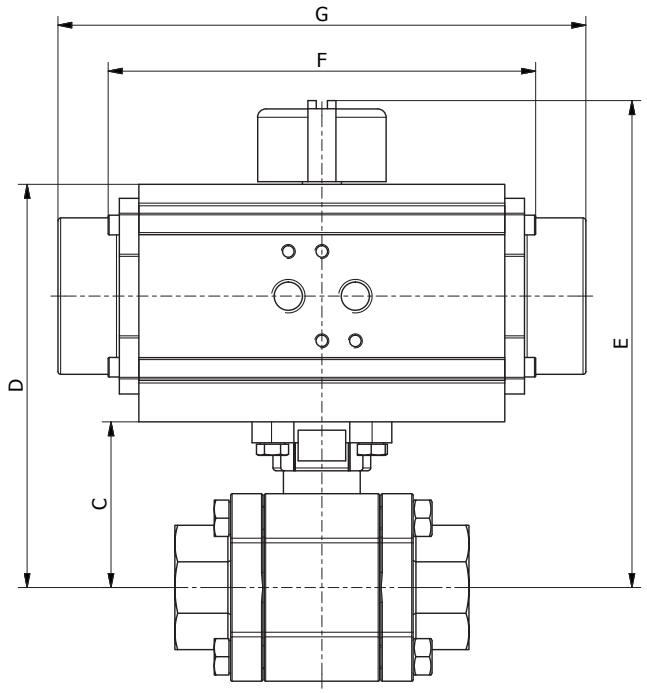
BALL VALVE - 390 SERIES
Pneumatic actuator - Actreg

FIGURE:
AD: Pneumatic actuator, double acting
AS: Pneumatic actuator, spring return





DIMENSIONS: (mm)

Ø	DN	C	AD					AS				
			AD	D	E	F	Kg	AS	D	E	G	Kg
1/4"	8	42,6	10	88,6	118,6	100	2,1	20	108,6	138,6	163,0	2,2
3/8"	10	42,6	10	88,6	118,6	100	2,1	20	108,6	138,6	163,0	2,2
1/2"	15	42,6	10	88,6	118,6	100	2,1	20	108,6	138,6	163,0	2,2
3/4"	20	46,9	10	92,9	122,9	100	2,5	20	112,9	142,9	163,0	3,3
1"	25	59,3	20	125,3	155,3	145	3,0	40	144,3	174,3	195,0	4,0
1 1/4"	32	62,6	40	147,6	177,6	158	4,6	40	147,6	177,6	195,0	6,2
1 1/2"	40	79,0	80	186,0	216,0	177	7,0	80	186,0	216,0	217,0	8,9
2"	50	87,7	80	194,7	224,7	177	9,7	80	194,7	224,7	217,0	13,7
2 1/2"	65	108,7	80	215,7	245,7	177	14,7	200	243,7	273,7	299,0	22,1
3"	80	117,7	200	252,7	282,7	225	21,6	300	269,7	299,7	348,5	29,1
4"	100	133,7	200	268,7	298,7	225	31,2	300	285,7	315,7	348,5	44,2

The pneumatic actuator is calculated for 6 bar air supply, safety factor of 30% and differential pressure of 0 bar.
For standard working conditions.

OPTIONS:
Solenoid valves, limit switches, manual override , pneumatic or electro-pneumatic positioner.

Subject to changes

THREE-PIECE BALL VALVE
390 SERIES

GENERAL FEATURES:

- 3-piece ball valve in stainless steel, full bore 1/4” (DN 8) - 4” (DN 100)
- Locking device
- Direct mounting according to ISO 5211
- Anti-blow out stem and anti-static with o-ring
- Ball with cavity balancing hole
- V-ring Chevron packing
- Fire safe version on demand (Body gaskets and stem seals in graphite), type FS
- Pressure: 1/4” - 1” 2000 psi, 138 bar
  1 1/4” - 2” 1500 psi, 103 bar
  2 1/2” - 4” 1000 psi, 69 bar



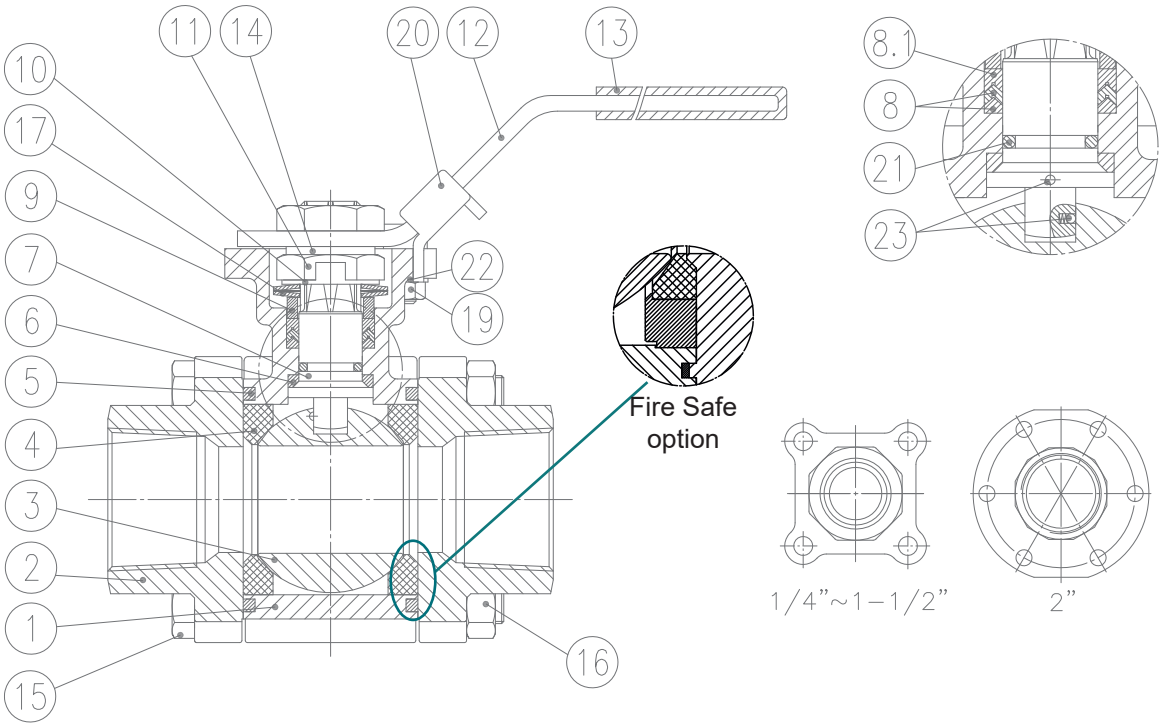
CE

TÜV
TA Luft

DESIGN STANDARDS	
Standards	ISO 5752, NACE MR-0175
Compliance	ANSI B16.34, ANSI B16.25, ANSI B1.20, API 6D
Actuator mounting flange	ISO 5211
Marking	ISO 5209, EN 19
TESTS AND CERTIFICATES	
Quality Assurance	ISO 9001
Material certificate	EN 10204-3.1
Pressure test	API 598, BS6755 part 1

Subject to changes

1/4" ~ 2":



