ANDERSON GREENWOOD CROSBY

tyco flow control

******

* EX *

******

DWN	S.WILLIS	4-7-99	INSTALLATION, OPERATION AND		
CHK	C. PORTER	4-8-99	MAINTENANCE INSTRUCTIONS FOR		
APPR	A. CHOU	4-8-99	MC AND MT INTEGRAL MANIFOLDS		
APPR	J. W. SPAHR	4-8-99	SIZE	REPORT NUMBER	REV
APPR			A	05.9040.309	A
APPR			PAGE 1 OF 16		

FORM NO. 910 J 5/93

REVISIONS		
REV.	**DESCRIPTION**	**APPROVALS/DATE**
A	ECN #00-1514 Revised entire report.	S.WILLIS 10-13-00 A.CHOU 10-13-00 J.SPAHR 10-13-00

1.0 INTRODUCTION

Anderson Greenwood MC & MT series Integral Manifolds are designed specifically for Rosemount Coplanar style transmitters including Model 3051C, Model 3051P, Model 2024, and the Model 3095 Multivariable transmitters.

The MC series of manifolds are coplanar wafer style, available in 2-valve MC2 for static pressure, 3-valve MC3 with two optional externally valved test ports, 5-valve gas pattern MC5G (double block, double equalize and single vent) and 5-valve power pattern MC5P (double block, double vent and single equalize). For 2-valve and 3-valve series of manifolds, the process connections are available with either 1/2″ or 1/4″ female NPT ports. For 5-valve series of manifolds, the standard process connections are 1/2″ female NPT ports.

The MT series of manifolds are traditional flange style, available in either 2-valve MT2 for static pressure or 3-valve MT3 with 1/4″ female NPT test ports. Process connections are designed with both 1/4″ female NPT ports and futbol flange.

The MC and MT Integral manifolds are available with metal seats only with the options of Teflon, Grafoil and low Emission Graphite stem packings. One exception is MC5G manifolds, which utilize mini-bonnets for two equalize valves and vent valve, Teflon is the only stem packing available. For maximum pressure/temperature ratings see the applicable valve submittal drawing.

2.0 INSTALLATION

The MC or MT Integral Manifolds and Rosemount Coplanar Transmitters are usually pre-assembled, calibrated and seal-tested at Rosemount factories to reduce on-site installation costs. Typically the MC and MT manifolds and transmitters are first assembled to a 2-inch pipe stand or attached to a wall bracket, then the process piping is completed.

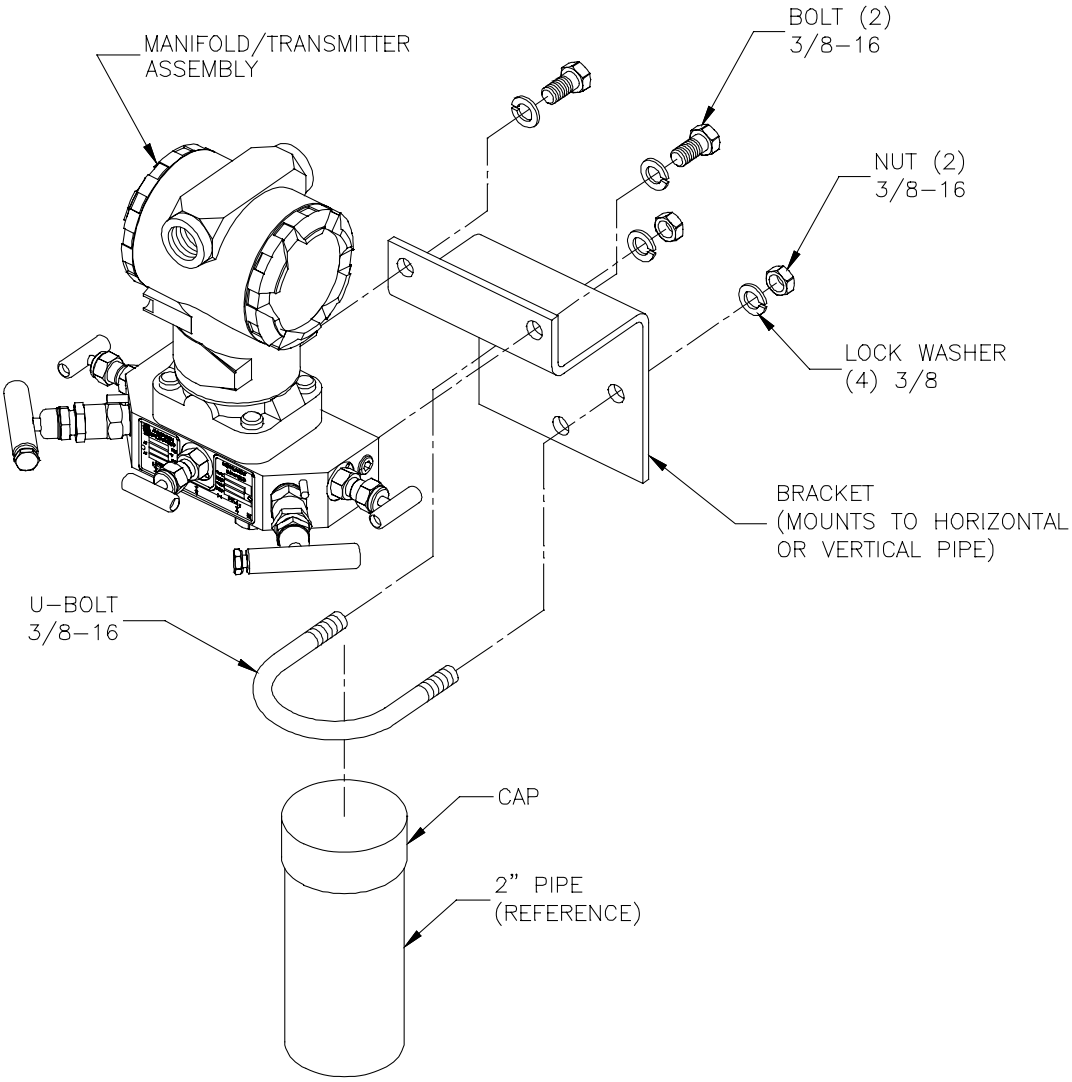
2.1 Check the manifold nameplates and bonnet labels for schematic of valve arrangement and note which ports are for process connections, instrument connections and vent connections.

