

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.

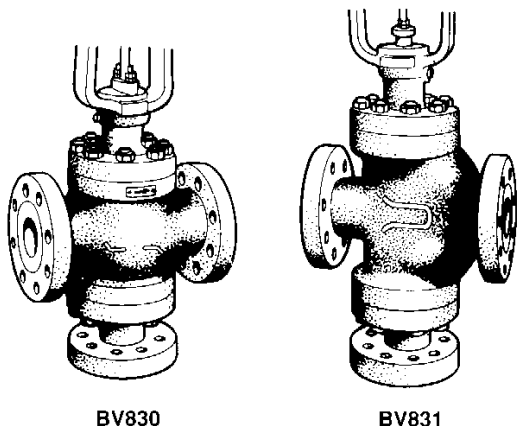
DESCRIPTION

Series BV830 – Flow mixing valves

These valves have two inlets and a common outlet branch. They are used for proportional blending of two flows into one stream, on such applications as control of process fluid temperature downstream of heat exchangers, or as mixing valves to control the composition of service media. They may be used for flow splitting duties. The total outlet flow is constant irrespective of the plug position. The valve action is – 'pull stem to close the upper port, open lower port'.

Series BV830 – Flow splitting valves

These valves are used for proportional control on flow splitting applications. The valves have two outlets and a common inlet branch. They are used for proportional flow splitting, diverting a portion of the process medium from one part of the system to another. A typical application is on the upstream side of heat exchangers, to control the temperature of the process fluid. The valve action is – pull stem to open upper port, close lower port'.



BV830

BV831

MAINTENANCE

Removal of instruments

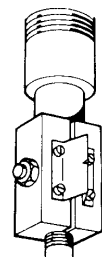
Remove all instruments and any existing check nut from the end of the stem connector.

Separating the stem connector

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

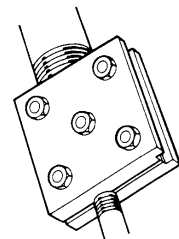
Type I – with fitted steel indicator pointer

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.



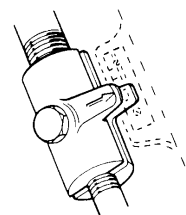
Type II – Anti rotation stem connector

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.



Blakeborough Control Valves**Installation, Operation & Maintenance Manual****BV830 and BV831 Three Way Valves****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 (18) 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).
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3. Invert the body and remove the bottom flange (3) and discard the lower body gasket (4).
 4. On BV830 valves lower the plug and stem assembly (9 & 10) out of the valve body. On BV831 series valves the lower plug head must be removed before removal of the plug. Remove the nut and lockwasher (9D and 9C) then slip the lower plug head (9A) and gasket (9B) off the plug (9). The plug can then be lifted out of the top 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. Guide bushing (12) should be removed from the bonnet (2) only for replacement. A stud welded into the guide will serve as a jackscrew puller.

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.

1. Apply litharge and glycerine compound to the threads of the seats ring(s).
2. Screw the seat ring(s) into the body (1) and/or bottom flange (3) 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 worn guide bushing (12) has been removed, press the new bushing into the bonnet (2).

BV830 Valve assembly

1. Lower the plug and stem assembly (9 & 10) into the underside of the body and carefully guide the plug into the seat ring (7).
2. Place a new gasket (4) onto the body and lower the bottom flange (3) carefully over the plug (9) and studs (5) to its place on the body.
3. Install the stud nuts (6) and tighten them evenly.
4. Turn the body upright being careful to hold the plug stem to ensure it does not drop onto the seat ring.

5. Place a new gasket (4) on to the body and lower the bonnet carefully over the plug stem to its place on the body.
6. Install the new packing rings as per packing instructions information.

BV831 Valve assembly

1. Lower the plug and stem assembly (9 & 10) into the top of the body and carefully guide the plug into the seat ring (7).
2. Place a new gasket (4) onto the body and lower the bonnet (2) carefully over the plug (9) and locate onto the body.
3. Bolt the bonnet to the body and tighten the nuts evenly.
4. Invert the body carefully holding the stem to prevent the plug from dropping onto the seat ring.
5. Place the gasket (9B) on the end of the plug (9).
6. Carefully slip the plughead (9A) onto the end of the plug (9) and guide it into the lower seat ring.
7. Install the lockwasher and nut (9C and 9D) and tighten securely. Once secure, bend the lockwasher lips down onto the nut to prevent the nut from loosening.
8. Install the new packing rings as per packing instructions information.