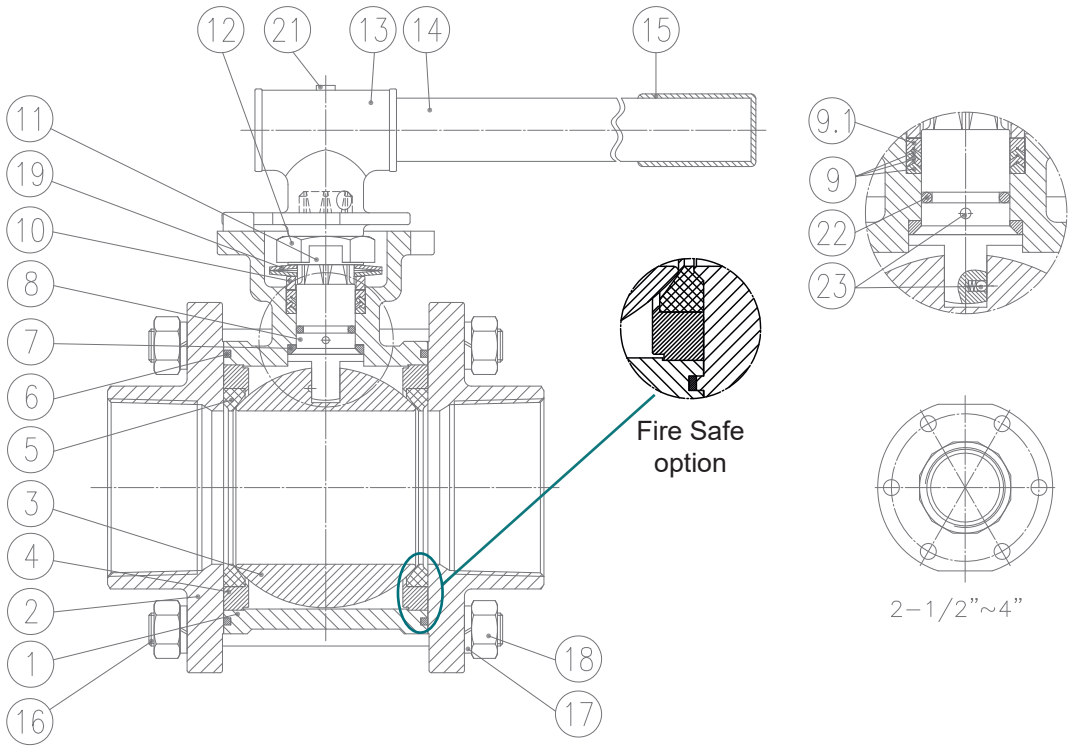
Item	Description	Materials
1	Body	ASTM A351 Gr. CF8M
2	End cap	ASTM A351 Gr. CF8M (CF3M for SW and BW)
3	Ball	Stainless steel AISI 316 (1/4" & 3/8" CF8M)
4	Seat	RPTFE
5	Joint Gasket	PTFE*
6	Stem thrust seal	RPTFE
7	Stem	Stainless steel AISI 316
8	Gland packing	PTFE**
8.1	Gland packing	25% G.F. + PTFE*
9	Gland bush	Stainless steel AISI 304
10	Stop washer	Stainless steel AISI 304
11	Stem nut	Stainless steel AISI 304
12	Handle	Stainless steel AISI 304
13	Handle cover	Vinyl
14	Stem washer	Stainless steel AISI 304
15	Bolt	Stainless steel AISI 304
16	Bolt nut	Stainless steel AISI 304
17	Belleville washer	Stainless steel AISI 301
18	Stop pin	Stainless steel AISI 304
19	Pin nut	Stainless steel AISI 304
20	Locking device	Stainless steel AISI 304
21	O-ring	Viton
22	Washer	Stainless steel AISI 304
23	Anti-static device	Stainless steel AISI 316

* Graphite for Fire Safe version

** PTFE + 25% GF for Fire Safe version

Subject to changes

2 1/2” ~ 4”:

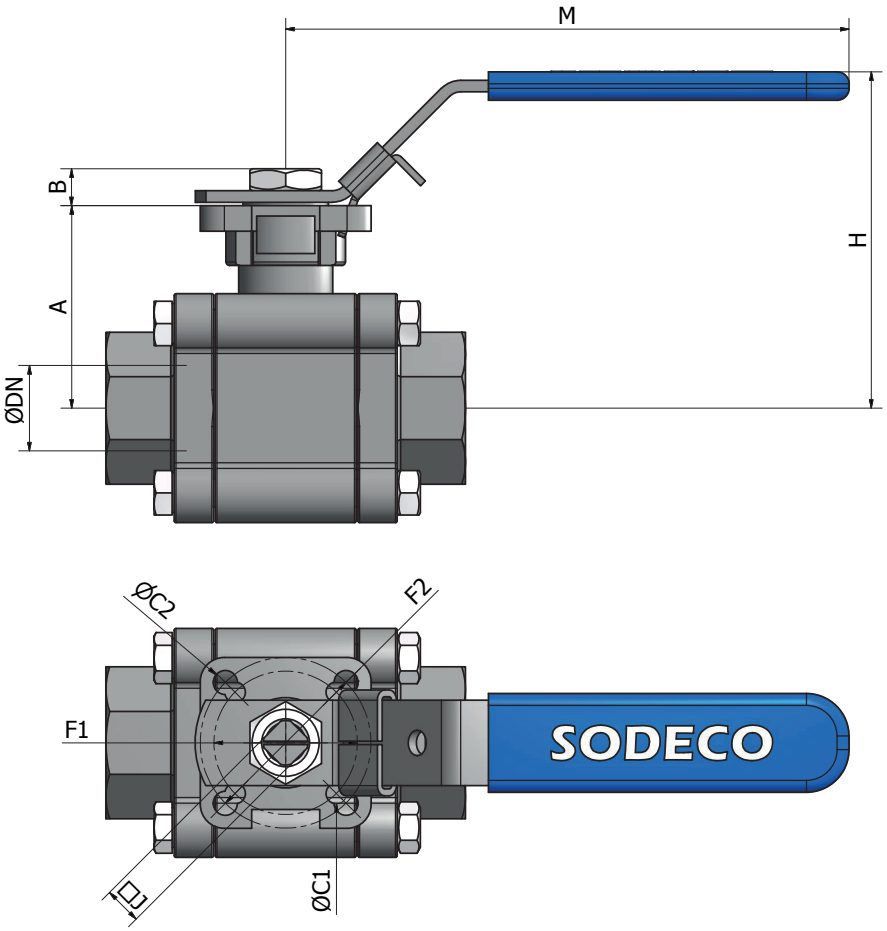


Item	Description	Materials
1	Body	ASTM A351 Gr. CF8M
2	End cap	ASTM A351 Gr. CF8M (CF3M for SW and BW)
3	Ball	Stainless steel CF8M
4	Seat ring	ASTM A351 Gr. CF8M
5	Seat ring	RPTFE
6	Joint gasket	PTFE*
7	Stem thrust seal	RPTFE
8	Stem	Stainless steel AISI 316
9	Gland packing	PTFE**
9.1	Gland packing	RPTFE*
10	Gland bush	Stainless steel AISI 304
11	Stop washer	Stainless steel AISI 304
12	Stem nut	Stainless steel AISI 304
13	Handle-A	Stainless steel AISI 304
14	Handle-B	Stainless steel AISI 304
15	Handle sleeve	Vinyl
16	Bolt	Stainless steel AISI 304
17	Bolt washer	Stainless steel AISI 304
18	Bolt nut	Stainless steel AISI 304
19	Belleville washer	Stainless steel AISI 301
20	Stop pin	Stainless steel AISI 304
21	Handle screw	Stainless steel AISI 304
22	O-ring	Viton
23	Anti-static device	Stainless steel AISI 316

* Graphite for Fire Safe version

** PTFE + 25% GF for Fire Safe version

Subject to changes



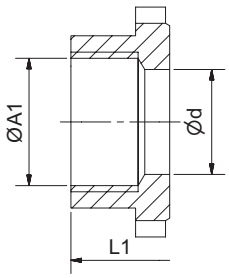
DIMENSIONS: (mm)

Ø	DN	A	B	H	M	F1	ØC1	F2	ØC2	□J	Kg
1/4"	8	42,6	7,6	77,0	139	36	6,0	42	6	9	0,8
3/8"	10	42,6	7,6	77,0	139	36	6,0	42	6	9	0,9
1/2"	15	42,6	7,6	77,0	139	36	6,0	42	6	9	0,9
3/4"	20	46,9	8,6	82,0	139	36	6,0	42	6	9	1,3
1"	25	59,3	10,4	98,5	165	42	6,0	50	7	11	2,0
1 1/4"	32	62,6	10,4	102,0	165	42	6,0	50	7	11	2,8
1 1/2"	40	79,0	13,4	128,0	215	50	7,5	70	9	14	4,2
2"	50	87,7	13,4	137,0	215	50	7,5	70	9	14	6,9
2 1/2"	65	108,7	16,8	167,0	300	70	10,0	102	12	17	12,0
3"	80	117,7	17,8	176,0	370	70	10,0	102	12	17	16,2
4"	100	133,7	16,8	192,0	370	70	10,0	102	12	17	25,8

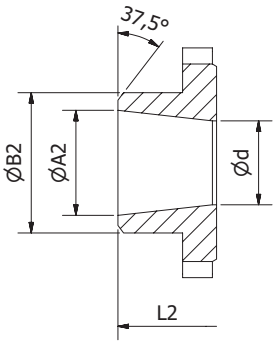
Subject to changes

THREE-PIECE BALL VALVE
390 SERIES - Dimensions

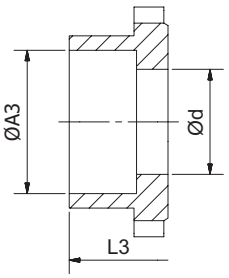
BSP/NPT



BW Sch. 40

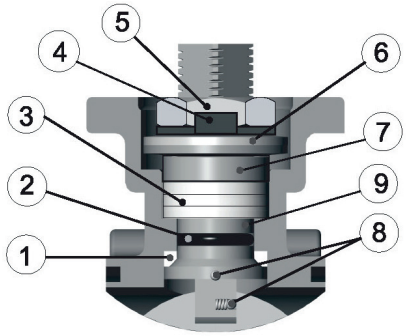


SW



DIMENSIONS: (mm)

