

Installation & Maintenance Instructions

3-WAY SOLENOID VALVES
NORMALLY CLOSED AND NORMALLY OPEN OPERATION
3/8" , 1/2" AND 3/4" NPT

SERIES

8316

NOTICE: See separate solenoid installation and maintenance instructions for information on: Wiring, Solenoid Temperature, Causes of Improper Operation, and Coil Replacement.

DESCRIPTION

Series 8316 are 3-way, diaphragm-operated solenoid, pilot-controlled valves. Valves are made of brass with only four moving parts: a core assembly, two diaphragm assemblies and a disc holder sub-assembly. Valves may be provided with a general purpose, explosionproof/watertight solenoid enclosures.

Series 8316 valves with Suffix "P" in the catalog number are designed for dry inert gas and non-lubricated air service.

OPERATION

Normally Open

Solenoid De-energized: Flow is from Pressure "P" to Cylinder "A". Exhaust Port "E" is closed.

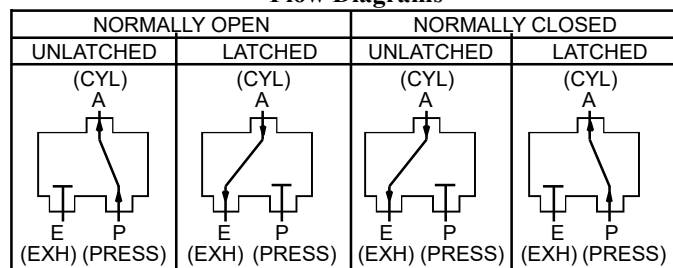
Solenoid Energized: Flow is from Cylinder "A" to Exhaust "E". Pressure Port "P" is closed.

Normally Closed

Solenoid De-energized: Flow is from Cylinder "A" to Exhaust "E". Pressure Port "P" is closed.

Solenoid Energized: Flow is from Pressure "P" to Cylinder "A". Exhaust Port "E" is closed.

Flow Diagrams



IMPORTANT: A minimum operating pressure differential of 10 psi is required; however, valve vents to 0 psi.

Manual Operator

Manual operator allows manual operation when desired or during an electrical power outage. To operate valve manually, rotate manual operator stem clockwise 180°. Valve will now be in the same position as when the solenoid is energized. Rotate manual operator stem counterclockwise 180° before operating valve electrically.

INSTALLATION

Check nameplate for correct catalog number, pressure, voltage, frequency, and service. Never apply incompatible fluids or exceed pressure rating of the valve. Installation and valve maintenance to be performed by qualified personnel.

Temperature Limitations

For maximum valve ambient and fluid temperatures, refer to following chart or as limited by hazardous location (explosive atmosphere) solenoid approvals. See solenoid installation and maintenance instructions. Check catalog number prefix and watt rating on nameplate.

Valves with design change letter "G" within the catalog number (example: 8316G014) have a maximum fluid temperature of 180°F AC and 120°F DC (except hazardous location solenoid - example: prefix EF or EV). Refer to separate solenoid instruction sheet provided for ambient temperature.

Positioning

This valve is designed to perform properly when mounted in any position. However, for optimum life and performance, the operator movement should be mounted vertical and upright to reduce the possibility of foreign matter accumulating in the solenoid base sub-assembly area. Valve with suffix "P" in the catalog number must be mounted with the solenoid vertical and upright.

Mounting

Refer to Figure 1 for mounting bracket (optional feature) mounting dimensions.

Piping

Connect piping to valve according to markings on valve body. Refer to flow diagrams provided. Apply pipe compound sparingly to male pipe threads only. If applied to valve threads, the compound may enter the valve and cause operational difficulty. Avoid pipe strain by properly supporting and aligning piping. When tightening the pipe, do not use valve or solenoid as a lever. Locate wrenches applied to valve body or piping as close as possible to connection point.

