Part No.	Manifold # Stations	Dim A	Dim B	3/8 NPTF Part No.	G 3/8 Part No.
2 Stations	3.92 (99.2)	2.40 (60.9)	229-946	229-957	8 Stations	10.10 (256.5)	8.58 (217.9)	229-952	229-963
3 Stations	4.95 (125.7)	3.43 (87.1)	229-947	229-958	9 Stations	11.13 (282.7)	9.61 (244.1)	229-953	229-964
4 Stations	5.98 (151.9)	4.46 (113.3)	229-948	229-959	10 Stations	12.16 (308.9)	10.64 (270.3)	229-954	229-965
5 Stations	7.01 (178.1)	5.49 (139.5)	229-949	229-960	11 Stations	13.16 (335.0)	11.67 (296.4)	229-955	229-966
6 Stations	8.04 (204.2)	6.52 (165.6)	229-950	229-961	12 Stations	14.22 (361.2)	12.70 (322.6)	229-956	229-967
7 Stations	9.07 (230.4)	7.55 (191.8)	229-951	229-962					

Dimensions: Inches (mm)



Α	В	C	D	E	F	G	H	I	J	K	L	М	N	0	Р
2.88	2.00	1.13	0.75	1.63	2.38	2.44	1.57	1.27	2.00	0.72	5.18	3.93	1.68	0.08	1.00
(73.2)	(50.8)	(28.7)	(19.1)	(41.4)	(60.5)	(62.0)	(39.9)	(32.3)	(50.8)	(18.3)	(131.6)	(99.8)	(42.7)	(2.0)	(25.4)

Lever Rotation Procedure

The Numatics L22 & L23 Hand Lever Series allows for the rotation of the lever 90° to become parallel with the valve cylinder ports.

Remove (2) M3 socket head screws from lever bracket and rotate 90° in either direction. Re-assemble screws and tighten securely.



Hand Lever Valve Manifold Assembly





Α	В	C	D	E	F	G	Н	I	J	К	L	м
See chart	See chart	4.43	0.88	0.72	1.20	1.48	3.48	3.18	5.18	1.26	2.49	2.78
on pg. 6	on pg. 6	(112.5)	(22.4)	(18.3)	(30.5)	(37.6)	(88.4)	(80.8)	(131.6)	(32.0)	(63.2)	(70.6)

Speed Control Kit - Side Mounted

239-209

The L2 speed control mounts between any L2 Series valve and die cast adaptor using (3) O-rings from the speed control kit and (3) O-rings and (2) screws from the adaptor kit. This assembly then mounts to and 3-gallery manifold by using the remaining (3) O-rings and (2) screws from the adaptor kit.





Valve Service Kits and Parts – 2 Position

Solenoid-Pilot Actuated Kit No. L2-K1 (For Models L22BA4, L23BA4)



Kit No. L2-K2 (For Models L22BB4, L23BB4)



Air-Pilot Actuated

Kit No. L2-K1 (For Models L2_PA4, L2_JA4)







(12)
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Valve Service Kits and Parts – 3 Position

Solenoid-Pilot Actuated

Kit No. L2-K3 (For Models L2_BB5, L2_BB6, L2_BB7)



Air-Pilot Actuated

Kit No. L2-K3 (For Models L2_PP5, L2_PP6, L2_PP7, L2_JJ5, L2_JJ6, L2_JJ7)



Port Type	Part. No.	Part Name	Part No.
1	1	Solenoid Capsule Assembly	See p. 14
2	1	Valve Body (not sold separately)	
3	1	Nameplate	122-940
4	>	Adaptor Assembly	219-129
5	1	Adaptor Assembly	219-127
6 *	2	Gasket	113-313
7 ~	2	Bumper	114-147
8 ***	1	Detent Assembly	210-116
9	1	Sleeve Assembly w/Seals ‡ for models: L2-BA4 L2-BB4, JA4, PA4 L2-BB5, JJ5, PP5 L2-BB6, JJ6, PP6 L2-BB7, JJ7, PP7	209-323 209-327 209-370 209-371 209-372
10 **	1	Spring	115-248
11	1	Spring Cover Assembly	204-393
12	<	Screw Assembly	127-396
13	•	Lockwasher	128-190
14	2	Screw	127-400
15 ****	2	Bumper	114-148
16 ****	2	Spring	115-247
17 ****	2	Spacer	116-341
18 ****	2	Spring Retainer	116-340
19 *	6	O-Ring Seal	126-204
20	1	Pilot Cap Assembly	204-404
21	>	Pilot Cap Assembly	204-408
22 *	2	Seal (override)	126-163
23	2	Seal (solenoid-pilot)	126-203
24	1	Pilot Cap Assembly	204-406

