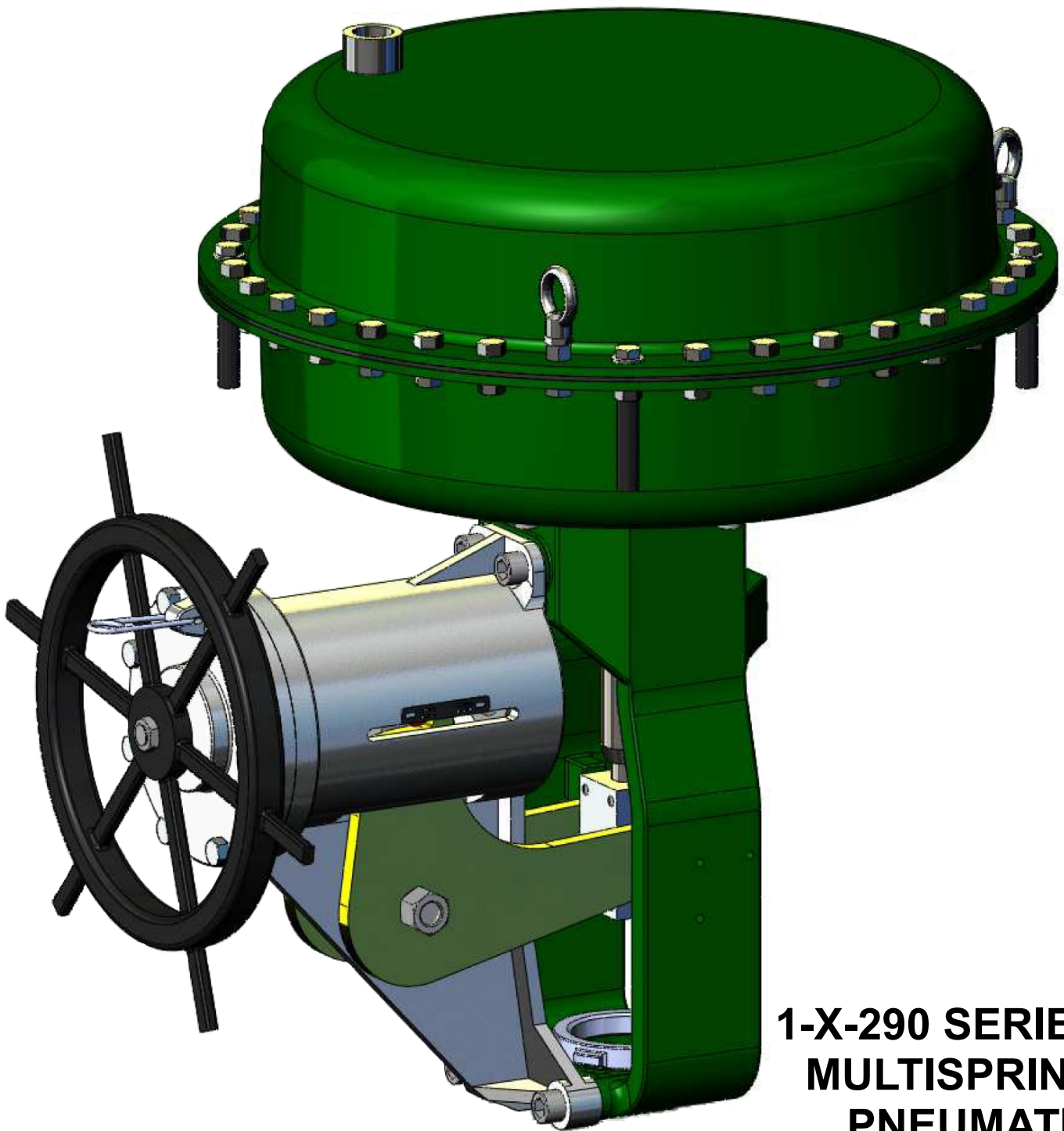


**KOSO** **PARCOL**



**1-X-290 SERIES  
MULTISPRING  
PNEUMATIC  
DIAPHRAGM ACUATORS**



## 1-X-290 SERIES MULTISPRING PNEUMATIC DIAPHRAGM ACTUATORS

*PARCOL 1-X-290 Series multispring pneumatic diaphragm actuators are designed to provide high performances in both direct and reverse acting configuration.*

*The thrust is supplied by a rubber, air-loaded diaphragm or, in the opposite configuration, by helical springs.*

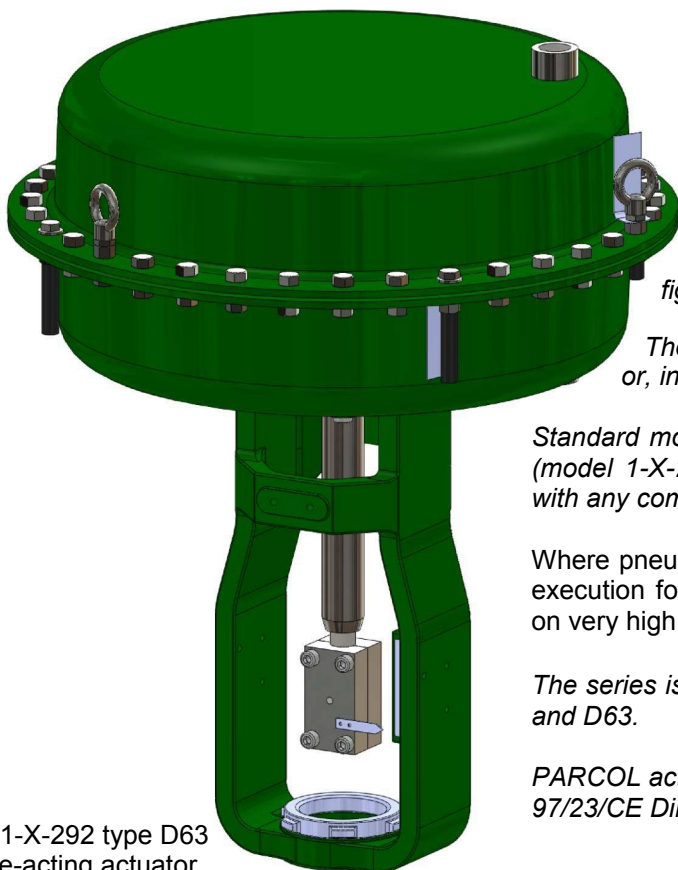
*Standard model can be delivered either as direct-acting actuator (model 1-X-291) or as reverse-acting actuator (model 1-X-292), with any component change.*

Where pneumatic cylinders are not applicable, double-diaphragm execution for type D63 is available to perform high sealing class on very high pressure drops.

*The series is composed by 5 actuator sizes: D25, D33, D39, D46 and D63.*

*PARCOL actuators 1-X-290 Series is qualified in accordance with 97/23/CE Directive (PED) where applicable.*

Model 1-X-292 type D63 reverse-acting actuator.



### MAIN FEATURES (standard model)

#### DIAPHRAGM CASE

Two formed steel cases (upper and lower) clamp external edge of the diaphragm to get an air-proof sealing.

#### YOKE

Actuator yokes are from castings or fabricated forged steel, depending on stroke. Standard material is A216WCB carbon steel. On request A352LCB for low temperature service is available.

#### DIAPHRAGM

Diaphragm is molded neoprene with a cloth fabric in-sert. It has an excellent resistance to aging, chemicals and to continuous deformations under load.

The particular design provides a remarkably constant efficiency throughout the travel (see table of net stem thrust).

#### RATING P/T

Max operating pressure = 4.1 bar (60 psig). Over this pressure limit, internal parts of actuator can be permanently damaged.

Case and its joints can withstand a pressure of 10 bar at least without significant permanent deformations (Design Pressure certified in accordance with PED: PS=6bar).

Bursting pressure = over 40 bar.

Ambient temperature = -29 °C ÷ +60 °C.

#### SPRINGS

Springs are made of a high strength, nickel - chromium - silicium steel and are protected by a corrosion resistant coating.

Suitable springs can be delivered for each listed combination of actuator type, signal range and stroke.

