Satchwell

VZ, VZF, VSF

TWO-PORT SEAT VALVES

Specification No. VZ/VZF 624-X-XXX*
VSF 667-X-XXX*

These seat valves are of 'globe' construction with a linear moving spindle and equal percentage characterised plug which closes against the seat when the spindle is lifted. They are suitable for the control of hot or chilled water, steam, brine or glycol solutions within the limitations given in the table on Page 2.

The information in this Data Sheet covers operation, using the 'AL' and 'AL-S' ranges of linear actuators.

The 'VZ', 'VZF' and 'VSF' ranges of valves fitted with appropriate Satchwell actuators will fully comply with all relevant European directives.

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

SPECIFICATIONS AND GUIDE TO SELECTION

VALVE					SUITABLE ACTUATORS — See DS 3.401, 3.501, 3.601						CONTROL MEDIUM					
					ALM 1601 ALE 1302 ALX 1201 ALE 1327			ALX 1251 ALE 1352	ALMS 1601 ALMS 1651 ALXS 1201 ALXS 1251 ALES 1302 ALES 1352	ALi 1576 ALi 1577	Brine, 15% max. NaCl or $CaCl_2$ (freeze protection) Glycol solution, 25% max. (freeze protection) Water	Steam (dry saturated				
Group	Size	Type	*Cv_S	Stroke	Maximum differential pressure (Δ p)	Optional: Spring accessory kit	Optional: Gives increased max. (Δ p)	Maximum differential pressure (Δ p)					Temperature Limits		Max. Internal pressure	International Pressure Rating
					kPa		kPa	kPa	kPa	kPa			Min.	Max.	kPa	
VZ Screwed Bronze	½" ½" ½" ½" ¾"	**VZ 1401** **VZ 1402** **VZ 1403** **VZ 1404** **VZ 1451**	0.2 0.5 1.0 2.0 4.0	9.5mm ($^3/_8$")	1600 1600 1600 1600 1600	— — — — —	— — — — —	1600 1600 1600 1600 1000	1600 1600 1600 1600 1000	1600 1600 1600 1600 1600	•	• 140 kPa max. gauge	2ºC	130ºC at 1500 120ºC at 1600		PN 16 (ND 16)
	1" 1¼" 1½" 2"	**VZ 2501** **VZ 2551** **VZ 2601** **VZ 2651**	8 12 20 32	15.9mm ($^5/_8$")	970 580 410 240	823-2-801	1600 900 600 370	560 340 220 120	560 340 220 120	1262 755 533 312	•	—	2ºC	200ºC at 1300 120ºC at 1600		PN 16 (ND 16)
VSF Flanged SG Iron	15mm 15mm 15mm 15mm 15mm	**VSF 2426** **VSF 2427** **VSF 2428** **VSF 2429** **VSF 2430**	0.63 1.0 1.6 2.5 4.0	9.5mm ($^3/_8$")	1600 1600 1600 1600 1600	— — — — —	— — — — —	1600 1600 1600 1600 1600	1600 1600 1600 1600 1600	1600 1600 1600 1600 1600	•	•	2ºC	200ºC at 1300 120ºC at 1600		PN 16 (ND 16 to DIN 2401)
VSF Flanged Cast Iron	20mm 25mm	**VSF 1476** **VSF 1526**	6.3 10	15.9mm ($^5/_8$")	1600 1170	— 823-2-801	— 1600	1000 500	1000 580	1600 1522	•	•	2ºC	200ºC at 1300 120ºC at 1600		PN 16 (ND 16 to DIN 2401)
	32mm 40mm 50mm	**VSF 1576** **VSF 1626** **VSF 1676**	16 25 40	24.5mm (1")	640 400 240	— 823-2-801	1130 670 410	— — —	340 200 120	833 520 312						
VZF Flanged Cast Iron	65mm 80mm 100mm	**VSF 1727** **VSF 1777** **VSF 1852**	63 80 125	25.4mm (1")	140 100 50	— — —	— — —	— — —	80 50 20	182 130 65	•	—	2 ºC	200ºC at 1300 120ºC at 1600		PN 16 (ND 16 to DIN 2401)
	125mm 150mm	**VZF 1902** **VZF 1954**	200 315	38mm (1½")	28 18	— —	— —	— —	— —	36 23						

*. Cv_S = Flow in UK gal/min to produce 1 lbf/in^2 pressure drop when the valve is fully open $Kv_S = Cv_S \times 1.03$
Kv_S = Flow in m^3/hr to produce 1 bar pressure drop when the valve is fully open
100 kPa = 1 Bar ≡ 1.02 Kgf/cm^2 = 14.5 lbf/in^2

For full TECHNICAL SPECIFICATION see table on page 3 which gives details on flange drillings, materials etc.