To ensure proper operation of the valve, the pressure and exhaust lines must be full area without restriction. A minimum differential pressure as stamped on the nameplate must be maintained between pressure and exhaust at the moment of shifting. Air reservoirs must have adequate capacity to maintain this minimum pressure during shifting. To check pressure during shifting, install a pressure gauge in the pressure piping as close to the valve as possible.

IMPORTANT: To protect the solenoid valve, install a strainer or filter, suitable for the service involved in the inlet side as close to the valve as possible. Clean periodically depending on service conditions. See ASCO Series 8600 and 8601 for strainers.

Flow Controls (Speed or Metering Devices)

Flow control valves may be added to control cylinder speed. If used, these flow control valves must be located in Cylinder A piping between the solenoid valve and the cylinder.

IMPORTANT: Do not install flow controls (speed or metering devices) or any type of restrictive device in either the Pressure "P" (inlet) or Exhaust "E" (outlet) ports of the valve. Restricting either of these lines may cause valve malfunction.

MAINTENANCE

⚠ WARNING: To prevent the possibility of death, personal injury or property damage, turn off electrical power, depressurize valve, and vent fluid to a safe area before servicing the valve.

⚠ AVERTISSEMENT: Pour éviter tous danger de mort, de blessure grave ou de dommage matériel, avant d'intervenir sur la vanne, couper le courant, purger la vanne dans une zone sécurisée.

NOTE: It is not necessary to remove the valve from the pipeline for repairs.

Cleaning

All solenoid valves should be cleaned periodically. The time between cleanings will vary depending on the medium and service conditions. In general, if the voltage to the coil or solenoid is correct, sluggish valve operation, excessive noise, or leakage will indicate that cleaning is required. In the extreme case, faulty valve operation will occur and the valve may fail to shift. Clean strainer or filter when cleaning the valve.

Preventive Maintenance

- Keep the medium flowing through the valve as free from dirt and foreign material as possible.
- While in service, the valve should be operated at least once a month to ensure proper opening and closing.
- Depending on the medium and service condition, periodic inspection of internal valve parts for damage or excessive wear is recommended. Thoroughly clean all parts. If parts are worn or damaged, install a complete ASCO Rebuild Kit.

Causes of Improper Operation

- **Incorrect Pressure:** Check valve pressure. Pressure to valve must be within range specified on nameplate.
- **Excessive Leakage:** Disassemble valve and clean all parts. If parts are worn or damaged, install a complete ASCO Rebuild Kit.

Valve Disassembly (Refer to Figures 1 and 2)

1. Disassemble valve in an orderly fashion. Use exploded views for identification and placement of parts.
2. To remove valve solenoid, see separate solenoid instructions.
3. If the valve being serviced has a manual operator, refer to section "Manual Operator Disassembly".
4. Unscrew solenoid base sub-assembly. Remove solenoid base gasket, core assembly, core spring and core guide, if present. NOTE: Suffix "P" construction has a rider ring on the core assembly in addition to the core spring and core guide.
5. A 4-40 machine screw provided in the ASCO Rebuild Kit serves as a self-tapping screw to remove insert from body. Turn screw a few turns into through hole located in flat surface of insert.

▲ CAUTION: Do not damage center hole (pilot orifice) in raised surface insert. Remove insert by using a pair of pliers to grip the head of the screw.

▲ ATTENTION: N'endommager pas le trou central (orifice pilote) situé dans la partie haute de la pièce d'insertion. Retirez la pièce d'insertion en utilisant une pince sur la tête de la vis.

6. Remove three gaskets from insert. Tag each gasket as it is removed so that they can be reassembled in the same location. Middle and lower gaskets are the same size. However, the lower gasket is a softer material. Then remove disc holder sub-assembly, spring cup and disc spring. NOTE: Spring cup not present on all valve constructions.
7. The solenoid pilot is now completely disassembled.
8. Remove bonnet screws and lockwashers (4) from each end of valve body. Remove valve bonnets, body passage gaskets, retaining rings, diaphragm assemblies and body gaskets from each end of the valve body. These parts are identical.
9. All parts are now accessible to clean or replace. If parts are worn or damaged, install a complete ASCO Rebuild Kit.

