

SAFETY

Safety - consult Blakeborough publication 'Safety' before starting any maintenance work.

The valve and actuator should be handled and installed with care. Consult publication 'Good Installation Practices' for details.

Before any maintenance work it is essential to ensure that the actuator is isolated and depressurised.

VALVE DISASSEMBLY

Removal of instruments

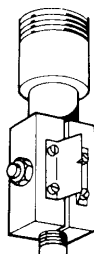
Remove all instruments and any existing check nut from the end of the stem connector.

Separating the stem connector

The valve plug must be off the seat ring while the stem connector is being separated. Apply air if necessary.

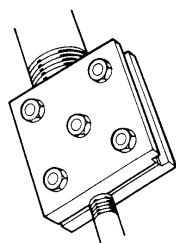
Type I – with fitted steel indicator pointer

1. Remove the stem connector screw nut and partly remove the stem connector screw.
2. The two connector halves linked together by the steel indicator pointer can then be sprung apart and removed from the actuator stem.



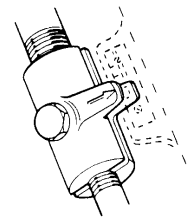
Type II – Anti rotation stem connector

1. Remove the attachment from the end of the centre anti rotation bolt and remove the bolt.
2. Remove the four lock nuts from the end of the stem connector screws.
3. Release the plug stem locknut (39) from the stem connector (in some cases two lock nuts are used).
4. Unscrew the stem connector screws and remove the halves of the stem connector.



Type III – with integral indicator fingers

1. Remove the stem connector screw nut and the stem connector screw.
2. The two connector halves will spring apart and can be removed from the actuator stem.



Removing the actuator

The actuator is removed from the body as a unit, without disturbing the packing box bolting. The actuator yoke will pass over the packing flange.

1. Disconnect the air supply and any electrical connections to the actuator.
2. Unscrew the hammer lug clamp nut (25) from the bonnet threads and lift the nut over the plug stem (on large valves the actuator is secured to the valve with bolts).
3. Lift or hoist the actuator off the valve taking care to avoid damaging the plug stem, instruments, or tubing.

Removing the packing

Refer to 'Packing Instructions' in separate bulletin.

Complete disassembly

1. Remove the body/bonnet stud nuts (6).
2. Lift the bonnet (2) away from the valve body taking care not to damage the packings. Discard the upper body gasket (4).
3. On a 'pull stem to open':
 - a. The valve the plug and stem (9 & 10) assembly can be lifted out of the valve body.
4. On a 'push stem to open':
 - a. Invert the valve body and remove the bottom flange (3) and discard the lower body gasket (4). Lift the



Blakeborough Control Valves**Installation, Operation & Maintenance Manual****BV800/BV801/BV802/BV803 Series Contour Trim Valves**

plug and stem (9 & 10) out of the body from the underside of the valve.

5. If the plug stem is to be re-machined or replaced, drive out the plug pin (11) and unscrew the stem.
 6. If necessary unscrew and remove the seat ring(s). Seat rings should be removed only for re-machining or replacement. They should not be removed for cleaning. For some applications the seat rings are tack welded (to prevent spinout) into the body. Special wrenches are available for seat removal. A lathe or boring mill can be used for unscrewing seat rings. Heating the valve body or chilling the seat rings may be required to loosen extremely tight seats.
 7. Upper and lower guide bushing (12) should be removed from the bonnet (2) and bottom flange (3) only for replacement. A stud welded into the guide will serve as a jackscrew puller.
5. If worn guide bushing (12) has been removed, press the new bushing into the bonnet (2) and bottom flange (3).
 6. On a *'pull stem to open valve'*:
 - a. Place a new body gasket (4) on the shoulder of the bottom flange (3), then bolt the bottom flange to the body and tighten all nuts evenly.
 - b. Lower the plug and stem assembly into the body guiding the lower plug shank into the lower guide bushing (12).
 7. On a *'push stem to open valve'*:
 - a. With the body inverted, lower the plug stem assembly into the body so that the plug rests on the seat.
 - b. Place a new gasket (4) on the shoulder then bolt the bottom flange evenly and securely to the body.
 - c. Turn the valve body upright for the bonnet installation.
 8. Place a new bonnet gasket (4) on the body (1) and lower the bonnet (2) carefully over the plug stem to its place on the body.
 9. Bolt the bonnet evenly and securely to the body.
 10. Install the new packing rings as per packing instructions information.

Body assembly

Clean the inside of the body thoroughly, particularly the gasket surfaces. It is essential that all surfaces in contact with the gaskets i.e., the bonnet spigot should be clean and all traces of the previous gaskets removed before replacement is carried out.

The body of a 'push stem to open' valve should be inverted for convenience of assembly.