ACCESSORIES

LINKAGE KITS

SPECIFICATION	VALVE	ACTUATOR	ACTUATOR MANUFACTURER
LNK 1541	VSF, 32mm to 50mm	SKD62	Landis & Gyr
LNK 1542	VZ ½", ¾", 1" to 2", MJF,VSF 20mm, 25mm, MJF 15mm	SKD62	Landis & Gyr
LNK 1543	VZF, 65mm to 150mm	SKD62	Landis & Gyr
LNK 1544	VZ ½" to 2", VSF 20mm, 25mm	M6425C	Honeywell
LNK 1545	VZF, 65mm to 150mm	M6425C	Honeywell
LNK 1546	VSF, 32mm to 50mm	M6425C	Honeywell
LNK 1547	VZ ½" to 2", VSF, 15mm to 25mm	MVL 56, MVL 56A/C	Controlli
LNK 1548	VZF, 65mm to 150mm, VSF, 32mm to 50mm	MVL 56, MVL 56A/C	Controlli

CONSTRUCTION AND TECHNICAL SPECIFICATION

Technical specification			VZ ½" & ¾"	VZ Bronze 1" to 2"	VSF SG Iron 15mm	VSF 20 to 50mm	VZF 65 to 150mm
Pipe Connections	Screwed B.S.P. to BS 21 female — taper		•	—	—	—	—
	Screwed B.S.P. to BS 21 female — parallel		—	•	—	—	—
	Flanged BS 4504 16/11. = DIN 2533 ND 16		—	—	•	•	•
	Face to Face dimension to DIN 3300		—	—	•	•	—
Characteristic	Equal percentage		•	•	•	•	•
Rangeability	50:1		•	•	•	•	•
Let-by	Tight Shut-off — Soft Seal		•	—	—	—	—
	Based on:	0.05% max.	—	—	•	•	—
	% Cv at 1 lb/in^2 pressure drop	0.1% max.	—	•	—	—	—
	% Kv at 1 bar pressure drop	0.2 max.	—	—	—	—	•
Temperature	See table on Page 2		—	—	—	—	—
Working Pressure	See table on Page 2		—	—	—	—	—
Test Pressure	2400 kPa		•	•	•	•	•
Body Material	Bronze: leaded gunmetal BS 1400 LG2		•	•	—	—	—
	Close grained cast iron BS 1452 Grade 220 or 260		—	—	—	•	•
	Spheroidal Graphite iron BS 2789 Grade 350/22 or 400/18 (low temperature)		—	—	•	—	—
Seat	Integral with body		•	•	—	—	—
	Leaded gunmetal BS 1400 LG2		—	—	—	—	•
	Stainless Steel BS 970 Grade 303 (S42)		—	—	•	•	—
Plug	Copper alloy BS 2874 CZ 132 or BS 2871 CZ 110		•	•	—	—	—
Plug Seating	Ethylene propylene		•	—	—	—	—
	Leaded gunmetal BS 1400 LG2		—	—	—	—	•
	Stainless Steel BS 970 Grade 303 (S42)		—	—	•	•	—
Spindle	Stainless Steel: BS 970 Grade 303 S42		•	•	•	•	•
Guide	Stainless steel BS 970 Grade 303 S42		—	—	•	•	—
	Leaded brass BS 2874 CZ 121		—	—	—	—	•
	Copper alloy BS 2874 CZ 132 or BS 2874 CZ 110		—	•	—	—	—
Bonnet	Integral with body		•	•	•	—	—
	Copper alloy BS 2874 CZ 132		—	—	—	—	•
	Close grained cast iron BS 1452 Grade 220 or 260		—	—	—	•	—
Gland (non-adjustable spring-loaded)	Packing chevron: PTFE BS 4271 Grade B		•	•	•	•	•
	Scraper rings: PTFE BS 4271 Grade B		•	•	•	•	•
	Headers: Brass BS 2874 CZ 121		—	—	—	32 to 50mm	•
	Copper alloy BS 2874 CZ 132 or BS 2871 CZ 110		•	•	•	20 & 25mm	—
	Spring: Austenitic stainless steel BS 2056 302 S26		•	•	•	•	•
	Gland Nut: Copper alloy BS 2874 CZ 132 or BS 2871 CZ 110		•	•	•	•	—
	Leaded brass BS 2874 CZ 122		—	—	—	—	•
Gland 'O' Ring	Fluoroelastomer		•	•	•	•	—
Replacement Gland Kit	626-9-203		•	•	•	20 & 25mm	—
	667-9-201		—	—	—	32 to 50mm	—
	626-9-311		—	—	—	—	•

Spring Accessory Kit: Available for use in conjunction with ALM 1601, 1626, ALX 1201, 1226, ALE 1302, 1327, 1376, to increase maximum differential pressure. See table on Page 2.

