

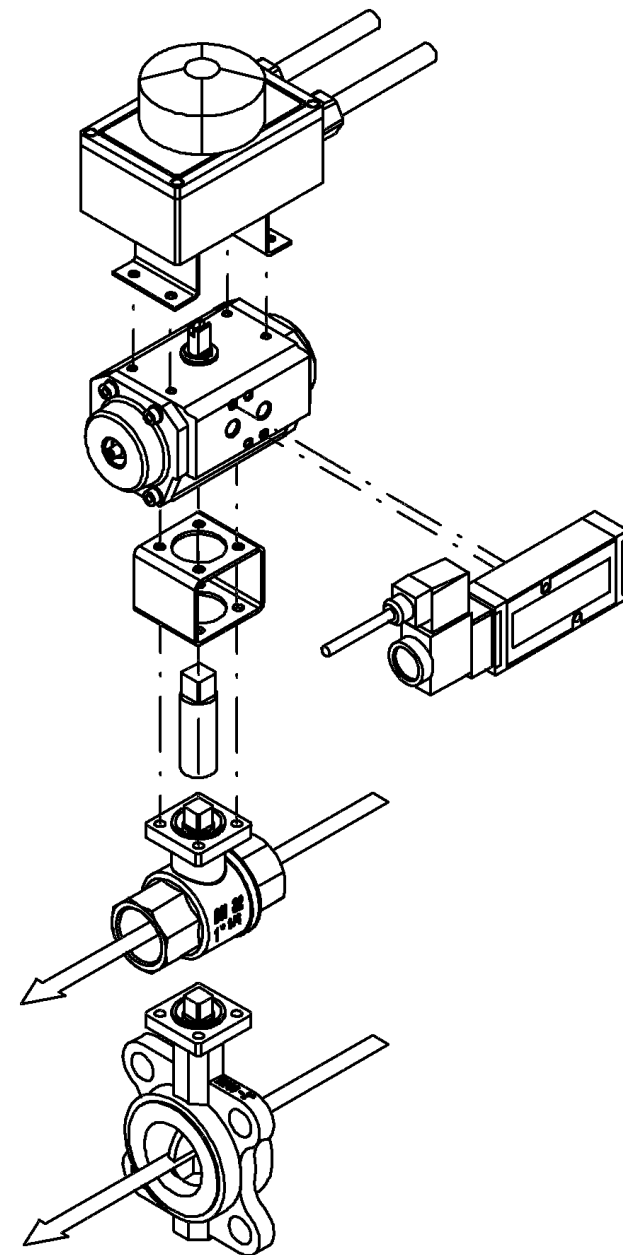
AP Series - Aluminium **AP-A Series - AISI 316 Stainless Steel**

internal rotation adjustment

INSTRUCTION MANUAL FOR INSTALLATION, USE AND MAINTENANCE

PNEUMATIC
RACK&PINION ACTUATORS
90° - 120° - 180° ROTATION

Rev. - 01/12/2022



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1 - INTRODUCTION

The Manufacturer owns the present publication. It is only combined to the supply of standard products, of which represents illustrative literature. Further details are available on "Technical Catalogue". All rights reserved.

These actuators are designed and manufactured in compliance with all applicable Essential Health and Safety Requirements (EHSR), according to MACHINERY Directive - 2006/42/EC. These actuators are excluded from compliance with PED Directive - 2014/68/UE, according to Art. 1.2.j.ii. These actuators are designed, manufactured and classified following ATEX Directive - 2014/34/UE, so as identified in the sticker on the body. Their use in areas with potentially explosive atmosphere is authorized only in accordance with the classification stated on the sticker, and respecting the instructions contained in the annex sheet ATEX SAFETY INSTRUCTIONS.

The Manufacturer is not responsible for any damage whatsoever arising from the use of its devices, from mistakes or inaccuracies during installation or in using the information here contained. Any change to products and to this publication can be made without prior notice.

(Iscr. Reg. Impr. Cod. F. & P.I. 00434020178)

2 - ACTUATOR IDENTIFICATION

Pneumatic rack&pinion actuators are engineered to induce opening and closing of ball and butterfly valves, by means of compressed air feeding. They are provided with interfaces for auxiliary connection according to ISO 5211 standard, DIN 3337 and VDI/VDE 3845 (NAMUR). Fig.01 and 02.

Every actuator bears an identification nameplate, Fig.03 that indicates:

- Working pressure, air feeding by dry/lubricated air MAX 8 BAR/120 PSI.
- Working temperature: keep to indicated field of use.
- Model identification. More features on "General Catalogue".
- Serial number.
- DA/SR working (see Part 3 - TYPE OF OPERATION).
- Opening and closing movements depending on supplied feeding.

