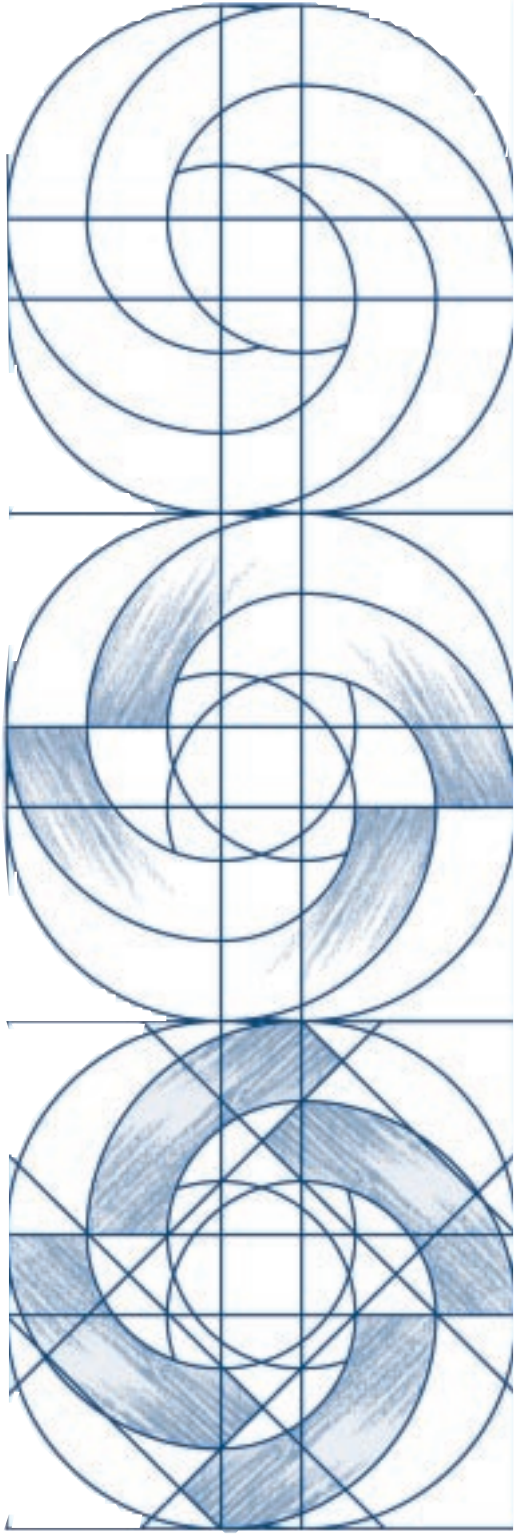


"ALGA" &
"ALGAS" SERIES

BIFFI

tyco flow control

Table of Contents

Double Acting ALGA Actuator

Spring Return ALGAS Actuator

Common features to ALGA and ALGAS Actuators

Double acting pneumatic actuator for 90° operation for On-Off and Modulating heavy duty service

General

The ALGA pneumatic actuator series was engineered and is manufactured to provide maximum torque output with minimum supply pressure. Simplicity, reliability and economy being at the top of the list of design parameters. The ALGA actuator is suitable for any quarter turn application such as ball, plug, butterfly valves or dampers, in both **On-Off** and **Modulating heavy duty** service.

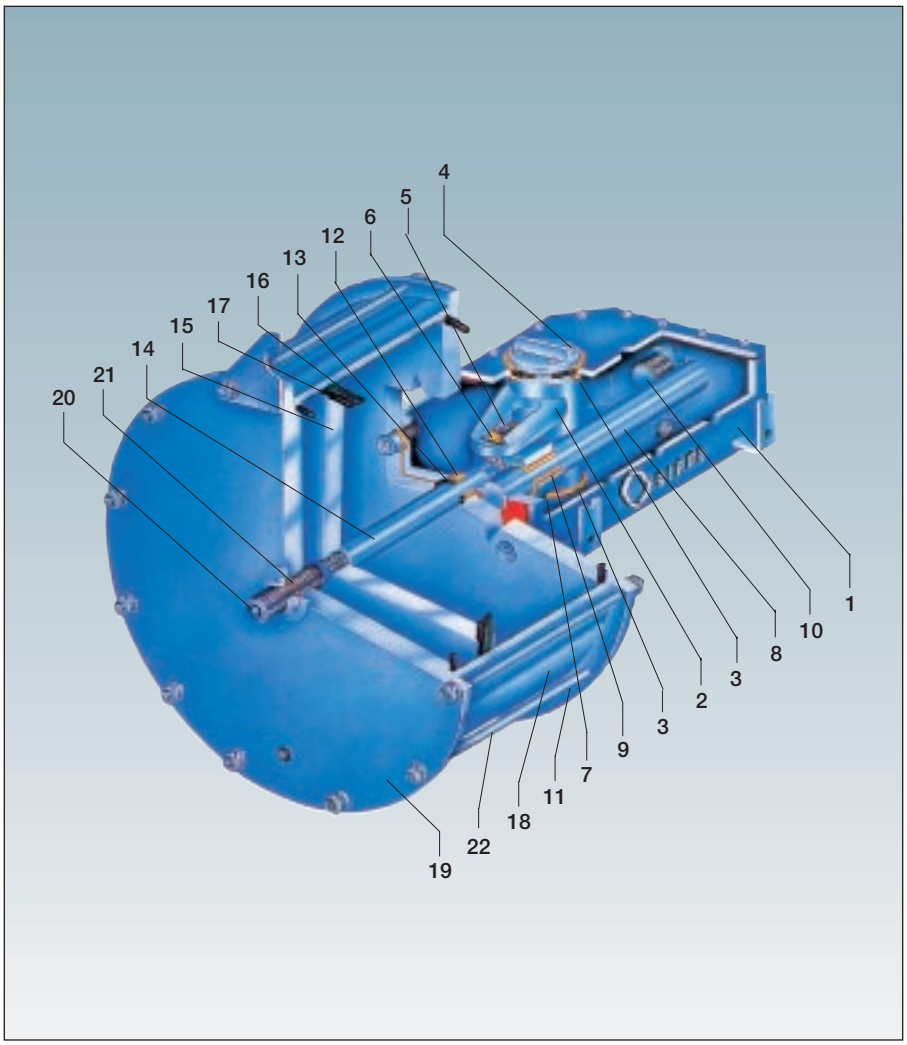
Features

- **Totally enclosed, weatherproof housing** in fabricated carbon steel for maximum strength
- **Canted scotch yoke** actuators are ideally suited to the larger valve sizes where high break away torques are required or for valves with high working pressure
- **Symmetric** scotch yoke actuators **available** for special applications
- External travel stops for precise **angular stroke adjustment** between **82°** and **98°**
- **Hard chromium plated** and polished **guide bar** and **piston rod** for corrosion resistance and minimal friction
- **Bushings made of bronze or sintered bronze, charged with teflon**, to provide minimal friction and extended service life
- **Electroless nickel plated** and polished **cylinder** for corrosion resistance and minimal friction
- **Floating type piston rod and piston seals** provide low hysteresis and high sensitivity, **preventing sticking problems**
- Jackscrew or hand pump **manual override** available
- An extensive range of **accessories** are available:
  - **limit switch boxes** - explosionproof, intrinsically safe and/or weatherproof
  - limit switches can be provided in different types according to customer requirements
  - **position transmitters** - explosionproof, intrinsically safe and/or weatherproof
  - **air conditioners**
  - **air storage tanks** PED 97/23/EL stamped. Tanks in accordance with different codes (ASME VIII, div. 1) on request
  - **solenoid valves** - explosionproof, intrinsically safe and/or weatherproof
  - **control valves, flow regulators, quick exhaust valves**
  - **positioners** - pneumatic or electropneumatic
  - **pressure switches** - pneumatic or electric
  - **terminals enclosures, pushbutton panels** - explosionproof or intrinsically safe and/or weatherproof
- **Special coatings** for offshore or corrosive environments

Technical Data

Supply pressure	:	12 bar g maximum
Supply medium	:	air, nitrogen or sweet gas. Special version available for sour gas
Ambient temperature	:	-30° C to +100° C Special versions for service outside this range on request
Output torques	:	up to 300000 Nm Higher values with special versions

Contents may change without notice



Item	Name
1	Housing
2	Yoke
3	Yoke bushing
4	Cover
5	Guide block pin
6	Sliding block
7	Guide block
8	Guide bar
9	Guide block bushing
10	Travel stop screw
11	Cylinder head flange
12	Piston rod bushing
13	Piston rod seal ring
14	Piston rod
15	Piston
16	Piston guide sliding ring
17	Piston seal ring
18	Cylinder tube
19	End flange
20	Travel stop screw
21	Sealing washer
22	Tie rod

Materials of construction

Item	Name	Material	Equivalence to U.S. standards
1	Housing	Carbon steel	ASTM A537 cl1 + ASTM A283 gr D
2	Yoke	Carbon steel	API 5LX gr X52 (C<0.2%) + ASTM A537 cl 1
3	Yoke bushing	Bronze	ASTM B427 Alloy UNS No. C90800
4	Cover	Carbon steel	ASTM A283 gr D
5	Guide block pin	Alloy steel	AISI SAE 9840
6	Sliding block	Bronze	ASTM B427 Alloy UNS No C90800
7	Guide block	Carbon steel	ASTM A537 cl 1
8	Guide bar	Alloy steel (Chromium plated)	AISI SAE 9840
9	Guide block bushing	Steel+Bronze+Teflon	
10	Travel stop screw	Carbon steel	AISI SAE 1040
11	Cylinder head flange	Carbon steel	ASTM A537 cl.1
12	Piston rod bushing	Steel+Bronze+Teflon	
13	Piston rod seal ring	Nitrile rubber	
14	Piston rod	Alloy steel (Chromium plated)	AISI SAE 9840
15	Piston	Carbon steel	ASTM A537 cl.1
16	Piston guide sliding ring	Teflon+Graphite	
17	Piston seal ring	Nitrile rubber	
18	Cylinder tube	Carbon steel (Nickel plated)	API 5LX gr X52
19	End flange	Carbon steel	ASTM A537 cl.1
20	Travel stop screw	Carbon steel	AISI SAE 1040
21	Sealing washer	PVC	
22	Tie rod	Alloy steel	ASTM A320 L7

Technical data

Supply pressure : 12 bar g maximum

Ambient temperature : -30°C to +100°C
Special versions for service outside this range on request

Note

The air consuption is the air volume required for one actuator stroke (in opening or in closing)

ALGA actuators

Model	Air consumption (litres)
0.3 - 135	2.9
0.3 - 175	4.8
0.3 - 235	9
0.9 - 235	9
0.9 - 280	14
1.5 - 280	16
1.5 - 335	23
1.5 - 385	31
3 - 385	47
3 - 485	74
6 - 485	85
6 - 585	124
14 - 635	159
18 - 685	208
18 - 735	239
18_2 - 635	357
32_2 - 685	487

Output torques in daNm

Model	Max operating torque (daNm)	Max operating pressure (bar g)	Angular position	Operating supply pressure (bar g) 3	3.5	4	5	6	7	8	9	10
0.3S-135	300	10	0°	38	45	51	65	78	91	105	118	132
			45°	23	27	31	40	48	56	64	73	81
			90°	38	45	51	65	78	91	105	119	132
0.3S-175	300	10	0°	64	75	87	109	132	154	177	199	222
			45°	40	47	54	68	82	96	110	124	138
			90°	65	77	88	111	134	157	180	203	226
0.3S-235	300	6	0°	117	137	158	198	239				
			45°	73	86	99	125	150				
			90°	120	141	162	204	246				
0.9S-235	900	10	0°	135	159	182	229	276	323	370	417	464
			45°	85	100	114	144	173	203	232	262	292
			90°	139	163	187	236	284	332	381	429	477
0.9S-280	900	10	0°	193	226	259	326	393	459	526	593	660
			45°	120	141	161	203	244	286	327	369	410
			90°	196	230	264	332	400	468	536	604	672
1.5S-280	1500	10	0°	264	310	356	447	539	630	722	813	905
			45°	152	178	204	257	310	362	415	467	517
			90°	227	266	306	384	463	542	620	699	777
1.5S-335	1500	10	0°	380	445	511	642	773	904	1030	1170	1297
			45°	218	256	294	369	444	520	598	674	748
			90°	328	385	442	555	668	781	895	1010	1122
1.5S-385	1500	7.5	0°	505	591	678	851	1020	1197			
			45°	291	341	391	491	591	693			
			90°	438	513	588	738	889	1039			
3S-385	3000	9.6	0°	825	966	1110	1390	1670	1960	2240	2521	
			45°	485	568	651	814	979	1150	1310	1479	
			90°	736	863	989	1240	1490	1750	2000	2251	
3S-485	3000	6	0°	1320	1540	1770	2220	2665				
			45°	775	907	1040	1300	1569				
			90°	1180	1380	1580	1990	2389				
6S-485	6000	10	0°	1540	1800	2060	2590	3110	3630	4150	4680	5204
			45°	906	1060	1210	1520	1830	2140	2450	2750	3070
			90°	1380	1620	1850	2330	2800	3270	3740	4210	4683
6S-585	6000	7.2	0°	2250	2630	3010	3770	4530	5293			
			45°	1330	1550	1780	2220	2670	3130			
			90°	2030	2370	2710	3400	4090	4774			
14S-635	12000	10	0°	2940	3430	3930	4930	5920	6920	7910	8910	9906
			45°	1700	1990	2280	2860	3430	4010	4590	5170	5746
			90°	2560	2990	3430	4290	5160	6030	6900	7770	8613
18S-685	18000	10	0°	3930	4590	5260	6590	7920	9250	10580	11910	13250
			45°	2280	2660	3050	3820	4590	5360	6130	6900	7670
			90°	3420	4000	4580	5740	6900	8060	9220	10380	11540
18S-735	18000	10	0°	4520	5290	6050	7590	9120	10650	12180	13720	15257
			45°	2620	3070	3510	4400	5290	6180	7070	7950	8873
			90°	3940	4610	5280	6620	7950	9290	10630	11960	13306
18S2-635	18000	7.2	0°	6720	7860	9000	11270	13550	15838			
			45°	3920	4590	5250	6580	7910	9273			
			90°	5900	6900	7900	9900	11900	13905	24448		
32S2-685	30000	8.4	0°	9070	10600	12140	15210	18290	21360	14499		
			45°	5370	6280	7190	9010	10830	12650	22070		
			90°	8190	9570	10960	13740	16510	19280			

Notes

- Max allowable pressure 12 bar g (static pressure applicable to fully stroked actuator against the travel stops)
- Max operating pressure is the pressure required to produce the maximum operating torque of the actuator
- Angular positions: 0° Closed
  45° Intermediate
  90° Open
- For the 2 strokes to open/to close the lowest torque output is listed

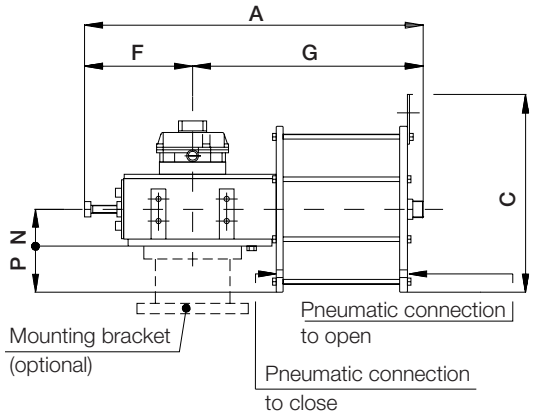
Output torques in daNm

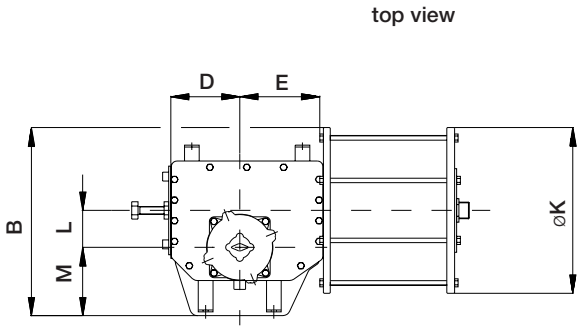
Model	Max operating torque (daNm)	Max operating pressure (bar g)	Angular position	Operating supply pressure (bar g) 3	3.5	4	5	6	7	8	9	10
0.3C-135	300	10	0°	60	71	82	103	124	146	167	188	210
			45°	23	27	31	39	47	55	63	71	81
			90°	31	37	43	54	65	76	87	99	110
0.3C-175	300	7.2	0°	102	120	138	174	210	246			
			45°	39	46	53	67	80	96			
			90°	54	64	73	92	111	130			
0.3C-235	300	4.2	0°	186	219	251						
			45°	72	85	99						
			90°	100	117	134						
0.9C-235	900	10	0°	216	253	290	365	440	515	590	665	740
			45°	83	98	112	141	170	199	228	262	291
			90°	115	135	155	196	236	276	316	356	396
0.9C-280	900	7.7	0°	307	360	413	520	626	732			
			45°	118	138	158	199	240	286			
			90°	163	191	219	276	332	389			
1.5C-280	1500	10	0°	388	455	523	657	791	926	1060	1195	1329
			45°	149	174	200	252	303	355	406	466	519
			90°	206	242	277	349	420	491	562	634	705
1.5C-335	1500	7.5	0°	558	654	750	942	1135	1328			
			45°	215	252	289	363	437	521			
			90°	298	349	400	503	606	709			
1.5C-385	1500	5	0°	742	869	996	1250					
			45°	287	336	385	493					
			90°	397	465	534	670					
3C-385	3000	6	0°	1230	1440	1650	2070	2490				
			45°	475	556	638	800	982				
			90°	658	770	883	1110	1334				
3C-485	3000	4.2	0°	1960	2300	2630						
			45°	762	892	1039						
			90°	1060	1240	1415						
6C-485	6000	7.2	0°	2290	2680	3070	3850	4630	5416			
			45°	891	1040	1190	1500	1800	2140			
			90°	1230	1440	1650	2070	2490	2914			
6C-585	6000	4.8	0°	3350	3920	4480						
			45°	1300	1520	1750						
			90°	1810	2110	2420						
14C-635	12000	7.2	0°	4310	5040	5770	7230	8700	10161			
			45°	1680	1960	2240	2810	3380	4013			
			90°	2320	2720	3110	3900	4680	5456			
18C-685	18000	8.4	0°	5770	6750	7730	9680	11640	13590	15555		
			45°	2240	2620	3000	3760	4520	5280	6146		
			90°	3100	3630	4150	5210	6260	7310	8363		
18C-735	18000	7.2	0°	6640	7770	8890	11150	13400	15656			
			45°	2580	3020	3460	4330	5210	6186			
			90°	3580	4180	4790	6000	7210	8426			
18C2-635	18000	4.8	0°	9870	11540	13220						
			45°	3860	4520	5170						
			90°	5350	6260	7160						
32C2-685	30000	6	0°	13490	15780	18070	22640	27227				
			45°	5280	6170	7070	8850	10759				
			90°	7310	8550	9790	12270	14753				

Notes

- Max allowable pressure 12 bar g (static pressure applicable to fully stroked actuator against the travel stops)
- Max operating pressure is the pressure required to produce the maximum operating torque of the actuator
- Angular positions: 0° Closed
  45° Intermediate
  90° Open
- For the 2 strokes to open/to close the lowest torque output is listed

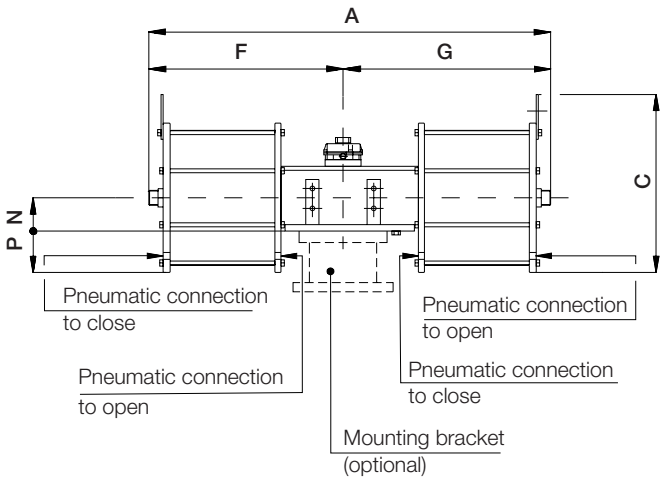
ALGA Pneumatic Actuator
overall dimensions