Parts List

indicates parts in L2-K1, L2-K2, and L2-K3

- ** indicates part in L2-K1 only
- *** indicates part in L2-K2 only ****
- indicates part in L2-K3 only indicates part in L2-K1 and L2-K2 only
- ~
- Spool & sleeve assemblies are precision matched sets ‡
- & include (6) 126-204 seals; spools are not interchangeable. (1) for 2-position models; (2) for 3-position models >
- (4) for L2-BA4, (2) for L2-BB4 <
- (2) for 2-position models; (4) for 3-position models





Adaptor Kit





Blocking Plug Kit



Manifold Type	Part No.
Common Supply, Common Exhaust (shown)	239-516
Common Supply, Individual Exhaust (not shown)	239-250
Kit includes (2) blocking plug spacer, rubber spacer, nut and s	screw

Parts List

Det. No.	No. Req'd	Part Name	Part No.
1 *	2	Adaptor (not sold separately)	
2 *	2	Screw	127-577
3 *	2	Screw	127-570
4 *	6	O-Ring	126-129
5 *	2	Screw (shipped loose)	127-400

*Indicates parts included in kit

Solenoid Assemblies

Standard Voltages	100-115/50 115-120/60 VAC	200-240/50 220-240/60 VAC	24/50-60	12 VDC	24VDC
Part No.	237-569	237-570	237-568	226-737	226-749

Manifold Type	Part No.
Common Supply, Common Exhaust (shown)	239-471
Common Supply, Individual Exhaust (not shown)	229-990

Det. No.	No. Req'd	Part Name	239-471 Part No.	229-990 Part No.
1*	1	Blank Station Plate (not s	old separately)	
2 *	2	Screw Assembly	127-570	N/A
3 *	1	Adaptor (not sold separat	tely)	
4 *	6	O-Ring	126-129	126-129
5 *	2	Screw	127-710	127-361
6 *	2	Lockwasher	128-190	128-188

*Indicates parts included in kit



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4-Way Direct Acting & Pilot Operated Valves 1/8" - 1/2" NPT



4-Way Direct Acting and Pilot Operated valves are used in applications for actuation of double acting cylinders and piloting of larger control valves. Pilot operated valves require the minimum operating pressure differential specified to ensure proper operation. Direct Acting valves do not have a minimum pressure differential requirement.

Installation

Valves can be mounted in any position. The preferred orientation is with the coil vertical and upright.

Standard Materials of Construction

Please refer to page C15.

Compatible Fluids

Lubricated Air, Inert Gases, Water, Light Oil (300 SSU) and additional fluids compatible with materials of construction, as shown in the product specification charts.

Use of non-lubricated gaseous media can affect valve life.

Electrical Characteristics:

Standard Voltages:

AC -24/60 120/60-110/50 240/60-220/50 DC -12, 24 & 120 For other voltages - consult factory



Coil Classification:

Class F standard, Class H available Class B standard on V9xx models

Agency Approvals:

Standard valves with NEMA 4X or explosion proof solenoid enclosures are UL Listed and CSA Certified. (Consult Factory for Approvals on Models V933, V935 and V955).

SIL-3 Capable (Models 73417xx, 74417xx, 73477xx). See certificate on page F20 in the Technical section of this catalog. For additional details, consult factory. **Maximum Ambient Temperature** 167°F

Minimum Ambient Temperature

-40°F for models 73417xx, 74417xx and 73477xx. Dew point must be more than 7°F below ambient.

Applications:

- Pilot valve actuation of control valves
- Oil and gas including off-shore
- Double acting cylinder control
- Air vises and Air motors
- Damper control

Please refer to page C15 for details.



