FSB 2D Fire-Safe Direct Mount 2-Piece

Flanged End Ball Valves

½" - 8" (DN15 - DN200)
ANSI Class 150; Class 300;
DIN PN16, PN40



FIRE-SAFE ANTI-STATIC 2014/68/EU SAFETY

Before and After, Perfect Operation

In process industries, fire-safe equipments are often required for petroleum and flammable applications. For ideal fire-safe valves, DIE ERSTE offers Series FSB 2D Direct Mount 2-Piece Fire-safe Full Port Flanged End Ball Valve in ANSI Class 150 and Class 300, DIN PN16 and PN40, where maximum flow capacity and minimum pressure drops are required. Series FSB 2D conforms to API 607 5th Edition with fire-safe features, including fire-safe contact, graphite seals, and anti-static devices. The API 607 certification, which is equivalent to ISO 10497, is designed to test soft seat quarter turn valves, where valves are tested under high temperature condition (above 750°C) for certain period of time.

The fire-safe design consists of three elements: fire-safe contact, graphite seals, and anti-static devices. Fire-safe contact is a precise machined metal ring surface to fit with the valve ball after the soft ball seat has been burnt away by high temperature heat. The fire-safe contact acts as a metal seat, and together with the floating ball pushed downstream, the tight-shutoff secondary seal is formed even without the presence of soft ball seat. In the body connection where main body and end cap are connected, DIE ERSTE offers dual body seal to achieve non-leakage externally with PTFE and graphite rings. DIE ERSTE also provides anti-static device for all FSB 2D ball valves. Electrical charges can be grounded with anti-static device, to avoid potential danger.

For flange facing option, DIE ERSTE offers raised face flange for use with most general applications. For special or high pressure applications, please consult with DIE ERSTE representatives.

(A) ISO5211 Actuator Direct-Mount
Square stem and twin ISO 5211 pattern mounting pad allow easy valve automation product installation without bracket and adaptor.

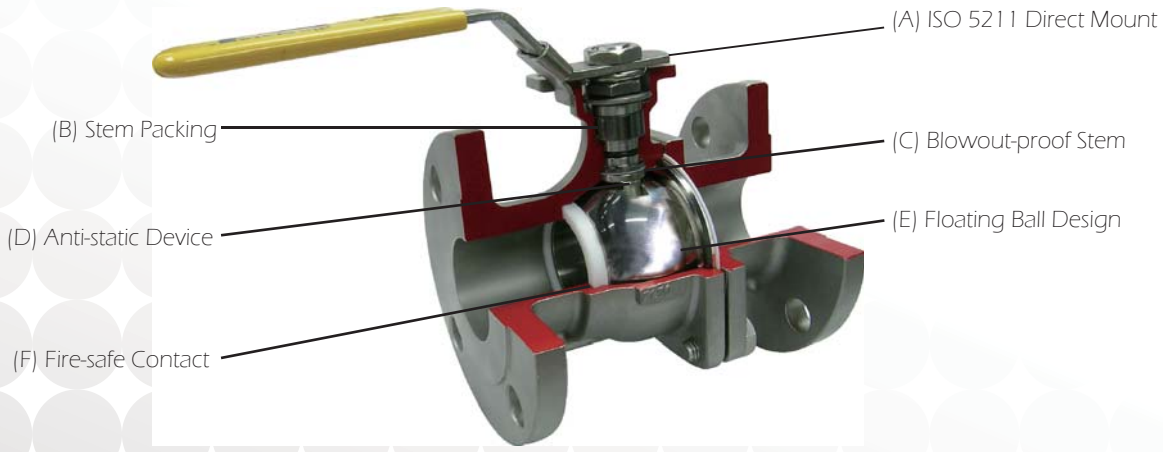
(B) Stem Packing
The stem packing is designed to self-adjust for temperature variation and pipeline system vibration, and thus provideing safe working conditions of the valve. In FSB ball valves, graphite stem packing is used to prevent stem leakage after fire.

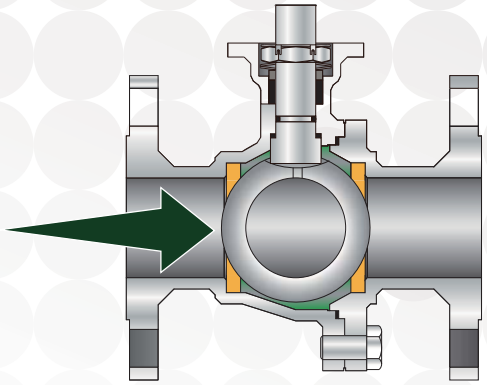
(C) Blowout-Proof Stem
The stem is inserted from inside the body bore. This particular design prevents the stem from shooting out when there is excess pressure in the bore caused by high temperature heat.

(D) Anti-Static Device
All FSB ball valves are equipped with Anti-Static Device in the ball bore. This device provides a grounding path between the valve body and the ball for static electric charges built up by valve operation.

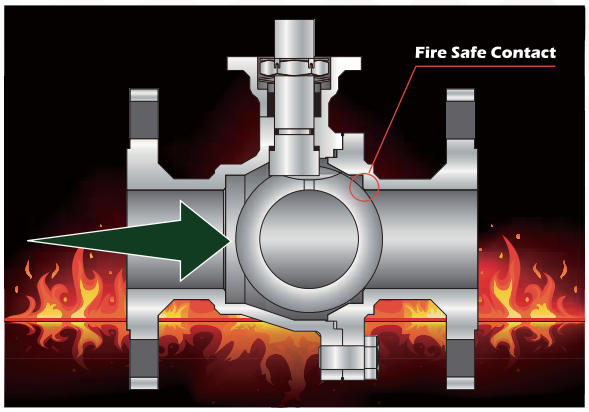
(E) Floating Ball Design
The floating ball design, combined with soft seat, offers bubble-tight shutoff, low operating torque, and prolonged life cycle. For fire-safe purposes, the floating ball design plays important role in the formation of secondary metal-to-metal sealing property.

(F) Fire-Safe Contact
The special designed fire-safe contact forms an alternative seal after the soft ball seat has been burnt away during fire. The new metal-to-metal seal reduces the leaking possibilities to the minimum.





Before a fire



After a fire

Fire-Safe Design

Fire-Safe Contact

The end cap is specially designed and machined precisely to fit with the valve ball surface. During the event of fire, the soft ball seat may disintegrate in high temperature due to the nature of the material. Thus, the valve ball comes into contact with the fire-safe contact surface and forms a secondary metal-to-metal seal. The downstream flow pushes the floating ball to the side, and effectively seals the bore.

Anti-Static Device

Anti-static device provides a grounding path to the electric charge built up from valve operations. This particular device prevents potential spark occurrence, and even fire or explosion when working with flammable fluids. Small metal balls and springs are inserted on the stem to provide the grounding path.

Graphite Stem Seals and Packing

With the high temperature resistance property, graphite becomes the perfect material of choice for sealing parts. The graphite sealing rings are enclosed in a compartment and will not be in touch with the fluid. Therefore, regardless of the temperature and pressure, graphite seals stay immobile and continuously prevent leakage from or into the joined parts while under compression.



Seals and Packings

Dual Body Seal

Dual body seal are often used in DIE ERSTE Series FSB 2D ball valves to prevent leakage. The inner body seal is made with PTFE, and the outer body seal is made with graphite.

Direct Mounting Pad

The dual ISO direct mounting pad allows precise and flexible mounting of actuator. Usually two sets of mounting holes are drilled for different actuator sizes. With the integrally cast top mounting platform, machined flat surface and square stem, the design ensures correct alignment of the actuator to effectively minimize the side-loading during high cycle or continuous duty applications. The well-supplied (air or electric power) actuation equipments can be removed safely and easily while the valve is under the line pressure.



Direct Mount with Actuators

CE Marking CE

The whole series of ball valves is approved according to European Directive 2014/68/EU.

Body Material:

ASTM CF8M, CF8, WCB
DIN 1.4408. 1.4308, 1.0619

Size Range

1/2" – 8" (DN15 ~ DN200)

Standards

Design: ASME B16.34, BS 5351, DIN 3337
Face to face: ASME B16.10, EN 558 Series 14 (DIN 3202-F4)
Flange dimension: ASME B16.5, DIN 2632/2633, DIN 2634/2635
Testing: API 607, ISO 10497, API 598, ISO 5209
Mounting pad: ISO 5211
Material: DIN EN 10204
Marking: MSS SP-25, ISO 5209
Others: MSS SP-72, BS 5351

Pressure Rating:

ANSI Class 150
ANSI Class 300
DIN PN16
DIN PN40 up to DN100
150 psi (10 bar) with saturation steam

Temperature Range:

- -40°F to 350°F (-40°C to 180°C) with TFM 1600 seat
- -4°F to 350°F (-20°C to 180°C) with RPTFE seat
- -4°F to 350°F (-20°C to 180°C) with PTFE seat

End Connection:

Flanged end

Certifications of Series FSB 2D:

API 607 Fire Test or Soft Seated Quarter Turn Valves

Canadian Registration Number

ATEX Directive 2014/34/EU Explosive Prevention

Low Emmision Certificated
TA-Luft 2002, Sec. 5.2.6.4
VDI 2440 2000, Sec. 3.3.1.3

SIL3 Capable
Please inquire

Locking Device

The locking device is ideal for applications where it is critical to keep the valve positions fixed without the risk of accidental operation. The metal piece fit accordingly to the opening on the actuator to lock on open and close position. In addition, padlock can be added with key to lock and secure the position.