2.2 AGCO Mount the manifold/transmitter assembly to a 2-inch pipe stand or wall. Typical MC5G manifold/transmitter assembly mounted to a 2-inch pipe stand is shown in Figure 1. A typical MT3 manifold/transmitter assembly mounted to a 2-inch pipe stand is shown in Figure 2.

2.3 Pipe or fitting connections must be made up tight. Threaded pipe joint seals depend on a good fit between the male and female pipe threads. Thread sealant is required.

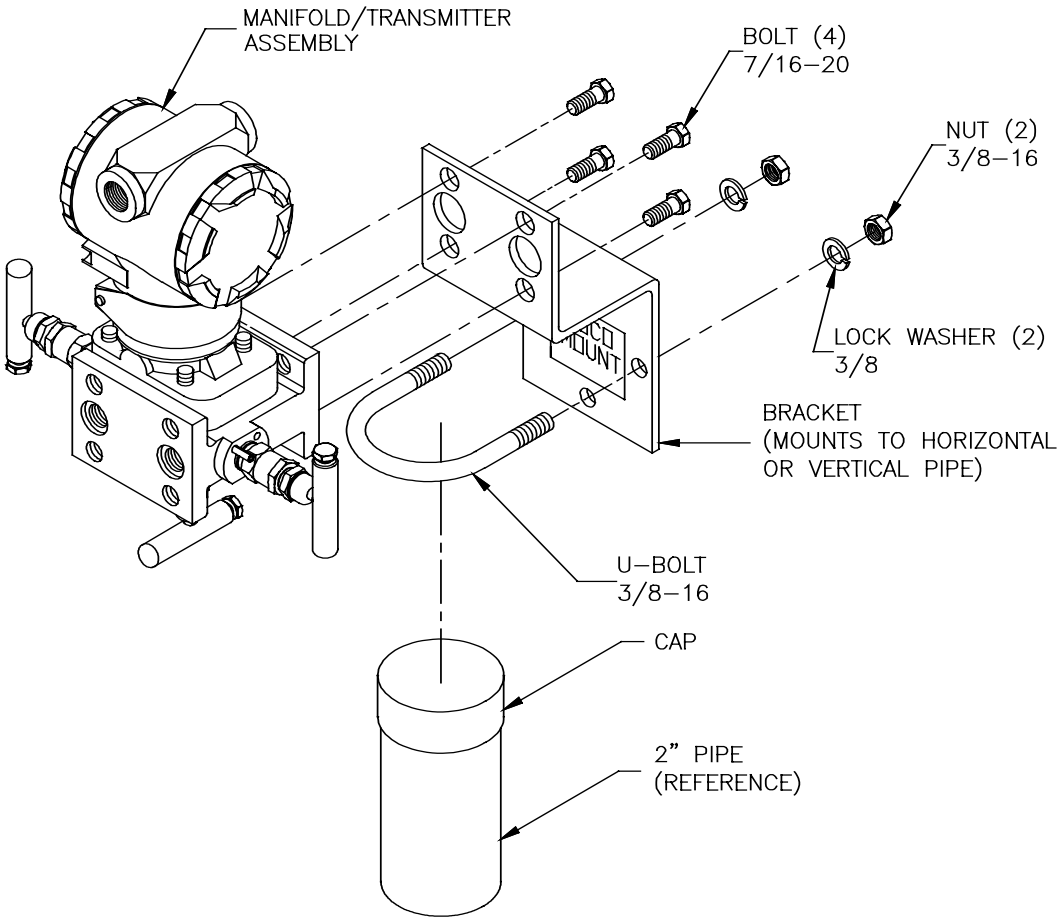
a. Check the threads on both the valve and the mating pipe for both form and cleanliness.

b. Wrenching tighten the NPT pipe joint only enough to seal. Excessive tightening can damage the manifold & piping.



