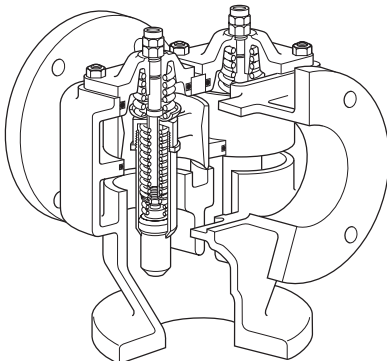
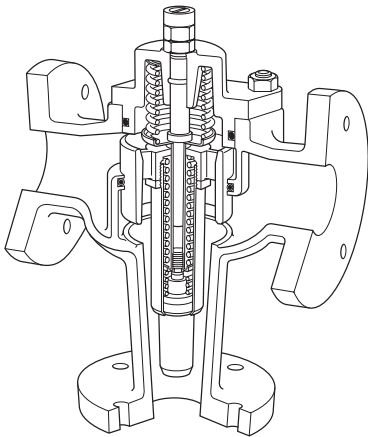


Type 58 Control Valve

Installation and Maintenance Instructions



1. Safety information
2. Installation
3. Operation
4. Maintenance
5. Available Spares

1. Safety information

Safe operation of this product can only be guaranteed if it is properly installed, commissioned, used and maintained by qualified personnel (see Section 1.11) in compliance with the operating instructions. General installation and safety instructions for pipeline and plant construction, as well as the proper use of tools and safety equipment must also be complied with.

1.1 Intended use

Referring to the Installation and Maintenance Instructions, name-plate and Technical Information Sheet, check that the product is suitable for the intended use/application. The products listed below comply with the requirements of the European Pressure Equipment Directive 97/23/EC and carry the CE mark when so required. The products fall within the following Pressure Equipment Directive categories:

Product		Group 2 Liquids
Bronze	DN20 - DN40	SEP
TW	DN50	SEP
Cast iron	DN50	SEP
	DN80 - DN100	SEP

- i) The products have been specifically designed for use on water and other non-hazardous liquids which are in Group 2 of the above mentioned Pressure Equipment Directive. The products' use on other fluids may be possible but, if this is contemplated, Spirax Sarco should be contacted to confirm the suitability of the product for the application being considered.
- ii) Check material suitability, pressure and temperature and their maximum and minimum values. If the maximum operating limits of the product are lower than those of the system in which it is being fitted, or if malfunction of the product could result in a dangerous overpressure or overtemperature occurrence, ensure a safety device is included in the system to prevent such over-limit situations.
- iii) Determine the correct installation situation and direction of fluid flow.
- iv) Spirax Sarco products are not intended to withstand external stresses that may be induced by any system to which they are fitted. It is the responsibility of the installer to consider these stresses and take adequate precautions to minimise them.
- v) Remove protection covers from all connections before installation.

1.2 Access

Ensure safe access and if necessary a safe working platform (suitably guarded) before attempting to work on the product. Arrange suitable lifting gear if required.

1.3 Lighting

Ensure adequate lighting, particularly where detailed or intricate work is required.

1.4 Hazardous liquids or gases in the pipeline

Consider what is in the pipeline or what may have been in the pipeline at some previous time. Consider: flammable materials, substances hazardous to health, extremes of temperature.

1.5 Hazardous environment around the product

Consider: explosion risk areas, lack of oxygen (e.g. tanks, pits), dangerous gases, extremes of temperature, hot surfaces, fire hazard (e.g. during welding), excessive noise, moving machinery.

1.6 The system

Consider the effect on the complete system of the work proposed. Will any proposed action (e.g. closing isolation valves, electrical isolation) put any other part of the system or any personnel at risk?

Dangers might include isolation of vents or protective devices or the rendering ineffective of controls or alarms. Ensure isolation valves are turned on and off in a gradual way to avoid system shocks.

1.7 Pressure systems

Ensure that any pressure is isolated and safely vented to atmospheric pressure. Consider double isolation (double block and bleed) and the locking or labelling of closed valves. Do not assume that the system has depressurised even when the pressure gauge indicates zero.

1.8 Temperature

Allow time for temperature to normalise after isolation to avoid danger of burns.

1.9 Tools and consumables

Before starting work ensure that you have suitable tools and/or consumables available. Use only genuine Spirax Sarco replacement parts.

1.10 Protective clothing

Consider whether you and/or others in the vicinity require any protective clothing to protect against the hazards of, for example, chemicals, high/low temperature, radiation, noise, falling objects, and dangers to eyes and face.

1.11 Permits to work

All work must be carried out or be supervised by a suitably competent person. Installation and operating personnel should be trained in the correct use of the product according to the Installation and Maintenance Instructions.

Where a formal 'permit to work' system is in force it must be complied with. Where there is no such system, it is recommended that a responsible person should know what work is going on and, where necessary, arrange to have an assistant whose primary responsibility is safety.

Post 'warning notices' if necessary.

1.12 Handling

Manual handling of large and/or heavy products may present a risk of injury. Lifting, pushing, pulling, carrying or supporting a load by bodily force can cause injury particularly to the back. You are advised to assess the risks taking into account the task, the individual, the load and the working environment and use the appropriate handling method depending on the circumstances of the work being done.

1.13 Residual hazards

In normal use the external surface of the product may be very hot. If used at the maximum permitted operating conditions the surface temperature of some products may reach temperatures of 200°C.

Many products are not self-draining. Take due care when dismantling or removing the product from an installation (refer to 'Maintenance instructions').

1.14 Freezing

Provision must be made to protect products which are not self-draining against frost damage in environments where they may be exposed to temperatures below freezing point.

1.15 Disposal

The product is recyclable. No ecological hazard is anticipated with the disposal of this product providing due care is taken. EXCEPT;

PTFE:

- Can only be disposed of by approved methods, not incineration.
- Keep PTFE waste in a separate container, do not mix it with other rubbish, and consign it to a landfill site.

1.16 Returning products

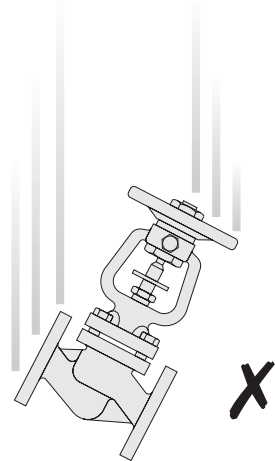
Customers and stockists are reminded that under EC Health, Safety and Environment Law, when returning products to Spirax Sarco they must provide information on any hazards and the precautions to be taken due to contamination residues or mechanical damage which may present a health, safety or environmental risk. This information must be provided in writing including Health and Safety data sheets relating to any substances identified as hazardous or potentially hazardous.

1.17 Working safely with cast iron products on steam

Cast iron products are commonly found on steam and condensate systems. If installed correctly using good steam engineering practices, it is perfectly safe. However, because of its mechanical properties, it is less forgiving compared to other materials such as SG iron or carbon steel. The following are the good engineering practices required to prevent waterhammer and ensure safe working conditions on a steam system.

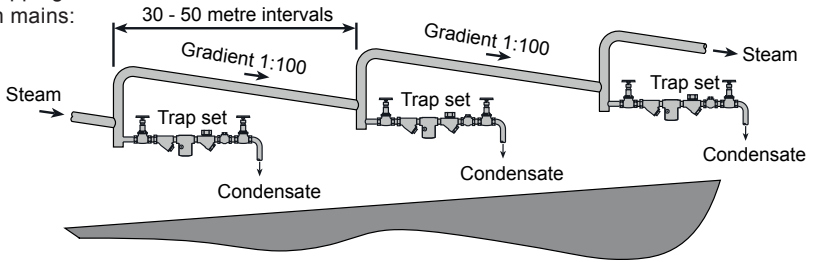
Safe Handling

Cast Iron is a brittle material. If the product is dropped during installation and there is any risk of damage the product should not be used unless it is fully inspected and pressure tested by the manufacturer.