4/2, 4-Way 2 Position Single Solenoid - Brass*

		-										
			Operating Pressure Differential (MOPD) PSI								Refe	erence
				Air,								
				Inert								
				Gas,		Max.						
Port	Orifice	Flow		Water		Media			Pressure Vessel	Pressure Vessel		
Size	Size	Factor		& light		Temp.		Pressure Vessel	Number with	Number with		
NPT	in.	Cv**	Min.	oil	Watt	°F	Seal	Number	Metering	Manual Operator	Coil	Valve
AC T	ECHNI	CAL SF	PECIF	ICATION	NS (Av	ailable	ONLY	in AC)				
1/4	3/16	0.75	0	125	24	160	NBR	71417BN2SN00	71417BN2SNR1	71417BN2SNM0	10	C9
3/8	3/16	0.75	0	125	24	160	NBR	71417BN3SN00	71417BN3SNR1	71417BN3SNM0	10	C9

*Minimum ambient temperature: -40°F (-40°C). Dew point must be more than 7° F below ambient temperature. ** Cv=0.45 with built-in metering control (Digits 11 and 12 are R1)

4/2, 4-Way 2 Position Dual Solenoid - Brass*

		•										
			Ope Pre Diffe (MO	erating essure erential PD) PSI							Refe	Prence
				Air,								
				Inert								
				Gas,		Max.						
Port	Orifice	Flow		Water		Media			Pressure Vessel	Pressure Vessel		
Size	Size	Factor		& light		Temp.		Pressure Vessel	Number with	Number with		
NPT	in.	Cv**	Min.	oil	Watt	°F	Seal	Number	Metering	Manual Operator	Coil	Valve
AC T	ECHNI	CAL SF	PECIF	ICATIO	٧S							
1/4	3/16	0.75	0	125	24	160	NBR	71477BN2SN00	71477BN2SNR1	-	10	C9
3/8	3/16	0.75	0	125	24	160	NBR	71477BN3SN00	71477BN3SNR1	-	10	C9

* Minimum ambient temperature: -40°F (-40°C). Dew point must be more than 7° F below ambient temperature. ** Cv=0.45 with built-in metering control (Digits 11 and 12 are R1)

4/2, 4-Way 2 Position Single Solenoid - Brass

Port	Ori Size	fice e in.	Flow		Operatin Differe	g Pressu Intial PSI	re		Max. Fluid			Refe	erence
Size			Factor		Air, Inert		Liaht Oil	1	Temp.				
NPT	In	Exh.	Cv	Min.	Gas	Water	(300 SSU)	Watt	°F	Seal	Pressure Vessel	Coil	Valve
AC TECHNICAL SPECIFICATIONS													
1/4	1/16	1.59	0.09	10	150	150	150	11	180	NBR	04F48S2106ACF	4	C8
DC ⁻	DC TECHNICAL SPECIFICATIONS												
1/4	1/16	1.59	0.09	10	100	100	100	11.5	104	NBR	04F48S2106A3F	6	C8



4-Way Direct Acting Normally Closed - Normally Closed Aluminum

Port	Orific in. Val Norr Clo	e Size lve #1 nally sed	Cv F Fac Valv Norr Clo	low tor e #1 nally sed	Orific in. Va Norr Clo	e Size lve #2 nally sed	Cv F Fac Valv Norr Clo	low tor e #2 nally sed	Oper Pres Diffe	rating ssure rential 2SI Air,		Max. Fluid		Pressure Vessel Number	Pressure Vessel Number with Inlet	Refer	rence
Size NPT	In	Exh.	In	Exh.	In	Exh.	In	Exh.	Min.	Inert Gas	Watt	Temp. °F	Seal	without Metering	and Exaust Metering	Coil	Valve
AC/E	C TE	CHNIC	AL SF	PECIF	ICATIO	ONS			•	•							
1/4	3/64	1/16	0.05	0.10	3/64	1/16	0.05	0.10	0	150	10	130	NBR	V933LB2150	V933LEF2150	*	C5
1/4	1/16	3/32	0.10	0.14	1/16	3/32	0.10	0.14	0	100	10	130	NBR	V933LB2100	V933LEF2100	*	C5
1/4	3/32	3/32	0.16	0.14	3/32	3/32	0.16	0.14	0	75	10	130	NBR	V933LB2075	V933LEF2075	*	C5