Optional Material

- Stainless Steel ASTM A351 Gr. CF3M, CF3
- Monel 400
- Low Temperature Carbon Steel ASTM A352 Gr. LCB
- Alloy 20 ASTM A351 CN7M
- Hastelloy ASTM A494 Gr. CW12MW

For more detailed information regarding to different material, please contact your DIE ERSTE representatives

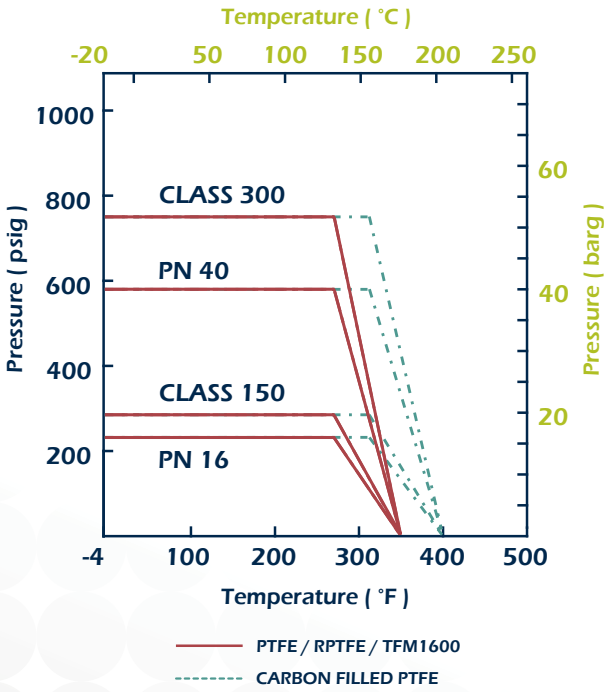
Optional Material of O-Ring

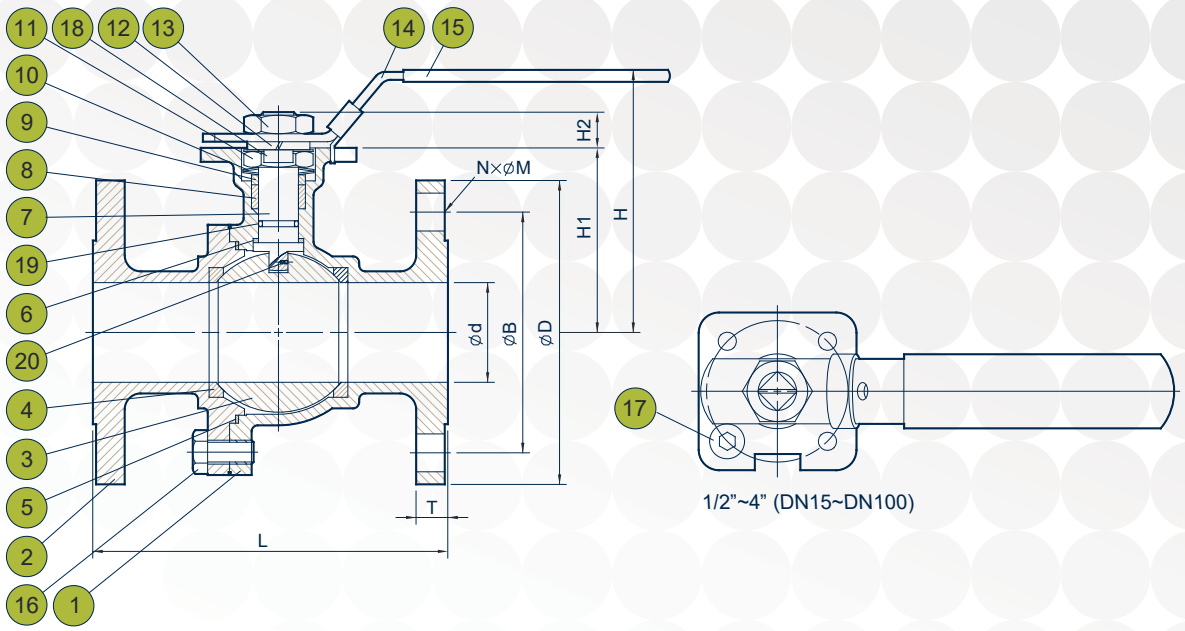
- RPTFE 15%
- Viton

Marine Application

Casting from Lloyd's or DNV approved foundry available upon request.

Pressrue and Temperature Rating





NO	PART NAME	MATERIAL
1	BODY	CF8M / WCB
2	CAP	CF8M / WCB
3	BALL	CF8M / CF8
4	BALL SEAT	PTFE / RPTFE
5	BODY SEAL	PTFE & GRAPHITE
6	THRUST WASHER	PTFE & GRAPHITE
7	STEM	ASTM A276 316 / 304
8	STEM PACKING	GRAPHITE
9	GLAND	SS304
10	BELLEVILLE WASHER	SS301

NO	PART NAME	MATERIAL
11	STEM NUT	SS304
12	HANDLE WASHER	SS304
13	HANDLE NUT	SS304
14	HANDLE	SS304 / ZINC PLATE STEE
15	HANDL SLEEVE	VINYL
16	BODY BOLT	A2-70 / ISO 898-1 8.8
17	STOP PIN	SS304 / ISO 898-1 12.9
18	LOCKING SADDLE	SS304
19	O-RING	VITON
20	ANTI-STATIC DEVICE	SS316

Size		Cv	Kv
Inch	DN		
1/2"	15	23	19.7
3/4"	20	45	38.6
1"	25	77	66
1½"	40	192	165
2"	50	358	307
2½"	65	611	524
3"	80	858	736
4"	100	1512	1296

For v-port ball valves, please see
Flow coefficients of v-port ball valve.

The left table represents the Flow Coefficients (CV) and Flow Factor (Kv) for DIE ERSTE Series FSB 2D ball valves. This number represents the volume of water at 60°F that will flow in US gallon per minute through a valve with a 1 lb/in^2 pressure drop across in the full open position. For Kv, it is the flow of water with temperature from 5°C - 30°C in cubic meters per hour (m^3/h) with a pressure drop of 1 bar.

$$Cv = F\sqrt{\frac{SG}{\Delta P}}$$

The Cv value is dependent on flow rate, pressure drop, specific gravity. The larger the Cv value, the easier the fluid will flow within the valve. However, Cv value is easily affected by various factors, such as fluid type, fluid viscosity, saturated steam pressure.

ANSI CLASS 150 Dimensions inch/mm

SIZE Inch DN	ød	L	H	W	øD	øB	T	H1	H2	S	N	M	ISO 5211	Weight lbs Kg	Torque lbs.in N.m
1/2"	0.59	4.25	3.23	5.31	3.50	2.38	0.44	1.77	0.35	9	4	0.62	F03/	3.53	115.1
15	15	108	82	135	88.9	60.5	11.2	45	9			15.8	F04	1.6	13
3/4"	0.79	4.62	3.46	5.31	3.88	2.75	0.44	1.97	0.35	9	4	0.62	F03/	4.41	132.8
20	20	117	88	135	98.6	69.9	11.2	50	9			15.8	F04	2	15
1"	0.98	5.00	3.62	6.50	4.25	3.12	0.44	2.17	0.47	11	4	0.62	F04/	6.83	177
25	25	127	92	165	108	79.2	11.2	55	12			15.8	F05	3.1	20
1½"	1.51	6.50	4.41	7.68	5.00	3.88	0.56	2.83	0.63	14	4	0.62	F05/	12.79	265.5
40	40	165	112	195	127	98.6	14.2	72	16			15.8	F07	5.8	30
2"	1.99	7.00	5.20	7.68	6.00	4.75	0.62	3.62	0.63	14	4	0.75	F05/	18.3	389.4
50	50	178	132	195	152.4	120.7	15.8	92	16			19.1	F07	8.3	44
2½"	2.56	7.50	5.98	11.81	7.00	5.50	0.69	4.13	0.75	17	4	0.75	F07/	30.86	486.8
65	65	191	152	300	177.8	139.7	17.5	105	19			19.1	F10	14	55
3"	3.15	8.00	6.48	11.81	7.50	6.00	0.75	4,57	0.75	17	4	0.75	F07/	40.12	840.8
80	80	203	164	300	190.5	152.4	19.1	116	19			19.1	F10	18.2	95
4"	3.94	9.02	7.64	13.19	9.00	7.50	0.94	5.43	0.94	22	8	0.75	F10/	65.48	1593.2
100	100	229	194	335	228.6	190.5	23.9	138	24			19.1	F12	29.7	180

ANSI CLASS 300 Dimensions inch/mm

SIZE Inch DN	d	L	H	W	D	B	T	H1	H2	S	N	M	ISO 5211	Weight lbs Kg	Torque lbs.in N.m
1½"	1.57	7.48	4.88	7.68	6.1	4.5	0.75	3.31	0.55	14	4	0.88	F05/	19.4	354
40	40	190	124	195	155	114.3	19.1	84	14			22.3	F07	8.8	40
2"	1.97	8.5	5.2	7.68	6.50	5	0.81	3.62	0.55	14	8	0.75	F05/	24.6	442.6
50	50	216	132	195	165	127	20.7	92	14			19.1	F07	11.2	50
2½"	2.56	9.49	5.98	11.81	7.48	5.87	0.94	4.13	0.67	17	8	0.88	F07/	38.6	619.6
65	65	241	152	300	190	149.2	23.9	105	17			22.3	F10	17.5	70
3"	3.15	11.1	6.46	11.81	8.27	6.63	1.06	4.57	0.67	17	8	0.88	F07/	56	885.1
80	80	282	164	300	210	168.3	27	116	17			22.3	F10	25.4	100
4"	3.94	12.01	7.64	13.19	10.04	7.87	1.19	5.43	0.87	22	8	0.88	F10/	89.07	1593.2
100	100	305	194	335	255	200	30.2	138	22			22.3	F12	40.4	180