MC5G MANIFOLD/TRANSMITTER ASSEMBLY
AGCO MOUNTED WITH 2" PIPE STAND

FIGURE 1



MT3 MANIFOLD/TRANSMITTER ASSEMBLY
AGCO MOUNTED WITH 2" PIPE STAND

FIGURE 2

3.0 OPERATION

Manifolds which have been reasonably matched to a typical service application and properly installed in its piping system can be expected to have a long service life with a minimum of attention. However, valves have moving and wearing parts and depend on long term preservation of highly finished surfaces on certain working parts for satisfactory performance.

All Anderson Greenwood manifolds have rising stems with right-hand threads. The valve is opened by rotating the stem counter clockwise. The opposite direction to closes the valve. The handle of the valve has been designed to provide an adequate seating force to seal the valve against the maximum pressure of the valve without the use of additional mechanical advantage. The use of a "cheater" to operate the valve is not necessary and not recommended. This practice can cause valve damage.

Anderson Greenwood manifold valves are provided with a backseat. This is a shoulder on the stem or other part of the stem assembly which engages a corresponding seat shoulder on the inner side of the bonnet. It has become generally recognized that use of the stem back-seat for stem sealing may mask unsatisfactory condition of the stem packing. For this reason the use of the backseat for normal stem sealing is not recommended. Backseats in rising stem valves should be considered basically as stops to prevent overtravel when opening valves. Normal practice should be to unseat the backseat slightly. If it is necessary to use the backseat for stem sealing it should be recognized that backseats are usually smaller than the main seat and care should be exercised to avoid applying excessive stem force in backseating.

3.1 OPERATION OF 2-VALVE MANIFOLD

The schematic for the MC2 and MT2 two-valve Integral Manifolds is shown in Figure 3. These 2-valves units are used with coplanar style static pressure transmitters.

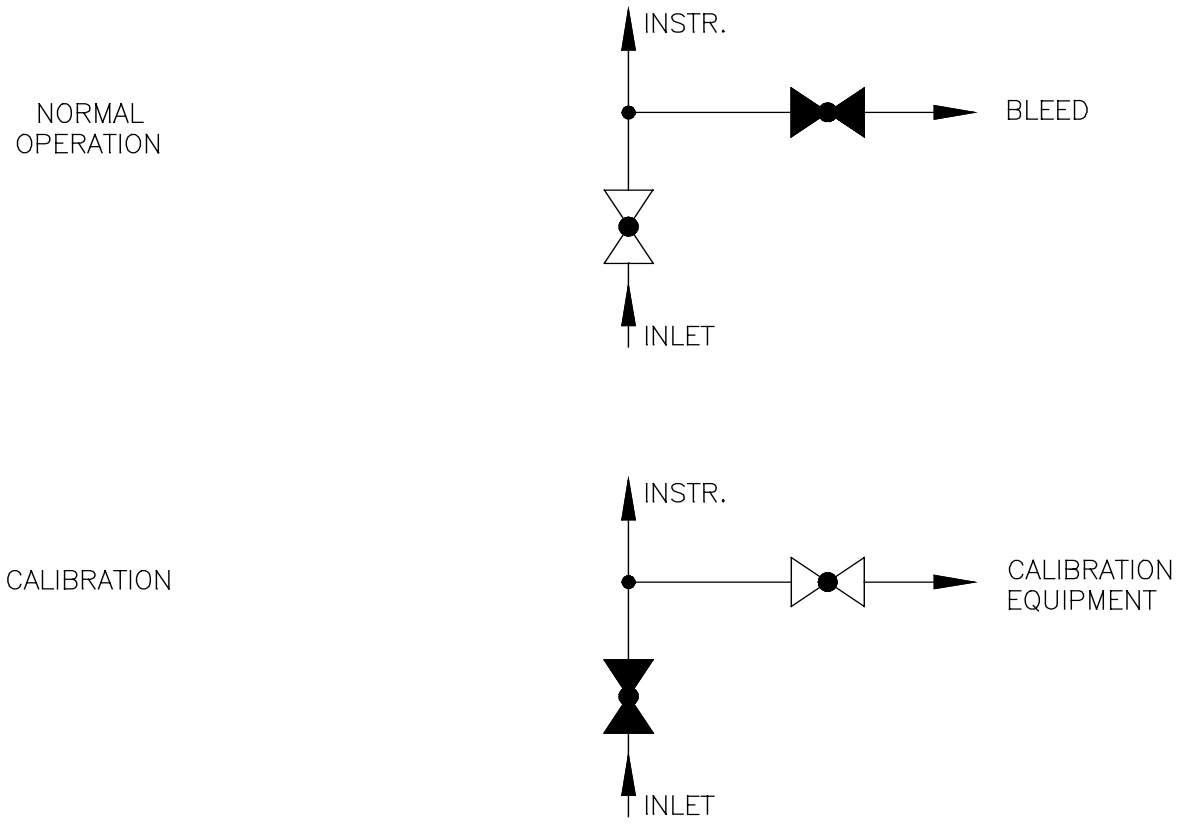


FIGURE 3

a. In normal operation of the system, the block valve between the process and instrument ports will be open and the calibration/vent valve closed.

b. To readjust the instrument to zero, close the block valve to isolate the instrument from the system. Then, open the calibration/vent valve to bleed the instrument pressure to atmosphere pressure. A 1/4″ female NPT threaded outlet is provided for field spot-check or reset of the instrument.

