Pressure Differential Controls

Type TD

0-3.9.01-J

TDS

TD66

TD56-2

Fig 1

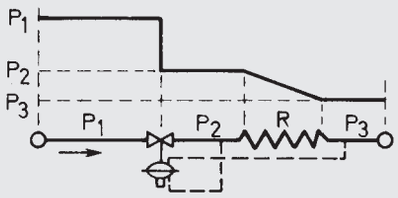
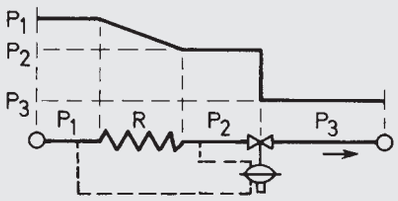


Fig 2



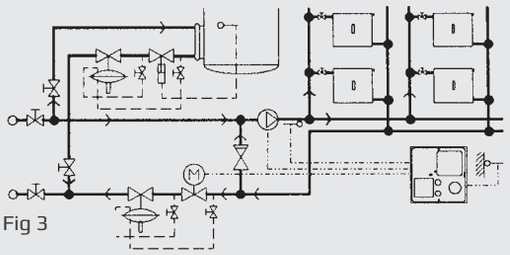


Fig 3

Pressure differential controls, type TD, comprise a control valve, a diaphragm unit and 2 connecting capillaries.

Type TDS is supplied fitted to a brass valve and is available in four size/range combinations. For further information, see separate data sheet no. 0.3.9.02.

The large controls type TD56-2, TD66-4 and TD66-8 can be used with our wide range of 2-way control valves, in sizes from 4 mm up to 80 mm (type TD56-2M up to DN 150 mm). For quick and accurate valve selection and valve sizing, we advise you to visit our website www.cloriuscontrols.com and select our sizing software Quick Choice. TD56-2 is delivered complete with actuator and valve - please see datasheet 0.3.9.06.01.

The diaphragm housings are made of cast iron and the diaphragms of synthetic rubber clamped between 2 steel discs. To prevent the diaphragm from being ruptured, a safety overload spring is fitted between the diaphragm and the valve to prevent damage when subjected to excess pressure, forcing the diaphragm against the housing.

The controls are proportional controls. The proportional band is given as a percentage of set pressure value.

The TD-controls are primarily for use in water systems where they maintain a constant differential pressure across 2 points and ensure stable flow conditions.

With the lower pressure connected to the valve side of the diaphragm and the higher pressure to the other side; the differential pressure across the diaphragm will be balanced by the force exerted by the spring. Any change in the differential pressure will cause the diaphragm and the valve mechanism to move up or down to restore the set condition.

WORKING PRINCIPLE OF THE TD-CONTROLS

Fig. 1. In the control valve the pressure is reduced from P1 to P2, and the control keeps (P2-P3) constant at a set value, although the external pressures "P1" and "P3" or the resistance "R" may be fluctuating. Sizing of the valve is based on the smallest value of (P1-P2) with the maximum flow. For quick and accurate valve selection and valve sizing, we advise you to visit our website www.cloriuscontrols.com and select our sizing software Quick Choice. Similarly, **fig. 2** shows the TD-control installed after the resistance "R" (in the return flow). In this case, (P2-P3) forms the basis for sizing the valve.

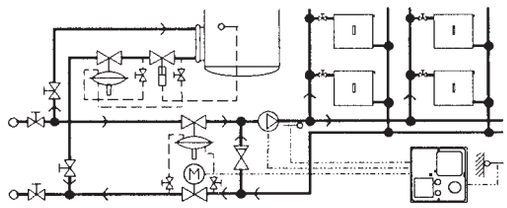


Fig 4

APPLICATIONS

District Heating - in Housing Circuits without by-passes

The function of the TD-controls is to reduce the high and fluctuating pump head in the district heating system to a suitable and, under all circumstances, a constant differential pressure. It is very important that the TD-controls reduce the water flow as much as possible, to satisfy the design temperature drop across radiators and maintain heat output without excessive water flow.

An inexpensive arrangement for a district heating scheme is to use the TD-control instead of a return by-pass to reduce the flow rate to a minimum. This results in small bore pipework and reduces the need for additional pumps or electrically operated controls.