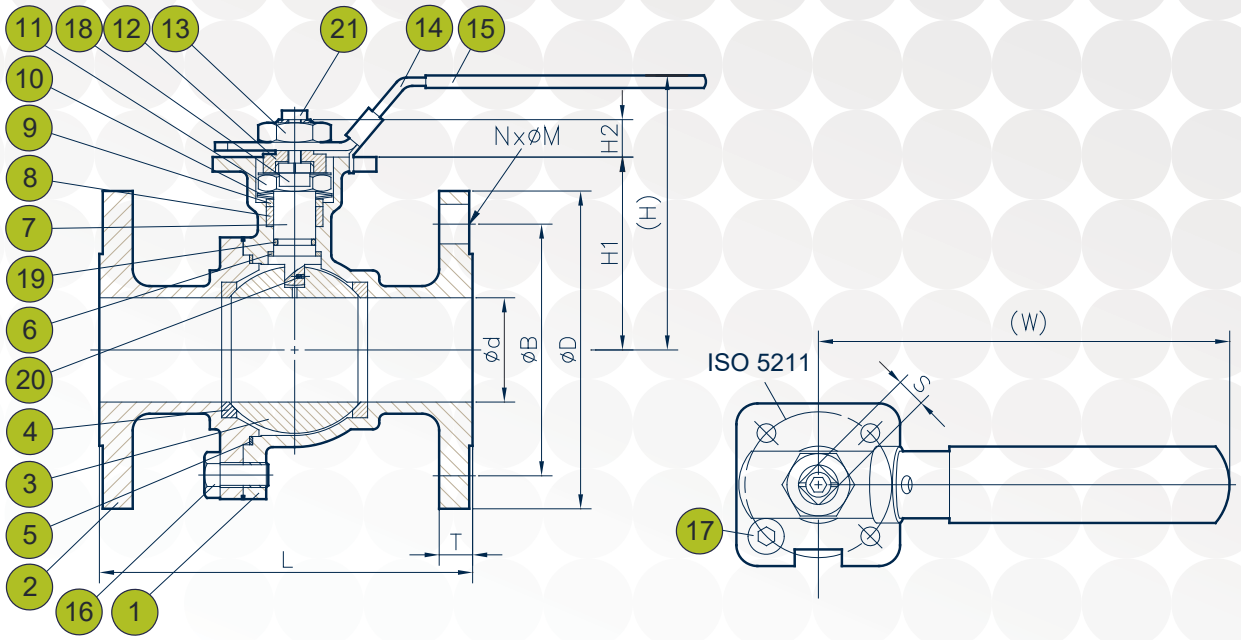
PN16 Dimensions inch/mm

SIZE Inch DN	ød	L	H	W	øD	øB	T	H1	H2	S	N	M	ISO 5211	Weight lbs Kg	Torque lbs.in N.m
1/2"~2" (DN15~DN50) same as PN40															
2½"	2.53	6.69	5.98	11.81	7.28	5.71	0.71	4.13	0.75	17	4	0.71	F07/	30.42	486.8
65	64	170	152	300	185	145	18	105	19			18	F10	13.8	55
3"	3.00	7.09	6.48	11.81	7.87	6.30	0.79	4.57	0.75	17	8	0.71	F07/	40.57	840.8
80	76	180	164	300	200	160	20	116	19			18	F10	18.4	95
4"	3.94	7.48	7.64	13.19	8.66	7.09	0.79	5.43	0.94	22	8	0.71	F10/	55.78	1593.2
100	100	190	194	335	220	180	20	138	24			18	F12	25.3	180

PN40 Dimensions inch/mm

SIZE Inch DN	ød	L	H	W	øD	øB	T	H1	H2	S	N	M	ISO 5211	Weight lbs Kg	Torque lbs.in N.m
1/2"	0.59	4.53	3.46	5.31	3.74	2.56	0.63	1.93	0.35	9	4	0.55	F03/	4.85	115.1
15	15	115	88	135	95	65	16	49	9			14	F04	2.2	13
3/4"	0.79	4.72	3.66	5.31	4.13	2.95	0.71	2.13	0.35	9	4	0.55	F03/	6.61	132.8
20	20	120	93	135	105	75	18	54	9			14	F04	3	15
1"	1.00	4.92	3.86	6.50	4.53	3.35	0.71	2.32	0.47	11	4	0.55	F04/	9.48	177
25	25	125	98	165	115	85	18	59	12			14	F05	4.3	20
1¼"	1.26	5.12	4.33	6.50	5.51	3.94	0.71	2.83	0.47	11	4	0.71	F04/	12.35	221.3
32	32	130	110	165	140	100	18	72	12			18	F05	5.6	25
1½"	1.51	5.51	4.56	7.68	5.91	4.33	0.71	3.03	0.63	14	4	0.71	F05/	15.87	265.5
40	40	140	116	195	150	110	18	77	16			18	F07	7.2	30
2"	1.97	5.91	4.88	7.68	6.50	4.92	0.79	3.35	0.63	14	4	0.71	F05/	21.16	389.4
50	50	150	124	195	165	125	20	85	16			18	F07	9.6	44
2½"	2.53	6.69	5.98	11.81	7.28	5.71	00.87	4.13	0.75	17	8	0.71	F07/	30.42	486.8
65	64	170	152	300	185	145	22	105	19			18	F10	13.8	55
3"	3.00	7.09	6.48	11.81	7.87	6.30	0.94	4.57	0.75	17	8	0.71	F07/	40.57	840.8
80	76	180	164	300	200	160	24	116	19			18	F10	18.4	95
4"	3.94	7.48	7.64	13.19	9.25	7.49	0.94	5.43	0.94	22	8	0.87	F10/	55.78	1593.2
100	100	190	194	335	235	190	24	138	24			22	F12	25.3	180

Note1: Torque measured at ambient temperature with no loading; safety factor is not included.
Note2: Datasheet for larger sizes available upon request.



NO	PART NAME	MATERIAL
1	BODY	CF8M / WCB
2	CAP	CF8M / WCB
3	BALL	CF8M / CF8
4	BALL SEAT	PTFE / RPTFE
5	BODY SEAL	PTFE & GRAPHITE
6	THRUST WASHER	PTFE & GRAPHITE
7	STEM	ASTM A276 316 / 304
8	STEM PACKING	GRAPHITE
9	GLAND	SS304
10	BELLEVILLE WASHER	SS301

NO	PART NAME	MATERIAL
11	STEM NUT	SS304
12	COUPLER	SS304
13	HANDLE NUT	SS304
14	HANDLE	SS304 / ZINC PLATE STEEL
15	HANDLE SLEEVE	VINYL
16	BODY BOLT	A2-70 / ISO 898-1 8.8
17	STOP PIN	SS304 / ISO 898-1 12.9
18	LOCKING SADDLE	SS304
19	O-RING	VITON
20	ANTI-STATIC DEVICE	SS316
21	COUPLER BOLT	SS304 / ISO 898-1 12.9

ANSI CLASS 300 Dimensions inch/mm

SIZE Inch DN	d	L	H	W	D	B	T	H1	H2	S	N	M	ISO 5211	Weight lbs Kg	Torque lbs.in N.m
1/2" 15	0.59 15	5.51 140	3.62 92	5.31 135	3.74 95	2.63 66.7	0.5 12.7	2.4 61	0.35 9	9	4	0.63 15.9	F03/ F04	-	159.3 18
3/4" 20	0.79 20	5.98 152	3.82 97	5.31 135	4.53 115	3.25 82.6	0.56 14.3	2.6 66	0.35 9	9	4	0.75 19.1	F03/ F04	-	177 20
1" 25	1.00 25	6.50 165	4.02 102	6.50 165	4.92 125	3.5 88.9	0.63 15.9	2.8 71	0.47 12	11	4	0.75 19.1	F04/ F05	11.02 5	221.3 25

Note: Torque measured at ambient temperature with no loading; safety factor is not included.

Flow Coefficients (Cv) of V-port Ball Valve

Valve Size	V Type	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
1/2"	10°	2.95	2.36	1.94	1.53	1.19	0.84	0.51	0.36	0.00	0.00
	30°	5.76	3.99	3.15	2.22	1.46	0.89	0.51	0.32	0.02	0.00
	60°	10.13	6.93	4.56	3.18	2.02	1.32	0.73	0.33	0.03	0.00
	90°	15.28	9.83	6.29	4.10	2.57	1.58	0.84	0.34	0.03	0.00
3/4"	10°	4.27	3.55	2.70	2.13	1.55	1.19	0.66	0.37	0.03	0.00
	30°	8.43	6.45	4.88	3.51	2.18	1.49	0.79	0.38	0.03	0.00
	60°	16.84	11.09	7.59	5.12	3.17	2.09	0.95	0.41	0.03	0.00
	90°	27.63	17.52	11.28	6.70	4.14	2.47	1.29	0.46	0.03	0.00
1"	10°	5.88	4.97	4.25	3.28	2.14	1.74	1.06	0.84	0.22	0.00
	30°	12.34	9.86	7.50	5.36	3.89	2.41	1.63	0.95	0.24	0.00
	60°	26.91	17.37	12.47	8.19	5.45	3.45	2.16	0.97	0.26	0.00
	90°	40.62	26.78	17.96	11.74	7.48	4.49	2.55	1.09	0.28	0.00
1-1/4"	10°	10.24	6.87	6.86	5.22	3.73	2.86	2.23	1.19	0.52	0.00
	30°	20.10	16.09	12.17	8.66	6.09	4.22	2.55	1.67	0.56	0.00
	60°	39.26	27.25	19.36	13.11	8.82	5.60	3.25	1.75	0.56	0.00
	90°	70.96	44.32	29.44	18.79	11.83	7.44	4.51	2.32	0.75	0.00
1-1/2"	10°	12.76	11.06	7.65	5.94	5.21	3.50	2.41	0.89	0.00	0.00
	30°	28.60	22.35	15.23	11.38	8.30	5.48	2.46	1.37	0.46	0.00
	60°	55.73	40.16	26.54	17.53	11.87	7.31	3.07	1.59	0.34	0.00
	90°	96.99	62.87	38.90	24.95	15.69	9.73	5.46	2.37	0.62	0.00
2"	10°	21.53	16.98	16.01	12.47	10.07	5.26	4.43	2.37	0.79	0.00
	30°	47.47	37.46	27.32	20.75	14.12	9.65	6.53	3.05	1.15	0.00
	60°	92.06	69.69	49.08	31.92	21.36	13.98	8.52	4.21	1.31	0.00
	90°	173.40	110.49	73.44	48.50	29.56	18.56	11.54	5.13	1.44	0.00
2-1/2"	10°	35.16	29.35	24.60	19.68	14.70	10.63	7.63	3.85	1.32	0.00
	30°	79.21	63.94	49.22	34.32	25.24	15.90	9.98	4.98	2.16	0.00
	60°	150.59	107.54	80.65	52.93	34.89	22.72	14.87	6.44	2.02	0.00
	90°	253.06	180.69	119.78	84.32	50.76	32.69	21.11	11.67	1.79	0.00
3"	10°	47.02	32.65	26.34	19.84	15.89	12.27	7.97	3.98	1.81	0.00
	30°	105.15	80.57	58.10	42.90	29.96	19.58	12.14	5.04	1.96	0.00
	60°	190.26	136.08	112.14	82.22	54.10	27.60	15.80	13.54	1.43	0.00
	90°	388.90	235.03	157.48	99.49	64.78	38.40	22.20	11.64	2.10	0.00
4"	10°	58.97	52.74	43.58	33.52	25.93	18.16	11.12	7.42	3.66	0.00
	30°	160.29	131.67	100.78	72.91	53.71	35.10	19.49	10.73	3.90	0.00
	60°	332.17	243.98	174.60	118.86	81.15	51.80	24.79	15.34	6.48	0.00
	90°	652.17	401.89	262.88	170.63	111.42	73.39	43.49	24.32	7.20	0.00