3.2 OPERATION OF 3-VALVE MANIFOLD

The schematic for the MC3 and MT3 3-valve Integral Manifold is shown in Figure 4. These manifolds are three valve units designed for use with coplanar style differential pressure transmitters. Two valves on the beveled sides of the body are block valves for shutting off the high and low side connections to the D/P transmitter when the transmitter is to be adjusted or removed from service. The third valve is an equalizing valve to equalize pressure on the two sides of the instrument while readjusting.

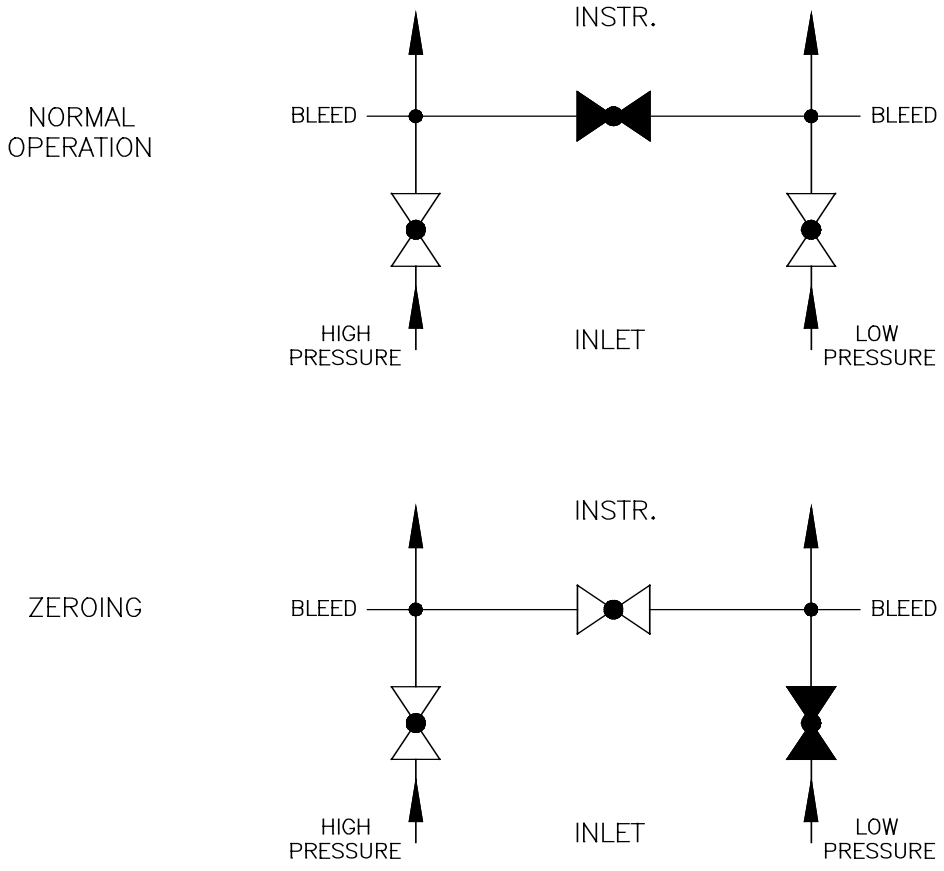


FIGURE 4

a. In normal operation of the system the two block valves will be open and the equalize valve will be closed.

b. To readjust the instrument to zero, close the block valve to the low pressure side (downstream side) of the instrument and open the center valve to equalize the pressure on both sides of the instrument.

c. To return the instrument to service, close the equalize valve and open the block valve to the low pressure side of the instrument.