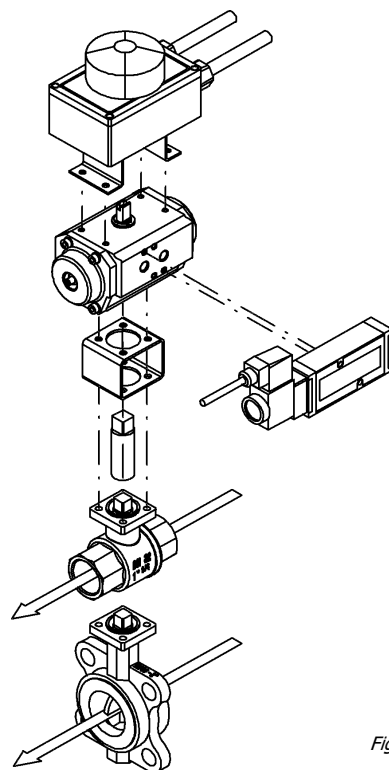


Fig.01

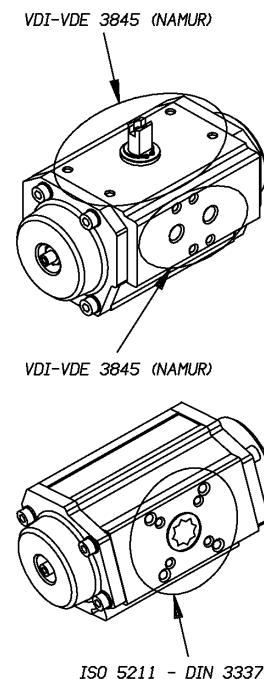


Fig.02

MODEL	050 F03\05 Q11	S/N	06062489	DA	SR	6\6
MAX 8 BAR (120 PSI)	-20	+80°C	ROTATION	90	ANCILLARIES	AA1 B1
6	Nm	13,5	Nm	8,4	X	4 6 2 4 2 CCW
BAR	MAX TORQUE	MIN TORQUE	CW	4 6 2 4 2	CCW	

Fig.03

3 - TYPE OF OPERATION

DA operation (air-air) on the nameplate indicates:

- Feeding by port "A2" opens pistons with shaft's rotation.
- Feeding by port "B4" closes pistons with shaft's counter-rotation.

(Referred to standard DA models, Fig.4)

SR operation (air-springs) on the nameplate indicates:

- Feeding by port "A2" opens pistons with shaft's rotation.
- Fall of feeding pressure in port "B4" closes pistons with shaft's counter-rotation.

(Referred to standard SR models, Fig.5)

DA Double Acting air-air operation

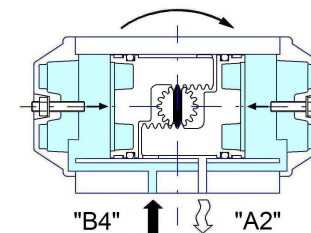
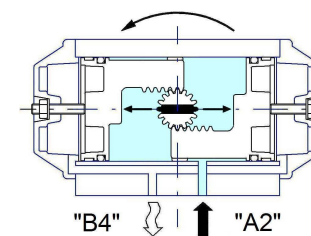


Fig.04

SR Spring Return air-spring operation

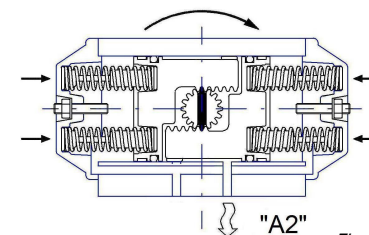
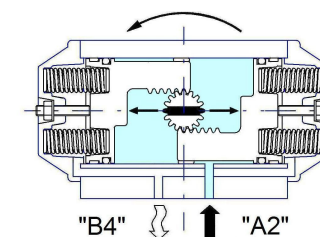
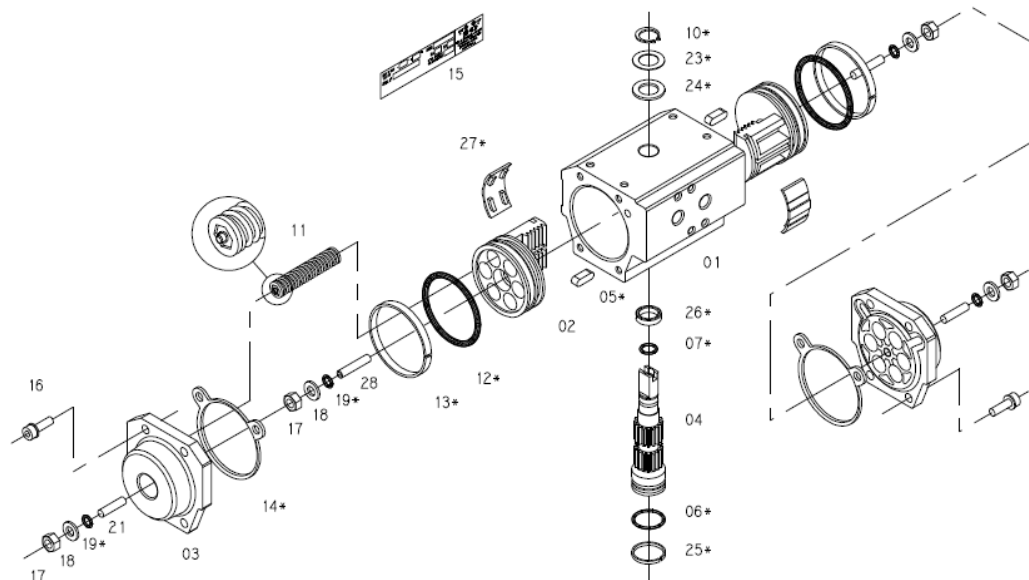


Fig.05

4 - CONSTRUCTION PARTS, MATERIALS, ASSEMBLY SCHEME



* Only complete sets of spare-parts are available.
P.N. No spare-parts available for spring cartridges: they are supplied complete and assembled.
FOR SAFETY REASONS, DO NOT DISASSEMBLY SPRINGS CARTRIDGES.