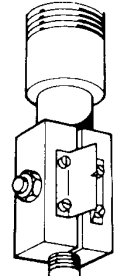
Mounting the actuator

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 (18) 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

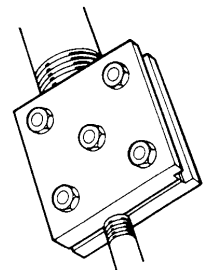
Type I – with fitted steel indicator pointer

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.



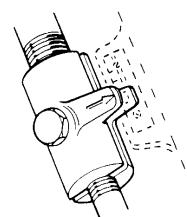
Type II – Anti rotation stem connector

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



Blakeborough Control Valves
Installation, Operation & Maintenance Manual
BV830 and BV831 Three Way Valves

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

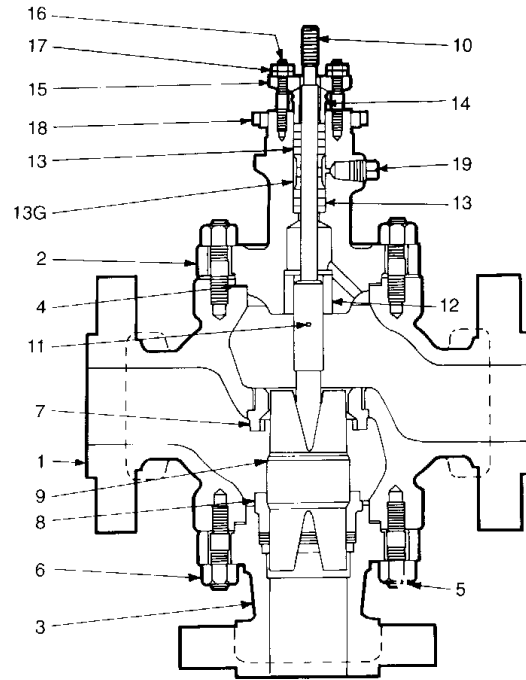
1. Maintain the actuator stem at its lowest position of travel.
2. In case the plug was moved off the seat during the stem connection procedure: Prevent the stem connector from rotating, and then unscrew the plug stem from the connector until the plug is firmly seated.
3. Move the plug off the seat then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

Machining of trim

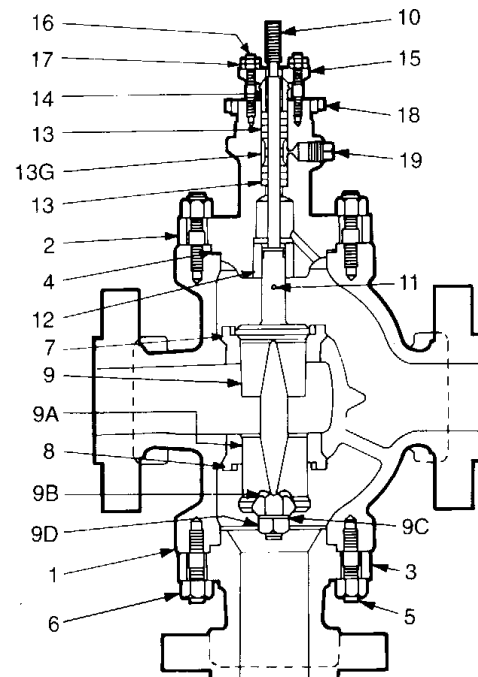
1. Plugs or seats having a hard facing such as stellite can be re-machined before being lapped, but care should be taken to leave sufficient hard facing material intact.
2. Plugs should be machined on their seating surfaces only.

TYPICAL VALVE SECTIONS

PARTS LIST	
1	BODY
2	BONNET
3	BOTTOM FLANGE
4	BODY GASKET*
5	BODY STUD
6	BODY STUD NUT
7	SEAT RING (UPPER)*
8	SEAT RING (LOWER)*
9	VALVE PLUG*
9A	VALVE PLUG (LOWER)*
9B	GASKET
9C	LOCKWASHER
9D	NUT
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
39	STEM NUT
* Recommended spares	
Refer to Packing Instructions for details of packings.	



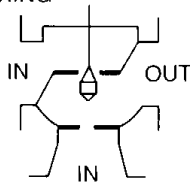
BV830



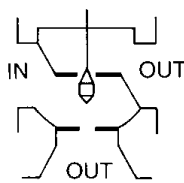
BV831

BV830 VALVES

MIXING

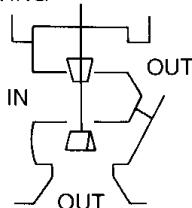


SPLITTING



BV831 VALVES

SPLITTING



FLOW DIAGRAM