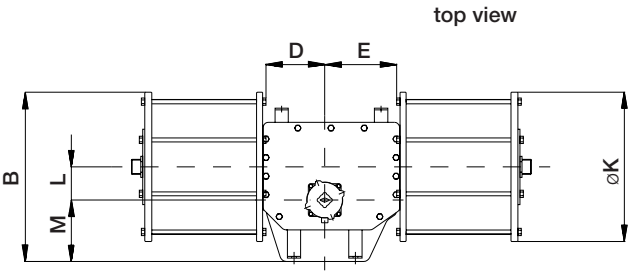




Dimensions in mm

Model	A	B	C	D	E	F	G	øK	L	M	N	P	Pneumatic connections to close NPT	Pneumatic connections to open NPT	Weight (kg)
0.3*-135	731	319	296	136	149	222	509	⌀154	70	119	70	7	1/4	1/4	53
0.3*-175	744	319	306	136	151	222	522	⌀200	70	119	70	30	1/4	1/2	64
0.3*-235	748	319	336	136	138	222	526	⌀260	70	119	70	60	1/2	1/2	82
0.9*-235	810	413	347	160	190	245	565	⌀260	80	170	83	47	1/2	1/2	94
0.9*-280	807	423	390	160	190	245	562	345	80	170	83	90	1/2	3/4	124
1.5*-280	926	462	510	187	217	293	633	345	100	185	100	73	1/2	3/4	166
1.5*-335	926	484	478	187	217	293	633	400	100	185	100	100	1/2	1	194
1.5*-385	920	510	536	187	217	293	627	450	100	185	100	125	1/2	1	227
3*-385	1305	600	536	285	320	391	914	450	160	215	106	119	1/2	1	308
3*-485	1312	655	640	285	317	391	921	560	160	215	106	174	3/4	1	388
6*-485	1499	725	640	327	366	430	1069	560	185	260	140	140	3/4	1	512
6*-585	1504	780	758	327	366	430	1074	670	185	260	140	195	3/4	1	704
14*-635	1673	855	809	376	422	496	1177	720	200	295	193	167	1	1	1250
18*-685	1956	955	889	422	475	548	1408	770	230	340	196	189	1	1	1550
18*-735	1956	978	941	422	475	548	1408	815	230	340	196	212	1	1	1650





Dimensions in mm

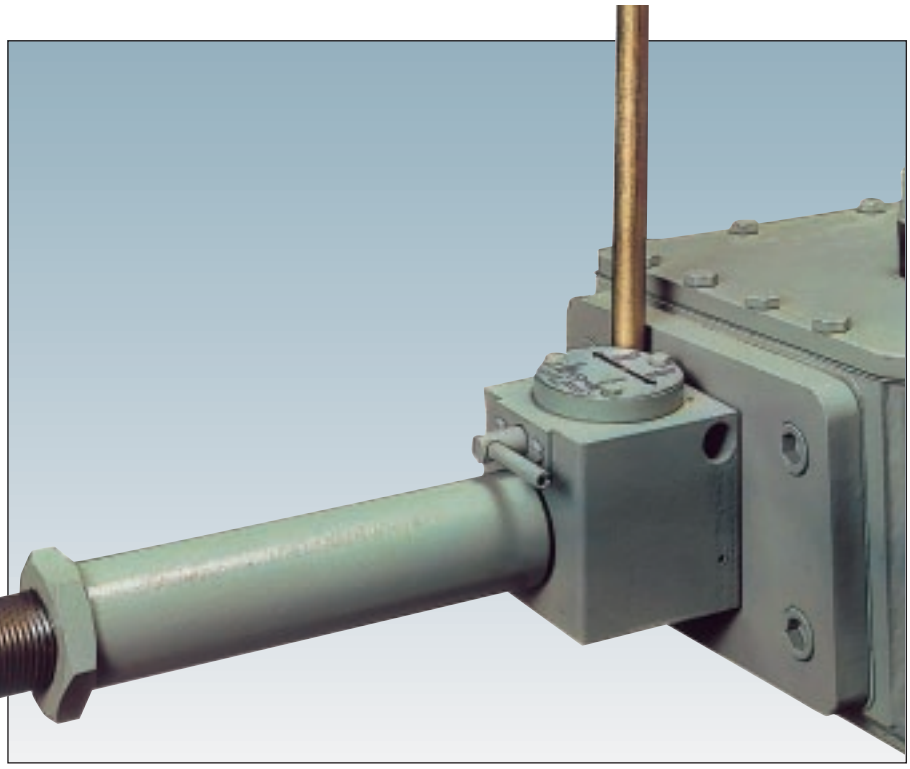
Model	A	B	C	D	E	F	G	øK	L	M	N	P	Pneumatic connections to close NPT	Pneumatic connections to open NPT	Weight (kg)
18*2-635	2690	935	814	397	465	1310	1380	730	230	340	196	169	1	1	1950
32*2-685	3110	1050	889	488	568	1515	1595	770	270	395	232	153	1	1	2450

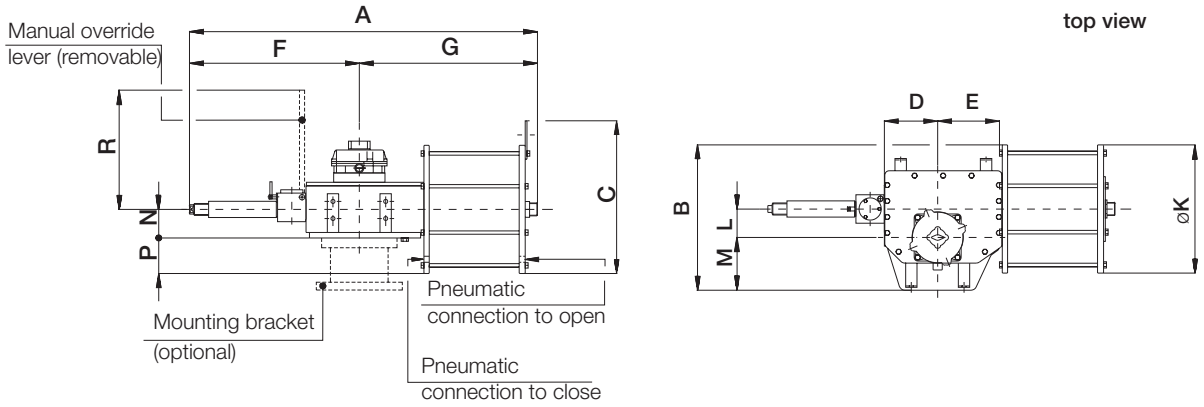
Notes

1. * Add C for canted yoke, S for symmetric yoke (i.e. 0.3C-135)
2. Dimensions and weights given are without optional bracket or adaptor flange

Manual override type "MSJ"

The MSJ jackscrew manual override can be supplied for ALGA actuators up to model 3.
The override is mounted on the left side of the actuator, the jackscrew end is screwed into the guide block. A bronze split screw nut is mounted inside the body. By rotating the engagement lever, the screw nut is engaged with the jackscrew.
When the screw nut is engaged with the jackscrew manual operation follows by rotating the body of the screw container by a lever.



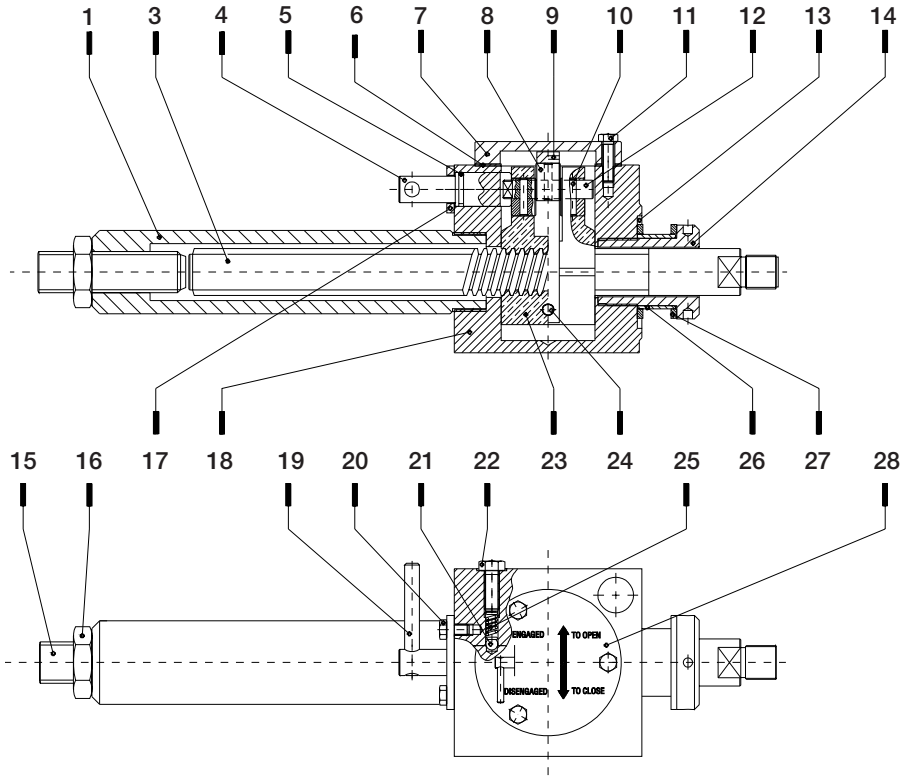


Dimensions in mm

Model	A	B	C	D	E	F	G	øK	L	M	N	P	R	Jackscrew turns per stroke	Pneumatic connections to close NPT	Pneumatic connections to open NPT	Weight (kg)
0.3⋆-135-MSJ	996	319	296	136	149	487	509⌀	154	70	119	70	7	437	30	1/4	1/4	64
0.3⋆-175-MSJ	1009	319	306	136	151	487	522⌀	200	70	119	70	30	437	30	1/4	1/2	75
0.3⋆-235-MSJ	1013	319	336	136	138	487	526⌀	260	70	119	70	60	437	30	1/2	1/2	93
0.9⋆-235-MSJ	1076	413	347	160	190	511	565⌀	260	80	170	83	47	437	35	1/2	1/2	105
0.9⋆-280-MSJ	1073	423	390	160	190	511	562	345	80	170	83	90	437	35	1/2	3/4	135
1.5⋆-280-MSJ	1229	462	510	187	217	596	633	345	100	185	100	73	627	35	1/2	3/4	180
1.5⋆-335-MSJ	1229	484	478	187	217	596	633	400	100	185	100	100	627	35	1/2	1	208
1.5⋆-385-MSJ	1223	510	536	187	217	596	627	450	100	185	100	125	627	35	1/2	1	241
3⋆-385-MSJ ◆	1831	600	536	285	320	917	914	450	160	215	106	119	627	56	1/2	1	325
3⋆-485-MSJ ◆	1838	655	640	285	317	917	921	560	160	215	106	174	627	56	3/4	1	405

Notes

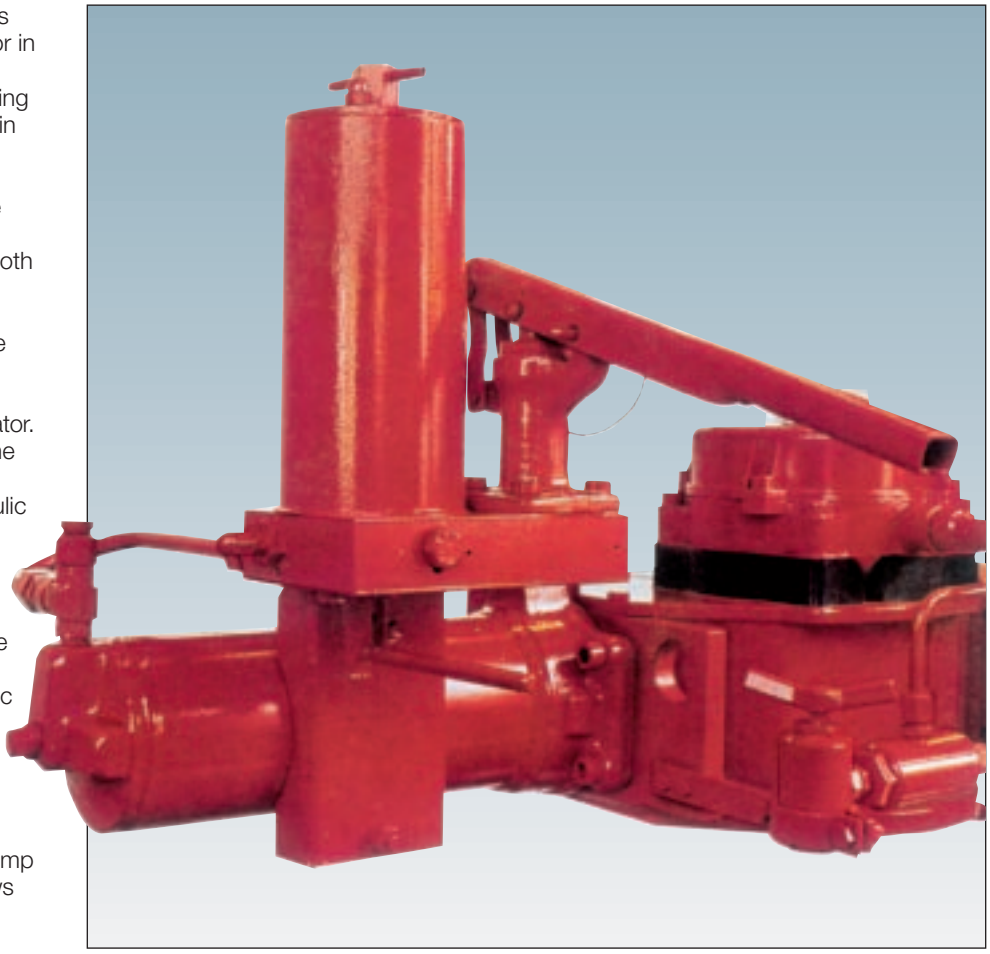
1. ⋆ add C for canted yoke, S for symmetric yoke (i.e. 0.3C-135-MSJ)
2. ◆ Max. operating torque with jackscrew manual override is 19000 Nm
3. Dimensions and weights given are without optional bracket or adaptor flange



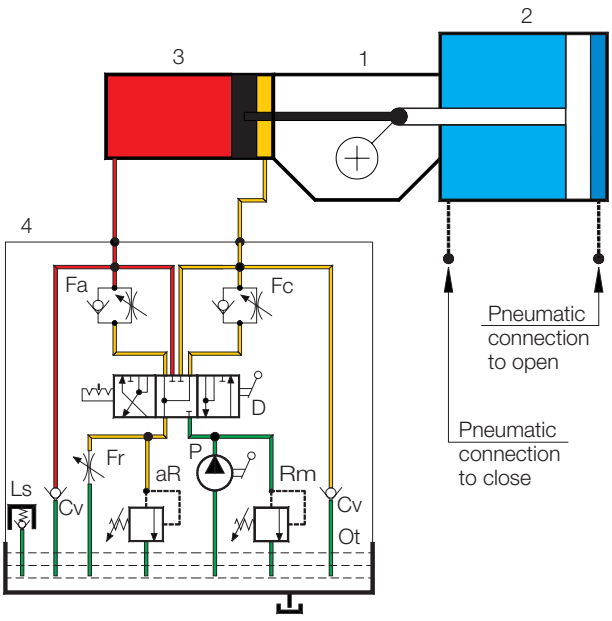
Item	Name	Material	Equivalence to U.S. standards	Q.ty	
1	Protection pipe	Carbon steel	API 5LX gr X52	1	
3	Jackscrew	Carbon steel	AISI SAE 1040	1	
4	Engagement lever pin	Stainless steel	ASTM A479 Type 304	1	
5	O-ring	Fluorosilicon rubber		1	•
6	Cover gasket	Fibre		1	•
7	Cover	Carbon steel	ASTM A283 gr D	1	
8	Cam	Alloy steel	AISI SAE 9840	3	
9	Fork	Carbon steel	AISI SAE 1040	1	
10	Spring pin	Stainless steel	ASTM A479 Type 302	3	
11	Screw	Carbon steel	AISI SAE 1040	3	
12	Screw nut operating cam	Alloy steel	AISI SAE 9840	1	
13	O-ring	Fluorosilicon rubber		1	•
14	Thrust block ring nut	Alloy steel	AISI SAE 9840	1	
15	Travel stop screw	Carbon steel	AISI SAE 1040	1	
16	Nut	Carbon steel	ASTM A194 gr 2	1	
17	Flange	Carbon steel	ASTM A283 gr D	1	
18	Body	Carbon steel	ASTM A283 gr D	1	
19	Spring pin	Spring steel	ASTM A29 gr 4047	1	
20	Screw	Carbon steel	AISI SAE 1040	2	
21	Ball	Stainless steel	ASTM A479 Type 304	1	
22	Screw	Carbon steel	AISI SAE 1040	1	
23	Screw nut	Bronze	ASTM B427 Alloy UNS No. C90800	1	
24	Pin	Carbon steel	AISI SAE 1040	1	
25	Spring	Spring steel	ASTM A29 gr 9254	1	
26	Bush	Bronze	ASTM B427 Alloy UNS No. C90800	1	
27	Thrush shoulder washer	Bronze	ASTM B427 Alloy UNS No. C90800	2	
28	Operating instruction plate	Aluminium	ASTM B221 Alloy 6351	1	

• Recommended spare parts

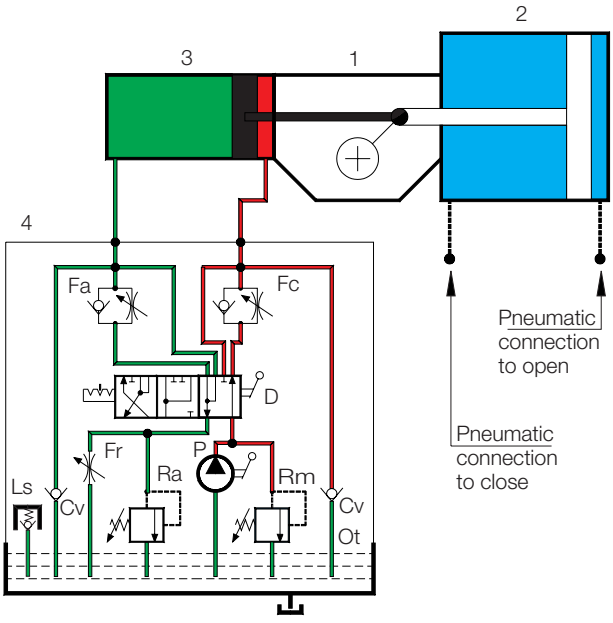
The MHP hydraulic manual override is used to manually operate the actuator in lack of air supply. It also allows to accurately adjust the actuator operating times, independently in opening and in closing, by way of the hydraulic regulators which work on the oil flow from one chamber to the other of the hydraulic cylinder during pneumatic operation. Moreover it permits a smooth angular speed all along the stroke.
During manual operation the flow regulators are by-passed to make the force on the hand pump lever easy.
The MHP unit consists of a hydraulic cylinder mounted directly on the actuator. The piston rod end is screwed into the guide block. The compact hydraulic control unit is mounted on the hydraulic cylinder. The hydraulic control unit consists of: a hand pump, directional control valve, oil tank, relief valve and two unidirectional flow regulators.
The directional control valve has three operating positions: “remote”, the actuator is operated by pneumatic supply; “to open”, the actuator operation is opening by hand pump; “to close”, the actuator operation is closing by hand pump.
On request the hydraulic manual override type MHP2 (double hand pump version) can be supplied, which allows the remote control to automatically override manual operation.



