
	<b>Manual</b>		Document Number: SP81-MA-3003
	Title: PV-80 Remotely Operated Cryogenic Flow Control Globe Valve Installation, Operation, and Maintenance Manual	Initial Release Date: 3/22/1996	
		Revision:	Letter: G

# PV-80

## Remotely Operated Cryogenic Flow Control Globe Valve Installation, Operation, and Maintenance Manual



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### 1. INSTALLATION

The valve must be disassembled prior to installation to prevent damage to soft goods during welding. Item numbers are shown in the parts diagrams, Figure 1 and Figure 2.

#### 1.1. Valve Disassembly

- The valve has been factory calibrated and set to ensure proper fail safe operation. Before proceeding, mark one of the wrench flats at the top of the Valve Stem (5) with a marker so it can be returned to the factory settings.
- On fail-closed operators, apply air pressure to the positioner and set the valve to approximately 50% open.
- Loosen the Operator Shaft Jam Nut (52).
- Turn the Stem to remove it from the Operator (51) shaft.
  - Count and document the number of revolutions made by the marked wrench flat.
- Loosen the Operator Yoke from the Bonnet as follows:
  - For ½" to 4" NPS valves, remove the Operator Yoke Jam Nut (54) by turning it counterclockwise.
  - For 6" and 8" NPS valves, remove the Operator Yoke Bolts (55).
- Lift the Operator off of the Bonnet (10) and carefully set it aside.
  - For ½" to 4" NPS valves, also remove the Operator Yoke Adapter (58) and set it aside.
- Remove the Bonnet Bolts (11).
- Pull Bonnet vertically upward until the top of the Barrel (21) is exposed.
- Carefully grasp the Barrel so that it will not drop back into the Valve Body, which can damage the PCTFE Seal Disc (36).

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- Remove the Stem from the slot in the Barrel and set the Bonnet and Stem assembly aside.
- Remove the Barrel (which has the plug assembly attached; parts 32-39) from Valve Body (1).
- Remove Bonnet Face O-Ring (15) and store in a clean area until ready to reassemble.

**CAUTION:** Assembly may contain equipment plated with nickel. Cleaning with acids or other caustic solutions will remove plating and void warranty.

## 1.2. Welding

- Prepare connection on equipment on which valve will be installed.
- Position Valve Body to equipment and weld in place.

**CAUTION:** All Valve Bodies are 304L Stainless Steel. Therefore, care should be taken not to over-heat Valve Body beyond that required for normal welding.


**CAUTION:** When the valve is to be installed in a vacuum jacketed system, care should be taken in the jacket design to prevent forces on the Bonnet of the Valve caused by differential contraction rates (thermal loads) between the inner process line and the vacuum jacket. Contact PHPK for assistance.

## 1.3. Valve Reassembly

- Allow Valve Body to cool after welding.
- Clean Bonnet Face O-Ring and the O-Ring groove on the Valve Body.
- Apply a very thin film of Halocarbon 25-5S or Krytox®<sup>1</sup> Grease to the o-ring and replace in groove.  
<sup>1</sup>Krytox® is a registered trademark of DuPont.
- Reassemble valve in reverse order of instruction given in Section 1.1.
  - During reassembly, Bonnet Bolts should be tightened as listed in Table 1.

Table 1 – Bonnet Bolt Tightening Torque

NPS Valve Size	Bonnet Bolt Size	Wrench Size	Tightening Torque in-lb (ft-lb)
1/2", 3/4", 1"	1/4"-20	3/16" Allen	90 (7.5)
1-1/2", 2"	3/8"-16	5/16" Allen	180 (15)
3", 4"	1/2"-13	3/8" Allen	360 (30)
6", 8"	3/4"-16	1-1/4" Crescent	1200 (100)

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## 2. OPERATION

- The Operator and Valve have been pre-adjusted to ensure bubble-tight shut-off of the valve at the seat up to 1.25 times the customer-supplied design pressure rating. No further adjustments should be required.
- The valve is designed to operate smoothly under all cryogenic conditions.
  - All moving and contacting parts have closely-held tolerances for free operation.
  - The self-aligning, tapered plug contains a replaceable PCTFE Seal Disc for positive shut-off.
  - The Bonnet O-Ring Seals, Barrel O-Ring, and Seal Disc are the only replaceable wear items.