VALVE STROKE TIME

This table gives total stroke time related to type, size and stroke of valve with type of actuator used

VALVE TYPE AND SIZE		VALVE STROKE	VALVE STROKE TIME (Secs.)					
			Actuator speed 8.5 s/mm	Actuator speed 5.0 s/mm	Actuator speed 2.5 s/mm	Actuator speed 7.0 s/mm	Actuator speed 1.8 s/mm	Spring Return speed 0.3 s/mm
VZ VSF	½" & ¾" 15mm	9.5mm ($^3/_8$")	81	48	24	67	17	3
VZ VSF	1" -2" 20, 25mm	15.9mm ($^5/_8$")	135	80	40	111	29	5
VSF VZF	32-50mm 65-100mm	25.4mm (1")	216	—	64	178	46	8
VZF	125mm, 150mm	38mm (1½")	323	—	95	—	69	—

For information relating to the following associated products see the Data Sheets listed:
Actuators, main voltage (ALM), 24 volt (ALX) or with electronic positioner (ALE) - DS 3.401
Power Failure Return Actuators, mains voltage (ALMS), 24 volt (ALXS) or with electronic positioner (ALES) - DS 3.501
Intelligent Linear Actuators, 24 volt (ALi) - DS 3.601

GOOD DESIGN PRACTICE

CONTROL MEDIUM

The table on Page 2 lists suitable fluids and which valves are appropriate.

Steam should be dry saturated. A small degree of superheat (up to about 20°C maximum) is permissible, but wet steam will damage plugs and seats due to the scouring action of water droplets at high velocity.

Other fluids – e.g. sea water, oils etc: Satchwell cannot accept responsibility for use of these valves with fluids other than those listed in the table on Page 2. Detailed specifications of all materials in contact with the fluid are given in the table on Page 3 and it is the responsibility of the specifier to check their suitability.

Note that all brass components used in valve construction, which are in contact with the fluid, are manufactured from dezincification resistant materials.

The valves are intended to be used in closed circuits for water; if the circuit is open e.g. mains water or from exposed cooling tower ponds 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.

STEAM VALVES

Steam valves should be sized to give a pressure drop of about 40% of absolute inlet pressure. Allowance should be made for this and for the drop through isolating valves and other pipe fittings when sizing heating coils.

In calculating the maximum differential pressure against which the valve will close, consider the possibility of a vacuum existing downstream of the valve as the steam condenses.

If the steam supply drops to the valve from a main at higher level, trapping is essential also *before* the valve to prevent a slug of water being hurled at the valve plug on opening.

Correct steam trapping after the coil is also essential so that the condensate is cleared *continuously*. A build-up causes waterlogging which impairs heat exchange and may produce on/off control.

WATER VALVES

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.

Efficient air venting is important, especially for systems handling low flow rates.

STEAM AND WATER SIZING CHARTS

See DS 4.950.

PLANNING THE INSTALLATION

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

- Allow sufficient access for actuator and wiring.
- Avoid spindle pointing vertically downwards to avoid risk of condensation or leakage damaging actuator.
- Observe the upper ambient temperature limitation of actuators (50°C).
- Where fluid in valve exceeds 100°C actuator must *not* be above valve. Therefore valve should be mounted with spindle horizontal.
- Observe correct direction of flow through valve as indicated by arrow cast on body.
- Ensure system is efficiently vented, particularly for low flow rates.
- Where operating conditions are particularly arduous, use the VSF valve with Spheroidal Graphite iron body.
- For valves having a Kv_s/Cv_s of 1.0 or below, it is recommended that a pipeline strainer be installed upstream of valve. Suggested size 100 micron.

INSTALLATION

The system should be thoroughly flushed out to remove foreign matter before fitting the valve. Step-by-step installation instructions are packed with each valve and the precautions listed under 'Planning the Installation' must be observed.

Instructions for fitting electric actuators to valve are packed with actuator.

It is recommended that valve insulation covers should be fitted to conserve energy.

Cast iron valves used in chilled water systems which are subject to the formation of condensation should also be protected against corrosion by a further coat of suitable paint.

