spirax sarco

205 Control
Installation and Maintenance Instructions

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1. General

Control System and Valve Types
1. The 205 Control System is intended to operate one of the following valves up to the maximum differential pressure shown below.

		Max. Diff. Pressure bar
Gunmetal 2 port valves		
BX	½" 15 mm	14
SB	½" 15 mm	9
	¾" 20 mm	5
	1" 25 mm	3.4
KB 51	1"	9
	1¼"	9
	1½"	6
Steel 2 port valves		
BM	15 mm	14
KA 43	15 mm	9
	20 mm	5
	25 mm	2.4
KB 43	25 mm	9
	32 mm	6.2
	40 mm	6
Gunmetal 3 port valves		
TW	¾" 20 mm	2
	1" 25 mm	2
	1½" 40 mm	2

Extra Commissioning Adjustment
See Section 4-16

Dimensions (approximate) in millimetres

Range	A	B	C	D
3	382	250	380	30
4	382	290	380	30
5	382	188	380	30

Despatch
2. The Type 205 Control consists of two parts. (1) the valve and (2) the control system which consists of two duct sensors connected by means of capillary tubing to an actuator. These are packed in one box.

Storing
3. If the Control has to be stored for any length of time before being fixed, it is advisable to leave the factory packing intact and to store in a cool dry place.
A careful examnation should be made and any damage reported immediately.

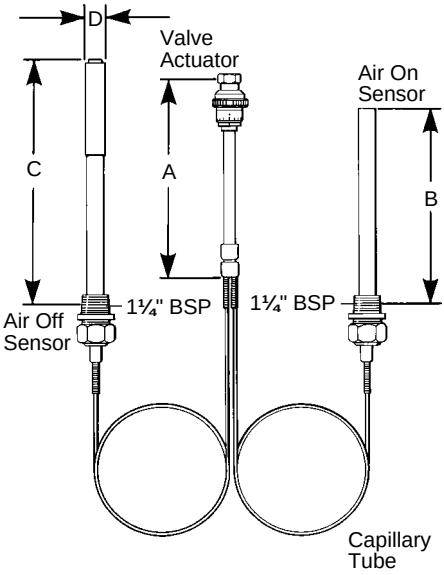
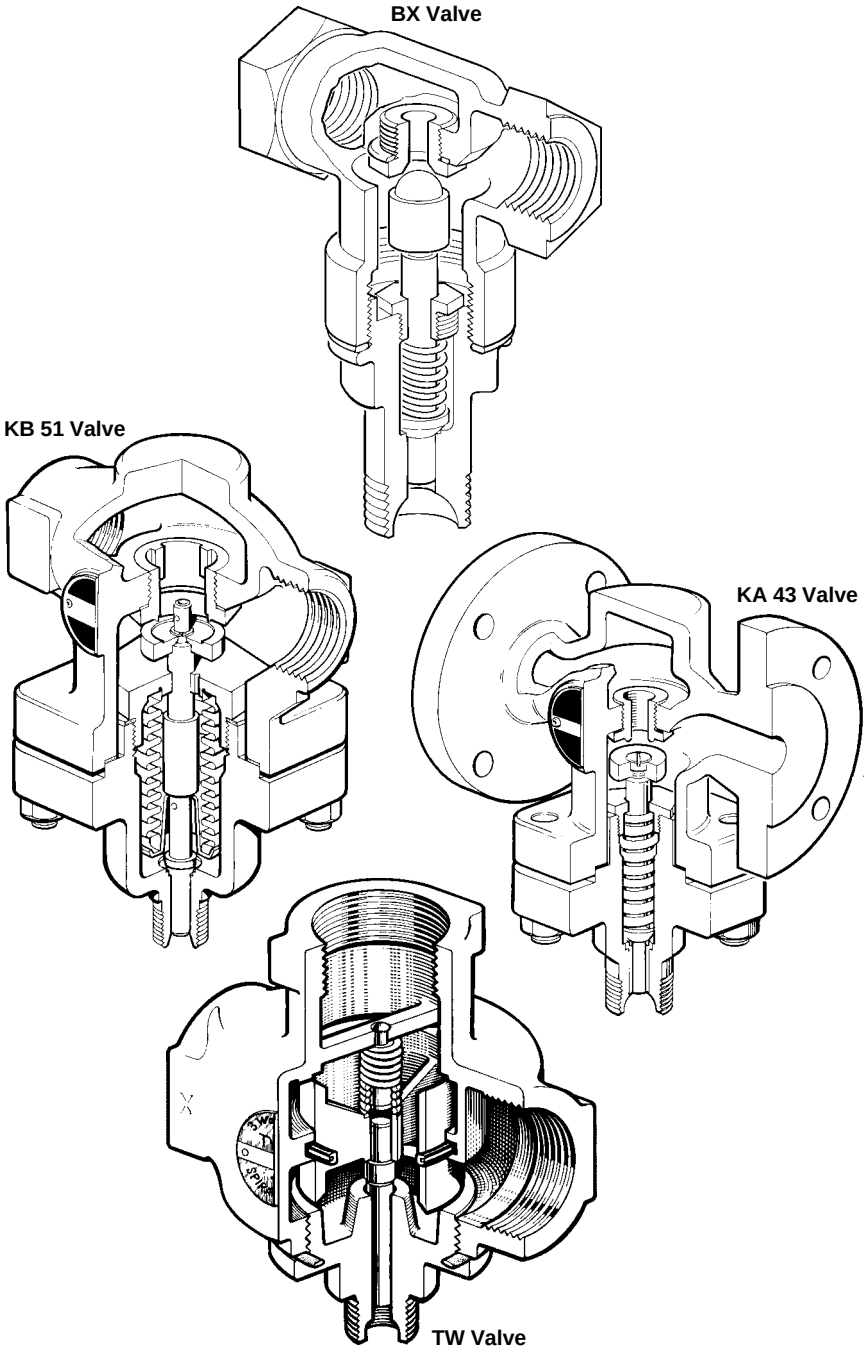