Pneumatic operation
The diagram is drawn with actuator under pneumatic operation in opening. The flow regulator Fa allows control of the stroke time



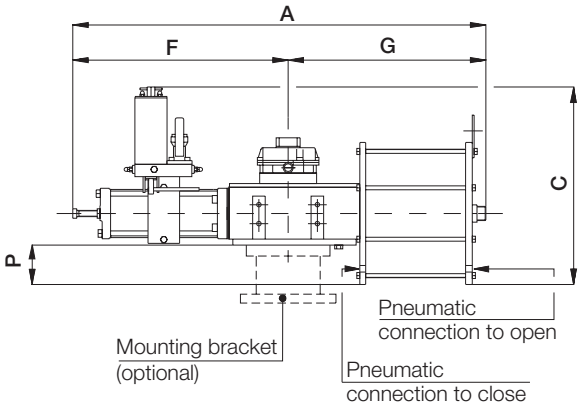
Manual operation
The diagram is drawn with actuator under manual operation towards open. The operation to be performed is selected by the directional control valve D



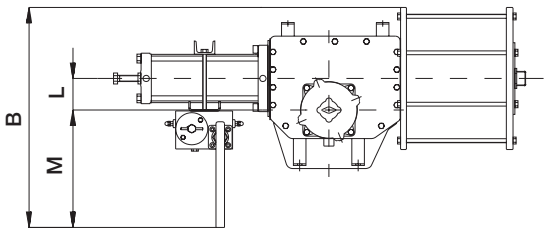
1 = Scotch yoke mechanism
2 = Pneumatic cylinder
3 = Hydraulic cylinder
4 = Hydraulic manual override
= High pressure oil
= Intermediate pressure oil
= Low pressure oil
= Pressurised air
= Atmospheric pressure air

Ra = Relief valve for automatic operation
Rm = Relief valve for manual operation
P = Hand pump
D = Hand operated directional control valve
Fa = Unidirectional flow regulator (opening operation)

Fc = Unidirectional flow regulator (closing operation)
Fr = Bidirectional flow regulator
Cv = Check valve
Ot = Oil tank
Ls = Level stick with relief valve

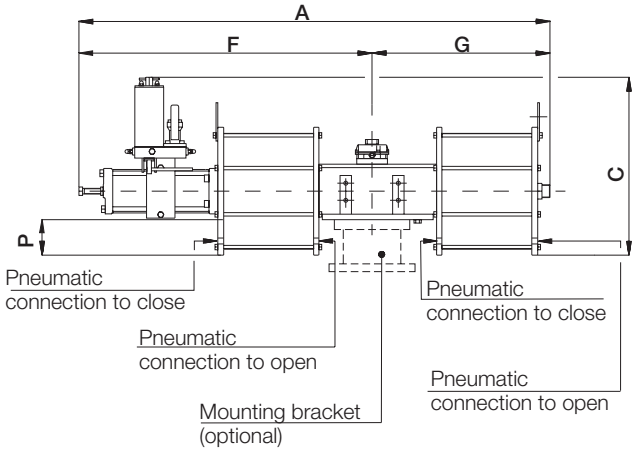


top view

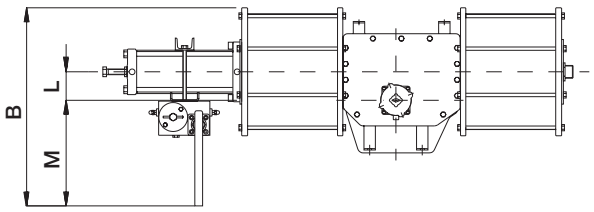


Dimensions in mm

Model	A	B	C	F	G	L	M	P	Hand pump operations per stroke	Oil content (litres)	MHP model	Pneumatic connections to close NPT	Pneumatic connections to open NPT	Weight (kg)
0.3★-135-MHP75	1026	531	478	517	509	70	384	7	40	0.9	1	1/4	1/4	77
0.3★-175-MHP75	1039	554	501	517	522	70	384	30	40	0.9	1	1/4	1/2	88
0.3★-235-MHP75	1043	584	531	517	526	70	384	60	40	0.9	1	1/2	1/2	106
0.9★-235-MHP100	1127	584	531	562	565	80	374	47	80	1.8	1	1/2	1/2	124
0.9★-280-MHP100	1124	627	574	562	562	80	374	90	80	1.8	1	1/2	3/4	154
1.5★-280-MHP135	1294	645	574	661	633	100	372	73	180	3.6	1	1/2	3/4	220
1.5★-335-MHP135	1294	672	601	661	633	100	372	100	180	3.6	1	1/2	1	248
1.5★-385-MHP135	1288	697	626	661	627	100	372	125	180	3.6	1	1/2	1	281
3★-385-MHP135	1901	697	626	987	914	160	312	119	290	6.6	1	1/2	1	370
3★-485-MHP135	1908	762	691	987	921	160	312	174	290	6.6	1	3/4	1	450
6★-485-MHP175	2174	900	872	1105	1069	185	420	140	400	12	2	3/4	1	618
6★-585-MHP175	2179	940	927	1105	1074	185	420	195	400	12	2	3/4	1	810
14★-635-MHP200	2398	978	965	1221	1177	200	418	167	580	17	2	1	1	1350
18★-685-MHP235	2764	1047	1010	1360	1410	230	432	189	900	25	2	1	1	1700
18★-735-MHP235	2764	1077	1033	1360	1410	230	432	212	900	25	2	1	1	1800



top view



Dimensions in mm

Model	A	B	C	F	G	L	M	P	Hand pump operations per stroke	Oil content (litres)	MHP model	Pneumatic connections to close NPT	Pneumatic connections to open NPT	Weight (kg)
18★2-635-MHP235	3520	1028	990	2140	1380	230	432	169	900	25	2	1	1	2100
32★2-685-MHP280	4030	1076	1052	2430	1600	270	416	153	1500	41	2	1	1	2800

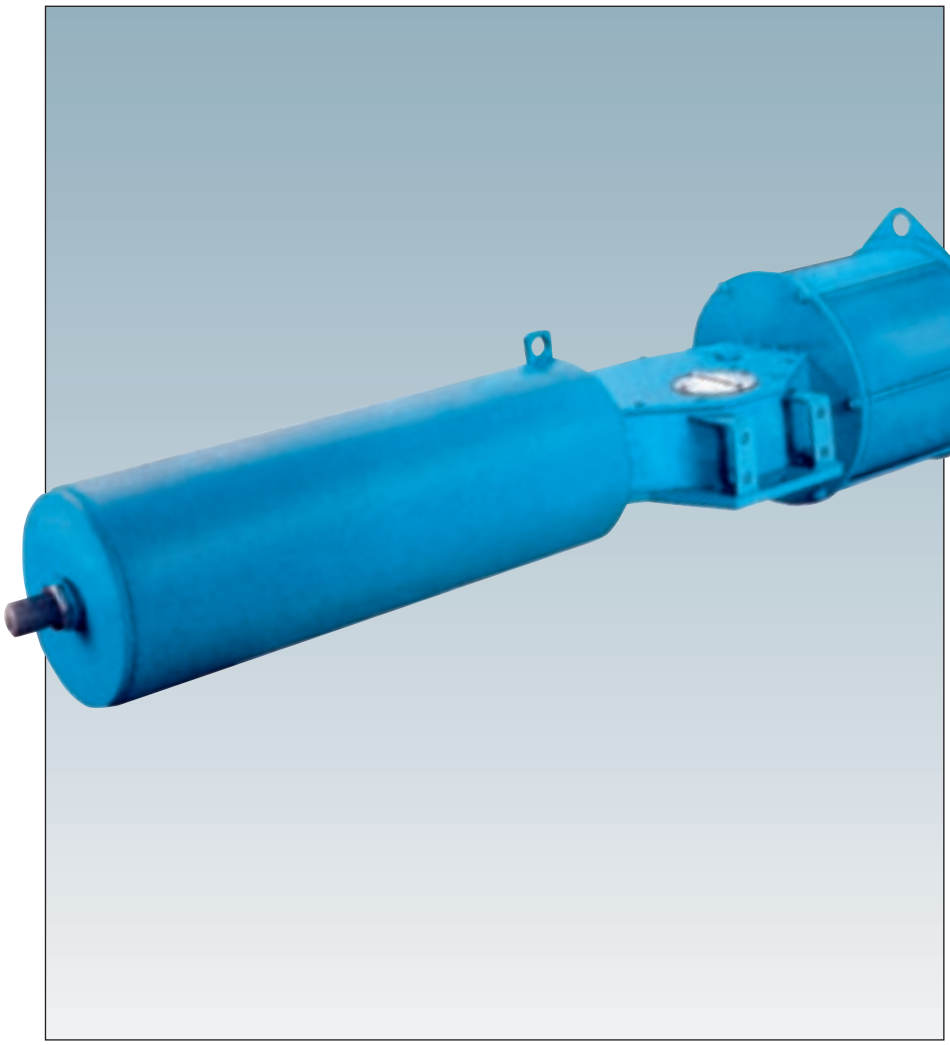
Notes

1. ★ add C for canted yoke, S for symmetric yoke (i.e. 0.3C-135-MHP75)
2. Dimensions and weights given are with oil and without optional bracket or adaptor flange

Spring return pneumatic actuator for 90° operation for On-Off and Modulating heavy duty service

General

The **ALGAS** low pressure pneumatic spring return actuator series was engineered and is manufactured to provide fail safe operation for any quarter turn application such as ball, plug, butterfly valves or dampers, in both **On-Off** and **Modulating heavy duty service**.
Simplicity, reliability and economy are at the top of the list of design parameters.
The **spring module** incorporates up to four springs, **fully encapsulated** in a factory-welded cartridge. This ensures safety to personnel and ease of assembly.

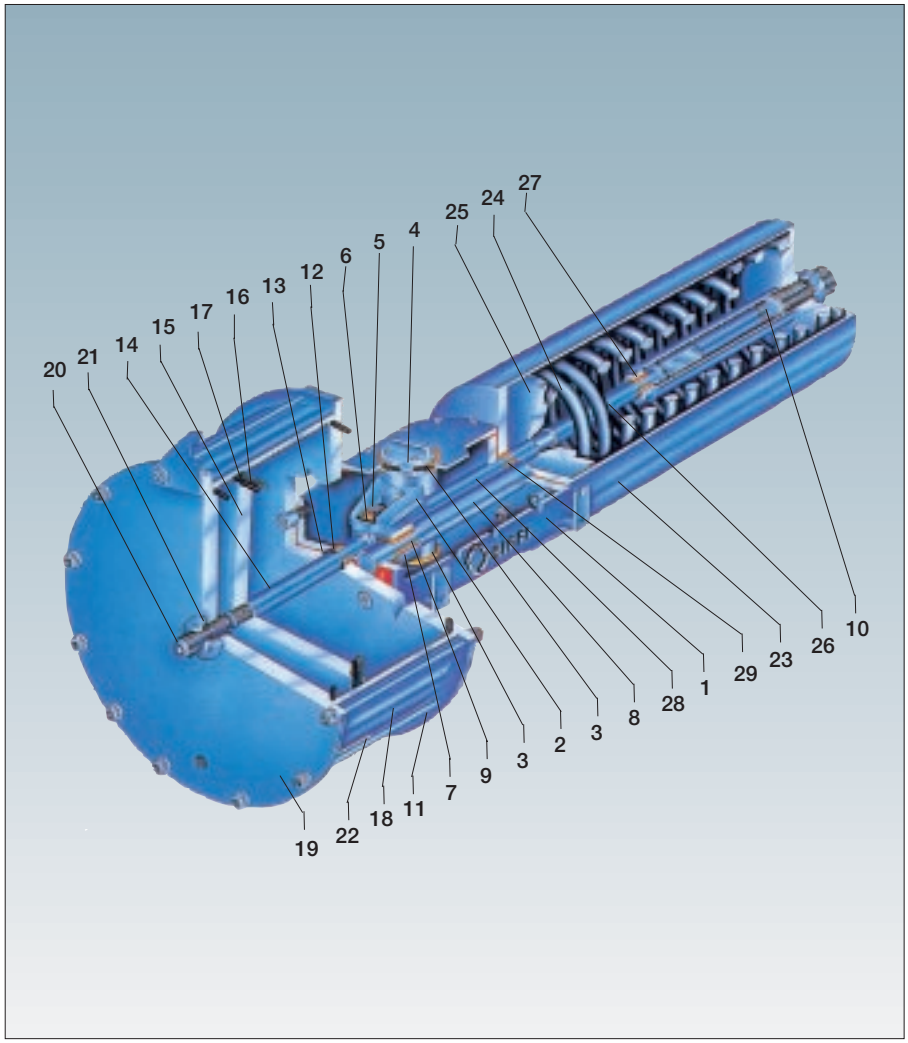


Features

- **Totally enclosed, weatherproof housing** in fabricated carbon steel for maximum strength
- **Canted scotch yoke** actuators are ideally suited to the larger valve sizes where high break away torques are required or for valves with high working pressure
- **Symmetric** scotch yoke actuators **available** for special applications
- External travel stops for precise **angular stroke adjustment** between **82°** and **98°**
- **Hard chromium plated** and polished **guide bar** and **piston rod** for corrosion resistance and minimal friction
- **Bushings made of bronze or sintered bronze**, **charged with teflon**, to provide minimal friction and extended service life
- **Electroless nickel plated** and polished **cylinder** for corrosion resistance and minimal friction
- **Floating type piston rod and piston seals** provide low hysteresis and high sensitivity, **preventing sticking problems**
- **Jackscrew manual override**. Hydraulic manual override special version
- The **spring return pack** incorporates **up to four springs**, **fully encapsulated** in a factory welded cartridge: this **ensures safety to personnel** and simplifies assembly
- The **spring action can be easily changed in the field** from to close in to open or viceversa (modular design)
- An extensive range of **accessories** are available:
  - **limit switch boxes** - explosionproof, intrinsically safe and/or weatherproof
  - limit switches can be provided in different types according to customer requirements
  - **position transmitters** - explosionproof, intrinsically safe and/or weatherproof
  - **air conditioners**
  - **solenoid valves** - explosionproof, intrinsically safe and/or weatherproof
  - **control valves**, **flow regulators**, **quick exhaust valves**
  - **positioners** - pneumatic or electropneumatic
  - **pressure switches** - pneumatic or electric
  - **terminals enclosures**, **pushbutton panels** - explosionproof or intrinsically safe and/or weatherproof
- **Special coatings** for offshore or corrosive environments
- **Special version** with built-in quick exhaust valves and dumper **for "quick spring operation"**

Technical Data

Supply pressure	:	12 bar g maximum
Supply medium	:	air, nitrogen or sweet gas. Special version available for sour gas
Ambient temperature	:	-30° C to +100° C Special versions for service outside this range on request
Spring ending torques	:	from 390 up to 150000 Nm Higher values with special versions



Item	Name
1	Housing
2	Yoke
3	Yoke bushing
4	Cover
5	Guide block pin
6	Sliding block
7	Guide block
8	Guide bar
9	Guide block bushing
10	Travel stop screw
11	Cylinder head flange
12	Piston rod bushing
13	Piston rod seal ring
14	Piston rod
15	Piston
16	Piston guide sliding ring
17	Piston seal ring
18	Cylinder tube
19	End flange
20	Travel stop screw
21	Sealing washer
22	Tie rod
23	Spring container
24	Spring
25	Spring thrust flange
26	Guide rod
27	Guide rod bushing
28	Container rod
29	Container rod bushing

Materials of construction

Item	Name	Material	Equivalence to U.S. standards
1	Housing	Carbon steel	ASTM A537 cl1 + ASTM A283 gr D
2	Yoke	Carbon steel	API 5LX gr X52 (C<0.2%) + ASTM A537 cl 1
3	Yoke bushing	Bronze	ASTM B427 Alloy UNS No. C90800
4	Cover	Carbon steel	ASTM A283 gr D
5	Guide block pin	Alloy steel	AISI SAE 9840
6	Sliding block	Bronze	ASTM B427 Alloy UNS No C90800
7	Guide block	Carbon steel	ASTM A537 cl 1
8	Guide bar	Alloy steel (Chromium plated)	AISI SAE 9840
9	Guide block bushing	Steel+Bronze+Teflon	
10	Travel stop screw	Carbon steel	AISI SAE 1040
11	Cylinder head flange	Carbon steel	ASTM A537 cl.1
12	Piston rod bushing	Steel+Bronze+Teflon	
13	Piston rod seal ring	Nitrile rubber	
14	Piston rod	Alloy steel (Chromium plated)	AISI SAE 9840
15	Piston	Carbon steel	ASTM A537 cl.1
16	Piston guide sliding ring	Teflon+Graphite	
17	Piston seal ring	Nitrile rubber	
18	Cylinder tube	Carbon steel (Nickel plated)	API 5LX gr X52
19	End flange	Carbon steel	ASTM A537 cl.1
20	Travel stop screw	Carbon steel	AISI SAE 1040
21	Sealing washer	PVC	
22	Tie rod	Alloy steel	ASTM A320 L7
23	Spring container	Carbon steel	ASTM A283 gr D + ASTM A106 gr B
24	Spring	Carbon steel	ASTM A29 gr 9254
25	Spring thrust flange	Carbon steel	ASTM A283 gr D
26	Guide rod	Alloy steel (Chromium plated)	AISI SAE 9840
27	Guide rod bushing	Steel+Bronze+Teflon	
28	Container rod	Alloy steel (Chromium plated)	AISI SAE 9840
29	Container rod bushing	Steel+Bronze+Teflon	

Technical data

Supply pressure : 12 bar g maximum

Ambient temperature : -30°C to +100°C
Special versions for service outside this range on request

Note

The air consuption is the air volume required for one actuator stroke (in opening or in closing)

Output torques in daNm

				Operating supply pressure (bar g)																				
	Spring torque			3			3.5			4			4.5			5			6			7		
Model	SET	SRT	SST	AST	ART	AET	AST	ART	AET	AST	ART	AET	AST	ART	AET	AST	ART	AET	AST	ART	AET	AST	ART	AET
0.3-0150-235-CL	75	42	72	103	21	21	135	35	40	168	48	58	200	61	76	232	74	94						
0.3-0150-175-CL	78	43	73													91	14	14	126	33	35	162	46	55
0.9-0200-280-CL	96	55	98	197	54	62	249	75	91	301	95	121	353	116	150	404	136	179	517	180	241	623	221	301
0.9-0200-235-CL	99	56	100				145	32	33	182	48	54	218	62	74	255	77	95	331	107	137	406	136	179
0.9-0350-385-CL	190	106	181	379	105	122	480	145	178	580	185	235	680	224	291									
0.9 0350-335-CL	191	106	182				310	77	83	386	108	125	462	138	168	538	168	211	690	228	297			
0.9-0350-280-CL	195	108	184										259	54	54	312	78	84	419	121	144	525	163	204
0.9-0400-385-CL	258	131	215	311	77	83	411	118	140	512	158	196	612	197	253	698	237	309						
0.9-0400-335-CL	259	131	215				241	44	44	317	80	87	393	111	130	469	141	172	621	201	258			
0.9-0400-280-CL	263	132	217													244	45	45	350	93	105	456	136	165
0.9-0700-485-CL	344	182	304	573	157	181	695	221	271															
0.9-0700-385-CL	347	183	306				323	40	40	423	95	97	524	137	153	624	178	210						
0.9-0700-335-CL	348	183	307													381	73	73	533	141	158	685	202	244
1.5-1100-485-CL	512	318	568				848	148	148	1050	249	261	1190	333	375									
1.5-1100-385-CL	517	319	570																965	212	214	1190	320	357
1.5-1200-585-CL	699	385	656	1000	230	236	1190	351	401															
1.5-1200-485-CL	705	387	659							858	156	156	1050	255	270	1190	338	383						
1.5-1200-385-CL	709	389	661																773	109	109	1020	242	252
3-2000-585-CL	1110	580	965	1690	457	520	2180	652	793															
3-2000-485-CL	1120	583	969				1130	199	199	1460	361	387	1790	497	575	2130	630	763						
3-2000-385-CL	1130	590	973																1320	302	302	1740	476	545
6-2500-635-CL	1660	840	1370	2200	585	658	2870	853	1030	3540	1110	1410	4210	1380	1780	4870	1640	2160						
6-2500-585-CL	1670	844	1380	1610	322	322	2170	573	641	2740	801	961	3310	1020	1280	3870	1250	1600	4990	1690	2230			
6-2500-485-CL	1680	848	1380										1720	383	387	2110	548	607	2890	861	1040	3670	1170	1480
6-3800-735-CL	2480	1160	1850	2700	743	856	3600	1100	1360	4490	1450	1860												
6-3800-635-CL	2510	1170	1870				2030	465	477	2700	742	854	3370	1000	1230	4030	1270	1600						
6-3800-585-CL	2520	1180	1870							1900	404	404	2470	648	724	3030	877	1040	4170	1320	1680			
14-5400-935-CL	3550	1760	2870	5620	1650	1990	7200	2280	2880	8790	2900	3770	9980	3520	4660									
14-5400-835-CL	3580	1770	2880	3730	883	923	4990	1400	1630	6250	1900	2340	7520	2400	3050	8780	2900	3770						
14-5400-735-CL	3620	1780	2900							4010	1000	1080	4990	1400	1630	5970	1780	2180	7920	2560	3280	9880	3330	4380
14-8300-935-CL	4680	2290	3710	4500	1030	1050	6080	1680	1940	7670	2310	2830	9250	2940	3730									
14-8300-835-CL	4710	2300	3720				3870	700	700	5130	1290	1410	6390	1800	2120	7660	2310	2830	9990	3310	4250			
14-8300-735-CL	4760	2320	3750										3880	700	700	4860	1180	1260	6820	1970	2360	8700	2750	3460
18-9600-1100-CL	6245	3495	5995	8365	1650	1650	10885	2790	3070	13405	3810	4490	14990	4815	5910									
18-9600-935-CL	6325	3525	6035							7880	1375	1375	9700	2295	2400	11520	3050	3430	14990	4510	5480			
18-9600-835-CL	6365	3540	6055													7875	1370	1370	10775	2745	3010	13680	3920	4645
18-9800-1100-CL	7780	4410	7620				9350	1290	1290	11870	2660	2710	14390	3730	4130									
18-9800-935-CL	7850	4440	7660													9990	1650	1650	13630	3410	3700			
18-9800-835-CL	7890	4460	7680																			12150	2790	2860

Notes

1. Max allowable pressure 12 bar g
   (static pressure applicable to fully
   stroked actuator against the travel stop)
2. Angular positions: 0° Closed
   45° Intermediate
   90° Open
3. SET: Spring Ending Torque to close (0°)
   SRT: Spring Running Torque (45°)
   SST: Spring Starting Torque to close (90°)
   AST: Air Starting Torque to open (0°)
   ART: Air Running Torque (45°)
   AET: Air Ending Torque to open (90°)