Part	Nº	Description	Material
1	1	Body	Aluminium EN AW 6063 T6 - AISI 316
2	2	Piston	Aluminium EN AB 46100 T6 - AISI 316
3	2	Cover	Aluminium EN AB 46100 T6 - AISI 316
4	1	Shaft	Carbon Steel ASTM A105 - AISI 304/316
* 5	2	Antiejection key	Acetalic Resin - PA66 - LEXAN
* 6	1	Lower shaft O-Ring	NBR - FPM/FKM - Silicone
* 7	1	Upper shaft O-Ring	NBR - FPM/FKM - Silicone
* 10	1	Seeger ring	Carbon Steel - AISI 420
11	0...12	Spring cartridge	
* 12	2	Piston O-Ring	NBR - FPM/FKM - Silicone
* 13	2	Piston head bearing	Acetalic Resin - PA66 - LEXAN
* 14	2	Cover gasket	NBR - FPM/FKM - Silicone
15	1	Nameplate	Aluminium
16	8	Cover fastening screw	AISI 304/316
17	4	Nut	AISI 304/316
18	4	Washer	AISI 304/316
* 19	4	O-Ring	NBR - FPM/FKM - Silicone
21	2	Cover dowel	AISI 304/316
* 23	1	Shaft thrust washer	AISI 304/316
* 24	1	Antifriction washer	Acetalic Resin - PA66 - LEXAN
* 25	1	Lower shaft pilot ring	Acetalic Resin - PA66 - LEXAN
* 26	1	Upper shaft pilot ring	Acetalic Resin - PA66 - LEXAN
* 27	2	Piston bearing	Acetalic Resin - PA66 - LEXAN
28	2	Piston dowel	AISI 304/316

5 - WARNINGS AND NOTES FOR THE USE IN EXPLOSIVE ENVIRONMENTS

"AP" Series - Pneumatic Rack&Pinion Actuators, made of ALUMINIUM alloy
"AP-A" Series - Pneumatic Rack&Pinion Actuators, made of AISI 316 Stainless Steel

The Pneumatic Rack&Pinion Actuators (RPAs) are engineered and manufactured according to the relevant Technical Norms and safety European Directives. They can be used in "ATEX" 2014/34/UE dangerous zones, according to the following classifications.

ALUMINIUM		
Sealing set Ambient temperature	ATEX-2014/34/UE	EN ISO 80079-36:2016 EN ISO 80079-37:2016
Very Low -60 +80°C Low -40 +80°C Standard -20 +80°C	Ex II 2GD c Tmax 95°C	Ex h IIC Gb T95°C Ex h IIIC Db T95°C
High -20 +150°C	Ex II 2GD c Tmax 165°C	Ex h IIC Gb T165°C Ex h IIIC Db T165°C

AISI 316 Stainless Steel		
Sealing set Ambient temperature	ATEX-2014/34/UE	EN ISO 80079-36:2016 EN ISO 80079-37:2016
Very Low -60 +80°C Low -40 +80°C Standard -20 +80°C	Ex I M2 c Tmax 95°C Ex II 2GD c Tmax 95°C	Ex h I Mb T95°C Ex h IIC Gb T95°C Ex h IIIC Db T95°C
High -20 +150°C	Ex I M2 c Tmax 165°C Ex II 2GD c Tmax 165°C	Ex h I Mb T165°C Ex h IIC Gb T165°C Ex h IIIC Db T165°C

Because of the relevant safe condicions for applications in explosive environments, please read carefully the above notices.

- Before installation, please read carefully our "Instruction manual for Use and Maintenance".
- Follow the use expected for RPAs.
- Follow the indications of maximum temperature-environment of use, punched on identification nameplate.
- Don't let the actuator be fed by flammable, explosive or burning fluids (oxygen, acetylene etc...).
- Avoid the penetration of explosive atmospheres inside RPAs.
- Do not hit the external parts of RPAs (both aluminium and steel parts) through metallic objects (it may cause sparkles).
- Do not manually force RPAs over the maximum output torque.
- Avoid accumulation of combustible dusts on RPA surfaces.
- Avoid accumulation of electrostatic charges on insulating surfaces of RPAs, by providing suitable "grounding", using for example the valve fixing screws.
- All components and accessories installed on RPAs for drive and control purposes, must be suitable for those uses in accordance to the danger classification of the area.
- Maintenance operations on RPAs must be made according to the norms in force, (for example EN 50281, EN 60079...) and to the danger classification of the area.
- Do not make maintenance operations in places with explosive atmosphere.
- Verify springs functioning every 100.000 (one hundred thousand) cycles: substitute complete spring cartridges when necessary, but do not try to disassembly them.
- Verify all rubber sealing elements (o-ring s and plane gaskets) and all plastic anti-friction pads every 300.000 (three hundred thousand) cycles: substitute the complete spare-parts set when necessary.
- Use and operation carried out not in accordance to a.m. notes, may cause danger or damage to people and things, and let every legal responsibility lose from Manufacturer side.
- Use and operation carried out not in accordance to the a.m. notes, may cause danger or damage to people and things, and let every legal responsibility lose by the Manufacturer.