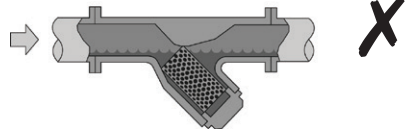
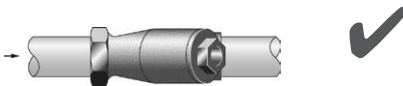
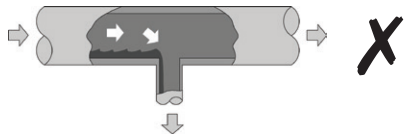
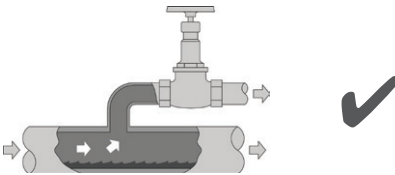
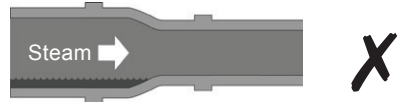
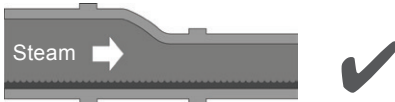
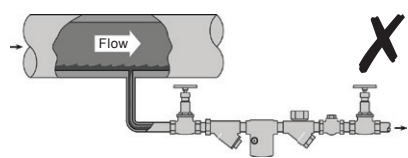
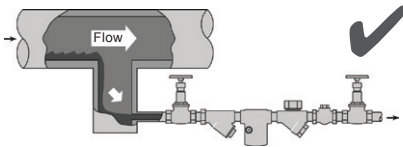


Prevention of water hammer

Steam trapping
on steam mains:

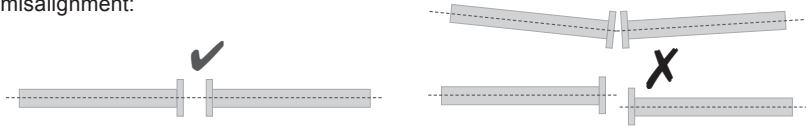


Steam Mains - Do's and Don'ts:



Prevention of tensile stressing

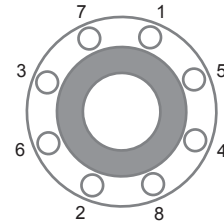
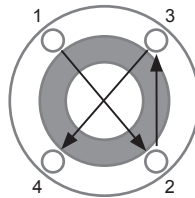
Pipe misalignment:



Installing products or re-assembling after maintenance:

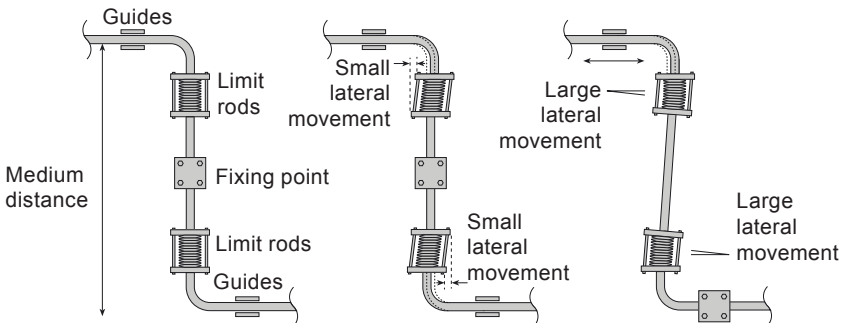
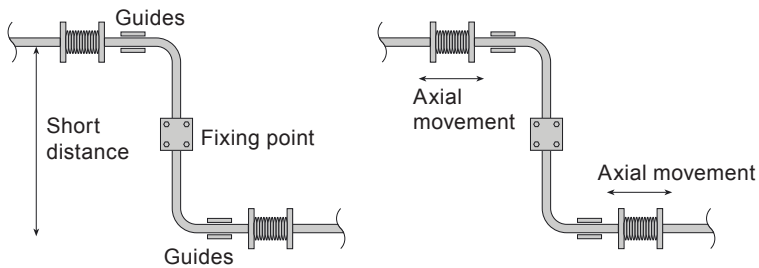


Do not over tighten.
Use correct torque figures.



Flange bolts should be gradually tightened across diameters to ensure even load and alignment.

Thermal expansion:



2. Installation

2.1 Description

The standard Type 58 temperature control is a three port mixing or diverting valve suitable for heating or cooling applications on water or oil systems.

2.1.1 Valve option

Valves are available for use on sea water or brine applications. Please contact Spirax Sarco for further information.

2.2 Serial numbers

All Type 58 control valves bear a serial number which is stamped on the nameplate and should be noted in all contacts with the manufacturer.

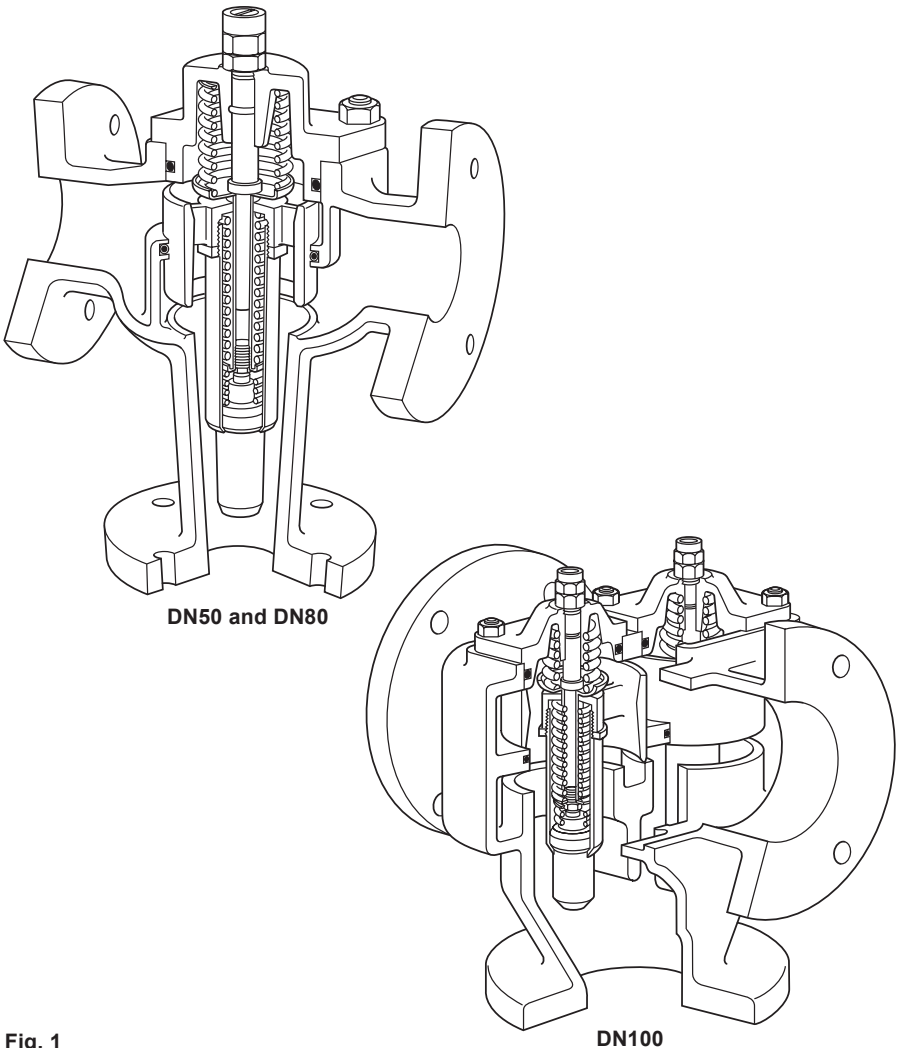


Fig. 1

2.3 General arrangement

The Type 58 Control Valve should be fitted in a vertical position with the Port O at the bottom. For ease of maintenance an isolating valve should be fitted in the line serving each port, although for clarity these are not shown on the recommended installation layouts.

