

# SERVICE MANUAL 161/171-93



**TRI-FLO®**

**AIR-ACTUATED VALVES**

**SERIES 161 • 161OY • 171 • 171OY**



**Tri-Clover Inc.**



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# INTRODUCTION

Thank you for purchasing a Tri-Clover Product!

This manual contains disassembly and assembly instructions, maintenance procedures, and complete parts list of all Series 161 & 171 Air-Actuated Valves, 161-90 "Y" Body Shut Off Valve, 171-10-90 Manually Operated Micrometer Valve and actuators designed and manufactured by Tri-Clover Inc., Kenosha, Wisconsin.

**READ THIS MANUAL** carefully to learn how to service these valves. Failure to do so could result in personal injury or equipment damage.

# SAFETY

Safety is very important!



Included throughout this manual is the safety alert symbol you see to the left. When you see this symbol be alert to the potential for personal injury.

**SIGNAL WORDS:** Like DANGER, WARNING, or CAUTION are used with a safety alert symbol. DANGER-Immediate hazard which WILL result in severe personal injury or death. WARNING-Hazards or unsafe practices which COULD result in personal injury or death. CAUTION-Hazards or unsafe practices which COULD result in minor personal injury or product damage.

**DO NOT attempt to modify any Tri-Clover product.** To do so could create unsafe conditions and void all warranties. **DO NOT place any Tri-Clover product in an application where general product service ratings are exceeded.**

SAFETY LABELS below are placed on every valve. Do not remove any labeling on any Tri-Clover product. Immediately replace any label that is missing.



Part Number 38-264

## VALVE DISASSEMBLY



**WARNING:** To prevent personal injury, keep hands and tools out of and away from valve bodies and stems when applying or releasing air to an actuator. The actuator stem assembly moves with extreme force and suddenness.

- When disassembling and assembling valve, bench area should be clean to prevent marring and nicking of seats.
- 161 and 171 Series valves can be equipped with an open yoke. When so equipped, additional parts are a type 316 stainless steel open yoke insert (located between valve actuator and upper body), o-ring, clamp, washer, and lower stem. See parts list for related information.

### Models 161-10, 21, 23, 30, 41, 43, and 90 Y Body

#### Models 171-10, 21, and 30

##### Normally Open: Type 10, 15, and 80 Actuators

1. Remove body clamp, lower body and gasket.
2. Apply air to actuator.
3. Remove valve stem.
4. Release air supply.
5. Remove o-ring from valve stem.
6. Remove actuator clamp, actuator, actuator o-ring, bonnet o-ring, stainless steel washer and upper body or bonnet.

##### Normally Closed: Type 20 Actuator

1. Apply air to actuator.
2. Remove body clamp, lower body and gasket.
3. Release air supply.
4. Remove valve stem and valve stem o-ring.
5. Remove actuator clamp, actuator, actuator o-ring, bonnet o-ring, stainless steel washer and upper body.

## Models 161-27 and 47

### Models 171-27

#### Normally Closed: Type 20 and 25 Actuators

1. Remove actuator clamp.
2. Apply air to actuator. Remove actuator, actuator o-ring and release air supply.
3. Remove body clamp, lower body and gasket.
4. Remove "E" retaining ring from valve stem.
5. Remove stainless steel washer and bonnet o-ring.

\* Actuator disassembly and service information starts on page five.

## Models 171-10

### Tri-Flo Manually Operated Micrometer Valve

#### Type 90 Actuator

1. Put valve in partially open position.
2. Remove body clamp, body, and gasket.
3. Remove clip on top of actuator.
4. Remove valve plug assembly and valve stem o-ring.
5. Unscrew knurled handle.
6. Replace friction buttons if the knurled handle turns freely. Use a notched screwdriver to remove threaded bushing. This gives access to the friction button, spring and washer.

## VALVE INSPECTION

### Stem & Seat(s)

Carefully examine the rubber or PTFE valve plug seats for cracking, tearing, checking or excessive wear. Leakage past the seat(s) may result from these types of irregularities.

### Surface Finish

Inspect the valve stem and stem bore in valve upper body or bonnet for signs of galling. Replace both components if galling exists. Galling will continue to occur if only one part is replaced and the other is damaged.

### Valve Body

Inspect the valve seats in the valve bodies for nicks, scratches and other irregularities. Leakage past the seats may result from these type of irregularities.

### Gaskets & O-ring(s)

Inspect for cuts, abrasions, flat spots or other damage that would cause leakage or ineffective cleaning. Replace as necessary.

## VALVE REASSEMBLY



**WARNING:** To prevent personal injury, keep hands and tools out of and away from valve bodies and stems when applying or releasing air to an actuator. The actuator stem assembly moves with extreme force and suddenness.

- When disassembling and assembling valve, bench area should be clean to prevent marring and nicking of seats.

## **Models 161-10, 21, 23, 30, 41, 43, and 90 Y Body**

### **Models 171-10, 21, and 30**

#### **Normally Open: Type 10, 15, and 80 Actuators**

1. Replace actuator o-ring, bonnet o-ring and stainless steel washer.
2. Clamp actuator to upper body or bonnet with actuator clamp.
3. Install o-ring on valve stem.
4. Apply air to actuator.
5. Insert valve stem through opening in upper valve body and into coupling unit in actuator. Hold assembly together, then position vertically on top of work bench so that valve plug rests on top of bench surface. Push down firmly on top of actuator and release air supply. If properly coupled, stem cannot be removed.
6. Replace gasket, lower body and body clamp.

#### **Normally Closed: Type 20 Actuator**

1. Replace actuator o-ring, bonnet o-ring and stainless steel washer.
2. Clamp actuator to upper body or bonnet with actuator clamp.
3. Install o-ring on valve stem.
4. Insert valve stem through upper valve body stem opening and into coupling unit in actuator. Hold assembly together, then position vertically on top of work bench so that valve plug rests on top of bench surface. Push down firmly on top of actuator, then apply air to actuator. If properly coupled, stem cannot be removed.
5. Replace gasket, lower body and body clamp.
6. Release air supply.

## **Models 161-27 and 47**

### **Model 171-27**

#### **Normally Closed: Type 20 and 25 Actuators**

1. Install o-ring on the valve stem and insert valve stem through upper body stem opening.
2. Replace bonnet o-ring and stainless steel washer.
3. Snap "E" retaining ring on valve stem.
4. Replace actuator o-ring. Apply air to actuator. Insert valve stem into coupling unit in actuator. Hold complete assembly, then position vertically on work bench so that the valve plug rests on top of bench surface. Push down firmly on top of actuator, then release air supply. If properly coupled, valve stem cannot be removed.
5. Clamp actuator to upper body with actuator clamp. Be sure the valve bonnet and actuator are mated properly before clamping. Release air supply.
6. Replace body gasket, lower body and body clamp.

## **Model 171-10**

### **Tri-Flo Manually Operated Micrometer Valve**

#### **Type 90 Actuator**

1. If friction buttons have been removed, reassemble by inserting spring, washer and friction button. Screw the threaded bushing into bonnet with a notched screwdriver.
2. Screw knurled handle on actuator body.
3. Install valve stem o-ring and valve plug assembly.
4. Install clip through top of valve stem.
5. Install gasket, body and body clamp.