Fig. 1 Control System


BX Valve
KB 51 Valve
KA 43 Valve
TW Valve

General Arrangement
4. For steam or hot water applications the Type 205 Control uses the standard two ported valves as shown in Fig. 2.
The three ported TW Valve (DN20 to 40) can also be used where the heating medium is water. Fig. 1 shows the general arrangement of the control system. Fig. 3 and 4 show how the complete Control would normally be applied to a heater battery.

The Valve

Size of Pipeline
5. Where steam is the heating medium, the valve will in many cases be smaller than the bore of the pipeline to and from it. It is essential that the supply line be of ample bore to carry the load required, and that any reduction in line size to meet the valve size should be carried out adjacent to the valve.

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

Isolating Valves
7. Where isolating valves are fitted they should be of the same size as the pipeline and not the same size as the control valve where this is smaller than the line.

Removal of Condensate
8. Where the primary medium is steam, condensate which forms due to radiation losses in the steam main should be prevented from reaching the valve by fitting an adequate drain pocket and steam trap. If the steam is known to be wet it is best to fit a Spirax separator in the line.

Preventing Dirt
9. It is advisable to protect the valve by fitting a strainer immediately before it. Where the medium is steam, it is best to fit the strainer on its side to prevent the body filling with water which would reduce the screening area available.

By-pass
10. Where a continuous duty is essential, it is recommended that a by-pass be installed to enable the plant to be kept in operation when inspecting or servicing the control valve.
The by-pass should be the same size as the control valve and may be arranged above or to the side of the main assembly, but never below it when the medium is steam, because of the danger of condensate collecting.

Control System

Sensors
11. The two duct sensors are provided with nipples having 1¼" BSP threads. The 'air on' sensor, which is the shorter of the two, should be fitted in the fresh air inlet duct where is can sense only the fresh air inlet temperature unaffected by any recirculated air.

