

TWO, THREE AND FOUR PORT ELECTRO-THERMIC VALVES

Spec. No. VEX – 188-7-201
 MEX – 188-7-301
 FEX – 188-7-401
 AVX – 189-7-XXX*
 AVM – 189-7-XXX*

These valves are designed to control heating/cooling coils in terminal units such as fan coils and reheat coils.

Valves equipped with the thermo-electric actuator are suitable for either on/off or pulse width modulation operation. The actuators are available in either 24 or 230Vac versions. Pulse width modulation is available from the IAC controller or a BAS outstation.

The valves can be normally open or normally closed (NO or NC) with the actuator mounted.

Valves and actuators are close coupled with a bonnet nut.



* For full part number, substitute XXX with part numbers shown on page 2.

FEATURES

- Small compact valves particularly suitable for mounting in small enclosures
- Actuators are designed to fit to valves without the use of tools, to reduce installation time
- Suitable for both mixing and diverting applications
- Fly lead for easy electrical connection



SPECIFICATIONS AND GUIDE TO SELECTION

Group	Size	Type	Mode	Cv _s	Maximum Differential Pressure (bar)		Fluid Temperature °C	International Pressure Rating	Weight kg
					AVX 7201 AVM 7301 NO	AVX 7251 AVM 7351 NC			
2 Port BSP Male	0.5"	VEX 7201	–	0.2-1.9	7	7	4-100°C	PN 16	0.18
3 Port BSP Male	0.5"	MEX 7301	MIX	1.7	2.5	2.5	4-100°C	PN 16	0.19
			DIVERT		3	7			
4 Port BSP Male	0.5"	FEX 7401	MIX	1.7	2.5	2.5	4-100°C	PN 16	0.37
			DIVERT		3	7			

Cv_s = Flow in UK gal/min to produce 1 lbf/in² pressure drop when the valve is fully open. Kv_s = Cv_s x 1.038

Kv_s = Flow in m³/hr to produce 1 bar pressure drop when the valve is fully open

100 kPa = 1 Bar = 1.02kg/cm² = 14.5 lbf/in²

Type:	AVX 7201 - Normally open AVX 7251 - Normally closed AVM 7301 - Normally open AVM 7351 - Normally closed	Weight:	0.13 kg
Power Supply:	AVX - 24Vac ±10% AVM - 230Vac ±10%	Operation:	On/Off Pulse width modulation
Peak Power Consumption:	8 VA	Associated Controllers:	AVX IAC, BAS AVM CSMC, BAS
Operating Consumption:	3 VA	Nominal Pressure:	16 bar
Thrust:	110 N	Close Off Pressure:	200 kPa
Cable Length:	1m	Stroke:	2.5mm
Motor Fly Lead:	2 core	Medium:	Water or Glycol solution in water (Max. conc. of 30%)
Motor Lead Colours:	Yellow	Minimum Water Temp.:	4°C
Operation Time:	Approx. 180 seconds @ 20°C	Maximum Water Temp.:	100°C
Protection Class:	IP 44	Max. Ambient Operational Temperature Range:	0-40°C

CONSTRUCTION

Pipe Connections: ½" BSP male threads for compression couplings or union tailpieces

VALVE MATERIALS

Body:	Forged Brass 0T58 UNI 5705
Springs:	Stainless Steel
Stem:	Stainless Steel
Seat and Stem Packing:	EPDM
Plug Disk:	EPDM
Plug:	Brass

CONTROL MEDIUM

Only the control mediums specified on page 2 should be used.

Other fluids - e.g. sea water, oils etc: Satchwell cannot accept responsibility for use of these valves with fluids other than those listed on page 2. Detailed specifications of all materials in contact with the fluid are given on page 2 and it is the responsibility of the specifier to check their suitability.

The valves are intended for use in closed circuits. If the circuit is open it is possible that a build up of mineral deposits may impair the operation of the valve and frequent maintenance will be necessary. Appropriate precautions should be taken.

PLANNING THE INSTALLATION

In planning the pipework layout the following considerations apply when deciding on the valve position.