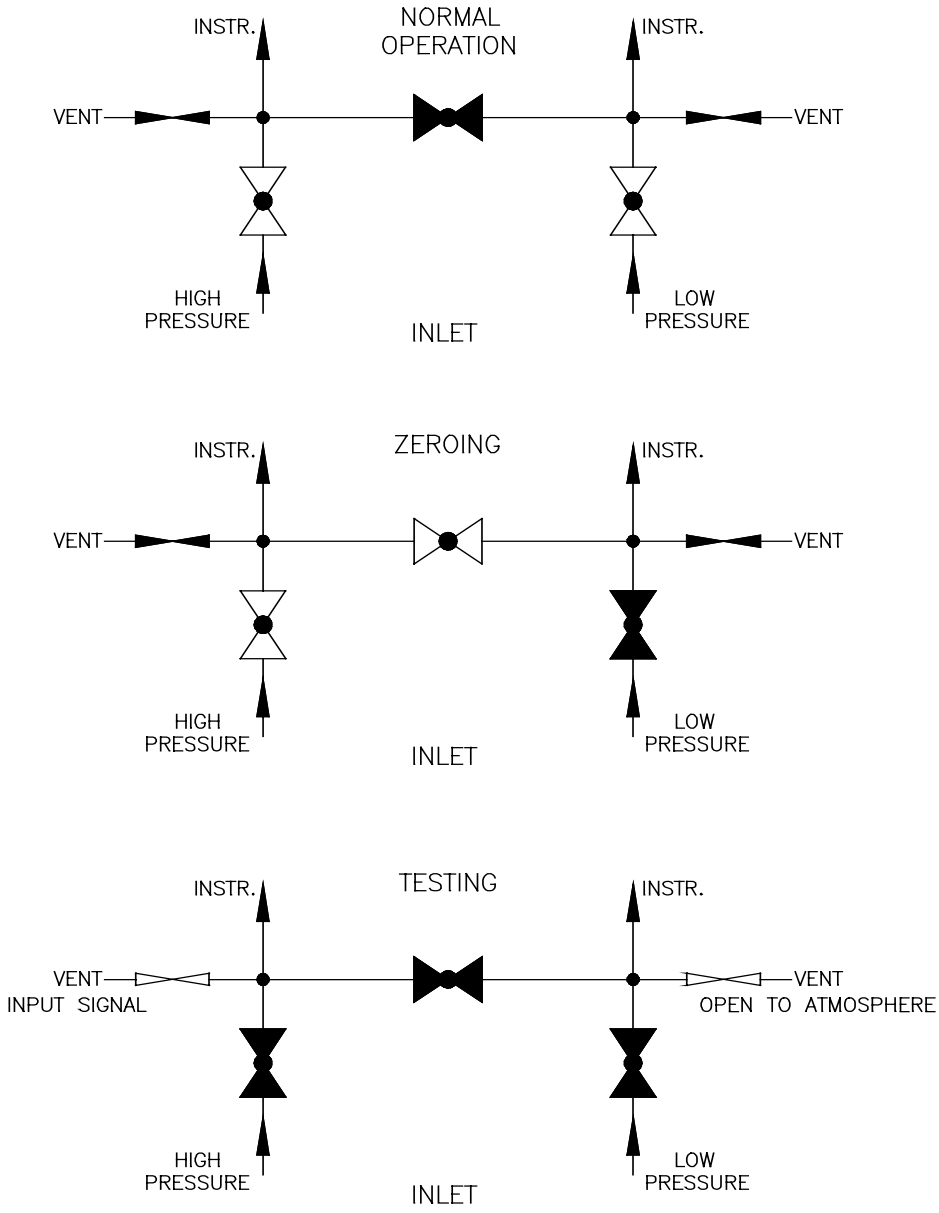


FIGURE 5

3.3 OPERATION OF 5-VALVE POWER PATTERN MANIFOLD

The schematic for the MC5P 5-valve power pattern Integral Manifold is shown in Figure 5. This manifold is similar to the 3-valve manifold in that it has two line block valves and an equalize valve. The other two valves are vent valves for the calibration and test ports which are integral with the manifold.

a. In normal operation of the system the two block valves will be open, the equalize valve will be closed and the two vent valves will be closed.

b. To readjust the instrument to zero, close the block valve to the low pressure side (downstream side) of the instrument and open the center valve to equalize the pressure on both sides of the instrument.

c. To perform a span calibration check on the instrument, both line block valves are closed. Open the equalize valve and crack the low pressure vent valve to release pressure. After the pressure is released, close the equalize valve. Install calibration input-signal tubing to the high pressure vent port and open the high pressure vent port valve. The instrument may now be checked for calibration.

d. To return the instrument to service, close both vent valves. Open the high pressure line block valve then open the low pressure block valve.

3.4 OPERATION OF 5-VALVE GAS PATTERN MANIFOLD

The MC5G 5-valve gas pattern Integral Manifold illustrated in Figure 6 is a five valve unit designed for use with coplanar style differential pressure transmitters. Two valves on the beveled sides of the body are block valves for shutting off the high and low side connections to the D/P transmitter when the transmitter is to be adjusted or removed from service. The three mini-bonnet valves on the other peripheral sides of the body, two equalizing valves and one vent valve, are for equalizing and venting pressure on the two sides of the instrument while readjusting.

a. In normal operation of the system the two block valves along with the vent valve will be open and the two equalize valves will be closed.

b. To readjust the instrument to zero, close the block valve to the low pressure side (downstream side) of the instrument along with the vent valve. Then open the two equalize valves to equalize the pressure on both sides of the instrument.

c. To return the instrument to service, close both equalize valves and open the block valve to the low pressure side of the instrument along with the vent valve.

