

# Parker Electronic Valve

Product Bulletin 24-00 B

Type: PEV

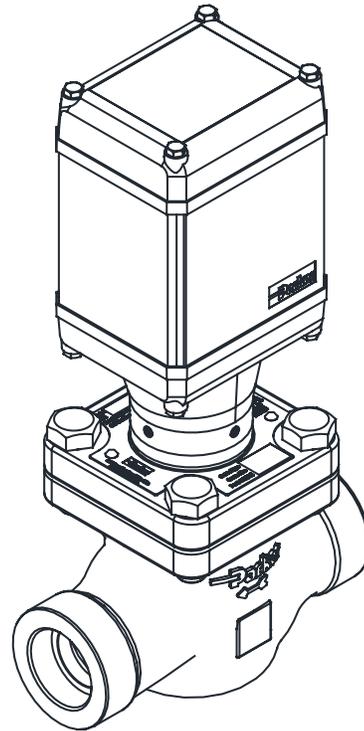


## Purpose:

The PEV series of electronic modulating valves provide enhanced control for industrial refrigeration systems. The PEV provides precise control of flow for liquid level, expansion, superheat, and temperature control applications. The stainless steel construction helps overcome corrosion problems encountered in harsh environments. The valve's weld-in feature design reduces potential for connection leaks.

This design has a higher working pressure, a greater working temperature range and higher flow capacities than competitive products. These valves provide long-term performance with replaceable internal components.

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## Contact Information: Product Features:

Parker Hannifin Corporation  
**Refrigerating Specialties Division**  
2445 South 25th Avenue  
Broadview, IL 60155-3891

**phone (708) 681-6300**  
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[www.parker.com/refspec](http://www.parker.com/refspec)

- Suitable for ammonia, CO<sub>2</sub>, R-134a, R-404a, R-410a and other common refrigerants
- Stainless steel construction increases product life cycle
- Lightweight construction
- Cartridge based design simplifies service and eliminates body wear
- Interchangeable cartridge assembly with other P-Series offerings
- Works with any 4-20 mA controller
- Bright Seven-Segment LED Display
- Password protection prevents tampering
- Alarm notification
- IP67/NEMA 6 rated
- Parker Backup Module (PBM) available



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		HBLT-C1 Liquid Level Controller	

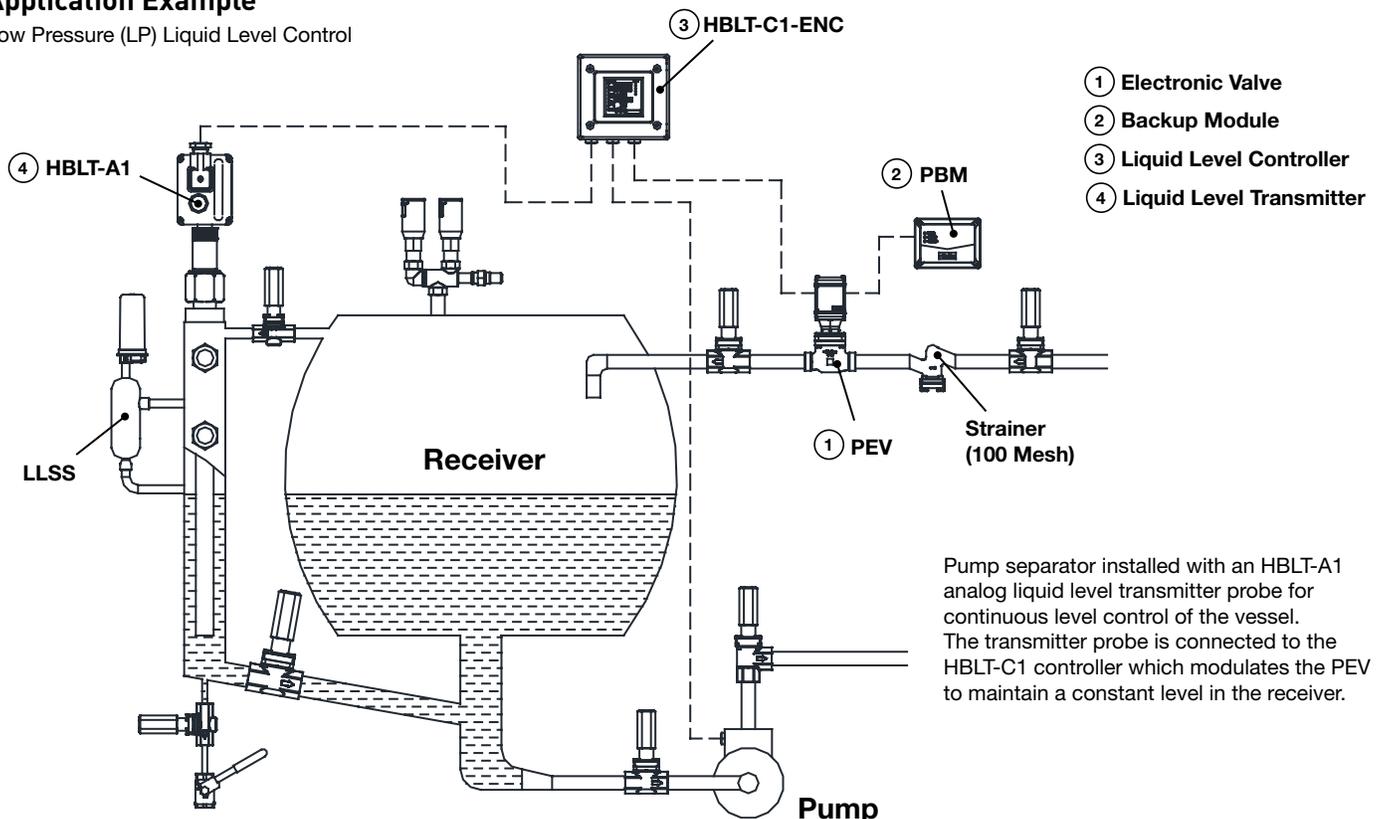
**Technical Data**

Liquid Temperature Range .....	-60°C to 120°C (-76°F to 248°F)	Operating Pressure Range .....	500 mm Hg to 52 bar (20in. Hg to 754 psig)
Ambient Temperature Range .....	-40°C to 50°C (-40°F to 122°F)	Electrical Specification .....	.24 VDC @ 1.3 Amp
Maximum Rated Pressure (MRP).....	52 bar (754 psig)	Enclosure Specification .....	IP67 / NEMA 6
Maximum Operating Pressure Differential (MOPD)		Rated Seat Leakage.....	ANSI/ FCI 70-2 2006 Class II
20mm (¾") to 25mm (1") .....	52 bard (754 psid)		
32mm (1¼") to 40mm (1½").....	28 bard (406 psid)		

Port Size		Capacity Plugs	Flow Coefficient <sup>[1]</sup>		Connections		Weight	
mm	inch		Kv	Cv	SW, BW ANSI	BW Metric (DIN)	kg	lbs
20	¾	Full 70%	6.1 4.3	7.0 5.0	¾", 1", 1¼"	20, 25, 32	5.4	11.8
25	1	Full 40%	11.2 4.3	13.0 5.0	¾", 1", 1¼"	20, 25, 32	5.4	11.8
32	1¼	Full	14.1	16.3	1¼", 1½"	32, 40	10.8	23.9
40	1½	Full	26.9	31.1	1½", 2"	40, 50	10.8	23.9

**Application Example**

Low Pressure (LP) Liquid Level Control



## Function and Design

The Parker Electronic Valve (PEV) is an electronically controlled valve that modulates the flow of refrigerant in industrial refrigeration applications. Common applications include those where load fluctuations are great such as chilling and cooling applications and where precise control over temperature or humidity is important. The PEV consists of two major components; the electronic actuator and the sealed valve body.

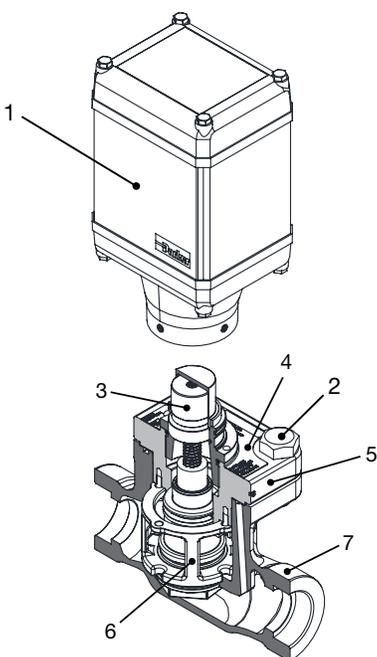
The actuator is contained in an IP67 (NEMA 6) housing. The valve body is made entirely from stainless steel, designed to resist corrosion, and work in a variety of industrial refrigeration applications. The PEV is powered by 24 VDC and accepts a 4-20 mA control signal. The PEV will modulate the flow of refrigerant by opening and closing based on the control signal input. The actuator is automatically calibrated when power is established.