Output torques in daNm

				Operating supply pressure (bar g)																				
	Spring torque			3			3.5			4			4.5			5			6			7		
Model	SST	SRT	SET	AET	ART	AST	AET	ART	AST	AET	ART	AST	AET	ART	AST	AET	ART	AST	AET	ART	AST	AET	ART	AST
0.3-0150-235-OP	133	35	39	34	27	52	69	40	69	105	53	87	141	66	104	177	78	122	249	104	157			
0.3-0150-175-OP	136	36	40																60	36	64	100	51	84
0.9-0200-280-OP	169	42	46	118	63	106	177	84	135	236	105	163	295	126	192	354	147	221	472	189	278	590	230	336
0.9-0200-235-OP	172	43	47				58	41	76	100	56	97	141	71	117	183	86	137	266	116	178	349	145	218
0.9-0350-385-OP	324	83	90	234	122	203	345	162	257	456	201	311	568	241	366	679	280	420						
0.9-0350-335-OP	325	83	91				157	94	165	241	124	206	325	155	247	409	185	289	578	244	371			
0.9-0350-280-OP	328	84	93										100	73	138	159	95	166	277	137	224	395	179	281
0.9-0400-385-OP	386	108	125	158	94	166	269	134	220	380	174	274	492	214	329	603	253	383						
0.9-0400-335-OP	387	108	126							165	97	169	249	127	210	334	158	251	502	218	334	671	277	416
0.9-0400-280-OP	390	109	128																201	110	187	319	152	244
0.9-0700-485-OP	545	146	165	347	183	306	524	246	392	699	309	478												
0.9-0700-385-OP	548	147	167							181	122	225	292	163	279	403	203	334	626	283	442			
0.9-0700-335-OP	549	148	168													134	104	202	303	167	284	471	228	367
1.5-1100-485-OP	1000	229	234				279	230	454	502	314	563	726	396	672	949	477	781						
1.5-1100-385-OP	1000	230	237																408	279	517	697	383	655
1.5-1200-585-OP	1160	300	330	452	295	536	778	414	695	1100	531	853												
1.5-1200-485-OP	1170	301	333							295	236	459	519	319	568	742	401	677	1180	561	895			
1.5-1200-385-OP	1170	303	335																202	199	413	483	306	551
3-2000-585-OP	1710	463	528	1010	544	916	1550	737	1170	2090	929	1440	2490	1120	1700									
3-2000-485-OP	1720	467	533				384	311	608	754	449	789	1120	583	969	1490	716	1150	2230	979	1510			
3-2000-385-OP	1720	469	537																599	391	713	1060	562	941
6-2500-635-OP	2440	681	792	1290	704	1190	2030	971	1550	2770	1230	1910	3510	1490	2280	4250	1760	2640						
6-2500-585-OP	2450	685	798	632	461	872	1260	693	1170	1890	920	1480	2510	1140	1790	3140	1360	2100	4400	1810	2710			
6-2500-485-OP	2460	689	803										760	509	934	1190	668	1140	2050	979	1560	2920	1280	1990
6-3800-735-OP	3310	988	1200	1680	879	1460	2670	1230	1950	3660	1580	2430	4660	1930	2910									
6-3800-635-OP	3330	997	1210				937	607	1100	1670	878	1460	2410	1140	1820	3160	1400	2180	4640	1930	2910			
6-3800-585-OP	3340	1000	1210							792	553	1030	1420	784	1330	2050	1010	1640	3300	1460	2250	4560	1900	2870
14-5400-935-OP	5110	1440	1700	3910	1880	3040	5660	2510	3900	7420	3140	4760	9180	3760	5620									
14-5400-835-OP	5130	1450	1710	1800	1120	2010	3200	1630	2700	4600	2140	3380	6000	2630	4070	7410	3130	4750	9900	4120	6120			
14-5400-735-OP	5160	1460	1730				1030	838	1640	2110	1240	2170	3200	1630	2700	4280	2020	3230	6450	2790	4290	8630	3560	5350
14-8300-935-OP	6590	1890	2230	2090	1350	2440	3840	1990	3300	5600	2620	4160	7350	3240	5020	9110	3870	5880						
14-8300-835-OP	6620	1900	2250				1380	1080	2100	2780	1600	2780	4180	2110	3470	5590	2610	4150	8390	3610	5520			
14-8300-735 OP	6650	1910	2260										1380	1080	2100	2460	1480	2630	4630	2270	3690	6800	3040	4750
18-9600-1100-OP	10460	2615	2830	3355	2430	4585	6155	3460	5950	8950	4475	7320	11745	5475	8680	14540	6470	10050						
18-9600-935-OP	10530	2645	2870							2820	2230	4325	4840	2980	5310	6860	3720	6295	10900	5175	8270	14940	6610	10245
18-9600-835-OP	10565	2660	2890													2810	2225	4320	6030	3420	5895	9255	4585	7465
18-9800-1100-OP	13310	3280	3520				2660	2510	5130	5460	3570	6490	8250	4590	7860	11050	5600	9220						
18-9800-935-OP	13380	3310	3560													3370	2780	5470	7410	4280	7450	11450	5750	9420
18-9800-835-OP	13410	3320	3580																2540	2460	5070	5760	3680	6640

Notes

1. Max allowable pressure 12 bar g (static pressure applicable to fully stroked actuator against the travel stop)
2. Angular positions: 0° Closed
   45° Intermediate
   90° Open
3. SST: Spring Starting Torque to open (0°)
   SRT: Spring Running Torque (45°)
   SET: Spring Ending Torque to open (90°)
   AET: Air Ending Torque to close (0°)
   ART: Air Running Torque (45°)
   AST: Air Starting Torque to close (90°)

Output torques in daNm

	Operating supply pressure (bar g)																							
	Spring torque			3.5			4			5			6			7			8			10		
Model	SET	SRT	SST	AST	ART	AET	AST	ART	AET	AST	ART	AET	AST	ART	AET	AST	ART	AET	AST	ART	AET	AST	ART	AET
0.3S-0150-235-CL	52	41	89	80	38	47	101	51	70	141	77	117	182	103	163	223	129	209						
0.3S-0150-175-CL	54	42	91							52	15	15	75	34	41	97	49	67	120	63	92	165	92	144
0.9S-0200-280-CL	67	53	117	152	79	113	185	100	151	252	143	227	319	185	303	385	228	379	452	270	455	585	355	608
0.9S-0200-235-CL	69	55	119	85	35	36	118	51	63	155	81	116	202	111	170	249	141	224	296	171	277	390	231	384
0.9S-0350-385-CL	132	103	224	290	152	219	353	193	291	479	273	435	605	353	580									
0.9S-0350-335-CL	132	103	224	184	83	98	231	114	152	327	176	261	420	237	370	518	298	479	613	358	588			
0.9S-0350-280-CL	135	105	227							185	84	99	250	128	176	319	170	252	385	213	328	519	298	480
0.9S-0400-385-CL	175	130	265	245	125	170	310	165	240	435	245	385	560	325	530	690	405	675						
0.9S-0400-335-CL	176	130	265				190	85	105	285	150	210	380	210	320	475	270	430	570	330	540			
0.9S-0400-280-CL	178	130	267										210	100	125	275	145	205	340	185	280	476	271	431
0.9S-0700-485-CL	235	180	375	445	230	335	545	295	445															
0.9S-0700-385-CL	238	180	377				250	105	110	375	190	255	500	270	400	625	350	545						
0.9S-0700-335-CL	238	180	378							220	80	80	320	150	190	415	215	300	510	275	410	700	396	626
1.5S-1100-485-CL	360	300	615	570	180	180	710	280	315	980	445	575												
1.5S-1100-385-CL	365	300	620										650	240	255	820	350	425	995	450	590			
1.5S-1200-585-CL	490	370	715	870	380	475	1070	500	670															
1.5S-1200-485-CL	495	370	720				575	190	190	850	365	455	1120	530	720									
1.5S-1200-385-CL	497	375	720										520	135	135	690	270	300	865	375	470	1190	581	801
3S-2000-585-CL	775	560	1070	1450	695	940	1770	890	1260	2430	1280	1910												
3S-2000-485-CL	780	565	1080	740	240	240	965	395	465	1410	670	910	1860	940	1350	2310	1210	1790						
3S-2000-385-CL	786	567	1080										870	340	370	1150	515	650	1430	685	930	2000	1020	1490
6S-2500-635-CL	1150	815	1540	1900	905	1230	2350	1170	1670	3250	1710	2570	4140	2250	3460	4990	2780	4350						
6S-2500-585-CL	1160	820	1540	1430	620	765	1810	855	1140	2580	1310	1900	3340	1760	2650	4100	2220	3410	4860	2670	4170			
6S-2500-485-CL	1170	825	1550							1390	595	725	1910	915	1240	2440	1230	1760	2960	1540	2280	4010	2170	3330
6S-3800-735-CL	1710	1140	2070	2380	1160	1610	2980	1520	2210	4190	2240	3410												
6S-3800-635-CL	1730	1150	2090	1330	520	570	1780	800	1010	2680	1340	1910	3580	1870	2800	4470	2410	3690						
6S-3800-585-CL	1740	1150	2090							2010	935	1240	2770	1390	1990	3530	1850	2750	4290	2300	5310			
14S-5400-935-CL	2480	1710	3130	4880	2400	3380	5960	3040	4420	8120	4300	6500	9990	5570	8580									
14S-5400-835-CL	2500	1720	3150	3370	1500	1930	4230	2020	2760	5950	3030	4420	7670	4040	6070	9390	5050	7730						
14S-5400-735-CL	2520	1730	3170				2700	1100	1290	4030	1900	2570	5370	2690	3850	6700	3470	5140	8030	4250	6420			
14S-8300-935-CL	3260	2230	4050	4110	1810	2300	5190	2460	3340	7340	3730	5420	9500	5000	7500									
14S-8300-835-CL	3280	2240	4070				3460	1420	1680	5180	2450	3340	6900	3470	4990	8620	4480	6650	9990	5490	8310			
14S-8300-735-CL	3300	2250	4090							3260	1300	1490	4590	2110	2770	5930	2900	4050	7260	3680	5340	9930	5250	7910
18S-9600-1100-CL	4410	3380	6550	7310	3040	3630	9020	4070	5280	12460	6110	8590												
18S-9600-935-CL	4460	3390	6600				5260	1650	1650	7740	3300	4040	10220	4790	6440	12700	6260	8830	14990	7720	11220			
18S-9600-835-CL	4490	3400	6620							5260	1650	1650	7230	2990	3560	9210	4180	5460	11190	5360	7370	14990	7700	11180
18S-9800-1100-CL	5470	4230	8310				7980	3000	3250	11410	5100	6560	14840	7150	9870									
18S-9800-985-CL	5520	4260	8350							6690	2020	2020	9180	3750	4410	11660	5250	6800	14140	6730	9190			
18S-9800-835-CL	5550	4270	8380										6190	1530	1530	8170	3120	3430	10140	4340	5340	14100	6710	9150

Notes

1. Max allowable pressure 12 bar g
   (static pressure applicable to fully stroked actuator against the travel stop)
2. Angular positions: 0° Closed
   45° Intermediate
   90° Open
3. SET: Spring Ending Torque to close (0°)
   SRT: Spring Running Torque (45°)
   SST: Spring Starting Torque to close (90°)
   AST: Air Starting Torque to open (0°)
   ART: Air Running Torque (45°)
   AET: Air Ending Torque to open (90°)

Output torques in daNm

				Operating supply pressure (bar g)																				
	Spring torque			3.5			4			5			6			7			8			10		
Model	SST	SRT	SET	AET	ART	AST	AET	ART	AST	AET	ART	AST	AET	ART	AST	AET	ART	AST	AET	ART	AST	AET	ART	AST
0.3S-0150-235-OP	80	37	46	49	39	86	72	52	107	118	79	149	163	105	192	209	130	234	249	156	276			
0.3S-0150-175-OP	82	39	49										44	36	81	69	51	105	94	65	128	145	94	175
0.9S-0200-280-OP	101	46	55	119	84	166	156	105	200	231	148	269	306	190	339	381	232	408	455	275	477	605	360	616
0.9S-0200-235-OP	103	47	57	44	39	96	70	55	120	123	86	169	175	116	218	228	146	266	280	176	315	386	235	413
0.9S-0350-385-OP	193	89	109	231	161	316	302	201	382	443	282	513	584	362	643									
0.9S-0350-335-OP	194	90	109	112	91	205	165	124	255	272	184	354	379	245	453	486	306	552	593	367	651			
0.9S-0350-280-OP	196	91	112							113	92	207	188	136	276	263	179	346	338	222	415	487	307	553
0.9S-0400-385-OP	232	115	153	183	133	272	254	174	337	395	254	468	536	355	599	678	415	699						
0.9S-0400-335-OP	233	115	154				117	95	210	224	157	309	331	218	409	438	279	508	545	339	607			
0.9S-0400-280-OP	235	117	156										140	108	232	215	151	301	289	194	370	439	279	509
0.9S-0700-485-OP	327	157	201	315	245	483	463	309	587															
0.9S-0700-385-OP	329	158	203				134	118	281	275	201	412	416	282	543	558	363	674						
0.9S-0700-335-OP	330	158	204							104	100	254	211	164	353	318	226	452	425	287	551			
1.5S-1100-485-OP	675	257	282	201	201	492	355	297	613	663	462	853	971	624	1090									
1.5S-1100-385-OP	678	259	285										291	262	562	485	367	714	679	471	865	1070	674	1170
1.5S-1200-585-OP	787	328	393	545	499	758	769	517	933															
1.5S-1200-485-OP	790	330	396				213	213	498	521	386	739	828	548	979	1140	710	1190						
1.5S-1200-385-OP	793	332	399										148	148	448	342	289	599	536	394	751	924	599	1050
3S-2000-585-OP	1140	502	631	1070	721	1310	1440	916	1610	2170	1300	2200												
3S-2000-485-OP	1140	506	636				532	429	878	1030	700	1280	1540	968	1690	2040	1230	2090	2490	1500	2490			
3S-2000-385-OP	1150	508	641										427	370	794	744	544	1050	1060	714	1300	1690	1050	1810
6S-2500-635-OP	1620	733	945	1410	951	1740	1910	1220	2150	2920	1750	2960	3920	2290	3770	4930	2820	4580						
6S-2500-585-OP	1620	738	950	885	669	1320	1310	899	1660	2160	1350	2350	3020	1810	3040	3870	2260	3730	4720	2710	4420			
6S-2500-485-OP	1630	742	958							838	643	1280	1420	959	1750	2010	1270	2230	2600	1580	2700	3770	2210	3650
6S-3800-735-OP	2200	1050	1430	1850	1210	2180	2520	1570	2730	3870	2290	3810												
6S-3800-635-OP	2210	1060	1440	670	576	1230	1170	851	1640	2180	1390	2450	3180	1920	3260	4190	2460	4070	4990	2990	4880			
6S-3800-585-OP	2220	1060	1450				570	520	1150	1420	988	1840	2280	1440	2530	3130	1900	3220	3980	2350	3910			
14S-5400-935-OP	3450	1550	2010	3930	2470	4270	5140	3110	5220	7560	4370	7110	9980	5630	9000									
14S-5400-835-OP	3470	1570	2030	2240	1590	2950	3200	2090	3700	5140	3100	5210	7060	4110	6720	8990	5120	8230						
14S-5400-735-OP	3490	1580	2050				1490	1180	2360	2990	1980	3530	4480	2760	4700	5970	3540	5870	7470	4320	7040	9990	5880	9370
14S-8300-935-OP	4460	2020	2640	2690	1920	3600	3900	2560	4550	6310	3830	6440	8730	5010	8330									
14S-8300-835-OP	4480	2040	2660				1960	1530	3040	3890	2560	4540	5820	3570	6050	7750	4580	7560	9680	5580	9070			
14S-8300-735-OP	4500	2050	2680							1740	1410	2860	3240	2210	4030	4730	3000	5200	6220	3780	6370	9210	5340	8700
18S-9600-1100-OP	7030	2860	3360	4350	3330	6510	6280	4360	8020	10130	6380	11030	13970	8390	14040									
18S-9600-935-OP	7070	2900	3400				2060	2060	4720	4840	3590	6890	7620	5070	9070	10400	6520	11240	13180	7980	13420			
18S-9600-835-OP	7100	2910	3430							2060	2060	4710	4270	3290	6450	6490	4470	8180	8710	5640	9920	13140	7960	13390
18S-9800-1100-OP	8960	3620	4200	1960	1960	5570	3880	3360	7070	7730	5430	10080	11580	7460	13090									
18S-9800-935-OP	9010	3650	4250							2440	2440	5950	5220	4100	8120	8000	5580	10300	10780	7040	12470			
18S-9800-835-OP	9040	3660	4270										1870	1870	5500	4090	3480	7240	6310	4680	8970	10740	7020	12440

Notes

1. Max allowable pressure 12 bar g (static pressure applicable to fully stroked actuator against the travel stop)
2. Angular positions: 0° Closed
   45° Intermediate
   90° Open
3. SST: Spring Starting Torque to open (0°)
   SRT: Spring Running Torque (45°)
   SET: Spring Ending Torque to open (90°)
   AET: Air Ending Torque to close (0°)
   ART: Air Running Torque (45°)
   AST: Air Starting Torque to close (90°)

ALGAS actuators

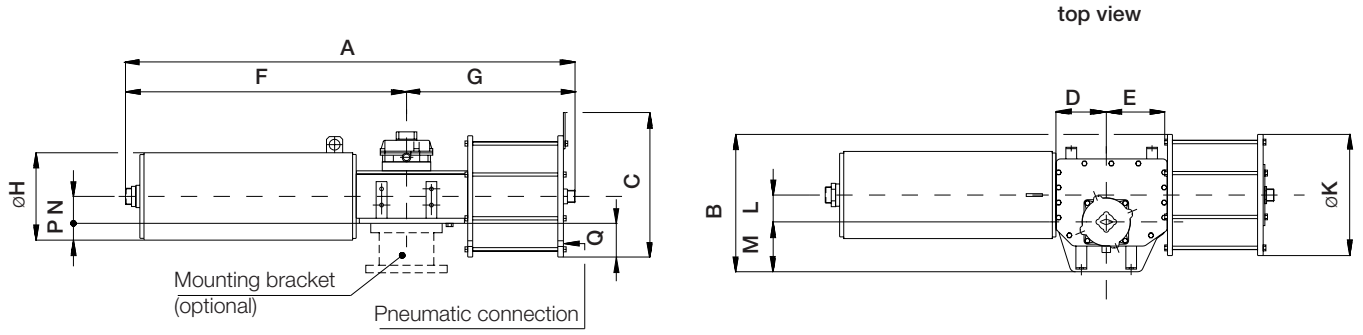
Model	Air displacement (litres)
0.3-0150-235	9
0.3-0150-175	4.8
0.9-0200-280	14
0.9-0200-235	9
0.9-0350-385	26
0.9-0350-335	20
0.9-0350-280	14
0.9-0400-385	26
0.9-0400-335	20
0.9-0400-280	14
0.9-0700-485	41
0.9-0700-385	26
0.9-0700-335	20
1.5-1100-485	48
1.5-1100-385	31
1.5-1200-585	70
1.5-1200-485	48
1.5-1200-385	31
3-2000-585	108
3-2000-485	74
3-2000-385	47
6-2500-635	146
6-2500-585	124
6-2500-485	85
6-3800-735	196
6-3800-635	146
6-3800-585	124
14-5400-935	343
14-5400-835	274
14-5400-735	213
14-8300-935	343
14-8300-835	274
14-8300-735	213
18-9600-1100	552
18-9600-935	398
18-9600-835	318
18-9800-1100	552
18-9800-935	398
18-9800-835	318

Maximum operating torque and pressure

Model	Max operating torque (dNm)	Max Operating Pressure (bar g) canted yoke spring to close	canted yoke spring to open	symmetric yoke spring to close	symmetric yoke spring to open
0.3-0150-235	300	6	6.5	8.5	8.5
0.3-0150-175	300	10.5	10.5	10.5	10.5
0.9-0200-280	900	9.5	9.5	10.5	10.5
0.9-0200-235	900	10.5	10.5	10.5	10.5
0.9-0350-385	900	5.5	5.5	8	7.5
0.9-0350-335	900	7	7.5	10.5	10
0.9-0350-280	900	10.5	10.5	10.5	10.5
0.9-0400-385	900	5.5	6	8.5	8
0.9-0400-335	900	7.5	8	10.5	10.5
0.9-0400-280	900	10.5	10.5	10.5	10.5
0.9-0700-485	900	4	4.5	5.5	5.5
0.9-0700-385	900	6	7	9	8.5
0.9-0700-335	900	8	9.5	10.5	10.5
1.5-1100-485	1500	5	6	6.5	7.5
1.5-1100-385	1500	8	9.5	10.5	10.5
1.5-1200-585	1500	3.5	4.5	5	5.5
1.5-1200-485	1500	5.5	6.5	7	8
1.5-1200-385	1500	8.5	10.5	10.5	10.5
3-2000-585	3000	4	4.5	5.5	6
3-2000-485	3000	6	7	8.5	8.5
3-2000-385	3000	9.5	10.5	10.5	10.5
6-2500-635	6000	5.5	6	8	8
6-2500-585	6000	6.5	7	9.5	9.5
6-2500-485	6000	9.5	10.5	10.5	10.5
6-3800-735	6000	4.5	5	6.5	6.5
6-3800-635	6000	6	6.5	8.5	8.5
6-3800-585	6000	7.5	8	10	10
14-5400-935	12000	5	5	6.5	6.5
14-5400-835	12000	6	6.5	8.5	8.5
14-5400-735	12000	8	8.5	10.5	10.5
14-8300-935	12000	5	5.5	7	7
14-8300-835	12000	6.5	7	8.5	9
14-8300-735	12000	8.5	9	10.5	10.5
18-9600-1100	18000	4.5	5.5	6.5	7
18-9600-935	18000	6.5	7.5	9	9.5
18-9600-835	18000	10.5	10.5	8	9.5
18-9800-1100	18000	5	6	6.5	7.5
18-9800-935	18000	7	8.5	9.5	10.5
18-9800-835	18000	9	10.5	10.5	10.5