4-Way Direct Acting Normally Closed - Normally Open Aluminum

	Orif Size Valv	OrificeCv FlowOrificeCv FlowSize in.FactorSize in.FactorValve #1Valve #1Valve #2Valve #		low tor e #2	Oper Pres	ating sure											
	Norr	nally	Norr	nally	Norr	nally	Norr	nally	Diff	er-					Pressure		
	Clo	sed	Clo	sed	Clo	sed	Clo	sed	entia	<u>l PSI</u>		Max.		Pressure	Vessel Number	Refe	rence
Port										Air,		Fluid		Vessel Number	with Inlet		
Size										Inert		Temp.		without	and Exaust		
NPT	In	Exh.	In	Exh.	In	Exh.	In	Exh.	Min.	Gas	Watt	°F	Seal	Metering	Metering	Coil	Valve
AC/D	C TE	CHNI	CAL	SPEC	IFICA	TION	S										
1/4	3/64	1/16	0.05	0.10	3/64	1/16	0.05	0.10	0	150	10	130	NBR	V935LB2150	V935LEF2150	*	C5
1/4	1/16	3/32	0.10	0.14	1/16	1/8	0.08	0.18	0	100	10	130	NBR	V935LB2100	V935LEF2100	*	C5
1/4	3/32	3/32	0.16	0.14	3/32	1/8	0.14	0.21	0	75	10	130	NBR	V935LB2075	V935LEF2075	*	C5

4-Way Direct Acting Normally Open - Normally Open Aluminum

	-			_		-	_			_	-						
	Orii Size Valve Norr	fice e in. e #1 nally	Cv F Fac Valv	low tor e #1	Ori Size Valv	fice e in. e #2 nally	Cv Flow Factor Valve #2		Oper Pres	rating ssure rential				Prossuro	Prossuro		
		cod		cod		cod		cod				Max		Voccol	Voccol Number	Rofo	rence
_	0.0	Jeu		Jeu		Jeu	0.0	Jeu	<u> </u>	51				VESSEL	vesseriulliber	Refe	I
Port										Air,		Fluid		Number	with Inlet		
Size										Inert		Temp.		without	and Exaust		
NPT	In	Exh.	In	Exh.	In	Exh.	In	Exh.	Min.	Gas	Watt	°F	Seal	Metering	Metering	Coil	Valve
AC/D	C TE	CHNI	CAL	SPEC	IFICA	TION	S										
1/4	3/64	1/16	0.05	0.10	3/64	1/16	0.05	0.10	0	150	10	130	NBR	V955LB2150	V955LEF2150	*	C5
1/4	1/16	1/8	0.08	0.18	1/16	1/8	0.08	0.18	0	100	10	130	NBR	V955LB2100	V955LEF2100	*	C5
1/4	3/32	1/8	0.14	0.18	3/32	1/8	0.14	0.21	0	75	10	130	NBR	V955LB2075	V955LEF2075	*	C5

*Fig. 1

Voltage	24/60	120/60	240/60	12VDC	24VDC
Coil Code	AB2A7W	AB6A0Z	AB8B6A	DC1A3X	DC2A4Y
Coil Part Number*	V57724F24	V57731F24	V57734F24	V57727F24	V57730F24

*When ordering a replacement coil, use Coil Part Number (not Coil Code) Select the series V9 pressure vessel number from above and follow with the coil/enclosure number based on voltage from Fig. 1. Example V935LB2150 for 120/60 becomes part number V935LB2150AB6A0Z.