## 3. MAINTENANCE

With proper care, the Valve Assembly should require very little maintenance; however, as with all cryogenic equipment, thorough inspection of the system should be performed periodically to ensure continued, reliable operation.


### 3.1. O-Ring Replacement

#### 3.1.1. Gland Nut O-Rings

- Gland Nut O-Rings (7,8) can be replaced by first removing the Operator per Section 1.1 instructions.
- Remove the Gland Nut (6) from Stem by turning Gland Nut counterclockwise and sliding it off the end of the Stem.
- Remove O-Rings from Gland Nut, taking care not to damage the O-Ring grooves during removal.
- Clean O-Ring grooves.
- Apply a very thin film of Halocarbon 25-5S or Krytox® Grease to the new O-Rings and install them.
- Reassemble the Valve in reverse order of this section's instructions.

#### 3.1.2. Bonnet Face O-Ring

- The Bonnet Face O-Ring (15) can be replaced by first removing the Bonnet per the instructions given in Section 1.1.
- Remove O-Ring from Bonnet Face, taking care not to damage the O-Ring groove during removal.
- Clean O-Ring groove.
- Apply a very thin film of Halocarbon 25-5S or Krytox® Grease to the new O-Ring and install it.

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- Reassemble valve per Section 1.3 instructions.

### 3.1.3. Barrel O-Ring

- The Barrel O-Ring (22) can be replaced by first removing the Barrel (21) and plug assembly per the instructions given in Section 1.1.

Note: the barrel may have two O-Ring grooves. If this is the case, only the top groove should have an O-Ring in it. The lower groove (near the plug) should be left empty.

- Clean O-Ring groove.
- Install the new O-Ring.
  - New Barrel O-Ring must be split (cut in one location with a razor) prior to installation.
  - If the O-Ring ends overlap, a second cut is necessary to make the O-Ring lay flat in the groove.
  - **Do not** use grease on the Barrel O-Ring.
- Reassemble valve per Section 1.3 instructions.

## 3.2. Seal Disc Replacement

### 3.2.1. For 1/2" – 4" valves


- The Seal Disc (36) is replaced by first removing the Barrel (21) and plug assembly per Section 1.1 instructions.
- Removing the Flow Plug Screw (32) from the Flow Plug (39).
- Remove and replace the Seal Disc. The bevel on the outside diameter of the Seal Disc **must** be oriented as shown in Figure 1.

**CAUTION:** Care should be taken not to damage sealing serrations in the Barrel.

- Install the Flow Plug and Flow Plug Screw. Flow Plug Screw should be tightened as listed in Table 2.
- Reassemble valve per Section 1.3 instructions.

### 3.2.2. For 6" and 8" valves

- The Seal Disc (36) is replaced by first removing the Barrel (21) and plug assembly per Section 1.1 instructions.
- Removing the Flow Plug Screw (32) and the Flow Plug (39).
- Remove the Seal Disc Support (37) from the Barrel by removing the Seal Disc Support Screws (38) with a 5/16" Allen wrench.

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**CAUTION:** Care should be taken not to damage sealing serrations in the Seal Disc Support.

- Remove and replace the Seal Disc. The bevel on the outside diameter of the Seal Disc **must** be oriented as shown in Figure 2.
- Install the Seal Disc Support and tighten all of the Seal Disc Support Screws hand-tight.
- Torque all of the screws to 180 in-lbs (15 ft-lbs).
- Install the Flow Plug and Flow Plug Screw. Flow Plug Screw should be tightened as listed in Table 2.
- Reassemble valve per Section 1.3 instructions.

Table 2 – Flow Plug Screw Tightening Torque

NPS Valve Size	Flow Plug Screw Size	Allen Wrench Size	Tightening Torque in-lb (ft-lb)
1/2", 3/4", 1"	1/4"-20	3/16"	150 (12.5)
1-1/2", 2"	3/8"-16	5/16"	420 (35)
3", 4"	5/8"-11	1/2"	1380 (115)
6", 8"	3/4"-16	5/8"	1200 (100)

## 4. PRESSURE RATINGS

PV-60 valves from 1/2" to 8" NPS are designed for a maximum allowable working pressure (MAWP) of 600 psig for temperatures up to 120°F.