MAINTENANCE

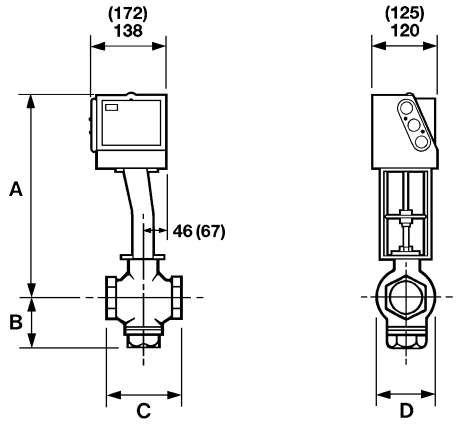
WARNING -
ISOLATE VALVE CONTROL MEDIUM AND RELIEVE PRESSURE BEFORE REMOVING THE ACTUATOR OR WORKING ON THE VALVE.

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

DIMENSIONS

VZ

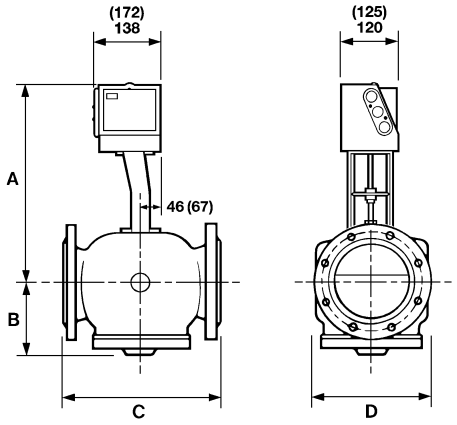
Dimensions in brackets are for 'AL-S' actuators only



Valve Size	A mm			B mm	C mm	D mm
	ALM 1601, ALX 1201, ALE 1302, 1327 ALE 1376, ALi 1576, 1577	ALX 1251 ALE 1352	ALMS ALXS ALES			
½"	361	311	429	39	62	36
¾"	362	312	430	40	74	43
1"	366	316	434	67	97	54
1¼"	371	321	439	62	108	73
1½"	375	325	443	74	121	79
2"	382	332	450	77	145	96

VZF

Dimensions in brackets are for 'AL-S' actuators only

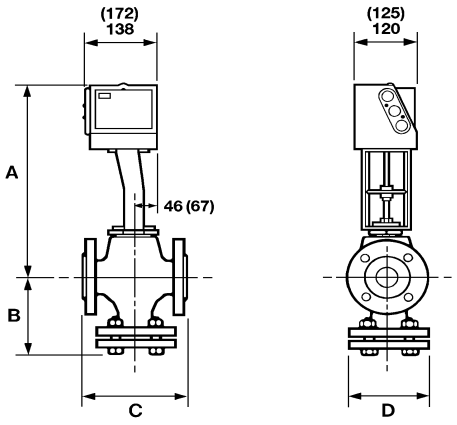


Valve Size	A mm		B mm	C mm	D mm
	ALM 1601, ALX 1201, ALE 1302, 1327 ALE 1376, ALi 1576, 1577	ALMS ALXS ALES			
65mm	384	452	108	238	185
80mm	385	453	108	254	200
100mm	401	469	140	292	220
125mm	435	—	227	347	250
150mm	447	—	248	396	285

Note: VZF 65mm has 4-hole flanged drilling.

VSF

Dimensions in brackets are for 'AL-S' actuators only



Valve Size	A mm			B mm	C mm	D mm
	ALM 1601, ALX 1201, ALE 1302, 1327 ALE 1376, ALi 1576, 1577	ALX 1251 ALE 1352	ALMS ALXS ALES			
15mm	360	310	428	48	130	95
20mm	372	322	440	101	150	105
25mm	394	334	462	121	160	115
32mm	395	—	463	145	180	140
40mm	395	—	463	145	200	150
50mm	395	—	463	147	230	165

Note: Outline shown is typical for sizes 20-50mm only.

Notes:

- Allow 110mm between top of actuator and nearest obstruction to permit fitting and removal of actuator, also access to manual operator.
- Allow 150mm clearance for access to actuator terminal cover.

WARNINGS -
THESE VALVES CONTAINS FLUOROELASTOMER 'O' RINGS WHICH ARE COMPLETELY SAFE WHILST IN NORMAL OPERATION. DO NOT INCINERATE.

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

Cautions

- **Observe recommendations under 'Good Design Practice' — See Page 4.**
- **Observe limits of water temperature, system pressure and maximum differential pressure — see Page 2.**
- **Interference with those parts under sealed covers renders the guarantee void.**
- **When valve plug/spindle assemblies are changed after factory test or replaced in service, the original specific percentage let-by can no longer be guaranteed.**
- **Information is given for guidance only and Satchwell do 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 Satchwell equipment are subject to continual improvement and therefore liable to alteration without notice.**
- **A periodic system and tuning check of the control system is recommended. Please contact your local Satchwell service office for details.**

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