When the 4-20 mA signal comes back in range after being out of range, or when manually requested by the user. At 4 mA the valve will be closed, and at 20 mA the valve will be 100% open, unless the direction has been reversed at the time of setup.

The PEV is available with an optional Parker Backup Module (PBM) that will place the valve in a user-defined position in the event of a power loss. After the calibration cycle, the PEV actuator will position the valve based on the control signal input.

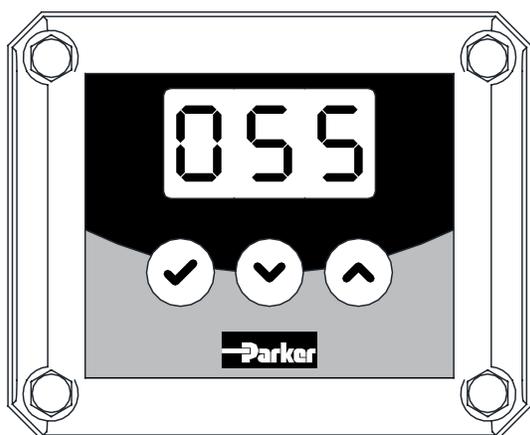
The PEV valve is comprised of a stainless steel 52 bar (754 psi) rated housing. The PEV valve is modulated by means of a magnetic coupling. The magnetic coupling drives a screw mechanism which opens and closes the valve plug.

## Material List



Item	Description	Material
1	PEV Actuator	Aluminum, Resin, Silicone
2	Bolts - M12 x 1.5 x 13 mm	Stainless Steel
3	Magnet Assembly	Stainless Steel
4	Nameplate	Aluminum
5	Port Plate	Stainless Steel - CF3 (ASTM A351) or F 304 (ASTM A182)
6	Cartridge Assembly	Stainless Steel, PTFE, Resin
7	Valve Body	Stainless Steel - CF3 (ASTM A351)
-	O-Ring	Neoprene
-	Gasket	Gylon 3500

## User Interface



Select



Move selection down

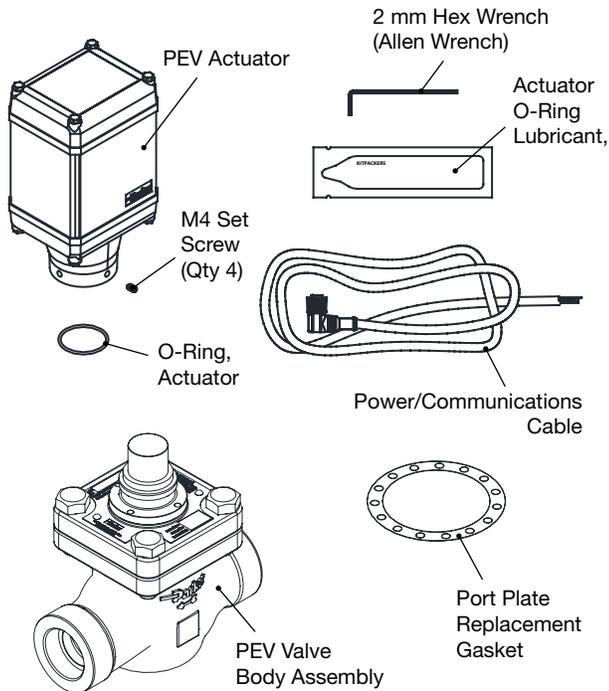


Move selection up

## Installation Instructions

All personnel working on valves must be qualified to work on refrigeration systems. If there are any questions contact Refrigerating Specialties before proceeding with the work.

All valves are packaged for a maximum protection. Check the carton to make sure all items are unpacked, see Figure 1 for the list of items included.

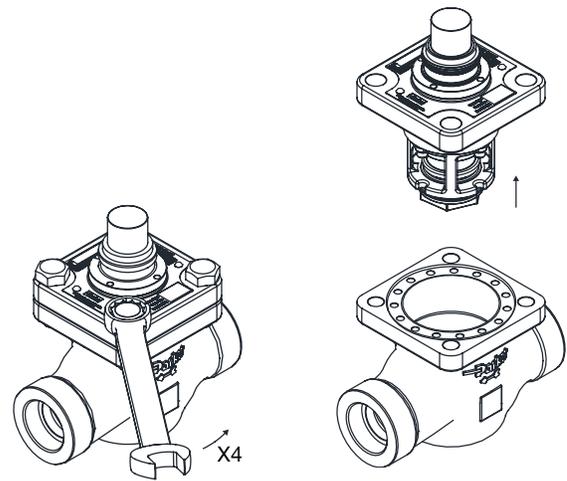


**Figure 1:** Component Contained in Box

Do not remove the protective coverings from the inlet and outlet of the valve until the valve is ready to be installed. Protect the inside of the valve from dirt and chips before and during installation. In the event the valve is left disassembled for any length of time, protecting the components is essential. Place the components in a plastic bag and store them in an area where they will not be damaged.

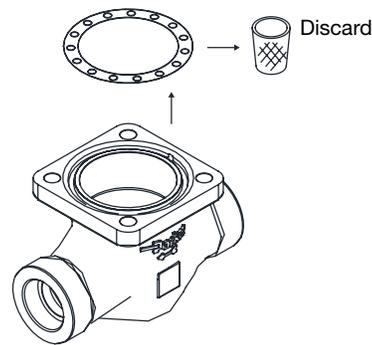
The valve should be installed in a location where it is easily accessible for adjustment and maintenance. The location should be such that the body cannot be easily damaged by material handling equipment. Proper indicating gauges should be installed to be easily visible to the operating engineer for system checks and adjustment purposes.

The valve should be disassembled before welding to prevent damage to o-rings and teflon (PTFE) components. First remove the port plate by unbolting the bolts as shown in Figure 2. If the port plate does not come apart easily, rotate the port plate 45° and use the corners to pry the port plate out. If using a tool, such as a screw driver, it is important to be careful not to damage any gasket surfaces.



**Figure 2:** Removal of Port Plate Assembly

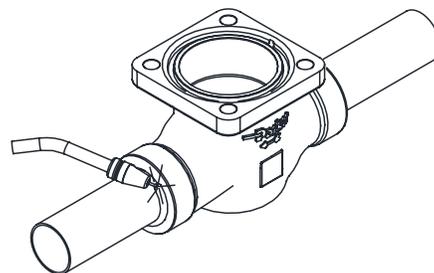
The current port plate gasket must be removed, as shown in Figure 3, and discarded. A replacement gasket is provided with every purchase of a new valve.



**Figure 3:** Removal of Port Plate Assembly Gasket

The PEV valves must be mounted in the upright horizontal position, as shown in Figure 4, with the actuator on the top. The valve must be installed with the arrow pointing in the direction of flow for the valve to function properly.

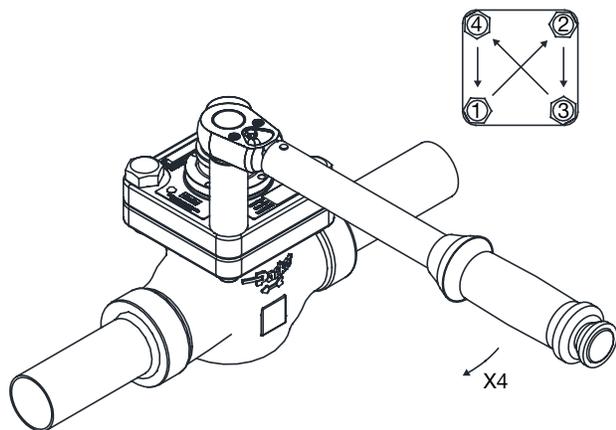
△ In the event the valve is left disassembled for any length of time, protecting the components is essential. Place the components in a plastic bag or apply a rust protection agent, such as refrigerant oil.



**Figure 4:** Mounting Position

Installers need to follow a WPS (Welding Procedure Specification) for all welding. Both the procedure and welder must be qualified to perform that procedure.

The codes applicable to the welding of socket weld valves require that the pipe be inserted into the socket until bottomed against the stop, then backed out approximately 1/16 of an inch (1.6 mm) before welding. Use of welding rings is optional but recommended for butt weld valves. They help with alignment, control gap for full penetration welding, and reduces welding debris from entering the valve.



Port	Bolt Size	Nm	Ft Lb
20 mm (3/4") to 25 mm (1")	M12 x 1.75	61	45
32 mm (1 1/4") to 40 mm (1 1/2")	M16 x 2	149	110

Figure 5: Torque Specifications

Note: When welding carbon steel to stainless steel the welded joint should be painted to prevent galvanic corrosion.