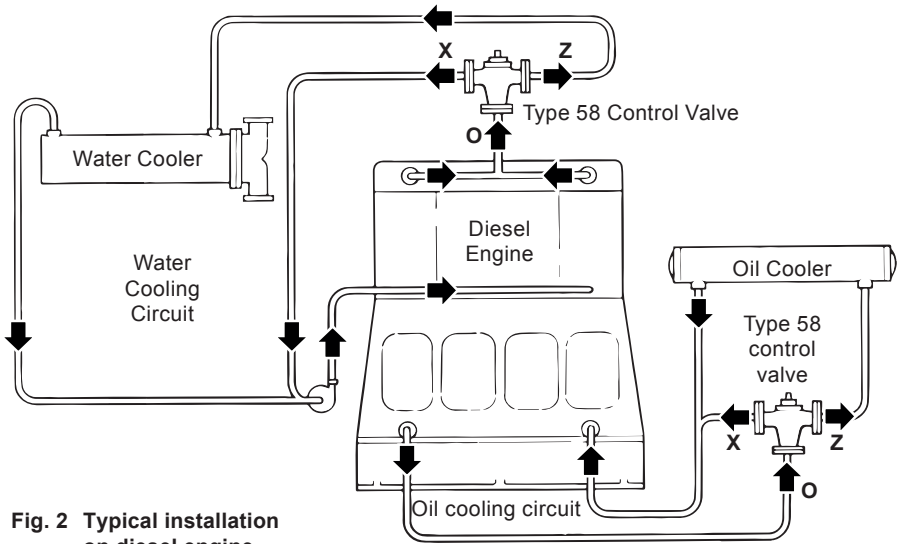


Fig. 2 Typical installation on diesel engine

2.3.1 Recommended installation

- As a diversion valve to control the temperature of the cooling water and lubricating oil serving a diesel engine. Figure 2 shows a typical layout.
- As a mixing valve to control the minimum return water temperature to a hot water boiler in a low temperature hot water heating system (93°C maximum).

Figure 3 shows a typical layout for one boiler.

Where two or more boilers are used in parallel it is advisable to fit a separate Type 58 Control Valve to each boiler as is shown in Figure 4.

Alternatively one or more Type 58 Valves may be fitted as Figure 5 to serve a range of boilers.

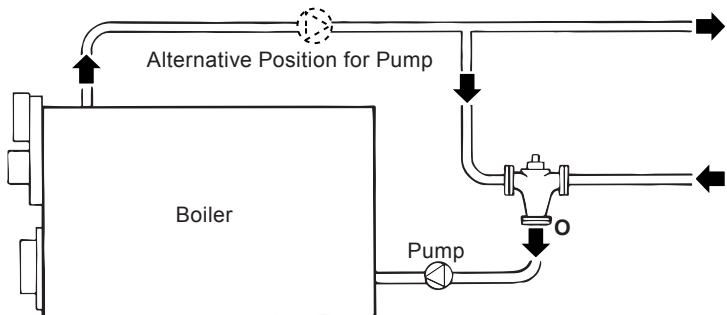


Fig. 3 Single boiler application

2.4 Pipeline stress

It is important that line stresses such as can be caused by expansion or inadequate supporting of the pipe, are not imposed on the valve body.

Main Duty and Standby Pumps

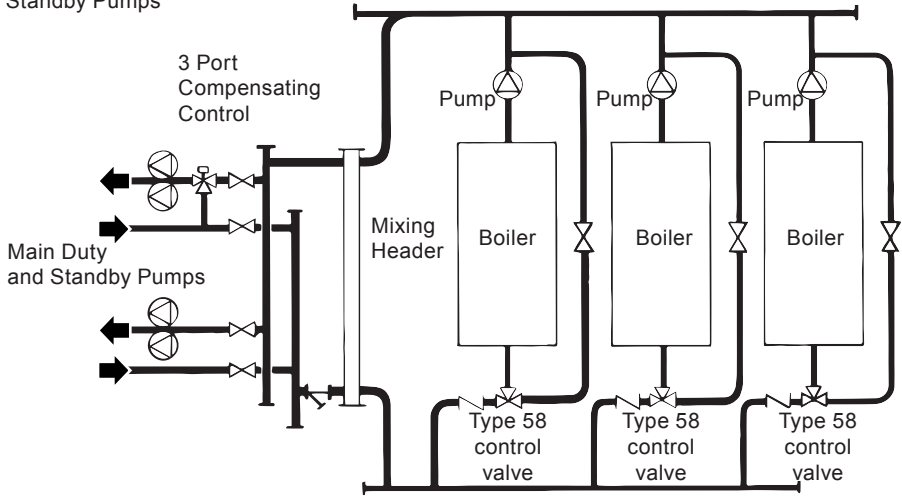


Fig. 4 Multi-boiler installation with separate Type 58 on each boiler

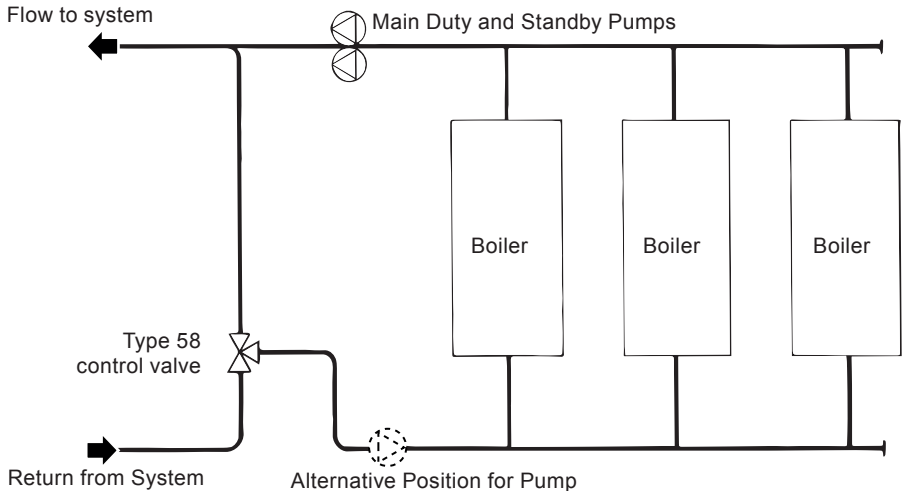
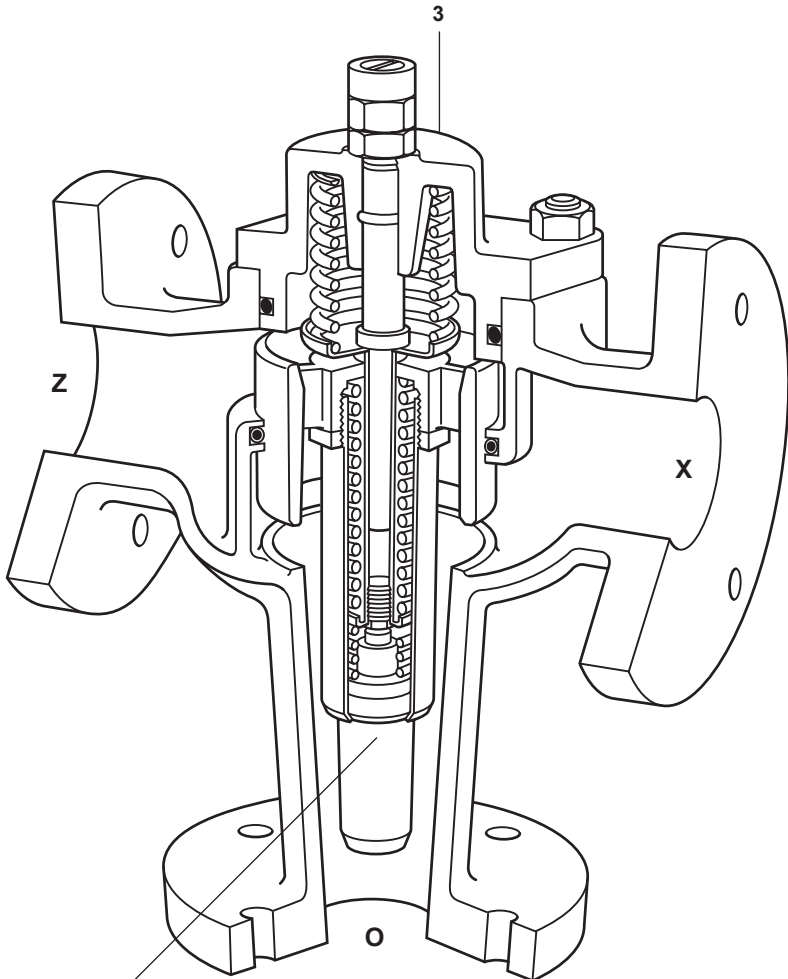


