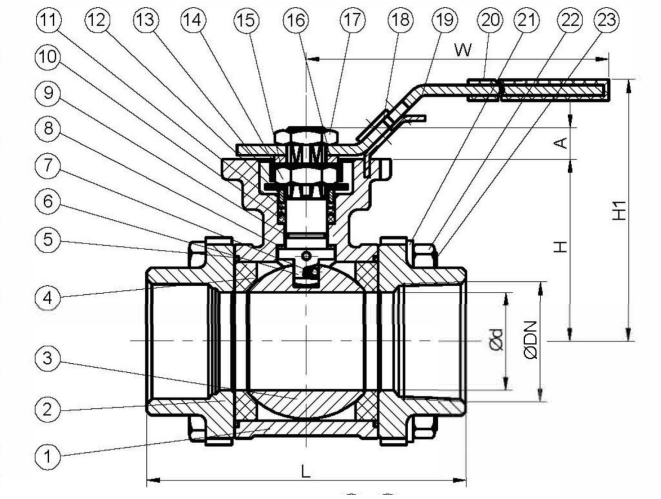
Pneumatic Actuated Threaded BSP Ball Valve

Stainless Steel · Full Bore · 69 bar (1000 WOG) · 1/4" – 4" BSP · Rack and Pinion Pneumatic Actuator

A factory-assembled automated ball valve package. The valve is a three-piece full bore stainless steel body rated 69 bar cold working pressure, with female BSP threaded ends and an integral ISO 5211 direct-mount pad. The actuator is a rack and pinion pneumatic unit, available double acting or spring return, mounting straight onto that pad without a bracket on most sizes. Both parts are covered here: the valve first, then the actuator, then the mounting and selection data that ties the two together.



VALVE — SECTIONAL ASSEMBLY

ASSEMBLED UNIT — THREE-PIECE BALL VALVE WITH RACK AND PINION ACTUATOR

Valve — Technical Data

Assembly	Three-piece stainless steel ball valve with rack and pinion pneumatic actuator, factory assembled and function tested
Valve type	Three-piece body, floating ball, full bore
Size range	1/4" to 4" BSP (DN8 to DN100)
Pressure rating	69 bar / 1000 psi cold working pressure (1000 WOG)
End connections	BSP parallel or taper female threads. NPT, PT, socket weld and butt weld ends also available
Body & end caps	CF8M (316) or CF8 (304) investment casting
Ball	CF8M (316) or CF8 (304), solid, mirror polished
Stem	SUS316 or SUS304, blow-out proof, anti-static device
Seats & body seals	TFM1600 standard; PTFE or RTFE optional
Stem seals	TFM1600 / PTFE / RTFE V-ring packing, FKM (Viton) O-ring, Belleville washer live-loaded gland
Actuator mounting	Integral direct-mount pad, two bolt circles (4 × ØU1 on ØE1 PCD, 4 × ØU2 on ØE2 PCD)
Temperature range*	–20 °C to +180 °C typical for TFM1600 / PTFE seats; actuator seals limit the assembly to –18 °C to +80 °C as standard

* The assembly is limited by whichever component reaches its limit first. With standard NBR actuator seals that is the actuator at +80 °C; specify FPM or silicone seals where the process runs hotter or colder.

Valve — Key Features

- **Three-piece swing-out body** — seats, seals and ball are replaceable in line, without disturbing the pipework or the actuator mounting
- **Full bore** throughout for unrestricted flow and low pressure drop
- **Investment-cast 316 or 304 stainless** body, end caps and ball
- **TFM1600 seats as standard** — better creep resistance and a wider temperature range than conventional PTFE
- **Blow-out proof stem** with anti-static device between ball, stem and body
- **Live-loaded gland** using a Belleville washer to hold the packing load through thermal and pressure cycling
- **Integral direct-mount pad** — the actuator bolts to the valve without a bracket or coupling on most sizes

Valve — Dimensions BSP screwed ends, all dimensions in millimetres

SIZE	DN	Ød bore	L face to face	H c/l to pad	MOUNTING PAD				ISO 5211 PAD
					ØE1	4-ØU1	ØE2	4-ØU2	
1/4"	DN8	10.6	75.0	42.0	36.0	6.0	42.0	6.0	F03 / F04
3/8"	DN10	12.7	75.0	42.0	36.0	6.0	42.0	6.0	F03 / F04
1/2"	DN15	15.0	75.0	42.0	36.0	6.0	42.0	6.0	F03 / F04
3/4"	DN20	20.0	80.0	48.5	36.0	6.0	50.0	7.0	F03 / F05
1"	DN25	25.0	90.0	58.5	42.0	6.0	50.0	7.0	F04 / F05
1-1/4"	DN32	32.0	110.0	63.0	42.0	6.0	70.0	9.0	F04 / F07
1-1/2"	DN40	38.0	120.0	71.3	50.0	7.0	70.0	9.0	F05 / F07
2"	DN50	50.0	140.0	78.2	50.0	7.0	70.0	9.0	F05 / F07
2-1/2"	DN65	63.5	185.0	100.0	70.0	9.0	102.0	11.0	F07 / F10
3"	DN80	76.0	205.0	108.5	70.0	9.0	102.0	11.0	F07 / F10
4"	DN100	100.0	240.0	140.0	—	—	102.0	11.0	F10