Reassemble the valve in reverse order using the new gasket provided. Tighten the port plate bolts, with a torque wrench, evenly in an "X" pattern to provide proper seating. Bolt torque values are provided in Figure 5.

Apply the supplied grease to the actuator o-ring before attaching the PEV actuator to the valve, as shown in Figure 6. Before attaching the actuator to the valve body check if the M4 set screws are not protruding into the bore. If so use the hex wrench to back out the set screws. Now slide the actuator onto the valve and press down until the flat surface the actuator touches the valve. Once the actuator is in position use the hex wrench to tighten the set screws.

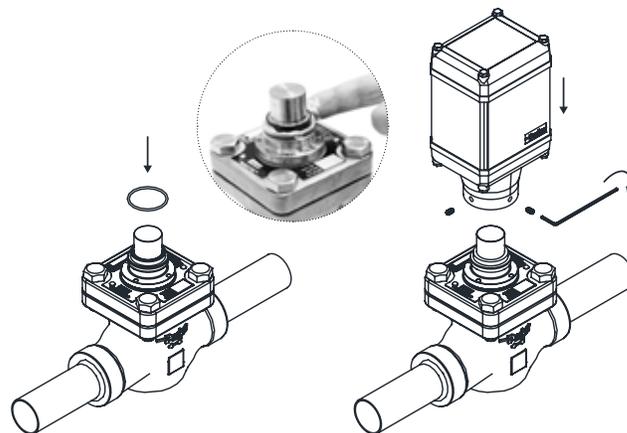


Figure 6: PEV Actuator Installation

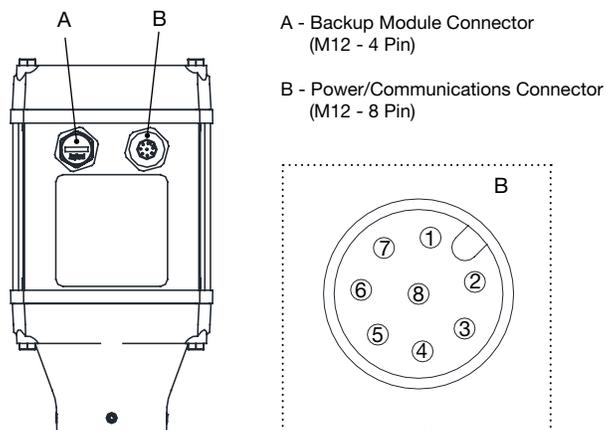
**⚠ WARNING**

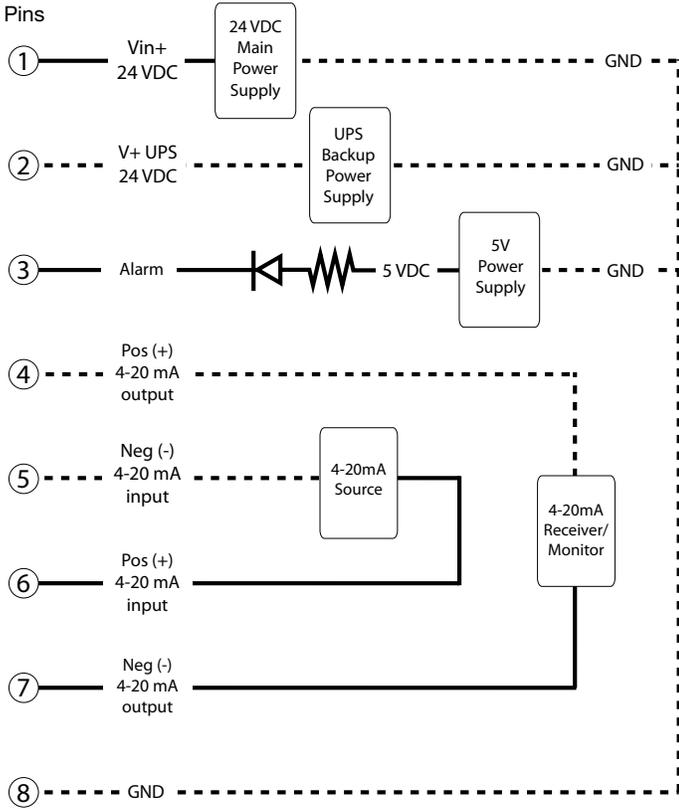
It is recommended to install a 100 mesh strainer upstream of the PEV valve.

## Electrical

The PEV requires 24 VDC power and a 4-20 mA input signal. The acceptable voltage range is 24 ± 2 for the power supply. The power supply should be sized to provide a minimum of 1.3 Amps of current to the PEV actuator. The PEV can be connected to a capacitive Parker Backup Module (PBM) via the four pin quick disconnect cable. The PBM is designed to position the PEV to a pre-determined user-identified position in the event of a power loss. The PEV can also be connected to a user supplied Uninterruptible Power Supply (UPS) via pin 2 on the eight pin communication cable. The UPS should be sized to supply the necessary voltage and current to the PEV. For system wiring the PEV comes with a 3 meters (9 feet) power cable. If needed the communication cable can be extended to a maximum of 60 meters (200 feet) with an 18 AWG 8 pin cable.

At a minimum, the PEV actuator needs to be connected to a 24 Vdc power supply (pins 1 & 8) and be provided with a 4-20 mA control signal (pins 5 & 6).





Wire Connections			
Pin	Wire Color	Description	Notes
1*	Brown	24 Vdc (+)	Power Supply (+)
2	Red	Backup power in (+)	For backup power supply
3	Orange	Alarm output	Sink output (pulled to low)
4	Yellow	4-20 mA output (+)	Output signal
5*	Green	4-20 mA input (-)	PEV control signal (-)
6*	Blue	4-20 mA input (+)	PEV control signal (+)
7	Purple	4-20 mA output (-)	Output signal
8*	Gray	24 Vdc	Power supply (-)

\* Denotes mandatory connection

### Quick Start Instructions

PEV Quick Start Instructions		
Steps	Display	Setup Instructions
1		Connect the 8-pin cable to an appropriate power source and controller and apply 24 VDC to the PEV. During initial configuration the PEV will display 'A01' (which indicates no valve selected) .
2		Press  to get to the level 1 parameters. '01.' is the valve size selection parameter.
3		Press  to choose a valve size. '1.0.0.' indicates that no valve is selected.
4		In order to change the valve size a password must be entered. Press  to get to the password screen. 'P0.0.' should be displayed.
5		Toggle up to 'P05' using the  arrow. P05 is the default password. Press .
6		The screen will revert to '1.0.0.' indicating that the PEV is in the valve selection parameter with the password entered.

PEV Quick Start Instructions												
Steps	Display	Setup Instructions										
		Select the valve size by pressing the  or  arrow.										
		<table border="1"> <thead> <tr> <th>Display</th> <th>Valve Size</th> </tr> </thead> <tbody> <tr> <td>1.0.1.</td> <td>20mm (3/4")</td> </tr> <tr> <td>1.0.2.</td> <td>25mm (1")</td> </tr> <tr> <td>1.0.3.</td> <td>32mm (1 1/4")</td> </tr> <tr> <td>1.0.4.</td> <td>40mm (1 1/2")</td> </tr> </tbody> </table>	Display	Valve Size	1.0.1.	20mm (3/4")	1.0.2.	25mm (1")	1.0.3.	32mm (1 1/4")	1.0.4.	40mm (1 1/2")
Display	Valve Size											
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1.0.2.	25mm (1")											
1.0.3.	32mm (1 1/4")											
1.0.4.	40mm (1 1/2")											
7		Press  to confirm the valve size selection. Upon pressing enter the valve will automatically calibrate. During calibration the PEV display will flash 'CAL' to indicate that it is in calibration mode.										
8	 	Upon completing the calibration routine, the valve will enter modulating mode. The valve is now ready for standard operation or for setting advanced parameter configurations. During normal operation the PEV will display the % open. If 'A03' is flashing, the PEV is indicating that the 4-20 mA control signal is out of range.										