Fig. 5 Multi-boiler Installation served by one Type 58 control valve

2.5 Temperature range

The sensor (18) is available in a choice of temperature settings as shown in Table 1 opposite. Types A, B, C, D and E are the standard and type X is non-standard. In each case the temperature at which the valve commences to move is stamped on the bottom end of each sensor (18). In addition the type of sensor fitted to each valve is shown by the letter A, B, C, D, E or X stamped on the nameplate fixed to the cover (3).



18

Fig. 6 DN50 and DN80

Table 1 - temperature settings

Type	Port Z commences to open	Full flow to Z
A	57°C	66°C
B	63°C	71°C
C	74°C	82°C
D	82°C	91°C
E	40°C	49°C
X	Where an X sensor is fitted the letter X on the nameplate will be followed by the temperature setting and in all cases full movement of the valve, opening port Z and closing port X will occur at a temperature 8/9°C higher.	

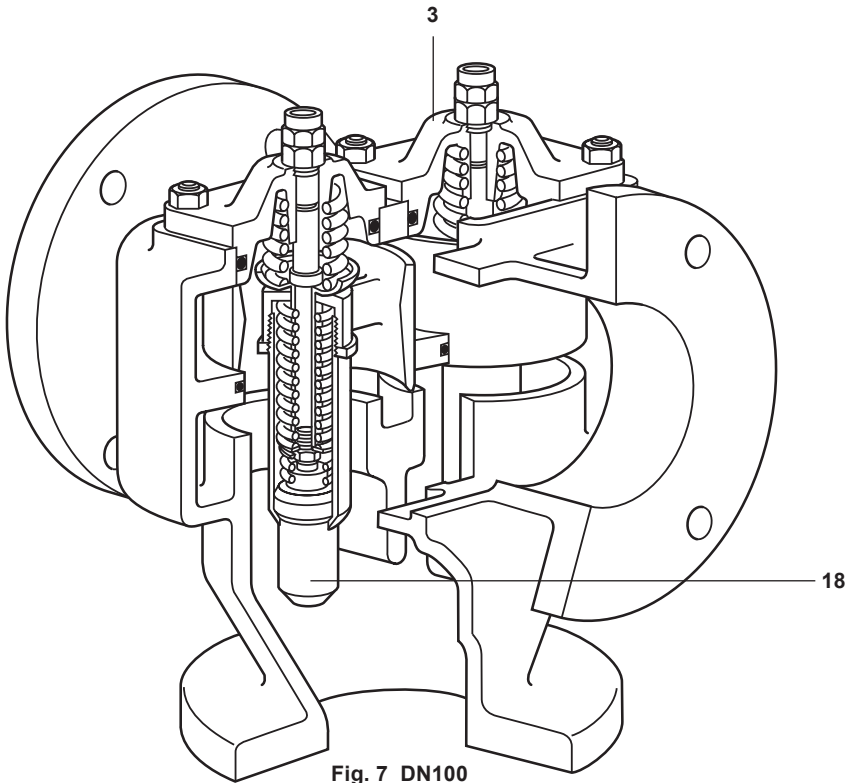


Fig. 7 DN100

2.6 Port identification

The valve ports are marked O,X,Z.

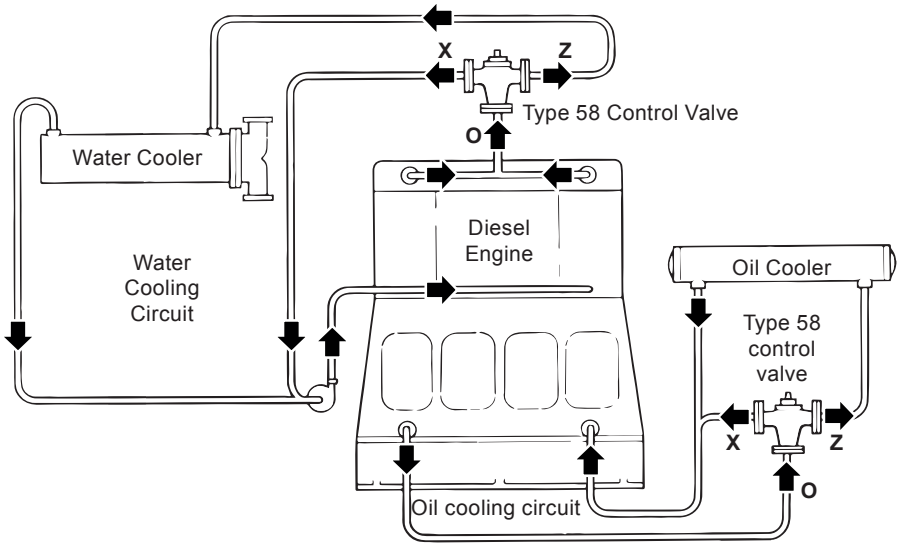


Fig. 8

3. Operation

3.1 Adjustment

After the Type 58 Control Valve has been put into service and allowed to settle down, if it is found that it is controlling at a slightly different temperature to that required, it may be adjusted over a small range as follows:

Using a 16 mm A/F spanner hold the adjustment nut (1) and slacken the lock nut (2). Now using a screw-driver in the slot provided to prevent the rod turning, the adjustment nut (1) and lock nut (2) may be repositioned up to a maximum of ± 2 mm as shown on Figure 9.

Turning the nuts clockwise to bring the end of the rod up to a maximum of 2 mm above the top face of the adjustment nut will raise the temperature.

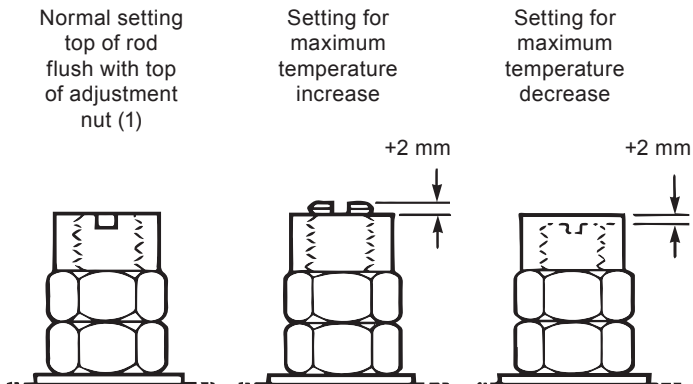


Fig. 9

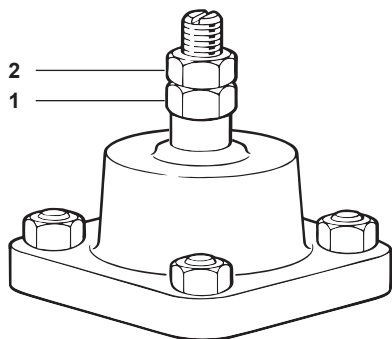


Fig. 10

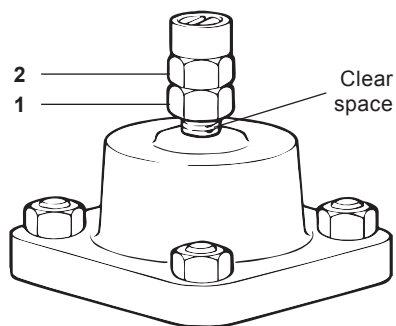


Fig. 11

3.2 Fail safe device

In the event of failure of the sensor (18) allowing a substantial rise in water temperature, a temperature sensitive fuse will come into operation at approximately 95°C mechanically putting the piston into the position where full flow will be through port Z.