Depending on the circumstances, the TD-controls may be installed in the return main (**fig. 3**) or the flow main (**fig. 4**). Installation in the return main is preferable where there is a risk of air in the system, and in high buildings where the pressure in the return main does not considerably exceed the static head. For low buildings, and high flow pressures, it is normally preferable to install the TD in the flow main to reduce the pressure in the radiators to a level almost equivalent to the static head in the return main. Please also note the TD-control in the district heating circuit of the hot water tank (H.W.T), and that the capillaries are connected across the control valves, maintaining a constant differential pressure across the valves and an optimum control. The H.W.T's control valve should be as

small as possible ensuring a slow heating and a good cooling of the district heating water.

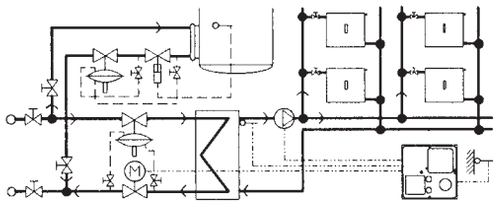


Fig 5

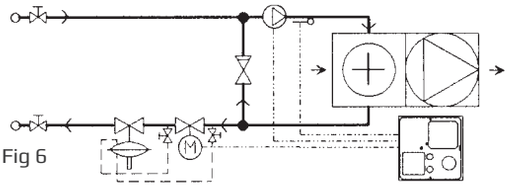


Fig 6

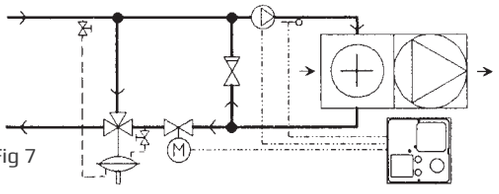


Fig 7

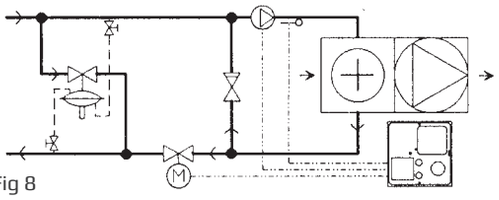


Fig 8

Pressure Stabilization for Temperature Control

The TD-controls also apply for heating systems with heat exchangers see **fig. 5**. When temperatures have to be kept within close limits e.g. in ventilating plants, control may be difficult if the differential pressure in the system is not constant or is very high. This can be overcome by installing a TD-control in front of one or more places to be controlled. Examples are shown in **fig. 6**, and **7**.

Fig. 6 is for district heating, direct supply, whereas **fig. 7** is for boiler supply. Note that a by-pass is established by a 3-way valve and a TD control.

The TD-controls can be used with our range of reverse acting valves in by-pass around pumps or across the flow and return pipes of a circuit - see **fig. 8** (boiler supply). This avoids the pump working against a dead head when all the sub-circuits are closed down and stops any bypassing on motorised valves or thermostatic radiator valves.

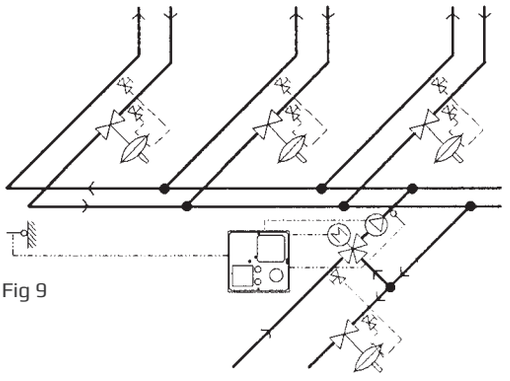


Fig 9

Noise Prevention

Noise from central heating installations can often be overcome by TD-controls. The noise arising from a control valve is normally related to the pressure drop across it. Experts recommend that the pressure drop across radiator valves should not exceed 0,08 bar, especially in the case of living room applications. In blocks of buildings with a common district heating station, there has, in recent years, been a tendency to increase the main pump head and this often results in valve noise.

Fig. 9 shows an example of the circuit to a block of buildings. The TD-control on the take off from the distribution main reduces the high pump head to suit the local pump head. The pressure differential across the TD-controls itself may exceed 2 bar if the distribution pump head is high. In such cases, to avoid noise problems, the TD-controls should be installed well away from living quarters and the immediate pipework should be well muffled.