Springs are guided by slots in the diaphragm plate or both in the diaphragm plate and in the diaphragm case (direct version).

Different spring range can be performed with the same springs set by changing springs position.

The same spring can be positioned both on direct and reverse configuration.

#### STEM

Stem is made of AISI 304 stainless steel. Guiding (direct-acting type) or sealing (reverse-acting type) surfaces are ground and rolled.

Connection between stem and diaphragm plate is assured by a split pin.

#### CONNECTIONS

Air connection are default provided for fast open/closed service.

D25	D33	D39	D46	D63
½" NPT	½" NPT	¾" NPT	1" NPT	1" NPT

Air is exhausted through a special plug which prevents liquid, sand or dirt infiltration.

Standard materials for main components are listed in "Materials of construction" table.

See next pages for explanatory drawings

**HANDWHEEL**

A handwheel, fitted on a pneumatic actuator, enables personnel to operate valve regardless of the air pressure loading the diaphragm.

This accessory is very useful during plant start of safe shut-off or simply every time an air-supply failure occurs.

**SIDE-DRIVEN HANDWHEEL**

This device can operate valve stem either to open or to close valve, just by rotating the handwheel in one sense or in the opposite.

Design is based on a lead-screw/cranked-lever mechanism mounted onto the side of the standard yokes.

The device usually stands in a base position which allows full stroke operation of valve by means of air.

Hand operation is switched on automatically turning the handwheel (572) till the cranked-lever (582) starts to move.

Side-mounted handwheel can be used for limiting travel of valve stem in one of the two directions

See following pages for further details.

**HYDRAULIC MANUAL OPERATOR**

Instead of mechanical handwheel a hydraulic manual operator with integrated speed adjustment system is available, on request.

The manual operator can be installed on field modifying only the upper diaphragm case.

The speed adjustment function allows an accurate stroking time regulation during fast valve opening and closing without positioner.

Hydraulic fluid is usually mineral oil. Fire resistant fluid is available, on request.

Other benefits of hydraulic manual operator:

- manual operation time greatly reduced;
- time for engagement drastically reduced;
- limited operation force.

The built-in relief valve limits the maximum oil pressure in the cylinder to avoid mechanical damages

**STROKE LIMITER**

To limit valve stroke both in closing and opening position a top mounted stroke limiter is available as option.

**AVAILABLE STROKES [mm]**

D25	D33	D39	D46	D63
17	17	17		
	25	25	25	
		34	34	34
		45	45	45
			60	60
				76

**AVAILABLE SPRING RANGES [psi]**

DIRECT ACTION					
STROKE	D25	D33	D39	D46	D63
17	3÷13	7÷13	8÷15		
	4÷18	9÷18	11÷20		
	7÷26	13÷27	16÷30		
25		4÷13	4÷14	8÷15	
		5÷17	5÷19	11÷21	
		7÷26	7÷28	16÷31	
34			6÷14	4÷14	7÷14
			8÷19	5÷18	9÷18
			12÷28	7÷28	13÷28
45			4÷14	6÷14	3÷13
			5÷19	8÷19	4÷17
			7÷28	12÷28	7÷26
60				4÷14	5÷13
				5÷19	7÷17
				7÷28	10÷26
76					3÷13
					4÷17
					7÷26

REVERSE ACTION					
STROKE	D25	D33	D39	D46	D63
17	9÷22	15÷22	17÷24		
	11÷29	20÷29	22÷31		
	17÷43	30÷44	33÷47		
25		12÷22	12÷22	16÷24	
		15÷29	16÷30	22÷31	
		23÷44	25÷45	32÷47	
34			13÷23	12÷22	14÷21
			17÷30	16÷29	19÷28
			25÷45	24÷44	28÷43
45			10÷23	12÷22	11÷21
			13÷31	16÷30	15÷27
			19÷47	24÷44	22÷41
60				10÷24	11÷21
				13÷32	14÷28
				19÷48	21÷42
76					8÷21
					10÷28
					15÷42

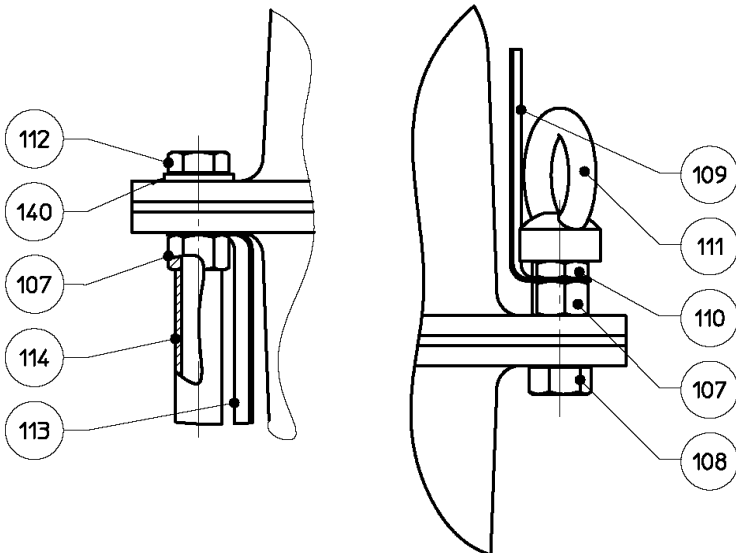
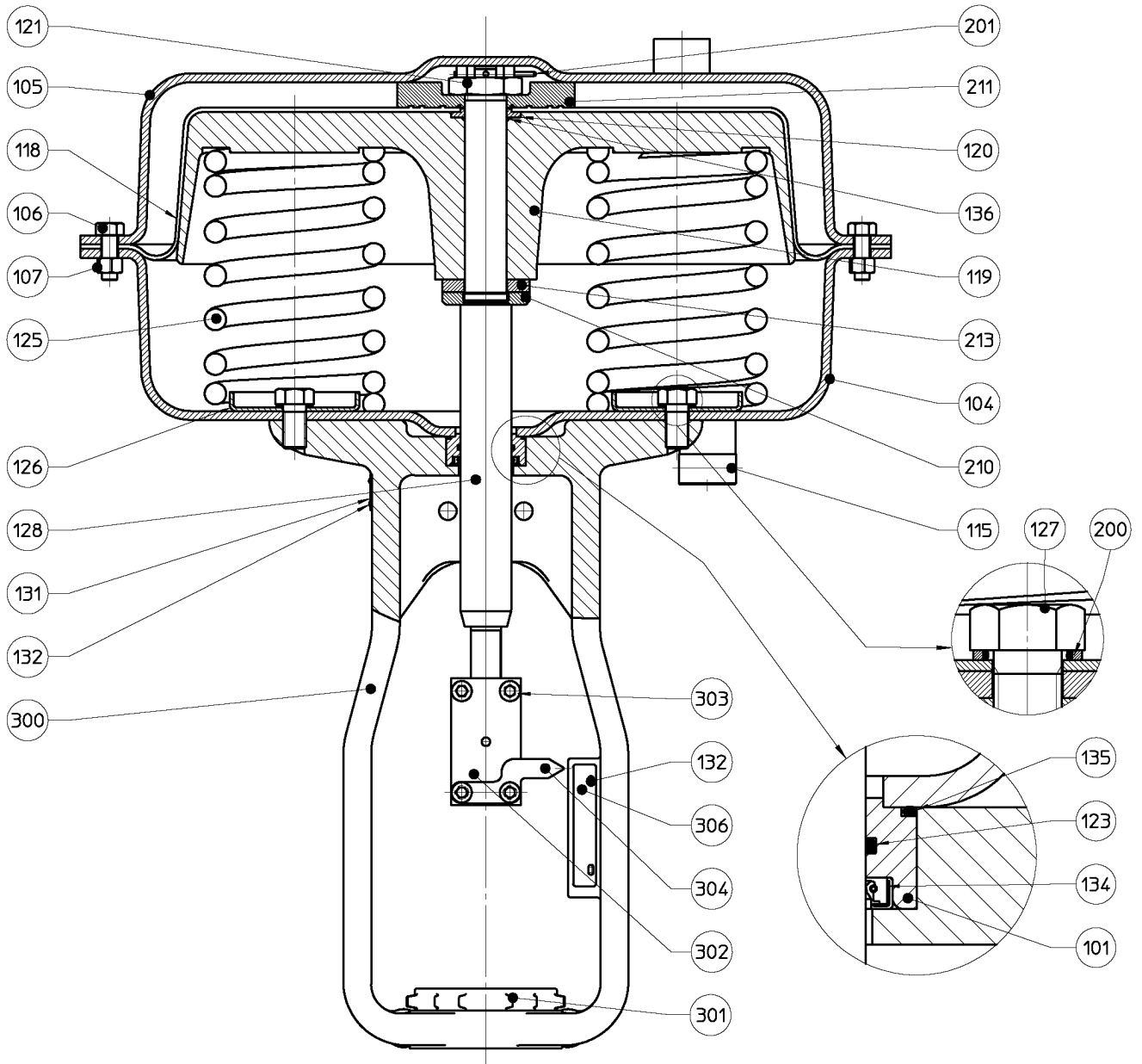
**EFFECTIVE STEM THRUST [N/psi]**