1. Apply litharge and glycerine compound to the threads of the seats ring(s).
2. Screw the seat ring(s) into the body – smaller seat first on double seated valves – then clean off the excess compound. Special wrenches are available for tightening seat rings.
3. The new plug and stem are pinned together at the factory. If only one of these parts is to be renewed or if either part has been re-machined, screw the stem (10) tightly into the plug (9), drill through the plug shank and stem, then countersink the hole at both ends. Insert the pin (11) then peen over the ends.
4. If the plug and/or seat has been re-machined or replaced the parts must be lapped together.

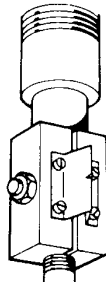
Mounting the actuator

1. Assemble and adjust the actuator as instructed in the appropriate actuator instructions.
2. Lower the actuator over the plug stem and packing flange to sit squarely on the bonnet.
3. Rotate the actuator to a convenient position, then screw the hammer lug clamp nut (25) onto the bonnet threads and tighten securely.
4. For connecting the actuator stem to the plug stem the plug must be on its seat while the actuator stem is being connected.

Connecting the stem connector

Type I – with fitted steel indicator pointer

1. Spring the two halves of the stem connector, which are held together by the indicator pointer, over the actuator and plug stems so that the ends of both stems are equidistant from the stem connector screw holes.



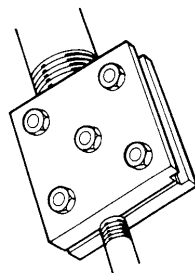
2. Replace the stem connector screw and tighten by hand ensuring that the stem connector threads are in proper engagement with the actuator stem and the valve plug stem.

3. Replace and tighten the nut by hand.

Type II – Anti rotation stem connector

1. Press the half of the stem connector which is threaded to take the four stem connector screws against the actuator stem and the plug stem.

2. Ensure that the slot in the plug stem is central in height with the centre hole in the stem connector, and the stem connector straddles the yoke rib bearing the travel indicator scale.

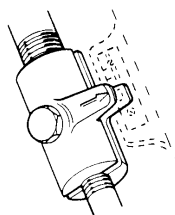


3. Apply the other half of the stem connector carefully engaging the threads, then insert the stem connector screws and tighten by hand.

4. It may be necessary to move the valve plug off its seat a slight distance in order to mesh the plug stem threads with the lower connector threads.

Type III – with integral indicator fingers

1. Press half of the stem against the actuator stem and the plug stem. Ensure that the centre hole in the stem connector is central between the plug stem and actuator stem, and the stem connector straddles the yoke rib bearing the travel



indicator scale.

2. Apply the other half of the stem connector carefully engaging the threads, then insert the stem connector screws and tighten by hand.
3. It may be necessary to move the valve plug off its seat a slight distance in order to mesh the plug stem threads with the lower connector threads.

Note: It is not essential at this stage to ensure that the position marking slot in the indicator pointer, coincided with the 'shut' mark on the travel indicator scale, because the indicator scale position can be adjusted by loosening the two securing screws.

Establishing valve travel and seating tension

1. On a 'pull stem to open valve':
 - a. Maintain the actuator stem at its lowest position of travel.
2. On a 'push stem to open valve':
 - a. Maintain the actuator stem at its lowest position of travel.
3. In case the plug was moved off the seat during the stem connection procedure: Prevent the stem connector from rotating, and then unscrew the plug stem from the connector until the plug is firmly seated.
4. Move the plug off the seat then unscrew the plug stem an additional one half turn out of the connector to ensure positive seating.
5. Tighten the connector screw securely.
6. Tighten the plug stem nut (39) securely.
7. Seat the valve plug firmly by means of the actuator.
8. Adjust the travel scale so that the 'shut' mark is opposite the travel pointer on the coupling.
9. Disconnect the air line used for assembly procedure then apply the check nut or attachments (if any) to the connector screw.

Reversal of valve action in the field

1. Disassemble the valve as previously directed.

2. Drive out the plug stem pin (11) and unscrew the stem.
3. Screw the stem into the other end of the valve plug, then drill a hole through the plug and stem and pin them together as previously instructed.
4. Invert the body so that in reassembling the valve, the bonnet will be fastened to the body flange where the bottom flange was originally located.
5. Assemble the valve as instructed in the previous sections.
6. Invert the travel indicator scale so that its reading of the valve travel is in accordance with the change in action that has been effected.

Note: Bellows seal valves are not reversible, a new actuator is required to change the valve operation.

