

### THREE PORT VALVES

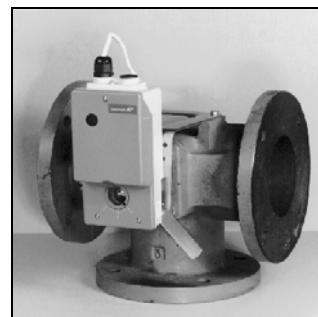
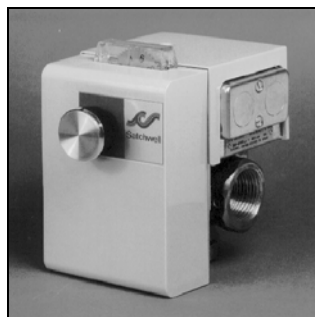
Specification No. MB – 617-X-XXX\*  
MBF – 618-X-XXX\*

MB and MBF valves are of the 3-port rotary-shoe type. They are characterised for use as mixing or diverting valves, with hot or chilled water, in heating, ventilating and air conditioning applications.

The MB is driven by either the 'R' (DS 3.201) or 'AR' (DS 3.215) range of actuators. The MBF is only suitable for use with the 'AR' (DS 3.215) range of actuators.

Note: They will operate satisfactorily as two-port valves if the bottom port is blanked off.

The MB and MBF ranges of valves fitted with appropriate Satchwell actuators will fully comply with all relevant European directives.



\* For full specification number replace the 4Xs with the appropriate figures from the TYPE column in the table on Page 2.



## SPECIFICATIONS

Group	Size	Kv <sup>a</sup> or Cv	Type	Maximum Differential Pressure		Temperature Limits		Maximum Internal Pressure (gauge)		International Pressure Rating
				ARX2201 ARM2601 ARE2301	XRM3201 RM3601 ARX2251 ARM2651 ARE2351	Min.	Max.	kPa	lbf/in <sup>2</sup>	
				kPa	kPa					
<b>MB</b> <b>Screwed</b> <b>B.S.P.</b> <b>Parallel</b> <b>Female</b>	½"	1.8	<b>MB1402</b>	–	70	2°C	120°C	1000	145	PN 10 (ND 10)
	¾"	4.0	<b>MB1452</b>	–	70					
	1"	8.0	<b>MB1502</b>	–	70					
	1¼"	12.0	<b>MB1552</b>	–	35					
	1½"	20.0	<b>MB1602</b>	–	35					
2"	32.0	<b>MB1652</b>	–	35						
<b>MBF</b> <b>Flanged</b>	65mm	63	<b>MBF4732</b>	35	–	2°C	120°C	600	87	PN 6 (ND 6 TO DIN 2401)
	80mm	80	<b>MBF4782</b>	25	–					
	100mm	120	<b>MBF4857</b>	25	–					

100kPa = 1 Bar approximately equal to 1.02 kgf/cm<sup>2</sup> approximately equal to 14.5 lbf/in<sup>2</sup>

- a Cv<sub>s</sub> = Flow in UK gal/min to produce 1 lbf/in<sup>2</sup> pressure drop when the valve is fully open  
Kv<sub>s</sub> = Flow in m<sup>3</sup>/hr to produce 1 bar pressure drop when the valve is fully open

For full TECHNICAL SPECIFICATION see table on Page 3 which gives details of flange drilling, materials etc.

## POSSIBLE ACTUATOR VALVE COMBINATIONS AND LINKAGES

ACTUATOR TYPE		'R' (See Data Sheet)	'AR' 15Nm (See Data Sheet)	'AR' 8Nm (See Data Sheet)
220 to 240Vac		RM (DS 3.201)	ARM (DS 3.215)	ARM (DS 3.215)
24Vac		XRM (DS 3.201)	ARX (DS 3.215)	ARX (DS 3.215)
0-10V Signal		–	ARE (DS 3.215)	ARE (DS 3.215)
Angular Stroke		90°∠	90°∠	90°∠
VALVE	MB ½" to 2"	Direct Coupling to valve - no linkage required. Not suitable for cooling applications.	No	Use linkage kit No. LK2702 (see DS 5.001)
	MBF4732, 4782, 4857	No	Use linkage kit no. LK2701 (see DS 5.001). The kit is also used for converting other MBF specifications (see DS 5.001). Manual operating lever included (optional).	No