AC Power Cons	sumption Rating
VA Holding	VA Inrush
17.5	32.5

DC Power Consumption Rating									
12 VDC	24 VDC	120 VDC							
0.71	0.35	0.07							



5/2, 4-Way 2 Position Single Solenoid - Brass

			Oper Pres Differ (MOP	Operating Pressure Differential (MOPD) PSI		Max.			Pressure Vessel	Pressure Vessel	Refe	rence
Port	Orifice	Flow		Air,		Media		Pressure Vessel	Number with	Number with	Refe	
Size	Size	Factor		Inert		Temp.		Number without	Locking Manual	Momentary		
NPT	in.	Cv	Min.	Gas	Watt	°F	Seal	Manual Override	Override	Manual Override	Coil	Valve
AC/D	C TEC	HNICA	L SPEC	CIFICAT	FIONS							
1/4	11/64	0.55	30	150	10	167	NBR	73417BN2KN00	73417BN2KNM0	73417BN2KN7A	7	C1
1/4	11/64	0.55	30	150	1.5	150	NBR	73417BN2KN00	73417BN2KNM0	73417BN2KN7A	11	C1
1/4	1/4	1.20	30	150	10	167	NBR	73417BN2PN00	73417BN2PNM0	73417BN2PN7A	7	C1
1/4	1/4	1.20	30	150	1.5	150	NBR	73417BN2PN00	73417BN2PNM0	73417BN2PN7A	11	C1
1/4	1/4	1.20	30	150	0.6	150	NBR	73417BN2PN90	-	-	12	C1
1/2	5/8	4.00	30	150	10	167	NBR	73417BN4UN00	73417BN4UNM0	-	7	C10
1/2	5/8	4.00	30	150	1.5	150	NBR	73417BN4UN00	73417BN4UNM0	-	11	C10
1/2	5/8	4.00	30	150	0.6	150	NBR	73417BN4UN90	-	-	12	C10

5/2, 4-Way 2 Position Dual Solenoid - Brass

			Oper Pres Differ (MOP	ating sure ential D) PSI		Мах			Pressure Vessel	Pressure Vessel	D. (a)	
Port	Orifice	Flow		Air,		Media		Pressure Vessel	Number with	Number with	Refe	rence
Size	Size	Factor		Inert		Temp.		Number without	Locking Manual	Momentary		
NPT	in.	Cv	Min.	Gas	Watt	°F	Seal	Manual Override	Override	Manual Override	Coil	Valve
AC/D	C TEC	HNICA	L SPEC	CIFICA	TIONS							
1/4	11/64	0.55	30	150	10	167	NBR	73477BN2KN00	73477BN2KNM0	73477BN2KN7A	7	C3
1/4	11/64	0.55	30	150	1.5	150	NBR	73477BN2KN00	73477BN2KNM0	73477BN2KN7A	11	C3
1/4	1/4	1.20	30	150	10	167	NBR	73477BN2PN00	73477BN2PNM0	73477BN2PN7A	7	C3
1/4	1/4	1.20	30	150	1.5	150	NBR	73477BN2PN00	73477BN2PNM0	73477BN2PN7A	11	C3
1/4	1/4	1.20	30	150	0.6	150	NBR	73477BN2PN90	-	-	12	C3
1/2	5/8	4.00	30	150	10	167	NBR	73477BN4UN00	73477BN4UNM0	73477BN4UN7A	7	C11
1/2	5/8	4.00	30	150	1.5	150	NBR	73477BN4UN00	73477BN4UNM0	73477BN4UN7A	11	C11
1/2	5/8	4.00	30	150	0.6	150	NBR	73477BN4UN90	-	-	12	C11



5/2, 4-Way 2 Position Single Solenoid - Brass External Pilot*

			Oper Pres Differ (MOP	ating sure ential D) PSI		Max.			Pressure Vessel	Pressure Vessel	Refe	rence
Port Size NPT	Orifice Size in.	Flow Factor Cv	Min.	Air, Inert Gas	Watt	Media Temp. °F	Seal	Pressure Vessel Number without Manual Override	Number with Locking Manual Override	Number with Momentary Manual Override	Coil	Valve
AC/D	C TEC	HNICA	L SPEC		TIONS			•		•		
1/4	1/4	1.20	0	150	10	167	NBR	74417BN2PN00	-	-	7	C4
1/4	1/4	1.20	0	150	1.5	150	NBR	74417BN2PN00	-	-	11	C4

* External pilot pressure to operate valve must be 30 - 150 psi.