# TYPE 10 AND 20 ACTUATORS

## Introduction

The 10 & 20 actuators are spring return units used when a spring to open (10) or spring to close (20) valve is required.

## Installation

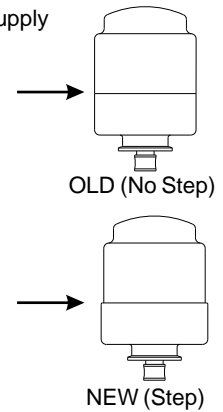
Connect air supply to the quick coupler fitting or the 1/8-27 FNPT port it is screwed into. Air supply specifications: 35-50 psig.



**WARNING:** To prevent personal injury do not attempt to repair an old style actuator. The old style actuator has a preloaded spring which will eject from the actuator body with sufficient force to cause serious injury to anyone in the immediate area. An old style actuator has no "step" between cylinder and bonnet. See the illustration to the right.



**WARNING:** To prevent personal injury, hand pressure should be applied to the top of the cylinder and bonnet. Actuator cylinder may eject with sufficient force to cause serious injury. Remove actuator from valve before disassembling actuator. On 1" size valves, the actuator spring is not contained. Caution should be used when the spring force is released.



## Actuator Disassembly

1. Place the two flats on the actuator bonnet in a vise. This will prevent the actuator bonnet from turning when removing the cylinder.
2. Remove actuator cylinder from bonnet by applying a strap wrench to the cylinder and turning in a counterclockwise direction until cylinder and bonnet can be separated.
3. Lift the cylinder off the bonnet.
4. Remove the piston assembly and spring.
5. Remove the actuator stem nut and lockwasher from the piston.
6. Remove the actuator stem from the piston.
7. Remove the o-ring from the actuator stem.
8. Remove the coupler from the actuator stem by applying wrenches to the flats on both parts.
9. Remove both o-rings from the bonnet and remove the bonnet from the vise.

## Actuator Reassembly

1. Attach the coupler to actuator stem and replace o-ring on actuator stem.
2. Install new packings on the piston if required.
3. Apply Tri-Clover C137 lubricant to packings and felt seal after installation on the piston. Be sure packing lip of the upper packing is toward the top of the piston. The lip of the lower packing must be toward the bottom of the piston.
4. Install the actuator stem lockwasher and nut and tighten.
  - Type 210
    - Place actuator stem through piston with coupler located on cavity side.
  - Type 220
    - Place actuator stem through piston with coupler located on flat side.
5. Now insert the two flats of the actuator bonnet back in a vise.
6. Replace both o-rings in the bonnet.
7. Install the spring and piston.
  - Type 210
    - Place the spring into position in the bonnet with the smaller retainer diameter toward the bonnet.
    - Place the piston on the spring with piston cavity facing downward, enclosing the spring.
  - Type 220
    - Set the piston on the bonnet with cavity facing upward.
    - Insert the spring into the piston with the smaller retainer diameter towards the top. Be sure it is centered.
8. Lubricate inside walls of cylinder with C137 lubricant and slowly slide the cylinder over the piston. Use shim stock or a thin flat tool to compress the upper packing on the piston to get it started in the cylinder.

9. Lubricate the cylinder threads with Tri-Clover C137 lubricant. This will prevent the stainless steel threads from galling.
10. Thread the cylinder into the bonnet and tighten it until it bottoms. It will be necessary to use a strap wrench for the last few turns.

### To Convert a Type 210 Actuator to a Type 220 Actuator

1. Remove the cylinder, actuator stem, nut and lockwasher, piston and spring as outlined in the Disassembly instructions.
2. Reassemble as outlined in steps #4 through #10 in the Actuator Reassembly section.

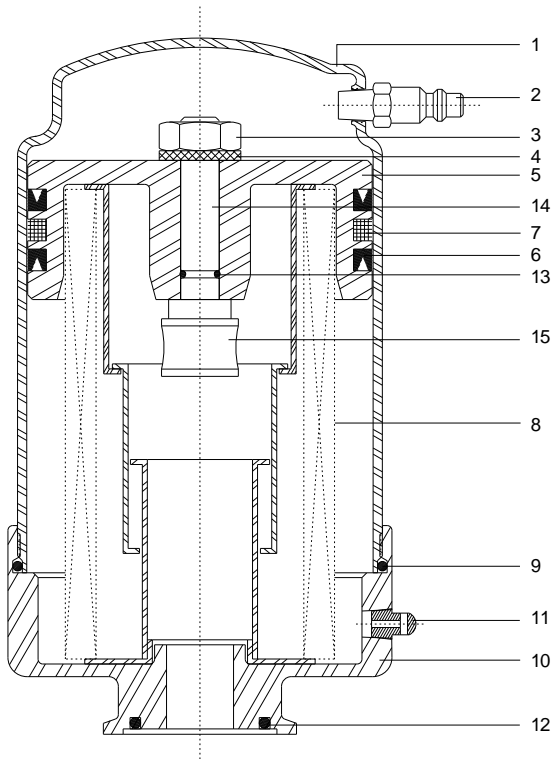
### PARTS LIST

#### Type 10 & 20 Actautors

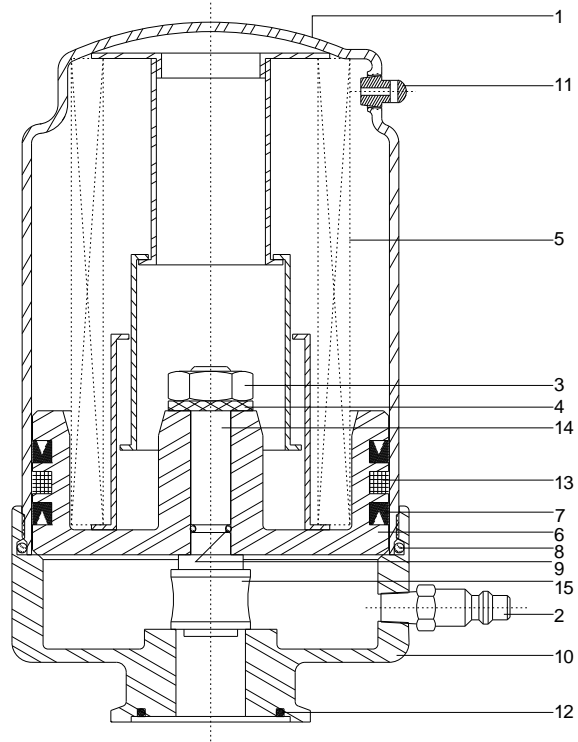
##### Actuator Assembly Part Numbers

Application	Type 10	Type 20
Shut-Off Valves 1", 1 1/2" & 2"	25-161-210-1-S	25-161-220-1-S
Shut-Off Valves 2 1/2" & 3"	25-161-210-2-S	25-161-220-2-S
Shut-Off Valves 4"	25-161-210-4-S	25-161-220-4-S
Divert Valves 1 1/2" & 2"	25-161-210-3-S	25-161-220-3-S
Divert Valves 2 1/2"	25-161-210-4-S	25-161-220-4-S
Divert Valves 3" & 4"	25-161-210-5-S	25-161-220-5-S