Face to face L is for screwed ends. Socket weld and butt weld end dimensions are published separately. ISO 5211 pad designations are derived from the published bolt circle diameters — confirm the tapping thread against the order. The 4" size has a single bolt circle.

Valve — Materials of Construction

NO.	PART	MATERIAL	NO.	PART	MATERIAL
1	Body	CF8M / CF8	16	Handle gland †	SUS304
2	End cap	CF8M / CF8	17	Handle nut †	A194-8
3	Ball	CF8M / CF8	18	Lock device †	SUS304
4	Ball seat	TFM1600 / PTFE / RTFE	19	Handle †	SUS304
5	Body gasket	TFM1600 / PTFE / RTFE	20	Handle sleeve †	Vinyl plastic
6	Stem	SUS316 / SUS304	21	Bolt washer	SUS304
7	Anti-static device	SUS316 / SUS304	22	Bolt nut	A194-8
8	Thrust washer	TFM1600 / PTFE / RTFE	23	Body bolting	A193-B8
9	O-ring	FKM (Viton)	24	Stop bolt	A193-B8
10	V-ring stem packing	TFM1600 / PTFE / RTFE	25	Bolt nut	A194-8
11	Bushing	50% SS + 50% PTFE	26	Handle adapter ‡‡	A351-CF8
12	Gland	SUS316	27	Pipe handle ‡‡	SUS304
13	Belleville washer	SUS301	28	Set screw ‡‡	A193-B8
14	Stem nut	A194-8	29	Triangle stopper ‡‡	SUS304
15	Stop-lock cap	SUS304	30	Handle sleeve ‡‡	Vinyl plastic

† Lever components, supplied only where the valve is ordered manually operated. ‡ 3" and 4" pipe handle arrangement. Alternative seat, seal and material combinations are available on request.

Actuator — Key Features

- **Common body and end caps** for double acting and spring return in the same model — conversion is a matter of adding or removing spring cartridges, cutting spares holding
- **Modular preload spring cartridges**, coated for corrosion resistance and safe to handle
- **Twin opposed pistons** giving compact envelope, high cycle life and symmetrical mounting
- **External travel stops** with ±4° adjustment on both open and closed positions, set without stripping the actuator
- **Composite bearings and guides** on pinion and pistons for low friction and long life
- **Hard anodised extruded body** with fine ground bore
- **NAMUR interfaces** — VDI/VDE 3845 accessory pad and NAMUR air ports for direct-mount solenoids and switch boxes

Actuator — Technical Data

Actuator type	Rack and pinion, twin opposed piston, 90° quarter turn
Action	Double acting (D) or spring return (S), 4 to 12 spring cartridges
Rotation	90° standard, clockwise to close; direction reversed by inverting the pistons
Air supply	2.5 to 8 bar, neutral clean air
Travel stops	Dual independent external stops, ±4° adjustment in both directions
Body	Extruded aluminium alloy, hard anodised internally and externally
End caps	Aluminium alloy, coated; RAL colour options
Pinion	45# steel; 304 or 316 stainless output shaft available
Fasteners	Stainless steel throughout, internal and external
Seals	NBR –18 to +80 °C standard. FPM –18 to +150 °C, silicone –40 to +80 °C and fluorosilicone –60 to +80 °C available
Air connections	G1/8" (VT032), G1/4" (VT050–VT210), G1/2" (VT240–VT400), NAMUR pattern
Standards	ISO 5211 flange, DIN 3337 drive, VDI/VDE 3845 (NAMUR) accessory interface, ISO 9001 manufacture
Certification	ATEX 2014/34/EU, CE to MD 2006/42/EC, SGS, DNV. 100% pressure and leak tested with serial number traceability
Position indicator	Multifunctional indicator with NAMUR slot for direct sensor mounting