UHMWPE – Ultra High Molecular Weight Polyethylene

Valve Seat Selection

Please contact your sales for more properties of materials



Seat Code	Description	Temprature Range
VIRGIN PTFE	The most common material of seat ring. With excellent chemical resistance, PTFE can be used almost in all media.	-20°C to 180°C (-4°F to 350°F)
RPTFE (15% GLASS FILLED PTFE)	Similar to PTFE, but offers higher pressure capacity while temperature is increasing. The material itself is harder than conventional PTFE. Please specify the application due to confusion with PTFE.	-20°C to 180°C (-4°F to 350°F)
CARBON FILLED PTFE	Specially used for steam and thermal oil, with low coefficient of friction. The chemical resistance is similar to PTFE and RPTFE. 15% carbon and 25% carbon are provided.	-20°C to 200°C (-4°F to 392°F)
S/S POWDER FILLED PTFE	Combined with the strength of stainless steel and lubricity of PTFE, 50% SS316 powder is added to 50% PTFE. Abrasion resistance of metal and higher pressure rating than RPTFE.	-20°C to 200°C (-4°F to 392°F)
TFM1600	TFM is a modified PTFE which reduces permeation to provide advantages for corrosive applications or those applications where PTFE is used as a barrier to protect against or contain aggressive chemicals.	-40°C to 180°C (-40°F to 350°F)
DELRIN	High pressure seat material. Delrin material is able to sustain pressure up to 5000 psig. However, it is not recommended to use in oxygen applications.	-20°C to 80°C (-4°F to 180°F)
PEEK	Highest pressure resistance. Excellent in recovery from deformation, and high degree of dimensional stability. High mechanical strength.	-20°C to 240°C (-4°F to 464°F)

More Automation Choices

Pneumatic Actuators

VT Series – Rack & Pinion Type



The VT Series rack & pinion actuators are reliable quality products, which can be relied on to perform faultlessly under any difficult circumstances.. For double-acting mode , the actuator is available in 11 sizes. Under the provision of common power supply (80 psi), the output torque ranges from 8.02 to 2877 Nm (71 to 25469 in-lbs). For single-active, also known as spring return type, 10 sizes are available.

Electric Actuators

JS Series



The Jexme electric actuators are made in new sizes from 34.3 to 597.8 Nm (303.6 to 5290.8 in-lbs), which are generally applied for ball valves with maximum size 6", and butterfly valves with maximum size 12", and are available in on-off or modulating versions, with a choice of duty cycles. All models include standard manual override, visual position indicator, torque limiter and adjustable-position switches.

VSII™ Namur Type Solenoid Valves

for Valve Actuator



VSII™ namur type solenoid valve is specifically engineered to pilot pneumatic process valve actuators. Using enhanced materials, VSII™ has an operating temperature range from -20°C up to 50°C (-4°F up to 140°F). The most notable improvement is the patened rotary sealing plate. It features in the field conversion form 3/2 to 5/2 action without the need for tools or additional parts, and incorporates exhaust feedback to increase actuator spring life span.

Other Fire-safe Products

FSB 35	FSB 26	FSB 23	FSB 1D	FSB 22
				
2000 psi (140 bar) DN8 - DN100	6000 psi (420 bar) DN8 - DN50	3000 psi (210 bar) DN8 - DN50	PN16/PN40 DN15 - DN150	2000 psi (140bar) DN8 - DN50

How to order

VALVE TYPE	PORT	BODY MATERIAL	SEAT	TRIM	TYPE OF CONNECTION	PRESSURE RATING	SPECIAL REQUEST	SIZE OF CONNECTION	OTHER
A	B	C	D	E	F	G	H	I	J

die erste®

Taiwan
5F-1, No. 936,
Wen-Xin Rd., Sec. 4,
Taichung City 406, Taiwan
T +886 (4) 2231 0059
F +886 (4) 2236 0236

Shanghai
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678, Gu-Bei Rd.,
Shanghai, China
T +86 (21) 5777 3810
F +86 (21) 5777 3819

DIE-ERSTE INDUSTRY CO., LTD.
www.die-erste.com | sales@die-erste.ocm

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Due to continuous development of the products, DIE ERSTE reserves the right to alter the dimension and information contained in the document as required without notice. For specific performance data and proper material selection, please consult with your DIE ERSTE representatives.

JYL®

PNEUMATIC ACTUATOR
Serie JYL-AP



Higher performance and reliability

Fully compliance with all the latest international standards

Wide range options in technical specification and highly cost-effective

Compact housing design, suitable for any application and workin genvironment

DESIGN AND CONSTRUCTION

DESIGN

JYL series pneumatic actuators ha ve introduc ed improvement design for rack and pinion. It is alw ays Vtork's mission to o ffer initiative products by c ombining the long field experienc es in products a pplication and the latest production and materials te chnology a v a il a ble in the market tod ay. The benefit of new design has long been verified in practic e. With new te chnicalfe atures equipped, Vtork series pneumatic actuators have advanta geous characteristic in:

- Reliability
- High performance
- Fully compliance with all the latest international standards
- Extensive products range allows best versatility at lower price
- Innovations and patented solutions for a universal drive shaft
- Multifunction position indicator
- Compact and light

CONSTRUCTION

1. A single compact design utilizing identical body and end caps for both double acting and spring return models. This feature reduces inventory and allows field conversion, by adding or removing modular spring cartridges.

2. Full conformance to following latest specifications: ISO 5211, DIN 3337 and VDI/VDE 3845 for product interchangeability and easy mounting of solenoids, limit switches and other accessories.

3. JYL piston rack and pinion design for compact construction, symmetric mounting position, high-cycle life and fast operation. Reverse rotation can be accomplished in the field by simply inverting the pistons.

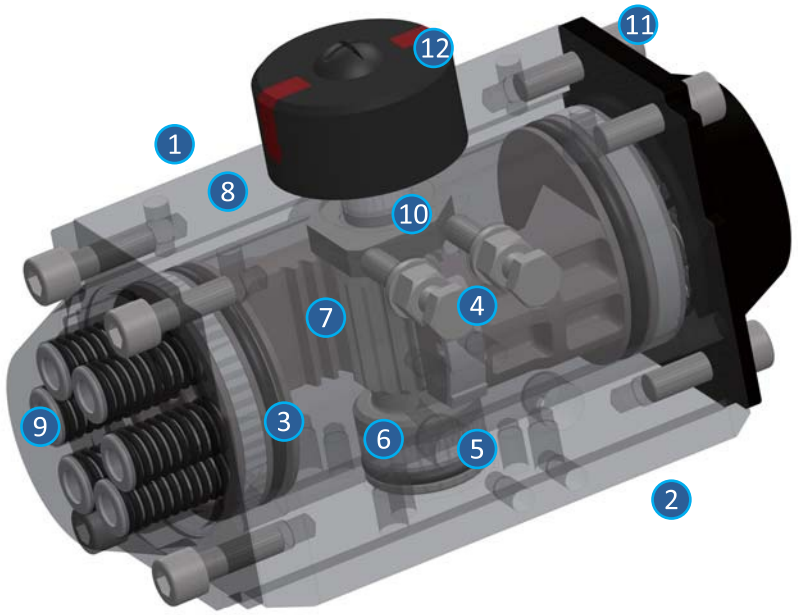
4. Two independent external travel stop adjustments permit easy and precise adjustment of +/- 5° in both directions. This adjustment may be made in either the open or closed position and provides for accurate valve alignment.

5. Multiple bearings and guides on pistons and racks for precise operation, low friction, high cycle life and a blowout proof pinion shaft.

6. Electroless nickel-plated blowout resistant, bearing guided, one-piece pinion shaft for improved safety and maximum cycle life.

7. High precision teeth on piston racks and pinion shaft for accurate positioning, low backlash, and maximum engagement resulting in overall efficient operation.

8. Extruded aluminum body with both internal and external corrosion protections having a honed cylinder surface for longer life and a lower coefficient of friction.



9. Modular preloaded spring cartridges designed with coated springs for simple range versatility, greater safety and corrosion resistance.

10. Selected high quality bearings and seals that provide a wide operating temperature range, low friction, and high cycle life.

11. Internal and external stainless steel fasteners for long term corrosion resistance.

12. Multifunctional position indicator for visual position indication, and a direct, easy, economical way to mount popular sensors.

RANGE OF OPTIONS, QUALITY MANUFACTURING, AND ACCESSORIES

RANGE OF OPTIONS

A. Stainless steel 304 or 316 drive shafts are available on request for all sizes no matter the type of corrosion protection selected.
B. For extremely high or low temperature applications, all models may be equipped with FPM or Silicon O rings along with an JYL tested and certified suitable lubricant.
C. Other than the standard double square bottom drive shaft connection, we can supply a keyed drive connection, a flat head connection or a special personalized drive connection.

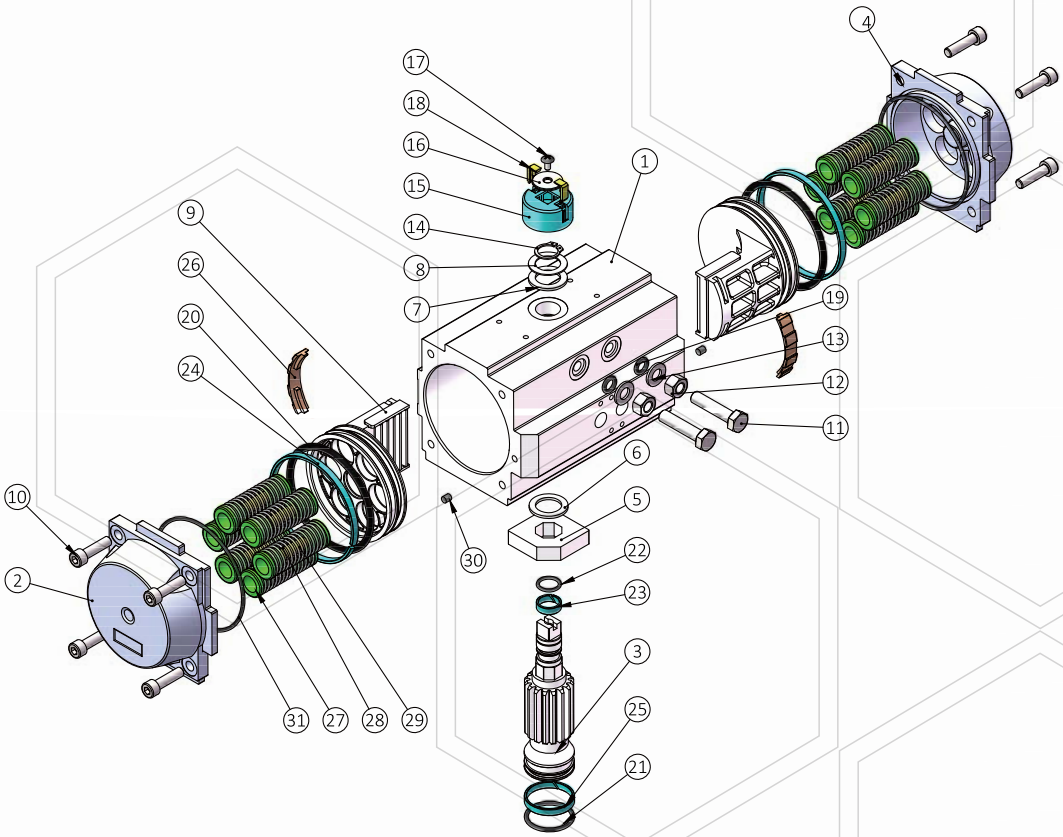
QUALITY MANAGEMENT

- Production conforms to ISO9001.
- Each individual actuator has been factory inspe cted and tested and given a serial number for full trac e ability.
- Each individual actuator is individually packed in a special cardboard carton for protection,with a product description label for easy identification and includes installation,operation and maintenance instructions .