Type 10



Type 20





## Type 10 Actuator

Key #	Description	25-161-210-1-S	25-161-210-2-S	25-161-210-3-S	25-161-210-4-S	25-161-210-5-S	No. Req'd
1	Actuator body cylinder	25-161-210-1-01-S	25-161-210-2-01-S	25-161-210-3-01-S	25-161-210-4-01-S	25-161-210-5-01-S	1
2	Air coupler adapter	25-361-210-06-S	25-361-210-06-S	25-361-210-06-S	25-361-210-06-S	25-361-210-06-S	1
3	Nut	NU1700H-SS	NU1700H-SS	NU1700H-SS	NU1700H-SS	NU1700H-SS	1
4	Lockwasher	LWA1700-SS	LWA1700-SS	LWA1700-SS	LWA1700-SS	LWA1700-SS	1
5	Piston	25-361-210-02	25-361-210-02	25-361-210-02	25-361-210-02	25-361-210-02	1
* 6	Vee block packing	17-97	17-97	17-97	17-97	17-97	2
* 7	Felt seal	17-101	17-101	17-101	17-101	17-101	1
8	Spring assembly	25-161-210-1-07-S	25-161-210-2-07-S	25-161-210-3-07-S	25-161-210-4-07-S	25-161-210-5-07-S	1
* 9	O-ring, Type 10	10CPLO-3-73-1A	10CPLO-3-73-1A	10CPLO-3-73-1A	10CPLO-3-73-1A	10CPLO-3-73-1A	1
10	Bonnet	25-161-210-1-03-S	25-161-210-1-03-S	25-161-210-1-03-S	25-161-210-1-03-S	25-161-210-1-03-S	1
11	Vented plug	MS-105-58A-CP	MS-105-58A-CP	MS-105-58A-CP	MS-105-58A-CP	MS-105-58A-CP	1
* 12	O-ring	17-2-U	17-2-U	17-2-U	17-2-U	17-2-U	1
* 13	O-ring	17-35-U	17-35-U	17-35-U	17-35-U	17-35-U	1
14	Coupler stud	25-161-210-1-09-S	25-161-210-1-09-S	25-161-210-1-09-S	25-161-210-1-09-S	25-161210-1-09-S	1
* 15	Coupler	37-95A-SS	37-95A-SS	37-95A-SS	37-95A-SS	37-95A-SS	1

\* It is recommended that one spare part of each item marked (\*) with the exception of item 6, in which case two spares should be stocked.

**Note:** It is also recommended that a tube of C137 lubricant be stocked for servicing stainless steel actuators.

## Type 20 Actuator

Key #	Description	25-161-220-1-S	25-161-220-2-S	25-161-220-3-S	25-161-220-4-S	25-161-220-5-S	No. Req'd
1	Actuator body cylinder	25-161-210-1-01-S	25-161-210-2-01-S	25-161-210-3-01-S	25-161-210-4-01-S	25-161-210-5-01-S	1
2	Air coupler adapter	25-361-210-06-S	25-361-210-06-S	25-361-210-06-S	25-361-210-06-S	25-361-210-06-S	1
3	Nut	NU1700H-SS	NU1700H-SS	NU1700H-SS	NU1700H-SS	NU1700H-SS	1
4	Lockwasher	LWA1700-SS	LWA1700-SS	LWA1700-SS	LWA1700-SS	LWA1700-SS	1
5	Spring assembly	25-161-210-1-07-S	25-161-210-2-07-S	25-161-210-3-07-S	25-161-210-4-07-S	25-161-210-5-07-S	1
* 6	Vee block packing	17-97	17-97	17-97	17-97	17-97	2
* 7	Felt seal	17-101	17-101	17-101	17-101	17-101	1
8	Piston	25-361-210-02	25-361-210-02	25-361-210-02	25-361-210-02	25-361-210-02	1
* 9	O-ring, Type 20	10CPLO-3-73-1A-U	10CPLO-3-73-1A-U	10CPLO-3-73-1A-U	10CPLO-3-73-1A-U	10CPLO-3-73-1A-U	1
10	Bonnet	25-161-210-1-03-S	25-161-210-1-03-S	25-161-210-1-03-S	25-161-210-1-03-S	25-161-210-1-03-S	1
11	Vented plug	MS-105-58A-CP	MS-105-58A-CP	MS-105-58A-CP	MS-105-58A-CP	MS-105-58A-CP	1
* 12	O-ring	17-2-U	17-2-U	17-2-U	17-2-U	17-2-U	1
* 13	O-ring	17-35-U	17-35-U	17-35-U	17-35-U	17-35-U	1
14	Coupler stud	25-161-210-1-09-S	25-161-210-1-09-S	25-161-210-1-09-S	25-161-210-1-09-S	25-161210-1-09-S	1
* 15	Coupler	37-95A-SS	37-95A-SS	37-95A-SS	37-95A-SS	37-95A-SS	1

\* It is recommended that one spare part of each item marked (\*) with the exception of item 6, in which case two spares should be stocked.

**Note:** It is also recommended that a tube of C137 lubricant be stocked for servicing stainless steel actuators.

# TYPE 15 ACTUATOR

## Introduction

The 15 actuator is an air to close-spring to open unit, which utilizes a diaphragm for reduced friction.



**WARNING:** To prevent personal injury, remove actuator from valve before disassembling actuator. The actuator spring is not contained. Although preload force is low, caution should be used when the spring forces is released. Hand pressure should be applied to the top of the cylinder to restrict its travel.

## Actuator Disassembly

1. Remove actuator cylinder from bonnet by applying strap wrench to the cylinder and turning in counterclockwise direction until cylinder and bonnet can be separated. When the cylinder is completely unscrewed the spring force will push it up. Apply hand pressure as noted in warning note above.
2. Remove the cylinder from the bonnet.
3. Remove the spring from the bonnet.
4. Remove air coupler adapter, gasket, and sealing nut.
5. Slide cylinder off actuator internals.
6. Slide body insert and diaphragm from outer diaphragm clamp/retainer.
7. Remove coupler, washers, and retainer assembly nut. Retainer nut may be readily removed by inserting a punch in a hole in the retainer nut face, and tapping the nut in a counterclockwise direction.
8. Separate top and inner diaphragm clamp/retainers, freeing diaphragm.