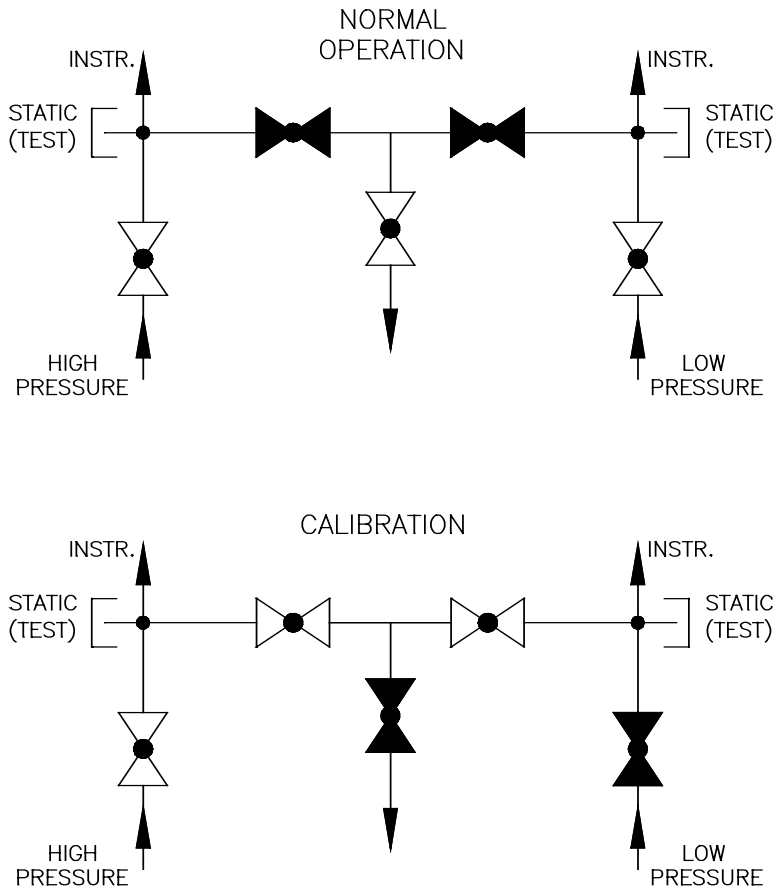


FIGURE 6

4.0 MANIFOLD MAINTENANCE

The important performance parameters are pressure boundary integrity, actuating force required and internal leak tightness. Maintenance should logically address the importance of preserving the performance parameters.

Valves which remain in one position for long periods of time may be subject to some degree of operability loss as a result of loss of effective lubricants in threads, aging of packing surface corrosion of moving parts or accumulation of harmful solids. In some applications it may be desirable to schedule periodic partial or full cycle exercising these valves.

Stem seal leakage usually results from packing wear and can usually be corrected by tightening the packing bushing. Over-tightening can cause high stem friction, accelerated wear and shortened packing life.

4.1 BONNET REMOVAL

If it should become necessary to remove the entire bonnet assembly, the following steps should be followed after the valve has been isolated from the line pressure and pressure bled off.

a. Open the bonnet by turning the handle till the stem backseats.

b. If the bonnet was supplied with a bonnet lock, loosen the panel nut on top of the bonnet lock and thread it up the bonnet as far as it will go. Lift the bonnet lock, exposing the bonnet hex.

c. If the bonnet was not supplied with a bonnet lock, remove the spring pin in the body by using a pair of pliers.

d. Unscrew bonnet counter clockwise to remove bonnet assembly from the valve body.

4.2 STEM SEAL REPLACEMENT

If stem seal replacement is needed, safe practice requires depressurizing the valve before removal of the bonnet. Use of backseat to permit repacking under pressure should be considered unsafe.

4.2.1 TEFLON PACKED Refer to figure 7 for part identification.

a. Place bonnet assembly in soft-jawed vise to facilitate disassembly.

b. Remove handle (item 9) by loosing handle bolt (item 11). Use care to avoid bending the stem.

c. Remove dust boot (item 8) from upper portion of bushing (item 3).

d. Loosen jam nut (item 4) and unscrew bushing off of the stem and out of the bonnet. Hold the stem and bonnet to keep them from rotating. The bushing and stem threads have the same thread pitch.

e. Remove stem (item 1) from bonnet (item 2) by pushing it down-ward.

f. Remove stem seal (item 5) from the bonnet. Use care to avoid damage the packing sealing surfaces.

g. Clean all bonnet assembly parts with Acetone or Alcohol.

h. Inspect parts for damage, particularly the stem threads and ball or plug end. Replace both stem and bonnet bushing if threads do not engage smoothly.

i. Lubricate the stem threads with the appropriate lubricants specified on the assembly drawing.

j. Insert the stem (item 1), threaded end first, into the end of the bonnet (item 2) that is threaded externally.

k. Push stem upward from the bottom of the bonnet.