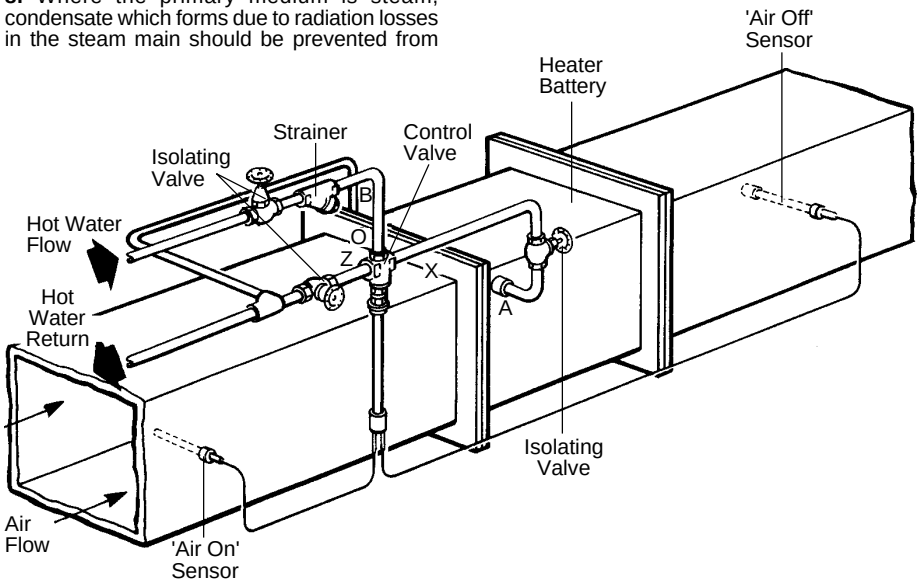


Fig. 3 Typical Installation of 3 port Valve on Water

The 205 Control is not suitable for use where there is no fresh air inlet.
The 'air off' sensor, which is the longer of the two, should be fitted into the duct on the warmed air discharge side of the heater battery, sufficiently far away to ensure that it will not be affected by radiant heat from the heater or by stratification of the air flow.

Capillary Tube
12. The capillary tube linking the units of the control system is a small bore tube filled with oil and must be handled with care. It should be so that there are no sharp bends and is in such a position that it is not exposed to external damage.

Condensate Handling from Steam Heated Units

Layout
13. When the heating medium is steam, the modulating action of the control valve on the steam supply will reduce the steam pressure within the battery to meet the heat demand.
At times of very light load, the pressure at the steam trap may therefore be down to atmospheric or even lower.
This would present a problem of condensate removal, so as a first step a check valve should be fitted as shown in Fig. 4. This will act as a vacuum breaker and will ensure that the minimum gauge pressure within the battery is 0. Then to provide some differential pressure to promote the flow of condensate, the steam trap should be fitted about 1 m below the outlet from the battery. See Fig. 4.

The steam trap should preferably be of the float type giving continuous discharge regardless of variations in pressure, **but under no circumstances should the condensate be lifted on discharge from the trap nor should it be discharged into a condensate return line operating under a back pressure**. Where it is necessary to elevate the condensate a Pump should be used.

Steam Trap Capacity
14. With atmospheric pressure in the battery and the trap fitted 1m below the drain point, this, allowing for resistance caused by the pipeline fittings, will provide a pressure differential across the trap orifice of about 0.07 bar
So whereas the steam trap must be capable of handling the maximum load at the maximum operating pressure, it is most important that it can also handle the reduced load at the minimum pressure differential.
The actual reduced load and minimum pressure differential will vary according to the design of the battery and local operating circumstances. In practice they can be allowed for by sizing the trap to handle 4 times the maximum load at the maximum pressure.
For example, a heater battery has a steam demand of 240 kg/h at a pressure of 5.5 bar so the trap should be chosen of a size to handle 960 kg/h at a differential pressure 5.5 bar.
Failing to provide adequate capacity at this low pressure will cause waterlogging which will no doubt give rise to erratic control and is a common cause of corrosion in heater batteries.

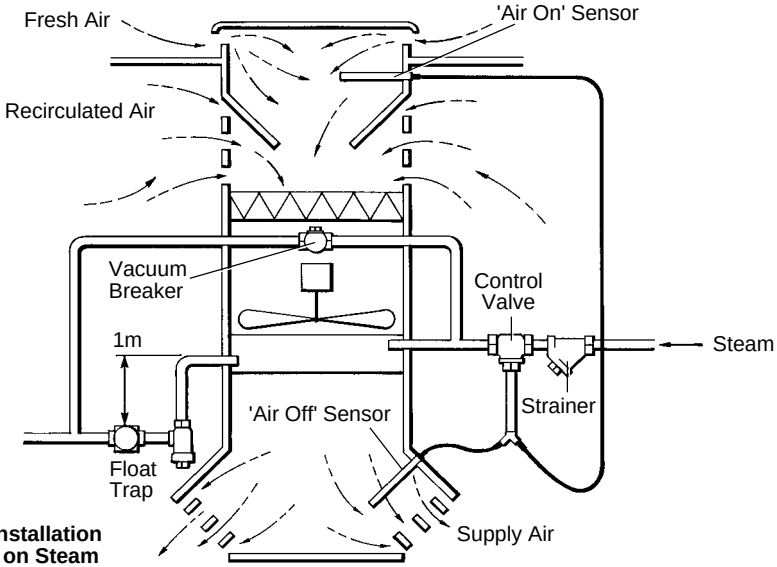
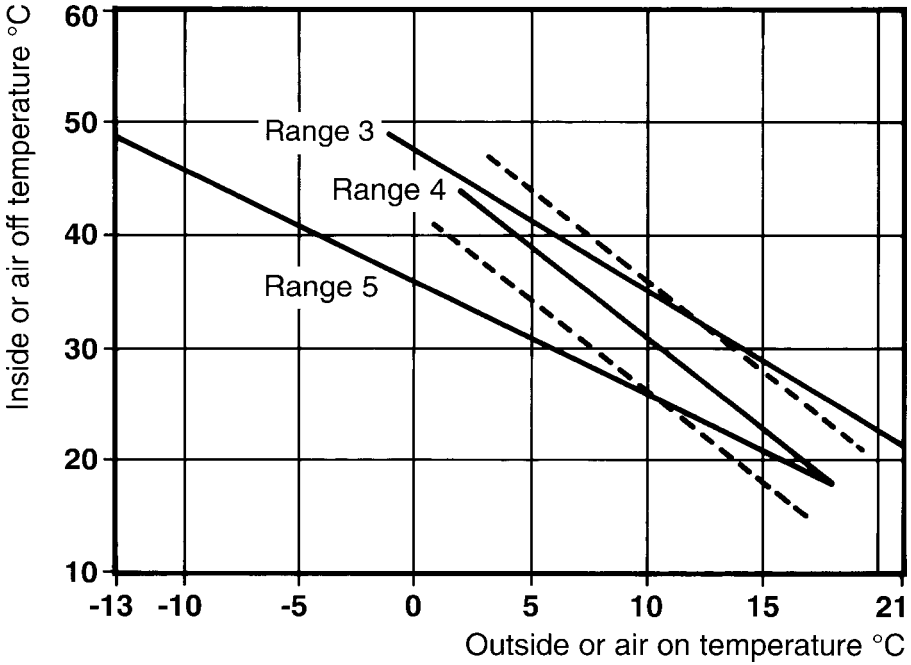