Valve Reassembly

1. Reassemble valve using exploded views for identification and placement of parts.
2. Lubricate all gaskets with Molykote® 111 Compound lubricant or an equivalent high-grade silicone grease.
3. At each end of valve body, install body gasket, diaphragm assembly, retaining ring, body passage gasket, valve bonnet and bonnet screws.
4. Torque bonnet screws in a crisscross manner to 95±10 in-lbs [10,7±1,1 Nm].
5. Position lower insert gasket and disc holder spring with spring cup (if present) in body insert cavity. NOTE: Use spring cup only when it has been previously used.
6. Snap upper and middle insert gaskets into grooves of insert. Lower insert gasket fits into the recess between the lower corner of the insert and the lower corner of the body insert cavity. Middle and lower insert gaskets are the same size. However, lower gasket is made of a softer material.
7. Place disc holder sub-assembly into insert. Install insert (with gaskets and disc holder sub-assembly) into body cavity, making certain that the disc holder spring is centered.
8. If the valve being rebuilt has a manual operator, refer to section on "Manual Operator Reassembly".
9. Replace solenoid base gasket, core assembly, core spring and core guide, if present. If the core spring is the internal type as shown in Figure 1, be sure that the wide end of the core spring goes into the core first. Closed end of core spring protrudes from core top. If the core spring is the same diameter throughout, the end with the closed turns will protrude from the top of the core.
10. Replace solenoid base sub-assembly and torque to 175±25 in-lbs [19,8±2,8 Nm].
11. Install solenoid, see separate instructions, and make electrical hookup.
12. Restore line pressure and electrical power supply to valve.
13. After maintenance is completed, operate the valve a few times to be sure of proper operation.

Manual Operator Disassembly

1. To remove valve solenoid, see separate solenoid instructions. NOTE: To determine correct manual operator construction, check valve nameplate for watt rating. Then see Figure 2 for corresponding watt rating.
2. Unscrew solenoid base sub-assembly. For valves with internal type core springs, remove core spring, core assembly and solenoid base gasket.
3. Unscrew manual operator body from main valve body and remove body gasket.
4. Before removing the stem retainer from the manual operator body, note the location of the captive spacer on the stem/lever sub-assembly. The captive spacer will either be on the inside or outside of the fork on the stem retainer. Location of this spacer is important for reassembly.
5. Remove stem retainer and slip the stem/lever sub-assembly from the manual operator body. Then remove stem gasket from stem/lever sub-assembly.
6. For valve with external type core springs, remove core assembly, core spring, core guide and rider ring (if present). For valve with a watt rating of 16.8; 6; 6.1; etc., remove disc holder sub-assembly.
7. Refer to "Valve Disassembly" step 5, for further disassembly.