6 - DIRECTIONS FOR INSTALLATION

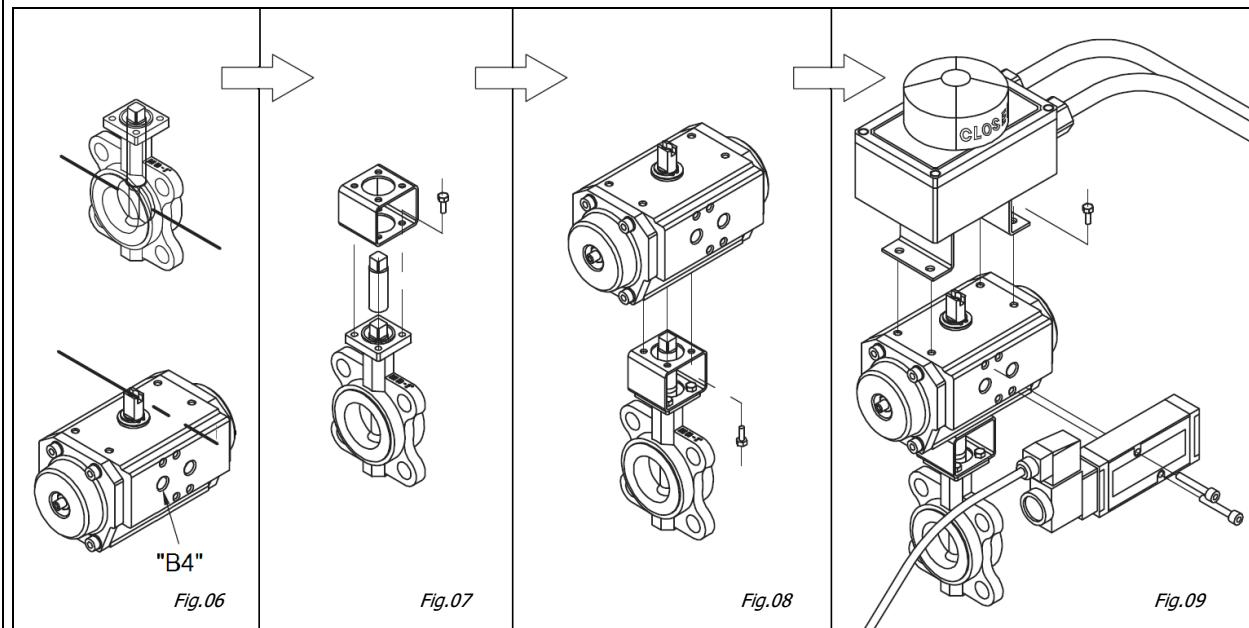
Duration and safety use of actuators and plants, for all operators within their range of action, also depends on the attention paid to the following directions.

- Installation, placing in service, use and maintenance of the actuators must be performed by skilled, experienced and informed personnel. We recommend observing the safety law requirements for accident's prevention, and to adopt appropriate safety devices: risk of serious personal injury!
- CAUTION: actuators must be used within working limits indicated in the technical data. Especially, do not exceed maximum allowed operating pressure and temperature: risk of serious personal injury!
- Do not disassemble the actuator from the machine/system, before disconnecting it from the pneumatic supply. Do not disassemble the covers, nor the circlip (P.10) if the actuator is pressurized: risk of serious personal injury!
- Move carefully, without crashes.
- Stock in warehouse between 0°C and + 40°C even for long periods.
- Keep actuators in their original packaging, with the relevant contents slips.
- Construction materials, surface treatments and paintings are physically steady and chemically inactive only under the conditions which are indicated on the identification nameplate. Do not use actuators with inadequate protection in corrosive environments: damages may occur to external and internal components and to pneumatic seals: risk of serious personal injury!
- During operations, possible arising of oily fogs inside the device: filtrate exhaust feeding air or recycle through specific solenoid-valves.
- Actuator's lubrication is made by the manufacturer. Its operation warranty, identified as number of movements before main metallic part's substitution, is guaranteed for 1.000.000 manoeuvres (opening and closing). It is referred to standard models only.
- Springs operation is guaranteed for 100.000 manoeuvres (opening and closing) before it has to be tested: they must be substituted in case of corrosion marks, wear or side yield. CAUTION: do not remove covers if the actuator is not in rest position (see shaft top position): risk of serious personal injury!
- On model AP 032, all 120° and 180° models, in presence of air feeding and without valve, shaft ejection may occur, owing to the absence of anti-ejection key (part n. 05). For these models, anti-ejection is only obtained through seeger ring (part. n. 10).
- To move and install models starting to AP 160 and over (total weight over Kg 25), use lifting devices and the special eyebolts provided.
- The actuator operation is forbidden before the machine/system in which it is incorporated is declared compliant to CE norms, or other standards governing the machine/system working.

PROCEDURE

- 1 - Make sure that both valve and actuator are closed, Fig.06. (Standard SR models normally closed. Standard DA models, feed by port "B4" in order to reach the correct positioning.)
- 2 - Assembly through screws, bracket and adapter, Fig.07.
- 3 - Insert actuator on top of adapter and assembly it through screws, Fig.08.
- 4 - Connect eventual accessories, making sure of the real position of the valve, Fig.09.
- 5 - Connect pneumatic/electrical feeding and verify correct operation.
- 6 - Pay attention to safety rules. In case of difficulty, do not force the elements, but verify clearances, axis position, supplied feeding and correct dimensioning of valve and actuator. If necessary get in touch with the supplier.

Disassembly is made following all described operations backwards.



7 - PERFORMANCES

The indicated performances are expressed in Newton per Meter (Nm) and air feeding in bar for DA actuators.
SR actuators performances depend both on feeding pressure and springs presence.