DIAPHRAGM POSITION	D25	D33	D39	D46	D63
Extended springs	201	345	469	691	1432
Compressed springs	184	333	457	664	1348

## MATERIALS OF CONSTRUCTION

BASIC CLASS		B	C	U
Temperature range		-29 °C ÷ +60 °C	-55 °C ÷ +60 °C	-29 °C ÷ +60 °C
ITEM	PART NAME			
101	GUIDE BUSHING	BRONZE - UNI EN 1982 CuSn5Zn5Pb5 (BSZN5 UNI 7013)		
103	UPPER DIPHRAGM CASE	UNI EN 10025 S235J2C + N ZINC COATED		
104	LOWER DIPHRAGM CASE			
105	UPPER DIPHRAGM CASE			
106	SCREW			
107	NUT	8.8 ISO 898-2	AISI 304 - A194 Gr.8	
108	SCREW	8.8 ISO 898-1	AISI 304 - EN ISO 3506 A2-70	
109	PLATE	AISI 304		
110	NUT	8.8 ISO 898-2	AISI 304 - A194 Gr.8	
111	EYEBOLT	CARBON STEEL	AISI 304	CARBON STEEL
112	LOADING SCREW	AISI 304 NITRIDED		
113	PLATE	AISI 304		
114	LOADING SCREW PROTECTION	RUBBER		
115	AIR VENT	PVC		
118	DIPHRAGM	REINFORCED NEOPRENE	SIL 70	REINFORCED NEOPRENE
119	DIPHRAGM PLATE	UNI EN 1676 EN AB-AISI7Mg0.3		
120	SPACER DISC	CARBON STEEL		
121	NUT	AISI 304 - A194 Gr.8		
123	O-RING	NB 70	SI 80	NB 70
125	SPRING	SEE RELATIVE DWG		
126	SPRING SEAT	UNI EN 10025 S235J2C + N ZINC COATED		
127	SCREW	8.8 ISO 898-1	AISI 304 - EN ISO 3506 A2-70	
128	ACTUATOR STEM	AISI 316		
129	ACTUATOR STEM	A479 XM19		
131	CHARACTERISTIC PLATE	AISI 304		
132	RIVET	ALUMINIUM		
133	O-RING	NB 70	SI 80	NB 70
134	SEAL RING	NB 70 + SPRING STEEL	SILICON + SPRING STEEL	NB 70 + SPRING STEEL
135	O-RING	NB 70	SI 80	NB 70
136	O-RING			
140	WASHER	AISI 304		
200	SEAL WASHER	CARBON STEEL + NBR72		
201	SPLIT PIN	AISI 304		
210	WASHER	ASTM A350 LF2		
211	SPACER			
212	UPPER SPACER			
213	WASHER			
300	YOKE	ASTM A216 WCB	ASTM A 352 LCB	ASTM A216 WCB
301	RING NUT	AISI 316		
302	STEM CONNECTOR	CARB.STEEL	ASTM A350 LF2	CARB.STEEL
303	SCREW	AISI 304 - A 194 Gr. 8		
304	STROKE INDICATOR	AISI 304		
305	SCREW	AISI 304 - A 194 Gr. 8		
306	STROKE PLATE	AISI 304		
310	CONNECTION YOKE	ASTM A216 WCB	ASTM A 352 LCB	ASTM A216 WCB
311	SCREW	8.8 ISO 898-1	AISI 304 - EN ISO 3506 A2-70	
312	O-RING	NB 70	SI 80	NB 70
320	BODY FOR LIMITER DEVICE	CARBON STEEL	ASTM A350 LF2	CARBON STEEL
321	STEM EXT. FOR LIMITER DEVICE	AISI 410 HARDENED		
322	COVER FOR LIMITER DEVICE	CARBON STEEL	ASTM A350 LF2	CARBON STEEL
325	O-RING	NB 70	SI 80	NB 70
327	NUT	8.8 ISO 898-2	AISI 304 - A194 Gr.8	
4001	HYDRAULIC CILINDER	VARIOUS		
4002	ACTUATOR STEM EXTENSION	A479 XM19		
4003	LOWER FLANGE	CARBON STEEL	ASTM A350 LF2	CARBON STEEL
4004	UPPER FLANGE			
4005	PLATE	AISI 304 - EN ISO 3506 A2-70		
4006	SCREW			
4007	SCREW			
4008	WASHER			
4009	SCREW	8.8 ISO 898-1	AISI 304	
4010	SCREW		AISI 304 - EN ISO 3506 A2-70	
4011	WASHER	AISI 304		
4012	GRUB SCREW	12.9 EN-ISO 898-2		
4013	PUMP+TANK+LEVER	VARIOUS		
4014	PLATE			