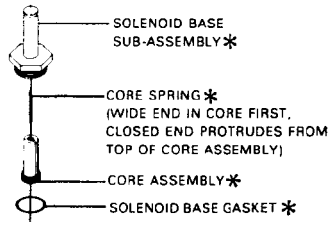
Manual Operator Reassembly

1. Reassemble manual operator in reverse order of disassembly. Use exploded views for identification and placement of parts. See instructions provided in Figure 2. Check watt rating on nameplate to determine construction.
2. Replace body gasket and disc holder sub-assembly, if used.
3. Replace stem gasket on stem/lever sub-assembly.
4. Preassemble manual operator parts consisting of stem/lever sub-assembly with stem gasket and stem retainer. On constructions with an external type core springs, it is necessary to position (preassemble) the core assembly in the manual operator body as part of the manual operator body sub-assembly.
5. There is a captive spacing washer on the stem/lever sub-assembly. Referring to the full size template in Figure 2, locate the spacing washer as follows:
 - A. For all core assemblies with an outside diameter up to 13/32" (.406 dia.) or valves having a watt rating of 6; 6.1; etc., the spacer must be located inside the retainer fork.
 - B. For all cores with an outside diameter greater than 13/32" (.406 dia.), or valves having a watt rating of 16.8; 10.1; 11.2, etc., the spacer must be located outside the retainer fork.
6. Install the stem/lever sub-assembly in manual operator body. Determine the proper location of the spacer and slip the stem retainer in place.
7. For valves, with external type core springs, install core assembly with core spring, core guide and rider ring (if present) into base of manual operator body. For valves with internal type core spring, install disc holder sub-assembly into base of manual operator body.
8. Screw the manual operator body assembly into the main body. Torque manual operator body to 175±25 in-lbs [19,8±2,8 Nm].
9. Turn the manual operator lever to the 9 o'clock position, i.e., the same position that the operator would be in if the valve was to be operated electrically.
10. Install core assembly, core spring, solenoid base gasket and solenoid base sub-assembly. Torque solenoid base sub-assembly to 175±25 in-lbs [19,8±2,8 Nm].
11. Install the solenoid and make electrical hookup
12. Restore line pressure and electrical power supply.
13. After maintenance is completed, operate the valve electrically and manually a few times to be sure of proper operation.

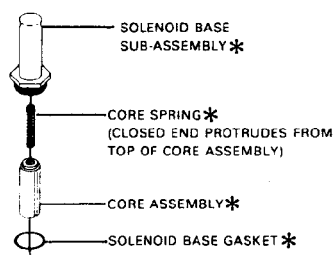
ORDERING INFORMATION FOR ASCO REBUILD KITS

Parts marked with an asterisk (*) in the exploded view are supplied in Rebuild Kits. When Ordering Rebuild Kits for ASCO valves, order the Rebuild Kit number stamped on the valve nameplate. If the number of the kit is not visible, order by indicating the number of kits required, and the Catalog Number and Serial Number of the valve(s) for which they are intended.

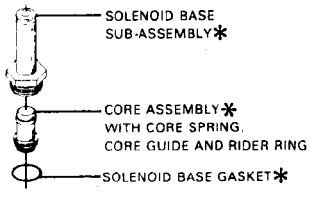
CONSTRUCTION WITH INTERNAL TYPE CORE SPRING (ONE END TAPERED)



CONSTRUCTION WITH INTERNAL TYPE CORE SPRING (SPRING DIAMETER CONSTANT)



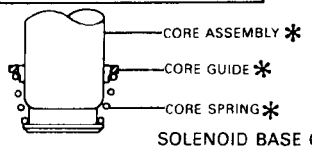
SUFFIX "P" CONSTRUCTION EXTERNAL TYPE CORE SPRING



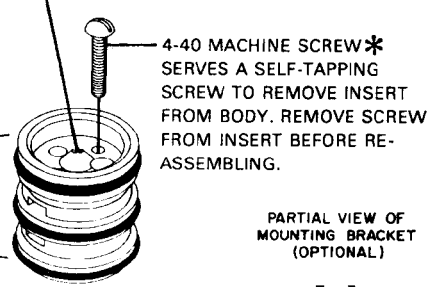
FOR PARTS IDENTIFICATION OF OTHER VALVE CONSTRUCTIONS SEE PARTIAL VIEWS ABOVE

TORQUE SOLENOID BASE SUB-ASSEMBLY TO 175 ± 25 INCH-POUNDS (19,8 ± 2,8 NEWTON-METERS)