ØA1	Ød	L1	ØA2	ØB2	L2	ØA3	L3
1/4"	11,5	75,0	9,2	13,7	75,0	14,3	75,0
3/8"	12,6	75,0	12,5	17,5	75,0	17,6	75,0
1/2"	15,0	72,5	15,8	21,7	75,0	21,9	72,5
3/4"	20,0	85,4	21,0	27,2	90,0	27,3	85,4
1"	25,0	105,3	26,6	34,0	110,0	33,9	105,3
1 1/4"	32,0	111,0	35,1	42,7	115,0	42,8	111,0
1 1/2"	38,0	127,3	40,9	48,6	130,0	48,9	127,3
2"	50,0	142,8	52,5	60,5	142,8	61,3	142,8
2 1/2"	65,0	185,0	65,0	73,0	185,0	76,9	185,0
3"	80,0	205,0	80,0	89,0	205,0	90,0	205,0
4"	100,0	240,0	102,0	114,0	240,0	115,5	240,0



1. Pyramidal stem with stem seal
First stage of defense against leakage.
The 45° slope of the stem accompanies the stem seal effectively and blocks all leak paths during rotation.

2. O-ring stem packing
Second stage of defense against leakage.
Enhances stem seal and maintains stem alignment, provides extra longer service life.

3. V-ring stem packing
Third stage of defense against leakage.
Multiple layers of V-ring Chevron packing expand sideways as it is being compressed, blocking all air pockets to prevent leak paths.

4. Lock saddle
Stabilizes the entire stem nut to keep it from loosening during operation

5. Stem nut
Compresses the entire stem system to enable blocking of leakage.

6. Belleville washers
Automatically compress the seals to adjust for wear, pressure and temperature fluctuations.

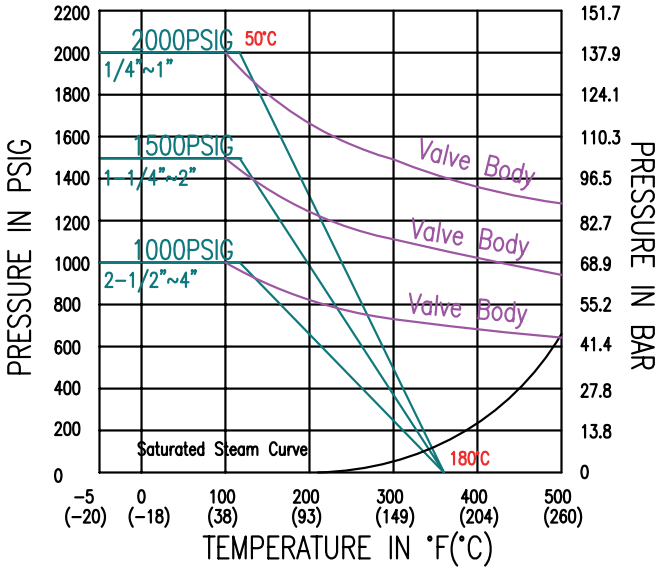
7. Gland
Made of stainless steel, equally distributes the compressive force on the packing and seal.

8. Anti-static device
Stem-to-ball and stem-to-body as standard

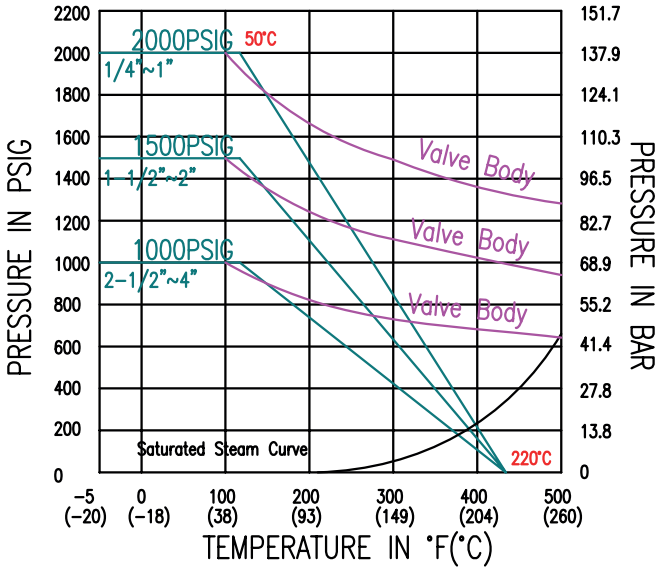
9. Super smooth stem finish
Reduces seal friction and operation

Subject to changes

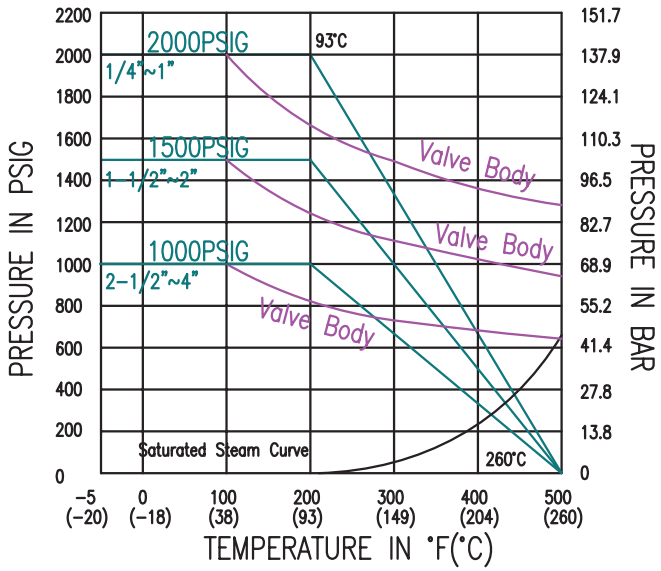
PRESSURE-TEMPERATURE CHART PTFE/RPTFE:



PRESSURE-TEMPERATURE CHART STANSIT:



PRESSURE-TEMPERATURE CHART PEEK:



Subject to changes

Kv VALUES:

Ø	T (Nm)			Kv (m³/h)
	PTFE - RPTFE	STANSIT	PEEK	
1/4"	8	9	13	7
3/8"	8	9	13	7
1/2"	8	9	17	13
3/4"	9	12	22	29
1"	14	17	34	48
1 1/4"	22	26	43	73
1 1/2"	30	35	60	108
2"	31	36	68	216
2 1/2"	61	68	306	277
3"	82	88	325	501
4"	114	114	930	882

Torques for 0 bar differential pressure, including 30% safety

TYPE		ENDS	ISO 5211	MATERIAL			Fire safe	SIZE
				BODY	BALL	SEATS		
3	9	3	BA	I	I	T	FS	025

= fix

ENDS	
1	BSP according to DIN 2999 / ISO 228-1
2	BW schedule 40, ANSI B16.25 & DIN 3239 part 1
3	SW according to ANSI B16.11 & DN 3239 part 2
4	NPT according to ASME B1.20.1

SEATS	
T	PTFE
S	Stansit
R	Reinforced PTFE
P	PEEK

FIRE SAFE	
-	Standard version
FS	Fire safe

Subject to changes

PNEUMATIC ACTUATOR
FIG. ADA - ASR

GENERAL FEATURES:
- Rack and pinion actuator
- Rotation angle 90° ±5°
- Travel stop adjustment ±5°
- Working temperature: -30 °C ~ 100 °C
- Working pressure: 3 ~ 8 bar
- Coupling according to ISO 5211 and DIN 3337 (octagonal drive)
- Mounting of solenoid valves according to Namur Std.
- Mounting of limit switches according to Namur

FIGURE:
ADA: double acting
ASR: spring return, normally closed
ASRO: spring return, normally open