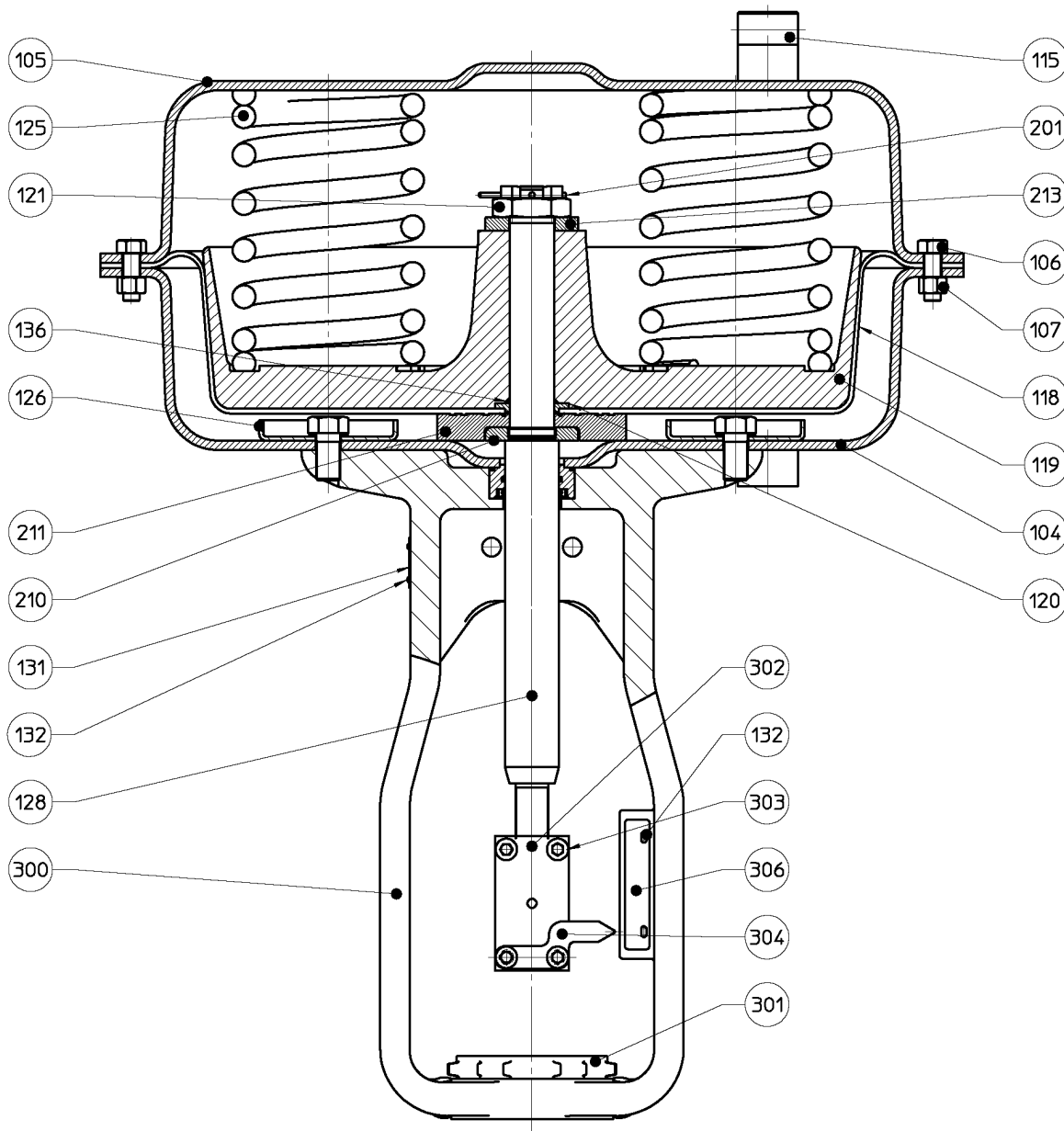
**MODEL 1-X-291 (direct-acting)**



All actuators (both direct and reverse acting) are also available with handwheel (not shown in the figures).



**MODEL 1-X-292 (reverse-acting)**



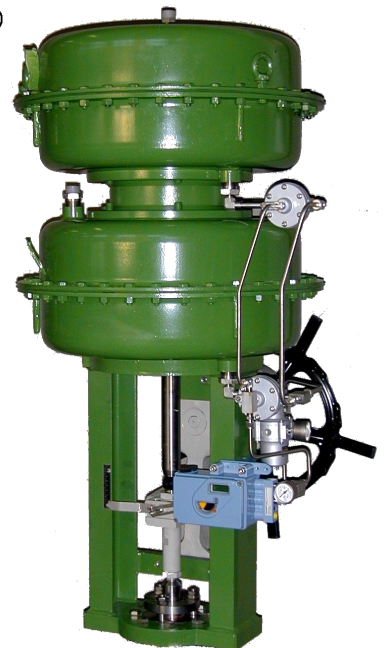
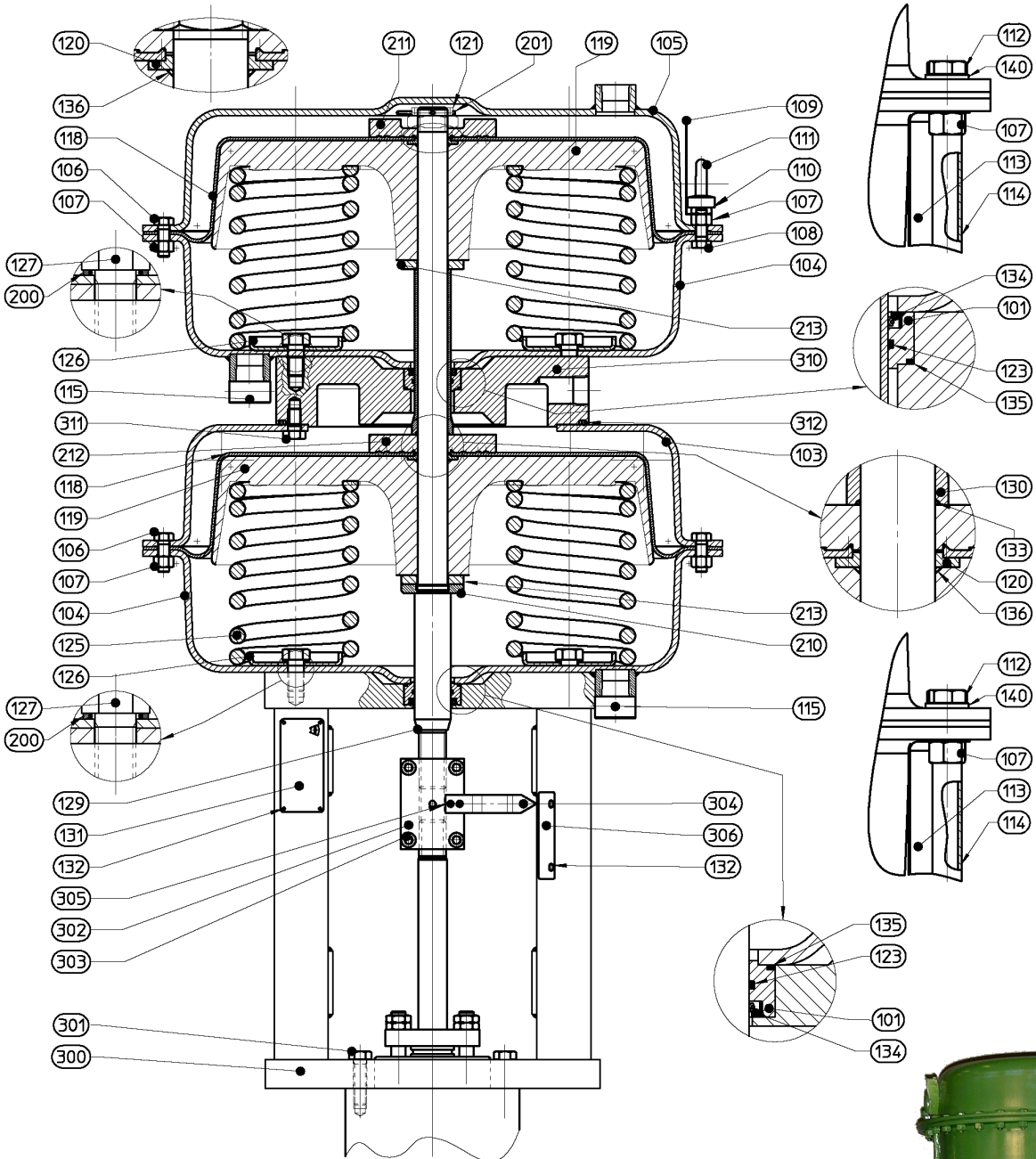
ITEM	PART NAME
101	GUIDE BUSHING
104	LOWER DIAPH. CASE
105	UPPER DIAPH. CASE
106	HEX HEAD SCREW
107	HEX NUT
108	HEX HEAD SCREW
109	PLATE
110	HEX NUT
111	EYEBOLT
112	LOADING SCREW
113	PLATE
114	LOAD SCREW PROTECTION
115	AIR VENT

ITEM	PART NAME
* 118	DIAPHRAGM
119	DIAPHRAGM PLATE
120	SPACER DISC
121	NUT
123	OR
126	SPRING SEAT
127	HEX HEAD SCREW
128	ACTUATOR STEM
131	CHARACTERIST. PLATE
132	SCREW
134	"A" TYPE SEAL RING
135	OR
* 136	OR

ITEM	PART NAME
140	WASHER
200	SEAL WASHER
* 201	SPLIT PIN
125	SPRING
210	WASHER
211	SPACER
213	WASHER
300	YOKE
301	RING NUT
302	STEM CONNECTION
303	SCREW
304	STROKE INDICATOR
306	STROKE PLATE

