	Manual		Document Number: SP81-MA-3001
	Title: PV-60 Manually Operated Cryogenic Globe Valve Installation, Operation, and Maintenance Manual	Initial Release Date: 3/22/1996	
		Revision:	Letter: G

PV-60

Manually Operated Cryogenic 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 diagram, Figure 1.

1.1. Valve Disassembly

- Remove Bonnet Bolts (11).
- Pull Bonnet (10) vertically upward until Stem (5) can be removed from slot in Barrel (21).
- Remove the Barrel (which has the plug assembly attached; parts 31-38) from Valve Body (1); care should be taken not to drop Barrel into Valve Body as the PCTFE Seal Disc (36) could be damaged.
- 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.

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- Apply a very thin film of Halocarbon 25-5S or Krytox®¹ Grease to the o-ring and replace in groove.
¹Krytox® 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	Allen Wrench Size	Tightening Torque in-lb (ft-lb)
1/2", 3/4", 1"	1/4"-20	3/16"	90 (7.5)
1-1/2", 2"	3/8"-16	5/16"	180 (15)
3", 4"	1/2"-13	3/8"	360 (30)

2. OPERATION

- To open valve, rotate Handwheel (4) counterclockwise until valve stem reaches internal stop.
- To close valve, rotate Handwheel clockwise until valve seats.

CAUTION: Valve should be closed *by hand* only. Excessive torque applied to handwheel using levers or other mechanical devices can damage seal disc or other internal parts of valve.


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 Handwheel as follows:
 - Remove the Handwheel Nut (2) and Handwheel Nut Lock Washer (3) by turning counterclockwise while holding the Stem (5) by the wrench flats.
 - Remove Handwheel (4) in the same manner as the Handwheel Nut.
- 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 O-Rings during removal.
- Inspect O-Rings for damage such as nicks, scratches, or tears. Replace as needed.

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- Clean O-Ring grooves.
- Apply a very thin film of Halocarbon 25-5S or Krytox® Grease to O-Rings.
- Replace in reverse assembly order.

3.1.2. Bonnet Face O-Ring

- The Bonnet Face O-Ring (15) can be replaced by first removing the Bonnet per the instruction given in Section 1.1.
- Remove O-Ring from Bonnet Face, taking care not to damage O-Ring during removal.
- Inspect O-Ring for damage such as nicks, scratches, or tears. Replace as needed.
- Clean O-Ring groove.
- Apply a very thin film of Halocarbon 25-5S or Krytox® Grease to O-Ring.
- Replace in reverse assembly order.


3.1.3. Barrel O-Rings

- The Barrel O-Rings (22) can be replaced by first removing the Barrel (21) and plug assembly per the instruction given in Section 1.1.
- Inspect O-Rings for damage such as nicks, scratches, or tears. Replace as needed.
- Clean O-Ring grooves.
- Replace in reverse assembly order.
 - New Barrel O-Rings 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-Rings.

3.2. Seal Disc Replacement

3.2.1. For ½” – 2” valves

- The Seal Disc (36) is replaced by first removing the Barrel (21) and plug assembly per Section 1.1 instructions.
- Next remove the Retainer Body (35) from the Retainer Lock Nut (34) by holding the Retainer Lock Nut and turning Retainer Body counterclockwise until they separate.
- Insert the PHPK Seal Disc Tool (91) into the Seal Disc and remove it from the Retainer Body by turning in the direction indicated on the Seal Disc Tool.
- Install the new Seal Disc onto the Retainer Body using the Seal Disc Tool.
 - The Seal Disc will bottom out on the Retainer Body.

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- Snug hand-tight without causing any deformation around the four holes in the face of the Seal Disc.
- Snug the Retainer Lock Nut Plug (33) hand-tight onto the Barrel using a 1/4" Allen wrench.
- Slide the Retainer Lock Nut back and verify the Plug Retainer Nut (31) is hand-tight against the Retainer Ring (32).
- Install the Retainer Body onto the Retainer Lock Nut by holding the Retainer Lock Nut and turning the Retainer Body clockwise until its face bottoms out against the Retainer Lock Nut.
- Reassemble the Valve per Section 1.3 instructions.


3.2.2. For 3" and 4" valves

- The Seal Disc (36) is replaced by first removing the Barrel (21) and plug assembly per Section 1.1 instructions.
- Next use two PHPK Spanner Wrenches (92). Place one Spanner Wrench on the Retainer Lock Nut (34) and the other on the Retainer Body (35). Hold the Retainer Lock Nut still and turn the Retainer Body counterclockwise until they separate.
- Remove the Seal Disc Support (37) from the Retainer Body by removing the Seal Disc Support Screws (38) with a 3/16" Allen wrench.
- Remove and replace the Seal Disc. The bevel on the outside diameter of the Seal Disc **must** be oriented as shown in Figure 1.
- Install the Seal Disc Support and tighten all of the Seal Disc Support Screws hand-tight.
- Torque all of the screws to 90 in-lbs (7.5 ft-lbs).
- Slide the Retainer Lock Nut back and verify the Plug Retainer Nut (31) is hand-tight against the Retainer Ring (32).
- Install the Retainer Body onto the Retainer Lock Nut by holding the Retainer Lock Nut and turning the Retainer Body clockwise until it seats against the Retainer Lock Nut.
- Use the two PHPK Spanner Wrenches to snug the Retainer Body to the Retainer Lock Nut.
- Reassemble the Valve per Section 1.3 instructions.

