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Find the *Cryogenic Services PLC-180LP* at our website: *Click HERE*

Part II: PLC-180LP Cryogenic Liquid Cylinder—Liquid Withdrawal Only

Part II—Section A: General Information PLC-180LP

1. Description

The PLC-180LP cryogenic container is a vacuum insulated cylinder designed to furnish liquid oxygen, nitrogen, or argon on a reliable, economical basis.

The PLC-180LP will hold 180 liters of cryogenic product. The container has a pressure range of 0 to approximately 22 psig. The product can be dispensed only as a liquid.

This tank does not contain any pressure buildup or vaporizer systems. Pressure in the tank is built by evaporation of product in the container. This evaporation is caused by the nominal heat leak into the container. The resultant gas, or boil off, is trapped in the container and causes the pressure to rise slowly as it expands. This pressure causes liquid to flow up the internal dip tube and out the liquid valve. If the container is left unused for a period of time, the pressure will build to the safety relief valve setting. If the container is used after pressure is built, the pressure should drop due to the increased area for gas expansion created by the dropping liquid level.

The insulation system is comprised of multiple layers of foil and paper that are incorporated with a very low vacuum. This vacuum is factory sealed and with the aid of internal molecular sieve, it should remain low for the life of the container.

The design and construction of the PLC-180LP is aimed at building the most durable tank available today. The inner vessel is constructed of stainless steel and coded to the DOT 4-L Code.

2. PLC-180LP Specifications

Specific Dimensions:

- Diameter . . . . . 20 in.
- Height . . . . . 63½ in.

Weight:

- Approximate Tare . . . . . 230 lb.

Liquid Capacity:

- Maximum . . . . . 196 liters (51.8 gal.)
- Nominal . . . . . 180 liters (47.6 gal.)

Normal Daily Evaporation Rate:

- Oxygen or Argon . . . . . 1.3% of capacity
- Nitrogen . . . . . 1.9% of capacity

Design Specification: . . . . . DOT 4L

Rated (DOT) Service Pressure: . . . . . 200 PSIG

Safety Devices:

- Pressure relief valve . . . . . 22 PSIG
- Inner casing burst disc rating . . . . . 400 PSIG
- Outer casing burst disc rating . . . . . 25 PSIG

Line Connections:

Inert:

- Liquid Fill and Withdrawal . . . . ½ in. ODT (SAE 45° flare)
- Gas Vent . . . . . ½ in. ODT (SAE 45° flare)

Oxygen:

- Liquid Fill and Withdrawal . . . . ⅝ in. ODT (SAE 45° flare)
- Gas Vent . . . . . ⅝ in. ODT (SAE 45° flare)