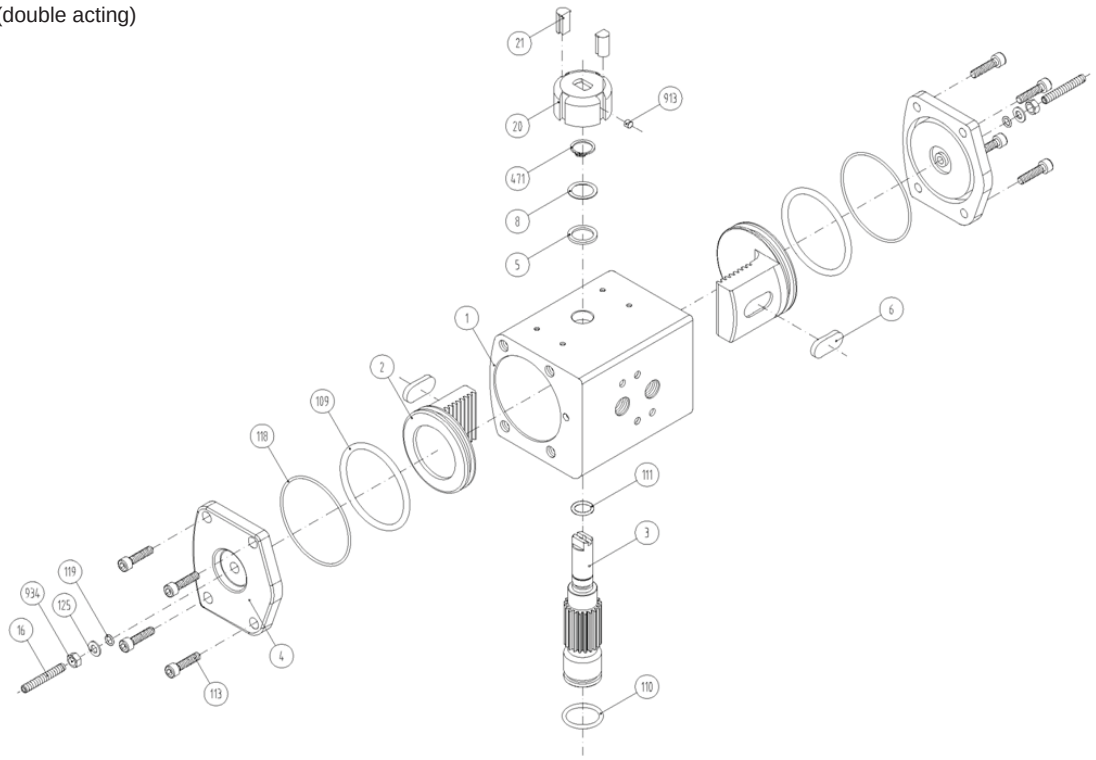


ATEX

DESIGN STANDARDS	
Mounting of solenoid valves	NAMUR Std.
Mounting of devices	NAMUR VDI, NAMUR VDE 3845 Std.
Coupling according	ISO 5211, DIN 3337
TESTS AND CERTIFICATES	
Safety	ATEX II 2 GD, SIL3
Quality Assurance	CE/PED, ISO9001

Subject to changes

TYPE 10: (double acting)



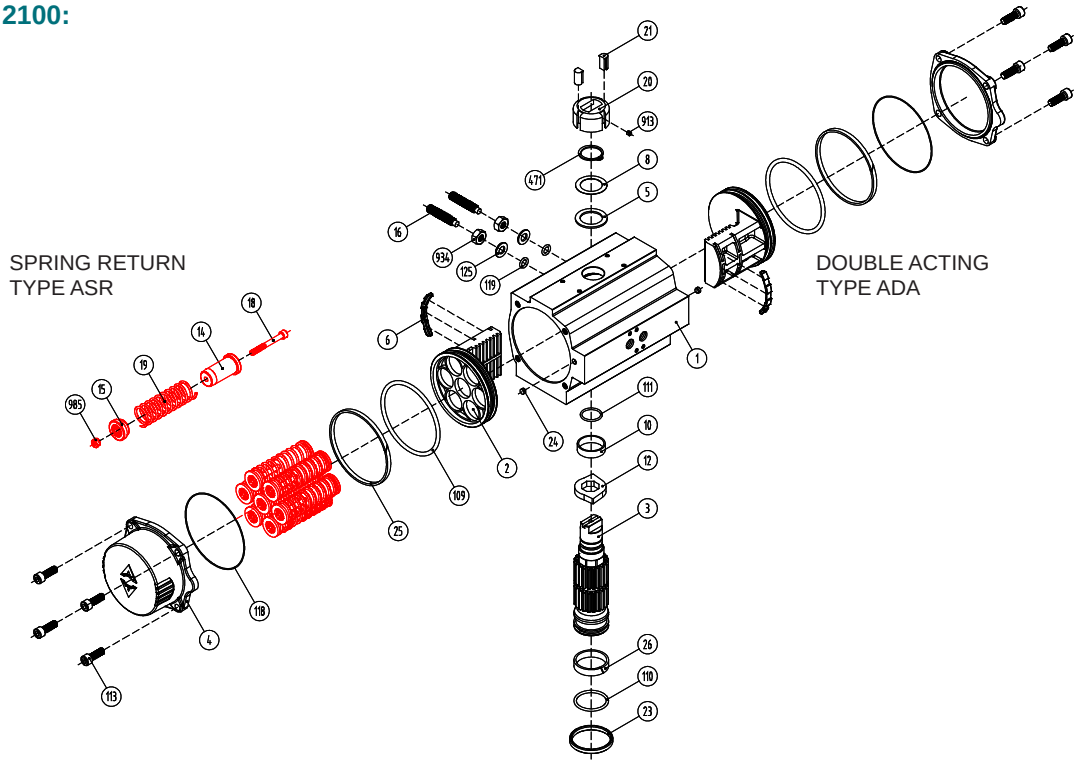
MATERIALS:

Item	Description	Material
1	Body	Aluminium hard anodized
2	Piston	Aluminium
3	Pinion	Nickel plated carbon steel
4	End caps	Aluminium Epoxy coated
5	Soft pinion washer	Polyamide PA 6.6
6	Slide piston	Polyamide PA 6.6 + 30% G.F.
8	Pinion washer	Stainless steel
16	Leveling screw	Stainless steel
20	Position indicator	Polyamide
21	Cam	Polyamide

Item	Description	Material
109	O-Ring	NBR
110	O-Ring	NBR
111	O-Ring	NBR
113	Bolt	Stainless steel
118	O-Ring	NBR
119	O-Ring	NBR
125	Washer	Stainless steel
913	Set screw	Stainless steel
471	External circlip	Stainless steel
934	Nut	Stainless steel

Subject to changes

TYPE 20 - 2100:



MATERIALS:

Item	Description	Material
1	Body	Aluminium hard anodized
2	Piston	Aluminium
3	Pinion	Nickel plated carbon steel
4	End caps	Aluminium Epoxy coated
5	Soft pinion washer	Polyamide PA 6.6
6	Slide piston	Polyamide PA 6.6 + 30% G.F.
8	Pinion washer	Stainless steel
10	Upper pinion bearing	PTFE + 25% GF (bronze: type 500 ~ 2100)
12	Stop	ASTM A 105
14	(*) Spring's long support	Polyamide PA 6.6
15	(*) Spring's short support	Polyamide PA 6.6
16	Leveling screw	Stainless steel
18	(*) Bolt	Stainless steel
19	(*) Spring	DIN 2076 -D-5.6
20	Position indicator	Polyamide