ACCESSORIES AVAILABLE

- Different Square reductions suitable for drive shaft
- Centering rings for all sizes
- Brackets
- Couplings
- Solenoid valves
- Switch boxes
- Proximity switches
- Gear boxes
- Positioners

Parts And Materials



Item Number	Part Description	Material Quality	QTY	Item Number	Part Description	Material Quality	QTY	Item Number	Part Description	Material Quality	QTY
1	Body	Aluminium alloy	1	12	Nut(stop screw)	Stainless steel	2	23	Bearing(pinion top)	POM+PTFE	1
2	Left End cap	Aluminium alloy	1	13	Washer (stop screw)	Stainless steel	2	24	Bearing(pinion head)	POM+PTFE	2
3	Drive shaft	Alloy Steel	1	14	Spring clip	Spring steel	1	25	Bearing(pinion bottom)	POM+PTFE	1
4	Right end cap	Aluminium alloy	1	15	Position indicator	Nylon	1	26	Wear band	Nylon	2
5	OCTI-CAM	Alloy Steel	1	16	Indicator thrust bearing	Stainless steel	1	27	Spring seat	Nylon	24
6	Thrust bearing (pinion top)	POM+PTFE	1	17	Cap screw	Stainless steel	1	28	Spring	High-carbon steel	12
7	Thrust bearing	POM+PTFE	1	18	Color code	Nylon	2	29	Straining beam	Copper pipe	12
8	Thrust washer	Stainless steel	1	19	"o" ring(stop screw)	NBR	2	30	Plug	NBR	2
9	Piston	Aluminium alloy	2	20	"o" ring(piston)	NBR	2	31	"o" ring(end cap)	NBR	2
10	Cap screw (end cap)	Stainless steel	8	21	"o" ring(pinion bottom)	NBR	1				
11	Stop top screw	Stainless steel	2	22	"o" ring(pinion top)	NBR	1				

TECHNICAL DATA(METRIC UNIT)

Model TypeA	AP032		AP050		AP065		AP0075		AP085		AP095		AP110		AP125		AP140		AP160		AP190		AP210		AP240		AP270		AP300		AP350		AP400	
	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S
Diameter mm	32		50		65		75		85		95		110		125		140		160		190		210		240		270		300		350		400	
Air Volume Opening(L)	0.03		0.09		0.19		0.30		0.44		0.88		0.83		1.41		1.76		2.85		4.75		6.60		11.40		15.80		19.09		27.65		42.81	
Air Volume Closing(L)	0.04		0.15		0.32		0.50		0.66		1.17		1.27		2.13		2.72		4.08		7.20		10.29		15.10		18.80		28.23		44.10		62.05	
Opening Time (sec)	0.3		0.3	0.9	0.4	0.9	0.4	0.9	0.9	1.0	0.9	1.4	0.9	1.4	1.3	2.4	1.3	2.8	2.0	4.8	2.2	2.4	2.9	3.4	3.2	3.8	4.4	5.0	5.0	6.0	6.2	7.4	7.5	9.6
closing Time (sec)	0.4		0.4	0.7	0.4	0.8	0.4	0.9	0.9	1.2	1.0	1.4	1.0	1.6	1.4	2.4	1.4	3.0	2.4	4.9	2.6	3.0	3.8	4.1	3.7	4.0	4.9	5.5	6.0	6.8	7.2	8.4	8.5	10.6
Weight (Kg)hai	0.47	0.59	1.13	1.25	1.97	2.21	2.93	3.29	3.78	4.26	5.14	5.86	6.09	7.17	10.86	12.54	13.77	15.93	20.15	23.75	28.41	33.81	40.03	48.43	52.6	77.76	73.64	90.6	108	135.6	146.7	188.1	220.5	283.5

1. For model 32-160

(1)Room temperature (2)Actuator stroke 90° (3) Solenoid valve with orifice of 4 mm and a flow capacity Qn400L/min (4) Inside pipe diameter 6 mm (5) Medium clean air

(6) Air supply pressure 5.5 bar (7)Actuator without external resistance load

2. For model 190-400

(1)Room temperature (2)Actuator stroke 90° (3)Solenoid valve with orifice of 12 mm and a flow capacity Qn5100L/min (4) Inside pipe diameter 8 mm (5) Medium clean air

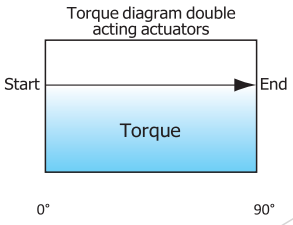
(6) Air supply pressure 5.5 bar (7)Actuator without external resistance load

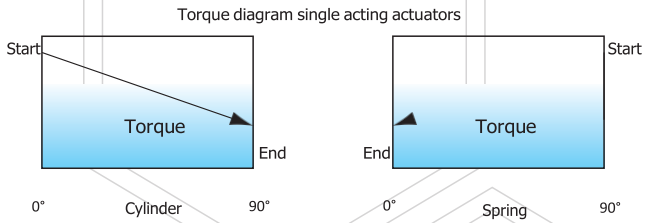
Cautions: obviously on the field applications when one or more of the above parameter are different, the moving time will be di fferent

Air consumption rest with air supply, air volume and action cycle times. Expressions:

$$L/min = \text{Air volume(opening air volume+closing air volume)} X \left[\frac{\text{Air Supply(Kpa)+101.3}}{101.3} \right] X \text{Action times(/min)}$$

METRIC TORQUE RATINGS





DOUBLE ACTING TORQUE RATINGS IN Nm

Model	Supply Pressure (Unit:bar)									
	2.5	**3**	**3.5**	**4**	**4.5**	**5**	**5.5**	**6**	**7**	**8**
AP032	2.9	3.4	4.0	4.6	5.3	5.9	6.5	7.1	8.3	9.5
AP050	8.6	10.4	12.3	14.2	16.0	17.9	19.8	21.6	25.4	29.1
AP065	17.4	21.2	25.0	28.7	32.5	36.3	40.1	43.9	51.4	59.0
AP075	27.0	32.9	38.8	44.7	50.5	56.4	62.3	68.2	79.9	91.7
AP085	39.7	48.3	56.9	65.6	74.2	82.8	91.4	100.1	117.3	134.6
AP095	55.7	67.9	80.0	92.1	104.2	116.4	128.5	140.6	164.8	189.1
AP110	72.0	89.3	105.0	120.6	136.3	152.0	167.6	183.3	214.6	245.9
AP125	128.7	159.5	187.5	215.4	243.4	271.4	299.4	327.4	383.3	439.3
AP140	196	237	278	319	360	401	442	483	565	647
AP160	263.5	326.6	383.9	441.2	498.5	555.8	613.1	670.4	785.0	899.7
AP190	428.5	518.0	607.3	696.6	785.9	875.3	964.6	1053.9	1232.5	1411.1
AP210	598.2	723.2	847.9	972.6	1097.3	1222.0	1346.6	1471.3	1720.7	1970.1
AP240	928.3	1122.0	1315.0	1508.0	1702.0	1895.0	2089.0	2282.0	2669.0	3056.0
AP270	1305.0	1577.0	1849.0	2121.0	2393.0	2665.0	2937.0	3209.0	3753.0	4297.0
AP300	1678.6	2029.4	2379.3	2729.2	3079.1	3429.0	3778.9	4128.8	4828.5	5528.3
AP350	2492.5	3011.8	3531.1	4050.4	4569.6	5088.9	5608.2	6127.5	7166.0	8204.6
AP400	3798.1	4589.4	5380.7	6172.0	6963.3	7754.5	8545.8	9337.1	10919.7	12502.2