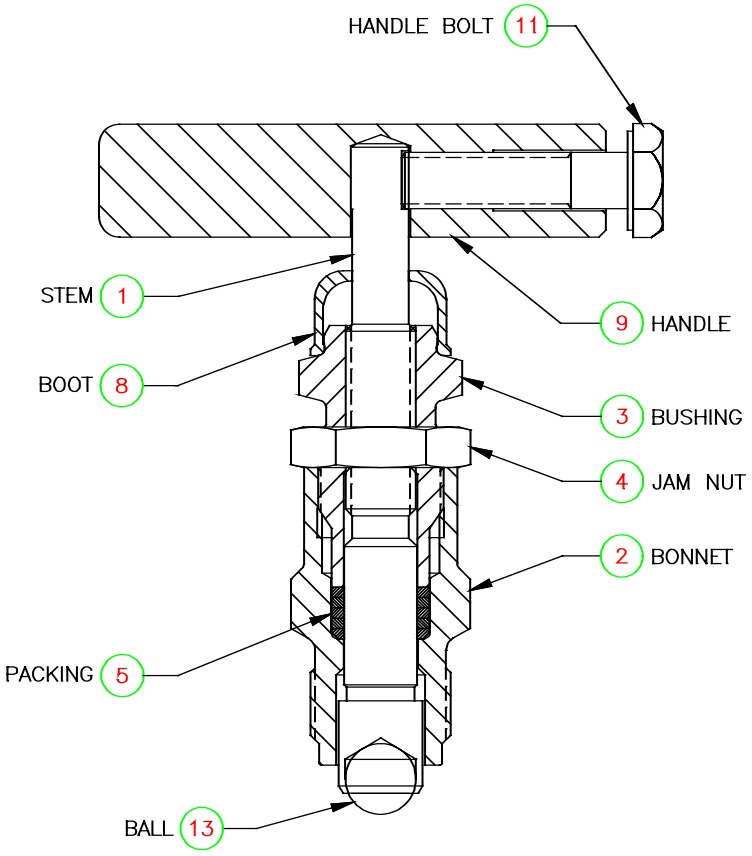
l. Place the stem seal (item 5) over the threaded end of the stem and push it down into the body of the bonnet.

m. Lubricate the bushing (item 3) threads with the appropriate lubricant.

n. Install jam nut (item 4) onto bushing. Place the bushing with jam nut over the stem and start the threads for both the stem and bonnet by hand. Screw the bushing down into the bonnet until it reaches the stem seal.

o. Place the boot (item 8) over the upper portion of the valve stem.

p. Place the handle assembly (item 9) onto the upper portion of the stem and tighten handle bolt (item 11) to 12 in-lb. Be careful not to bend the stem.



TEFLON PACKED
HARD SEAT BONNET

FIGURE 7

4.2.2 TEFLON PACKED (EQUALIZE/VENT VALVES, MC5G MANIFOLDS ONLY)

Refer to Figure 8 for part identifications.

a. Remove handle (item 1) by loosening handle bolt.

b. Remove packing nut (item 2) from bonnet (item 6).

c. Remove packing (item 3) from bonnet.

d. Remove packing washer (item 4) from bonnet.

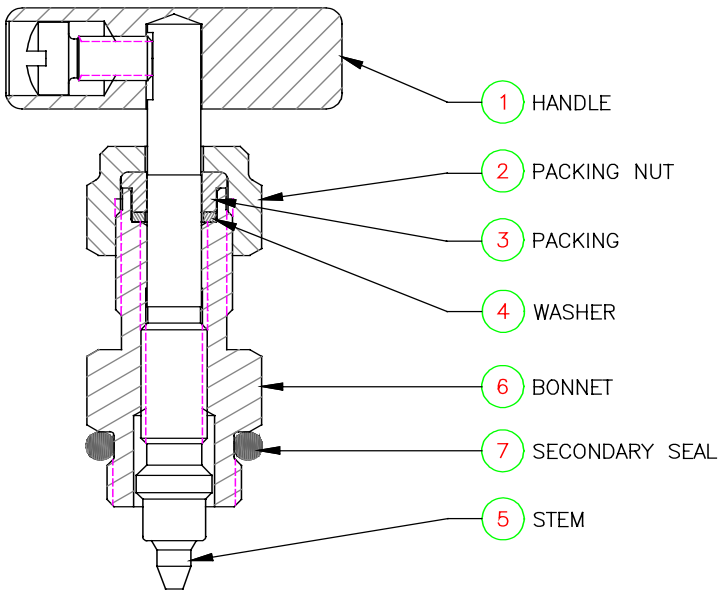
e. Remove stem (item 5) from bonnet.

f. Remove secondary seal (item 7) from bonnet.

g. Clean all bonnet assembly parts with Acetone or Alcohol.

h. Inspect parts for damage, particularly the stem and bonnet threads. Replace both stem and bonnet if threads do not engage smoothly.

i. Lubricate the stem threads with the appropriate lubricant specified on the assembly drawing.



EQUALIZE/VENT VALVE
MINI–BONNET

FIGURE 8

j. Screw stem (item 5) into the bonnet (item 6) from the bottom.

k. Install packing washer (item 4) into the bonnet.