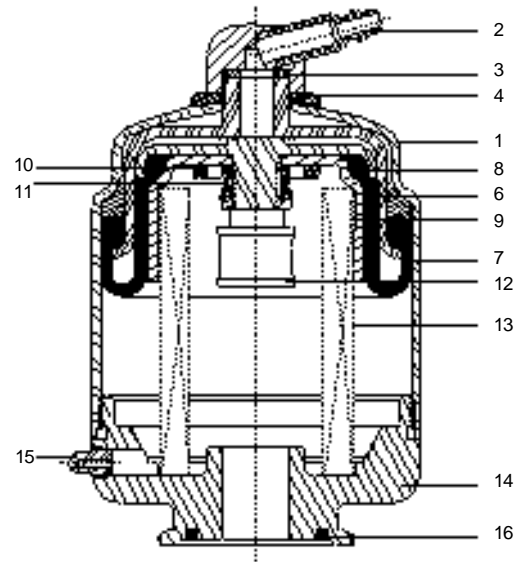
## Actuator Reassembly

1. Spray diaphragm with a silicone spray lubricant and install between top and inner diaphragm clamp/retainers.
2. Install retainer nut assembly, washers, and coupler.
3. Roll diaphragm onto outer diaphragm clamp/retainer. Slide body insert onto outer diaphragm clamp/retainer.
4. Carefully slide cylinder over diaphragm so that diaphragm is not abraded or torn.
5. Spray gasket with silicone spray lubricant. Install sealing nut, gasket, and air coupler adapter.  
NOTE: Now insert the two flats of the actuator bonnet back into a vise.
6. Place spring in bonnet.
7. Lubricate the cylinder threads with Tri-Clover C137 lubricant. This will prevent the stainless steel threads from galling.
8. Compress spring by hand. Thread the cylinder into the bonnet, and tighten it until it "bottoms". It will be necessary to use a strap wrench for the last few turns.

## PARTS LIST

### Type 15 Actuator

Key #	Description	Part Number	No. Req'd.
1	Actuator body cylinder	25-263B-01-S	1
2	Air coupler adapter	37-5-S	1
3	Gasket	17-88	1
4	Sealing nut	13-78-S	1
5	Outer diaphragm clamp/retainer	36-55	1
*7	Diaphragm	35-1	1
8	Top diaphragm clamp/retainer	36-15	1
9	Inner diaphragm clamp/retainer	36-3	1
10	Nut-retainer assembly	13-15	1
11	Washer	15-47	1
*12	Coupler	37-13A-SS	1
13	Compression spring	4-2-S	1
14	Bonnet	12-410-2	1
15	Vented plug	MS-105-58A-CP	1
*16	O-ring	17-2-U	1



\* It is recommended that one spare part be stocked for each item marked (\*).  
**Note:** It is also recommended that a tube of C137 lubricant be stocked for servicing stainless steel actuators.

# TYPE 280 ACTUATOR

## Introduction

For regular open and closed operation, apply air to the top center air connection. This will fully close the valve bottom port. Release the air supply to fully open the valve bottom port. The actuator is normally open to the bottom port.

## Installation

For intermediate or split-flow operation, apply air to the side air connection. This will position the valve in approximately mid position for split flow, depending on how the actuator is adjusted. Adjust the mid position as follows:

1. Loosen the jamnut on the top center of the actuator.
2. Use a wrench on the air coupler hex fitting and rotate the complete air guide stem.
3. Turn clockwise to give more restriction to the valve bottom port.
4. Turn counterclockwise to give more restriction to the top port.

NOTE: Use two 3-way solenoid valves to control air to the above connections.

## Actuator Disassembly

1. Secure the two flat edges on the actuator ferrule in a vise. This will keep the bonnet from turning when removing the actuator cylinder.
2. Remove the actuator cylinder from the bonnet by applying a strap wrench to the cylinder and turning counterclockwise.
3. Lift the spring from the bonnet and remove the bonnet from the vise.
4. Slowly slide the primary piston out of the cylinder.
5. Use suitable wrenches on the machined flats of the coupler and remove the stem nut and lockwasher from the piston.
6. Remove the coupler stud from the piston. Use suitable wrenches to remove the coupler from the coupler stud.
7. Remove the jamnut from the upper bonnet.
8. Remove the air guide stem by rotating counterclockwise and removing from inside the cylinder.
9. Slowly slide the secondary piston out of the cylinder.

NOTE: It is not necessary to remove the upper bonnet from the cylinder unless the o-ring does not seal properly.

## Actuator Reassembly

1. Install the upper o-ring and Quad ring on the secondary piston. Lightly coat the inside of the cylinder wall and the O.D. of the secondary piston with lubricant.
2. Slowly slide the secondary piston into the cylinder. Use shim stock or a thin flat tool to compress the Quad ring on the piston to get it started in the cylinder. Make sure the piston cavity faces out. Slide the piston into the cylinder until it seats against the stop on the upper bonnet.
3. Install the o-ring on the air guide stem. Insert the stem into the piston bore and out through the upper bonnet. Turn in a clockwise direction to the desired position.
4. Install the jamnut to the air guide stem.
5. Install the coupler to the coupler stud. Install the o-ring on the coupler stud. Insert the assembly into the piston so that the coupler is on the same side as the piston cavity. Secure with the lockwasher and stem nut.
6. Secure the lower bonnet in a vise and place the spring assembly over the hub in the bonnet. Place the small diameter of the spring cage into the bonnet first.
7. Apply Tri-Clover C137 lubricant to the O.D. of packings and the felt seal and install in the piston. Place the piston, with the piston cavity facing the spring, over the spring. Be sure the packing lip of the upper packing is toward the top of the piston and the lip of the lower packing is toward the bottom of the piston.
8. Lubricate inside walls of cylinder with C137 lubricant, and slowly slide the cylinder over the piston. Use a shim stock or a thin, flat tool to compress the upper packing on the piston to get it started in the cylinder.

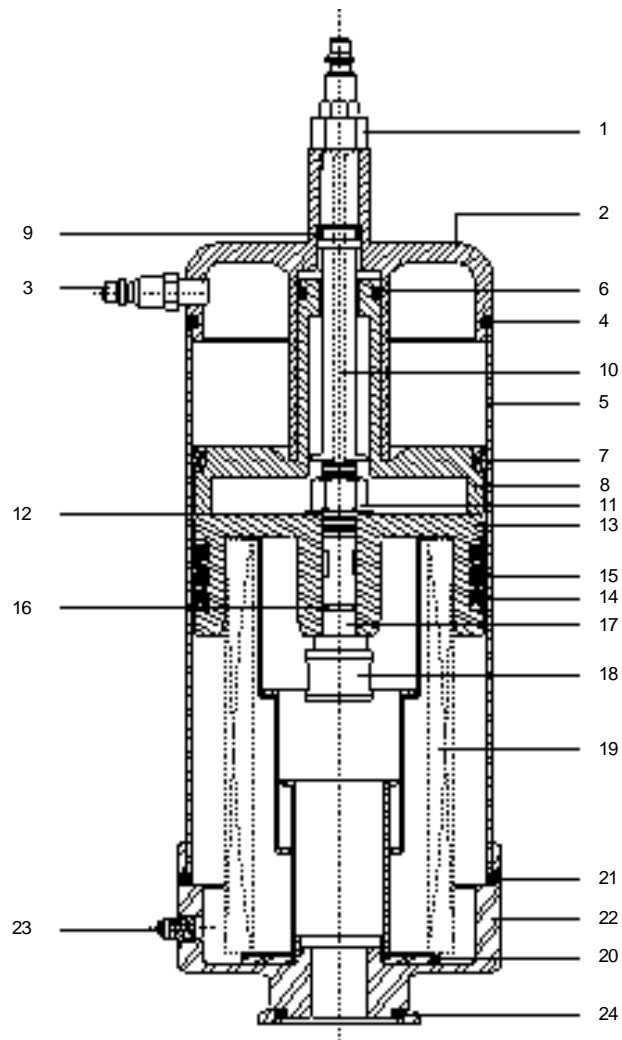
9. Lubricate the cylinder threads with Tri-Clover C137 lubricant. This will prevent the stainless steel threads from galling.
10. Install the bonnet o-ring. Thread the cylinder into the bonnet until it bottoms. Use a strap wrench for the last few turns.
11. Install the o-ring in the groove on the lower bonnet ferrule.
12. Refer to the instructions for adjusting the intermediate position in the INSTALLATION paragraph.