SINGLE ACTING TORQUE RATINGS IN Nm

Model	Supply Pressure (Unit:bar)																				Spring stroke	
	2.5		**3**		**3.5**		**4**		**4.5**		**5**		**5.5**		**6**		**7**		**8**			
	0°	**90°**	**0°**	**90°**	**0°**	**90°**	**0°**	**90°**	**0°**	**90°**	**0°**	**90°**	**0°**	**90°**	**0°**	**90°**	**0°**	**90°**	**0°**	**90°**	**90°**	**0°**
AP050 S05	**5.1**	**3.4**	6.9	5.3	8.8	7.2	10.7	9.0	12.5	10.9	14.4	12.8	16.3	14.6	18.1	16.5	21.9	20.2	25.6	23.9	**5.2**	**3.5**
AP050 S06	4.4	2.4	**6.2**	**4.3**	8.1	6.1	10.0	8.0	11.8	9.9	13.7	11.7	15.6	13.6	17.4	15.5	21.2	19.2	24.9	22.9	**6.2**	**4.2**
AP050 S07			5.5	3.2	**7.4**	**5.1**	9.3	7.0	11.1	8.8	13.0	10.7	14.9	12.6	16.7	14.4	20.5	18.2	24.2	21.9	**7.2**	**4.9**
AP050 S08					6.7	4.1	**8.6**	**5.9**	10.4	7.8	12.3	9.7	14.2	11.5	16.0	13.4	19.8	17.1	23.5	20.9	**8.2**	**5.6**
AP050 S09							7.9	4.9	**9.7**	**6.8**	11.6	8.6	13.5	10.5	15.3	12.4	19.1	16.1	22.8	19.8	**9.3**	**6.3**
AP050 S10									9.0	5.7	**10.9**	**7.6**	12.8	9.5	14.6	11.3	18.4	15.1	22.1	18.8	**10.3**	**7.0**
AP050 S11											10.2	6.6	**12.1**	**8.4**	13.9	10.3	17.7	14.0	21.4	17.8	**11.3**	**7.7**
AP050 S12													11.4	7.4	**13.2**	**9.3**	17.0	13.0	20.7	16.7	**12.4**	**8.4**
AP065 S05	**8.7**	**4.3**	12.5	8.1	16.3	11.9	20.0	15.6	23.8	19.4	27.6	23.2	31.4	27.0	35.2	30.8	42.7	38.3	50.3	45.9	**13.1**	**8.7**
AP065 S06	7.0	1.7	**10.7**	**5.5**	14.5	9.2	18.3	13.0	22.1	16.8	25.9	20.6	29.7	24.4	33.4	28.2	41.0	35.7	48.6	43.3	**15.7**	**10.4**
AP065 S07			9.0	2.8	**12.8**	**6.6**	16.6	10.4	20.4	14.2	24.1	18.0	27.9	21.8	31.7	25.5	39.3	33.1	46.8	40.7	**18.3**	**12.2**
AP065 S08					11.0	4.0	**14.8**	**7.8**	18.6	11.6	22.4	15.4	26.2	19.1	30.0	22.9	37.5	30.5	45.1	38.1	**21.0**	**13.9**
AP065 S09							13.1	5.2	**16.9**	**9.0**	20.7	12.7	24.4	16.5	28.2	20.3	35.8	27.9	43.4	35.4	**23.6**	**15.7**
AP065 S10									15.1	6.3	**18.9**	**10.1**	22.7	13.9	26.5	17.7	34.0	25.2	41.6	32.8	**26.2**	**17.4**
AP065 S11											17.2	7.5	**21.0**	**11.3**	24.7	15.1	32.3	22.6	39.9	30.2	**28.8**	**19.1**
AP065 S12													19.2	8.7	**23.0**	**12.4**	30.6	20.0	38.1	27.6	**31.4**	**20.9**
AP075 S05	**16.3**	**10.2**	22.2	16.0	28.1	21.9	34.0	27.8	39.8	33.7	45.7	39.6	51.6	45.4	57.5	51.3	69.2	63.1	81.0	74.8	**16.9**	**10.7**
AP075 S06	14.2	6.8	**20.1**	**12.7**	25.9	18.6	31.8	24.4	37.7	30.3	43.6	36.2	49.4	42.1	55.3	47.9	67.1	59.7	78.8	71.4	**20.2**	**12.8**
AP075 S07			17.9	9.3	**23.8**	**15.2**	29.7	21.1	35.6	26.9	41.4	32.8	47.3	38.7	53.2	44.6	64.9	56.3	76.7	68.1	**23.6**	**15.0**
AP075 S08					21.7	11.8	**27.5**	**17.7**	33.4	23.6	39.3	29.4	45.2	35.3	51.0	41.2	62.8	53.0	74.5	64.7	**27.0**	**17.1**
AP075 S09							25.4	14.3	**31.3**	**20.2**	37.1	26.1	43.0	32.0	48.9	37.8	60.7	49.6	72.4	61.3	**30.3**	**19.3**
AP075 S10									29.1	16.8	**35.0**	**22.7**	40.9	28.6	46.8	34.5	58.5	46.2	70.3	58.0	**33.7**	**21.4**
AP075 S11											32.9	19.3	**38.7**	**25.2**	44.6	31.1	56.4	42.8	68.1	54.6	**37.1**	**23.5**
AP075 S12													36.6	21.8	**42.5**	**27.7**	54.2	39.5	66.0	51.2	**40.4**	**25.7**
AP085 S05	**23.2**	**13.7**	31.8	22.3	40.4	30.9	49.0	39.5	57.6	48.1	66.3	56.8	74.9	65.4	83.5	74.0	100.8	91.3	118.0	108.5	**26.1**	**16.6**
AP085 S06	19.8	8.4	**28.4**	**17.0**	37.1	25.7	45.7	34.3	54.3	42.9	62.9	51.5	71.6	60.2	80.2	68.8	97.4	86.0	114.7	103.3	**31.3**	**19.9**
AP085 S07			25.1	11.8	**33.8**	**20.5**	42.4	29.1	51.0	37.7	59.6	46.3	68.3	55.0	76.9	63.6	94.1	80.8	111.4	98.1	**36.5**	**23.2**
AP085 S08					30.4	15.2	**39.1**	**23.9**	47.7	32.5	56.3	41.1	64.9	49.7	73.6	58.4	90.8	75.6	108.1	92.9	**41.7**	**26.5**
AP085 S09							35.8	18.7	**44.4**	**27.3**	53.0	35.9	61.6	44.5	70.3	53.2	87.5	70.4	104.8	87.7	**46.9**	**29.8**
AP085 S10									41.1	22.1	**49.7**	**30.7**	58.3	39.3	67.0	48.0	84.2	65.2	101.5	82.5	**52.1**	**33.1**
AP085 S11											46.4	25.5	**55.0**	**34.1**	63.6	42.7	80.9	60.0	98.1	77.2	**57.3**	**36.4**
AP085 S12													51.7	28.9	**60.3**	**37.5**	77.6	54.8	94.8	72.0	**62.5**	**39.7**
AP095 S05	**33.6**	**20.9**	45.8	33.0	57.9	45.1	70.0	57.3	82.1	69.4	94.3	81.5	106.4	93.6	118.5	105.8	142.7	130.0	167.0	154.2	**34.9**	**22.1**
AP095 S06	29.2	13.9	**41.4**	**26.1**	53.5	38.2	65.6	50.3	77.7	62.4	89.8	74.5	102.0	86.7	114.1	98.8	138.3	123.0	162.6	147.3	**41.8**	**26.5**
AP095 S07			36.9	19.1	**49.1**	**31.2**	61.2	43.3	73.3	55.4	85.4	67.6	97.5	79.7	109.7	91.8	133.9	116.1	158.1	140.3	**48.8**	**30.9**
AP095 S08					44.6	24.2	**56.8**	**36.4**	68.9	48.5	81.0	60.6	93.1	72.7	105.2	84.8	129.5	109.1	153.7	133.3	**55.8**	**35.4**
AP095 S09							52.3	29.4	**64.5**	**41.5**	76.6	53.6	88.7	65.8	100.8	77.9	125.1	102.1	149.3	126.4	**62.7**	**39.8**
AP095 S10									60.0	34.5	**72.2**	**46.7**	84.3	58.8	96.4	70.9	120.6	95.1	144.9	119.4	**69.7**	**44.2**
AP095 S11											67.7	39.7	**79.9**	**51.8**	92.0	63.9	116.2	88.2	140.5	112.4	**76.7**	**48.6**
AP095 S12													75.4	44.8	**87.6**	**57.0**	111.8	81.2	136.0	105.4	**83.6**	**53.0**
AP110 S05	**43.4**	**26.2**	60.7	43.4	76.4	59.1	92.0	74.8	107.7	90.4	123.4	106.1	139.0	121.8	154.7	137.4	186.0	168.8	217.3	200.1	**45.9**	**28.6**
AP110 S06	37.7	17.0	**55.0**	**34.3**	70.6	49.9	86.3	65.6	102.0	81.3	117.6	96.9	133.3	112.6	149.0	128.3	180.3	159.6	211.6	190.9	**55.0**	**34.3**
AP110 S07			49.3	25.1	**64.9**	**40.8**	80.6	56.4	96.2	72.1	111.9	87.8	127.6	103.4	143.2	119.1	174.6	150.4	205.9	181.8	**64.2**	**40.0**
AP110 S08					59.2	31.6	**74.9**	**47.3**	90.5	62.9	106.2	78.6	121.9	94.3	137.5	109.9	168.9	141.3	200.2	172.6	**73.4**	**45.8**
AP110 S09							69.1	38.1	**84.8**	**53.8**	100.5	69.4	116.1	85.1	131.8	100.8	163.1	132.1	194.5	163.4	**82.5**	**51.5**
AP110 S10									79.1	44.6	**94.8**	**60.3**	110.4	75.9	126.1	91.6	157.4	122.9	188.7	154.2	**91.7**	**57.2**
AP110 S11											89.0	51.1	**104.7**	**66.7**	120.4	82.4	151.7	113.7	183.0	145.1	**100.9**	**62.9**
AP110 S12													99.0	57.6	**114.6**	**73.2**	146.0	104.6	177.3	135.9	**110.0**	**68.6**