- Allow sufficient access for actuator fitting and removal.
- Avoid the spindle pointing vertically downwards to avoid the risk of condensation or leakage damaging the actuator.
- Observe the upper ambient temperature limitation of the actuator (40°C).
- Where the fluid in the valve exceeds 100°C the actuator must not be directly above the valve. Therefore the valve should be mounted with the spindle horizontal.
- Observe the correct direction of flow through the valve as indicated by the arrows cast on the body. 3 port valves should be fitted in the return for diverting applications.
- Regulating valves are recommended to be installed in the bypass pipe to each 3 port control valve in addition to those for pump sets and branches etc.
- It is suggested that strainers should be fitted to protect the valves. When strainers are fitted the following recommendations should be observed:-
 - Strainer bodies for line sizes up to DN 50 (50mm) should be Bronze to BS 1400, PB1 or Cast iron to BS 1452, class 180.
 - Strainer pressure ratings should be at least 150% of the maximum pressure expected in the application.
 - Strainer screens should be of a suitable stainless steel construction.
 - The strainer screen should have a free area of at least 250% of the line cross sectional area.
 - The screen perforation diameter should be in the range of 0.7 to 0.9mm for sizes up to DN 50 (50mm).
 - Strainer should be installed in parallel to enable online maintenance to be carried out.
- Ensure that the system is efficiently vented.

MEX 3-PORT VALVE - Diverting

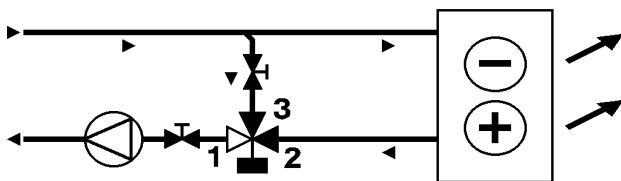
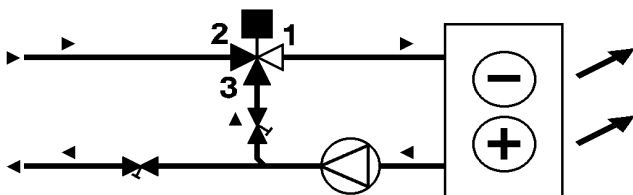


Fig.1

MEX 3-PORT VALVE - Mixing



INSTALLATION

1. **The system should be thoroughly flushed out to remove foreign matter before fitting the valve.**
The fitting of strainers is NOT a substitute for flushing the system out fully. Failure to fully flush the system can result in frequent clogging of the strainers.
2. Observe the recommendations under good design practice.
3. Install the valve as close as possible to the air heater or cooler being controlled.
4. With the valve in a horizontal pipe the actuator should preferably be sited vertically above the valve or to the side if the water temperature is above 100°C. Under no circumstances mount the actuator below the valve.
5. Allow a minimum clearance of 20mm above the actuator for fitting and removal.
6. When all the unit valves are 2 port the need for independent control of the main water circuit volume and/or differential pressure should be considered to maintain the pump head within reasonable limits.
7. 3 port valves used for diverting applications must be installed in the return pipe - see Fig. 1.
8. For 4 port valves see Fig. 2.
9. Unscrew the plastic dust-cap and keep.
10. Lower the actuator over the valve so that the thumb-wheel is directly above the valve body screw.
11. Hand tighten the thumb-wheel so that the actuator is securely fixed to the valve body Screw. **HAND TIGHTEN ONLY-NO TOOLS ARE REQUIRED.**
12. Connect the fly lead to the controller in accordance with the appropriate wiring diagram. Observe wiring precautions shown on page 4.

DO NOT SWITCH ON POWER SUPPLY UNTIL COMMISSIONING STEPS HAVE BEEN COMPLETED.

NEVER RUN THE AVX OR AVM WITHOUT A VALVE ATTACHED TO IT.

COMMISSIONING

1. Check that all control equipment is correctly located and fitted.
2. Check ambient temperature conditions.
3. Check the valve has been installed correctly to fig.1 or 2.
4. Check that the actuator has been correctly assembled to the valve as directed in the installations instructions and that the fly lead is routed clear of the valve body and pipe work.
5. Check for control circuit wiring is correct and in accordance with the overall control system wiring diagram.
6. Switch on power supply and check for correct valve and actuator operation.

MAINTENANCE

ISOLATE VALVE CONTROL MEDIUM AND RELIEVE PRESSURE BEFORE REMOVING THE ACTUATOR.

A periodic check of the valve should be made for general condition and leakage.