In this position the valve can be operated manually, see Section 3.3.

To replace or re-set the fail safe device see Section 4.3.

The safety fuse is provided by forming the main valve operating rod in two sections male (9) and female (13) which are joined together by solder having a known melting point.

The melting of the solder allows the two sections to separate under the power of the overload spring (6) which will override the piston assembly opening the valve fully to port Z.

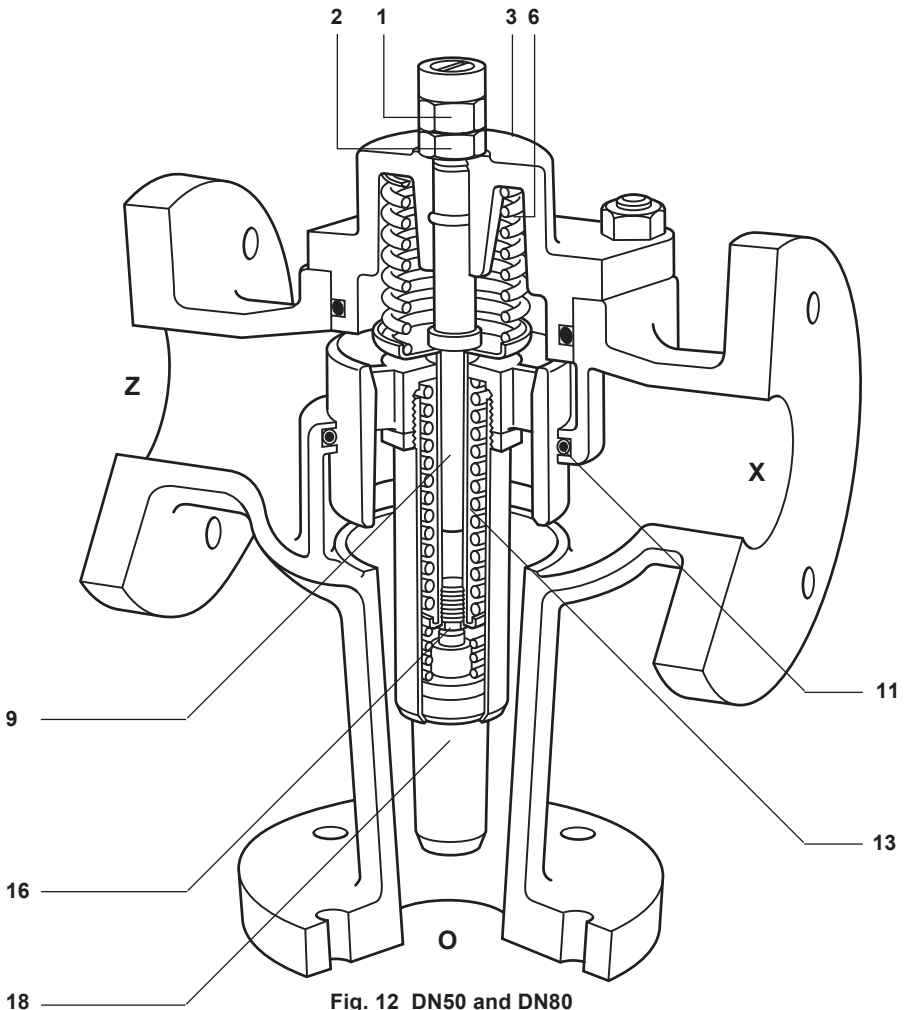


Fig. 12 DN50 and DN80

3.3 Manual operation

If by failure of the sensor or for some other reason the fail safe device has operated releasing the temperature sensitive fuse as described in Section 3.2, it is now possible to manually operate the valve as follows:

Using a 16 mm A/F spanner hold the adjustment nut (1) and slacken the lock nut (2). Unscrew and remove both these nuts completely from the rod, invert and replace them as shown in Figure 10.

By turning the inverted adjustment nut (1) the piston can now be moved to any intermediate position to give the required fluid temperature and if desired may be locked in position using the lock nut (2).

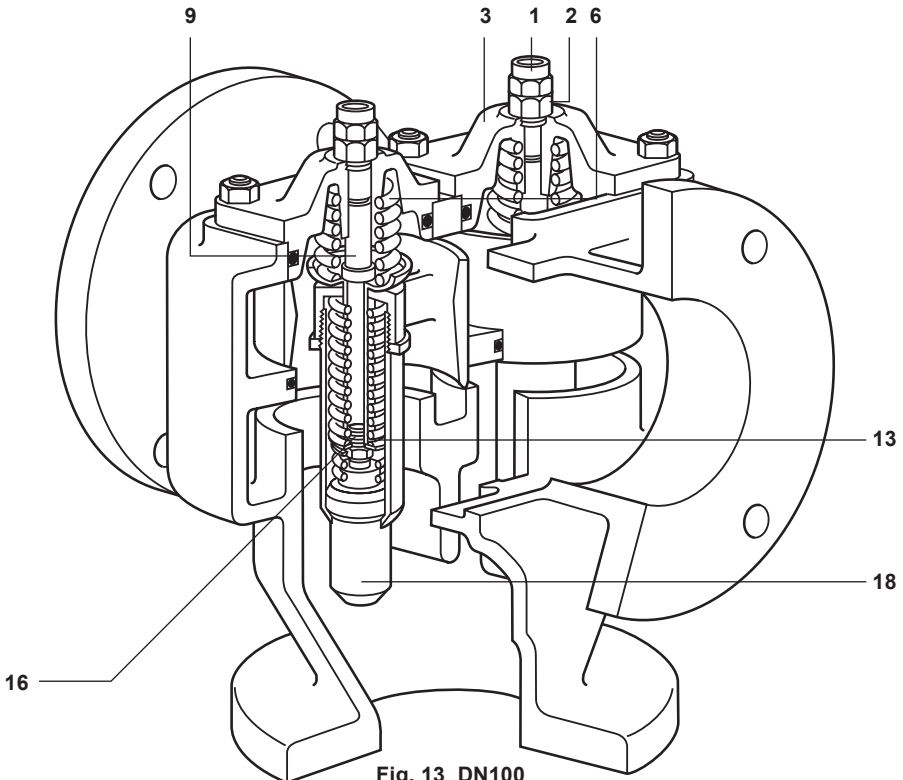
To repair or replace the fail safe device see Section 4.3.

3.4 Temperature override

If it is seen that the adjustment nut (1) and lock nut (2) assembly rises with the rod clear of the top face of the cover (3) as in Figure 11, it is an indication that the sensor is being subjected to a temperature in the excess of normal but not sufficiently high to bring the fail safe device into operation.

Under normal operation the expanding sensor (18) bears against the plug (16) pulling the piston assembly down to open the cooler port 11. If the system cannot cope with the load or if for some reason, such as dirt, the piston travel is restricted then overload of the sensor is avoided by allowing the rod assembly to rise up against the overload spring (6).

The cause of the overload should be immediately investigated.



4. Maintenance

4.1 Inspection

At least once a year the working parts should be removed for inspection. This can be done without uncoupling the valve body (5) from the pipework as follows but the valve should be isolated or the system drained.

- Undo nuts (4) and remove cover (3) by levering up evenly with two screw drivers, using the slots provided. Do not damage 'O' ring (7).
- The working parts are all attached to the cover (3) and may now be inspected and any scale cleaned off.