5/2, 4-Way 2 Position Single Solenoid - Stainless Steel

			Oper Pres Differ (MOPI	ating sure ential D) PSI		Max.			Pressure Vessel	Pressure Vessel	Refe	rence
Port Size	Orifice Size	Flow Factor	Min	Air, Inert	Watt	Media Temp. °⊑	Soal	Pressure Vessel Number without	Number with Locking Manual	Number with Momentary Manual Overside	Coil	Valva
AC/D	C TFC	HNICA	SPEC				Seat	Manual Over ride	overnue	Manual Overnue	COIL	valve
1/4	11/64	0.55	30	150	10	167	NBR	73417VN2KN00	73417VN2KNM0	73417VN2KN7A	7	C1
1/4	11/64	0.55	30	150	1.5	150	NBR	73417VN2KN00	73417VN2KNM0	73417VN2KN7A	11	C1
1/4	11/64	0.55	30	150	0.6	150	NBR	73417VN2KN90	-	-	12	C1
1/4	1/4	1.20	30	150	10	167	NBR	73417VN2PN00	73417VN2PNM0	73417VN2PN7A	7	C1
1/4	1/4	1.20	30	150	1.5	150	NBR	73417VN2PN00	73417VN2PNM0	73417VN2PN7A	11	C1

5/2, 4-Way 2 Position Dual Solenoid - Stainless Steel

			Operating Pressure Differential (MOPD) PSI		Max.			Pressure Vessel	Pressure Vessel	Refe	rence	
Port	Orifice	Flow		Air,		Media		Pressure Vessel	Number with	Number with	Refer	
NPT	512e		Min	Gas	Watt	remp. ∘⊑	Saal	Number Without		Momentary Manual Override	Coil	Valva
AC/D	C TEC	HNICA	L SPEC		TIONS		Jean	Handat over hae	overnue	Handat over hae	0011	vatve
1/4	11/64	0.55	30	150	10	167	NBR	73477VN2KN00	73477VN2KNM0	73477VN2KN7A	7	C3
1/4	11/64	0.55	30	150	1.5	150	NBR	73477VN2KN00	73477VN2KNM0	73477VN2KN7A	11	C3
1/4	11/64	0.55	30	150	0.6	150	NBR	73477VN2KN90	-	-	12	C3
1/4	1/4	1.20	30	150	10	167	NBR	73477VN2PN00	73477VN2PNM0	73477VN2PN7A	7	C3
1/4	1/4	1.20	30	150	1.5	150	NBR	73477VN2PN00	73477VN2PNM0	73477VN2PN7A	11	C3



5/2, 4-Way 2 Position Single Solenoid - Stainless Steel - External Pilot*

			Oper Pres Differ (MOP	ating sure ential D) PSI		Max.			Pressure Vessel	Pressure Vessel	Refe	rence
Port	Orifice	Flow		Air,		Media		Pressure Vessel	Number with	Number with	Refer	ence
NPT	in.	Factor Cv	Min.	Gas	Watt	°F	Seal	Manual Override	Override	Momentary Manual Override	Coil	Valve
AC/D	C TEC	HNICA	L SPEC	CIFICAT	TIONS	<u> </u>						
1/4	11/64	0.55	0	150	10	167	NBR	74417VN2KN00	-	-	7	C4
1/4	11/64	0.55	0	150	1.5	150	NBR	74417VN2KN00	-	-	11	C4
1/4	1/4	1.20	0	150	10	167	NBR	74417VN2PN00	-	-	7	C4
1/4	1/4	1.20	0	150	1.5	150	NBR	74417VN2PN00	-	-	11	C4

* External pilot pressure to operate valve must be 30 - 150 psi.

5/2, 4-Way 2 Position Single Solenoid - Aluminum

			Opera Differ	ting Pre ential (N PSI	essure MOPD)	Max.			Pressure Vessel	Pressure Vessel	Refe	rence
Port Size NPT	Orifice Size in.	Flow Factor Cv	Min.	Air, Inert Gas	Watt	Media Temp. °F	Seal	Pressure Vessel Number without Manual Override	Number with Locking Manual Override	Number with Momentary Manual Override	Coil	Valve
AC/D	C TEC	HNICA	L SPEC	CIFICAT	TIONS		-	•		•		
1/8	5/32	0.35	15	150	10	167	NBR	-	7341LAN1HNM0	-	7	C6
1/4	1/4	1.00	30	150	10	167	NBR	73419AN2NN00	73419AN2NNM0	-	7	C2

5/2, 4-Way 2 Position Single Solenoid - Zinc Alloy (Epoxy Coated)