## CONSTRUCTION AND TECHNICAL SPECIFICATION

TECHNICAL SPECIFICATION		MB ½ - 1"	MB 1¼"	MB 1½ & 2"	MBF 65 to 100mm
<b>Pipe Connections</b>	Screwed Parallel (female) BSP to BS 21 Flanged BS 4504, Table 6/11 (Equivalent to DIN 2531/ND6 and drilled to DIN 2501, ND6)	• —	• —	• —	— •
<b>Characteristic</b>	Port 2 Modified Parabolic Port 3 Linear	• •	• •	• •	• •
<b>Rangeability</b>	50:1	•	•	•	•
<b>Let-by</b>	<0.5% (max) (% of Cv or % of Kv)	•	•	•	•
<b>Temperature Working Pressure Test Pressure</b>	See Table on Page 2 See Table on Page 2 2100 kPa (300 lbf/in <sup>2</sup> )	• • •	• • •	• • •	• • •

## MATERIAL

<b>Body</b>	Hot Pressed Brass to BS 218 Close Grained Cast Iron BS 1452 Grade 260 Close Grained Cast Iron to BS 1452 Grade 260 or 220	• — —	— • —	— • —	— — •
<b>Valve Plate Assembly</b>	Stainless Steel to BS 1449 1967 Grade 301S21 Bonnet: Brass to BS 2874 CZ131	•	•	•	—
	Cast Iron Plate to BS 1452 Grade 260 or 220 Gland Housing Brass to BS 2874 CZ122	—	—	—	•
<b>Sleeve</b>	Aluminium Brass Alloy to BS 2870 CZ110 or Arsenical Brass to BS 2875 CZ105 or Gilding Brass to BS 2870 CZ102	—	•	•	•
<b>Shoe</b>	PTFE Filled Sintered Shoe	•	•	•	•
	Driving Plate Brass to BS 2873 CZ108	—	•	•	•
<b>Spindle</b>	High Tensile Brass to BS 2874 CZ114	•	•	•	•
<b>End Bearing</b>	As body material Brass to BS 2873 CZ108	• —	— •	— •	— —
	Stainless Steel to BS 970 Grade 321S12	—	—	—	•
<b>'O' Rings</b>	Adjacent to control medium: Ethylene Propylene Adjacent to air: Ethylene Propylene	• •	• •	• •	• —
<b>Springs</b>	Stainless Steel to BS 970 Grade 302S25	•	•	•	•

## SPARES

<b>Reconditioning kits</b>	617-9-410	•	—	—	—
	617-9-411	—	•	—	—
	617-9-412	—	—	1½"	—
	617-9-413	—	—	2"	—
<b>Reconditioning kits</b>	618-9-510	—	—	—	65mm
	618-9-511	—	—	—	80mm
	618-9-512	—	—	—	100mm

## PACKED WEIGHTS

<b>MB ½"</b>	1.1 kg	<b>MBF — 65mm</b>	17.0 kg
<b>MB ¾"</b>	0.9 kg	<b>MBF — 80mm</b>	25.5 kg
<b>MB 1"</b>	1.1 kg	<b>MBF — 100mm</b>	30.0 kg
<b>MB 1¼"</b>	2.1 kg		
<b>MB 1½"</b>	3.1 kg		
<b>MB 2"</b>	3.9 kg		

## GOOD DESIGN PRACTICE

### Control Medium

These valves are designed for use with hot water in a closed circuit. They may also be used with brine (up to 15% NaCl or CaCl solution) or Glycol solution (25% max) for freeze protection with appropriate corrosion inhibitors. (See Construction Materials in table on Page 3). Other fluids - e.g. seawater, oils etc.: Satchwell cannot accept responsibility for use of these valves with fluids other than those listed above. Detailed specifications of all materials in contact with the fluid are given in Table on Page 3 and it is the responsibility of the specifier to check their suitability.

The valves are intended to be used in closed circuits for water; if the circuit is open e.g. mains water 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.