Notes

- Max allowable pressure 12 bar g (static pressure applicable to fully stroked actuator against travel stop)
- Max operating pressure is the pressure required to produce the maximum operating torque of the actuator
- Add S to the model number to identify actuators with symmetric yoke (i.e. 0.3S-0150-235)
- Add CL or OP to the model number to identify spring to close or spring to open (i.e. 0.3-0150-235 CL)

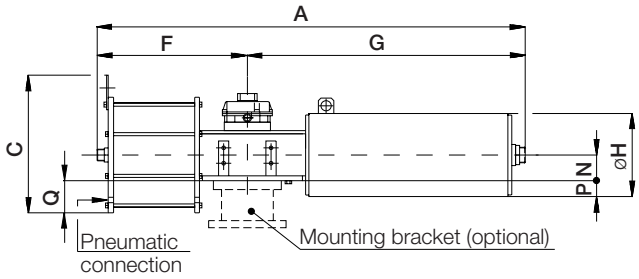


Dimensions in mm

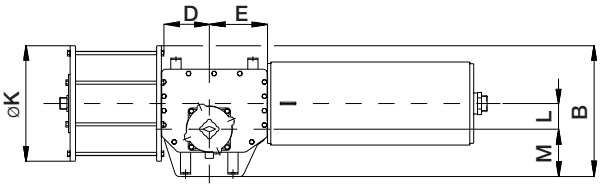
Model	A	B	C	D	E	F	G	øH	øK	L	M	N	P	Q	Pneumatic connection NPT	Weight (kg)
0.3-0150-235 CL	1291	319	336	136	138	765	526	210	⌀260	70	119	70	35	60	1/2	118
0.3-0150-175 CL	1287	319	306	136	151	765	522	210	⌀200	70	119	70	35	30	1/2	102
0.9-0200-280 CL	1419	423	390	160	190	857	562	265	345	80	170	83	50	90	3/4	214
0 9-0200-235 CL	1422	413	347	160	190	857	565	265	⌀260	80	170	83	50	47	1/2	185
0.9-0350-385 CL	1500	475	536	160	180	910	590	325	450	80	170	83	80	142	1	310
0.9-0350-335 CL	1507	450	478	160	180	910	597	325	400	80	170	83	80	117	1	277
0.9-0350-280 CL	1472	423	390	160	190	910	562	325	345	80	170	83	80	90	3/4	245
0.9-0400-385 CL	1434	475	536	160	180	844	590	325	450	80	170	83	80	142	1	310
0.9-0400-335 CL	1441	450	478	160	180	844	597	325	400	80	170	83	80	117	1	277
0.9-0400-280 CL	1406	423	390	160	190	844	562	325	345	80	170	83	80	90	3/4	245
0.9-0700-485 CL	1474	560	640	160	177	871	603	325	560	80	200	83	80	197	1	407
0.9-0700-385 CL	1461	475	536	160	180	871	590	325	450	80	170	83	80	142	1	332
0.9-0700-335 CL	1468	450	478	160	180	871	597	325	400	80	170	83	80	117	1	300
1.5-1100-485 CL	1603	565	640	187	214	963	640	415	560	100	185	100	108	180	1	517
1.5-1100-385 CL	1590	510	536	187	217	963	627	415	450	100	185	100	108	125	1	442
1.5-1200-585 CL	1709	670	758	187	214	1062	647	375	670	100	235	100	88	235	1	682
1.5-1200-485 CL	1702	565	640	187	214	1062	640	375	560	100	185	100	88	180	1	517
1.5-1200-385 CL	1689	510	536	187	217	1062	627	375	450	100	185	100	88	125	1	442
3-2000-585 CL	2547	710	758	285	317	1580	967	415	670	160	215	106	102	229	1	1015
3-2000-485 CL	2501	655	640	285	317	1580	921	415	560	160	215	106	102	174	1	820
3-2000-385 CL	2494	600	536	285	320	1580	914	415	450	160	215	106	102	119	1	762
6-2500-635 CL	3028	805	809	327	366	1906	1122	383	720	185	260	140	52	220	1	1323
6-2500-585 CL	2980	780	758	327	366	1906	1074	383	670	185	260	140	52	195	1	1245
6-2500-485 CL	2975	725	640	327	366	1906	1069	383	560	185	260	140	52	140	1	1068
6-3800-735 CL	3279	853	912	327	363	2138	1141	545	815	185	260	140	133	268	No.2x1	1934
6-3800-635 CL	3260	805	809	327	366	2138	1122	545	720	185	260	140	133	220	1	1720
6-3800-585 CL	3212	780	758	327	366	2138	1074	545	670	185	260	140	133	195	1	1640
14-5400-935 CL	3292	1055	1179	376	415	2040	1252	545	1055	200	328	193	150	335	No.2x1	2600
14-5400-835 CL	3237	958	1036	376	415	2040	1197	545	925	200	295	193	150	270	No.2x1	2250
14-5400-735 CL	3237	903	912	376	419	2040	1197	545	815	200	295	193	150	215	No.2x1	2050
14-8300-935 CL	3366	1055	1179	376	415	2114	1252	545	1055	200	328	193	150	335	No.2x1	2650
14-8300-835 CL	3311	958	1036	376	415	2114	1197	545	925	200	295	193	150	270	No.2x1	2300
14-8300-735 CL	3311	903	912	376	419	2114	1197	545	815	200	295	193	150	215	No.2x1	2100
18-9600-1100 CL	4081	1220	1364	427	467	2687	1394	580	1220	230	380	196	184	414	No.2x1	4350
18-9600-935 CL	4072	1098	1179	427	476	2687	1385	580	1055	230	340	196	184	331	No.2x1	3750
18-9600-835 CL	4020	1033	1034	427	475	2687	1333	580	925	230	340	196	184	265	No.2x1	3350
18-9800-1100 CL	4081	1220	1364	427	467	2687	1394	580	1220	230	380	196	184	414	No.2x1	4700
18-9800-935 CL	4072	1098	1179	427	476	2687	1385	580	1055	230	340	196	184	331	No.2x1	4100
18-9800-835 CL	4020	1033	1034	427	475	2687	1333	580	925	230	340	196	184	265	No.2x1	3700

Notes

1. Add S to the model number to identify actuators with symmetric yoke (i.e. 0.3S-0150-235 CL)
2. Dimensions and weights given are without optional bracket or adaptor flange



top view



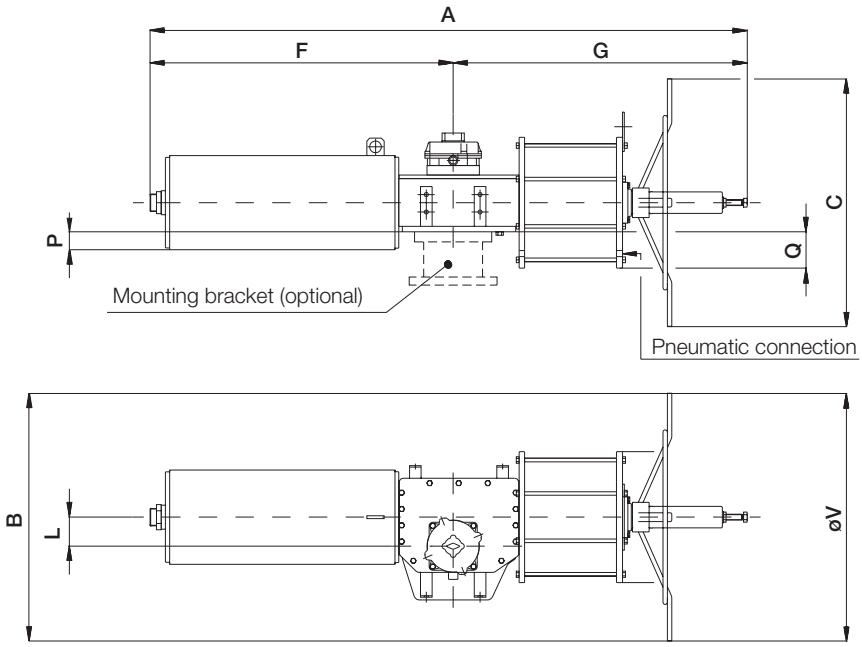
Dimensions in mm

Model	A	B	C	D	E	F	G	øH	øK	L	M	N	P	Q	Pneumatic connection NPT	Weight (kg)
0.3-0150-235 OP	1291	319	336	124	150	511	780	210	⌀ 260	70	119	70	35	60	1/2	118
0.3-0150-175 OP	1287	319	306	124	150	507	780	210	⌀ 200	70	119	70	35	30	1/2	102
0.9-0200-280 OP	1419	423	390	148	190	532	887	265	345	80	170	83	50	90	3/4	214
0.9-0200-235 OP	1422	413	347	148	190	535	887	265	⌀ 260	80	170	83	50	47	1/2	185
0.9-0350-385 OP	1500	475	536	148	190	560	940	325	450	80	170	83	80	142	1	310
0.9-0350-335 OP	1507	450	478	148	190	567	940	325	400	80	170	83	80	117	1	277
0.9-0350-280 OP	1472	423	390	148	190	532	940	325	345	80	170	83	80	90	3/4	245
0.9-0400-385 OP	1434	475	536	148	190	560	874	325	450	80	170	83	80	142	1	310
0.9-0400-335 OP	1441	450	478	148	190	567	874	325	400	80	170	83	80	117	1	277
0.9-0400-280 OP	1406	423	390	148	190	532	874	325	345	80	170	83	80	90	3/4	245
0.9-0700-485 OP	1474	560	640	148	190	573	901	325	560	80	200	83	80	197	1	407
0.9-0700-385 OP	1461	475	536	148	190	560	901	325	450	80	170	83	80	142	1	332
0.9-0700-335 OP	1468	450	478	148	190	567	901	325	400	80	170	83	80	117	1	300
1.5-1100-485 OP	1603	565	640	175	226	601	1002	415	560	100	185	100	108	180	1	517
1.5-1100-385 OP	1590	510	536	175	226	588	1002	415	450	100	185	100	108	125	1	442
1.5-1200-585 OP	1709	670	758	175	226	608	1101	375	670	100	235	100	88	235	1	682
1.5-1200-485 OP	1702	565	640	175	226	601	1101	375	560	100	185	100	88	180	1	517
1.5-1200-385 OP	1689	510	536	175	226	588	1101	375	450	100	185	100	88	125	1	442
3-2000-585 OP	2547	710	758	273	330	906	1641	415	670	160	215	106	102	229	1	1015
3-2000-485 OP	2501	655	640	273	330	860	1641	415	560	160	215	106	102	174	1	820
3-2000-385 OP	2494	600	536	273	330	853	1641	415	450	160	215	106	102	119	1	762
6-2500-635 OP	3028	805	809	315	378	1071	1957	383	720	185	260	140	52	220	1	1323
6-2500-585 OP	2980	780	758	315	378	1023	1957	383	670	185	260	140	52	195	1	1245
6-2500-485 OP	2975	725	640	315	378	1018	1957	383	560	185	260	140	52	140	1	1068
6-3800-735 OP	3279	853	912	315	378	1090	2189	545	815	185	260	140	133	268	No.2x1	1934
6-3800-635 OP	3260	805	809	315	378	1071	2189	545	720	185	260	140	133	220	1	1720
6-3800-585 OP	3212	780	758	315	378	1023	2189	545	670	185	260	140	133	195	1	1640
14-5400-935 OP	3292	1055	1179	356	435	1193	2099	545	1055	200	328	193	150	335	No.2x1	2600
14-5400-835 OP	3237	958	1036	364	435	1138	2099	545	925	200	295	193	150	270	No.2x1	2250
14-5400-735 OP	3237	903	912	364	435	1138	2099	545	815	200	295	193	150	215	No.2x1	2050
14-8300-935 OP	3366	1055	1179	356	435	1193	2173	545	1055	200	328	193	150	335	No.2x1	2650
14-8300-835 OP	3311	958	1036	364	435	1138	2173	545	925	200	295	193	150	270	No.2x1	2300
14-8300-735 OP	3311	903	912	364	435	1138	2173	545	815	200	295	193	150	215	No.2x1	2100
18-9600-1100 OP	4081	1220	1364	399	495	1326	2755	580	1220	230	380	196	184	414	No.2x1	4350
18-9600-935 OP	4072	1098	1179	410	495	1317	2755	580	1055	230	340	196	184	332	No.2x1	3750
18-9600-835 OP	4020	1033	1036	407	495	1265	2755	580	925	230	340	196	184	267	No.2x1	3350
18-9800-1100 OP	4081	1220	1364	399	495	1326	2755	580	1220	230	380	196	184	414	No.2x1	4700
18-9800-935 OP	4072	1098	1179	410	495	1317	2755	580	1055	230	340	196	184	332	No.2x1	4100
18-9800-835 OP	4020	1033	1036	407	495	1265	2755	580	925	230	340	196	184	267	No.2x1	3700

Notes

1. Add S to the model number to identify actuators with symmetric scotch yoke (i.e. 0.3S-0150-235 OP)
2. Dimensions and weights given are without optional bracket or adaptor flange

ALGAS spring to close actuator with “MHW” manual override



The handwheel manual override is mounted on the end flange of the pneumatic cylinder and consists of a jackscrew which is screwed into the bronze screw nut mounted in the cylinder end flange. The jackscrew is assembled into a protective tube and is driven by means of two keys.
Rotation of the protective tube results in axial movement of the jackscrew which pushes the cylinder piston rod, against the spring action.
The handweel of the MHW override is mounted on the protection tube and connected by key.
A reduction gear is fitted, in the MRHW overrides, which are used in the larger actuators, where high torques are required for jackscrew rotation.

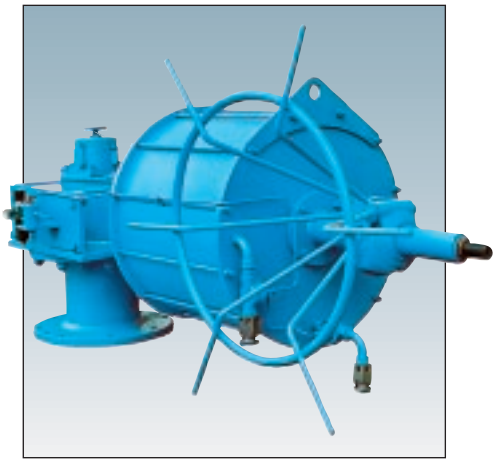
Dimensions in mm

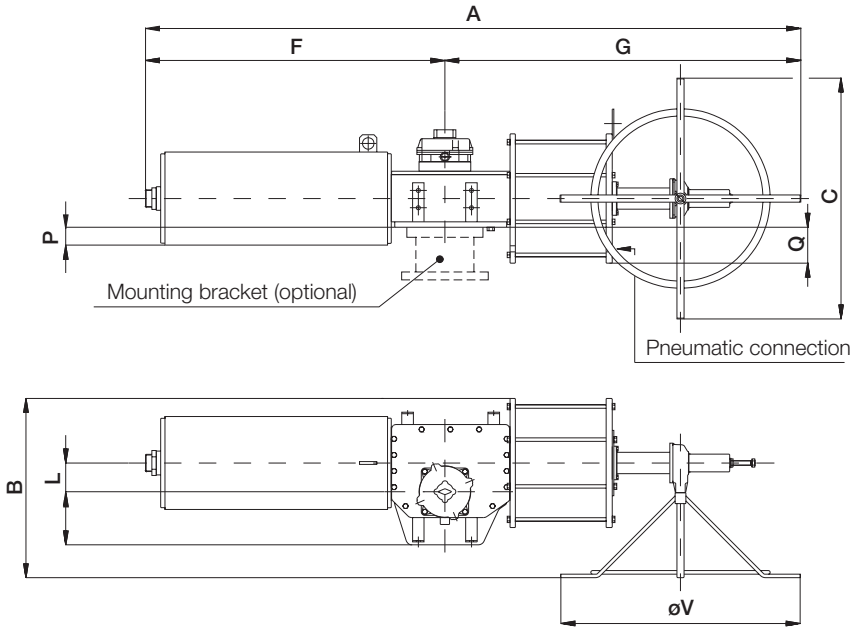
Model	A	B	C	F	G	øV	L	P	Q	Handwheel turns per stroke	Pneumatic connection NPT	Weight (kg)
0.3-0150-235 CL-MHW	1594	339	322	765	829	300	70	35	60	48	1/2	130
0.3-0150-175 CL-MHW	1574	339	300	765	809	300	70	35	30	48	1/2	112
0.9-0200-280 CL-MHW	1790	600	600	857	933	600	80	50	90	42	3/4	224
0.9-0200-235 CL-MHW	1725	413	322	857	868	300	80	50	47	55	1/2	195
0.9-0350-385 CL-MHW	1884	600	612	910	974	600	80	80	142	42	1	330
0.9-0350-335 CL-MHW	1881	600	600	910	971	600	80	80	117	42	1	297
0.9-0350-280 CL-MHW	1843	600	600	910	933	600	80	80	90	42	3/4	265
0.9-0400-385 CL-MHW	1818	600	612	844	974	600	80	80	142	42	1	330
0.9 0400-335 CL-MHW	1815	600	600	844	971	600	80	80	117	42	1	297
0.9-0400-280 CL-MHW	1777	600	600	844	933	600	80	80	90	42	3/4	265
0.9-0700-485 CL-MHW	1851	850	850	871	980	850	80	80	197	42	1	427
0.9-0700-385 CL-MHW	1845	850	850	871	974	850	80	80	142	42	1	352
0.9-0700-335 CL-MHW	1842	850	850	871	971	850	80	80	117	42	1	320
1.5-1100-485 CL-MHW	1981	850	850	963	1018	850	100	108	180	53	1	537
1.5-1100-385 CL-MHW	1974	850	850	963	1011	850	100	108	125	53	1	462
1.5-1200-585 CL-MHW	2094	850	850	1062	1032	850	100	88	235	53	1	702
1.5-1200-485 CL-MHW	2080	850	850	1062	1018	850	100	88	180	53	1	537
1.5-1200-385 CL-MHW	2073	850	850	1602	1011	850	100	88	125	53	1	462

Notes

1. Add S to the model number to identify actuators with symmetric yoke (i.e. 0.3S-0150-235 CL-MHW)
2. Dimensions and weights given are without optional bracket or adaptor flange

ALGAS spring to close actuator with "MRHW" manual override





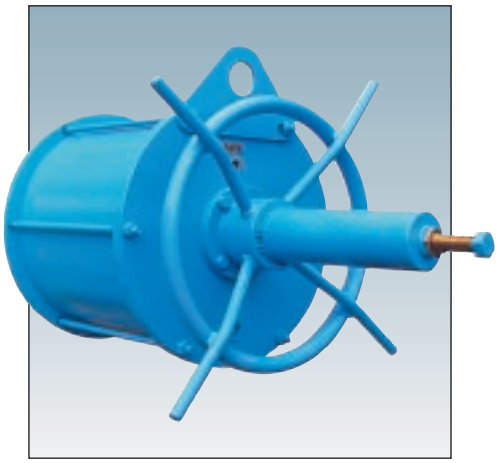
Dimensions in mm

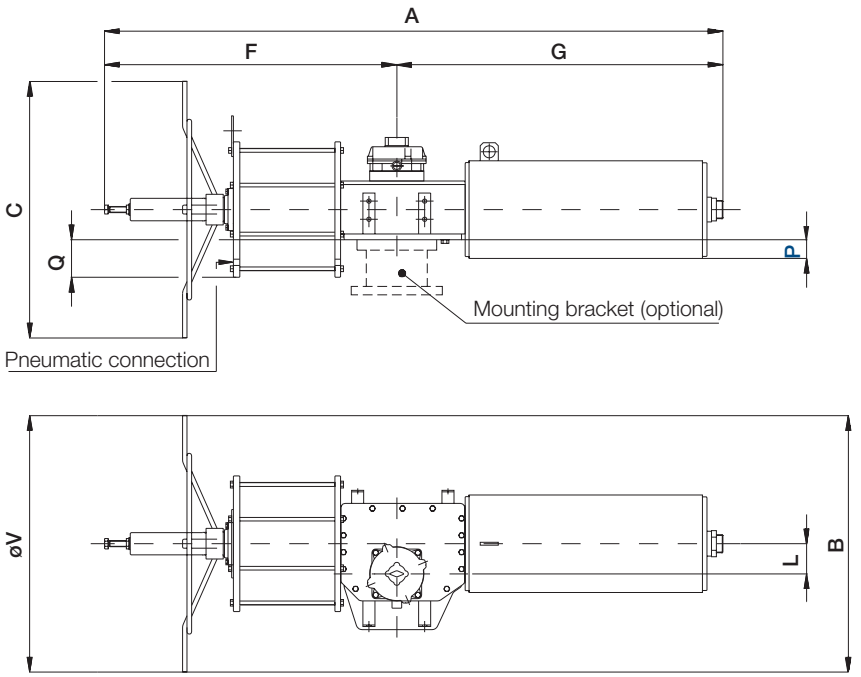
Model	A	B	C	F	G	øV	L	P	Q	Handwheel turns per stroke	Pneumatic connection NPT	Weight (kg)
3-2000-585 CL-MRHW	3217	815	1000	1580	1637	1000	160	102	229	418	1	1075
3-2000-485 CL-MRHW	3194	760	1000	1580	1614	1000	160	102	174	418	1	880
3-2000-385 CL-MRHW	3194	705	1000	1580	1614	1000	160	102	119	418	1	822
6-2500-635 CL-MRHW	3866	928	1200	1906	1960	1200	185	52	220	678	1	1463
6-2500-585 CL-MRHW	3817	903	1200	1906	1911	1200	185	52	195	678	1	1405
6-2500-485 CL-MRHW	3806	847	1200	1906	1900	1200	185	52	140	678	1	1208
6-3800-735 CL-MRHW	4121	976	1200	2138	1983	1200	185	133	268	678	No. 2x1	2074
6-3800-635 CL-MRHW	4098	928	1200	2138	1960	1200	185	133	220	678	1	1860
6-3800-585 CL-MRHW	4049	903	1200	2138	1911	1200	185	133	195	678	1	1780
14-5400-935 CL-MRHW	4128	1096	1200	2040	2088	1200	200	150	335	1254	No. 2x1	2740
14-5400-835 CL-MRHW	4079	1030	1200	2040	2039	1200	200	150	270	1254	No. 2x1	2390
14-5400-735 CL-MRHW	4079	976	1200	2040	2039	1200	200	150	215	1254	No. 2x1	2190
14-8300-935 CL-MRHW	4202	1096	1200	2114	2088	1200	200	150	335	1254	No. 2x1	2790
14-8300-835 CL-MRHW	4153	1030	1200	2114	2039	1200	200	150	270	1254	No. 2x1	2440
14-8300-735 CL-MRHW	4153	976	1200	2114	2039	1200	200	150	215	1254	No. 2x1	2240
18-9600-1100 CL-MRHW	5156	1314	1454	2687	2469	1400	230	184	414	1926	No. 2x1	4550
18-9600-935 CL-MRHW	5147	1232	1400	2687	2460	1400	230	184	331	1926	No. 2x1	3950
18-9600-835 CL-MRHW	5101	1166	1400	2687	2414	1400	230	184	265	1926	No. 2x1	3550
18-9800-1100 CL-MRHW	5156	1314	1454	2687	2469	1400	230	184	414	1926	No. 2x1	4900
18-9800-935 CL-MRHW	5147	1232	1400	2687	2460	1400	230	184	331	1926	No. 2x1	4300
18-9800-835 CL-MRHW	5101	1166	1400	2687	2414	1400	230	184	265	1926	No. 2x1	3900