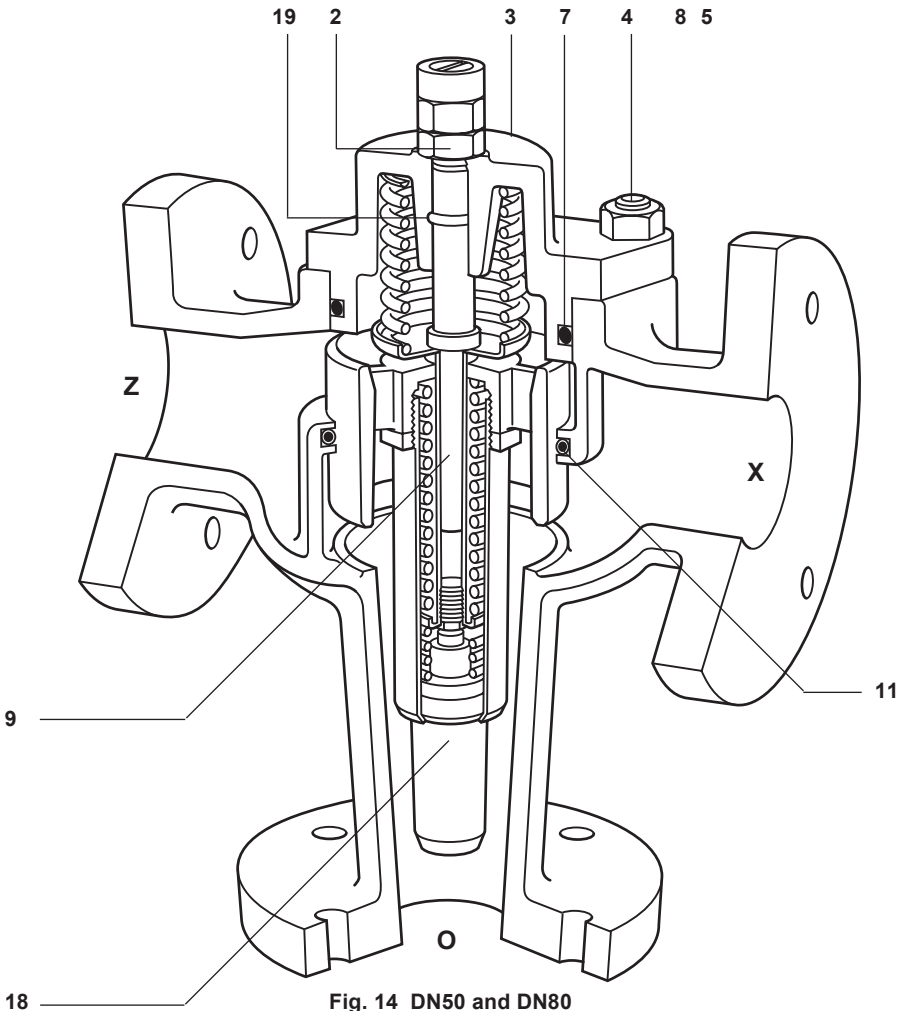


Fig. 14 DN50 and DN80

- Check that piston (8) is seating on machined face on cover (3). If not, it is either due to dirt, which should be cleaned off, or the safety fuse (9) is no longer 'set'. If the latter should be the case, repair or replace as detailed in Section 4.3.
- Without dismantling further, immerse the sensor (18) in water which is about 7°C hotter than the temperature stamped on its end and see that the piston (8) moves.
- If there is no movement replace the sensor (18) as described in Section 4.2.
- Remove any scale adhering to the inside of the valve body, taking care not to damage the seal (11).
- Make sure that the face on which the piston (8) seats is clean.
- If piston sealing ring (11) is worn (that is, if it is level with or below the groove into which it fits) prise out the old one and fit a new seal, shortening it with a razor blade until there is a gap of 1.5 mm between the two ends.
- Re-fit the cover (3) complete with working parts into the body taking care not to damage 'O' ring (7) or piston sealing ring (11).
- Replace and tighten nuts (4).
- **Nuts (4) should not be overtightened. The joint is sealed by 'O' ring (7) not by tightening nuts.**
- Should water leak either from the joint between the cover (3) and the valve body or from underneath lock nut (2) this shows that one of the 'O' rings (7) or (19) has been damaged and must be replaced.

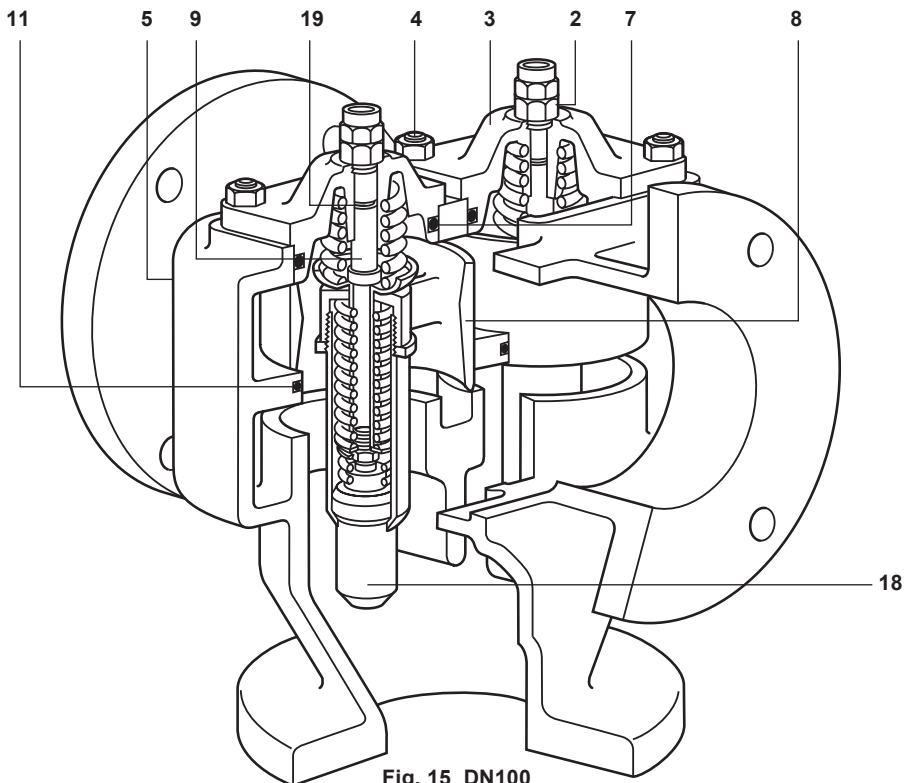


Fig. 15 DN100

4.2 To replace sensor

If the sensor (18) has to be replaced, proceed as follows after isolating the valve and/or draining the system:

- Undo lock nut (12) using a 42 mm A/F box spanner and unscrew sensor tube (14) a 'C' spanner in the slot provided if necessary.
- Remove retaining spring (17) and remove old sensor (18).
- To re-assemble drop new sensor (18) into tube (14) and replace retaining spring (17) on top of sensor.
- Screw tube (14) back into piston (8) until it is just possible to move sensor capsule between 2 mm and 3 mm against the retaining spring (17) before it comes into contact with plug (16). This operation should be done at ambient temperature. The sensor system is now correctly positioned and the sensor tube (14) should be locked by tightening the lock nut (12).
- After tightening check the movement once more.