Actuator — Output Torque Double acting, N·m at 90° stroke

MODEL	AIR SUPPLY PRESSURE (bar)									
	2.5	3	3.5	4	4.5	5	5.5	6	7	8
VT032	2.9	3.4	4.0	4.6	5.3	5.9	6.5	7.1	8.3	9.5
VT050	8.6	10.4	12.3	14.2	16.0	17.9	19.8	21.6	25.4	29.1
VT065	17.4	21.2	25.0	28.7	32.5	36.3	40.1	43.9	51.4	59.0
VT075	27.0	32.9	38.8	44.7	50.5	56.4	62.3	68.2	79.9	91.7
VT085	39.7	48.3	56.9	65.6	74.2	82.8	91.4	100.1	117.3	134.6
VT095	55.7	67.9	80.0	92.1	104.2	116.4	128.5	140.6	164.8	189.1
VT110	72.0	89.3	105.0	120.6	136.3	152.0	167.6	183.3	214.6	245.9
VT125	128.7	159.5	187.5	215.4	243.4	271.4	299.4	327.4	383.3	439.3
VT140	196	237	278	319	360	401	442	483	565	647
VT160	263.5	326.6	383.9	441.2	498.5	555.8	613.1	670.4	785.0	899.7

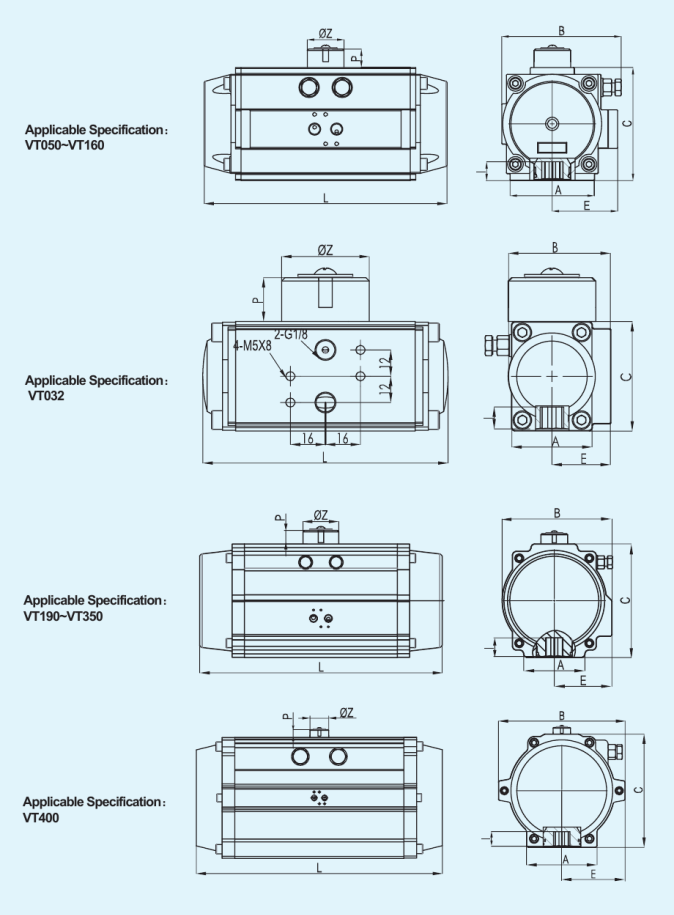
Double acting output is constant through the stroke. Spring return output varies across the stroke and is published separately for each spring count (S05 to S12) — ask for the spring return table when specifying a fail-safe assembly. Models above VT160 are available for larger or higher-torque duties.

Actuator — Dimensions All dimensions in millimetres

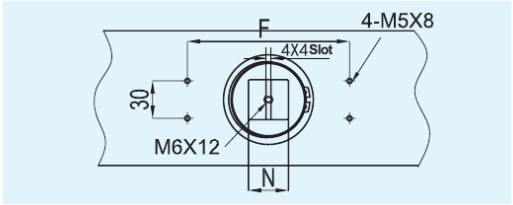
MODEL	A	B	C	L	E	F	P	ØZ	N	I	ISO 5211 FLANGE	Q	Q1	W	W1	Ch square	T air
VT032	37	47	50	110	27	50	20	40	10	10	F03	—	36	—	M5×8	9×9	G1/8"
VT050	45	70.5	70	154	41.5	80	20	40	10	12	F03/05	36	50	M5×7.5	M6×9	11×11	G1/4"
VT065	62	89.5	89	189	51.5	80	20	40	10	16	F05/07	50	70	M6×9	M8×12	14×14	G1/4"
VT075	68	102.5	100	210	59	80	20	40	14	16	F05/07	50	70	M6×9	M8×12	14×14	G1/4"
VT085	68	112.5	113	229	63.5	80	20	40	14	19	F05/07	50	70	M6×9	M8×12	17×17	G1/4"
VT095	92	126	123	264	71	80	20	40	14	19	F05/07	50	70	M6×9	M8×12	17×17	G1/4"
VT110	93	138.5	136	266	76.5	80	20	40	14	19	F07/10	70	102	M8×12	M10×15	17×17	G1/4"
VT125	96	157	161	337	85	80	30	56	22	25	F07/10	70	102	M8×12	M10×15	22×22	G1/4"
VT140	110	178	178	377	97	80/130	30	56	22	31	F10/12	102	125	M10×15	M12×18	27×27	G1/4"
VT160	112	196	200	414	106	80/130	30	56	22	31	F10/12	102	125	M10×15	M12×18	27×27	G1/4"

Q and Q1 are the two ISO 5211 bolt circle diameters; W and W1 the corresponding tapping threads and depths. Ch is the female drive square. Letters A to I refer to the actuator outline drawings on page 5.