Notes

1. Add S to the model number to identify actuators with symmetric yoke (i.e. 3S-2000-585 CL-MRHW)
2. Dimensions and weights given are without optional bracket or adaptor flange

ALGAS spring to open actuator with "MHW" manual override





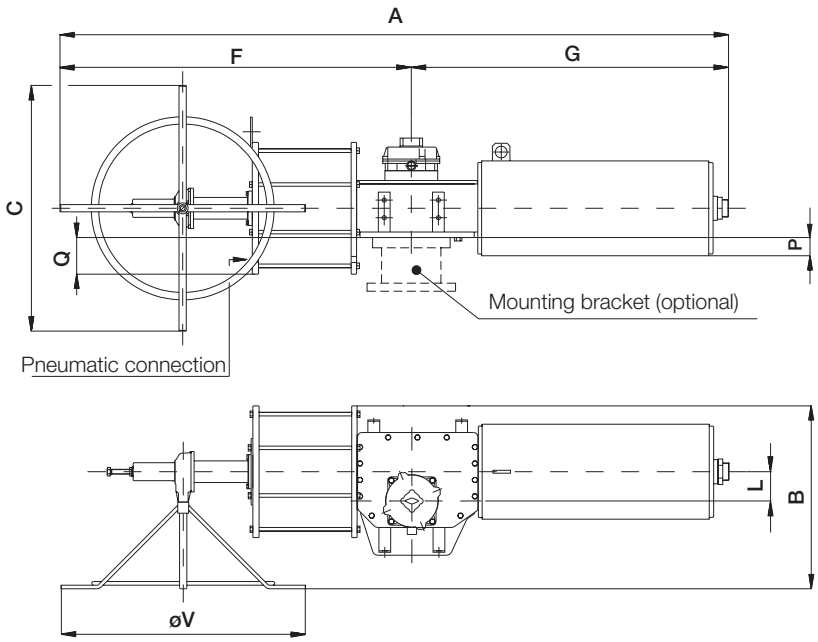
Dimensions in mm

Model	A	B	C	F	G	øV	L	P	Q	Handwheel turns per stroke	Pneumatic connection NPT	Weight (kg)
0.3-0150-235 OP-MHW	1595	339	322	815	780	300	70	35	60	48	1/2	130
0.3-0150-175 OP-MHW	1575	339	300	795	780	300	70	35	30	48	1/2	112
0.9-0200-280 OP-MHW	1812	600	600	925	887	600	80	50	90	42	3/4	224
0.9-0200-235 OP-MHW	1713	413	322	826	887	300	80	50	47	55	1/2	195
0.9-0350-385 OP-MHW	1882	600	612	942	940	600	80	80	142	42	1	330
0.9-0350-335 OP-MHW	1875	600	600	939	940	600	80	80	117	42	1	297
0.9-0350-280 OP-MHW	1865	600	600	925	940	600	80	80	90	42	3/4	265
0.9-0400-385 OP-MHW	1816	600	612	942	874	600	80	80	142	42	1	330
0.9-0400-335 OP-MHW	1813	600	600	939	874	600	80	80	117	42	1	297
0.9-0400-280 OP-MHW	1799	600	600	925	874	600	80	80	90	42	3/4	265
0.9-0700-485 OP-MHW	1852	850	850	951	901	850	80	80	197	42	1	427
0.9-0700-385 OP-MHW	1843	850	850	942	901	850	80	80	142	42	1	352
0.9-0700-335 OP-MHW	1840	850	850	939	901	850	80	80	117	42	1	320
1.5-1100-485 OP-MHW	1880	850	850	877	1003	850	100	108	180	53	1	537
1.5-1100-385 OP-MHW	1870	850	850	867	1003	850	100	108	125	53	1	462
1.5-1200-585 OP-MHW	2095	850	850	993	1102	850	100	88	235	53	1	702
1.5-1200-485 OP-MHW	2081	850	850	979	1102	850	100	88	180	53	1	537
1.5-1200-385 OP MHW	2071	850	850	969	1102	850	100	88	125	53	1	462

Notes

1. Add S to the model number to identify actuators with symmetric yoke (i.e. 0.3S-0150-235 OP-MHW)
2. Dimensions and weights given are without optional bracket or adaptor flange

ALGAS spring to open actuator with "MRHW" manual override

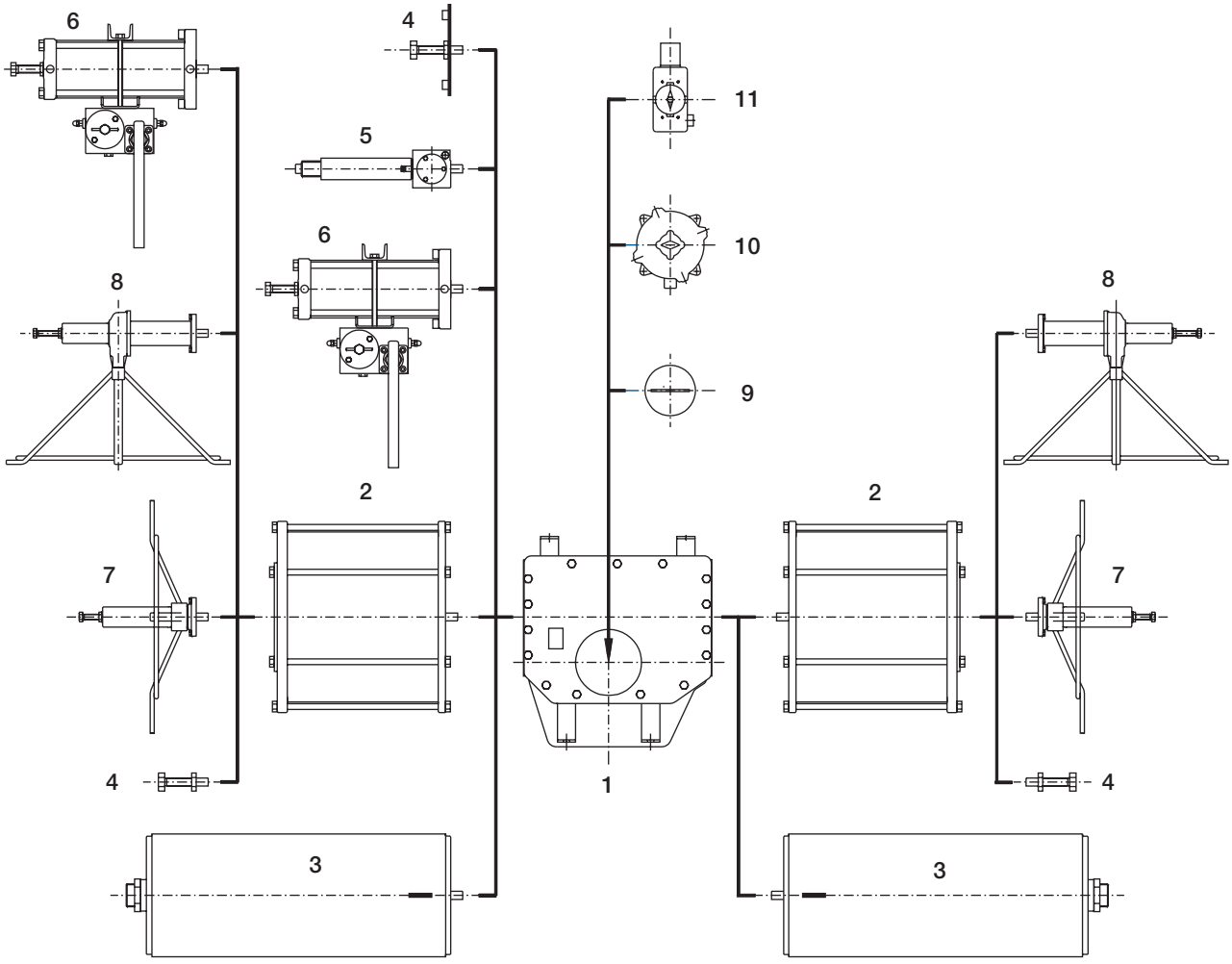


Dimensions in mm

Model	A	B	C	F	G	øV	L	P	Q	Handwheel turns per stroke	Pneumatic connection NPT	Weight (kg)
3-2000-585 OP-MRHW	3218	815	1000	1593	1625	1000	160	102	229	418	1	1075
3-2000-485 OP-MRHW	3195	760	1000	1570	1625	1000	160	102	174	418	1	880
3-2000-385 OP-MHRW	3195	705	1000	1570	1625	1000	160	102	119	418	1	822
6-2500-635 OP-MRHW	3867	928	1200	1909	1958	1200	185	52	220	678	1	1463
6-2500-585 OP-MRHW	3818	903	1200	1860	1958	1200	185	52	195	678	1	1405
6-2500-485 OP-MRHW	3818	847	1200	1849	1958	1200	185	52	140	678	1	1208
6-3800-735 OP-MRHW	4122	976	1200	1932	2190	1200	185	133	268	678	No.2x1	2074
6-3800-635 OP-MRHW	4099	928	1200	1909	2190	1200	185	133	220	678	1	1860
6-3800-585 OP-MRHW	4050	903	1200	1860	2190	1200	185	133	195	678	1	1780
14-5400-935 OP-MRHW	4129	1096	1200	2030	2099	1200	200	150	335	1254	No.2x1	2740
14-5400-835 OP-MRHW	4080	1030	1200	1981	2099	1200	200	150	270	1254	No.2x1	3240
14-5400-735 OP-MRHW	4080	976	1200	1981	2099	1200	200	150	215	1254	No.2x1	3040
14-8300-935 OP-MRHW	4203	1096	1200	2030	2173	1200	200	150	335	1254	No.2x1	2790
14-8300-835 OP-MRHW	4154	1030	1200	1981	2173	1200	200	150	270	1254	No.2x1	3390
14-8300-735 OP-MRHW	4154	976	1200	1981	2173	1200	200	150	215	1254	No.2x1	3190
18-9600-1100 OP-MRHW	5156	1314	1454	2401	2755	1400	230	184	414	1926	No.2x1	4550
18-9600-935 OP-MRHW	5147	1232	1400	2392	2755	1400	230	184	331	1926	No.2x1	3950
18-9600-835 OP-MRHW	5101	1166	1400	2346	2755	1400	230	184	265	1926	No.2x1	3550
18-9800-1100 OP-MRHW	5156	1314	1454	2401	2755	1400	230	184	414	1926	No.2x1	4900
18-9800-935 OP-MRHW	5147	1232	1400	2392	2755	1400	230	184	331	1926	No.2x1	4300
18-9800-835 OP-MRHW	5101	1166	1400	2346	2755	1400	230	184	265	1926	No.2x1	3900

Notes

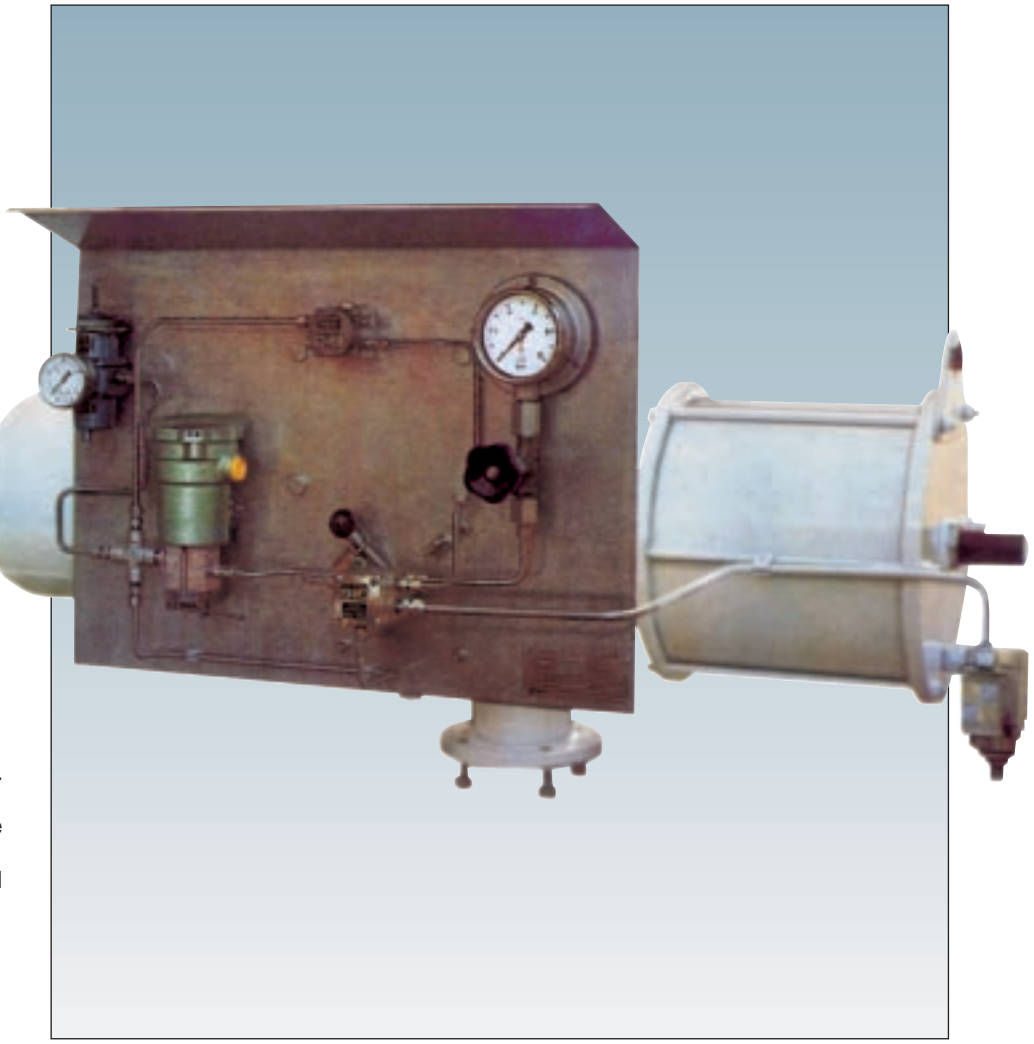
1. Add S to the model number to identify actuators with symmetric yoke (i.e. 3S-2000-585 OP-MRHW)
2. Dimensions and weights given are without optional bracket or adaptor flange



Item	Name
1	Scotch yoke mechanism
2	Pneumatic cylinder
3	Spring container
4	Travel stop screw
5	Manual override type “MSJ”
6	Manual override type “MHP”
7	Manual override type “MHW”
8	Manual override type “MHRW”
9	Local position indicator
10	Electric limit switch box
11	Pneumatic or electropneumatic positioner

General

BIFFI has the ability to apply **advanced engineering technology** to design and manufacture of **pneumatic controls and accessories**.
The **experience** and **knowledge** acquired in the actuator industry allow BIFFI to meet with the highest requirements for control modes and operating conditions by **correct selection of schematics**, **components**, **materials and protection treatment**.
The actuator service can be **On-Off** or **Modulating**. Actuator control can be **local or remote** by electric or pneumatic signals.
The control system can include **devices for automatic operation** or **stay put** in case of **emergency** (electric or pneumatic supply failure, high temperature, low or high pipeline pressure etc.).
For **heavy duty service** or **special working conditions** (for example low working temperature, sour gas supply, special emergency operation, etc.), **control valves specially designed** and **manufactured by BIFFI** can be supplied.
Control systems can either be **mounted on a panel** or enclosed inside a **weatherproof cabinet**.
Control systems can either be supplied **separately or assembled on the actuator**.
0The actuator housing has **dedicated supports for the mounting of control systems and accessories**.



Main components of the control system

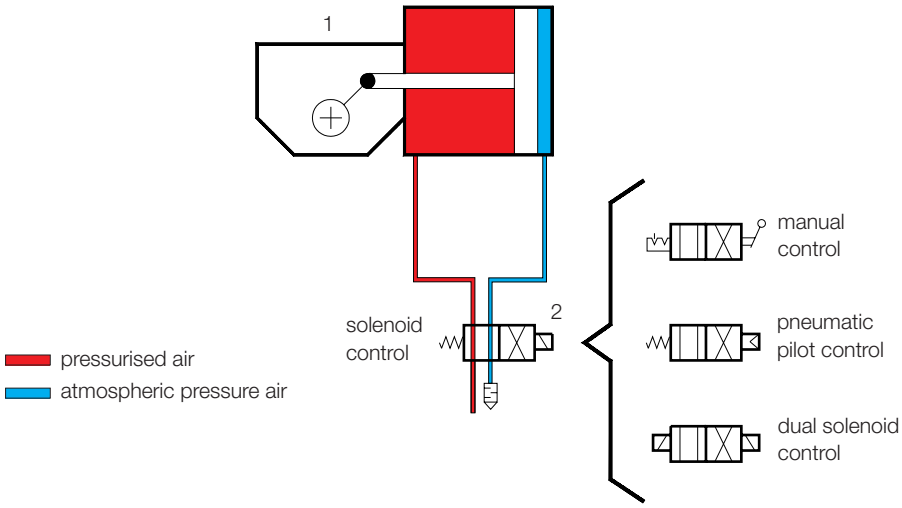
- **Stop valves, check valves**
- **Air conditioners** (filter, pressure regulator with pressure gauge, lubricator)
- **Air storage tanks** with accessories (relief valve, pressure gauge with stop valve, drain plug). **Standard air tanks** are designed, manufactured and tested **according to PED 97/23/EC**. If required the tank can be supplied in accordance with different codes like ASME VIII DIV. 1, SNCT/France, BS/UK, TÜV/Germany, etc.
- **Solenoid** valves, **manual** valves, **pneumatic pilot valves**
- **Flow regulators**
- **Quick exhaust valves**
- **Pressure switches** - pneumatic or electric
- **Terminal enclosures**
- **Positioners** - pneumatic or electropneumatic
- **I/P converters**

Features

- The standard **components** have the **body in aluminium**.
  Brass and stainless steel versions **can be supplied**
- The **standard directional control valves** are **spool type**.
  Poppet type valves are **available**
- The **standard solenoid valves** are **air pilot operated**. Direct solenoid operated valves are available
- **Manual override** for solenoid valves is available
- **Manual reset** is available for solenoid valves and for pneumatic pilot valves
- **The electrical component enclosures** can have **explosionproof** and/or **weatherproof** protection.
  The **explosionproof** enclosures are in accordance with **ATEX Directive 94/9/EC and Standards** EN 50014 and EN 50018. Enclosures in accordance with **UL or CSA Standards can be supplied**.
  Components suitable for use in **intrinsically safe** circuits are **available**
- Terminals enclosures with **increased safety** protection are **available**
- The **pneumatic connections** are in **copper pipe and brass fittings as standard**; stainless steel can be supplied on request
- **Standard weatherproof cabinets** for control systems are in **carbon steel**. **Glass reinforced polyester** and the **stainless steel on request**

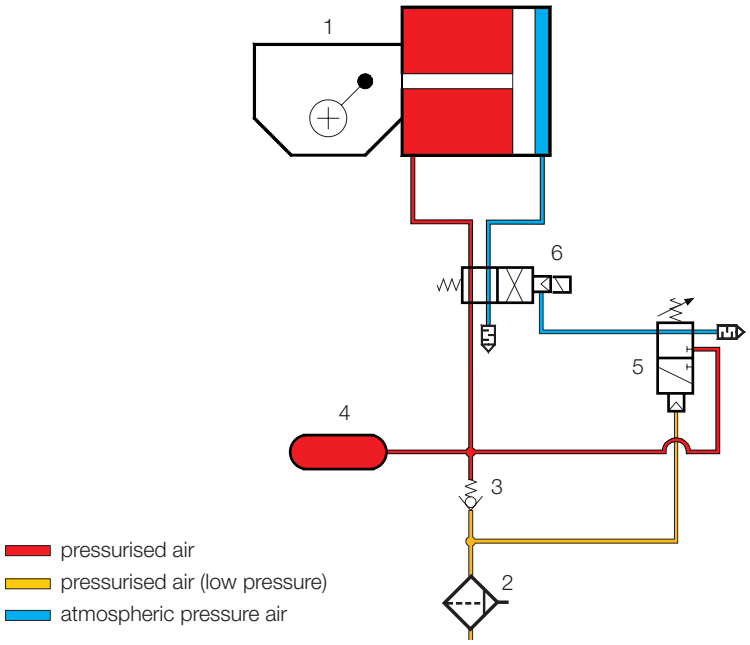
On-Off service: four way control valve

The diagram shows the simplest On-Off control. The gas supply pressure is applied to one side of the cylinder and exhausted from the opposite side.
When the control valve (2) is actuated the connections of supply and exhaust to the cylinder chambers are reversed.
The control valve can have many types of actuating devices (solenoid, manual control, pneumatic pilot, spring, etc.).
The spring return control valves allow "fail safe" operation.