Valves are individually tested to the customer-specified required pressure. Not all valves are tested to the MAWP.

## 5. CONTACT INFORMATION

PHPK Technologies  
 2111 Builders Place  
 Columbus, OH 43204

Tel (614) 486-4750  
 Fax (614) 486-4950

www.phpk.com

## 6. REPLACEMENT PARTS

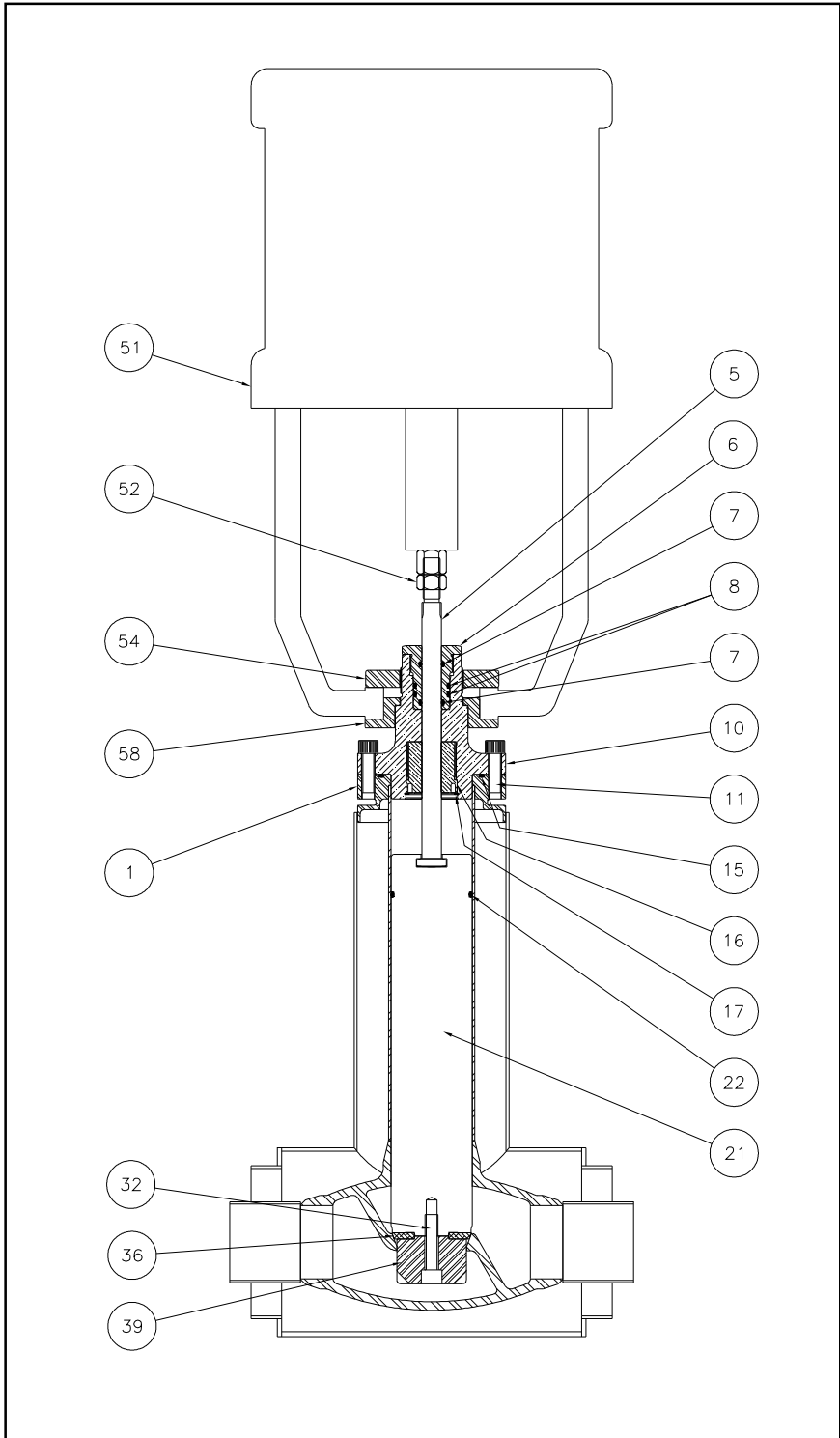


Figure 1 – Parts Diagram, 1/2" to 4" NPS


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Table 3 – Parts List, 1/2" to 2" NPS