\* Two years suggested spare parts

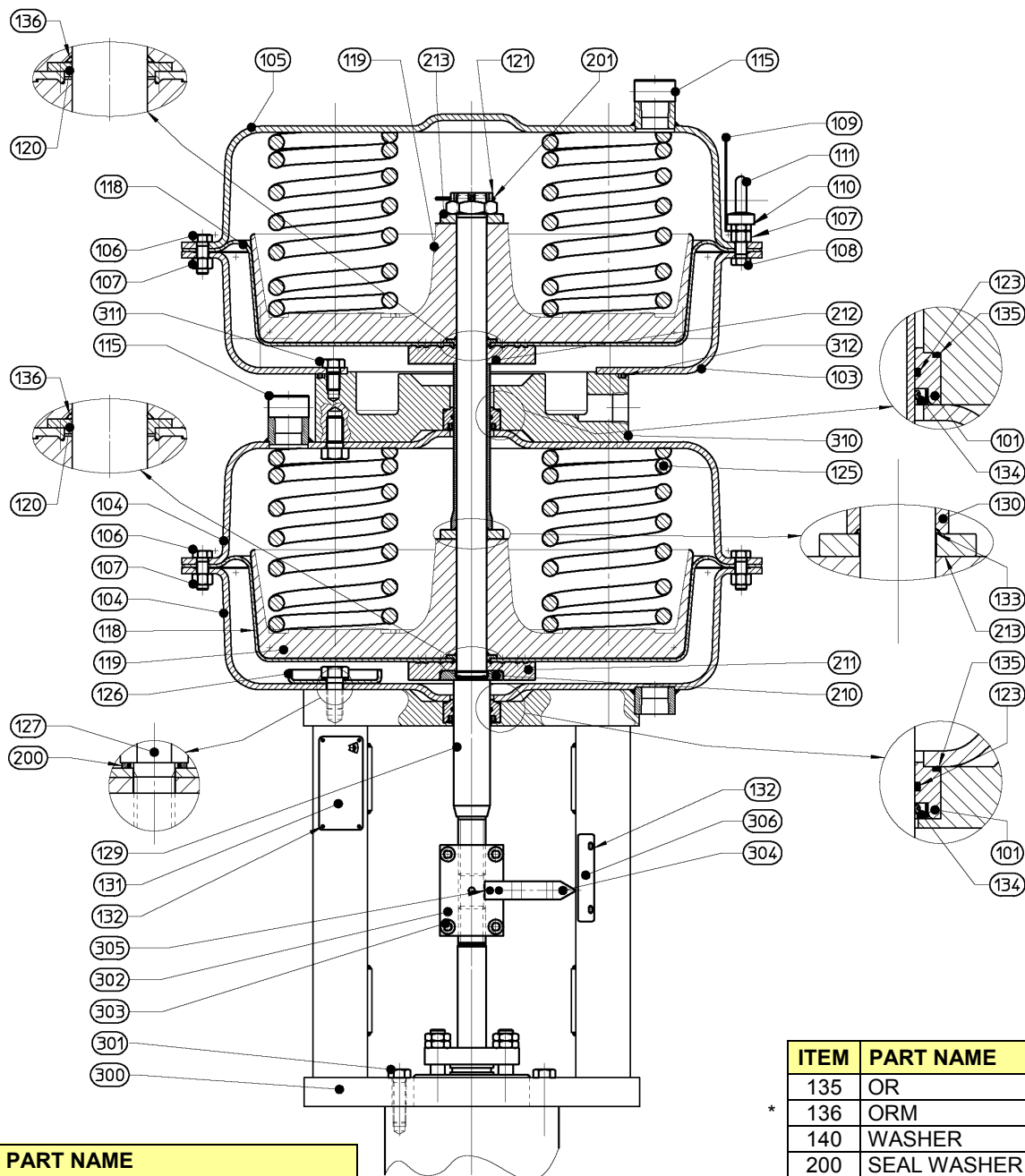
**MODEL 1-X-297 (direct acting)**



Multispring double-diaphragm pneumatic actuator 1-X-297 series provided with side-driven handwheel



**MODEL 1-X-298 (reverse acting)**



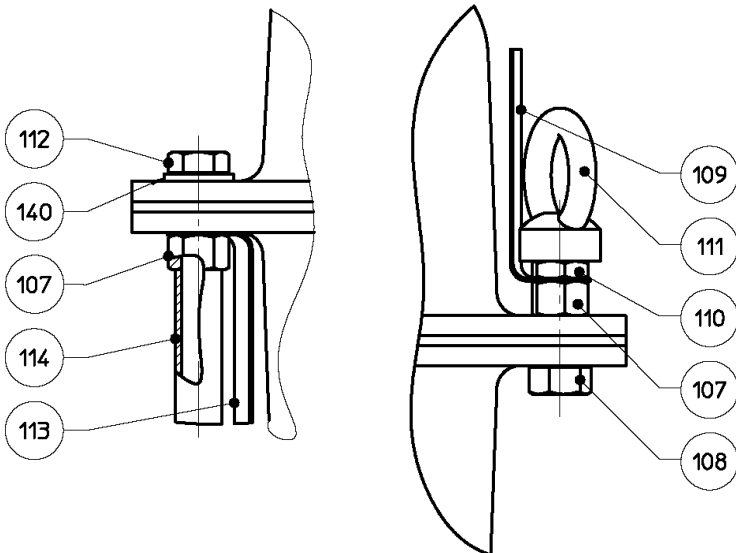
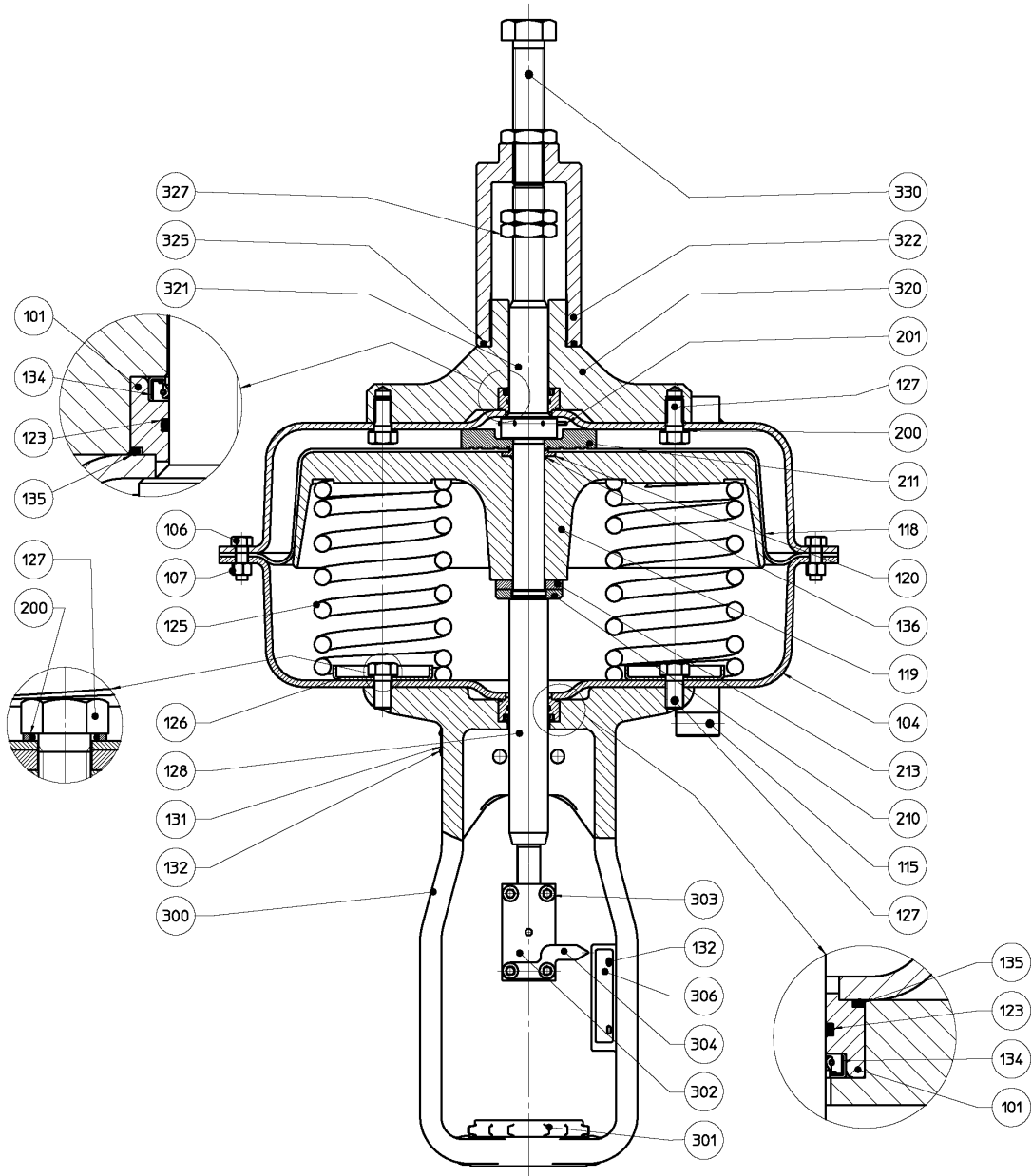
ITEM	PART NAME
101	GUIDE BUSHING
103	UPPER DIAPHRAGM CASE
104	LOWER DIAPHRAGM CASE
105	UPPER DIAPHRAGM CASE
106	HEX HEAD SCREW
107	HEX NUT
108	HEX HEAD SCREW
109	PLATE
110	HEX NUT
111	EYEBOLT
112	LOADING SCREW
113	PLATE
114	LOADING SCREW PROTECTION
115	AIR VENT
118	DIAPHRAGM