## PART LIST

### Type 280 Actuator

#### Actuator Assembly Part Numbers

Application-Divert Valves	Actuator
161-21-280-1½	25-161-280-1-S
161-21-280-2	25-161-280-2-S
161-21-280-2½	25-161-280-3-S
161-21-280-3	25-161-280-4-S
161-21-280-4	25-161-280-5-S



## Type 280 Actuator

Key #	Description	25-161-280-1-S	25-161-280-2-S	25-161-280-3-S	25-161-280-4-S	25-161-280-5-S	No. Req'd.
1	Jamnut	25-361-280-18-S	25-361-280-18-S	25-361-280-18-S	25-361-280-18-S	25-361-280-18-S	1
2	Actuator bonnet	25-161-280-1-03	25-161-280-2-03	25-161-280-3-03	25-161-280-4-03	25-161-280-5-03	1
3	Air coupler adapter	25-361-210-06-S	25-361-210-06-S	25-361-210-06-S	25-361-210-06-S	25-361-210-06-S	1
* 4	O-ring	17-99-U	17-99-U	17-99-U	17-99-U	17-99-U	1
5	Cylinder	25-161-280-1-01-S	25-161-280-2-01-S	25-161-280-3-01-S	25-161-280-4-01-S	25-161-280-5-01-S	1
* 6	O-ring	17-4-U	17-4-U	17-4-U	17-4-U	17-4-U	1
* 7	Quad ring	17-137Q	17-137Q	17-137Q	17-137Q	17-137Q	1
8	Piston	25-161-280-1-02	25-161-280-2-02	25-161-280-3-02	25-161-280-4-02	25-161-280-5-02	1
* 9	O-ring	60YM23-1-34-U	60YM23-1-34-U	60YM23-1-34-U	60YM23-1-34-U	60YM23-1-34-U	1
10	Air guide stem assembly	25-161-280-1-16-S	25-161-280-2-16-S	25-161-280-3-16-S	25-161-280-4-16-S	25-161-280-5-16-S	1
11	Nut	NU1700H-SS	NU1700H-SS	NU1700H-SS	NU1700H-SS	NU1700H-SS	1
12	Lockwasher	LWA1700-SS	LWA1700-SS	LWA1700-SS	LWA1700-SS	LWA1700-SS	1
13	Piston	25-361-210-02	25-361-210-02	25-361-210-02	25-361-210-02	25-361-210-02	1
* 14	Vee block packing	17-97	17-97	17-97	17-97	17-97	2
* 15	Felt seal	17-101	17-101	17-101	17-101	17-101	1
* 16	O-ring	17-35-U	17-35-U	17-35-U	17-35-U	17-35-U	1
17	Coupler stud	25-161-210-1-09-S	25-161-210-1-09-S	25-161-210-1-09-S	25-161-210-1-09-S	25-161-210-1-09-S	1
* 18	Coupler	37-95A-SS	37-95A-SS	37-95A-SS	37-95A-SS	37-95A-SS	1
19	Spring assembly	25-161-210-1-07-S	25-161-210-2-07-S	25-161-210-3-07-S	25-161-210-4-07-S	25-161-210-5-07-S	1
20	Spacer	25-161-280-22-1	-	-	-	-	-
* 21	O-ring	10CPLO-3-73-1A-U	10CPLO-3-73-1A-U	10CPLO-3-73-1A-U	10CPLO-3-73-1A-U	10CPLO-3-73-1A-U	1
22	Lower bonnet	25-161-210-1-03-S	25-161-210-1-03-S	25-161-210-1-03-S	25-161-210-1-03-S	25-161-210-1-03-S	1
23	Plug, vented	MS-105-58A-CP	MS-105-58A-CP	MS-105-58A-CP	MS-105-58A-CP	MS-105-58A-CP	1
24	O-ring	17-2-U	17-2-U	17-2-U	17-2-U	17-2-U	1

\* It is recommended that one spare part be stocked for each item marked (\*), with the exception of item 14, for which two spares should be stocked.