4. PRESSURE RATINGS

PV-60 valves from 1/2" to 4" 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.

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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

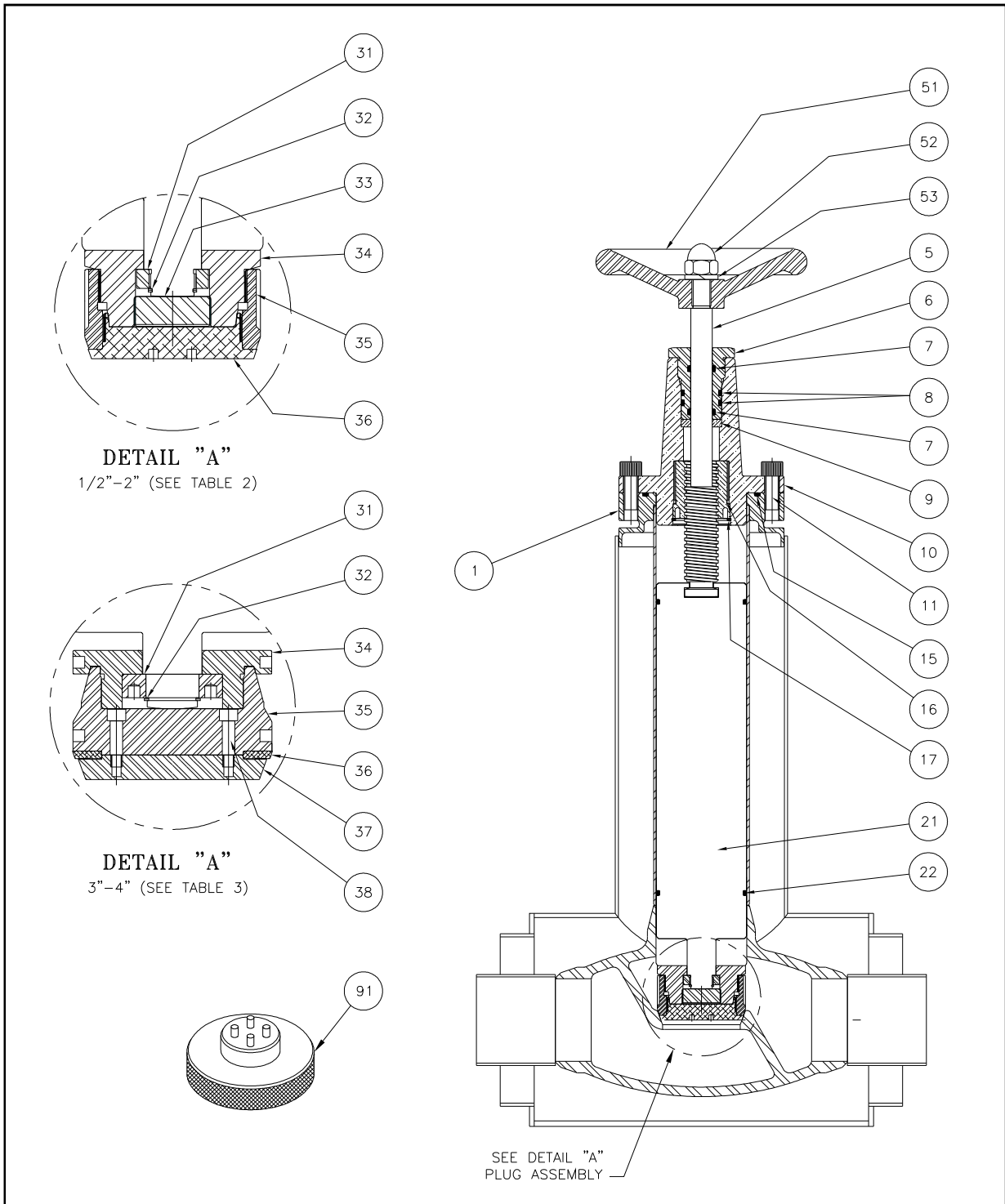


Figure 1 – Parts Diagram


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Table 2 – Parts List, ½” to 2” NPS