1 Nm = 0,102 kgm = 8,86 Lbin = 0,7383 Lbft

1 bar = 14,5 psi

«DA» Double Acting (air-air) torque ratings in Nm

TYPE	Air supply in bar									
	1	2	3	4	5	6	7	8	9	10
AP 032	-	-	-	5,0	6,3	7,6	8,8	10,0	11,4	12,6
AP 042	-	-	6,5	8,7	10,9	13,0	15,2	17,3	19,5	21,7
AP 050	3,0	6,1	9,2	12,3	15,4	18,5	21,5	24,6	27,7	30,8
AP 063	5,5	11,0	16,5	22,0	27,5	33,0	38,5	44,0	49,5	55,0
AP 075	11,7	23,4	35,1	46,8	58,5	70,2	81,9	93,6	105,3	117,0
AP 085	17,8	35,6	53,4	71,2	89,0	106,9	124,7	142,4	160,3	178,1
AP 100	27,7	55,4	83,2	110,9	138,6	166,4	194,1	221,8	249,5	277,3
AP 115	45,7	91,5	137,2	183,0	228,7	274,5	320,2	366,0	411,7	457,5
AP 125	60,1	120,3	180,5	240,7	300,9	361,1	421,2	481,4	541,6	601,8
AP 145	86,7	173,4	260,1	346,8	433,5	520,2	606,9	693,6	780,3	867,0
AP 160	118,3	236,7	355,0	473,4	591,7	710,1	828,4	946,8	1065	1183
AP 180	159,7	319,4	479,0	638,6	798,3	958,0	1119	1277	1437	1598
AP 200	221,8	443,7	665,6	887,5	1109	1333	1553	1775	1997	2219
AP 240	372,5	745,0	1118	1490	1863	2235	2608	2980	3353	3725
AP 270	539,2	1078	1617	2157	2696	3235	3774	4314	4853	5392
AP 330	911,5	1823	2734	3646	4558	5469	6835	7292	8204	9115
AP 420	1671	3342	5013	6684	8354	10025	11696	13367	-	-

«SR» Spring Return (air-spring) torque ratings in Nm

TYPE	N° springs for actuator side	Air supply in bar										SPRING TORQUE			
		3		4		5		6		7				8	
		0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	90°	0°
AP 042	3 4	-	-	-	-	7,1 4,1	4,1	9,3 8,1	6,3 4,1	11,5 10,2	8,5 6,2	13,7 12,4	10,7 8,4	6,8 9,0	3,8 5,0
AP 050	3	5,7	3,5	8,9	6,6	12,0	9,6	15,1	12,7	18,1	15,7	21,2	18,8	5,7	3,5
	4			7,7	4,7	10,8	7,7	13,9	10,8	16,9	13,8	20,0	16,9	7,7	4,7
	5					9,6	5,8	12,7	8,9	15,7	11,9	18,8	15,0	9,6	5,8
	6					8,4	3,9	11,5	7,0	14,5	10,0	17,6	13,1	11,5	7,0
AP 063	3	9,4	6,3	14,9	11,7	20,4	17,2	25,9	22,7	31,4	28,2	36,9	33,7	10,2	7,2
	4			12,3	8,3	17,8	13,8	23,3	19,3	28,8	24,8	34,3	30,3	13,7	9,7
	5					15,4	10,4	20,9	15,9	26,4	21,4	31,9	26,9	17,1	12,1
	6					13,0	7,0	18,5	12,5	24,0	18,0	29,5	23,5	20,5	14,5
AP 075	3	22,5	12,6	34,2	24,4	46,0	36,1	57,7	47,8	69,4	59,5	81,1	71,2	22,5	12,6
	4			30,0	16,9	41,8	28,6	53,5	40,3	65,2	52,0	76,9	63,7	30,0	16,9
	5					37,6	21,1	49,3	32,8	61,0	44,5	72,7	56,2	37,6	21,1
	6					33,4	13,6	45,1	25,3	56,8	37,0	68,5	48,7	45,1	25,3
AP 085	3	34,5	18,9	52,4	36,7	70,2	54,5	88,0	72,3	105,8	90,1	123,6	107,9	34,5	18,9
	4			46,1	25,2	63,9	43,0	81,7	60,8	99,5	78,6	117,3	96,4	46,1	25,2
	5					57,6	31,5	75,4	49,3	93,2	67,1	111,0	84,9	57,6	31,5
	6					51,5	20,0	69,1	37,8	86,9	55,6	104,7	73,4	69,1	37,8
AP 100	3	53,2	30,0	80,9	57,7	108,7	85,4	136,4	113,1	164,1	140,8	191,8	168,5	53,2	30,0
	4			70,9	40,0	98,7	67,7	126,4	95,4	154,1	123,1	181,8	150,8	70,9	40,0
	5					88,7	50,0	116,4	77,7	144,1	105,4	171,8	133,1	88,7	50,0
	6					78,7	32,2	106,4	60,0	134,1	87,7	161,8	115,4	106,4	60,0