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3. PLC-180LP Nomenclature

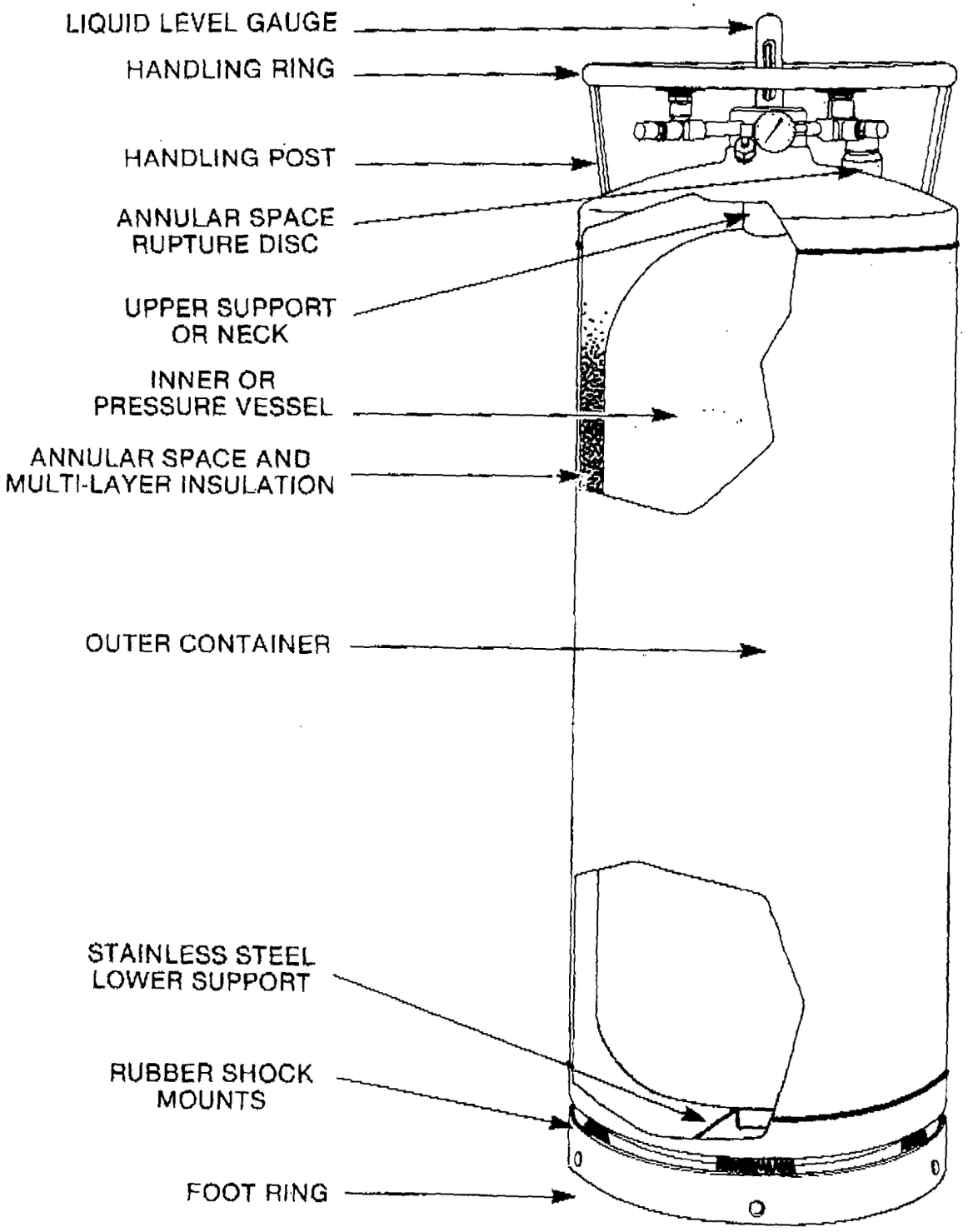


Figure 6: Nomenclature for PLC-180LP

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4. PLC-180LP Schematic

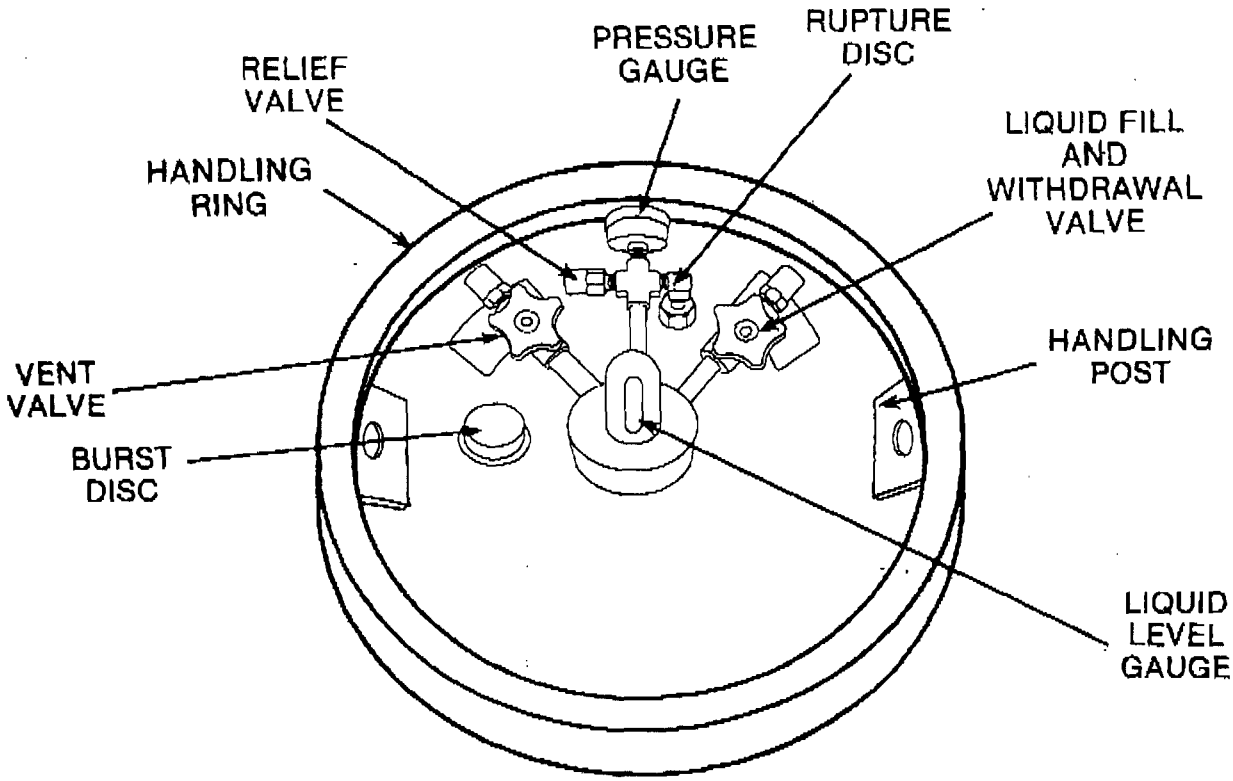


Figure 7: Top View for PLC-180LP

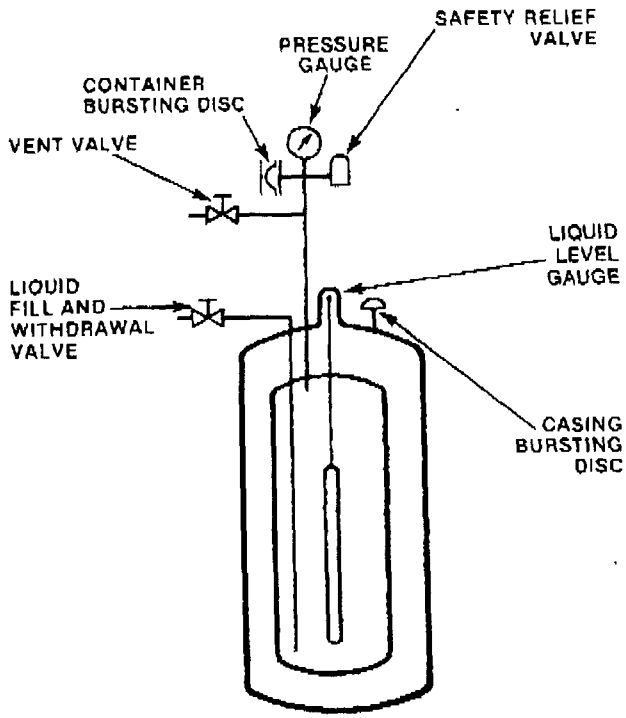


Figure 8: Schematic for PLC-180LP

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Part II—Section B:
PLC-180LP Operating Instructions

The PLC-180LP cryogenic container is designed with all of the operating controls situated on the top of the container. In this position the operator can perform and monitor all of the container's functions.

When the container is first received it should be inspected for shipping damage. Never fill a damaged container.

All PLC containers are shipped with low purity nitrogen gas in them. For this reason any container that is to be put into oxygen or argon service should be thoroughly purged with the applicable gas.

1. Purging the PLC-180LP

Before any operation that involves pressure or handling of a cryogenic fluid, be sure that all safety precautions are taken. See page 5 "Safety First" for review.

1. Open the vent valve to remove any pressure that has built in the inner vessel.
2. Make sure the tank is completely devoid of liquid.
3. Warm the inner vessel with warm nitrogen gas through the liquid valve. Check the gas temperature as it escapes through the open vent valve.
4. Close the liquid valve.
5. Attach a vacuum pump to the vent valve and evacuate the inner vessel to 26 inches of mercury.
6. Break the vacuum to 5 psig with high purity gas, as required by the service of the container.
7. Repeat steps 5 and 6 twice.
8. Close all valves and remove the vacuum and gas purge lines. The container is now ready for filling.

2. Filling Procedures

Each container should be examined for damage prior to filling. Any container that is damaged should not be filled.

Containers that have oil or grease on their exterior should be thoroughly cleaned by an approved method for oxygen compatibility. Refer to CGA Pamphlet G4.1 "Equipment Cleaned for Oxygen Service."

The hose fitting should be inspected to insure that the proper fitting is being used for the contents of the container. Incorrect fittings should be replaced. DO NOT USE ADAPTERS. Refer to CGA Pamphlet V-1 "Cylinder Valve Outlet and Inlet Connections."