**Menu and Level Navigation Guide**

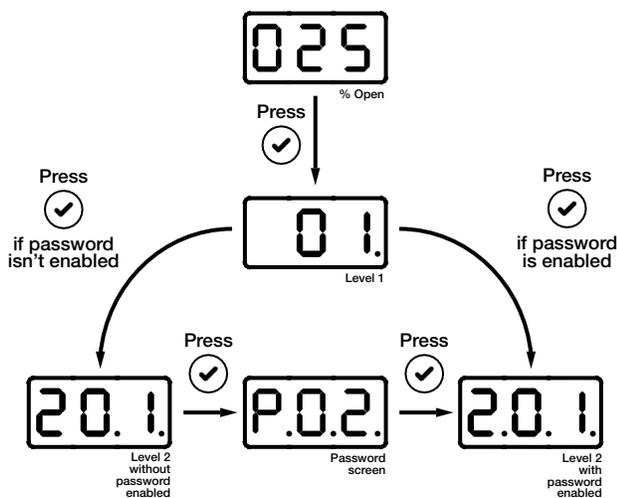


Figure 7: Moving Down a Level

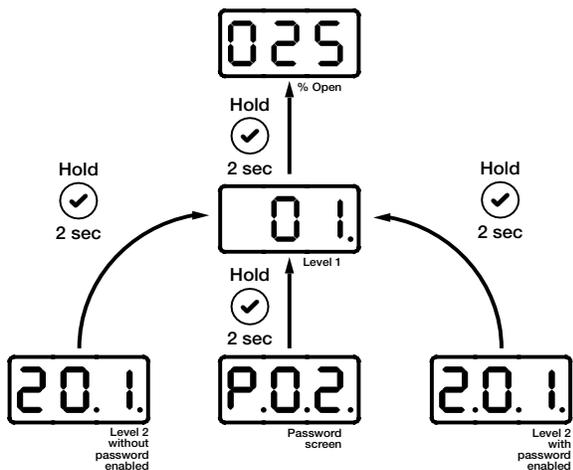
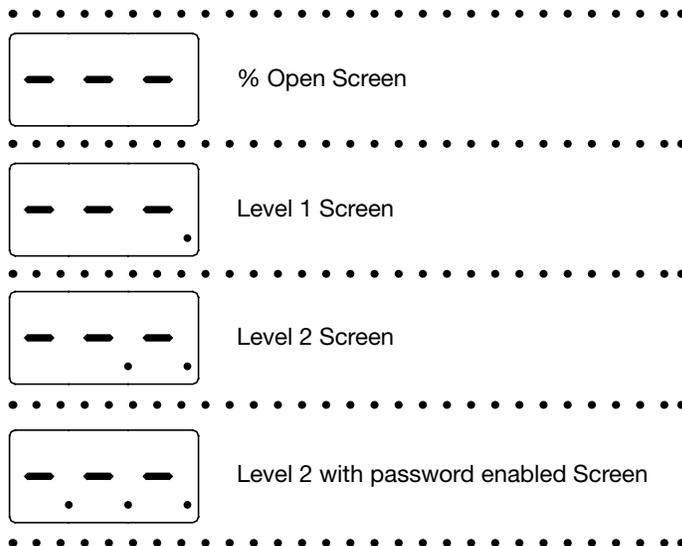


Figure 8: Moving Up a Level

All software parameters and settings of the PEV are viewable by default, but require password clearance to adjust. For instructions on navigating to the password input screen, see Figure 7 and Figure 8.

As demonstrated in the key above, current password clearance status is signified by the number of decimal points in the display: if the password has not been enabled, the screen for Level 2 will show two decimal points. If the password has been enabled, the screen for Levels 2 and above will show three decimal points.

The password will remain enabled for a period of seven minutes. After seven minutes have passed, the password will need to be re-entered to continue setting parameters.

## Software Parameters

PEV Software Parameters																											
Level 1	Level 1 Description	Level 2	Default Level 2 Value																								
-	-	PEV Valve % Open position is displayed during normal operation	Value																								
01.	PEV Configuration	Password Protected. Default Password = 'P0.5.' At initial startup, 'A01' will flash in display. Enter valve type: 1.0.1. = No valve selected. Alarm 'A01' will be active 1.0.2. = PEV 25mm (1") with Actuator A	1.0.1.																								
02.	Mode	Operation Mode: 2.0.1. = Modulating Mode - PEV position according to 4-20mA analog input signal 2.0.2. = Manual Mode When the Valve % Open is flashing, User can use up/down arrows to alter % open. After the User presses 'select' the valve will set accordingly. 2.0.3. = Quick Manual Mode OPEN/CLOSE the PEV by altering parameter '05.' inputs.	2.0.1.																								
03.	Direction	If Mode setting '02.' = 2.0.1., then Direction setting '03.' indicates if the valve is configured in forward or reverse directions. 3.0.1. = Forward = 4mA = closed, 20mA = open 3.0.2. = Reverse = 4mA = open, 20mA = closed	3.0.1.																								
04.	Speed	If Mode setting '02.' = 2.0.1. or 2.0.3., then Speed setting '04.' indicates the motor speed setting. Max speed is 3 sec for full stroke. <table border="1" data-bbox="386 808 1010 970"> <thead> <tr> <th rowspan="2">Display</th> <th rowspan="2">Speed Type</th> <th colspan="3">Full Stroke Speed (sec)</th> </tr> <tr> <th>20mm (¾")</th> <th>25mm (1")</th> <th>32mm (1¼")</th> <th>40mm (1½")</th> </tr> </thead> <tbody> <tr> <td>4.0.1.</td> <td>Slow</td> <td colspan="2">10</td> <td>17</td> </tr> <tr> <td>4.0.2.</td> <td>Medium</td> <td colspan="2">7</td> <td>12</td> </tr> <tr> <td>4.0.3.</td> <td>Fast</td> <td colspan="2">3</td> <td>8</td> </tr> </tbody> </table>	Display	Speed Type	Full Stroke Speed (sec)			20mm (¾")	25mm (1")	32mm (1¼")	40mm (1½")	4.0.1.	Slow	10		17	4.0.2.	Medium	7		12	4.0.3.	Fast	3		8	4.0.3.
Display	Speed Type	Full Stroke Speed (sec)																									
		20mm (¾")	25mm (1")	32mm (1¼")	40mm (1½")																						
4.0.1.	Slow	10		17																							
4.0.2.	Medium	7		12																							
4.0.3.	Fast	3		8																							
05.	Quick Manual Mode Input	If Mode setting '02.' = 2.0.3., then Quick Manual Mode Input setting '05.' moves the valve to the Open or Close position. 5.0.1. = Open PEV 5.0.2. = Close PEV	5.0.1.																								
06.	Forced Calibration	6.0.1. = Valve operates normally. No forced calibration initiated. 6.0.2. = Force an auto-calibration (Automatically defaults back to '6.0.1.' after calibration is complete) 'CAL' will flash on screen during calibration	6.0.1.																								
07.	Power-loss Position	Default position of valve during a power failure if PBM or UPS is connected. 7.0.1. = Close Valve 7.0.2. = Open Valve 7.0.3. = Go to % Open defined in 08.	7.0.1.																								
08.	% Open during Power Loss	Only active if power loss setting '07.' = 7.0.3. Adjust the % Open value to the position the valve moves to following a power loss	0%																								
09.	PBM Available	9.0.1. = No PBM is attached 9.0.2. = PBM is attached - locks out user upon power up for 200 sec to allow PBM to charge	9.0.1.																								
13.	Password	Specify password needed to configure any parameter Range: P00 - P99	P0.5.																								
21.	Alarm History	The last 99 alarms will be displayed with the latest shown first. Alarm list can be reset by pressing 'down' and 'up' arrows simultaneously for 2 seconds. X:YZ ├─ Alarm List (Range: 01 - 99, where 01 is the most current alarm) └─ Alarm Text (Range: 1 - 4; where 1 = Alarm A01, 2 = Alarm A02, etc.)	NA																								
22.	Alarm Count	Lists the number of times each of the four alarms have occurred. Alarm list can be reset by pressing 'down' and 'up' arrows simultaneously for 2 seconds. X:YZ ├─ Alarm Counter (Range: 0 - 99); i.e. number of occurrences └─ Alarm Text (Range: 1 - 4; where 1 = Alarm A01, 2 = Alarm A02, etc.)	NA																								
23.	Analog Input	% Open valve in mA (corresponding to 4-20mA input signal) to view analog input value on display.	NA																								
24.	Software Version	Software version currently installed	NA																								