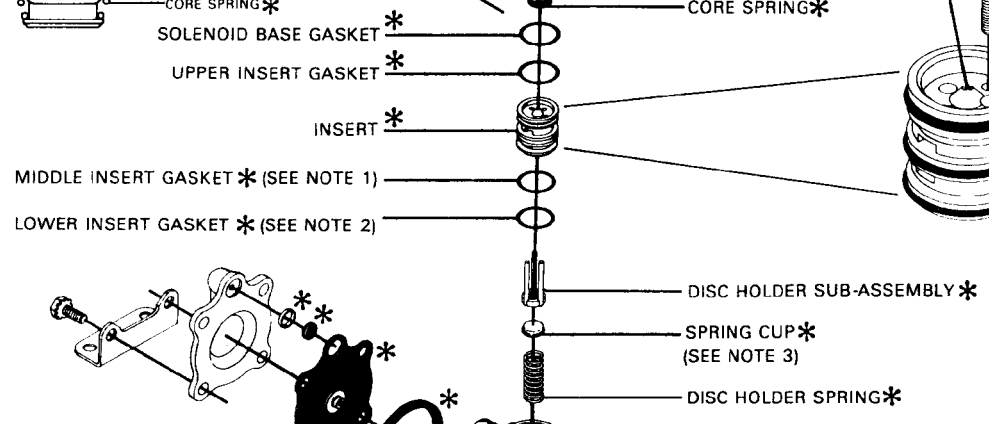
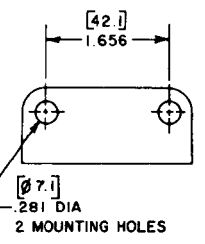
IMPORTANT PARTIAL CUTAWAY VIEW SHOWING POSITIONING OF CORE GUIDE AND CORE SPRING ON CORE ASSEMBLY.



CAUTION PILOT ORIFICE DO NOT DAMAGE

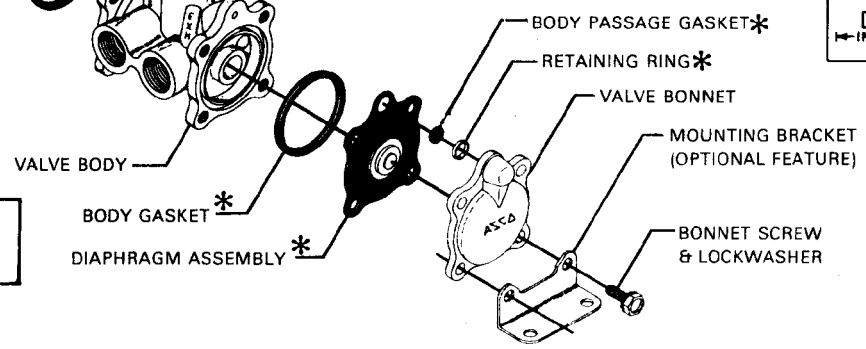


PARTIAL VIEW OF MOUNTING BRACKET (OPTIONAL)



TORQUE BONNET SCREWS IN A CRISSCROSS MANNER TO 95 ± 10 INCH-POUNDS (10,7 ± 1,1 NEWTON-METERS)

—SERVICE NOTE— DIAPHRAGM ASSEMBLIES ARE IDENTICAL



- NOTES:
- MIDDLE AND LOWER INSERT GASKETS HAVE THE SAME PHYSICAL DIMENSIONS. HOWEVER, THE LOWER INSERT GASKET IS MADE OF A SOFTER MATERIAL.
 - UPPER AND MIDDLE INSERT GASKETS SNAP INTO GROOVES OF INSERT. LOWER INSERT GASKET FITS BETWEEN RECESS IN LOWER CORNER OF INSERT AND LOWER CORNER OF BODY PILOT INSERT BORE.
 - THE SPRING CUP IS NOT PRESENT ON ALL VALVE CONSTRUCTIONS. USE SPRING CUP ONLY WHEN IT HAS BEEN PREVIOUSLY USED AS PART OF THE VALVE CONSTRUCTION.