Make sure that the container is labeled correctly for the product that it is holding. Incorrect labeling or fittings could cause serious damage to the container or contamination of the product.

Containers with questionable product purity or new containers from CSI should be purged before filling. Refer to the section on "Purging the PLC-180LP."

The following hints should be noted before filling the PLC-180LP:

1. Keep your transfer line as short as possible.
2. Use a ½" or larger transfer line.
3. Use a minimum number of elbows, transitions or valves.
4. Perform the filling operation as fast as possible.
5. DO NOT OVERFILL.

WARNING: Any time liquid can be trapped in a line, between two valves, the line must be equipped with a safety relief valve.

CAUTION: *Before any operation that involves pressure or handling of a cryogenic fluid be sure that all safety precautions are taken. Refer to Chapter 1 "Safety First."*

Filling the PLC-180LP should be done by pressure transfer. The following steps should be used for the actual filling procedure.

1. Place the container on a scale and record its weight as accurately as possible. The container should remain on the scale throughout the operation.
2. Connect the transfer hose to the liquid valve connection. Weigh the container and hose combination. The difference of these two weights will be the weight of the attached transfer hose.
3. Add the tare weight of the container, found on its data plate, to the weight of the transfer hose. Now add the product weight, found in Table B on the specification, to obtain the total weight of the container with product. Record this weight.
4. Transfer liquid into the container by first opening the vent valve and then the liquid and transfer hose shut off valves.
5. When the container reaches the weight recorded in step 3 it is considered full. Close the transfer hose shut off valve. Close the liquid and vent valves on the PLC. Remove the transfer hose from the container.

Table B—Filling Weights for PLC-180LP Containers

Product	For Liquid Service Pressure Set at 22 psig
OXYGEN	452 lbs.
NITROGEN	320 lbs.
ARGON	553 lbs.

Figure 9: Filling Weights for PLC-180LP

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3. Liquid Withdrawal

Since the PLC-180LP is built for liquid withdrawal only, the relief valve setting is 22 psig. Transferring liquid at higher pressures increases the flash-off rate of the liquid and adds to the danger of splashing.

Before liquid transfer can occur the operator must make sure that the vent valve is closed and a positive pressure exists in the tank. The normal evaporation of the liquid should be enough to maintain positive pressure for transferring. Positive pressure in the tank forces liquid up the internal dip tube to the liquid valve. To transfer liquid, attach the transfer hose to the liquid connection. Slowly open the liquid valve to flow the liquid. The liquid will vaporize at first until the transfer line cools down. A phase separator on the end of the transfer line will help when transferring liquid into open dewars.

The container can become contaminated, once it is emptied, if the liquid and vent valves are not closed.

4. Handling the PLC-180LP Container

Please refer to Part I, Section B, Subsection 5: Handling the PLC-180 Container, page 11.

Part II—Section C: Maintenance and Repair PLC-180LP

Please refer to Part I, Section C: Maintenance and Repair PLC-180A, pages 12 through 13.

Please omit subsections:

3. Resetting the Operating Pressure, page 12, and

7. Pressure Building and Economizer Regulator, page 13.

These subsections **do not apply** to the PLC-180LP cylinder. All other subsections apply equally to the PLC-180A and PLC-180LP.

PLC-180LP

Plumbing

ITEM NUMBER	PART NUMBER	DESCRIPTION	QUANTITY
1	400-1085	Globe Valve—⅜ NPT (see item 2 for repair)	2
*2	400- 1399	Globe Valve Repair Kit (see figure 12, page 23)	1
*3	450-1316	Pressure Gauge—¼ NPT, set at 0-100 psig	1
4	530-1016	Street Elbow—¼ NPT (Brass)	1
*5	420-1313	Rupture Disc—set at 100 psig	1
*6	410-1040	Relief Valve—¼ NPT, set at 22 psig	1
7	530-1025	¼ NPT Brass Cross	1
8	560-1167	Oxygen Fill Fitting—⅜ NPT CGA 440	Alternate
9	560-1019	Inert Fill Fitting—⅜ NPT CGA 295	2
*10		Liquid Level Gauge (see figure 14, page 25)	1
11	650-2082	Rupture Disc Cap	1
11 (A)	660-3060	C.S.I. Warranty Seal	1
12	660-1140	Label—Liquid	1
13	660-1142	Label—Vent	1
14	660-3087	Label—Oxygen D.O.T. Label	1
15	660-3086	Label—Nitrogen D.O.T. Label	Alternate
16	660-3088	Label—Argon D.O.T. Label	Alternate