**Note:** It is also recommended that a tube of C137 lubricant be stocked for servicing stainless steel actuators.

# PARTS LIST

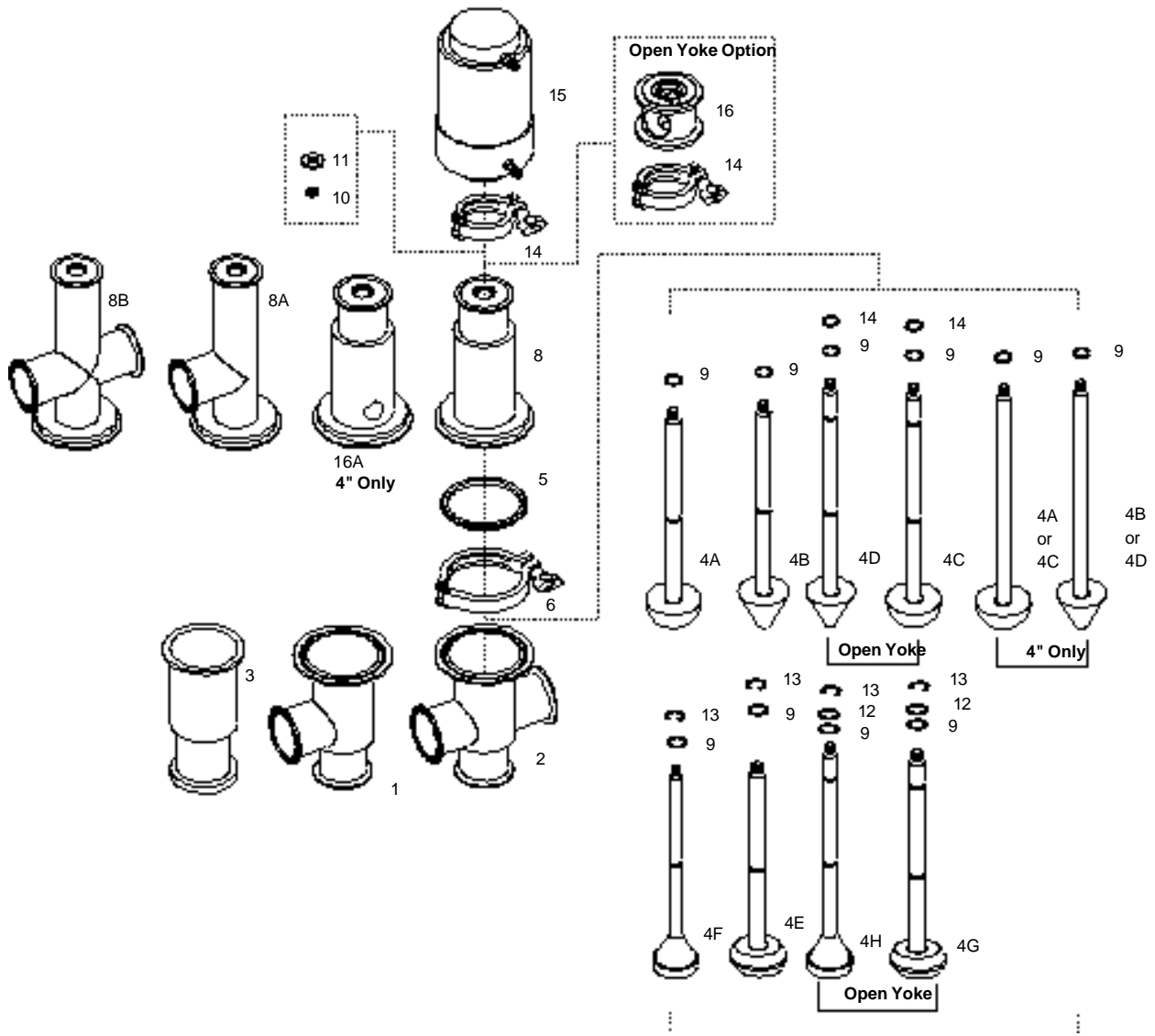
## 161 Shut Off Valves

## 171 Throttling Valves

All orders for repair parts must contain the following data.

1. Complete model number (located on actuator nameplate), including size.
2. Valve serial number (located on nameplate).
3. Description and part number from the parts list.

The following exploded view and accompanying parts list facilitate ordering repair parts from the factory. All parts illustrated are indexed to the parts list by key number.



## 161 and 171 Shut Off and Throttling Valves

Key #	Description	1"	1 1/2"	2"	2 1/2"	3"	4"
* 1	Valve, lower body-Model 10	7-225T-1-316	7-225T-1 1/2-316	7-225T-2-316	7-225T-2 1/2-316	7-225T-3-316	7-225T-4-316
* 2	Valve, lower body-Model 30	7-225C-1-316	7-225C-1 1/2-316	7-225C-2-316	7-225C-2 1/2-316	7-225C-3-316	7-225C-4-316
* 3	Valve, lower body-Models 27 & 47	-	7-241A-1 1/2-316	7-241A-2-316	7-241A-2 1/2-316	7-241A-3-316	7-241A-4-316
• 4A	Valve plug assembly-Models 161-10 & 30	19-627-1-316	19-627-1 1/2-316	19-627-2-316	19-627-2 1/2-316	19-627-3-316	19-627C-4-316
• 4B	Valve Plug Assembly	19-269-1-316	19-269-1 1/2-316	19-269-2-316	19-269-2 1/2-316	19-269-3-316	19-269-4-316
• 4C	Valve plug assembly-Models 161OY-10 & 30	19-1258-1-316	19-1258-1 1/2-316	19-1258-2-316	19-1258-2 1/2-316	19-1258-3-316	19-627C-4-316
• 4D	Valve plug assembly-Models 171OY-10 & 30	19-1286-1-316	19-1286-1 1/2-316	19-1286-2-316	19-1286-2 1/2-316	19-1286-3-316	19-269-4-316
• 4E	Valve plug assembly-Models 161-27 & 47	-	19-748-1 1/2-316	19-748-2-316	19-748-2 1/2-316	19-748-3-316	19-748-4-316
• 4F	Valve plug assembly-Model 171-27	-	19-986-1 1/2-316	19-986-2-316	19-986-2 1/2-316	19-986-3-316	-
• 4G	Valve plug assembly-Models 161OY-27 & 47	-	19-1299-1 1/2-316	19-1299-2-316	19-1299-2 1/2-316	19-1299-3-316	-
• 4H	Valve plug assembly-Models 171OY-27	-	19-1292-1 1/2-316	19-1292-2-316	19-1292-2 1/2-316	19-1292-3-316	-
• 5	Body gasket	17-62-1 1/2-U	17-62-1 1/2-U	17-62-2-U	17-62-2 1/2-U	17-62-3-U	17-62-4 1/2-U
• 6	Body clamp	H13MHMM-1 1/2-S	H13MHMM-1 1/2-S	H12MHMM-2-S	H13MHMM-2 1/2-S	H13MHMM-3-S	H13MHMM-4-S
• 8	Valve bonnet-Models 10 & 30	12-102-1 1/2-316	12-102-1 1/2-316	12-102-2-316	12-102-2 1/2-316	12-102-3-316	12-102-4-316
* 8A	Valve, upper body-Model 27	-	7-226T-1 1/2-316	7-226T-2-316	7-226T-2 1/2-316	7-226T-3-316	7-226T-4-316
* 8B	Valve, upper body-Model 47	-	7-226C-1 1/2-316	7-226C-2-316	7-226C-2 1/2-316	7-226C-3-316	7-226C-4-316
• 9	O-ring, valve plug stem	17-1-U	17-1-U	17-1-U	17-5-U	17-5-U	01-1165-11-U
• 10	O-ring, valve bonnet	17-5-U	17-5-U	17-5-U	17-17-U	17-17-U	17-17-U
• 11	Stainless steel washer	15-31-S	15-31-S	15-31-S	15-26-S	15-26-S	15-26-S
• 12	Open Yoke O-Ring	17-35-U	17-35-U	17-35-U	17-163-U	17-163-U	-
• 13	E ring-valve plug stem-Models 27 & 47	-	16-5-S	16-5-S	16-5-S	16-5-S	16-5-S
• 14	Actuator clamp	13MHMM-2-S	13MHMM-2-S	13-MHMM-2-S	13MHMM-2-S	13MHMM-2-S	13MHMM-2-S
• 15	Actuator	-	See appropriate Actuator Section in this manual	-	-	-	-
• 16	Open Yoke	12-491-1-S	12-491-1-S	12-491-1-S	12-491-2 1/2-S	12-491-2 1/2-S	12-102B-4-316
• 16A	OY - Bonnet	-	-	-	-	-	-

\* **Note:** Specify the type of port connections required.

- It is recommended that one of each of these items be stocked as spare parts.