* INDICATES THAT THESE PARTS ARE INCLUDED IN ASCO REBUILD KITS

Figure 1. Bulletin 8316, 3/8" and 1/2" NPT Construction Less Solenoid Enclosure

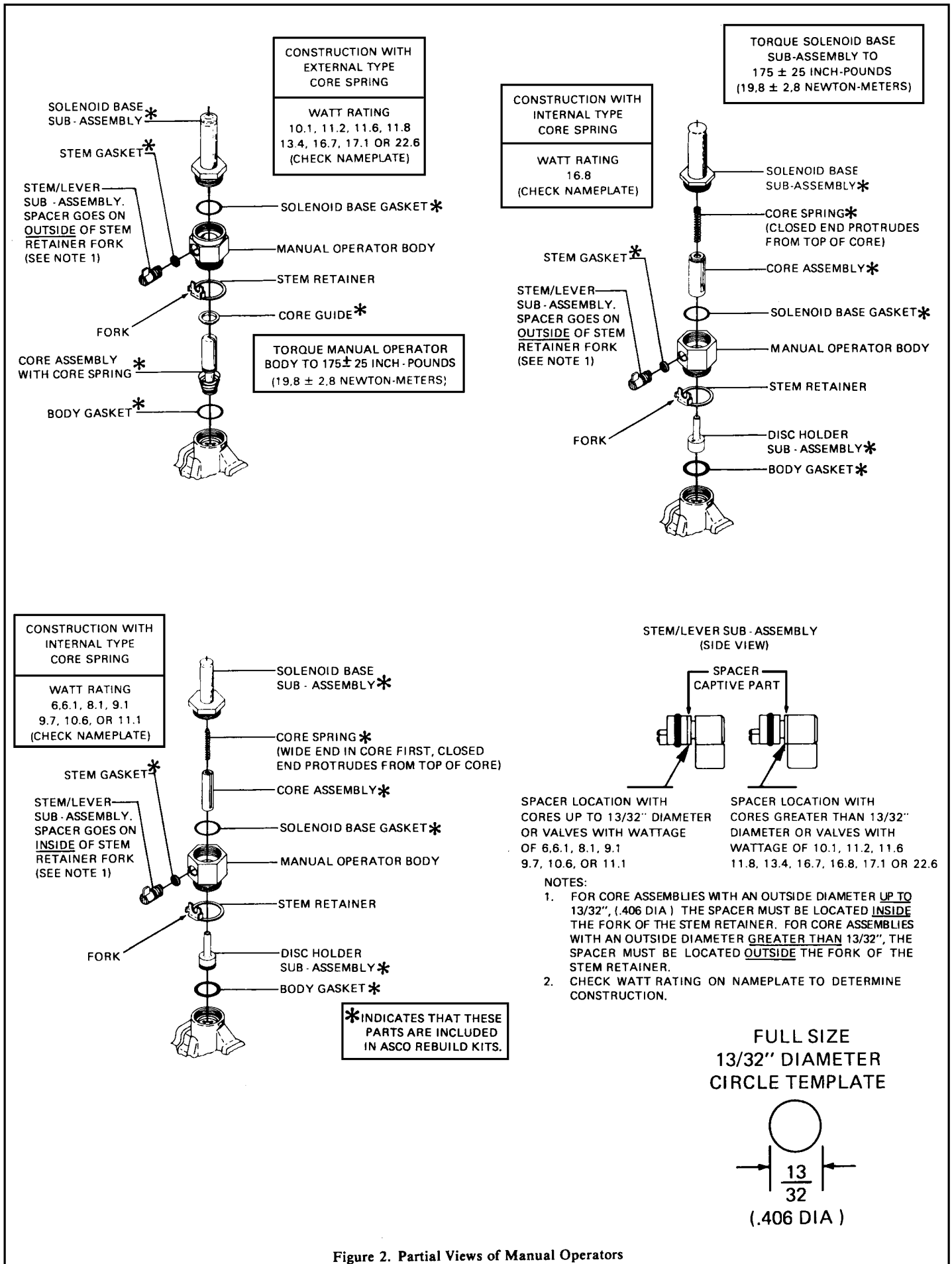


Figure 2. Partial Views of Manual Operators