Fig. 4 Typical Installation of 2 Port Valve on Steam

3. Temperature Ranges

15. The Type 205 Control is available with three temperature ranges and Fig. 5 is a graph showing the approximate temperature response curves. With range 4 for example, an outside temperature of 2°C or below, will result in an 'air off' temperature of 43°C. If the outside temperature rises above 2°C outside the 'air off' temperature will fall until at 18°C outside, the valve will be fully closed and no heat will reach the heater battery.



Temperature Range	Outside (Air On)	Inside (Air Off)
3	-1 to 21°C	49 to 21°C
4	2 to 18°C	44 to 18°C
5	-13 to 18°C	49 to 18°C

Fig. 5 Graph of Temperature Responsive Curve

4. Temperature Adjustment

16. On the actuator, just below the valve, there is a knurled ring (1) which can be rotated and then locked by a grub screw (2), see Fig. 6. With the Control at its mid-setting the setting line on the knurled ring (1) corresponds with a black dot on the stationary ring (3). When the grub screw (2) is released the knurled ring (1) can be rotated half a turn in each direction, to give an adjustment of plus 2.8°C or minus 2.8°C to the 'air off' temperature. After adjustment to grub screw (2) should be tightened. DO NOT RELEASE THE GRUB SCREW ON THE STATIONARY RING (3). The dotted lines on Fig. 5 show the effect of carrying out maximum adjustment on a range 4 unit. The slope of the curve is not altered but the curve is displaced in a parallel fashion. A similar effect can be obtained on the other ranges.

17. Further adjustment of up to about ± 6.7°C is provided by a key head in the end of the 'air off' sensor. This is normally used in initial calibration but may be used during commissioning of the plant to vary the temperature beyond the limits provided by the adjustment head. Using the key provided and turning this adjustment clockwise will increase the inside ('air off') temperature and anti clockwise will decrease it. Using this adjustment will upset the original calibration. No attempt should therefore be made to alter it until the plant has properly settled down and only if the desired conditions cannot be obtained with the normal adjustment shown in Fig. 6.

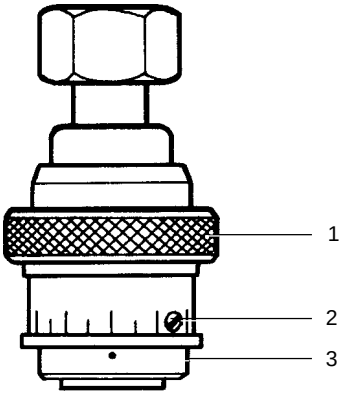


Fig. 6 Method of Carrying Out Adjustment

5. Maintenance

Control Unit

18. The control unit Fig. 1 is available only as a complete replacement unit but existing units can be returned to our Works for repair.

Valves

19. It is most important that all valve working faces are kept clear of dirt, scale etc. and strainers fitted to protect the valves should be cleaned regularly.

No further maintenance of the valve is required other than to replace worn or damaged parts. To enable this to be done spares are available, and details are shown on the appropriate product drawings.