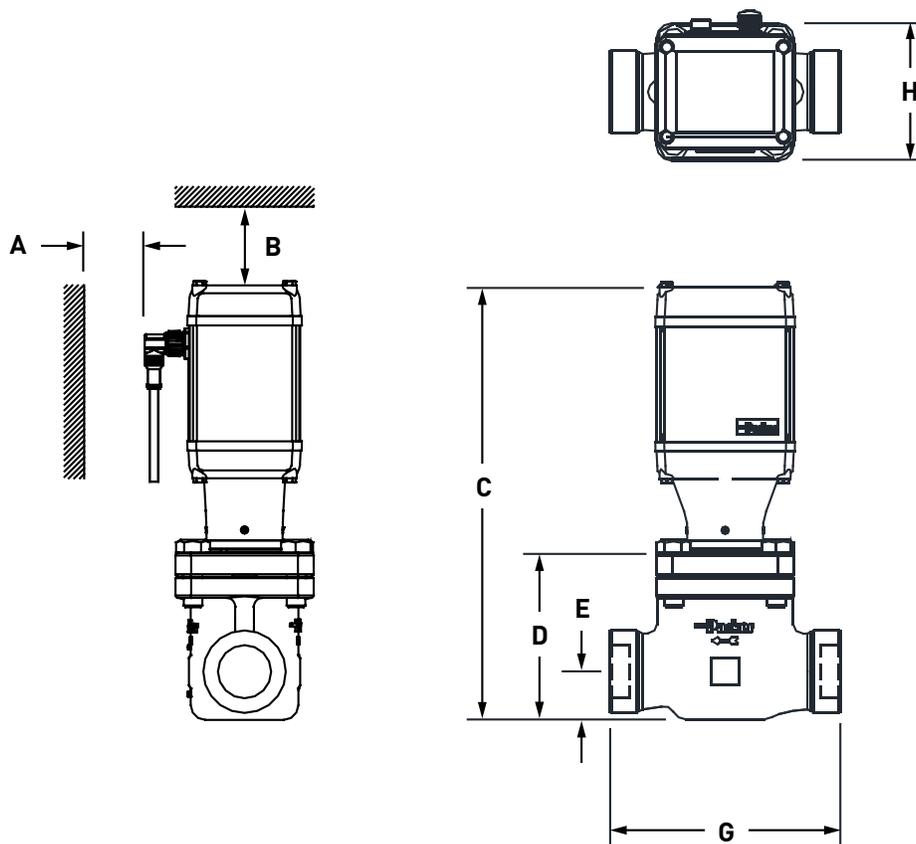
## Alarm List

PEV Alarm List		
Alarm Text	Description	Comments
A01	No valve size selected	During startup, after a reset to default settings, or any time a valve size is not selected, the alarm will be sent out until a valve size is chosen.
A02	PBM charging notification	If the user indicates a Parker Backup Module is connected '9.0.2', upon every power cycle the valve will remain closed and the alarm will be sent out from the PEV until the charging state of the backup module is complete.
A03	4-20 mA Input Error	Alarm monitoring active when the mode '02.' = '2.0.1'. The alarm will be sent out when the analog Input signal 4-20 mA is out of range: < 2 mA or > 22 mA
A04	Power Supply Failure	The alarm will be sent out when the main power supply to PEV actuator is < 19 VDC

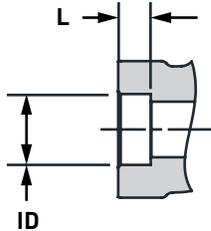
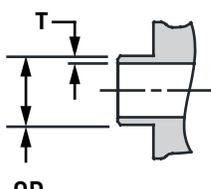
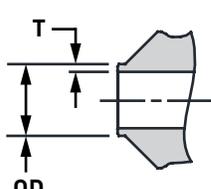
\*The display will not function when normal power is below threshold

\*\*All alarms will disappear when their trigger criteria is removed and PEV returns to normal operation.

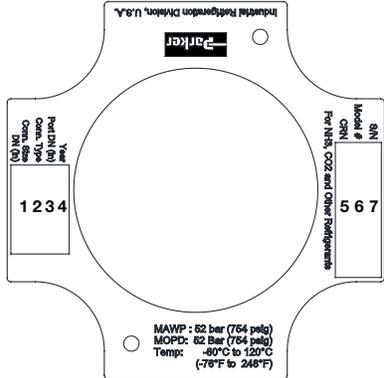
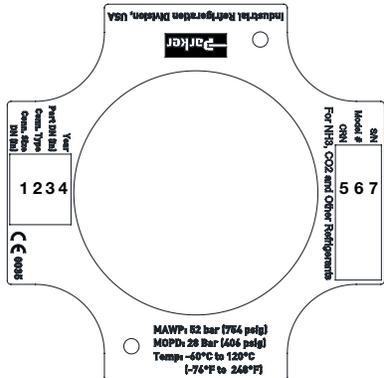
## Dimensional Information



Port Size		A		B		C		D		E		G		H	
mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
25	1	25	1	50	2	280	11.0	108	4.2	31	1.2	149	5.9	89	3.5
40	1½	25	1	50	2	324	12.8	151	6.0	48	1.9	188	7.4	121	4.8

<p>Socket Weld (SW) ANSI</p>		<table border="1"> <thead> <tr> <th colspan="2">Port Size</th> <th rowspan="2">Connection</th> <th colspan="2">L</th> <th colspan="2">ID</th> </tr> <tr> <th>mm</th> <th>inch</th> <th>mm</th> <th>inch</th> <th>mm</th> <th>inch</th> </tr> </thead> <tbody> <tr> <td rowspan="3">20, 25</td> <td rowspan="3">¾, 1</td> <td>¾"</td> <td rowspan="3">13</td> <td rowspan="3">0.50</td> <td>28</td> <td>1.09</td> </tr> <tr> <td>1"</td> <td>34</td> <td>1.35</td> </tr> <tr> <td>1¼"</td> <td>43</td> <td>1.70</td> </tr> <tr> <td rowspan="3">32, 40</td> <td rowspan="3">1¼, 1½</td> <td>1¼"</td> <td rowspan="3">13</td> <td rowspan="3">0.50</td> <td>43</td> <td>1.70</td> </tr> <tr> <td>1½"</td> <td>49</td> <td>1.94</td> </tr> <tr> <td>2</td> <td>61</td> <td>2.43</td> </tr> </tbody> </table>	Port Size		Connection	L		ID		mm	inch	mm	inch	mm	inch	20, 25	¾, 1	¾"	13	0.50	28	1.09	1"	34	1.35	1¼"	43	1.70	32, 40	1¼, 1½	1¼"	13	0.50	43	1.70	1½"	49	1.94	2	61	2.43								
Port Size		Connection	L			ID																																											
mm	inch		mm	inch	mm	inch																																											
20, 25	¾, 1	¾"	13	0.50	28	1.09																																											
		1"			34	1.35																																											
		1¼"			43	1.70																																											
32, 40	1¼, 1½	1¼"	13	0.50	43	1.70																																											
		1½"			49	1.94																																											
		2			61	2.43																																											
<p>Butt-Weld (BW) ANSI</p>		<table border="1"> <thead> <tr> <th colspan="2">Port Size</th> <th rowspan="2">Connection</th> <th colspan="2">T</th> <th colspan="2">OD</th> </tr> <tr> <th>mm</th> <th>inch</th> <th>mm</th> <th>inch</th> <th>mm</th> <th>inch</th> </tr> </thead> <tbody> <tr> <td rowspan="3">20, 25</td> <td rowspan="3">¾, 1</td> <td>¾"</td> <td>4.0</td> <td>0.16</td> <td>27</td> <td>1.06</td> </tr> <tr> <td>1"</td> <td>4.7</td> <td>0.18</td> <td>34</td> <td>1.33</td> </tr> <tr> <td>1¼"</td> <td>5.0</td> <td>0.20</td> <td>42</td> <td>1.67</td> </tr> <tr> <td rowspan="3">32, 40</td> <td rowspan="3">1¼, 1½</td> <td>1¼"</td> <td>5.0</td> <td>0.20</td> <td>42</td> <td>1.67</td> </tr> <tr> <td>1½"</td> <td>5.2</td> <td>0.21</td> <td>49</td> <td>1.91</td> </tr> <tr> <td>2</td> <td>4.0</td> <td>0.16</td> <td>61</td> <td>2.39</td> </tr> </tbody> </table>	Port Size		Connection	T		OD		mm	inch	mm	inch	mm	inch	20, 25	¾, 1	¾"	4.0	0.16	27	1.06	1"	4.7	0.18	34	1.33	1¼"	5.0	0.20	42	1.67	32, 40	1¼, 1½	1¼"	5.0	0.20	42	1.67	1½"	5.2	0.21	49	1.91	2	4.0	0.16	61	2.39
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Nameplate Information

Port Size	Name Plate Image	Name Plate
<p>20 mm, 25 mm (¾", 1")</p>		<ol style="list-style-type: none"> <li>1. Connection Size</li> <li>2. Connection Type</li> <li>3. Port Size</li> <li>4. Date Code</li> <li>5. Canadian Registration Number (CRN)</li> <li>6. Valve Model Number (Smart Part Number)</li> <li>3. Serial Number (S/N)</li> </ol>
<p>32 mm, 40 mm (1¼", 1½")</p>		<ol style="list-style-type: none"> <li>1. Connection Size</li> <li>2. Connection Type</li> <li>3. Port Size</li> <li>4. Date Code</li> <li>5. Canadian Registration Number (CRN)</li> <li>6. Valve Model Number (Smart Part Number)</li> <li>3. Serial Number (S/N)</li> </ol>

## Manual Opening Operation

The PEV manual opening tool is for the purpose of opening or closing the valve without the use of the actuator. Prior to using the opening tool, turn off the main power to the PEV and disconnect all cords from the actuator. Loosening the four M4 set screws around the base of the actuator and lift the actuator off the valve body.