Item	Description	Qty	Part Number (by NPS Valve Size)			
			1/2" & 3/4"	1"	1-1/2"	2"
1	Valve Body	1	customer specified	customer specified	customer specified	customer specified
5	Stem	1	81-411-010	81-411-010	81-415-010	81-415-010
6	Gland Nut	1	81-391-010	81-391-010	81-395-010	81-395-010
7	O-Ring, Gland Nut Inner (Viton® <sup>1</sup> )	*2	11-02-2112	11-02-2112	11-02-2113	11-02-2113
8	O-Ring, Gland Nut Outer (Viton® <sup>1</sup> )	*2	11-02-2115	11-02-2115	11-02-2118	11-02-2118
10	Bonnet Housing	1	81-331-010	81-331-010	81-304-410	81-304-420
11	Bolt, Bonnet (Niflor™ <sup>2</sup> Coated)	6	81-541-020	81-541-020	81-545-020	81-545-020
15	O-Ring, Bonnet Face (Viton® <sup>1</sup> )	*1	11-02-2130	11-02-2130	11-02-2150	11-02-2150
16	Bonnet Insert	1	n/a	n/a	81-335-240	81-335-240
17	Retaining Ring, Bonnet Insert	1	n/a	n/a	11-12-0012	11-12-0012
21	Barrel, With O-Ring Grooves (Niflor™ <sup>2</sup> Coated)	1	81-431-150	81-433-150	81-434-160	81-435-050
22	O-Ring, Barrel (Teflon® <sup>4</sup> )	*1	11-05-2123	11-05-2123	11-05-2131	11-05-2139
32	Screw, Flow Plug (Niflor™ <sup>2</sup> Coated)	1	81-541-030	81-541-030	81-545-030	81-545-030
36	Seal Disc (Neoflon® <sup>3</sup> M-400H)	*1	81-481-030	81-483-030	81-484-020	81-485-030
39	Flow Plug, Linear	1	81-521-010	81-523-010	81-524-010	81-525-010
	Flow Plug, Equal Percentage		81-521-020	81-523-020	81-524-020	81-525-020
51	Operator (Many variations available. Call for assistance.)	1	--	--	--	--
52	Jam Nut, Operator Shaft	1	FAS-70832	FAS-70832	FAS-70834	FAS-70834
54	Jam Nut, Operator Yoke, size 25	1	81-531-010	81-531-010	81-534-020	81-534-020
	Jam Nut, Operator Yoke, size 50		n/a	n/a	81-535-010	81-535-010
58	Adapter, Operator Yoke, size 25	1	81-531-020	81-531-020	81-534-010	81-534-010
	Adapter, Operator Yoke, size 50		n/a	n/a	81-535-020	81-535-020
95	Soft Goods Spare Parts Kit	1	81-901-020	81-903-020	81-904-020	81-905-020
96	O-Ring Grease (Halocarbon 25-5S or Krytox® <sup>5</sup> )	*1	11-06-0001	11-06-0001	11-06-0001	11-06-0001

See Table 4 Footnotes.