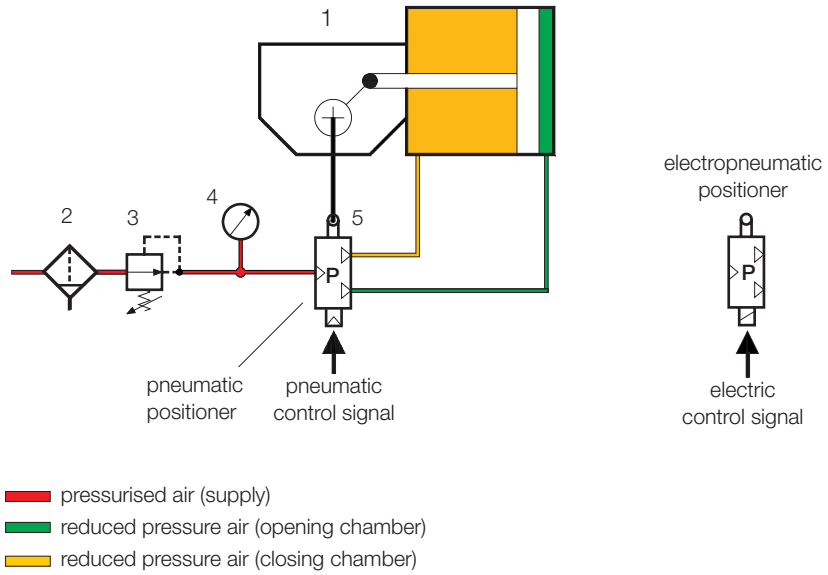
On-Off service: air fail safe system

This system allows "fail safe" operation when the pressure in the gas supply line drops below a set value.
The diagram shows the actuator (1) in the "fail safe" condition.
When the gas supply pressure drops below the pressure switch (5) set point, the pneumatic supply to the solenoid valve (6) pilot is exhausted and the actuator moves to the "fail safe" position by using the gas stored in the tank (4).
The tank is connected to the gas supply through the check valve (3).



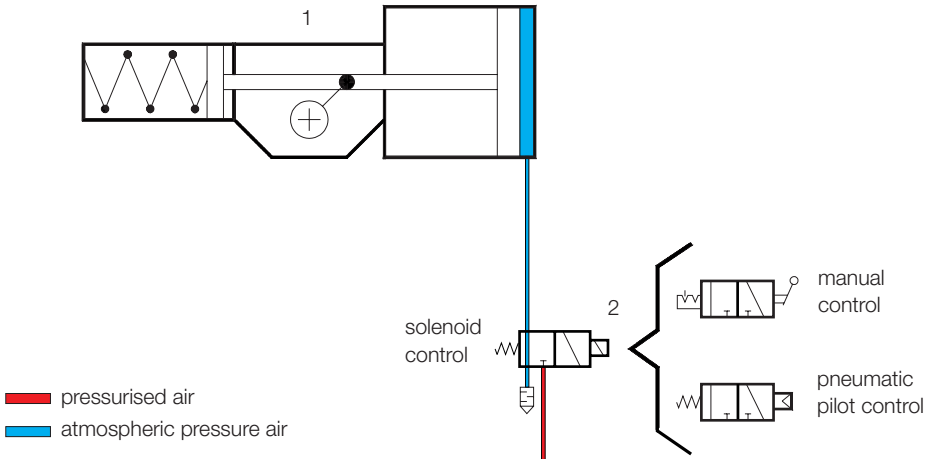
Modulating service

When modulating control is required as a function of a pneumatic or electric control signal, a positioner (5) is used, which controls the supply to the actuator cylinder to keep the valve in the required angular position.
The positioner has a mechanical linkage to the actuator, for a feedback of the valve position.



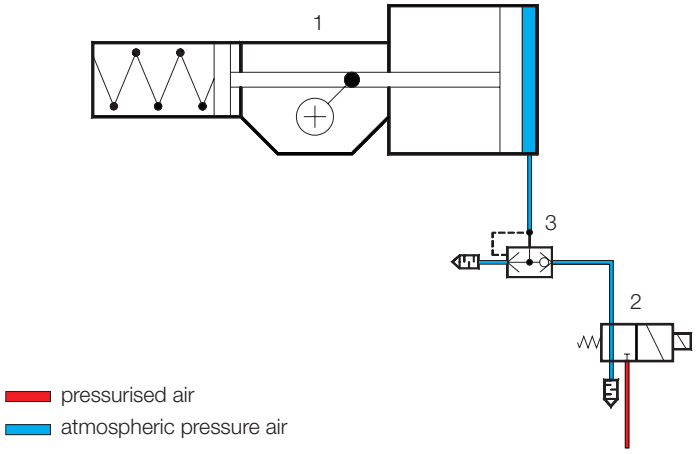
On-Off service: three way control valve

The diagram shows the simplest On-Off control. The control valve (2) has two positions. In one position the gas supply pressure is connected to the cylinder chamber, and the actuator performs the "pneumatic" operation. In the other position the cylinder is connected to the exhaust and the actuator moves under the operation of the spring.
The control valve can have many types of actuating devices (solenoid, manual control, pneumatic pilot, spring, etc.). Spring return control valves allow "fail safe" operation.



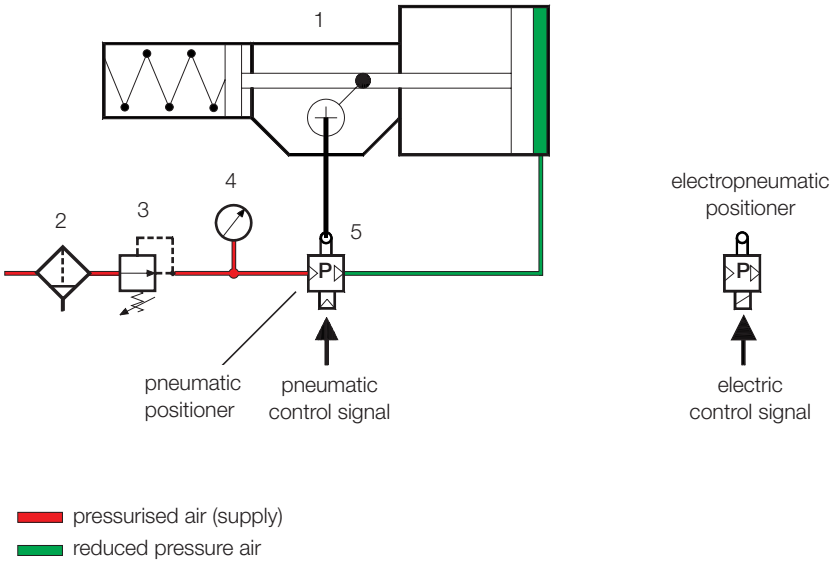
On-Off service: quick spring operation

When fast action is required under spring operation, a quick exhaust valve (3) is installed in the cylinder port to exhaust the gas from the cylinder directly to the atmosphere.
When the control valve (2) opens to the atmosphere a differential pressure is created across the quick exhaust valve (3) causing it to open.
The resultant high flow capacity from cylinder to atmosphere allows quick spring operation of the actuator.



Modulating service

When modulating control is required as a function of a pneumatic or electric control signal, a positioner (5) is used, which controls the supply to the actuator cylinder to keep the valve in the required angular position.
The positioner has a mechanical linkage to the actuator, for a feedback of the valve position.

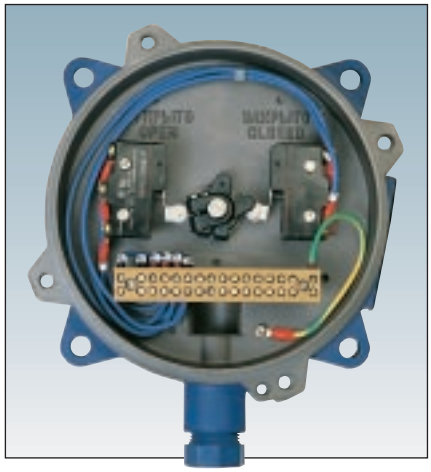


The limit switch boxes are rugged yet compact assemblies, designed for direct mounting onto the actuators for accurate indication of valve position

Features

- **Anodized aluminium enclosure** provides full environmental protection. Nodular cast iron enclosure available
- **Weatherproof** protection class IP 68 to EN 60529
- **Explosionproof** enclosure to ATEX 94/9 EC, **CENELEC** EN 50014 and EN 50018, EN 50281-1-1, **EEXd IIC T6**
- **Independently adjustable switches**, wired to a terminal block (for full angular valve travel)
- **2 SPDT sealed switches weatherproof protection IP55** OMRON type Z-15GW2255-B7. Enclosures with **up to 8 SPDT switches are available**
- **When required** the following switches can be supplied:
  - **sealed and under inert gas atmosphere silver plated contacts**: HONEYWELL type 1HS3
  - **sealed and gold plated contacts**: HONEYWELL type BZ-2RW 822725551-A2
  - **inductive proximity switch**: PEPPERL & FUCHS type NJ5-11-N-G
  - **magnetic proximity switch** (3 wires SPDT): BIFFI 8890008060
  - **DPDT switch**: OMRON type DZ-10GW22-1B6

  Other switches can be supplied according to customer specification
- **Switches and terminals**, suitable **for use in intrinsically safe circuits**, are **available**
- **Position indicator**: **external** on the top on the enclosure cover. Position indicator **protected by transparent cover** or **flag position indicator** (visible at a distance) are **available**
- **Cable entry**: **No.1x3/4 NPT**. Adaptors or cable glands can be supplied according to the connection cable
- The version in nodular cast iron with to cables entries 3/4" NPT is available with protection degree EExd-IIB-T6



Material of construction		
Body	:	die cast aluminium; cast iron optional
Cover	:	die cast aluminium; cast iron (optional); 316L stainless steel (optional);
Shafts	:	stainless steel
Cams	:	plastic moulding
Position indicator	:	plastic moulding Version protected by transparent cover available

Operation specification

Temperature range: -30°C to +100°C (special seals materials available for service outside this range)

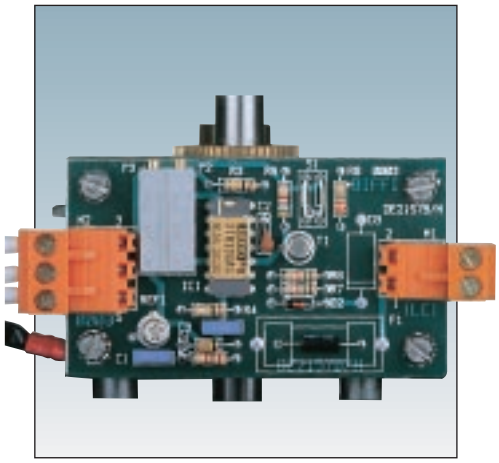
Valve position transmitter mounted in the limit switch box

Position Transmitter

When a remote continuous signalling of the position of the valve is required, a position transmitter is supplied assembled in the same enclosure as the limit switches.
Three different types are available:

Resistive potentiometer
The transmitter is a potentiometer of linear resistive type. For voltage drop reasons this transmitter can be used only **for medium distance** between the actuator and the position indicator instrument.
Recommended **for position transmission only** (not recommended for heavy duty modulating service).

- Element : wirewound
- Standard full scale value : 1000 Ohm
  (other full scale values available)
- Max voltage across coil : 52 Volt
- Power rating at 40°C ambient : 2.75 Watt
- Linearity : ±0.5% full scale
- Rotational life : 500000 cycles
  (resistive potentiometer with higher rotational life available on request)



Resistive potentiometer with 4-20 mA electronic card
The transmitter is a potentiometer wired to an electronic card which gives a current output signal. The current signal is used where a position indicator is located at a **long distance** from the actuator.
Recommended **for position transmission only** (not recommended for heavy duty modulating service).

- Potentiometer element : wirewound
- Potentiometer rotational life : 500000 cycles
  (resistive potentiometer with higher rotational life available on request)
- Supply voltage : from15 to 35 Vdc (nominal 24 Vdc)
- Linearity : ±0.5% full scale

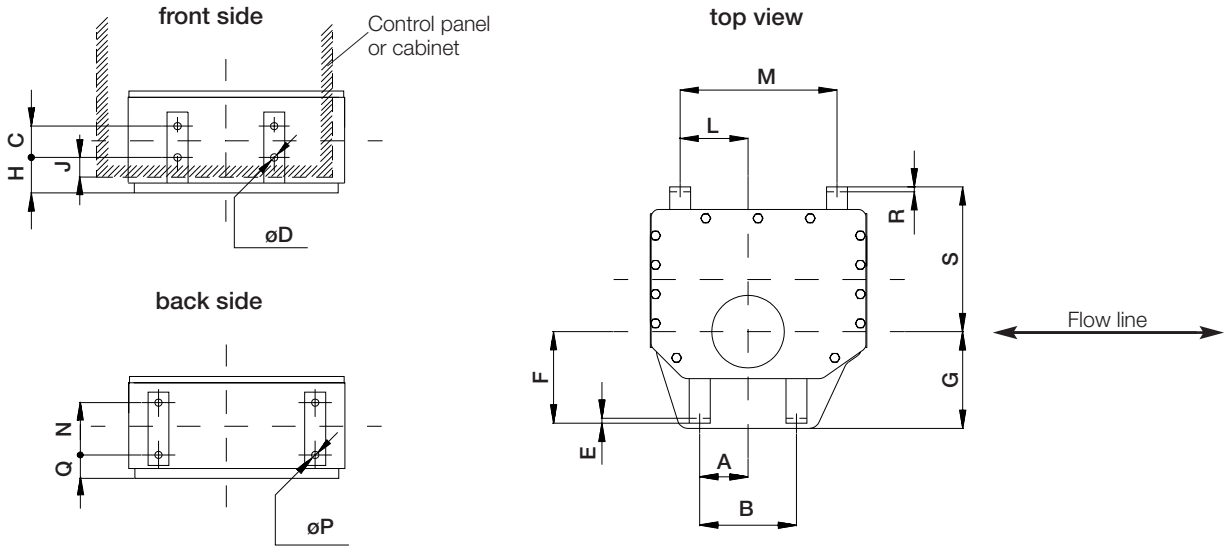
Special NOVOTECKHNIK potentiometer PL 310 SKOhm with 4-20 mA electronic card

- Suitable for **heavy duty modulating service**
- Element : conductive plastic
- Potentiometer rotational life : 100 millions cycles
- Supply voltage : from 15 to 35 Vdc (nominal 24 Vdc)
- Linearity : ±2.5% full scale

Contactless capacitive position transmitter KINAX 3w2 with 4-20mA output signal

- Accuracy ≤ 0.5%
- Supply voltage 12-30 VDC

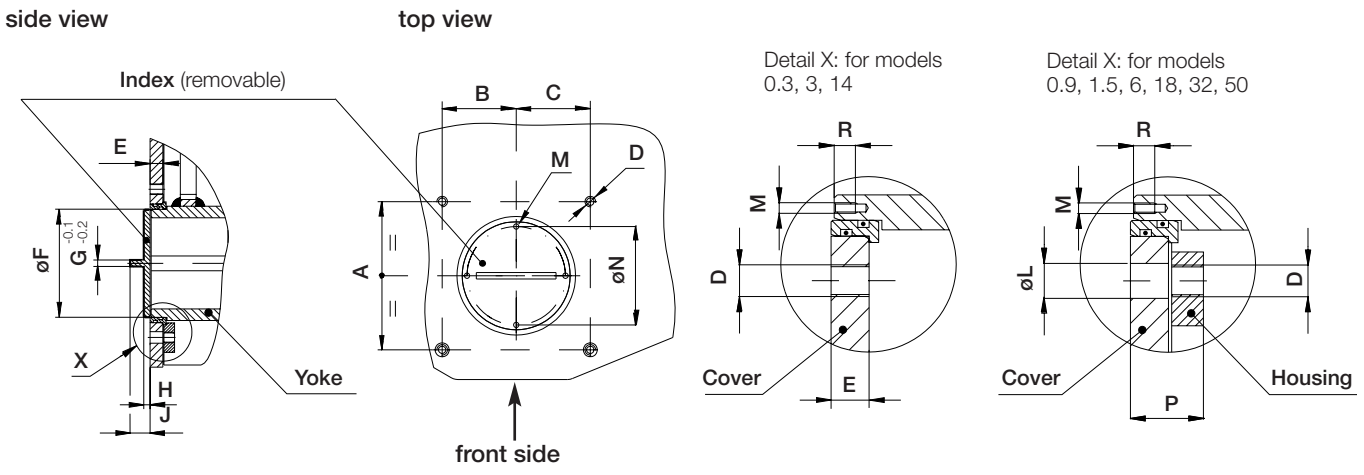
Mounting holes of housing



Dimensions in mm

Model	A	B	C	øD	E	F	G	H	J	L	M	N	øP	Q	R	S
0.3	77.5	155	60	14	5	113	119	37	12	92	200	60	14	36	5	200
0.9	92.5	185	60	14	5	155	170	61	35	85	200	60	14	48	5	243
1.5	92.5	185	60	14	5	175	185	62	35	130	300	100	14	45	5	284
3	117.5	235	85	23	8	203	215	57	25	230	500	100	14	54	5	371
6	137	455	115	23	8	248	260	59	22	224	500	100	14	87	8	480
14	315	630	200	27	10	227	330	97	55	220	500	170	27	99	8	543
18	315	630	200	27	10	235	340	72	32	306	680	215	27	80	10	600
32	315	630	200	27	10	385	395	72	32	414	890	215	27	149	10	660
50	387.5	860	250	30	12	372	387	77	35	473	1030	215	27	163	10	1072

Mounting holes of cover and yoke



Dimensions in mm

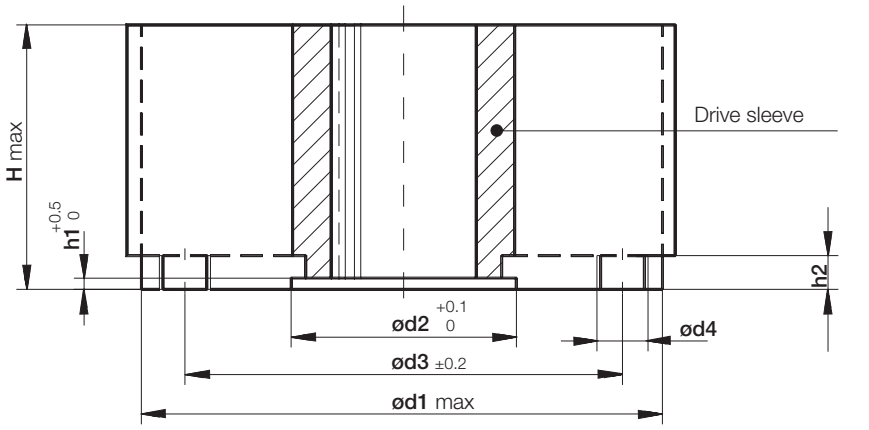
Model	A	B	C	D	E	øF	G	H	J	øL	M	øN	P	R
0.3	140	70	70	No. 4 x M10	10	84	6	6	19	-	No. 4 x M4	76	-	7
0.9	140	70	70	No. 4 x M10	12	102	6	6	19	11	No. 4 x M4	93	22	7
1.5	140	70	70	No. 4 x M10	12	133	6	6	19	11	No. 4 x M5	122	22	7
3	160	127	136	No. 4 x M16	12	184	6	6	19	-	No. 4 x M6	171	-	10
6	160	127	136	No. 4 x M16	13	232	6	6	19	16.5	No. 4 x M6	216	30	10
14	160	127	136	No. 4 x M16	16	232	6	6	19	-	No. 4 x M6	216	-	10
18	314	109	109	No. 4 x M16	18	255	6	6	16	16.5	No. 4 x M6	240	35	10
32	314	109	109	No. 4 x M16	16	265	6	6	16	16.5	No. 4 x M6	250	33	10
50	280.6	138.5	138.5	No. 4 x M20	18	295	6	6	16	20.5	No. 4 x M6	278	46	10

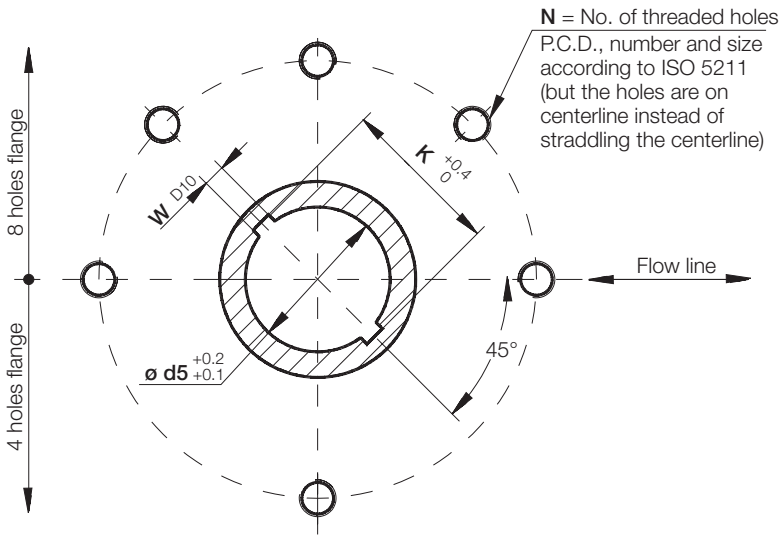
The index is shown for actuator in end position (fully open or closed)

The actuator mounting flange provides threaded holes according to BIFFI "standard" tables SCN 6200 and SCN 6201.
When the valve and actuator flanges are not compatible in "standard" configuration, an intermediate flange or a spool piece, machined in accordance with the valve flange dimensions, can be supplied. For actuator models 14 and larger the actuator flange can be machined in accordance with the valve flange dimensions.