METRIC TORQUE RATINGS

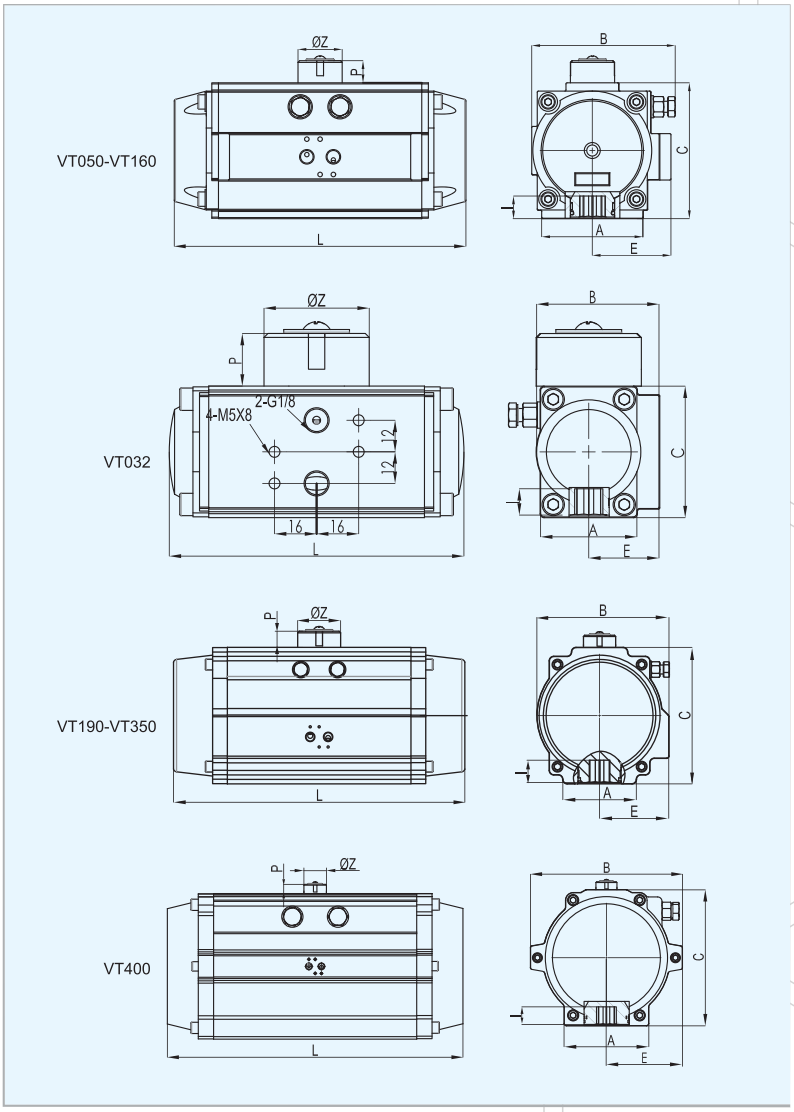
JYL®

SINGLE ACTING TORQUE RATINGS IN Nm

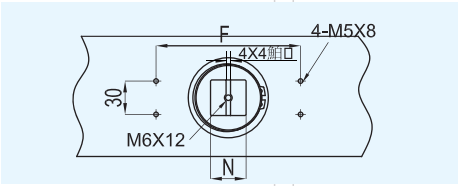
Model	Supply Pressure (Unit: bar)																				Spring stroke	
	2.5		3		3.5		4		4.5		5		5.5		6		7		8			
	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	90°	0°
AP125 S05	**77.7**	**48.2**	108.5	78.9	136.5	106.9	164.4	134.9	192.4	162.9	220.4	190.9	248.4	218.4	276.4	246.8	332.3	302.8	388.3	358.7	80.6	51.0
AP125 S06	67.5	32.0	**98.3**	**62.8**	126.3	90.8	154.2	118.8	182.2	146.8	210.2	174.7	238.2	202.7	266.2	230.7	322.1	286.7	378.1	342.6	96.7	61.2
AP125 S07			88.1	46.7	**116.1**	**74.7**	144.0	102.7	172.0	130.7	200.0	158.6	228.0	186.6	256.0	214.6	311.9	270.6	367.9	326.5	112.8	71.4
AP125 S08					105.9	58.6	**133.8**	**86.6**	161.8	114.5	189.8	142.5	217.8	170.5	245.8	198.5	301.7	254.4	357.7	310.4	128.9	81.6
AP125 S09							123.6	70.5	**151.6**	**98.4**	179.6	126.4	207.6	154.4	235.6	182.4	291.5	238.3	347.5	294.3	145.0	91.8
AP125 S10									141.4	82.3	169.4	110.3	197.4	138.3	225.4	166.3	281.3	222.2	337.3	278.2	161.1	102.0
AP125 S11											159.2	94.2	187.2	122.2	215.2	150.2	271.1	206.1	327.1	262.1	177.2	112.2
AP125 S12													177.0	106.1	205.0	134.0	260.9	190.0	316.9	246.0	193.3	122.4
AP140 S05	114.2	74.1	155.1	115	196.1	156	237.0	196.9	277.9	237.8	318.8	278.7									122.4	82.3
AP140 S06	97.7	49.6	138.7	90.6	179.6	131.5	220.5	172.4	261.5	213.3	302.4	254.3	343.3	295.2							146.8	98.7
AP140 S07			122.2	66.1	163.2	107.0	204.1	147.9	245.0	188.9	285.9	229.8	326.9	270.7	367.8	311.6					171.3	115.2
AP140 S08					146.7	82.5	187.6	123.5	228.6	164.4	269.5	205.3	310.4	246.2	351.3	287.2	433.2	369.0			195.8	131.6
AP140 S09							171.2	99.0	212.1	139.9	253.0	180.9	294.0	221.8	334.9	262.7	416.7	344.6	498.6	426.4	220.2	148.1
AP140 S10									195.7	115.5	236.6	156.4	277.5	197.3	318.4	238.2	400.3	320.1	482.1	401.9	244.7	164.5
AP140 S11											220.1	131.9	261.1	172.8	302.0	213.8	383.8	295.6	465.7	377.5	269.2	181.0
AP140 S12													244.6	148.4	285.5	189.3	367.4	271.1	449.2	353.0	293.6	197.4
AP160 S05	**153.5**	**101.3**	216.6	164.4	273.9	221.7	331.2	279.0	388.5	336.3	445.8	393.6	503.1	450.9	560.4	508.2	675.0	622.8	789.7	737.4	162.3	110.0
AP160 S06	131.5	68.8	**194.6**	**131.9**	251.9	189.2	309.2	246.5	366.5	303.8	423.8	361.1	481.1	418.4	538.4	475.7	653.0	590.3	767.7	705.0	194.7	132.0
AP160 S07			172.6	99.5	**229.9**	**156.8**	287.2	214.1	344.5	271.4	401.8	328.7	459.1	386.0	516.4	443.3	631.0	557.9	745.7	672.5	227.2	154.0
AP160 S08					207.9	124.3	**265.2**	**181.6**	322.5	238.9	379.8	296.2	437.1	353.5	494.4	410.8	609.0	525.4	723.7	640.1	259.6	176.0
AP160 S09							243.2	149.2	**300.5**	**206.5**	357.8	263.8	415.1	321.1	472.4	378.4	587.0	493.0	701.7	607.6	292.1	198.0
AP160 S10									278.5	174.0	335.8	231.3	393.1	288.6	450.4	345.9	565.0	460.5	679.7	575.2	324.5	220.0
AP160 S11											313.8	198.9	371.1	256.2	428.4	313.5	543.0	428.1	657.7	542.7	357.0	242.0
AP160 S12													349.1	223.7	406.4	281.0	521.0	395.6	635.7	510.3	389.4	264.0
AP190 S05	246.8	167.4	336.3	256.9	425.6	346.2	514.9	435.5	604.2	524.8	693.5	614.1									261.2	181.8
AP190 S06	210.4	115.1	299.9	204.6	389.2	293.9	478.5	383.3	567.8	472.6	657.2	561.9	746.5	651.2							313.4	218.1
AP190 S07			263.6	152.4	352.9	241.7	442.2	331.0	531.5	420.3	620.8	509.6	710.1	599.0	799.4	688.3					365.6	254.5
AP190 S08					316.5	189.5	405.8	278.7	495.1	368.1	584.5	457.4	673.8	546.7	779.5	636.0	941.7	814.7			417.8	290.8
AP190 S09							369.5	226.6	458.8	315.9	548.1	405.2	637.4	494.5	745.2	583.8	905.3	762.4	1084.0	941.1	470.1	327.2
AP190 S10									422.4	263.6	511.8	353.0	601.1	442.3	710.9	531.6	869.0	710.2	1047.6	888.8	522.3	363.5
AP190 S11											475.4	300.7	564.7	390.0	676.6	479.3	832.6	658.0	1011.3	836.6	574.5	399.9
AP190 S12													528.4	337.8	642.3	427.1	796.3	605.7	974.9	784.4	628.8	436.8
AP210 S05	**352.8**	**239.1**	477.8	364.1	602.5	488.8	727.2	613.5	851.9	738.2	976.6	862.9	1101.2	987.5	1225.9	1112.2	1475.3	1361.6	1724.7	1611.0	359.1	245.4
AP210 S06	303.7	167.3	**428.7**	**292.3**	553.4	417.0	678.1	541.7	802.8	666.4	927.5	791.0	1052.2	915.7	1176.9	1040.4	1426.2	1289.8	1675.6	1539.2	430.9	294.5
AP210 S07			379.6	220.5	**504.3**	**345.2**	629.0	469.8	753.7	594.5	878.4	719.2	1003.1	843.9	1127.8	968.6	1377.2	1218.0	1626.5	1467.4	502.7	343.6
AP210 S08					455.3	273.3	**579.9**	**398.0**	704.6	522.7	829.3	647.4	954.0	772.1	1078.7	896.8	1328.1	1146.2	1577.5	1395.5	574.6	392.6
AP210 S09							530.9	326.2	**655.6**	**450.9**	780.2	575.6	904.9	700.3	1029.6	825.0	1279.0	1074.3	1528.4	1323.7	646.4	441.7
AP210 S10									606.5	379.1	731.2	503.8	855.8	628.4	980.5	753.1	1229.9	1002.5	1479.3	1251.9	718.2	490.8
AP210 S11											682.1	431.9	806.8	556.6	931.5	681.3	1180.8	930.7	1430.2	1180.1	790.0	539.9
AP210 S12													757.7	484.8	882.4	609.5	1131.8	858.9	1381.1	1108.3	861.8	589.0
AP240 S05	517.8	374.3	711.2	567.7	904.6	761.1	1098.0	954.5	1291.4	1147.9	1484.8	1341.3									554.0	410.5
AP240 S06	435.7	263.5	629.1	456.9	822.5	650.3	1015.9	843.7	1209.3	1037.1	1402.7	1230.5	1596.1	1423.9							664.8	492.6
AP240 S07			547.0	346.1	740.4	539.5	933.8	732.9	1127.2	926.3	1320.6	1119.7	1514.0	1313.1	1707.4	1506.5					775.6	574.7
AP240 S08					658.3	428.7	851.7	622.1	1045.1	815.5	1238.5	1008.9	1431.9	1202.3	1625.3	1395.7	2012.1	1782.5			886.4	656.8
AP240 S09							769.6	511.3	963.0	704.7	1156.4	898.1	1349.8	1091.5	1543.2	1284.9	1930.0	1671.7	2316.8	2058.5	997.2	738.9
AP240 S10									880.9	593.9	1074.3	787.3	1267.7	980.7	1461.1	1174.1	1847.9	1560.9	2234.7	1947.7	1108.0	821.0
AP240 S11											992.2	676.5	1185.6	869.9	1379.0	1063.3	1765.8	1450.1	2152.6	1836.9	1218.8	903.1
AP240 S12													1103.5	759.1	1296.9	952.5	1683.7	1339.3	2070.5	1726.1	1329.6	985.2
AP270 S05	745.9	**519.4**	1017.9	791.4	1289.9	1063.4	1561.8	1335.3	1833.8	1607.3	2105.7	1879.2									786.0	**559.5**
AP270 S06	634.0	362.2	**906.0**	**634.2**	1178.0	906.2	1449.9	1178.1	1721.9	1450.1	1993.8	1722.0	2265.8	1994.0							943.2	**671.4**
AP270 S07			794.1	477.0	1166.1	**749.0**	1338.0	1020.9	1610.0	1292.9	1881.9	1564.8	2153.9	1836.8	2425.9	2108.8					1100.4	**783.3**
AP270 S08					954.2	591.8	1226.1	**863.7**	1498.1	1135.7	1770.0	1407.6	2042.0	1679.6	2314.0	1951.6	2857.9	2495.5			1257.6	**895.2**
AP270 S09							1114.2	706.5	1386.2	**978.5**	1658.1	1250.4	1930.1	1522.4	2202.1	1794.4	2746.0	2338.3	3289.9	2882.2	1414.8	**1007.1**
AP270 S10									1274.3	821.3	1546.2	**1093.2**	1818.2	1365.2	2090.2	1637.2	2634.1	2181.1	3178.0	2725.0	1572.0	**1119.0**
AP270 S11											1434.3	936.0	1706.3	**1208.0**	1978.3	1480.0	2522.2	2023.9	3066.1	2567.8	1729.2	1230.9
AP270 S12													1594.4	1050.8	1866.4	**1322.8**	2410.3	1866.7	2954.2	2410.6	1886.4	**1342.8**
AP300 S05	**987.5**	**646.7**	1338.3	997.5	1688.2	1347.4	2038.1	1697.3	2388.0	2047.2	2737.9	2397.1	3087.8	2747.0	3437.7	3096.9	4137.4	3796.6	4837.2	4496.4	1031.9	**691.1**
AP300 S06	849.3	440.3	**1200.1**	**791.1**	1550.0	1141.0	1899.9	1490.9	2249.8	1840.8	2599.6	2190.7	2949.5	2540.6	3299.4	2890.5	3999.2	3590.3	4699.0	4290.1	1238.3	**829.3**
AP300 S07			1061.9	584.7	**1411.7**	**934.6**	1761.6	1284.5	2111.5	1634.4	2461.4	1984.3	2811.3	2334.2	3161.2	2684.1	3861.0	3383.9	4560.8	4083.7	1444.7	**967.5**
AP300 S08					1273.5	728.2	**1623.4**	**1078.1**	1973.3	1428.0	2323.2	1777.9	2673.1	2127.8	3023.0	2477.7	3722.8	3177.5	4422.6	3877.3	1651.0	**1105.8**
AP300 S09							1485.2	871.8	**1835.1**	**1221.7**	2185.0	1571.5	2534.9	1921.4	2884.8	2271.3	3584.6	2971.1	4284.4	3670.9	1857.4	**1244.0**
AP300 S10									1696.9	1015.3	2046.8	**1365.2**	2396.7	1715.1	2746.6	2065.0	3446.3	2764.7	4146.1	3464.5	2063.8	**1382.2**
AP300 S11											1908.5	1158.8	2258.4	**1508.7**	2608.3	1858.6	3308.1	2558.4	4007.9	3258.2	2270.2	**1520.4**
AP300 S12													2120.2	1302.3	2470.1	**1652.2**	3169.9	2352.0	3869.7	3051.8	2476.6	**1658.6**
AP350 S05	**1498.2**	**1017.1**	2017.5	1536.4	2536.8	2055.6	3056.1	2574.9	3575.3	3094.2	4094.6	3613.5	4613.9	4132.7	5133.2	4652.0	6171.7	5690.6	7210.3	6729.1	1475.5	**994.3**
AP350 S06			**1818.6**	**1241.3**	2337.9	1760.5	2857.2	2279.8	3376.5	2799.1	3895.8	3318.4	4415.0	3837.7	4934.3	4356.9	5972.9	5395.5	7011.4	6434.0	1770.5	**1193.2**
AP350 S07			1619.8	946.2	**2139.1**	**1465.5**	2658.3	1984.7	3177.6	2504.0	3696.9	3023.3	4216.2	3542.6	4735.5	4061.8	5774.0	5100.4	6812.6	6139.0	2065.6	**1392.0**
AP350 S08					1940.2	1170.4	**2459.5**	**1689.6**	2978.8	2208.9	3498.0	2728.2	4017.3	3247.5	4536.6	3766.8	5575.1	4805.3	6613.7	5843.9	2360.7	**1590.9**
AP350 S09					1741.3	875.3	2260.6	1394.6	**2779.9**	**1913.8**	3299.2	2433.1	3818.5	2952.4	4337.7	3471.7	5376.3	4510.2	6414.8	5548.8	2655.8	**1789.7**
AP350 S10							2061.8	1099.5	2581.0	1618.7	**3100.3**	**2138.0**	3619.6	2657.3	4138.9	3176.6	5177.4	4215.1	6216.0	5253.7	2950.9	**1988.6**
AP350 S11							1862.9	804.4	2382.2	1323.7	2901.5	1842.9	**3420.7**	**2362.2**	3940.0	2881.5	4978.6	3920.0	6017.1	4958.6	3246.0	**2187.5**
AP350 S12									2183.3	1028.6	2702.6	1547.8	3221.9	2067.1	3741.2	**2586.4**	4779.7	3624.9	5818.3	4663.5	3541.1	**2386.3**
AP400 S05	2222.0	1497.0	3013.0	2288.0	3805.0	3080.0	4596.0	3871.0	5387.0	4662.0	6179.0	5454.0									2301.0	1576.0
AP400 S06			2698.0	1828.0	3490.0	2620.0	4281.0	3411.0	5072.0	4202.0	5863.0	4993.0	6655.0	5785.0							2761.0	1891.0
AP400 S07			2383.0	1368.0	3174.0	2195.0	3966.0	2951.0	4757.0	3742.0	5548.0	4533.0	6339.0	5324.0	7131.0	6116.0					3221.0	2206.0
AP400 S08					2859.0	1699.0	3650.0	2490.0	4442.0	3282.0	5233.0	4073.0	6024.0	4864.0	6816.0	5656.0	8398.0	7238.0			3682.0	2522.0
AP400 S09					2544.0	1239.0	3335.0	2030.0	4126.0	2821.0	4918.0	3613.0	5709.0	4404.0	6500.0	5195.0	8083.0	6778.0	9665.0	8360.0	4142.0	2837.0
AP400 S10							3020.0	1570.0	3811.0	2361.0	4603.0	3153.0	5394.0	3944.0	6185.0	4735.0	7768.0	6318.0	9350.0	7900.0	4602.0	3152.0
AP400 S11							2705.0	1110.0	3496.0	1901.0	4287.0	2692.0	5079.0	3484.0	5870.0	4275.0	7452.0	5857.0	9035.0	7440.0	5062.0	3467.0
AP400 S12									3181.0	1441.0	3972.0	2232.0	4763.0	2023.0	5555.0	3815.0	7137.0	5397.0	8720.0	6980.0	5522.0	3782.0