Table 4 – Parts List, 3" to 4" NPS

Item	Description	Qty	Part Number (by NPS Valve Size)	
			3"	4"
1	Valve Body	1	customer specified	customer specified
5	Stem	1	81-416-010	81-416-010
6	Gland Nut	1	81-396-010	81-396-010
7	O-Ring, Gland Nut Inner (Viton® <sup>1</sup> )	*2	11-02-2214	11-02-2214
8	O-Ring, Gland Nut Outer (Viton® <sup>1</sup> )	*2	11-02-2130	11-02-2130
10	Bonnet Housing	1	81-336-010	81-336-020
11	Bolt, Bonnet (Niflor™ <sup>2</sup> Coated)	8	81-547-050	81-547-050
12	Lock Washer, Bonnet	12	n/a	n/a
13	Flat Washer, Bonnet	12	n/a	n/a
15	O-Ring, Bonnet Face (Viton® <sup>1</sup> )	*1	11-02-2246	11-02-2246
21	Barrel, With O-Ring Grooves (Niflor™ <sup>2</sup> Coated)	1	81-436-150	81-436-400
22	O-Ring, Barrel (Teflon® <sup>4</sup> )	*1	11-05-2153	11-05-2156
32	Screw, Flow Plug (Niflor™ <sup>2</sup> Coated)	1	81-546-020	81-546-020
36	Seal Disc (Neoflon® <sup>3</sup> M-400H)	*1	81-486-010	81-486-260
39	Flow Plug, Linear	1	81-526-010	81-526-260
	Flow Plug, Equal Percentage		81-526-020	81-526-270
51	Operator (Many variations available. Call for assistance.)	1	--	--
52	Jam Nut, Operator Shaft	1	FAS-70837	FAS-70837
54	Jam Nut, Operator Yoke, size 25	1	Supplied with Operator	Supplied with Operator
	Jam Nut, Operator Yoke, size 50			
95	Soft Goods Spare Parts Kit	1	81-906-010	81-907-010
96	O-Ring Grease (Halocarbon 25-5S or Krytox® <sup>5</sup> )	*1	11-06-0001	11-06-0001

\* Recommended spare item.

<sup>1</sup>Viton® is a registered trademark of DuPont for a fluoroelastomer.

<sup>2</sup>Niflor™ is a trademark of Atotech USA for a composite coating of PTFE and electroless nickel.

<sup>3</sup>Neoflon® is a registered trademark of Daikin for PCTFE; Kel-F® 81 is a registered trademark of 3M for PCTFE.

<sup>4</sup>Teflon® is a registered trademark of DuPont for PTFE.

<sup>5</sup>Krytox® is a registered trademark of DuPont.