ITEM	PART NAME
119	DIAPHRAGM PLATE
120	SPACER DISC
121	NUT
123	OR
125	SPRING
126	SPRING SEAT
127	HEX HEAD SCREW
129	ACTUATOR STEM
130	STEM SPACER
131	CHARACTERISTIC PLATE
132	RIVET
133	OR
134	A-TYPE SEAL RING

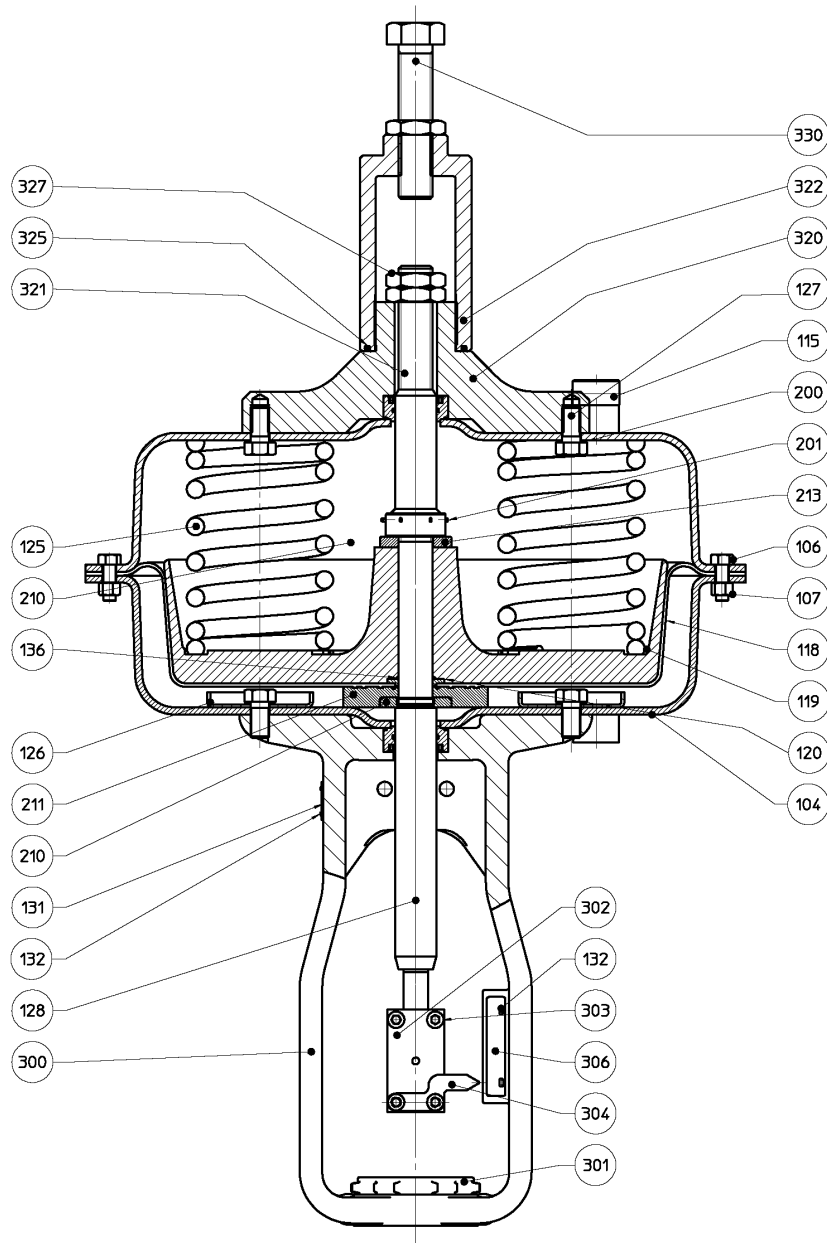
ITEM	PART NAME
135	OR
136	ORM
140	WASHER
200	SEAL WASHER
201	SPLIT PIN
210	SPACER
211	UPPER SPACER
212	UPPER SPACER D63D
213	WASHER
300	YOKE
301	HEX HEAD SCREW
302	STEM CONNECTOR
303	SCREW
304	STROKE INDICATOR
305	SCREW
306	STROKE PLATE
310	CONNECTION YOKE
311	SCREW
312	OR

\* Two years suggested spare parts

**MODEL 1-X-291 with STROKE LIMITER (direct-acting)**



**MODEL 1-X-292 with STROKE LIMITER (reverse-acting)**



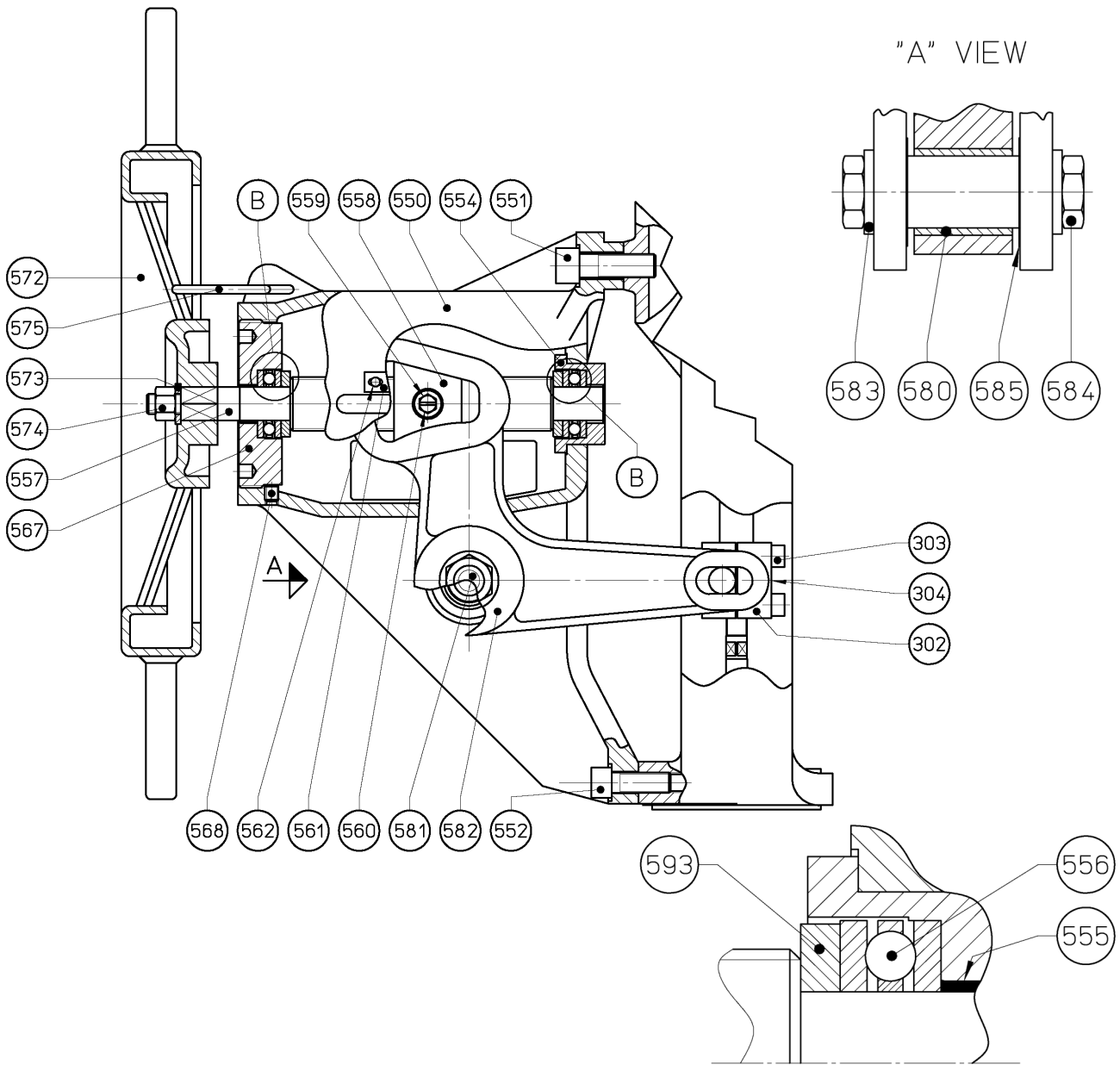
ITEM	PART NAME
101	GUIDE BUSHING
104	DIAPHRAGM CASE
106	HEX HEAD SCREW
107	HEX NUT
108	HEX HEAD SCREW
109	PLATE
110	HEX NUT
111	EYEBOLT
112	LOADING SCREW
113	PLATE
114	LOADING SCREW PROTECT.
115	AIR VENT
*	118 DIAPHRAGM
	119 DIAPHRAGM PLATE
	120 SPACER DISC