AP 115	3	84,3	53,0	130,0	98,8	175,8	144,5	221,6	190,3	267,3	236,0	313,0	281,7	84,3	53,0
	4			112,3	70,7	158,1	116,4	203,9	162,2	249,6	207,9	295,3	253,6	112,3	70,7
	5					140,4	88,3	186,2	134,1	231,9	179,8	277,6	225,5	140,4	88,3
	6					122,7	60,2	168,5	106,0	214,2	151,7	259,9	197,4	168,5	106,0
AP 125	3	116,8	63,7	177,0	123,9	237,3	184,1	297,5	244,2	357,6	304,3	417,7	364,4	116,8	63,7
	4			155,7	85,0	216,0	145,2	276,2	205,3	336,3	265,4	396,4	325,5	155,7	85,0
	5					194,7	106,3	254,9	166,4	315,0	226,5	375,1	286,6	194,7	106,3
	6					173,4	67,4	233,6	127,5	293,7	187,6	353,8	247,7	233,6	127,5
AP 145	3	158,0	92,0	245,0	179,0	332,0	265,0	418,0	352,0	505,0	439,0	592,0	526,0	168,0	102,0
	4			211,0	123,0	298,0	210,0	384,0	269,0	471,0	383,0	558,0	470,0	224,0	136,0
	5					264,0	154,0	350,0	240,0	437,0	327,0	524,0	414,0	280,0	170,0
	6					230,0	98,0	316,0	184,0	403,0	271,0	490,0	358,0	336,0	204,0
AP 160	3	222,4	132,6	340,7	251,0	459,1	369,3	577,4	487,6	695,7	605,9	814,0	724,2	222,4	132,6
	4			296,5	176,9	414,9	295,2	533,2	413,5	651,5	531,8	769,8	650,1	296,5	176,9
	5			370,7	221,1	489,0	339,4	607,3	457,7	725,6	576,0	725,6	576,0	370,7	221,1
	6					326,5	147,0	444,8	265,3	563,1	383,6	681,4	501,9	444,8	265,3
AP 180	3	287,9	191,0	447,6	350,7	607,3	510,4	766,9	670,0	926,6	829,7	1068	989,1	287,9	191,0
	4			383,9	254,7	543,6	414,4	703,3	574,0	862,9	733,7	1022	893,1	383,9	254,7
	5					479,9	318,4	639,6	478,1	792,2	637,7	958,6	797,1	479,9	318,4
	6					416,2	222,4	575,9	382,1	735,6	541,8	894,9	701,1	575,9	382,1
AP 200	3	423,6	242,0	644,7	463,8	867,4	685,8	1089	907,7	1311	1130	1533	1351	423,6	242,0
	4			564,8	322,6	786,7	544,6	1008	766,5	1230	988,4	1452	1209	564,8	322,6
	5					706,0	403,4	927,9	625,3	1150	847,2	1372	1068	706,0	403,4
	6					625,3	262,2	847,2	484,1	1069	706,0	1291	927,0	847,2	484,1
AP 240	3	664,0	453,6	1037	826,2	1409	1199	1782	1571	2154	1944	2527	2316	664,0	453,6
	4			885,4	604,8	1258	977,4	1630	1350	2003	1722	2376	2095	885,4	604,8
	5					1107	756,0	1479	1129	1852	1501	2224	1874	1107	756,0
	6					955,5	534,7	1328	907,2	1701	1280	2073	1653	1328	907,2
AP 270	3	912,5	705,1	1452	1244	1991	1783	2530	2323	3069	2862	3608	3401	912,5	705,1
	4			1217	940,2	1756	1479	2295	2019	2834	2558	3373	3097	1217	940,1
	5					1521	1175	2060	1714	2599	2144	3138	2793	1521	1175
	6					1286	871,0	1825	1410	2364	1954	2903	2489	1825	1410
AP 330	3	1626	1108	2538	2020	3450	2931	4361	3843	5273	4755	6184	5666	1626	1108
	4			2168	1477	3080	2389	3992	3301	4903	4212	5815	5123	2168	1477
	5					2711	1847	3622	2759	4534	3670	5445	4582	2711	1847
	6					2341	1305	3253	2216	4165	3128	5076	4040	3253	2216
AP 420	3	2999	2014	4670	3685	6340	5356	8011	7026	9682	8697	11353	10368	2999	2014
	4			3998	2685	5669	4356	7340	6027	9011	7698	10682	9369	3998	2685
	5					4998	3356	6669	5027	8340	6698	10010	8369	4998	3356
	6					4327	2357	5997	4028	7668	5698	9339	7369	5997	4028