INSTALLATION

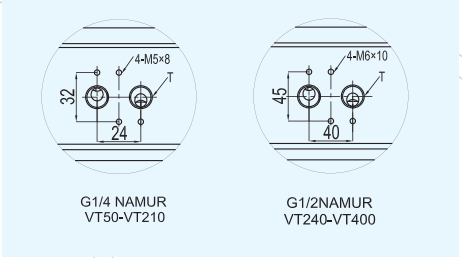
FRONT VIEW SIDE VIEW



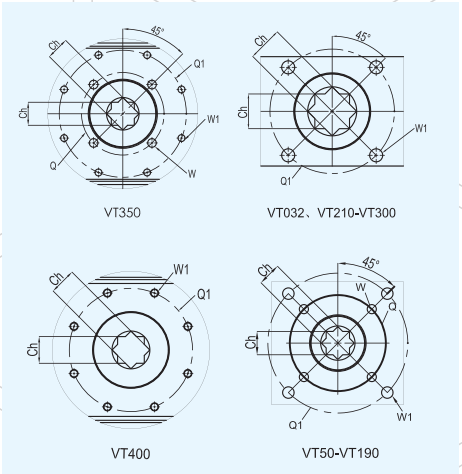
TOP



AIR CONNECTION



BOTTOM



MODEL	A	B	C	L	E	F	P	ØZ	N	I	FLANGE	Q	Q1	W	W1	Ch	T
AP032	37	47	50	110	27	50	20	40	10	10	F03	—	36	—	M5×9	9×9	G1/8"
AP050	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"
AP065	62	89.5	89	189	51.5	80	20	40	10	16	F05/07	50	70	M6×9	M8×12	14×14	G1/4"
AP075	68	102.5	100	210	59	80	20	40	14	16	F05/07	50	70	M6×9	M8×12	14×14	G1/4"
AP085	68	112.5	113	229	63.5	80	20	40	14	19	F05/07	50	70	M6×9	M8×12	17×17	G1/4"
AP095	92	126	123	264	71	80	20	40	14	19	F05/07	50	70	M6×9	M8×12	17×17	G1/4"
AP110	93	138.5	136	266	76.5	80	20	40	14	19	F07/10	70	102	M8×12	M10×15	17×17	G1/4"
AP125	96	157	161	337	85	80	30	56	22	25	F07/10	70	102	M8×12	M10×15	22×22	G1/4"
AP140	110	178	178	377	97	80	30	56	22	31	F10/12	102	125	M10×15	M12×18	27×27	G1/4"
AP160	112	196	200	412	106	130	30	56	22	31	F10/12	102	125	M10×15	M12×18	27×27	G1/4"
AP190	136	216.5	232	488	112	130	30	56	22	41	F10/14	102	140	M10×15	M16×24	36×36	G1/4"
AP210	140	235.5	255	550	120	130	30	80	32	40	F14	—	140	—	M16×24	36×36	G1/4"
AP240	159	262	292	602	131	130	30	80	32	50	F16	—	165	—	M20×28	46×46	G1/2"
AP270	159	295	331	672	147.5	130	30	80	32	50	F16	—	165	—	M20×28	46×46	G1/2"
AP300	180	335	354	784	173	130	30	80	32	50	F16	—	165	—	M20×28	46×46	G1/2"
AP350	270	385	410	845	195	130	30	80	32	50	F16/F25	165	254	M20×28	M16×30	46×46	G1/2"
AP400	290	520	466	956	260	130	30	80	32	60	F25	—	254	—	M16×30	55×55	G1/2"