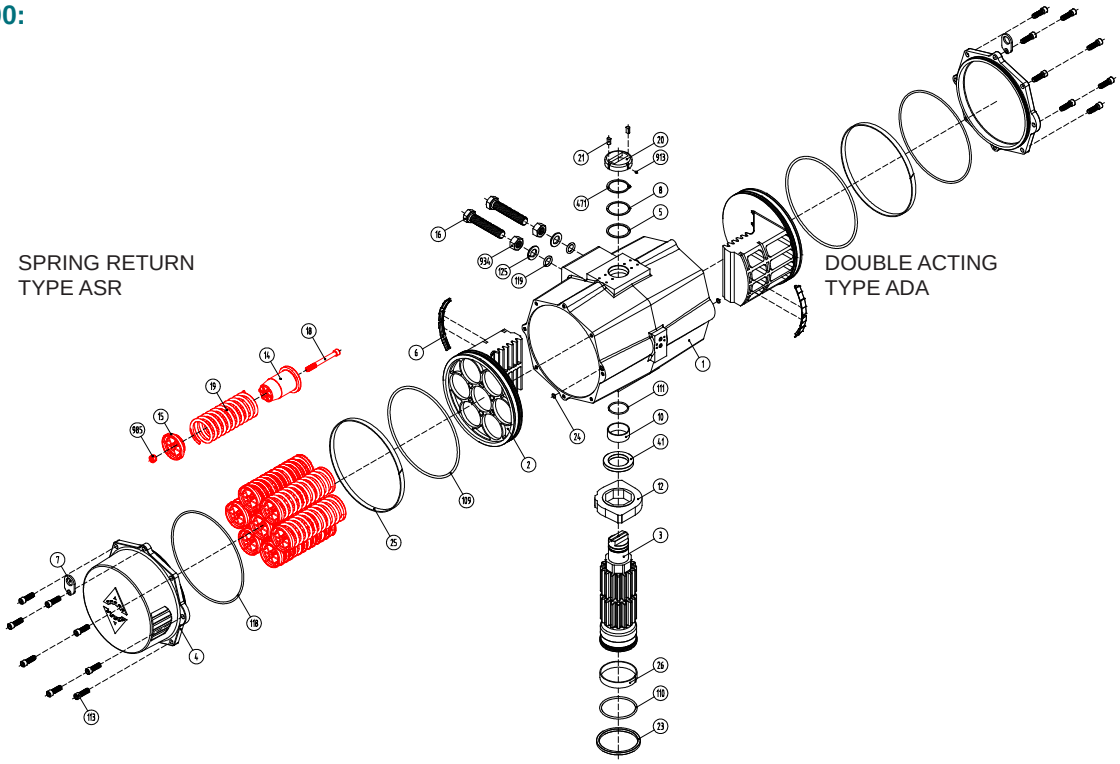
Item	Description	Material
21	Cam	Polyamide
23	Centering ring	Nickel plated carbon steel
24	Plug air stop	NBR
25	Slide guide	Resin
26	Lower pinion bearing	PTFE + 25% GF
109	O-Ring	NBR
110	O-Ring	NBR
111	O-Ring	NBR
113	Bolt	Stainless steel
118	O-Ring	NBR
119	O-Ring	NBR
125	Washer	Stainless steel
913	Set screw	Stainless steel
471	External circlip	Stainless steel
934	Nut	Stainless steel
985	(*) Nut	Stainless steel

* Only for ASR

** For type 20: Polyamide PA 6.6 + 30% G.F.

Subject to changes

TYPE 2500:



MATERIALS:

Item	Description	Material
1	Body	Aluminium hard anodized
2	Piston	Aluminium
3	Pinion	Nickel plated carbon steel
4	End caps	Aluminium Epoxy coated
5	Soft pinion washer	Polyamide PA 6.6
6	Slide piston	Polyamide PA 6.6 + 30% G.F.
8	Pinion washer	Stainless steel
10	Upper pinion bearing	PTFE + 25% GF (bronze: type 500 ~ 2100)
12	Stop	ASTM A 105
14	(*) Spring's long support	Polyamide PA 6.6
15	(*) Spring's short support	Polyamide PA 6.6
16	Leveling screw	Stainless steel
18	(*) Bolt	Stainless steel
19	(*) Spring	DIN 2076 -D-5.6
20	Position indicator	Polyamide

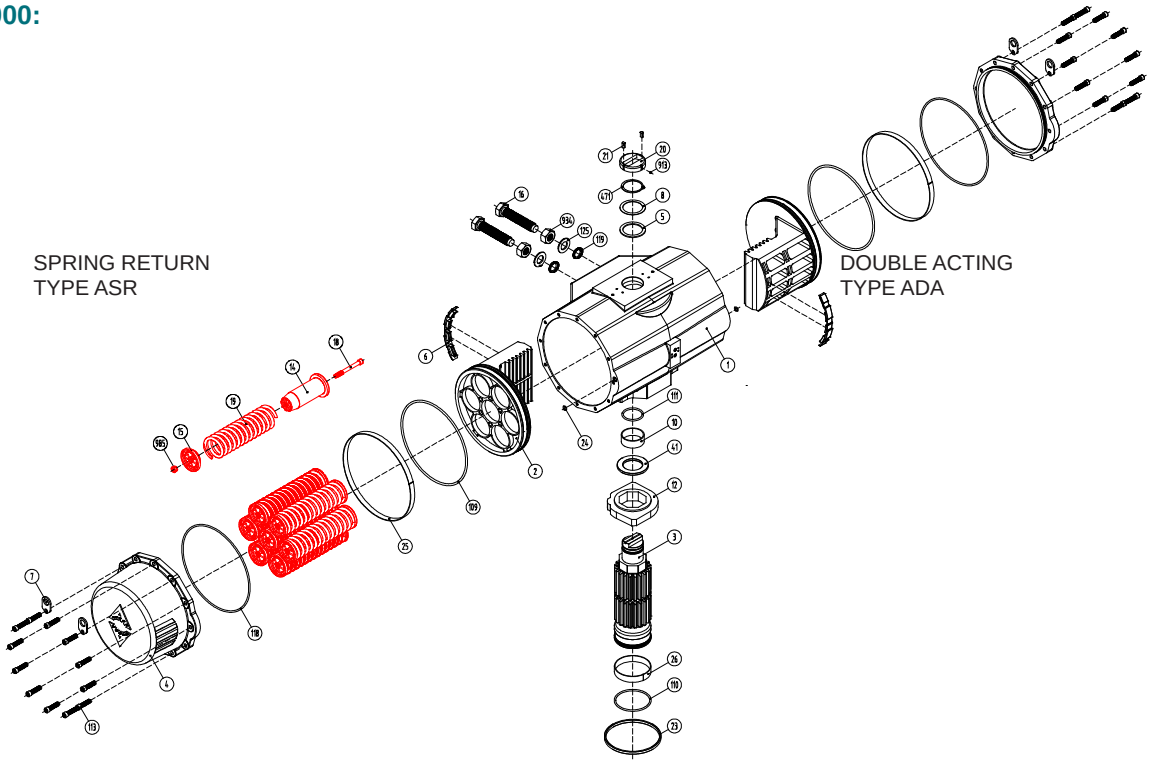
Item	Description	Material
21	Cam	Polyamide
23	Centering ring	Nickel plated carbon steel
24	Plug air stop	NBR
25	Slide guide	Resin
26	Lower pinion bearing	PTFE + 25% GF
109	O-Ring	NBR
110	O-Ring	NBR
111	O-Ring	NBR
113	Bolt	Stainless steel
118	O-Ring	NBR
119	O-Ring	NBR
125	Washer	Stainless steel
913	Set screw	Stainless steel
471	External circlip	Stainless steel
934	Nut	Stainless steel
985	(*) Nut	Stainless steel

* Only for ASR

** For type 20: Polyamide PA 6.6 + 30% G.F.

Subject to changes

TYPE 4000:



MATERIALS:

Item	Description	Material
1	Body	Aluminium hard anodized
2	Piston	Aluminium
3	Pinion	Nickel plated carbon steel
4	End caps	Aluminium Epoxy coated
5	Soft pinion washer	Polyamide PA 6.6
6	Slide piston	Polyamide PA 6.6 + 30% G.F.
8	Pinion washer	Stainless steel
10	Upper pinion bearing	PTFE + 25% GF (bronze: type 500 ~ 2100)
12	Stop	ASTM A 105
14	(*) Spring's long support	Polyamide PA 6.6
15	(*) Spring's short support	Polyamide PA 6.6
16	Leveling screw	Stainless steel
18	(*) Bolt	Stainless steel
19	(*) Spring	DIN 2076 -D-5.6
20	Position indicator	Polyamide