The valve should have an authority of approximately 0.5. That is, the pressure drop through the valve should be as near as practicable equal to the pressure drop through the rest of the circuit which it controls.

It is suggested that strainers should be fitted to protect the valves. When strainers are fitted the following recommendations should be observed:-

- Strainers 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 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).
- The screen perforation diameter should be in the range of 1.5 to 1.8mm for sizes over DN 50 (50mm).
- Strainers should be installed in parallel to enable online maintenance to be carried out.

WATER SIZING CHARTS ARE GIVEN IN DATA SHEET V110

## INSTALLATION

### WARNING -

**STEAM OR HOT WATER HAZARD. BEFORE REMOVING ACTUATOR FROM VALVE OR OPENING VALVE, ENSURE THAT THE VALVE CONTROL MEDIUM IS ISOLATED AND RELIEVE THE PRESSURE. WORK SHOULD ONLY BE CARRIED OUT BY A COMPETENT ENGINEER.**

**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.

1. Select location for valve which is reasonably clean with adequate access for fitting and wiring actuator.
2. Ambient temperature limits:  
MB with 'R' actuator:  
0 to 50°C - for water up to 80°C  
0 to 35°C - for water up to 120°C  
(pro rata in between)  
MB, MBF with ARE, ARM or ARX actuator, -20 to 50°C
3. Ensure that when installed the RM or XRM actuator shaft is horizontal, and that at least one port is vertical. When using ARX, ARM or ARE Actuators they may be mounted in any position as long as they are not underneath the valve. For chilled water applications use 'AR' type actuator with appropriate linkage.

The flow may be in either direction through the valve. The marking cast on the body indicates the internal configuration. Port 1 is always common. Port 2 is open for full load. Port 3 is open for full by-pass (zero load). See Fig.1 to Fig.4.

Allow sufficient access for linkage, actuator and wiring.

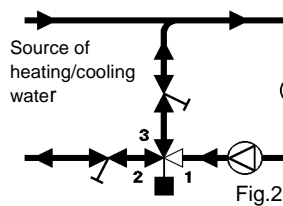
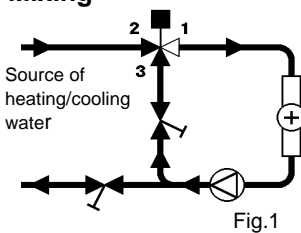
4. Install the valve as follows:
  - a. Remove all protective materials from the valve.
  - b. The system should be thoroughly flushed out to remove foreign matter before fitting the valve.
  - c. Fit valve into pipework using the minimum quantity of jointing materials.

## MAINTENANCE

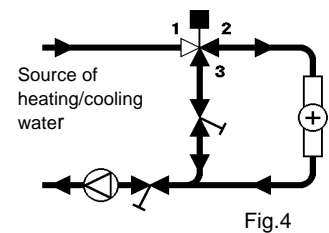
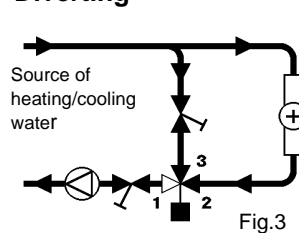
**STEAM OR HOT WATER HAZARD. BEFORE REMOVING ACTUATOR FROM VALVE OR OPENING VALVE, ENSURE THAT THE VALVE CONTROL MEDIUM IS ISOLATED AND RELIEVE THE PRESSURE. WORK SHOULD ONLY BE CARRIED OUT BY A COMPETENT ENGINEER.**

A periodic check of the valve should be made for general condition and leakage. For replacement gland kits etc. see table on Page 3.