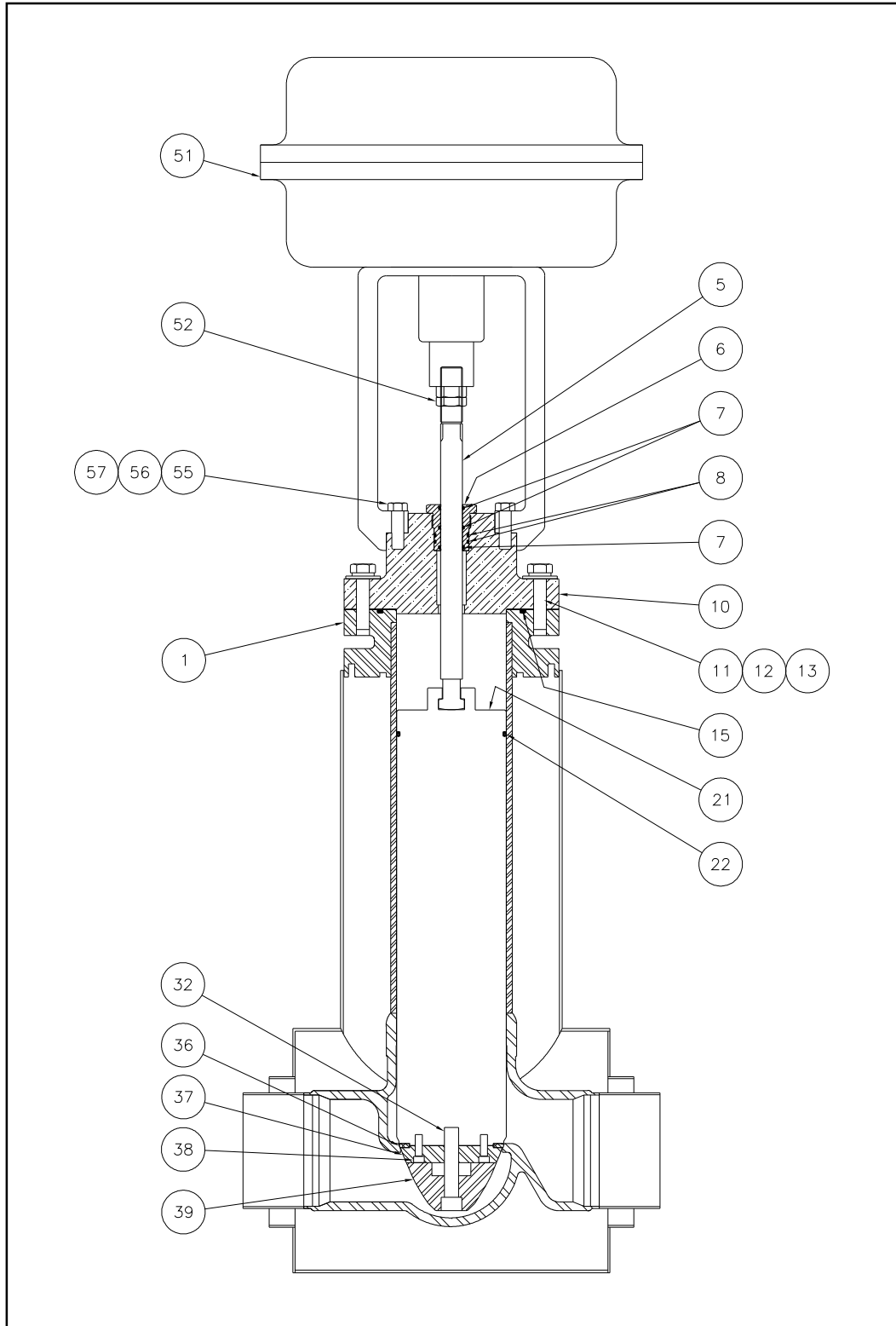


Figure 2 – Parts Diagram, 6" to 8" NPS


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Table 5 – Parts List, 6" to 8" NPS

Item	Description	Qty	Part Number (by NPS Valve Size)	
			6"	8"
1	Valve Body	1	81-230-070	81-230-250
5	Stem	1	81-417-010	81-417-250
6	Gland Nut	1	81-397-010	81-397-250
7	O-Ring, Gland Nut Inner (Viton® <sup>1</sup> )	*3	11-02-2218	11-02-2222
8	O-Ring, Gland Nut Outer (Viton® <sup>1</sup> )	*2	11-02-2224	10-02-2224
10	Bonnet Housing	1	81-337-050	81-337-250
11	Bolt, Bonnet (Niflor™ <sup>2</sup> Coated)	12	81-547-030	81-547-030
12	Lock Washer, Bonnet	12	10-7000-20	10-7000-20
13	Flat Washer, Bonnet	12	10-6000-17	10-6000-17
15	O-Ring, Bonnet Face (Viton® <sup>1</sup> )	*1	11-02-2442	11-02-2447
21	Barrel, With O-Ring Grooves (Niflor™ <sup>2</sup> Coated)	1	81-437-020	81-437-260
22	O-Ring, Barrel (Teflon® <sup>4</sup> )	*1	11-05-2164	11-05-2171
32	Screw, Flow Plug (Niflor™ <sup>2</sup> Coated)	1	81-547-020	81-547-020
36	Seal Disc (Neoflon® <sup>3</sup> M-400H)	*1	81-487-010	81-487-250
37	Seal Disc Support, Linear (Upper Half of Flow Plug)	1	81-527-010	81-527-250
	Seal Disc Support, Equal % (Upper Half of Flow Plug)		81-527-020	81-527-260
38	Screw, Seal Disc Support (Niflor™ <sup>2</sup> Coated)	6	81-547-040	--
		8	--	81-547-040
39	Flow Plug, Linear	1	81-527-010	81-527-250
	Flow Plug, Equal Percentage		81-527-020	81-527-260
51	Operator (Many variations available. Call for assistance.)	1	--	--
52	Jam Nut, Operator Shaft	1	FAS-70841	FAS-70841
55	Bolt, Operator Yoke (Niflor™ <sup>2</sup> Coated)	8	81-547-060	81-547-060
56	Lock Washer, Operator Yoke	8	10-7000-56	10-7000-56
57	Flat Washer, Operator Yoke	8	10-6000-14	10-6000-14
95	Soft Goods Spare Parts Kit	1	81-908-010	81-908-510
96	O-Ring Grease (Halocarbon 25-5S or Krytox® <sup>5</sup> )	*1	11-06-0001	11-06-0001

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