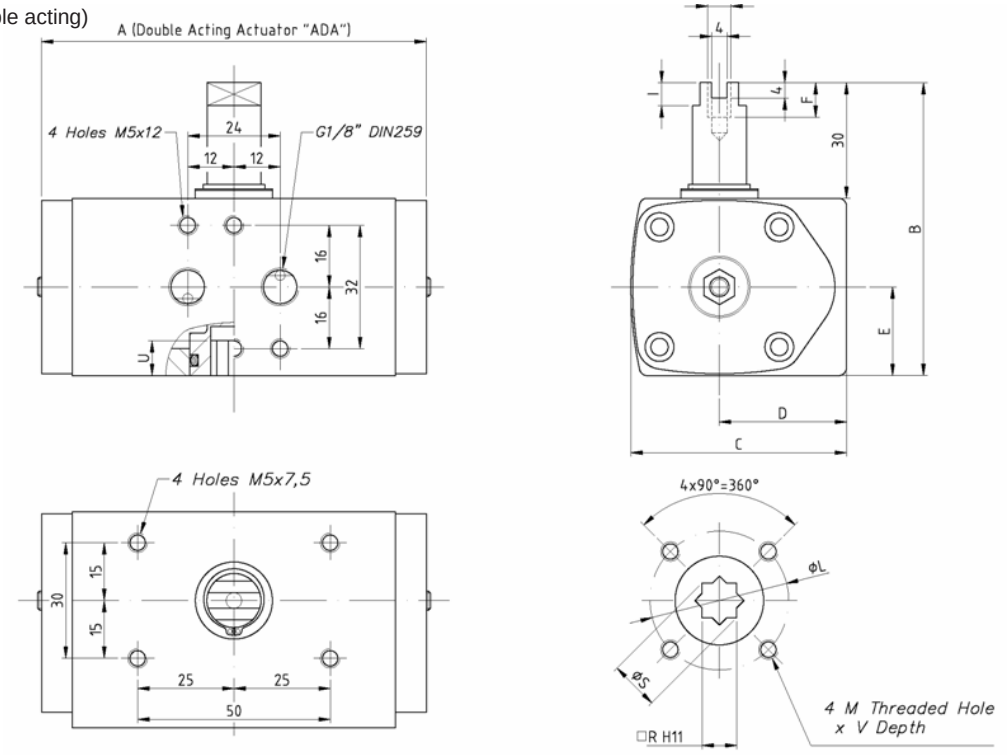
Item	Description	Material
21	Cam	Polyamide
23	Centering ring	Nickel plated carbon steel
24	Plug air stop	NBR
25	Slide guide	Resin
26	Lower pinion bearing	PTFE + 25% GF
109	O-Ring	NBR
110	O-Ring	NBR
111	O-Ring	NBR
113	Bolt	Stainless steel
118	O-Ring	NBR
119	O-Ring	NBR
125	Washer	Stainless steel
913	Set screw	Stainless steel
471	External circlip	Stainless steel
934	Nut	Stainless steel
985	(*) Nut	Stainless steel

* Only for ASR

** For type 20: Polyamide PA 6.6 + 30% G.F.

Subject to changes

TYPE 10: (double acting)

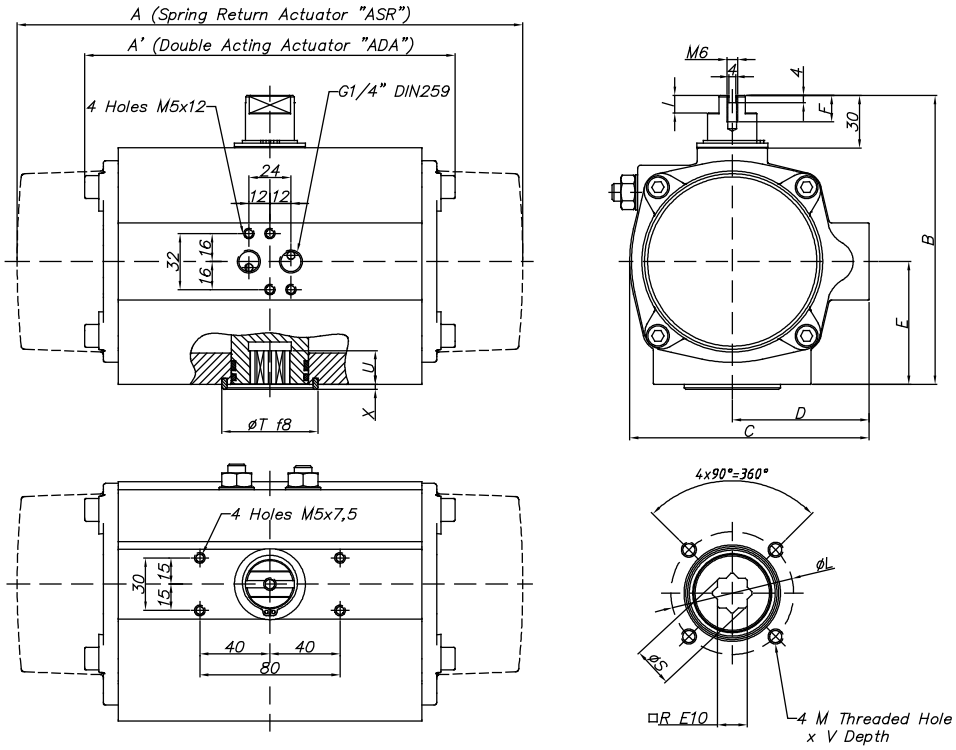


DIMENSIONS: (mm)

TYPE	A	B	C	D	E	F	I	R	ØS	ISO 5211	ØL	M x V	U
10	100	76	56	33	23	9	6	9	12,5	F03	36	M5x8	10

Subject to changes

TYPE 20-1750:

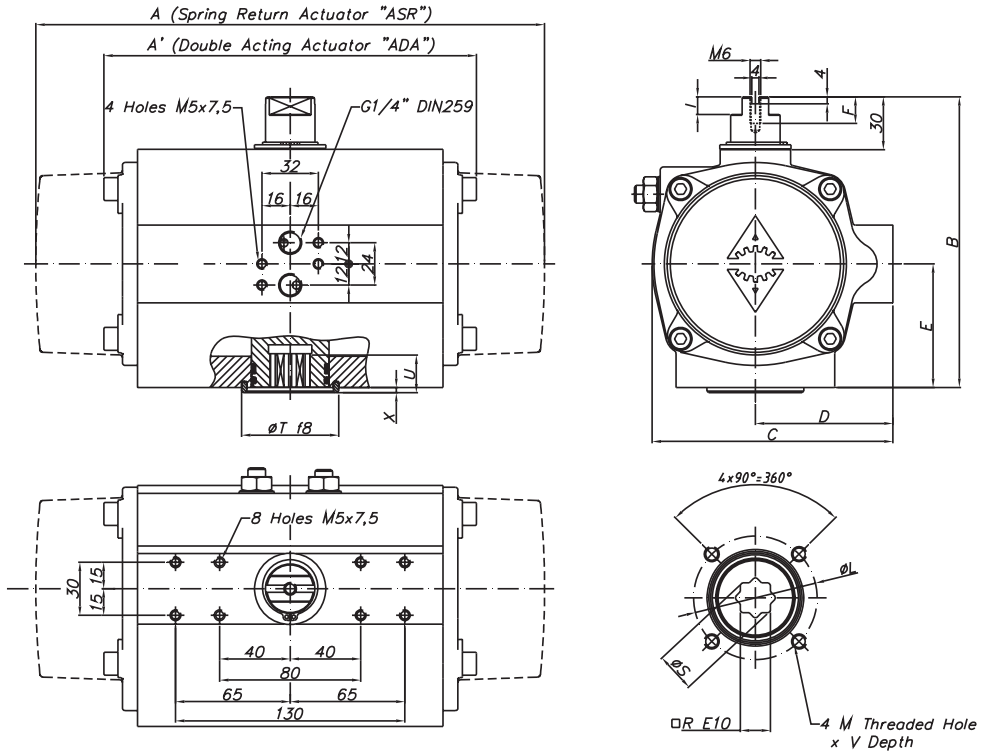


DIMENSIONS: (mm)

TYPE	A	A'	B	C	D	E	F	I	R	ØS	ISO 5211	ØL/ ØL1	M x V	ØT	X	U
C20	163,0	145	96	76,0	48	34	9	6	14	18,1	F04	42	M5x10	35	3	12
20F05	163,0	145	96	76,0	48	34	9	6	14	18,1	F05	50	M6x10	35	3	12
20VK09	163,0	145	96	76,0	48	34	9	6	9	12,5	F03	36	M5x8	25	2	10
											F05	50	M6x10			
40	195,0	158	115	91,0	56	45	9	6	14	18,1	F04	42	M5x10	35	3	12
40F05	195,0	158	115	91,0	56	45	9	6	14	18,1	F05	50	M6x10	35	3	12
80	217,0	177	137	111,0	66	55	12	8	17	22,5	F05	50	M6x10	55	3	19
											F07	70	M8x16			
130	258,0	196	147	122,0	71	60	15	8	17	22,5	F05	50	M6x10	55	3	22
											F07	70	M8x16			
200	299,0	225	165	135,5	78	70	15	10	17	22,5	F07	70	M8x16	55	3	23
											F10	102	M10x16			
300	348,5	273	182	152,5	86	80	16	12	22	28,5	F07	70	M8x16	70	3	24
											F10	102	M10x16			
500	397,0	304	199	173,0	96	85	17	15	22	28,5	F10	102	M10x16	70	3	32
850	473,0	372	221	191,5	106	98	15	15	27	36,5	F10	102	M10x17	85	3	39
											F12	125	M12x20			
1200	560,0	439	249	212,5	116	114	16	15	36	48,5	F10	102	M10x17	100	4	48
											F14	140	M16x26			
1750	601,0	461	280	242,5	131	130	16	15	36	48,5	F14	140	M16x26	100	4	50