# PARTS LIST

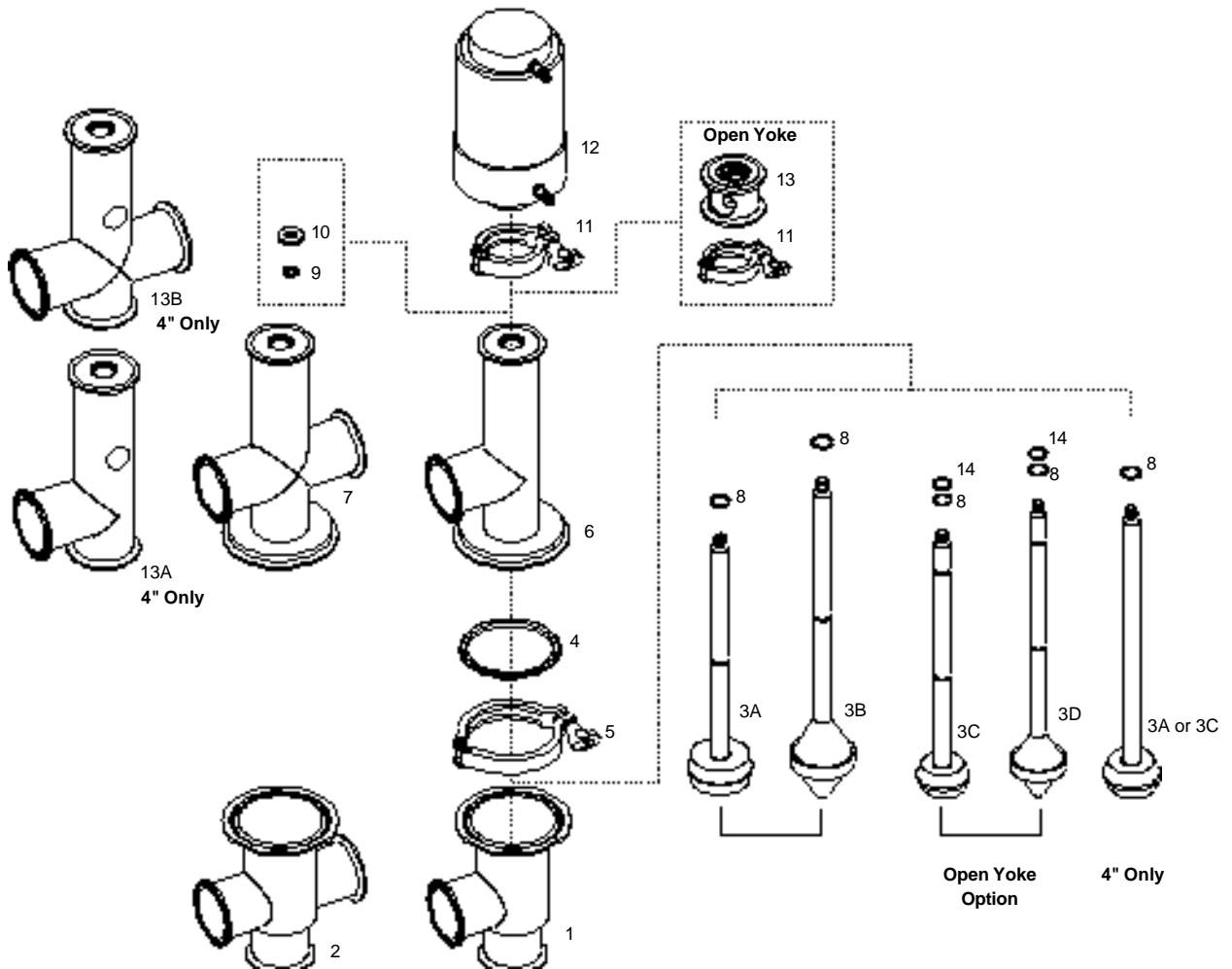
## 161 Divert Valves

## 171 Divert Valves

All orders for repair parts must contain the following data.

1. Complete model number (located on actuator nameplate), including size.
2. Valve serial number (located on nameplate).
3. Description and part number from the parts list.

The following exploded view and accompanying parts list facilitate ordering repair parts from the factory. All parts illustrated are indexed to the parts list by key number.





## 161 and 171 Divert Valves

Key #	Description	1 1/2"	2"	2 1/2"	3"	4"
* 1	Valve, lower body- Models 21 & 41	7-225T-1 1/2-316	7-225T-2-316	7-225T-2 1/2-316	7-225T-3-316	7-225T-4-316
* 2	Valve, lower body- Models 23 & 43	7-225C-1 1/2-316 19-947-1 1/2-316 19-281-1 1/2-316	7-225C-2-316 19-647-2-316 19-281-2-316	7-225C-2 1/2-316 79-647-2 1/2-316 19-281-2 1/2-316	7-225C-3-316 19-647-3-316 19-281-3-316	7-225C-4-316 19-647A-4-316 ---
• 3A	Valve Plug Assembly - 161	19-281-1 1/2-316	19-281-2-316	19-281-2 1/2-316	19-281-3-316	---
• 3B	Valve Plug Assembly - 171	19-1257-1 1/2-316	19-1257-2-316	19-1257-2 1/2-316	19-1257-3-316	19-647A-4-316
• 3C	Valve Plug Assembly	19-1291-1 1/2-316 17-62-1 1/2-U H13MHHM-1 1/2-S	19-1291-2-316 17-62-2-U H13MHHM-2-S	19-1291-2 1/2-316 17-62-2 1/2-U H13MHHM-2 1/2-S	19-1291-3-316 17-62-3-U H13MHHM-3-S	---
• 3D	Valve Plug Assembly	19-1291-1 1/2-316	19-1291-2-316	19-1291-2 1/2-316	19-1291-3-316	---
• 4	Body gasket	17-62-1 1/2-U	17-62-2-U	17-62-2 1/2-U	17-62-3-U	17-62-4 1/2-U
• 5	Body clamp	H13MHHM-1 1/2-S	H13MHHM-2-S	H13MHHM-2 1/2-S	H13MHHM-3-S	H13MHHM-4-S
* 6	Valve, upper body- Models 21 & 23	7-226T-1 1/2-316	7-226T-2-316	7-226T-2 1/2-316	7-226T-3-316	7-226TA-4-316
* 7	Valve, upper body- Models 41 & 43	7-226C-1 1/2-316 17-1-U 17-5-U 15-31-S 13MHHM-2-S	7-226C-2-316 17-1-U 17-5-U 15-31-S 13MHHM-2-S	7-226C-2 1/2-316 17-5-U 17-17-U 15-26-S 13MHHM-2-S	7-226C-3-316 17-5-U 17-17-U 15-26-S 13MHHM-2-S	7-226CA-4-316 1-1165-11-U 17-17-U 15-26-S 13MHHM-2-S
• 8	O-ring, valve plug stem	17-1-U	17-1-U	17-5-U	17-5-U	1-1165-11-U
• 9	O-ring, valve bonnet	17-5-U	17-5-U	17-17-U	17-17-U	17-17-U
10	SS Washer	15-31-S	15-31-S	15-26-S	15-26-S	15-26-S
11	Actuator clamp	13MHHM-2-S	13MHHM-2-S	13MHHM-2-S	13MHHM-2-S	13MHHM-2-S
12	Actuator	12-491-1-S	12-491-1-S	See appropriate Actuator Section in this manual.	12-491-2 1/2-S	---
13	Open Yoke	---	---	---	---	---
13A	Open Yoke Body	---	---	---	---	7-226TB-4-316
13B	Open Yoke Body	---	---	---	---	7-226CB-4-316
14	O-ring	17-35-U	17-35-U	17-163-U	17-163-U	17-163-U

\* **Note:** Specify the type of port connections required.

• It is recommended that one each of these items be stocked as spare parts.