			Opera Differ	ting Pre ential (N PSI	essure MOPD)	Max.			Pressure Vessel	Pressure Vessel	Refe	rence
Port Size NPT	Orifice Size in.	Flow Factor Cv	Min.	Air, Inert Gas	Watt	Media Temp. °F	Seal	Pressure Vessel Number without Manual Override	Number with Locking Manual Override	Number with Momentary Manual Override	Coil	Valve
AC/D	C TEC	HNICA	L SPEC	CIFICAT	TIONS							
1/4	5/16	1.40	15	150	10	167	NBR	-	7341LMN2NNM0	-	7	C7







4-Way 2 position single solenoid Port identification: Press-1/Cyl - 2,4/ EXH - 3,5







Valve Reference C2





4-Way 2 position single solenoid Port identification: Press-P/A-Cylinder/ EA-Exhaust/ B-Cylinder/ EB- Exhaust











4-Way 2 position dual solenoid Port Identification: Press-1/CYL-2,4/EXH - 3,5





Nanual override mechanical option





Valve Reference C4





4-Way 2 position solenoid external pilot

Port Identification: Press-1/CYL-2,4/EXH - 3,5









Parker Hannifin Corporation Fluid Control Division 1 800 825 8305 (1 800 Valve05) www.parker.com/fcd

Parker







4-Way

4-way direct acting

V933xx: Normally Closed-Normally Closed v935xx: Normally Closed-Normally Open v955xx: Normally Open-Normally Open













4-Way 2 position single solenoid Port identification: pressure-1/cyl.A-2/cyl.B-4/Exh.A-3/Exh. B-5

Valve Reference C8









4-Way 2 position single solenoid Port identification: de-energized: pressure to A B to exhaust energized: pressure to B A to exhaust







4-Way 2 position single solenoid



4-Way 2 position dual solenoid Port Identification: Press-P/CYL-A,B/EXH - E



4-Way

Valve Reference C10





4-Way 2 position single solenoid Port Identification: Press-1/CYL-2,4/EXH - 3,5



















Port Identification: 1-Pressure/2, 4-Cylinder/3, 5-Exhaust





V933 Four-Way Normally Closed - Normally Closed Valves

When de-energized, both inlet ports are closed by the two plungers preventing flow from the common inlet through both of the valves. The cylinder port in each valve is open to the common exhaust, permitting flow from the cylinders to the exhaust. When the coils are energized, both valve plungers rise, opening the inlet orifices, and at the same time closing the orifices in the sleeves. This stops flow from the cylinder ports to the exhaust, and permits flow from the inlet to the cylinder ports.



Typical cylinder operation with V933 Valves

Both coils de-energized. The inlet pressure is closed to both sides of a double-acting cylinder. Side #1 and Side #2 of the cylinder are open to exhaust through cylinder ports #C1 and #C2. The piston can be shifted manually.



Coil of valve #1 energized; coil of valve #2 de-energized. The inlet pressure is open to side #1 of the double-acting cylinder through cylinder port #C1, the exhaust is closed off by the plunger insert. Side #2 of the cylinder is open to exhaust through cylinder port #C2, the inlet is closed off by the plunger insert. The piston moves to the right.



Coil of valve #1 de-energized; coil of valve #1 energized. The inlet pressure is closed off to side #1 of the double-acting cylinder; the exhaust is open through cylinder port #C1. Side #2 of the cylinder is closed to the exhaust and open to inlet pressure through cylinder port #C2. The piston moves to the left.

V935 Four-Way Normally Closed - Normally Open Valves

The plungers of the two valves are at opposite positions in both the energized and de-energized conditions - one normally open while the other is normally closed. When de-energized, fluid flows from the inlet of the valve through the inlet port of the normally open valve, through the sleeve, and out the cylinder port of the valve. At the same time, the normally closed valve inlet orifice is closed, but the orifice in the sleeve is opened, permitting flow from its cylinder port to the common exhaust. Therefore, fluid flows from the inlet of the valve to the cylinder port of the normally open valve and from the cylinder port of the normally closed valve to the exhaust. When energized, the two valves reverse in position.