8 - ROTATION ADJUSTMENT

Rotation adjustment of actuators is made by the manufacturer. For further adjustment, follow these instructions.
WARNING! Installation, adjustment and maintenance must be effected under safety conditions.
 Do not connect pneumatic/electrical feeding until all operations are terminated.

ADJUSTMENT IN CLOSING - 0°

1 - Take off covers loosening screws as per indicated numeration; pull out springs, if any, from pistons seats, Fig.11.

2 - Unscrew counter-bolt and dowel for regulation of the piston's travel from both sides of actuator, Fig.12.

3 - Keep the stem slightly in tension, (by fix key for ball valves and by special dynamometrical key for butterfly valves) and regulate rotation of the actuator in closing (0°) on one side, adjusting piston's travel through the regulation dowel, Fig.13.

4 - When reaching the wanted point of closure, keep the regulation dowel in position and tighten the counter-bolt. Repeat this operation on the other side of the actuator, Fig.14.

5 - Re-assembly springs, if any, and covers tightening screws a little at a time following the numeration, Fig.11.

6 - Connect pneumatic/electrical feeding and verify correct operation.

ADJUSTMENT IN CLOSING - 0°

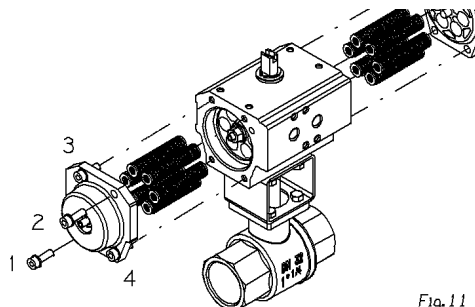


Fig. 11

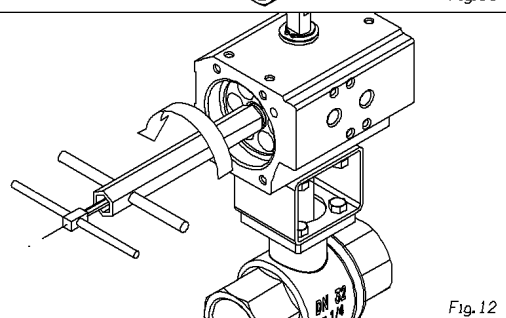


Fig. 12

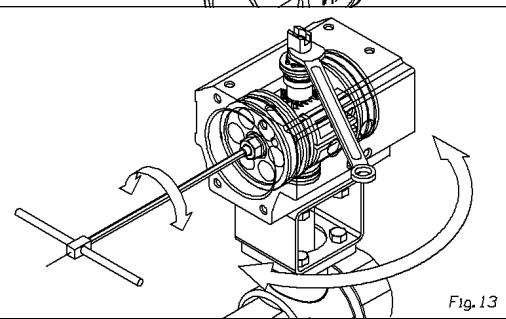


Fig. 13

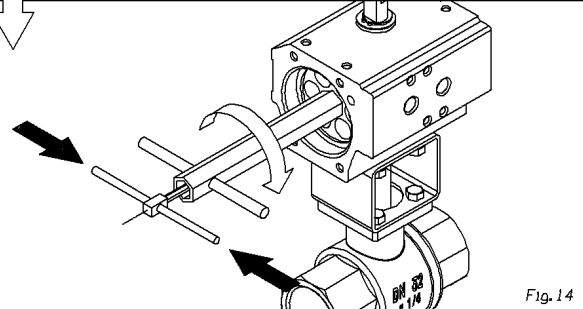


Fig. 14

ADJUSTMENT IN OPENING - 90°

1 - Unscrew counter-bolt and regulation dowel on both covers, Fig.15.

2 - Connect air feeding into port "A2" to have actuator's opening, Fig.16. Regulate the rotation of the actuator in opening (90°) on one side, by adjusting piston's travel through its regulation dowel, Fig.17.

3 - When reaching the wanted point of opening, keep regulation dowel in position and tighten counter-bolt. Repeat this operation on the other side of the actuator, Fig.18.

4 - Connect pneumatic/electrical feeding and verify correct working.

ADJUSTMENT IN OPENING - 90°

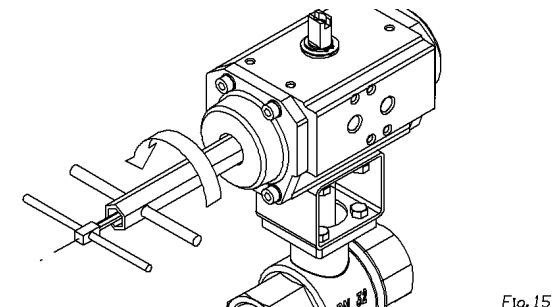


Fig. 15

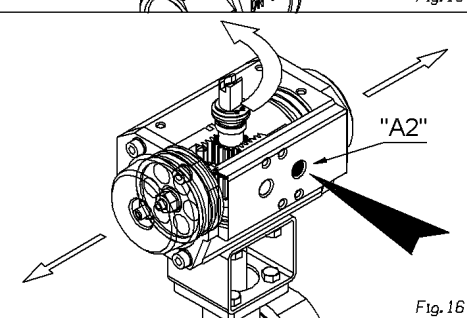


Fig. 16

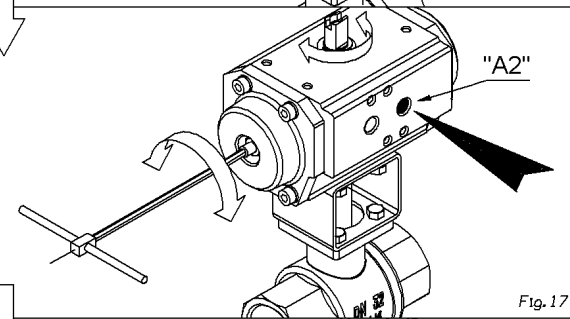


Fig. 17

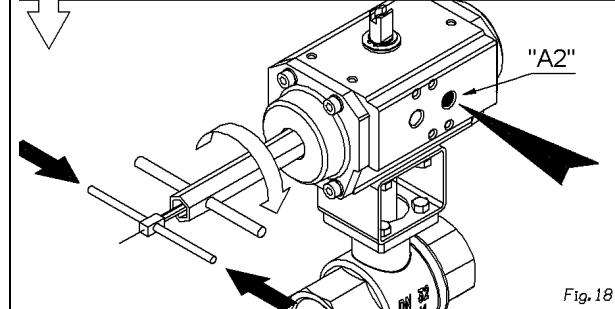


Fig. 18

9 - MAINTENANCE, SPARE PART SUBSTITUTION

Actuator must be taken off from the plant where it is installed, disconnected from pneumatic and electrical feeding, and from possible accessories, Fig.19.

WARNING!
Installation, adjustment and maintenance must be effected under safety conditions. Do not connect pneumatic/electrical feeding until all operations are terminated.
For all numbered parts, only complete sets of spare-parts are available.

1 - Disassembly covers loosening screws as per indicated numeration; pull out springs, if any, from pistons seats, Fig.20.

2 - Rotate stem in order to release pistons from shaft's rack. Take off pistons through a pair of pincers, Fig.21.

TAKE OFF

DISASSEMBLY

ROTATE
AND TAKE OFF

Fig.19

Fig.20

Fig.21

3 - Release seeger ring (part 10) from stem and take off: pinion thrust washer (part 23) and anti-friction washer (part 24), Fig.22.

4 - Extract shaft from actuator's body and take off: upper pilot ring for shaft (part 26), O-rings (parts 06-07), lower pilot ring for shaft (part 25), Fig.23.

5 - From both pistons take off: piston bearing (part 27), anti-ejection key (part 05), O-rings (parts 12-19), piston head bearing (part 13), Fig.24.

* Take note of the adjustment dowel projection before disassembly *

RELEASE
AND TAKE OFF

TAKE OFF

TAKE OFF

Fig.22

Fig.23

Fig.24

6 - From both covers take off: cover gasket (part 14), O-ring (part 19), Fig.25.

* Take note of the adjustment dowels projection before disassembly *

WARNING!
After disassembly all particulars to be substituted, and before proceeding with their replacement, carefully clean all components. Lubricating by synthetic type grease

NYE SINTHY 355
or similar, Fig.26.