Once the actuator has been removed, the manual opening tool can be placed on the valve body over the magnet assembly and manually rotated to open or close the valve, as shown in Figure 9. Clockwise motion will result in the valve opening and counterclockwise motion will result in the valve closing. The manual opening tool is designed so that no external tools, wrenches, or levers are required to manually actuate the valve.

Apply o-ring grease to the actuator o-ring before reattaching the PEV actuator to the valve, as shown in Figure 6. Before attaching the actuator to the valve body check to see that the set screws are not going to cause any interference. If the set screws are protruding into the bore, use the hex wrench (Allen key) to back out the set screws. Now slide the actuator onto the valve and press down until the flat surface the actuator touches the valve. Once the actuator is in position use the hex wrench to tighten the set screws.

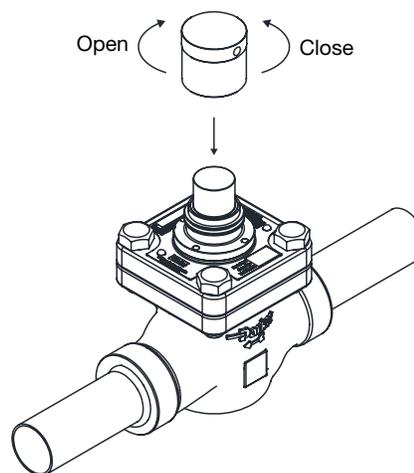


Figure 9: PEV Manual Opening Tool

## Maintenance and Service <sup>[1]</sup>

Before disassembling the PEV valve, read the information in this bulletin and the safety procedures for Refrigerating Specialties Division refrigeration control valves bulletin (RSBCV).

To learn more about the components refer to the material list section illustrated in this bulletin on page 3.

Steps for replacing valve cartridge components:

1. Before disassembling the PEV valve, it is important to ensure the valve main power supply is turned off. Isolate the valve from the rest of the system by following proper pump down procedures. For the manual opening procedures read the manual opening operations section in this bulletin on page 11.
2. Disconnect all cords connected to the actuator. Loosening the four M4 set screws around the base of the actuator and lift the actuator off the valve body, as shown in Figure 10.

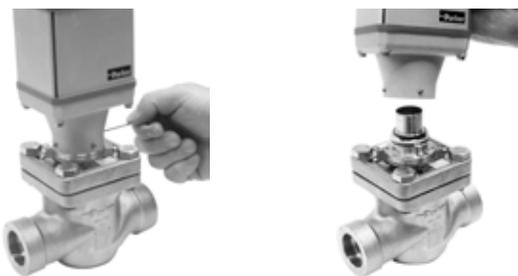


Figure 10: Removal of the PEV Actuator

3. Remove the port plate by unbolting the bolts, as shown in Figure 11. If the port plate does not come apart easily, rotate the port plate 45° and use the corners to pry the port plate out. If using a tool such as a screw driver, it is important to be careful not to damage any gasket surfaces.

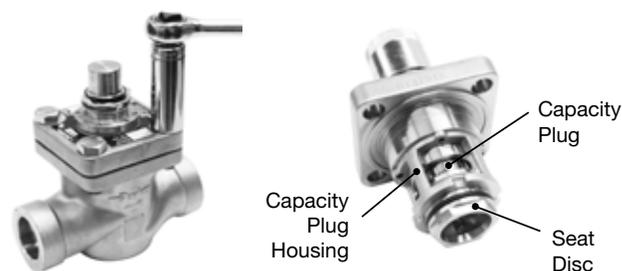


Figure 11: Removal of the PEV Port Plate Assembly

4. Place the port plate assembly in a vice with the valve cartridge facing upwards. Use the side walls of the port plate as the contact surfaces for the vice.
5. After the port plate is secure, use a socket wrench to remove the seat disc by turning it counterclockwise, as shown in Figure 12.



Figure 12: Removal of the PEV Seat Disc

1. For valves with port sizes 32 mm to 40 mm (1¼" to 1½") disregard steps 4 thru 9 in the maintenance and service section.

- Using a hex wrench remove the four bolts holding the capacity plug housing in place illustrated in Figure 13.

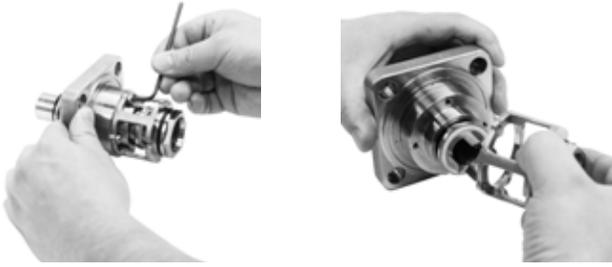


Figure 13: Removal of the PEV Plug Housing

- Turn the manual opening tool to make sure the plug pin moves freely in the retaining slot. Remove the pin from the hole and turn the manual opening tool counterclockwise, close direction, until the plug disengages from the threads, as shown in Figure 14.



Figure 14: Removal of the PEV Plug

- Insert the new plug and turn the manual opening tool clockwise to engage the plug with the threads. Keep the anti-rotation slot aligned with the pin hole and make sure the ring seal at the top of the plug is not damaged entering the port plate. Stop threading once the slot is aligned under the pin hole and insert the pin. Figure 15 provides additional information on the proper plug/port plate alignment.

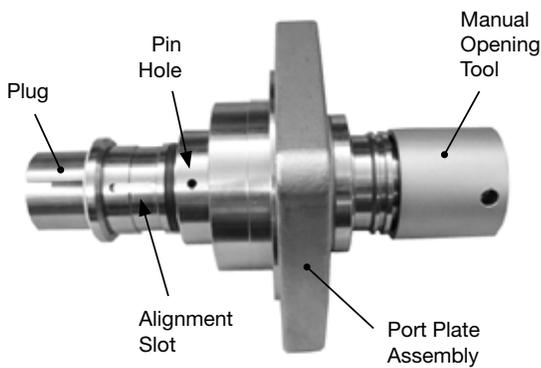


Figure 15: Assembly of the PEV Plug

- Reassemble the plug housing and new seat disc in reverse order using the torque specs in Table 1. Apply a light coating of O-ring grease to the seat disc O-ring before sliding the port plate assembly into the body.

- Replace the old gasket and remove any stuck gasket material from the gasket surface on the body without damaging the surface. Slide in the port plate and torque the port plate bolts using the torque specs in Table 1.

Note: The orientation of the port plate gasket and assembly does not matter. It will not effect the function of the valve.



Figure 16: PEV Port Plate Assembly to Body

Port Size		Plug Screw		Seat Disc		Port Plate Bolts	
mm	inch	Nm	Ft Lb	Nm	Ft Lb	Nm	Ft Lb
20	3/4	2.7	2	54	40	61	45
25	1						
32	1 1/4	N/A	N/A	N/A	N/A	149	110
40	1 1/2						

Table 1: PEV Assembly Torque Specs

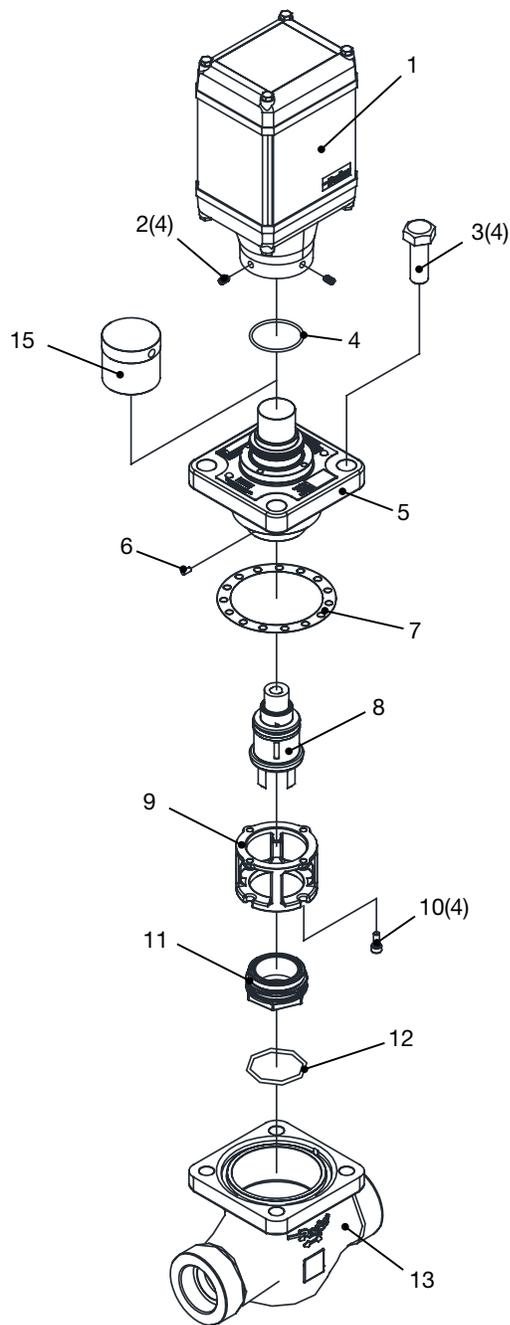
- Apply o-ring grease to the actuator o-ring before attaching the PEV actuator to the valve, as shown in Figure 17. Before attaching the actuator to the valve body, check to see that the set screws are not going to cause any interference. If the set screws are protruding into the bore use the hex wrench to back out the set screws. Now slide the actuator onto the valve and press down until the flat surface the actuator touches the valve. Once the actuator is in position use the hex wrench to tighten the set screws.