Item	Description	Qty	Part Number (by NPS Valve Size)			
			½” & ¾”	1”	1-½”	2”
1	Valve Body	1	customer specified	customer specified	customer specified	customer specified
5	Stem	1	81-401-010	81-401-010	81-405-010	81-405-010
6	Gland Nut	1	81-391-010	81-391-010	81-395-010	81-395-010
7	O-Ring, Gland Nut Inner (Viton® ¹)	*2	11-02-2112	11-02-2112	11-02-2113	11-02-2113
8	O-Ring, Gland Nut Outer (Viton® ¹)	*2	11-02-2115	11-02-2115	11-02-2118	11-02-2118
9	Bonnet Bearing	1	81-321-490	81-321-490	81-324-490	81-324-490
10	Bonnet Housing	1	81-321-010	81-321-010	81-324-010	81-325-010
11	Bolt, Bonnet (Niflor™ ² Coated)	6	81-541-020	81-541-020	81-545-020	81-545-020
15	O-Ring, Bonnet Face (Viton® ¹)	*1	11-02-2130	11-02-2130	11-02-2150	11-02-2150
16	Bonnet Insert	1	n/a	n/a	81-325-240	81-325-240
17	Retaining Ring, Bonnet Insert	1	n/a	n/a	11-12-0012	11-12-0012
21	Barrel, With O-Ring Grooves	1	81-431-030	81-431-030	81-434-020	81-435-080
22	O-Ring, Barrel (Teflon® ⁴)	*2	11-05-2123	11-05-2123	11-05-2131	11-05-2139
31	Plug Retainer Nut	1	n/a	n/a	n/a	81-505-030
32	Plug Retainer Ring	1	11-12-0001	11-12-0001	11-12-0002	11-12-0010
33	Plug Retainer Lock Nut Plug	1	81-491-020	81-491-020	81-494-010	81-495-020
34	Plug Retainer Lock Nut	1	81-511-020	81-511-020	81-514-040	81-515-050
35	Plug Retainer Body	1	81-501-020	81-503-010	81-504-030	81-505-020
36	Seal Disc (Neoflon® ³ M-400H)	*1	81-481-020	81-483-010	81-484-030	81-485-020
51	Handwheel	1	81-423-010	81-423-010	81-424-010	81-424-010
52	Nut, Handwheel	1	FAS-70983	FAS-70983	FAS-70984	FAS-70984
53	Lock Washer, Handwheel	1	FAS-71069	FAS-71069	FAS-71071	FAS-71071
91	Seal Disc Tool	1	81-911-010	81-911-010	81-911-010	81-911-010
95	Soft Goods Spare Parts Kit	1	81-901-010	81-903-010	81-904-010	81-905-010
96	O-Ring Grease (Halocarbon 25-5S or Krytox® ⁵)	*1	11-06-0001	11-06-0001	11-06-0001	11-06-0001

See Table 3 Footnotes.

Table 3 – Parts List, 3” & 4” NPS

Item	Description	Qty	Part Number (by NPS Valve Size)	
			3”	4”
1	Valve Body	1	customer specified	customer specified
5	Stem	1	81-406-010	81-406-010
6	Gland Nut	1	81-396-010	81-396-010
7	O-Ring, Gland Nut Inner (Viton® ¹)	*2	11-02-2214	11-02-2214
8	O-Ring, Gland Nut Outer (Viton® ¹)	*2	11-02-2130	11-02-2130
9	Bonnet Bearing	1	81-326-490	81-326-490
10	Bonnet Housing	1	81-326-010	81-326-020
11	Bolt, Bonnet (Niflor™ ² Coated)	8	81-547-050	81-547-050
15	O-Ring, Bonnet Face (Viton® ¹)	*1	11-02-2246	11-02-2246
21	Barrel, With O-Ring Grooves	1	81-436-060	81-436-310
22	O-Ring, Barrel (Teflon® ⁴)	*2	11-05-2153	11-05-2156
31	Plug Retainer Nut	1	81-506-030	81-506-280
32	Plug Retainer Ring	1	11-12-0008	11-12-0007
34	Plug Retainer Lock Nut	1	81-516-030	81-516-280
35	Plug Retainer Body	1	81-506-010	81-506-260
36	Seal Disc (Neoflon® ³ M-400H)	*1	81-486-010	81-486-260
37	Seal Disc Support	1	81-496-010	81-496-260
38	Screw, Seal Disc Support (Niflor™ ² coated)	6	81-541-020	81-541-020
51	Handwheel	1	81-426-010	81-426-010
52	Nut, Handwheel	1	FAS-70987	FAS-70987
53	Lock Washer, Handwheel	1	FAS-71077	FAS-71077
92	PHPK Spanner Wrench	2	81-916-010	81-916-010
95	Soft Goods Spare Parts Kit	1	81-906-010	81-907-010
96	O-Ring Grease (Halocarbon 25-5S or Krytox® ⁵)	*1	11-06-0001	11-06-0001

* Recommended spare item.

¹ Viton® is a registered trademark of DuPont for a fluoroelastomer.

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

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

⁴ Teflon® is a registered trademark of DuPont for PTFE.

⁵ Krytox® is a registered trademark of DuPont.