

Blakeborough Control Valves**Installation, Operation & Maintenance Manual****80mm X-Stream Series Valve (Flow Over)****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.

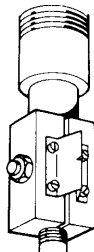
VALVE DISASSEMBLY**Removal of instruments**

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.

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.

**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.

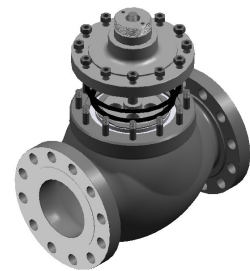
1. Disconnect the air supply and any electrical connections to the actuator.
2. Unscrew the hammer lug clamp nut (25) from the bonnet threads and lift the nut over the plug stem. (on large valves the actuator is secured to the valve with bolts).
3. Lift or hoist the actuator off the valve taking care 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 (10).
2. Lift the bonnet (2) away from the valve body taking care not to damage the packings.
3. The lipseal (65) can now be removed from the bonnet.
4. Remove and discard c-seal (43).
5. Lift the plug (6) and stem (8) carefully out of the valve body.
6. Remove grub screw (64).
7. Insert the torque tool into the holes in the locking ring (63) and with a suitable wrench unscrew the locking ring (63) from the disc retainer (66).
8. Once again using the torque tool, insert the ends into the holes in the retaining collar (62). Unscrew the retaining collar (62) out of the valve body.
9. The disc stack assembly, including the disc retainer (66), the disc stack (7) and the seat (5) should now lift out of the body.
10. If it is found necessary to split the disc stack, use an allen key to unscrew the capscrew (68). The capscrew is fixed into position with Loctite so it may take some effort to break the seal. Lift off the disc retainer (66) and the disc stack (7) should now be free for removal of the discs.
11. Remove the lower c-seal (42).

**Dismantling the valve plug**

The plug of a balanced valve is fitted with a seal ring that prevents leakage around the circumference of the valve cage.

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1. Removing the 'U' seal
 - a. Mark the top of the plug and the plug shroud (6 & 59) to ensure that the plug shroud is returned to the same position on assembly.
 - b. Remove the shroud retaining screws (60).
 - c. Using a soft jaw vice, grip the plug and with a suitable drift, loosen and remove the plug shroud. Alternatively, grip the two plug shroud flats in the end of the vice jaws and turn the plug anti-clockwise to achieve the same result.
 - d. Lift the 'U' seal from the spigot, noting the orientation of the 'U' shape.

until the marks on the top of the plug and the shroud coincide.

- c. Replace the shroud retaining screws (60) and tighten to lock the shroud in place.

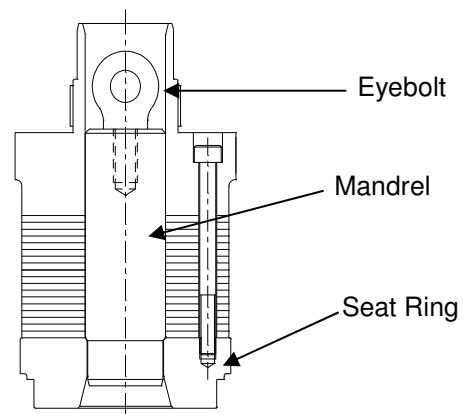
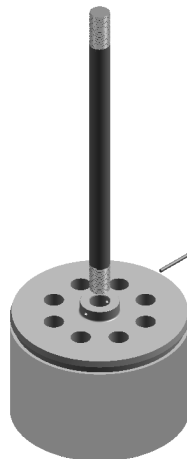
Discstack assembly

1. Clean the disc stack and ensure that all traces of dirt and debris are removed. Use suitable cleaning fluid if necessary.
2. Each of the discs are numbered so that they are replaced in the correct order. On linear valves all the disc will be numbered 1. On equal percentage trims there will be several number 1 discs, several number 2 discs, etc. Layout the discs in order to establish the order of assembly.
3. Locate the mandrel onto the seating face and lock the mandrel into position using the locking plate and nut.
4. Place the seat ring (5) and the mandrel into a

ASSEMBLY

Assembly of the plug and stem

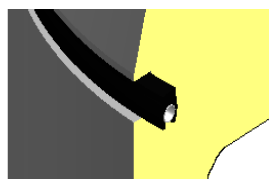
- a. Screw the plug tightly onto the stem.
- b. Drill through the plug shank and stem.
- c. Insert the pin. The new pin should be the same diameter as the original pin (19).
- d. Peen over the ends of the pin to ensure it cannot become loose in service



vice so the face where the disc stack will be located is flat.