*Recommended spare parts

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Part II—Section D: PLC-180LP Replacement Parts Lists

Plumbing

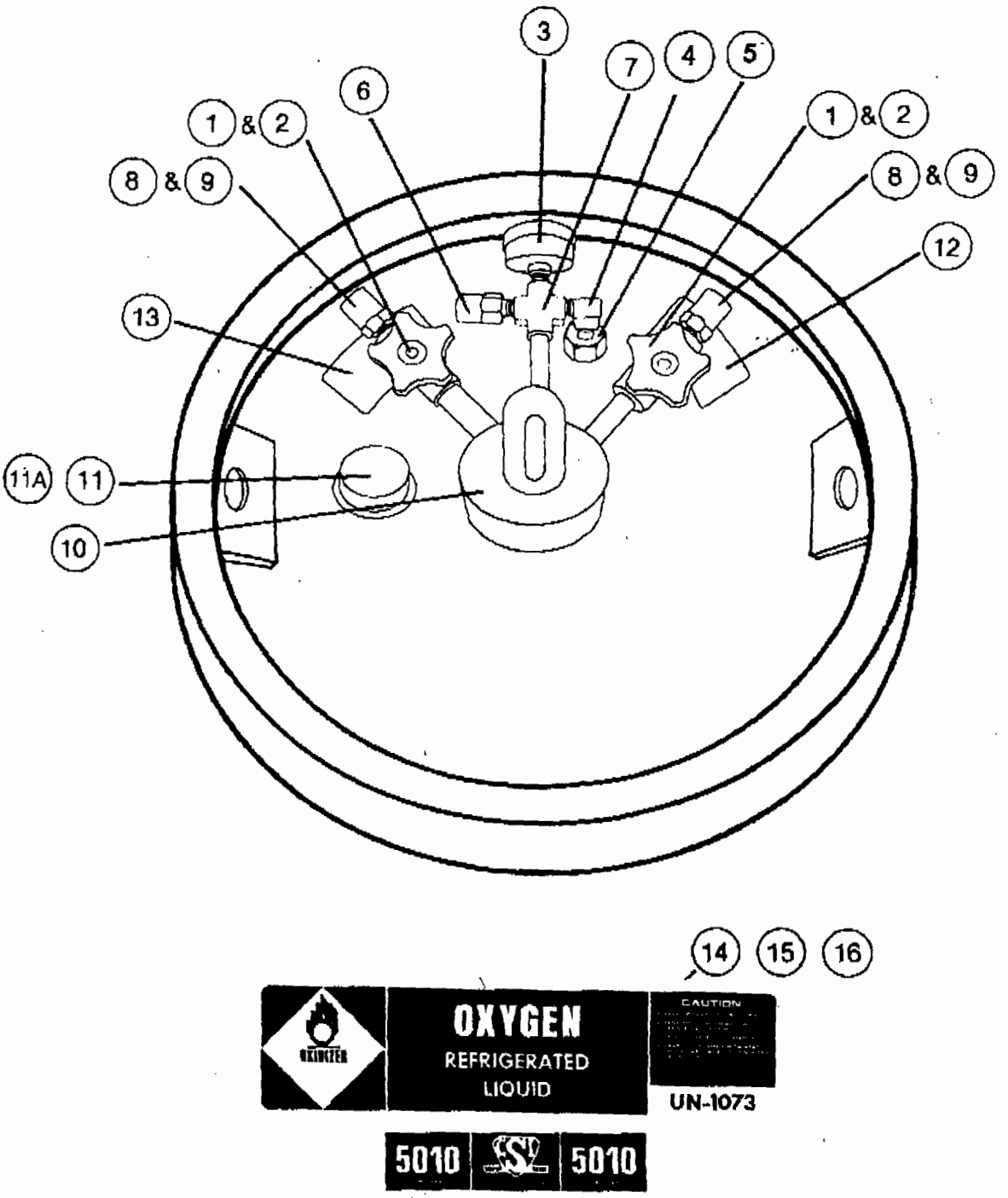


Figure 10: Plumbing Diagram for PLC-180LP

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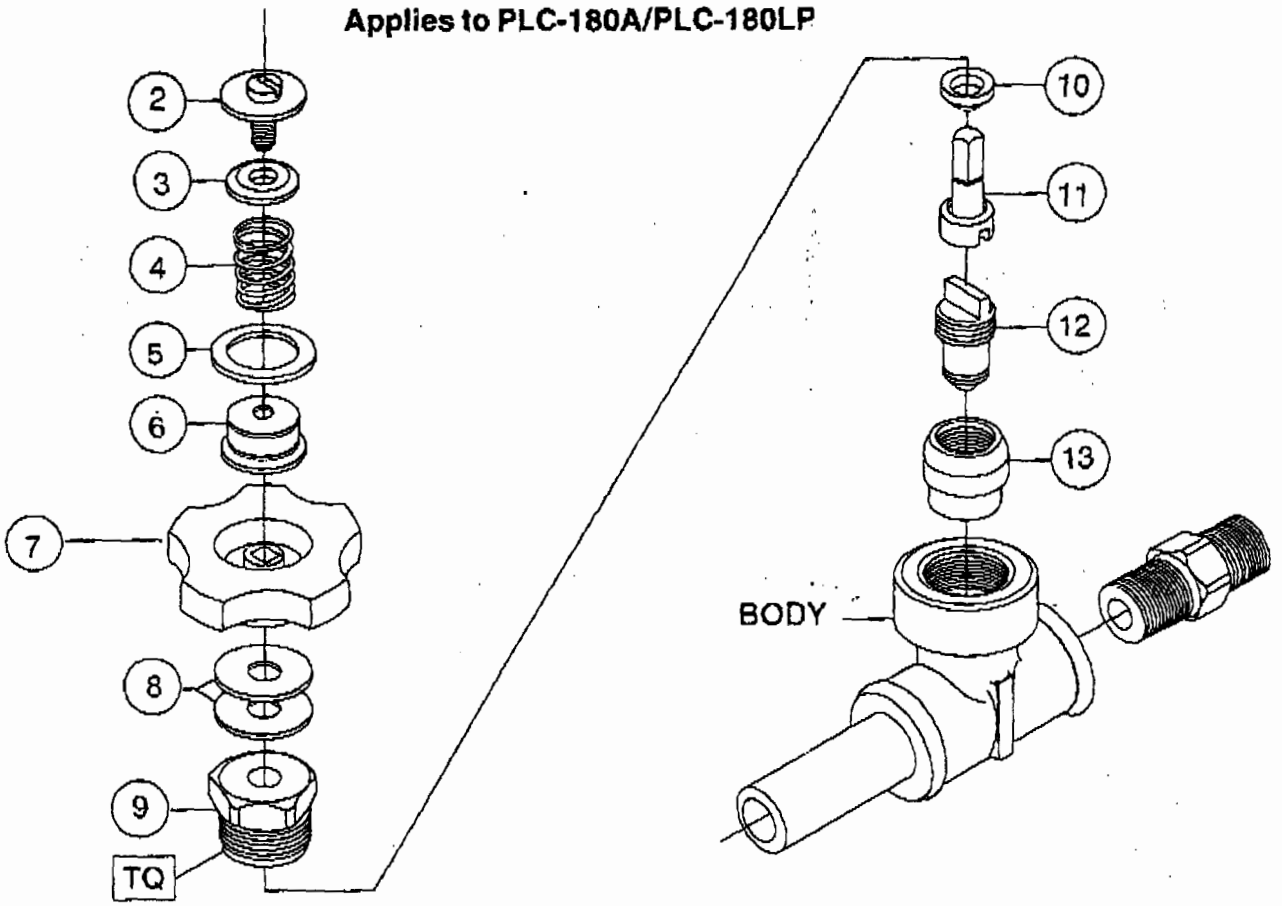


Figure 11: Globe Valve for PLC-180A/PLC-180LP

ITEM NUMBER	PART NUMBER	DESCRIPTION	QUANTITY
1	400-1399	Globe Valve Repair Kit	
2	400-1229	Screw & Washer	1
3	400-1076	Washer	1
4	400-1075	Spring	1
5	400-1074	Washer	1
6	400-1073	Seal	1
7	400-1067	Handwheel	1
8	400-1078	Washer	2
9	400-1071	Bonnet	1
10	400-1072	Gasket	1
11	400-1070	Stem	1
12	400-1069	Seat Assembly	1
13	400-1068	Bushing	1
TQ	*	Torque—1000 in./lbs.	*

*Not Applicable.

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