

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.

GENERAL

Maintenance such as diaphragm, packing, or trim replacement can be done without removing the valve from the line. Since most valve locations are not suited for repair operations, these instructions assume that the valve is taken to a workshop for servicing.

See the relevant instruction book supplement for actuator maintenance.

DESCRIPTION

Desuperheating is a convenient and efficient method of obtaining steam for process work from a superheated supply.

Superheated steam is passed through a section of pipe into which a Desuperheater is fitted. Water is injected into the steam via the spraynozzles of the Desuperheater. The nozzles produce a finely atomised spray that is readily absorbed by the steam, reducing its temperature. The amount of water injected into the steam is controlled by the linear movement of a valve plug uncovering the nozzles.

INSTALLATION

The correct installation of the Desuperheater is of prime importance with respect to ensuring good temperature control. The following guidelines are provided to ensure this is achieved.

- a) The Desuperheater should be installed in a straight length of pipe, ideally with a distance of 6 pipe diameters upstream. The minimum downstream length should be 7.5 metres. Consult the Blakeborough desuperheater catalogue to calculate the exact length of straight pipe required for efficient

desuperheating. Where minimum distances cannot be met, long radius elbows should be used to minimise the potential for erosion.

- b) To ensure that the piping drains correctly, it should be arranged to fall in the direction of flow by 20mm per metre. An adequately sized condensate trap should be provided at the lowest point in the pipework.
- c) To assist desuperheating, the steam pipework should be lagged.
- d) The spraywater should be clean and free of contamination. It should be effectively filtered to less than 0.25mm.
- e) The distance from the desuperheater to the temperature sensing element is very important and varies between 7.5 and 30 metres depending upon pipe size, enthalpy change and proximity of the conditioned temperature to saturation. Details for calculating the required distance are given in the Blakeborough Desuperheater catalogue.
- f) The temperature measuring element should be located in a straight length of pipe, at least 2 metres from the nearest bend. The temperature pocket should extend into the pipe by approximately 1/2 the diameter on pipe sizes up to 300mm, and by a 1/3 on sizes above 300mm.

MAINTENANCE

In order to disassemble the Desuperheater, it will be necessary to remove it from the pipeline. Prior to commencing the work, ensure the following:

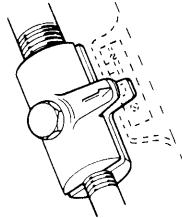
- a) Isolate the water supply pressure, and relieve any residual pressure.
- b) Isolate the steam pressure, and exhaust any residual pressure.
- c) Isolate the pneumatic and/or electrical supplies to the Desuperheater Actuator.
- d) Consult publication "Safety with Control Valves", and use only trained personnel to carry out the work.
- e) It is advisable to remove any valve mounted instrumentation prior to maintenance. This will ensure it is not damaged during any of the lifting procedures. Before removing the instruments, note their orientation.

Removing the Valve & Actuator

1. Remove the water and steam connection flange bolting.
2. Sling the Actuator, and using a straight lift, remove the complete assembly from the

pipework. (Preferably, maintenance should now continue in a clean workshop.)

3. Remove the stem connector. The valve should be in the open position, apply a little air if necessary. Loosen the coupling locknut (39). Remove the stem connector nut and the connector screw. The two halves of the coupling can then be removed.
4. Loosen the clamp nut (25) using a hammer and suitable drift, and then remove it. Lift the actuator off the Desuperheater, noting the orientation of the air connection. (For details of actuator maintenance, see the separate instruction manual.



Disassembly of the Valve

1. Grind off the spot weld(s) retaining the end cap (47), and unscrew it from the nozzle body (1).
2. Unscrew the coupling locknut (39) from the valve stem (8).
3. Remove the packing stud nuts (24) and lift off the packing flange (15).
4. Remove the packing follower (14)
5. Push the valve stem down, and remove the plug and stem assembly from the bottom of the nozzle body.
6. Use a wire hook to pull out the support rings (11), packing rings (12) and packing spacer (21) from the nozzle body. (The upper support rings is provided with tapped extraction points if required. The thread size is M3 x 0.5.)
7. Grind off the spot welds retaining the spray inserts (30), and unscrew the inserts using circlip pliers.
8. Remove the swirl inserts (31).

Inspection

Prior to rebuilding the valve, thoroughly clean and inspect all parts.

Pay particular attention to the condition of the swirl and nozzle inserts, they should be replaced if there are any signs of erosion.

The plug, stem and nozzle body should be examined for signs of "galling", and any marks removed by polishing.

Minor damage to the plug and nozzle body seating faces can be removed by lapping with a fine grade lapping compound.