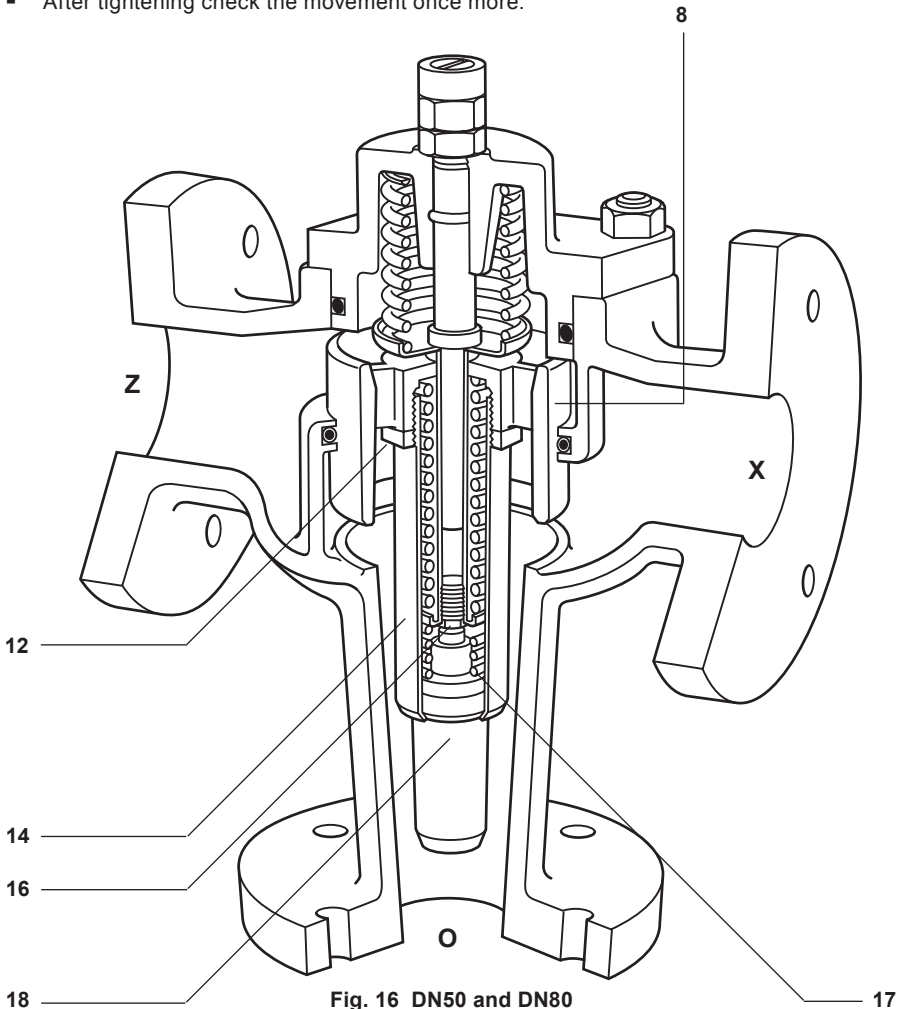
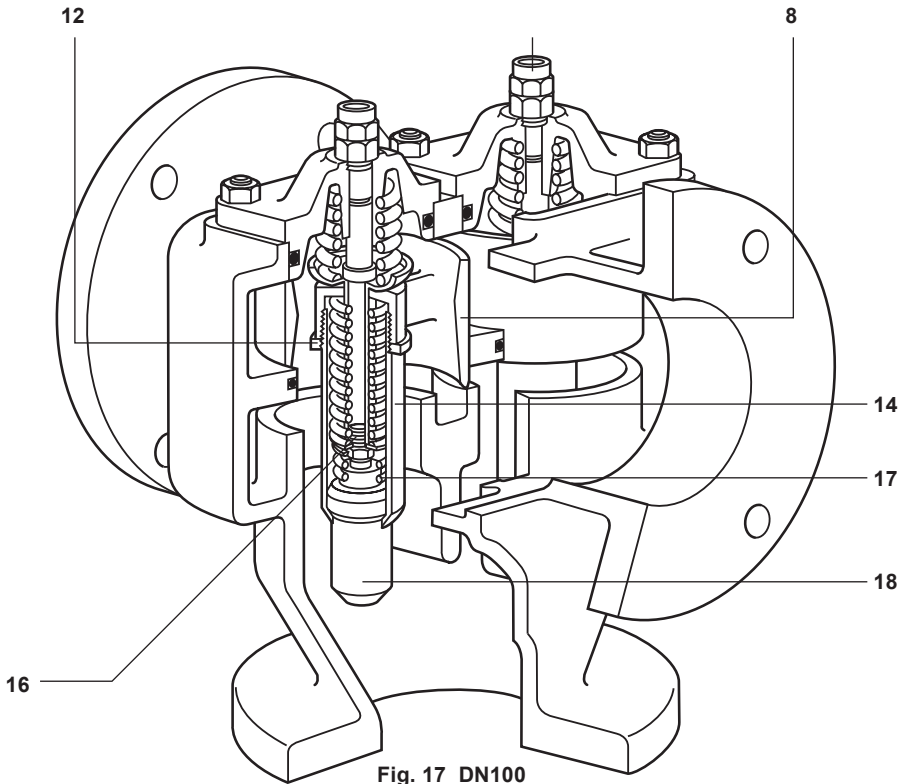


Fig. 16 DN50 and DN80



4.3 To Re-set or replace fail safe device

If safety fuse has operated for any reason it can be either re-set or replaced as follows:

- Isolate the valve and/or drain the system.
- Remove cover (3) complete with working parts as described in Section 4.1.
- Remove sensor (18) as described in Section 4.2.
- Hold hexagon plug (16) in vice and unscrew assembly from plug using 16 mm A/F spanner on locknut (2) being careful to keep the powerful return spring (10) under compression by pushing against cover (3).
- Then undo adjustment nut (1) and lock nut (2) and remove safety fuse assembly including spring (6).