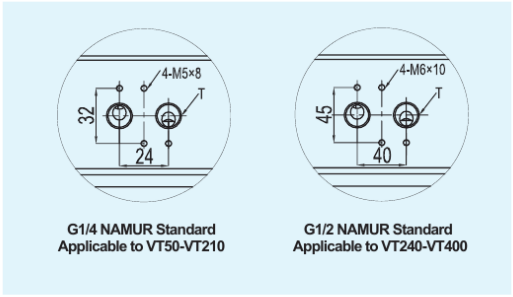
Actuator — Reference Views



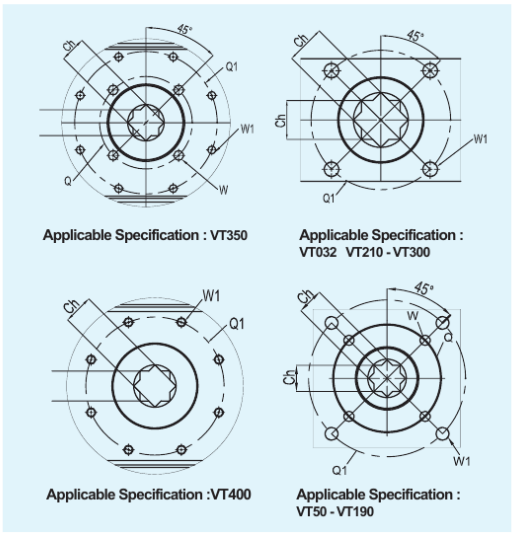
OUTLINE DIMENSIONS BY MODEL GROUP



Air Supply Interface



Bottom View



TOP VIEW, NAMUR AIR PORTS AND ISO 5211 BOTTOM FLANGE

Mounting Compatibility Valve pad bolt circle against actuator flange

VALVE SIZE	VALVE PAD PCD ØE1 / ØE2	MATCHING ACTUATOR PCD	ACTUATOR MODELS
1/4" – 1/2"	36 / 42	36 (F03)	VT032, VT050
3/4"	36 / 50	36 (F03) or 50 (F05)	VT032, VT050
1"	42 / 50	50 (F05)	VT050, VT065, VT075, VT085, VT095
1-1/4"	42 / 70	70 (F07)	VT065, VT075, VT085, VT095, VT110, VT125
1-1/2" – 2"	50 / 70	50 (F05) or 70 (F07)	VT050 to VT125
2-1/2" – 3"	70 / 102	70 (F07) or 102 (F10)	VT065 to VT160
4"	102	102 (F10)	VT110, VT125, VT140, VT160

Compatibility above is by bolt circle diameter only. Actuator selection must also satisfy the valve breakaway torque at the available air supply pressure, with a safety margin appropriate to the duty. The valve stem drive square is not published on the valve assembly drawing — confirm the stem square against the actuator Ch dimension, or specify a coupling, when ordering.

Actuator Model Coding

Format	Model · Type and spring quantity · ISO flange · Square · Cylinder and cap colour · Seal
Type	D = double acting. S = spring return, followed by the spring count from 04 to 12
Example	VT095D F07/10 17 P7046 — VT095 double acting, ISO F07 and F10 flange, 17 mm square, smooth hard anodised body, cap colour grey RAL 7046, standard nitrile seals
Example	VT190S12 F10/14 36 S5021 HT — VT190 spring return with 12 springs, ISO F10 and F14 flange, 36 mm square, sandblasted hard anodised body, cap colour green RAL 5021, fluororubber seals

Accessories & Options

- **Solenoid valve** — NAMUR mounted, 3/2 for spring return or 5/2 for double acting
- **Limit switch box** — mechanical, inductive or proximity sensors on the VDI/VDE 3845 pad
- **Positioner** — pneumatic or electro-pneumatic for modulating duty
- **Manual gear override** and declutchable handwheel
- **Mounting kit** — bracket and coupling where a direct mount is not used
- **Reduced square output shaft inserts** and alternative flange or square combinations

Compiled by Actuation Valve & Control Ltd from the valve assembly drawing 9130-XXXX-0014641 (BADNXXXXBGFC222-P) and the VT series actuator catalogue. Assemblies are built, stroked and function tested before despatch. Certified drawings, spring return torque tables and torque sizing for a specific duty are available on request against an order.