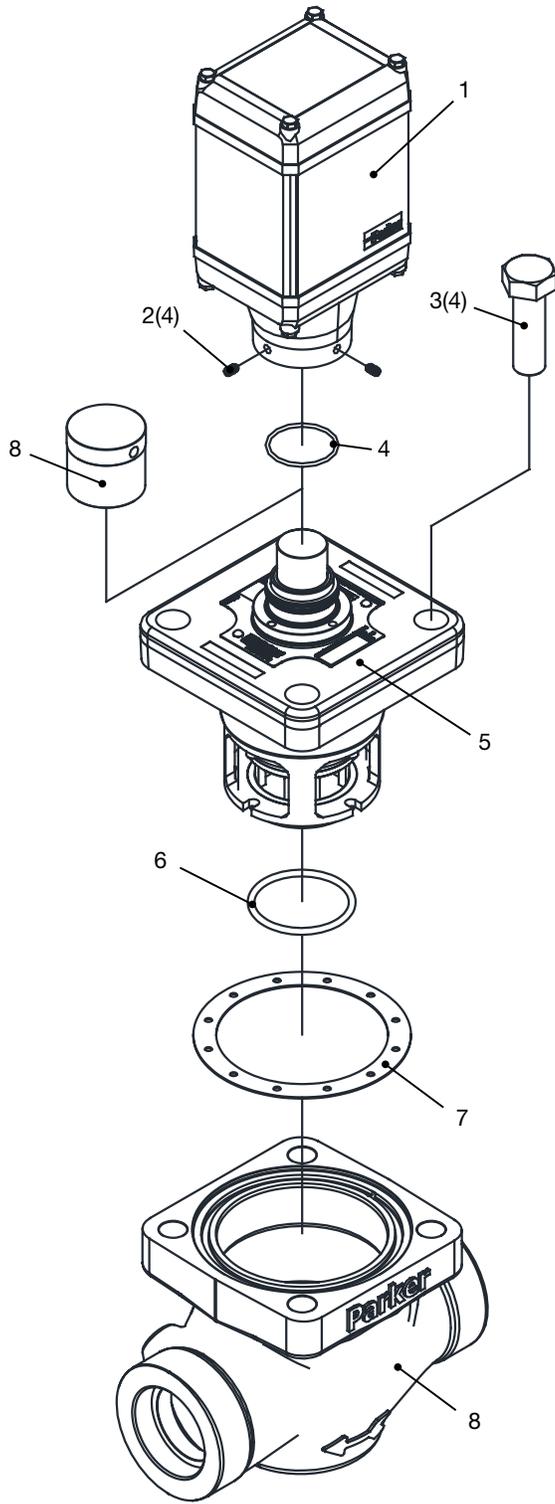
Figure 17: PEV Actuator O-ring

⚠ In the event the valve is left disassembled for any length of time, protecting the components is essential. Place the components in a plastic bag or apply a rust protection agent, such as refrigerant oil.

Parts Kit Reference



PEV Parts Kit Reference						
Item	Description	Kit Description	Port Size			
			20 mm (3/4")	25 mm (1")		
1	Actuator, Assembly					
2(4)	Set Screws,	Actuator Assembly	209865	209865		
-	Lubricant					
-	Wrench, Allen Cable, 8 Pin					
3(4)	Bolts	Bolts Pkg, Bonnet	209712	209712		
4	O-Ring, Actuator	Gasket/O-Ring, PEV	209737	209737		
7	Gasket, Port Plate					
12	O-Ring, Cartridge					
4	O-Ring, Actuator	Piston/Plug, PEV	209740	209755		
7	Gasket, Port Plate					
8	Capacity Plug, Assembly				100% Plug	209756
11	Seat Disc, Piston/Plug				70% Plug	-
12	O-Ring, Cartridge	40% Plug	209756	-		
15	Manual Tool (Accessory)	Manual Opening Tool, PEV	209866	209866		
-	Backup Module	Backup Module Assembly	209863	209863		



PEV Parts Kit Reference				
Item	Description	Kit Description	Port Size	
			32 mm (1¼")	40 mm (1½")
1	Actuator, Assembly	Actuator Assembly	209865	209865
2(4)	Set Screws,			
-	Lubricant			
-	Wrench, Allen Cable, 8 Pin			
3(4)	Bolts	Bolts Pkg, Bonnet	210459	210459
4	O-Ring, Actuator	Gasket/O-Ring, PEV	210462	210462
6	O-Ring, Plug Assembly			
7	Gasket, Port Plate			
4	O-Ring, Actuator	Port Plate Assembly, PEV	210460	210461
5	Port Plate Assembly			
6	Gasket, Port Plate			
8	Manual Tool (Accessory)	Manual Opening Tool, PEV 1	209866	209866
-	Backup Module	Backup Module Assembly	209863	209863



**APPENDIX**

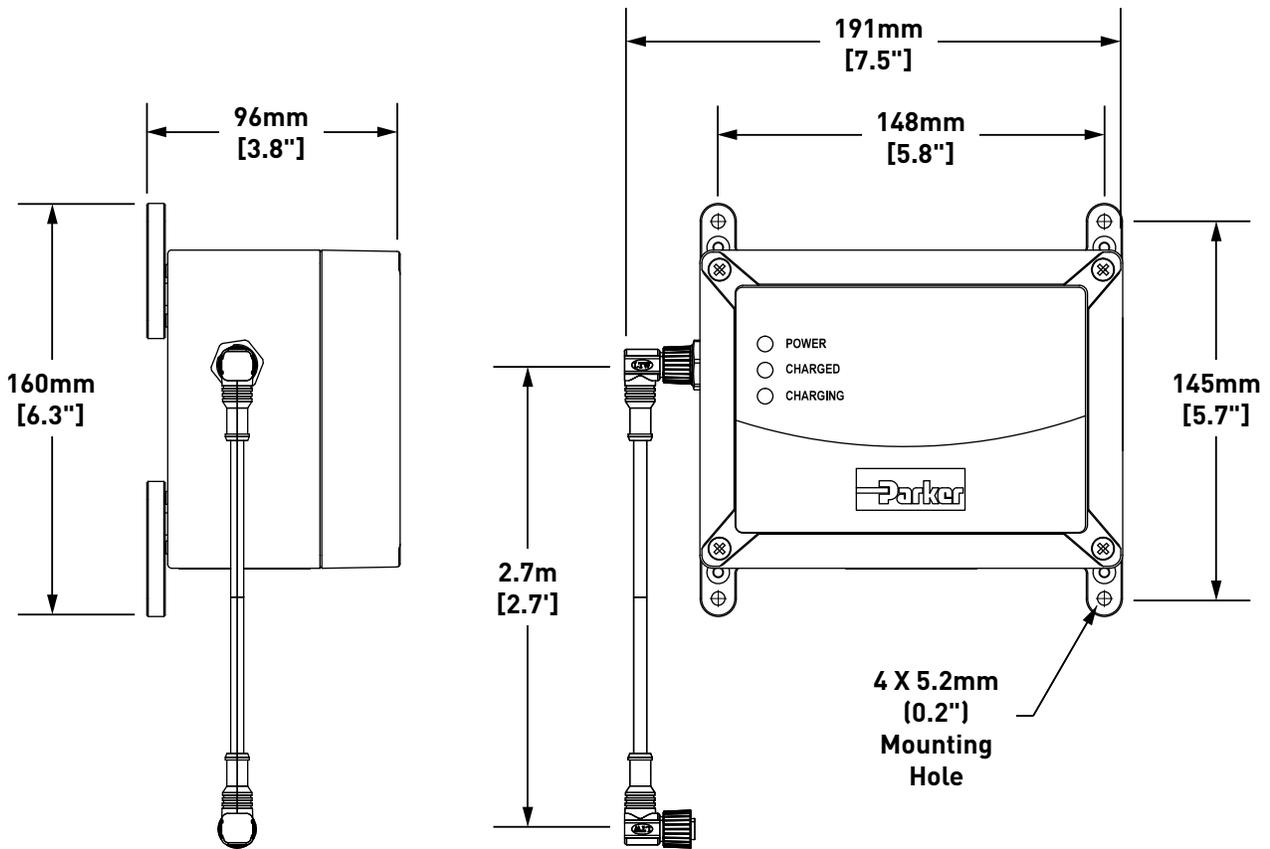
PEV Backup Module (PBM) .....	15
HBLT-C1 Liquid Level Controller .....	16

**PEV Backup Module (PBM)**



The PEV Backup Module is designed to bring the PEV electronic control valve to a user-defined position upon loss of power. The PBM can replace an upstream solenoid valve or user supplied uninterruptible power supply and offers a higher level of safety to the entire system. The PEV-PBM combination can be programmed to return to a full open, full closed, or defined position. Instructions on how to program the loss of power position see the software parameters table on page 8 (level 1; section 07).