Plug assembly

1. 'U' seal plug with shroud
 - a. Clean the 'U' seal spigot and shoulder of the plug. Also clean the face of the plug shroud which bears against the 'U' seal.
 - b. Place the 'U' seal, in the same orientation as it was removed (refer to the picture), on the spigot and fit the plug shroud back in place. Screw the shroud up tight



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5. Locate the disc marked 'lower' and drop it over the mandrel with the 'lower' mark facing upwards. Locate the subsequent discs in order and locate them in position over the mandrel.
6. Place the disc retainer (66) onto the mandrel, over the disc stack.
7. Smear the capscrew (68) threads with Loctite 272 and insert the capscrews into the seat ring. Pull down the capscrews evenly to a torque of 11Nm (8 ft lbs).

8. Lift the mandrel out of the cage. Ensure the mandrel moves smoothly when lifting it out of the cage.

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., on the bonnet spigot should be clean and all traces of the previous gaskets removed before replacement is carried out.

1. Smear a line of lubricant around the c-seal spigot on the bottom of the seat ring. Place the c-seal (42) onto the spigot until it sticks into position with the grease.
2. Ensuring the c-seal does not fall off the seat spigot, lower the seat/disc stack into the body.
3. Lower the plug (6) into the cage (7) until it rests on the seating face. If fitted with a 'U' seal ensure the seal feeds into the top of the disc retainer (66).
4. Smear the valve body threads and disc retainer threads with molydisulphide grease.
5. Screw the retaining collar (62) into the body. Locate the torque tool onto the retaining collar and with a torque wrench tighten the collar down to 3500Nm (2580lbf.ft).
6. Screw the locking ring (63) onto the disc retainer (66) and using the torque tool tighten the locking ring sufficient enough to secure the locking ring in position.
7. Using a suitably sized drill, drill through the grub screw hole to dimple the face of the retaining collar (62). Insert the grub screw (64) to lock the locking ring in position.
8. Fit the 'U' seal (65) into the bonnet. The open end of the 'U' should be facing out of the bonnet.
9. Insert the c-seal (43) into position in the body.
10. Lower the bonnet (2) over the stem (8) and onto the c-seal. Lubricate the studs with a smear of molydisulphide grease.
11. Replace the body stud nuts (10) and tighten them in a diagonal sequence. The bonnet should be pulled down squarely to ensure an

even and uniform compression of gaskets. The most accurate way of achieving this is by using a suitable torque wrench and working to a torque of 81Nm (60ft.lbs).

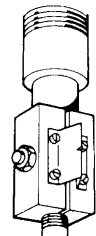
12. Pack the stuffing box. See separate instructions.
13. Screw the stem nut (39) onto the stem.

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. On larger valves the actuator is secured to the bonnet by means of bolts.
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

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.



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.

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2. In case the plug was moved off the seat during the stem connection procedure: Prevent the stem connector from rotating, 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 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.

PARTS LIST	
1	BODY
2	BONNET
5	SEAT*
6	PLUG*
7	DISC STACK*
8	STEM*
9	BODY STUD
10	BODY STUD NUT
12	PACKING RINGS*
14	PACKING FOLLOWER
15	PACKING FLANGE
19	PLUG STEM PIN
20	PLUG SEAL RING*
21	PACKING SPACER
23	PACKING STUD
24	PACKING STUD NUT
25	CLAMP NUT
39	COUPLING LOCKNUT
42	C-SEAL*
43	C-SEAL*
59	PLUG SHROUD
60	GRUB SCREW
62	RETAINING COLLAR
63	LOCKING RING
64	GRUBSCREW
65	LIPSEAL*
66	DISC RETAINER
68	CAPSCREW
* Recommended spares	
Refer to Packing Instructions for details of packings.	