Subject to changes

TYPE 2100:

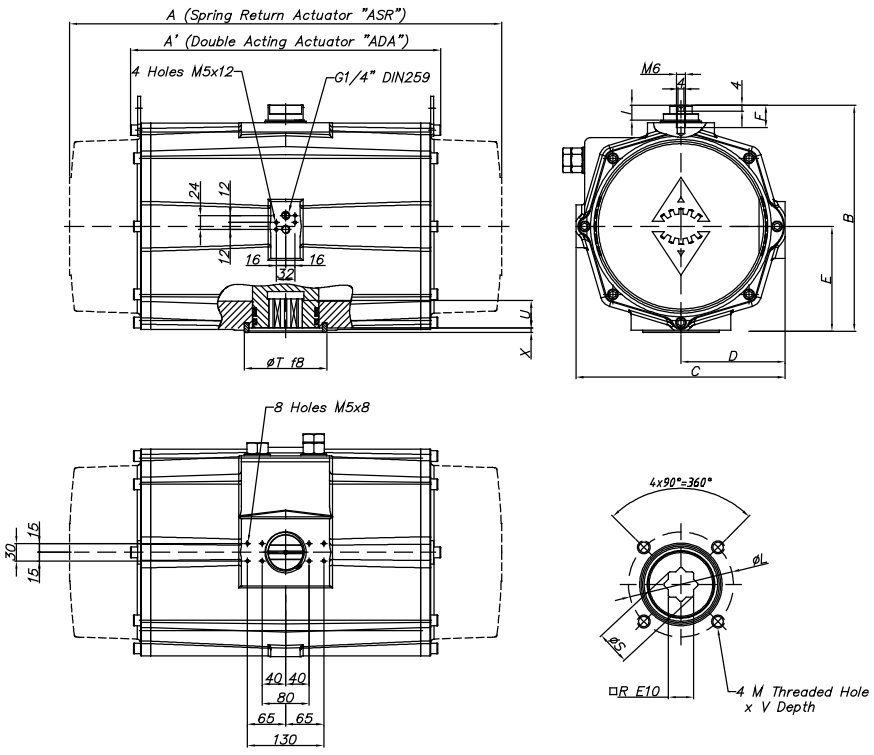


DIMENSIONS: (mm)

TYPE	A	A'	B	C	D	E	F	I	R	ØS	ISO 5211	ØL/ ØL1	M x V	ØT	X	U
C2100	702,0	510	313	276,5	148	147	16	15	46	65,1	F16	165	M20x29	130	4	50

Subject to changes

TYPE 2500:

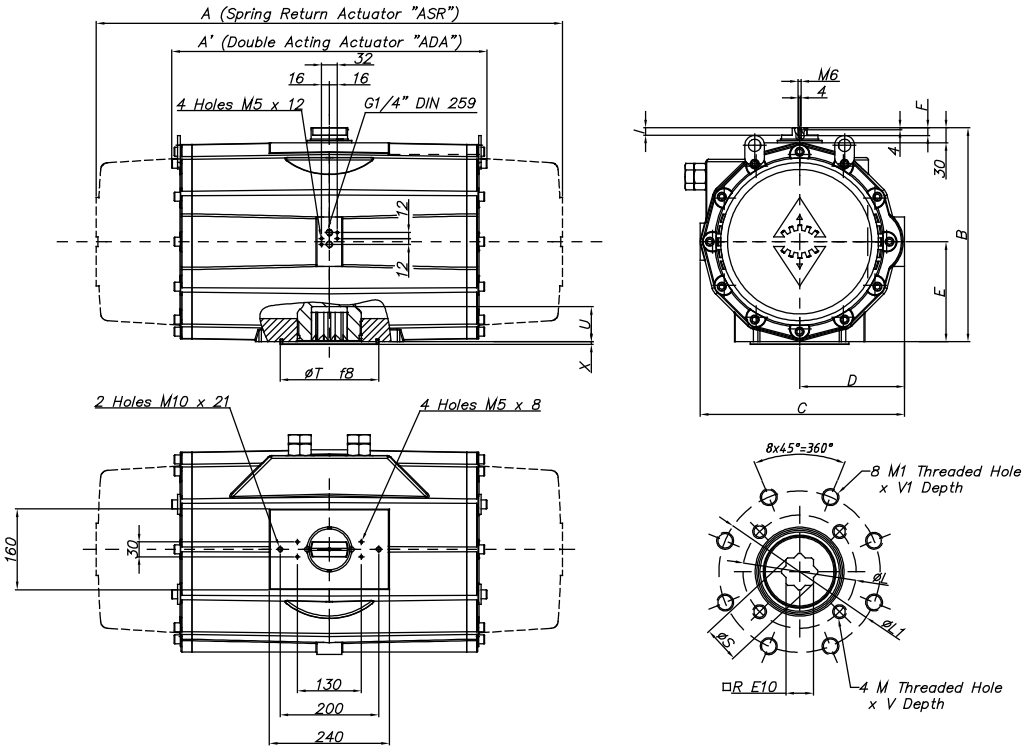


DIMENSIONS: (mm)

TYPE	A	A'	B	C	D	E	F	I	R	ØS	ISO 5211	ØL/ ØL1	M x V	ØT	X	U
C2500	738,0	518	383	356,0	177,5	176,5	16	15	46	60,2	F16	165	M20x29	130	4	58

Subject to changes

TYPE 4000:



DIMENSIONS: (mm)

TYPE	A	A'	B	C	D	E	F	I	R	ØS	ISO 5211	ØL	M x V	ØT	X	U
C4000	940,0	630	434	415,0	213	201	16	15	55	72,5	F16	165	M20x30	200	4	60
											F25	254	M16x30			

Subject to changes

PNEUMATIC ACTUATOR
Torque - FIG. ADA

TYPE	Output Torque For Double Acting in Nm																				Kg
	3 bar		3,5 bar		4 bar		4,5 bar		5 bar		5,5 bar		6 bar		6,5 bar		7 bar		8 bar		
	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	
10	6		8		9		10		11		11,5		12		12		13		14		0,6
20	9,7		11,4		13		14,6		16,2		17,8		19,5		21,1		23		26		1,4
40	20,3		23,7		27,1		30,5		33,9		37,3		41		44		47		54		2,1
80	38,5		44,9		51,3		57,7		64,1		70,5		77		83		90		103		3,0
130	59,1		68,9		78,7		88,6		98,4		108,3		118		128		138		157		3,8
200	88		102		117		131		146		161		175		190		205		234		5,6
300	145		170		194		218		242		267		291		315		339		388		8,5
500	217		253		289		325		361		397		433		469		505		577		11,2
850	359		419		479		538		598		658		718		778		837		957		16,9
1200	519		606		692		779		865		952		1038		1125		1211		1384		25,8
1750	707		824		942		1060		1178		1295		1413		1531		1649		1884		32,5
2100	1086		1267		1448		1629		1810		1991		2172		2353		2534		2896		49,0
2500	1730		2019		2307		2596		2884		3172		3461		3749		4038		4614		69,6
4000	2408		2809		3210		3612		4013		4414		4816		5217		5618		6421		129,4