FEX 4-PORT VALVE - Diverting

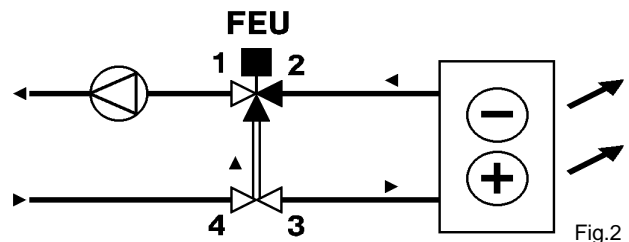
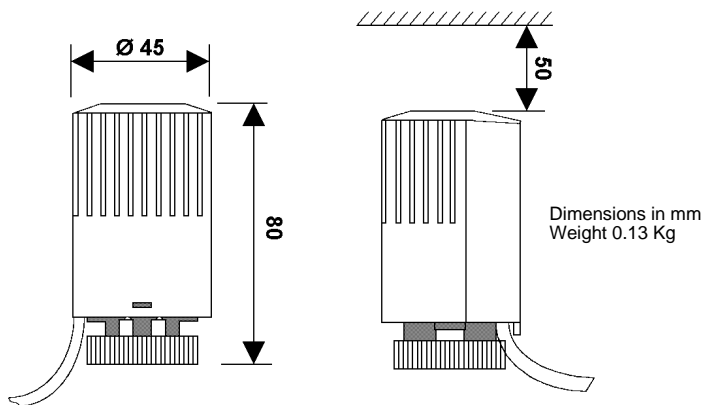


Fig.2

AVX, AVM



VEX 2-PORT VALVE (TYPICAL)

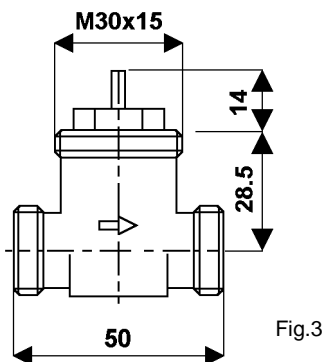


Fig.3

MEX 3-PORT VALVE (TYPICAL)

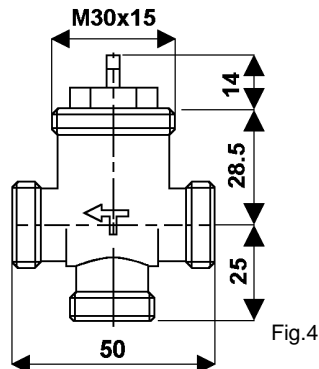


Fig.4

FEX 4-PORT VALVE (TYPICAL)

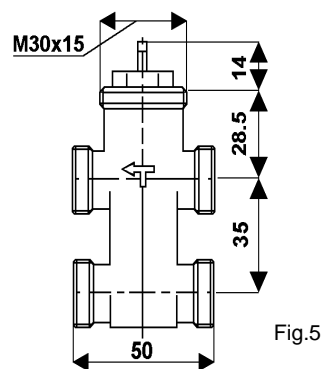


Fig.5

AVX WIRING

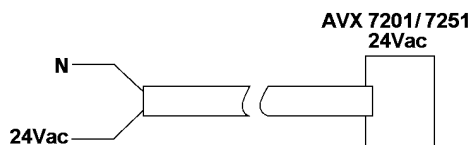


Fig.6

N.B. CONNECTIONS ARE NON-POLARISED.

AVM WIRING

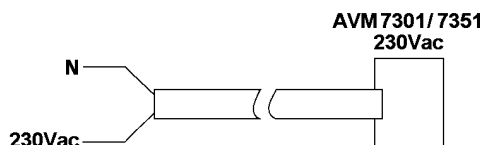


Fig.7

N.B. CONNECTIONS ARE NON-POLARISED.

When wiring to BAS outstations refer to the appropriate outstation.

For longer lengths, increase cable size and observe maximum resistance also screen wiring and earth the screen at the controller only.

NOTE: Upto 4 AVXs may be connected in parallel to a single IAC controller output.



Satchwell Control Systems Limited
Farnham Road, Slough, Berkshire,
United Kingdom SL1 4UH

Tel: +44 (0)1753 550550
Fax: +44 (0)1753 824078

CAUTION

- The AVM actuator is at mains potential. Local wiring regulations and usual safety precautions must be observed.
- The AVX actuator is a low Voltage (24Vac) device and should only be used with the appropriate Satchwell controllers. Local wiring precautions and usual safety precautions must be observed.
- Observe wiring precautions on page 4.
- Observe installation instructions on page 3.
- Do not switch on power supply until commissioning checks have been carried out - see page 3.
- Observe maximum and minimum ambient temperatures.
- Observe recommendations under "Good Design Practice" on page 3.
- Observe limits of water temperature and system pressure.
- The system should be thoroughly flushed out to remove foreign matter before fitting the valve.
- **ISOLATE VALVE CONTROL MEDIUM AND RELIEVE PRESSURE BEFORE REMOVING THE ACTUATOR.**
- Interference with parts under sealed covers invalidates the guarantee.
- Design and performance of Satchwell equipment is subject to continual improvement and therefore liable to alteration without notice.
- Information is given for guidance only and Satchwell do not accept responsibility for the selection and installation of its products unless information has been given by the Company in writing relating to a specific application.