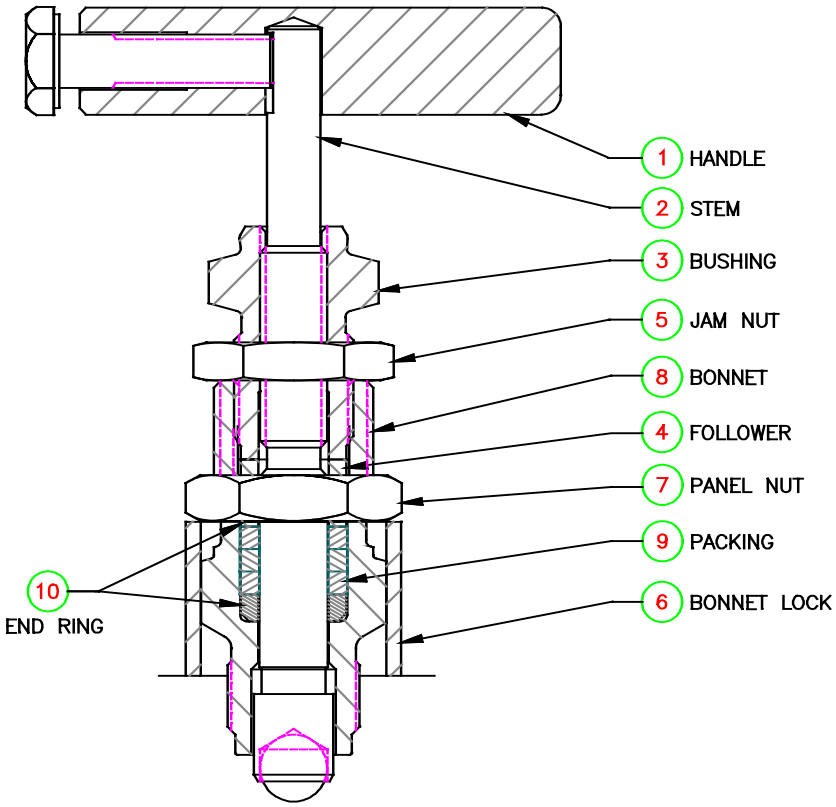
l. Install packing (item 3) into the bonnet.

m. Screw the packing nut (item 2) onto the bonnet and tighten snugly by hand.

n. Install the handle (item 1)_and tighten the handle screw to 25 in-lb.

o. Install secondary seal (item 7) over threaded end of bonnet and into thread relief.

4.2.3 GRAFOIL PACKED Refer to figure 9 for part identification.



GRAFOIL PACKED
HARD SEAT BONNET
WITH BONNET LOCK

FIGURE 9

a. Place bonnet assembly in soft-jawed vise to facilitate disassembly.

b. Loosen the handle bolt and remove the handle (item 1).

c. Loosen the jam nut (item 5) on the bushing (item 3) against the bonnet (item 8). Remove the bushing.

d. Remove stem (item 2) from bonnet (item 8) by pushing it down-ward. Use care to avoid damage the packing sealing surfaces.

e. Remove follower (item 4), then the two end rings (item 10) and three packing rings (item 9).

f. Lightly coat the new packing with packing lubricant. Insert into the packing cavity one new end ring, three rings of new packing, and then a second new end ring.

g. Insert follower over second end ring.

h. Thread bushing onto the stem and into the bonnet. Tighten the bushing to 10-15 ft-lb of torque. Tighten the jam nut firmly against the bonnet.

i. Install and tighten the handle to the upper stem to 10-12 ft-lb of torque.

4.3 VALVE ASSEMBLY

A. BONNET INSTALLATION

1. Lightly lubricate the bonnet threads with the appropriate lubricant. Place a small amount of lubricant on the sealing surface of the bonnet.

2. Place bonnet assembly into seat cavity and screw the bonnet into the body by hand. Make sure that the stem is fully retracted into the bonnet.

3. Tighten the bonnet to the proper torque value shown below using a torque wrench.

   Carbon Steel ---------- 32-38 ft-lb.
   Stainless Steel--------- 35-40 ft-lb.

   EQUALIZE/VENT VALVES, MC5G MANIFOLD ONLY
   Carbon Steel ---------- 13-15 ft-lb.
   Stainless Steel--------- 16-18 ft-lb.

4. Once the system is pressurized, further tightening of the bonnet to body joint and packing bushing may be required to stop leakage. Tighten these in 5 ft-lb increments until the leakage has stopped.

6. If using a bonnet lock, place the lock, slotted end down, up onto the bonnet. Screw the bonnet back into the seat cavity by hand.

6. If not using a bonnet lock, install a spring pin in the pin hole which is best centered with respect to the bonnet hex.

B. VALVE ADJUSTMENT

1. Tighten the bonnet bushing using a wrench. The bushing should be tightened snugly but not over-tightened. Check the bushing tightness by turning the handle. If it feels too loose you may tighten the bushing more. If it feels too tight, the stem seal must be replaced and the bushing retightened.

2. The bushing tightness is a matter of both judgement and experience. The basic considerations are:

   Too Loose – The bonnet will leak.

   Too Tight – The handle will be hard to turn and the stem seal may be ruined.

3. Once the bushing is properly adjusted, tighten the jam nut to lock the bushing in place.

5.0 POST ASSEMBLY INSPECTION

Turn the handle to open and close the valve. Check for binding, rubbing or any resistance to smooth operation.