Subject to changes

PNEUMATIC ACTUATOR
Torque - FIG. ASR

TYPE	Spring set	Output Torque For Spring Return in Nm																				Spring		Kg
		3 bar		3,5 bar		4 bar		4,5 bar		5 bar		5,5 bar		6 bar (A)		6,5 bar		7 bar		8 bar		stroke		
		0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	END	START	
20	S04			8	5	9	7	11	8	13	10	14	12	16	13	17	15	19	17	22	20	4	7	1,5
	S06 (A)									11	7	12	9	14	10	15	12	17	13	20	17	7	11	1,5
	S08											10	5	12	7	14	9	15	10	18	14	9	15	1,6
40	S04	16	14	20	17	23	20	26	24	30	27	33	30	37	34	40	37	43	41	50	47	5	8	2,2
	S06	14	10	18	14	21	17	24	20	28	24	31	27	34	30	38	34	41	37	48	44	7	12	2,2
	S08			15	10	19	14	22	17	26	20	29	24	32	27	36	30	39	34	46	41	10	16	2,2
	S10							20	14	24	17	27	20	30	24	34	27	37	30	44	37	12	20	2,3
	S12									21	13	25	17	28	20	32	24	35	27	42	34	15	24	2,3
	S14 (A)											23	13	26	17	30	20	33	24	40	30	17	28	2,3
80	S04	31	27	38	34	44	40	50	46	57	53	63	59	70	66	76	72	82	78	95	91	9	13	3,3
	S06	27	21	34	28	40	34	47	41	53	47	59	53	66	60	72	66	79	73	92	86	13	20	3,4
	S08					37	29	43	35	49	41	56	48	62	54	69	61	75	67	88	80	17	27	3,4
	S10							39	29	46	36	52	42	59	49	65	55	71	61	84	74	22	33	3,5
	S12									42	30	48	36	55	43	61	49	68	56	81	69	26	40	3,6
	S14 (A)											45	31	51	37	58	44	64	50	77	63	30	47	3,7
130	S06	43	36	52	46	62	56	72	65	82	75	92	85	102	95	111	105	121	115	141	134	19	27	4,4
	S08			47	38	57	48	67	58	76	68	86	77	96	87	106	97	116	107	135	127	26	36	4,5
	S10					51	40	61	50	71	60	81	70	91	80	100	89	110	99	130	119	32	45	4,6
	S12							56	42	65	52	75	62	85	72	95	82	105	92	124	111	39	54	4,7
	S14 (A)											70	54	80	64	89	74	99	84	119	103	45	64	4,8
200	S06	61	49	76	63	90	78	105	92	119	107	134	122	149	136	163	151	178	166	207	195	31	46	6,5
	S08			67	50	81	65	96	79	111	94	125	109	140	123	154	138	169	152	198	182	42	61	6,7
	S10					72	52	87	66	102	81	116	96	131	110	146	125	160	139	189	169	52	77	6,9
	S12							78	53	93	68	107	83	122	97	137	112	151	126	180	156	63	92	7,0
	S14 (A)											99	70	113	84	128	99	142	113	172	143	73	107	7,3
300	S06	102	75	126	99	151	123	175	148	199	172	223	196	247	220	272	245	296	269	344	317	51	83	9,7
	S08			112	76	136	100	160	124	185	148	209	173	233	197	257	221	281	245	330	294	68	111	9,9
	S10					122	76	146	101	170	125	194	149	219	173	243	198	267	222	315	270	85	138	10,2
	S12							131	77	156	101	180	126	204	150	228	174	253	198	301	247	102	166	10,5
	S14 (A)											165	102	190	126	214	151	238	175	287	223	119	193	10,8

(A) Standard

Subject to changes

PNEUMATIC ACTUATOR
Torque - FIG. ASR

TYPE	Max. pressure	Output Torque For Spring Return in Nm																				Spring		Kg
		3 bar		3,5 bar		4 bar		4,5 bar		5 bar		5,5 bar		6 bar (A)		6,5 bar		7 bar		8 bar		stroke		
		0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	END	START	
500	S06	152	119	188	155	224	191	260	227	296	263	333	299	369	335	405	371	441	407	513	480	76	115	13,3
	S08	131	86	167	122	203	158	239	194	275	231	311	267	347	303	383	339	419	375	492	447	101	153	13,8
	S10					181	126	217	162	254	198	290	234	326	270	362	306	398	342	470	414	126	192	14,4
	S12							196	129	232	165	268	201	304	238	340	274	376	310	449	382	152	230	14,9
	S14 (A)											247	169	283	205	319	241	355	277	427	349	177	268	15,4
850	S06	260	209	320	269	380	328	440	388	500	448	559	508	619	568	679	627	739	687	858	807	116	177	19,7
	S08	227	159	287	218	347	278	407	338	467	398	526	458	586	518	646	577	706	637	826	757	155	236	20,3
	S10			254	168	314	228	374	288	434	348	494	408	553	467	613	527	673	587	793	707	193	295	20,9
	S12							341	238	401	298	461	358	521	417	580	477	640	537	760	657	232	353	21,6
	S14 (A)											428	307	488	367	547	427	607	487	727	607	271	412	22,2
1200	S06	373	289	460	376	546	462	633	549	720	635	806	722	893	808	979	895	1066	981	1239	1154	171	271	30,1
	S08	325	213	411	299	498	386	584	472	671	559	758	645	844	732	931	818	1017	905	1190	1078	229	361	31,1
	S10	276	136	363	222	449	309	536	395	622	482	709	569	795	655	882	742	969	828	1142	1001	286	451	32,2
	S12					401	232	487	319	574	405	660	492	747	578	833	665	920	751	1093	924	343	541	33,2
	S14 (A)									525	329	612	415	698	502	785	588	871	675	1044	848	400	631	34,3
1750	S06	477	349	595	466	712	584	830	702	948	820	1066	937	1183	1055	1301	1173	1419	1291	1654	1526	270	421	39,3
	S08	400	229	518	347	636	465	754	582	871	700	989	818	1107	936	1225	1053	1342	1171	1578	1407	360	562	41,0
	S10			441	228	559	345	677	463	795	581	912	699	1030	816	1148	934	1266	1052	1501	1287	451	702	42,7
	S12							600	344	718	461	836	579	954	697	1071	815	1189	933	1425	1168	541	843	44,4
	S14 (A)									642	342	759	460	877	578	995	695	1113	813	1348	1049	631	983	46,0
2100	S06	702	509	883	690	1064	871	1245	1052	1426	1233	1607	1414	1788	1595	1969	1776	2150	1957	2512	2319	384	577	60,0
	S08	574	316	755	497	936	678	1117	859	1298	1040	1479	1221	1660	1402	1841	1583	2022	1764	2384	2126	512	770	62,0
	S10			627	305	808	486	989	667	1170	848	1351	1029	1532	1210	1713	1391	1894	1572	2256	1934	640	962	64,0
	S12							861	474	1042	655	1223	836	1404	1017	1585	1198	1766	1379	2128	1741	768	1154	66,0
	S14 (A)									914	463	1095	644	1276	825	1457	1006	1638	1187	2000	1549	896	1347	68,0
2500	S06	1299	1045	1587	1333	1876	1622	2164	1910	2453	2199	2741	2487	3029	2775	3318	3064	3606	3352	4183	3929	508	806	85,9
	S08	1155	816	1444	1105	1732	1393	2020	1682	2309	1970	2597	2258	2886	2547	3174	2835	3462	3124	4039	3700	677	1075	89,4
	S10			1300	876	1588	1165	1877	1453	2165	1742	2453	2030	2742	2318	3030	2607	3319	2895	3895	3472	846	1344	92,9
	S12					1444	936	1733	1225	2021	1513	2310	1802	2598	2090	2886	2378	3175	2667	3752	3243	1015	1613	96,4
	S14 (A)							1589	996	1877	1285	2166	1573	2454	1861	2742	2150	3031	2438	3608	3015	1184	1882	99,9
4000	S06	1763	1262	2165	1663	2566	2065	2967	2466	3369	2867	3770	3269									758	1348	158,7
	S08	1549	880	1950	1282	2351	1683	2752	2084	3154	2485	3555	2887	3956	3288	4358	3689	4759	4091	5068	4399	1011	1797	164,7
	S10					2136	1301	2538	1702	2939	2104	3340	2505	3742	2906	4143	3307	4544	3709	4853	4017	1264	2246	170,8
	S12							2323	1320	2724	1722	3125	2123	3527	2524	3928	2926	4329	3327	4638	3636	1516	2696	176,9
	S14 (A)											2911	1741	3312	2142	3713	2544	4115	2945	4423	3254	1769	3145	182,9

(A) Standard

Subject to changes

Operating conditions - FIG. ADA - ASR

TYPE	Air volume (l)		Time type ADA (s)		Time type ASR (s)	
	Opening	Closing	Opening	Closing	Opening	Closing
10	0,035	0,028	0,02	0,05	-	-
20	0,13	0,09	0,04	0,09	0,12	0,18
40	0,27	0,23	0,08	0,08	0,20	0,29
80	0,64	0,47	0,11	0,10	0,27	0,40
130	0,77	0,76	0,15	0,15	0,32	0,50
200	1,19	1,2	0,18	0,22	0,50	0,60
300	1,96	1,73	0,30	0,40	0,70	0,85
500	2,95	2,74	0,40	0,50	0,90	1,10
850	4,7	3,86	0,80	0,90	2,20	2,60
1200	6,95	4,64	1,20	1,50	2,30	2,80
1750	9,8	9,3	1,80	2,00	2,80	3,20
2100	11,6	10,2	2,30	2,60	3,30	3,70
2500	25	32	2,80	3,10	3,80	4,20
4000	33,2	27,5	3,00	3,50	4,30	5,00

Without resistant torque, air pressure 6 bar, standard spring set

Air consumption is the actual free air volume at 1 atm

Subject to changes