The PBM features quick-disconnects so no user wiring is required; simply plug it into the PEV and all the necessary connections are complete.



# HBLT-C1 Liquid Level Controller



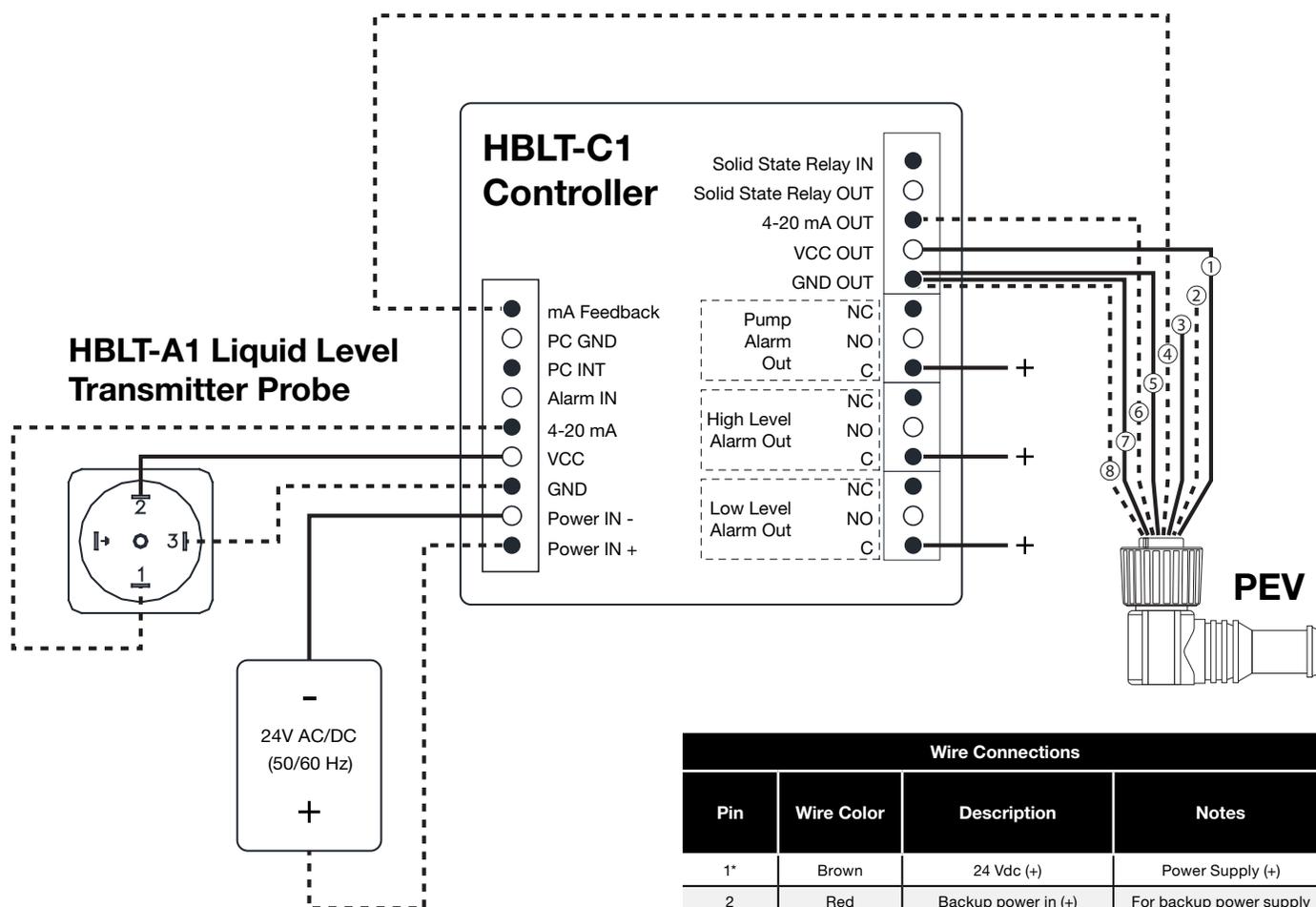
The HB liquid level controller (HBLT-C1) provides remote liquid level management for industrial refrigeration systems.

- Pump Vessels
- Separators
- Inter coolers,
- Economizers and
- Receivers

The HBLT-C1 controller serves as a stand alone programmable device for a variety of liquid level management systems. The controller provides three relay outputs for pump alarm, high level alarm, and low level alarm. The relays are available in the normally open (NO) or normally closed (NC) position.

It can be used in connection with the HBLT-A1 liquid level transmitter probe, HBS switches or other similar sensors with a 4-20 mA output.

For more information on the HBLT-C1 controller see bulletin 61-70.



Wire Connections			
Pin	Wire Color	Description	Notes
1*	Brown	24 Vdc (+)	Power Supply (+)
2	Red	Backup power in (+)	For backup power supply
3	Orange	Alarm output	Sink output (pulled to low)
4	Yellow	4-20 mA output (+)	Output signal
5*	Green	4-20 mA input (-)	PEV control signal (-)
6*	Blue	4-20 mA input (+)	PEV control signal (+)
7	Purple	4-20 mA output (-)	Output signal
8*	Gray	24 Vdc	Power supply (-)

\* Denotes mandatory connection





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**Safe Operation (See Bulletin RSBCV)**

People doing any work on a refrigeration system must be qualified and completely familiar with the system and the Refrigerating Specialties Division valves involved, or all other precautions will be meaningless. This includes reading and understanding pertinent Refrigerating Specialties Division Product Bulletins and Safety Bulletin RSB prior to installation or servicing work.

Where cold refrigerant liquid lines are used, it is necessary that certain precautions be taken to avoid damage which could result from liquid expansion. Temperature increase in a piping section full of solid liquid will cause high pressure due to the expanding liquid which can possibly rupture a gasket, pipe or valve. All hand valves isolating such sections should be marked, warning against accidental closing, and must not be closed until the liquid is removed. Check valves must never be installed upstream of solenoid valves, or regulators with electric shut-off, nor should hand valves upstream of solenoid valves or downstream of check valves be closed until the liquid has been removed.

It is advisable to properly install relief devices in any section where liquid expansion could take place. Avoid all piping or control arrangements which might produce thermal or pressure shock.

For the protection of people and products, all refrigerant must be removed from the section to be worked on before a valve, strainer, or other device is opened or removed. Flanges with ODS connections are not suitable for ammonia service.

**Warranty**

All Refrigerating Specialties products are under warranty against defects in workmanship and materials for a period of one year from date of shipment from factory. This warranty is in force only when products are properly installed, field assembled, maintained, and operated in use and service as specifically stated in Refrigerating Specialties Catalogs or Bulletins for normal refrigeration applications, unless otherwise approved in writing by the Refrigerating Specialties Division. Defective products, or parts thereof returned to the factory with transportation charges prepaid and found to be

defective by factory inspection, will be replaced or repaired at Refrigerating Specialties option, free of charge, F.O.B. factory. Warranty does not cover products which have been altered, or repaired in the field, damaged in transit, or have suffered accidents, misuse, or abuse. Products disabled by dirt or other foreign substances will not be considered defective.

The express warranty set forth above constitutes the only warranty applicable to Refrigerating Specialties products, and is in lieu of all other warranties, expressed or implied, written including any warranty of merchantability, or fitness for a particular purpose. In no event is Refrigerating Specialties responsible for any consequential damages of any nature whatsoever. No employee, agent, dealer or other person is authorized to give any warranties on behalf of Refrigerating Specialties, nor to assume, for Refrigerating Specialties, any other liability in connection with any of its products.

**ISO 9001 CERTIFIED**