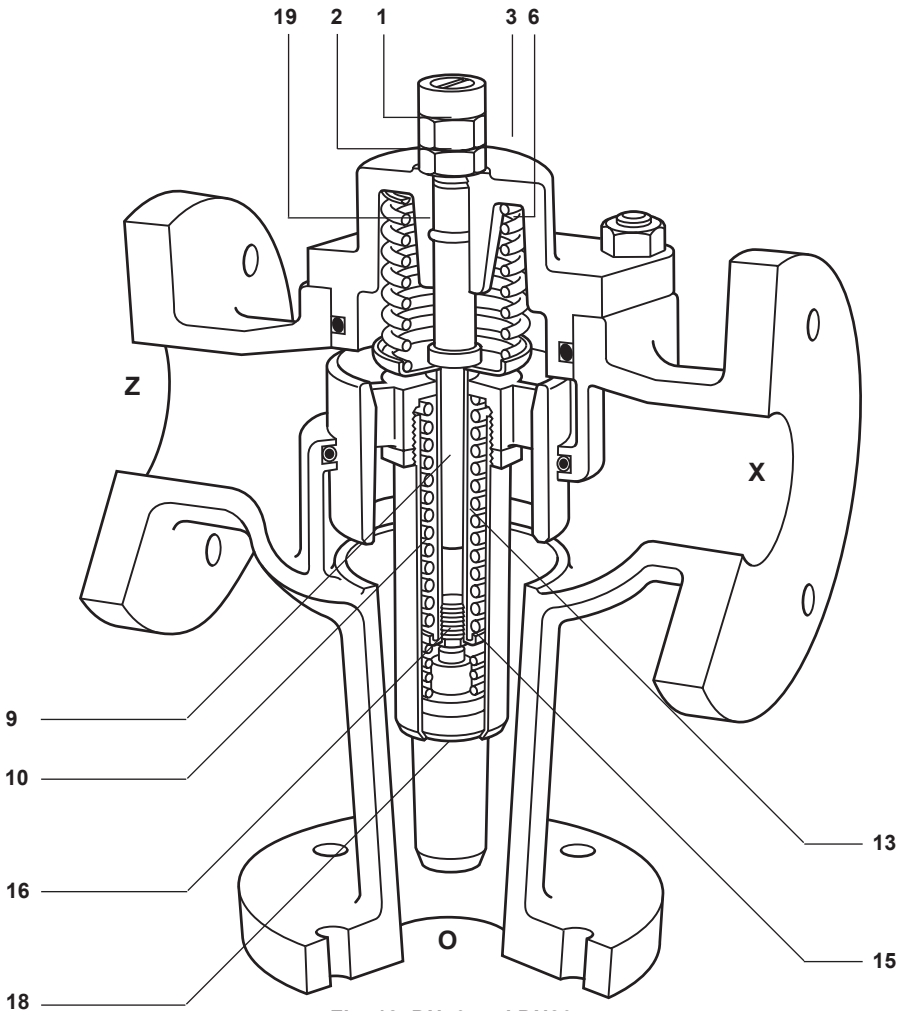
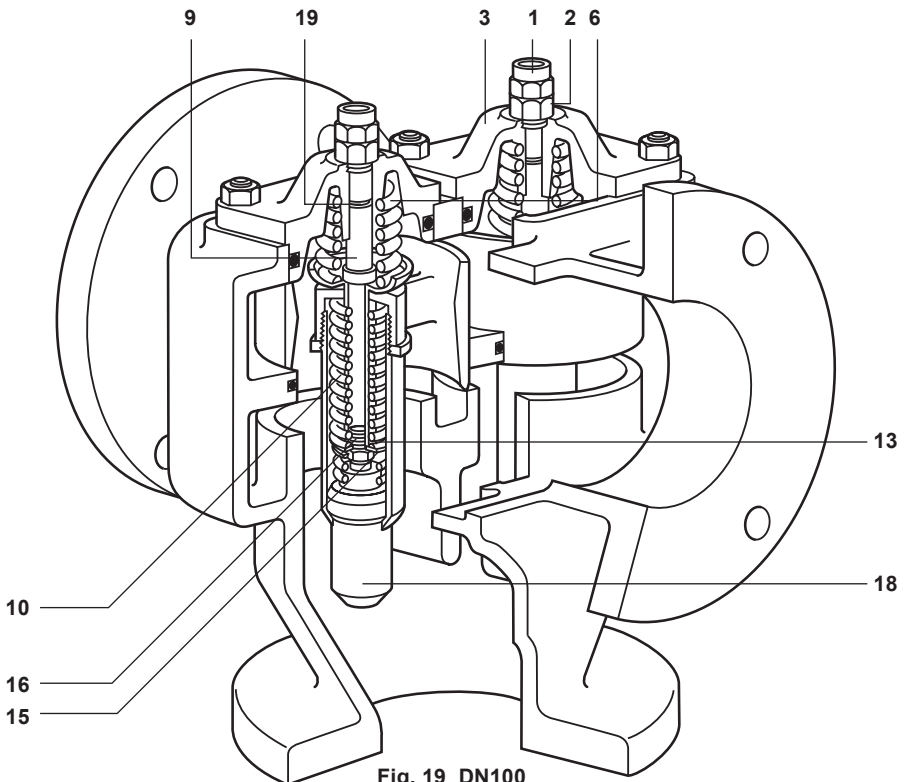


Fig. 18 DN50 and DN80

- **Either replace with a new safety fuse or remake the old safety fuse as follows:**
- Place safety fuse assembly in boiling water for a few minutes. Lift out and immediately push tube (13) as far as possible on to internal rod (9).
- Allow to cool. This is almost always satisfactory. If, however, it is evident that, due to extreme over-heating, solder has been lost and more is required, Fry's No. 9 solder should be used. This becomes plastic at 95°C approximately.
- As an alternative a replacement fail safe assembly consisting of rod (9) 'O' ring (19) and tube (13) can be purchased from Spirax Sarco Ltd.
- To re-assemble, fit rod (9) into cover (3) taking care to include spring (6) and checking that 'O' ring (19) is in good condition.
- Screw on locknut (2) and adjustment nut (1) compressing overload spring (6) until the end of the rod (9) is flush with face of adjustment nut (1).
- Lock two nuts (1) and (2) together.
- Hold hexagon plug (16) in vice as before.
- Place return spring (10) and spring plate (15) in position and firmly screw rod (9) and tube (13) on to plug (16).
- Should it be found in operation that the reassembled unit is controlling at a slightly different temperature from the original, it may be adjusted over a small range as described in Section 3.1.



5. Available spares

The spare parts available are shown in heavy outline. Parts drawn in broken line are not supplied as spares.

Available spares

Piston assembly (state temperature range)	1, 2, 3, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 18, 19
Fail-safe assembly	9, 19
Sensor	18
Adjustment nuts	1, 2
Set of sealing rings	7, 11, 19
Set of cover studs and nuts (set of 4)	4

Note: The spare parts above relate to one piston assembly only.

The DN100 has two piston assemblies in parallel. To obtain complete sets the spares should be doubled.

The internals for sizes DN80 and DN100 are interchangeable.

How to order spares

Always order spares by using the description given in the column headed 'Available spares' and state the size, type and temperature range of the valve.

Example: 2 - Piston assemblies, for a Spirax Sarco DN100 Type 58 temperature control valve having a temperature range A.

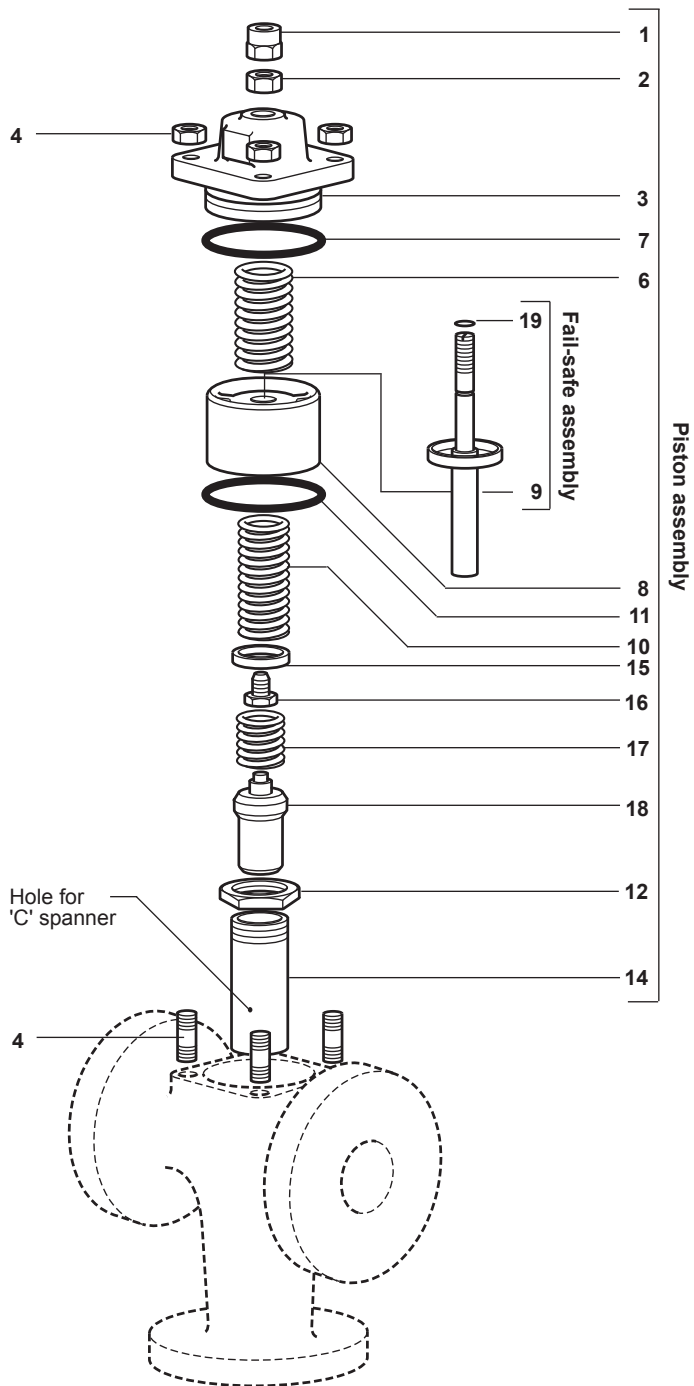


Fig. 20