Re-assembly of the Valve

1. If the valve plug (6) and plug stem (8) are being replaced, apply a light covering of anti-seize paste to the stem thread and screw the stem fully into the plug. Drill through the plug shank and stem, and fit the pin (19). Ensure any protruding edges of the pin are removed by carefully dressing the assembly.
2. Assemble the plug and stem into the nozzle body (1), and fit the end cap (47)
3. Fit the swirl inserts (31), and spray inserts (30).
4. Assemble the packing spacer (21) and the lower support ring (11) **Note:** the lower support ring does not have tapped extraction holes.
5. Lightly coat the packing rings (12) with a clear high polymer grease and slide them over the stem and into the packing box. Ensure each is pushed lightly home before fitting the next.
6. Fit the upper support ring (11), ensuring the tapped extraction holes are on the upper face.
7. Fit the packing follower (14) and packing flange (15). Replace and hand tighten the packing stud nuts (24). Stoke the valve plug by hand to ensure free movement. **Note:** The packing should be adjusted when the valve is returned to service. The packing stud nuts should be tightened evenly keeping the packing flange square. Apply only sufficient torque to prevent leakage, as overtightening can cause sticktion.
8. Screw the coupling locknut (39) onto the stem (8).
9. Tack weld the end cap (47), and the spray inserts (30).

Replacing the Actuator & Valve

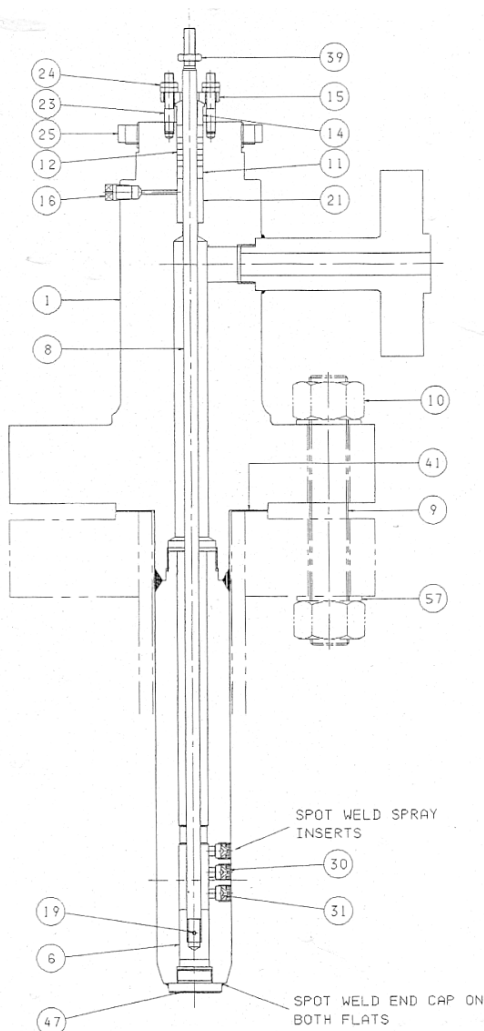
1. Lift the Actuator over the valve stem, and pass it over the mounting diameter on the nozzle body (1). Ensure it is sat squarely on the mounting face with the air connection in the required orientation.
2. Smear the thread of the clamp nut (25) with anti-seize compound, and screw it onto the nozzle body. Fully tighten it using a hammer and drift.
3. With the valve plug in the closed position, fit the two halves of the stem connector. Ensure the ends of the stem are equidistant from the centre of the connector screw hole, and that

the tapped half of the connector is on the same side as the valve positioner. It may be necessary to apply a little air to the actuator to correctly mesh the threads.

4. Hand tighten the connector screw and apply air to the actuator to open the valve. Screw the valve stem into the stem connector by one turn, and tighten the connector screw. (This will ensure that the actuator load is correctly applied to the valve seating faces). Fit and tighten the connector nut. Tighten the coupling locknut (39) against the underside of the stem connector.
5. Clean the gasket seating faces of the pipe flanges.
6. Sling the Actuator, and replace the Desuperheater assembly in the pipe work,

having first fitted a new gasket at the steam pipe connection. Replace the flange studs, nuts and washers.

7. Fit a new water connection gasket, and replace the flange studs, nuts and washers.
8. Tighten the flange bolting to the torque value recommended by the gasket manufacturer. Apply the torque evenly in several stages, using a diametrically opposite sequence.
9. Replace the valve mounted instrumentation, and re-connect the pneumatic and electrical supplies as applicable. Re-calibrate the instruments as required. (See separate instruction manuals)



Ref. No	Description
1	Nozzle Body
6*	Valve Plug
8	Plug Stem
9	Branch Flange Stud
10	Branch Flange Stud Nut
11	Support Ring
12*	Packing Ring
14	Packing Follower
15	Packing Flange
16	Lubricator Plug
19*	Plug Stem Pin
21	Packing Spacer
23	Packing Stud
24	Packing Stud Nut
25	Clamp Nut
30*	Spray Insert
31*	Swirl Insert
39	Coupling Locknut
41*	Flange Gasket
47	End Cap
57	Washer
* Recommended Spare Parts	