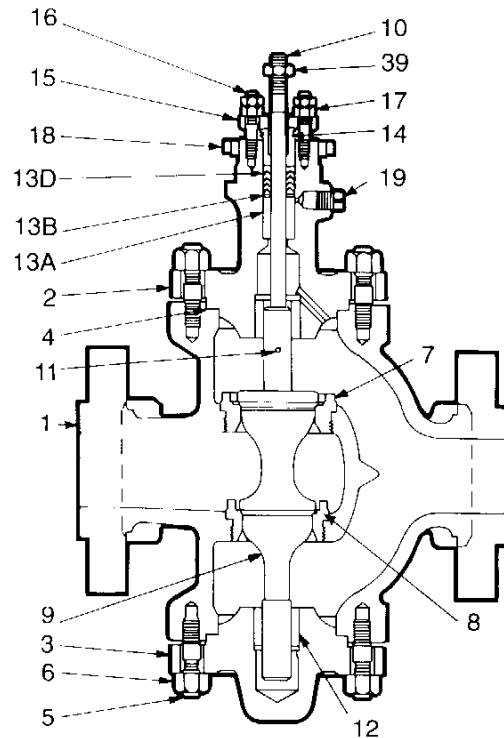
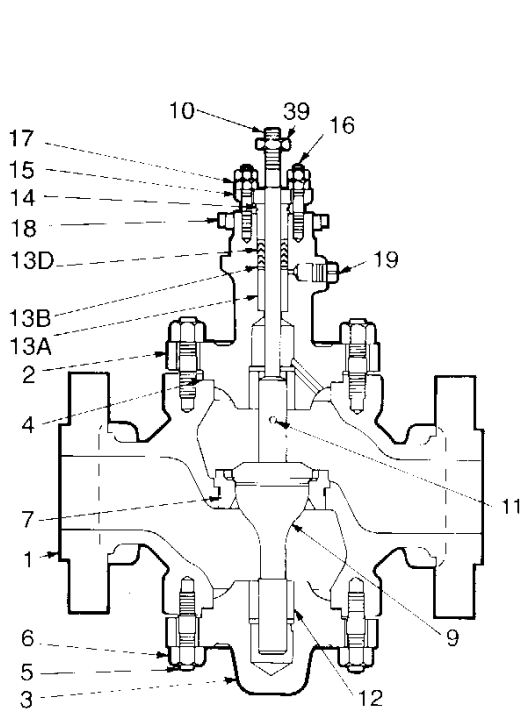
Machining of trim

1. Plugs or seats having a hard facing such as stellite can be re-machined before being lapped, but care should be taken to leave sufficient hard facing material intact.
2. Plugs should be machined on their seating surfaces only. Machining of contours or V-ports will alter the characteristic and rangeability of the trim.
3. Double seated plug and seat machining:
 - a. Whenever one plug head is machined to restore a seating surface, the other plug head must be machined correspondingly in order to preserve the distance between seating surfaces. Similarly, machining of one seat ring involves machining the other.
 - b. Changing the line temperatures can alter the original distance between the seats, therefore a new or remachined trim should be tested for simultaneous seating of both plug heads.
 - c. To do this apply template bluing to both plug heads, then seat the

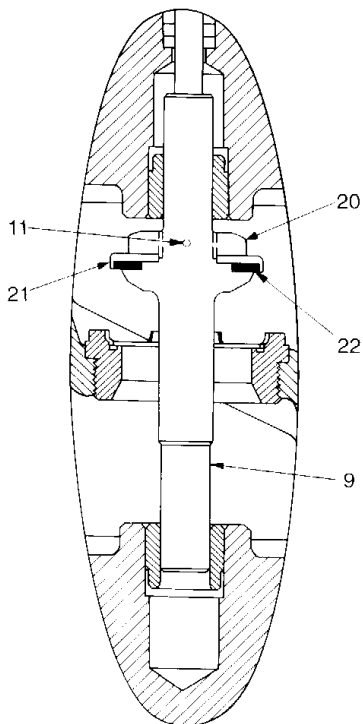
- plug and turn it gently to mark the seat contact in the bluing.
- d. If one plug head is not contacting its seat, machine the opposite plug head then repeat the bluing process.

PARTS LIST	
1	BODY
2	BONNET
3	BOTTOM FLANGE
4	DODY GASKET*
5	BODY STUD
6	BODY STUD NUT
7	SEAT RING (UPPER)*
8	SEAT RING (LOWER)*
9	VALVE PLUG*
10	PLUG STEM*
11	PLUG STEM PIN*
12	GUIDE BUSHING
14	PACKING FOLLOWER
15	PACKING FLANGE
16	PACKING FLANGE STUD
17	PACKING FLANGE NUT
18	CLAMP NUT
19	LUBRICATOR PLUG
20	SOFT FACE LOCKNUT
21	SHROUD
22	SOFT FACE RING*
39	STEM NUT
* Recommended spares	
Refer to Packing Instructions for details of packings.	

TYPICAL VALVE SECTIONS & TRIM COMBINATIONS



SOFT FACE TRIM



MULTI-FLOW TRIM