ITEM	PART NAME
123	OR
211	SPACER
125	SPRING
126	SPRING SEAT
127	HEX HEAD SCREW
128	ACTUATOR STEM
131	CHARACTERIST. PLATE
132	SCREW
134	"A" TYPE SEAL RING
135	OR
*	136 OR
	140 WASHER
	200 SEAL WASHER
*	201 SPLIT PIN

ITEM	PART NAME
210	WASHER
213	WASHER
300	YOKE
301	RING NUT
302	STEM CONNECTION
303	SCREW
304	STROKE INDICATOR
306	STROKE PLATE
320	BODY FOR LIMITER DEVICE
321	STEM EXT. FOR LIMIT. DEVICE
322	COVER FOR LIMITER DEVICE
325	OR FOR LIMITER DEVICE
327	HEX NUT
330	HEX SCREW

\* Two years suggested spare parts

**SIDE DRIVEN HANDWHEEL**

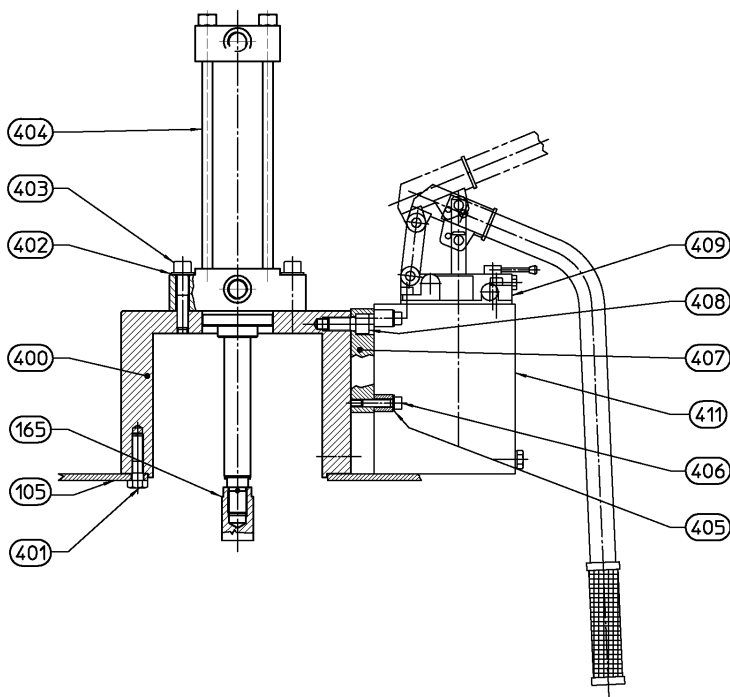


- DETAIL B: BEARING MOUNTING

ITEM	PART NAME
302	STEM CONNECTOR
303	STEM CONNECTOR SCREW
304	TRAVEL INDICATOR
550	HANDWHEEL CASING
551	HANDWHEEL CASING SCREW
552	HANDWHEEL CASING SCREW
554	BALL BEARING HOUSING
555	GUIDE BUSHING
556	BALL BEARING
557	LEAD SCREW
558	LEAD NUT
559	POSITION POINTER
560	NUT
561	POSITION PLATE
562	SCREW

ITEM	PART NAME
567	HANDWHEEL CASING COVER
568	SET SCREW
572	HANDWHEEL
573	WASHER
574	HANDWHEEL LOCKING NUT
575	HANDWHEEL STOP
580	LEVEL PIN BEARING
581	LEVER PIN
582	CRANCKED LEVER
583	WASHER
584	NUT
585	WASHER
592	SCREW
593	WASHER

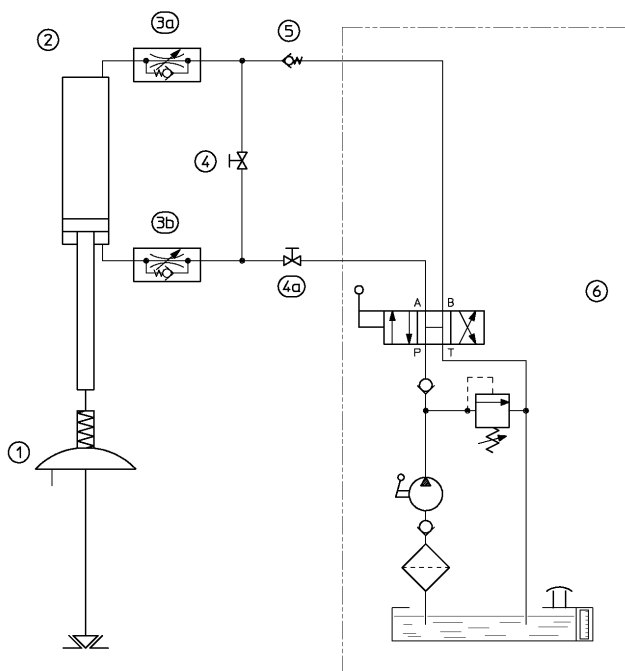
**HYDRAULIC MANUAL OPERATOR**



ITEM	PART NAME
105	UPPER DIAPHR. CASE
165	STEM CONNECTOR
400	FLANGE
401	SCREW
402	WASHER
403	SCREW
404	CYLINDER
405	WASHER
406	SCREW
407	CLAMPING PLATE
408	SCREW
409	MANUAL PUMP

Hydraulic manual operator equipped with adjustable stroke limiter in open position installed on 1-X-290 type D46 and D63 actuator.