The actuator has a drive bore with keyways. The dimensions are according to BIFFI "standard" tables SCN 6200 and SCN 6201.

For actuator models 0.3 to 6, an insert bush can be supplied with an unmachined bore in accordance with the "standard" table SCN 6362, or machined in order to couple the valve stem, provided its dimensions match the maximum stem acceptance of the bush according to the table TN 1005.
When the coupling of actuator to the valve is made by a spool piece, a stem extension can be supplied.
Stud bolts and nuts for assembly to the valve can be supplied on request.





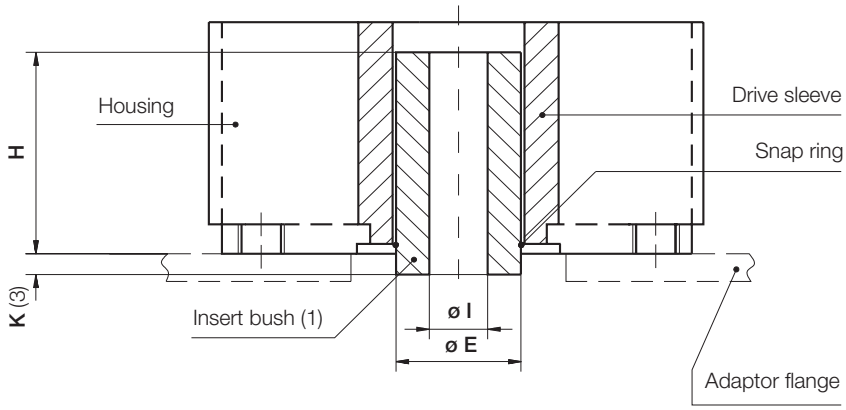
Top view of the scotch yoke mechanism (actuator shown in closed position)

Dimensions in mm

Model	ød1 max	ød2	ød3	ød4	N	h1	h2	H max	ød5	W	K
0.3	240	93	165	M20	4	5	17	127	70	12	75.6
0.9	310	112	254	M16	8	5	19	150	86	14	93.6
1.5	360	144	298	M20	8	6	19	190	112	18	119
3	430	195	356	M30	8	9	23	200	157	25	167.8
6	520	250	406	M36	8	14	29	260	200	28	212.8

Insert bushes

Model	øE	K	H	øI
0.3	70	20	106	23
0.9	86	20	130	41
1.5	112	22	157	53
3	157	32	162	73
6	200	35	214	102

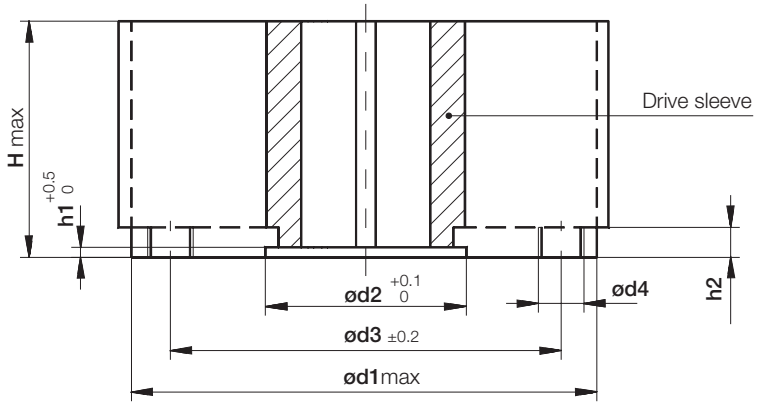


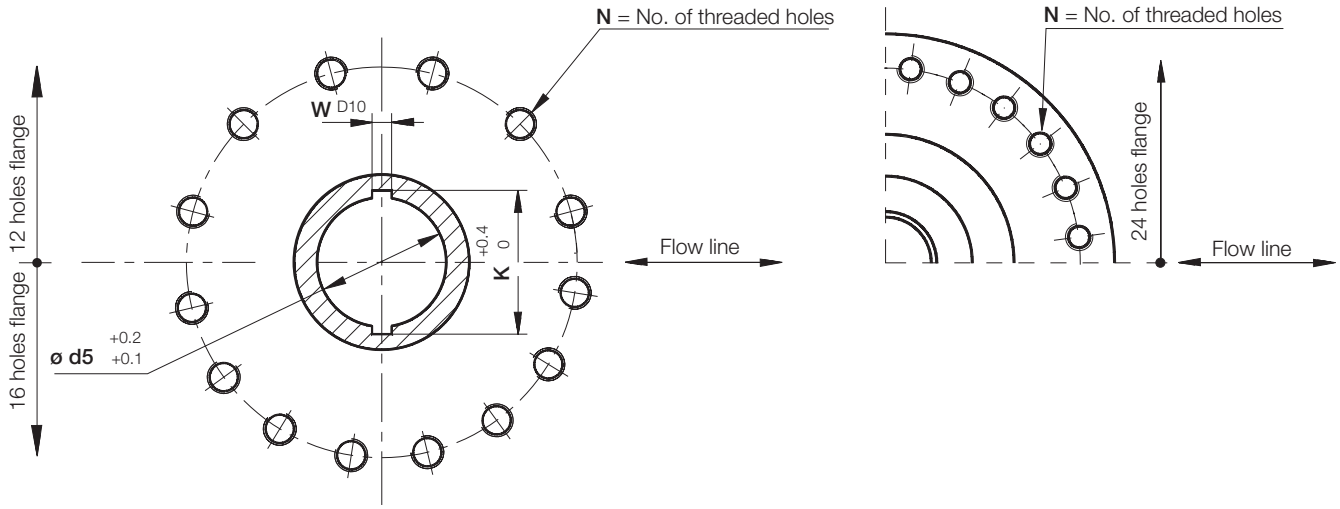
Stem acceptance for insert bushes (table TN 1005)

Model	Max operating torque (Nm)	Max stem diam. with square key (key dimension)	Max stem diam. with rectangular key (*)	W	Square stem S(**)	Max stem protrusion (***)
0.3	2500	52 (14)	55	46	64	120
0.9	7000	66 (16)	70	55	77	140
1.5	12000	85 (18)	90	73	103	180
3	25000	120 (32)	130	104	147	190
6	50000	150 (36)	170	133	188	250

Notes

1. Insert bush supplied by BIFFI with unmachined bore.
   Blind insert or different values of øI bore diameter on request.
   Machining of bore on request.
   For maximum stem acceptance see table TN 1005
2. For mounting flange dimensions see table SCN 6200, on page 1
3. Different values of insert protrusion K on request
4. The listed max acceptance values of the insert bushes are applicable for stems with keyways parallel or perpendicular to the flow line and for square stems with diagonal in parallel to the flow line
5. * Key according to UNI 6604 or DIN 6885 sh. 1 or BS 4235 part 1 or ISO 773 or equivalent
   ** S max: maximum external diameter in case of rounded edge
   *** Without adaptor flange
6. All **dimensions** are in **mm**

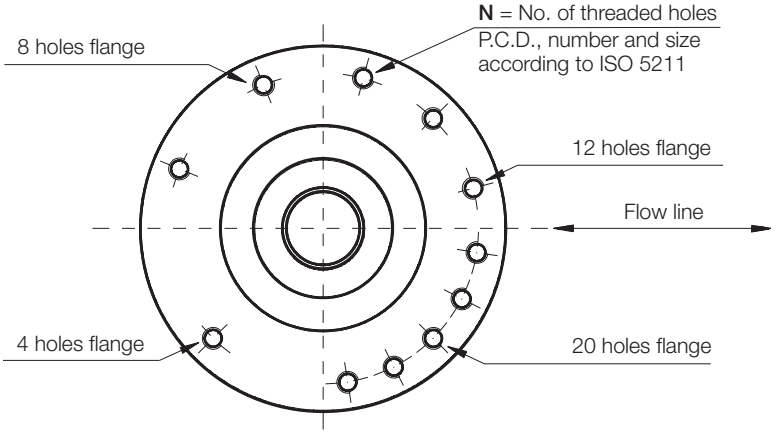


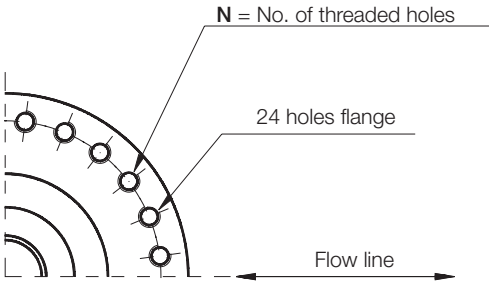


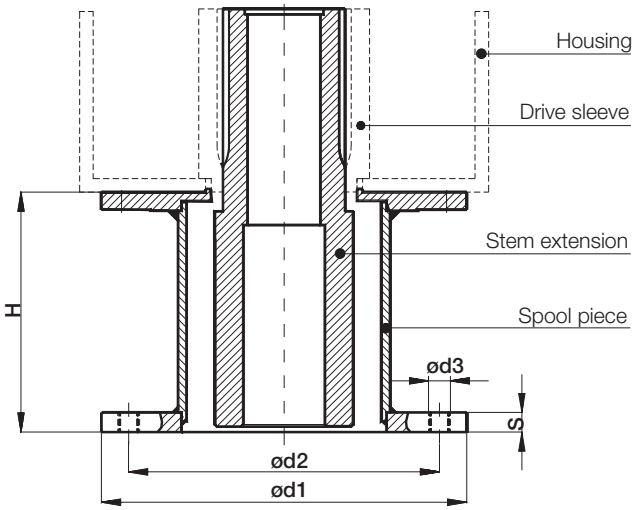
Top view of the scotch yoke mechanism
(actuator shown in closed position)

Dimensions in mm

Model	ød1 max	ød2	ød3	ød4	N	h1	h2	H max	ød5	W	K
14	580	250	483	M36	12	10	29	340	175	45	195.8
18	680	290	603	M36	16	12	32	350	200	45	220.8
32	780	290	603	M36	16	12	32	400	220	50	242.8
50	800	315	698	M36	24	10	32	430	240	56	264.8







Dimensions in mm

Model	Flange type ISO 5211	ød1	ød2	ød3	N	H	S
0.3	F16	210	165	M20	4	110	16
0.9	F25	300	254	M16	8	210	16
1.5	F30	350	298	M20	8	245	18
3	F35	415	356	M30	8	265	22
6	F40	475	406	M36	8	280	22
14	F48	560	483	M36	12	403	25
18	F60	686	603	M36	20	430	32
32	F60	686	603	M36	20	430	32
50	-	800	698	M36	24	530	32

Your enquiries for pneumatic actuators can be efficiently processed when you supply the information requested on this page.
Please use this page as guidance when sending your enquiries; if you need assistance, directly contact our offices.

Applicable documents

Customer requisition n° .....

Data sheet .....

Specification .....

Valve data

Manufacturer .....
Model .....Type .....
Size: ND ..... ☐ mm ☐ inches
Class .....
Max diff. pressure ..... ☐ bar ☐ PSI
Medium .....
Service ☐ on-off ☐ modulating
☐ .....

Valve required torques
☐ Nm ☐ Lbs-in
safety factor: included ..... % ☐ not incl.
break to open (0°) .....
break to close (90°) .....
end to close (0°) .....
end to open (90°) .....
running .....
dynamic torque (at.....°) .....
max allowable .....

Stem size
diameter/square side .....mm
height .....mm
key dimension ..... x .....mm
Coupling dimensions
customer's drawing .....
Installation
pipe axis: ☐ vertical ☐ horizontal
valve stem: ☐ vertical ☐ horizontal
cylinder axis: ☐ parallel ☐ perpendicular to the pipe axis

notes .....
.....
.....
.....
.....

Actuator data

Actuator type
☐ double acting
☐ single acting spring to close
☐ single acting spring to open

Gas supply
☐ air ☐ natural gas ☐ nitrogen
☐ .....
connections size: ..... ☐ ISO 7/1 Rp
☐ NPT
☐ .....
Gas supply pressure: ☐ bar ☐ PSI
min ..... normal ..... max .....

Operating time (sec)
opening: from ..... to .....
closing: from ..... to .....
Ambient temperature
min ..... max ..... ☐ °C ☐ °F
Environment conditions .....
Required painting cycle .....
Manual override:
☐ no ☐ jackscrew ☐ hand pump
☐ .....

Notes

.....
.....
.....
.....
.....

Valve position signaling

Electric limit switches
open q.ty ..... closed q.ty .....
intermediate q.ty .....
Supply voltage ..... ☐ DC
..... ☐ AC ..... Hz
load:
resistive ..... Amps
lamps ..... Amps
inductive ..... Amps
Cam actuated
☐ SPDT ☐ sealed ☐ sealed under inert gas
☐ gold contact ☐ DPDT ☐ .....
Proximity
☐ inductive
☐ magnetic ☐ NO ☐ NC ☐ SPDT
type/manufacturer .....
.....

Pneumatic limit switches
open q.ty ..... closed q.ty .....
intermediate q.ty .....
Supply pressure ..... ☐ bar
..... ☐ PSI
pneum. connection size ..... ☐ ISO7/1RP
☐ NPT
☐ .....

Electric position transmitter
☐ 4-20 mA output signal ☐ contact type
☐ contactless type ☐ .....
☐ resistive from ..... to ..... Ohm
☐ .....
type/manufacturer .....
notes .....
.....

Local position indicator
☐ standard
☐ special .....
Enclosure
Protection degree
☐ weatherproof IP.....
☐ explosionproof .....
.....
☐ intrinsically safe .....
code: ☐ CENELEC ☐ .....
Material
☐ alum. (std) ☐ cast iron ☐ .....
Cable entries
q.ty ..... size .....

Customer wiring diagram .....
.....

Control system

On-off service
☐ by electric signal
☐ by pneumatic signal
☐ by local manual control
☐ .....
1 signal ☐ to close ☐ to open
2 signals ☐ to close ☐ to open
Control signal:
voltage ..... ☐ DC
..... ☐ AC ..... Hz
pressure ..... ☐ bar ..... PSI
notes .....
.....
.....

Modulating service
☐ by electric signal ..... mA (closed valve)
..... mA (open valve)
☐ by pneum. signal ..... (closed valve)
☐ bar ☐ PSI ..... (open valve)
☐ .....

Control system reset
☐ automatic ☐ local manual
☐ remote .....
☐ after any closing operation
☐ after any opening operation
☐ after emergency operation only
☐ .....

Emergency action
☐ closing operation
☐ opening operation
☐ stay in position
☐ for pneumatic supply failure
☐ for low pressure in the storage tank
☐ for low pressure in the process line
☐ for high pressure in the process line
☐ for electric supply failure
for ☐ electric ☐ pneumatic control signal
☐ failure
☐ present from rem. control room
☐ for high rate of pressure drop in the process line

Control system components

Solenoid valves
Body material
☐ aluminium/brass
☐ stainless steel
☐.....
Action
☐ direct ☐ servopiloted
Coil enclosure protection
☐ weatherproof IP .....
☐ explosionproof .....
.....
☐ intrinsically safe .....
code: ☐ CENELEC ☐ .....
Coil enclosure material
☐ aluminium ☐ cast iron/steel
☐ .....
Function
☐ universal ☐ NC ☐ NO
Supply voltage ..... ☐ DC
..... ☐ AC ..... Hz
Max consumed power ..... ☐ W ☐ VA
notes .....
.....
.....

Pipe and fittings
☐ copper pipe and brass nickel plated fittings
☐ carbon steel
☐ 316 stainless steel
☐ .....
notes .....
.....

Junction box
Protection degree
☐ weatherproof IP .....
☐ explosionproof .....
☐ intrinsically safe .....
☐ increased safety .....
code: ☐ CENELEC ☐ .....
Material
☐ aluminium ☐ cast iron ☐ GRP
☐ stainless steel ☐ .....
Cable entries
☐ q.ty ..... size .....

Customer operating diagram .....
Customer wiring diagram .....

Control system valves
Body material
☐ aluminium/brass
☐ stainless steel
☐ .....
notes .....
.....

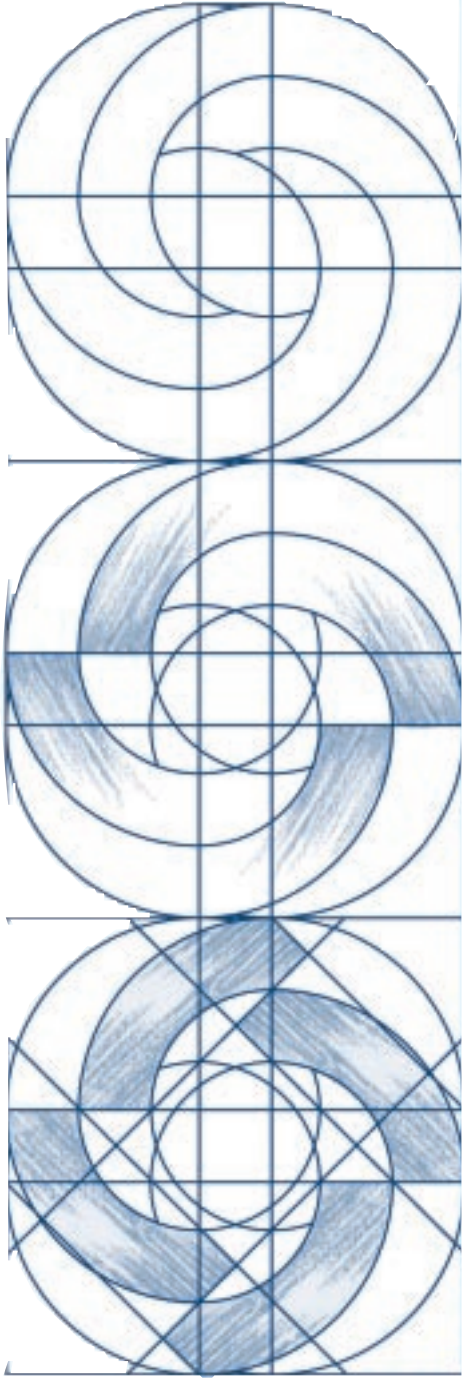
Control system assembling
☐ on panel:
panel material ☐ carbon steel (std)
☐ stainless steel
☐ into cabinet:
cabinet material ☐ carbon steel (std)
☐ GRP
☐ stainless steel
notes .....
.....
.....
.....
.....
.....
.....
.....

Storage tank

no of strokes .....
starting pressure ..... ☐ bar ☐ PSI
assembling: ☐ on actuator ☐ separate
code: ☐ ISPESL
☐ ASME VIII Div.1 not stamped
☐ .....
.....
.....

design pressure ..... ☐ bar ☐ PSI
design temperature ..... ☐ °C ☐ °F
required non destructive test .....
.....
.....
.....
.....
.....

Safety valve:
☐ yes ☐ no code .....
set at ..... ☐ bar ☐ PSI
body material ☐ brass
☐ carbon steel ☐ stainless steel
notes .....
Other accessories .....
.....



BIFFI

tyco flow control

Biffi Italia S.r.L. - Località Caselle S. Pietro - 29017 Fiorenzuola d'Arda (PC) - ITALY
Tel (0523) 944411 - Fax (0523) 941885 / 943923 / 944500
e_mail: biffi_italia@biffi.it