### Mixing

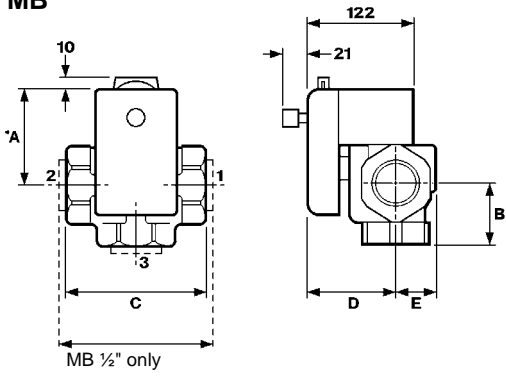


### Diverting



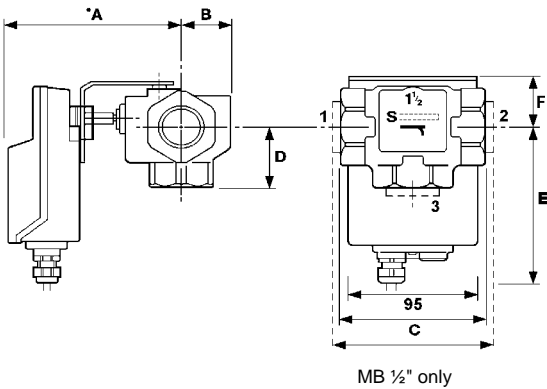
# DIMENSION DRAWINGS

## MB



## RM, XRM

Valve Size	*A mm	B mm	C mm	D mm	E mm
½"	86	55	110	77	24+
¾"	86	45	91	77	24+
1"	86	47	94	77	24+
1¼"	90	49	115	85	30
1½"	94	52	134	104	49
2"	100	63	148	104	49



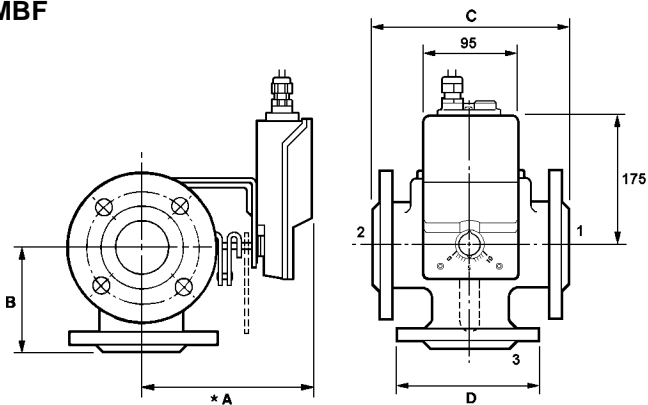
## ARM2651, ARX2251, ARE2351

Valve Size	<sup>a</sup> A mm	B mm	C mm	D mm	E mm	F mm
½"	117	24	110	55	175	43
¾"	117	24	90	45	175	43
1"	117	24	94	47	175	43
1¼"	123	30	115	50	170	48
1½"	142	49	134	53	167	51
2"	142	49	148	64	160	58

a Access and fitting clearance: allow additional 150mm to dimension A

All dimensions in mm

## MBF



## ARM2601, ARX2201, ARE2301

Valve Size	<sup>a</sup> A mm	B mm	C mm	D mm
65mm	169	114	226	160
80mm	202	129	254	190
100mm	202	150	297	210

a Access and fitting clearance: allow additional 150mm to dimension A

**WARNING -**

**STEAM OR HOT WATER HAZARD. BEFORE REMOVING ACTUATOR FROM VALVE OR OPENING VALVE, ENSURE THAT THE VALVE CONTROL MEDIUM IS ISOLATED AND RELIEVE THE PRESSURE. WORK SHOULD ONLY BE CARRIED OUT BY A COMPETENT ENGINEER.**

**Cautions**

- Do not apply any voltages until a qualified technician has checked the system and the commissioning procedures have been completed.
- If any equipment covers have to be removed during the installation of this equipment, ensure that they are refitted after installation to comply with UL and CE safety requirements.
- Observe recommendation under 'Good Design Practice' - see Page 4.
- The system should be thoroughly flushed out to remove foreign matter before fitting the valve.
- Observe limits of water temperature, system pressure and maximum differential pressure - see Page 2.
- Interference with parts under sealed covers renders the guarantee void.
- Information is given for guidance only and TAC Satchwell does not accept responsibility for the selection or installation of its products unless information has been given by the Company in writing relating to a specific application.
- Design and performance of TAC Satchwell equipment is subject to improvement and therefore liable to alteration without notice.
- A periodic system and tuning check of the control system is recommended. Please contact your local sales office for details.

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