Typical cylinder operation with V935 Valves

Both coils de-energized. The inlet pressure is open to side #2 of the doubleacting cylinder through cylinder port #C2 and the plunger insert closes off the exhaust. Side #1 of the cylinder is open to exhaust through cylinder port #C1 and the inlet pressure is closed off. This causes the piston in the cylinder to move to the left.



Both coils energized. The inlet pressure is open to side #1 of the cylinder through cylinder port #C1 and the exhaust is closed off. Side #2 of the cylinder is open to the exhaust through cylinder port #C2 and the inlet pressure is closed off by the plunger insert. The piston moves to the right.



V955 Four-Way Normally Open - Normally Open Valves

Both plungers are in the same position when the coils are de-energized. In this condition, fluid flows through the common inlet of the body, up through the sleeves of both valves, and out the cylinder ports of the valves. Both orifices in the sleeve stops are closed to the exhaust ports by the plunger. In the energized position, both valve plungers operate together to close the inlet ports, stopping flow into the valve. At the same time, the orifices in the sleeves are opened permitting flow from the cylinder ports to the common exhaust port in the body.



Typical cylinder operation with V955 Valves

Both coils de-energized. The inlet pressure is open to both sides of the double-acting cylinder through cylinder port #C2 and the plunger insert closes off the exhaust. Side #1 of the cylinder is open to exhaust through cylinder port #C1 and the inlet pressure is closed off. This causes the piston in the cylinder to move to the left.



Coil of valve #1 energized; coil of valve #2 de-energized. The inlet pressure is closed to side #1 of the double-acting cylinder and open to exhaust through cylinder port #C1. Side #2 of the cylinder is open to the inlet pressure, through cylinder port #C2. The exhaust is closed off by the plunger insert. The piston moves to the left.



4-Way Direct Acting Materials of Construction**

Product*	Watt	Туре	Port Size	Body	Sleeve Tube	Sleeve Stop	Sleeve Flange	"Plunger Blank"	Plunger Spring	Shading Ring	Max. Ambient Temp.
71417BN	24	4/2	1/4 - 3/8	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	140°F
71477BN	24	4/2	1/4 - 3/8	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	140°F
V933	20	NC-NC	1/4	Aluminum	304SS	430FR	430F	430FR	18-8SS	Copper	122°F
V935	20	NC-NO	1/4	Aluminum	304SS	430FR	430F	430FR	18-8SS	Copper	122°F
V955	20	NC-NC	1/4	Aluminum	304SS	430FR	430F	430FR	18-8SS	Copper	122°F

4-Way Pilot Piped Materials of Construction**

Product*	Watt	Туре	Port Size	Body	Sleeve Tube	Sleeve Stop	Sleeve Flange	"Plunger Blank"	Plunger Spring	Shading Ring	Max. Ambient Temp.
73417AN	10	5/2	1/4	Alum	304SS	430FR	430F	430FR	18-8SS	Copper	167°F
73417BN	10	5/2	1/4	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	167°F
73417BN	10	5/2	1/2	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	167°F
73417VN	10	5/2	1/4	303	304SS	430FR	430F	430FR	18-8SS	Copper	167°F
73419AN	10	5/2	1/4	Alum	304SS	430FR	430F	430FR	18-8SS	Copper	167°F
7341LAN	10	5/2	1/8	Alum	304SS	430FR	430F	430FR	301SS	Copper	150°F
7341LMN	10	5/2	1/4	Zinc	304SS	430FR	430F	430FR	301SS	Copper	150°F
73477BN	10	5/2	1/4	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	167°F
73477BN	10	5/2	1/4	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	167°F
73477BN	10	5/2	1/2	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	167°F
73477VN	10	5/2	1/4	303	304SS	430FR	430F	430FR	18-8SS	Copper	167°F
74417BN	10	5/2	1/4	Brass	304SS	430FR	430F	430FR	18-8SS	Copper	167°F
04F48S2	11	4/2	1/4	Brass	305SS	430FR	430F	430FR	302SS	Copper	77°F
04F48S2	11.5	4/2	1/4	Brass	305SS	430FR	430F	430FR	302SS	Copper	77°F

* Shows first 4 or 7 digits of pressure vessel part number.

** Maximum ambient temperature shown is the rating when valve is operating at the maximum fluid temperature as shown in the product sections for each of the valves in this catalog.