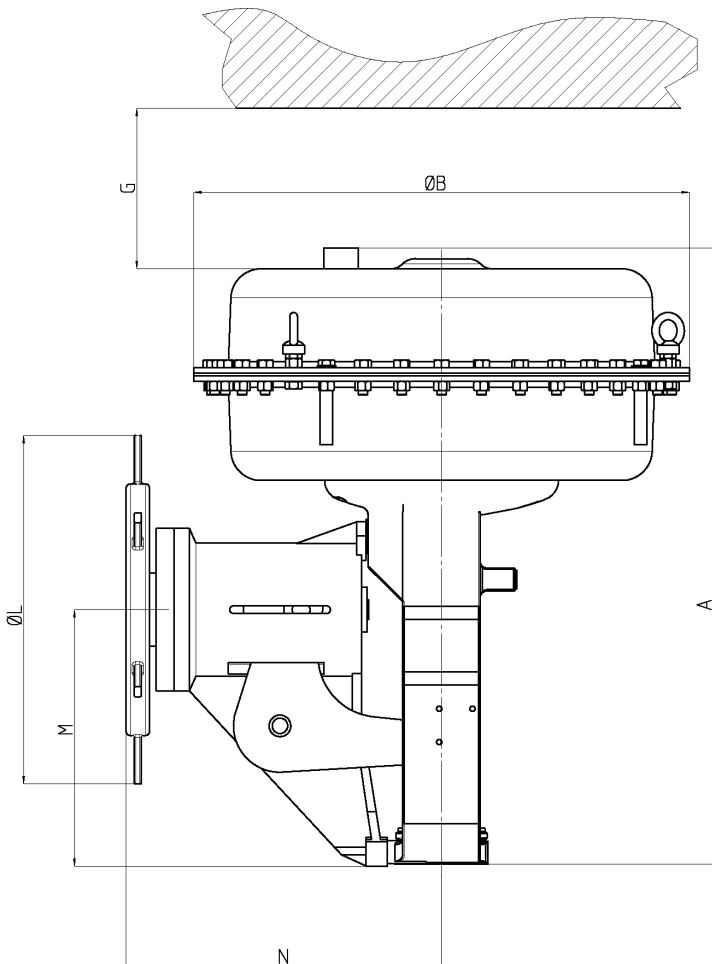
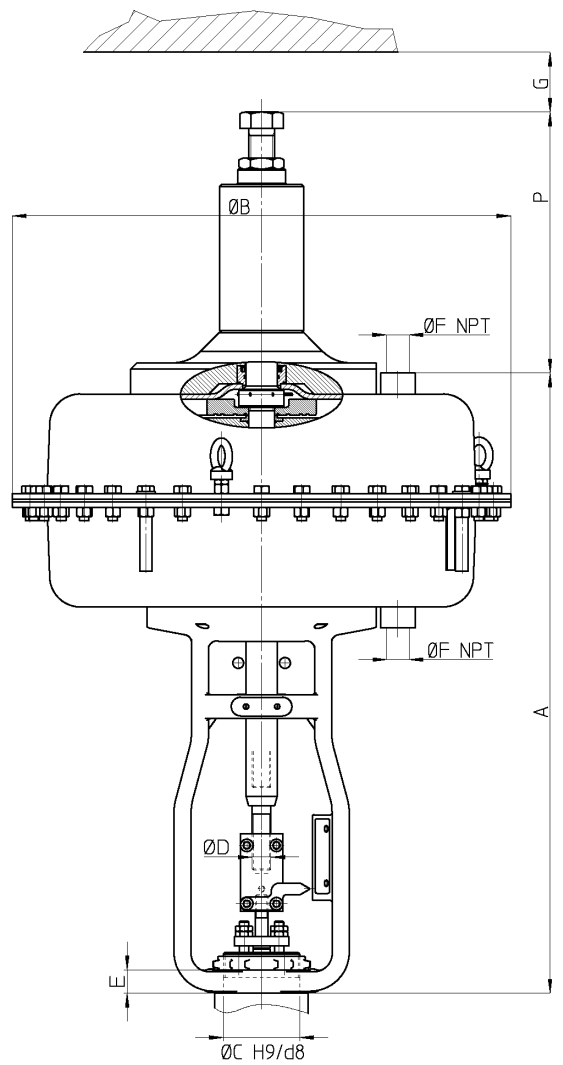
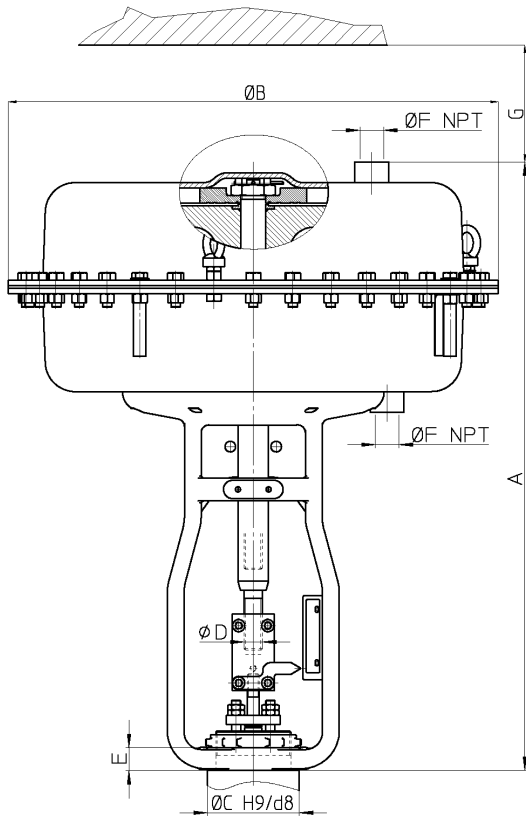
**HYDRAULIC DIAGRAM**



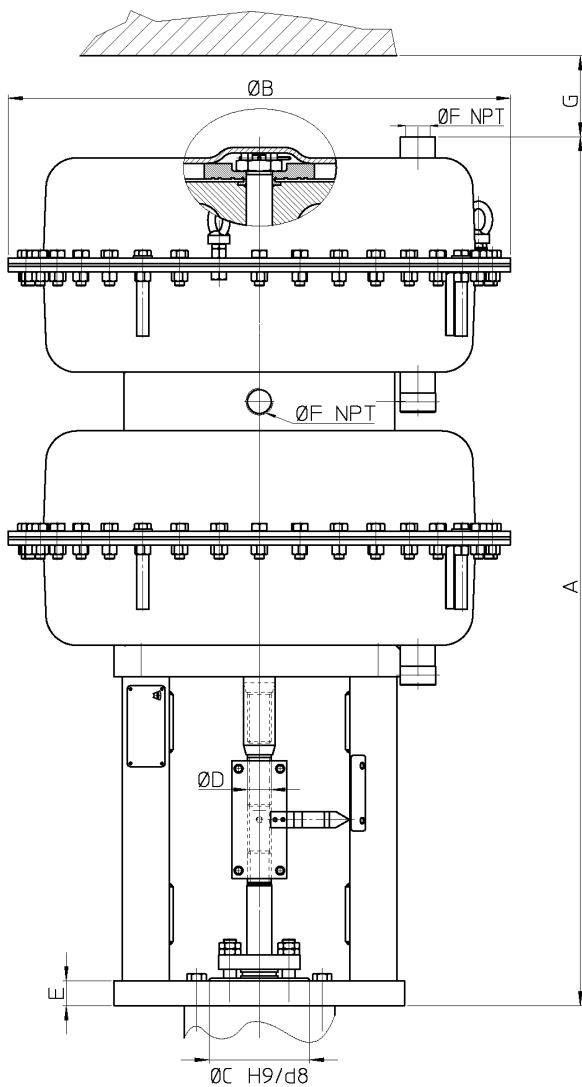
ITEM	PART NAME
1	PNEUMATIC ACTUATOR
2	HYDRAULIC CYLINDER
3a-3b	FLOW REGULATOR
4-4a	BALL VALVE
5	CHECK VALVE *
6	HAND PUMP

\* only for D63 double-diaphragm execution

OVERALL DIMENSIONS AND WEIGHTS







DIMENSIONS [mm]						
SIZE	D25	D33	D39	D46	D63	D63D
A	487	510	574	644	796	1109
B	262	333	395	465	640	640
C	60	60	76	76	88	128
D	M12	M12	M18X1.5	M18X1.5	M24X2	M30
E	21	21	24	22	30	32
F	1/4"	1/2"	3/4"	3/4"	1"	1"
G	150	150	200	200	250	350
L	380	380	570	570	570	-
M	200	200	252	252	285	-
N	300	300	365	365	500	-
O	310	345	460	530	670	-
P	160	196	259	331	420	-

WEIGHTS [kg]					
SIZE	D25	D33	D39	D46	D63
ACTUATOR	15	22	33	54	120
SDH	10	10	19	19	35
HMO	-	-	-	TBD	TBD
S. LIMITER	5	8	12	18	45

Dimensions are referred both to direct and reverse action.