# PARTS LIST

## 161-90 "Y" Body Shut Off Valve

## 171-10-90 Tri-Flo Manually Operated Micrometer Valve

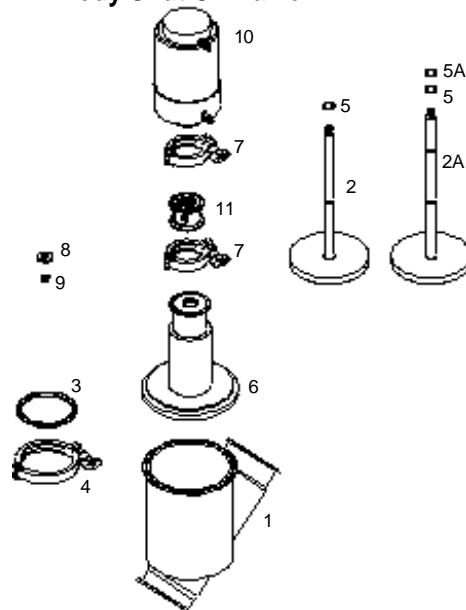
All orders for repair parts must contain the following data.

1. Complete model number (located on actuator nameplate), including size.
2. Valve serial number (located on nameplate).
3. Description and part number from the parts list.

The following exploded view and accompanying parts list facilitate ordering repair parts from the factory. All parts illustrated are indexed to the parts list by key numbers.

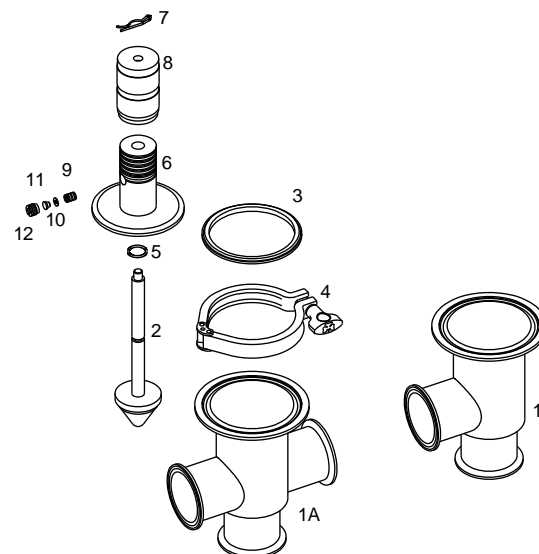
### 161-90

#### "Y" Body Shut Off Valve



### 171-10-90

#### Manually-Operated Micrometer Valve



## 161-90 "Y" Body Shut Off Valve

Key #	Description	1"	1 1/2"	2"	2 1/2"	3"	4"
* 1	Valve, "Y" Body	60YMMP-1-51-316	60YMMP-1 1/2-51-316	60YMMP-2-51-316	60YMMP-2 1/2-51-316	60YMMP-3-316L	E60YMMP-4-51-316L
• 2	Valve, plug assembly	19-821-1-316	19-821-1 1/2-316	19-821-2-316	19-821-2 1/2-316	19-821-3-316	19-821-4-316
• 2A	OY Valve, plug assembly	19-1259-1-316	19-1259-1 1/2-316	19-1259-2-316	19-1259-2 1/2-316	19-1259-3-316	19-1259-4-316
• 3	Body, gasket	60YM-1-15B-U	40MP-U-2 1/2	40MP-U-3	40MP-U-4	40MP-U-5	60YM-4-15B-U
• 4	Body, clamp	16-138-S	H13MHHM-2-S	H13MHHM-2 1/2-S	13MHHM-161-90-2 1/2-S	16-94-S	13MHHVM-161-90-4-S
• 5	O-ring, valve plug stem	17-1-U	17-1-U	17-1-U	17-5-U	17-5-U	17-5-U
• 5A	O-ring, valve plug stem	17-35-U	17-35-U	17-35-U	17-163-U	17-163-U	17-163-U
6	Valve, bonnet	12-15-316	12-16-316	12-17-316	12-18A-316	12-19-316	12-20-316
7	Actuator clamp	13MHHM-2-S	13MHHM-2-S	13MHHM-2-S	13MHHM-2-S	13MHHM-2-S	13MHHM-2-S
8	Stainless steel washer	15-31-S	15-31-S	15-31-S	15-26-S	15-26-S	15-26-S
• 9	O-ring, valve bonnet	17-5-U	17-5-U	17-5-U	17-17-U	17-17-U	17-17-U
10	Actuator-Type 10	25-161-210-90-1-S	25-161-210-1-S	25-161-210-3-S	25-161-210-4-S	25-161-210-5-S	On Application
10	Actuator-Type 20	25-161-220-90-1-S	25-161-220-1-S	25-161-220-3-S	-	-	-
10	Actuator-Type 30	25-161-230-90-1-S	25-161-230-1-S	25-161-230-3-S	25-161-230-4-S	25-161-230-5-S	25-161-230-7-S
11	Yoke	12-491-1-S	12-491-1-S	12-491-1-S	12-491-2 1/2-S	12-491-2 1/2-S	12-491-2 1/2-S

\* **Note:** Specify the type of port connections required.

- It is recommended that one each of these items be stocked as spare parts.

## 171-10-90 Tri-Flo Manually Operated Micrometer Valve

* 1	Body - Tee	7-225T-1-316	7-225T-1 1/2-316	7-225T-2-316	7-225T-2 1/2-316	7-225T-3-316	7-225T-4-316
* 1A	Body - Cross	7-225C-1-316	7-225C-1 1/2-316	7-225C-2-316	7-225C-2 1/2-316	7-225C-3-316	7-225C-4-316
2	Stem	19-797-1-316	19-797-1 1/2-316	19-797-2-316	19-797-2 1/2-316	19-797-3-316	19-797-4-316
• 3	Gasket	17-62-1 1/2-U	17-62-1 1/2-U	17-62-2-U	17-62-2 1/2-U	17-62-3-U	17-62-4 1/2-U
4	Clamp	H13MHHM-1 1/2-S	H13MHHM-1 1/2-S	H13MHHM-2-S	H13MHHM-2 1/2-S	H13MHHM-3-S	H13MHHM-4-S
• 5	O-ring	17-1-U	17-1-U	17-1-U	17-5-U	17-5-U	17-5-U
6	Bonnet	12-368-1 1/2-316	12-368-1 1/2-316	12-368-2-316	12-368-2 1/2-316	12-368-3-316	12-368-4-316
• 7	Clip	10-1164-03-S	10-1164-03-S	10-1164-03-S	10-1164-04-S	10-1164-04-S	10-1164-04-S
8	Knurled handle	8-1-S	8-1-S	8-1-S	8-18-S	8-18-S	8-18-S
§ 9	Spring	4-36	4-36	4-36	4-36	4-36	4-36
§ 10	Washer	15-110	15-110	15-110	15-110	15-110	15-110
• § 11	Friction button	24-21	24-21	24-21	24-21	24-21	24-21
§ 12	Threaded bushing	40-7-S	40-7-S	40-7-S	40-7-S	40-7-S	40-7-S

\* **Note:** Specify the type of port connections required.

- It is recommended that one each of these items be stocked as spare parts except item 10 as noted.
- § **Note:** Quantity required for 1", 1 1/2" and 2" is 2 each; 2 1/2", 3" and 4" are 3 each.

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