TAKE OFF

CLEAN AND LUBRICATE

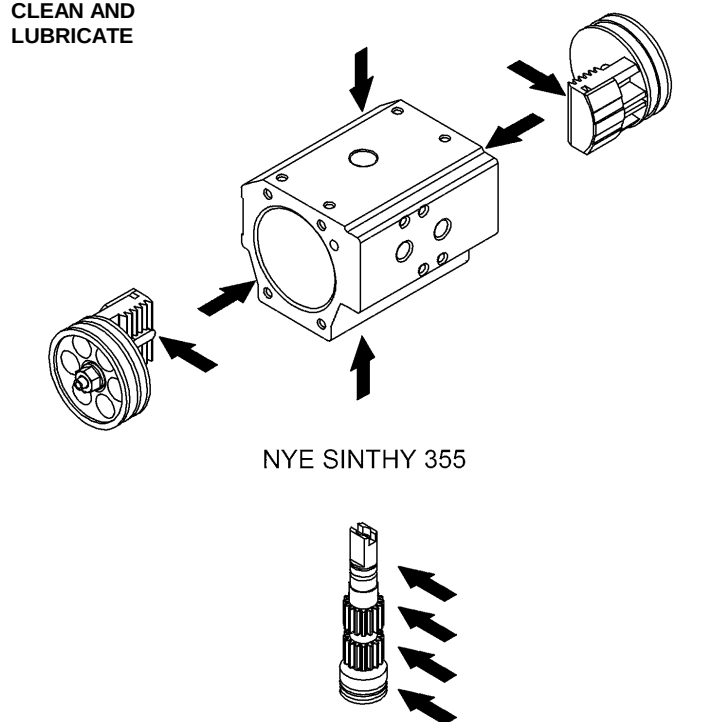


Fig.26

7 - Replace new spare-parts on shaft: upper pilot ring for shaft (part 26), O-rings (parts 06-07), lower pilot ring for shaft (part 25), and replace shaft into actuator's body, Fig.27.

8 - Replace and slip new spare-parts on stem: pinion thrust washer (part 23), anti-friction washer (part 24), then replace seeger-ring (part 10) in its special seat, Fig.28.

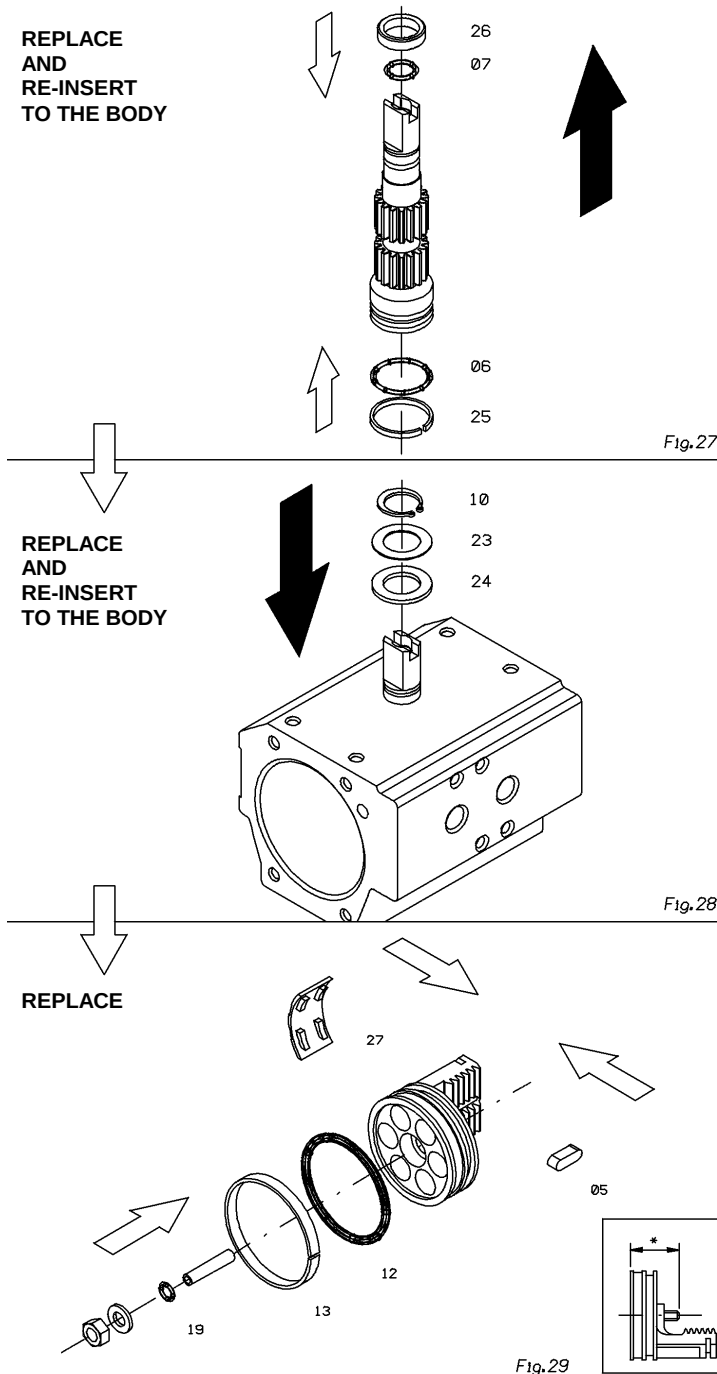
9 - Replace new spare-parts on pistons: piston bearing (part 27), anti-ejection key (part 05), O-rings (parts 12-19), piston head bearing (part 13), Fig.29.

* P.N. previous dowel's projection *

REPLACE AND RE-INSERT TO THE BODY

REPLACE AND RE-INSERT TO THE BODY

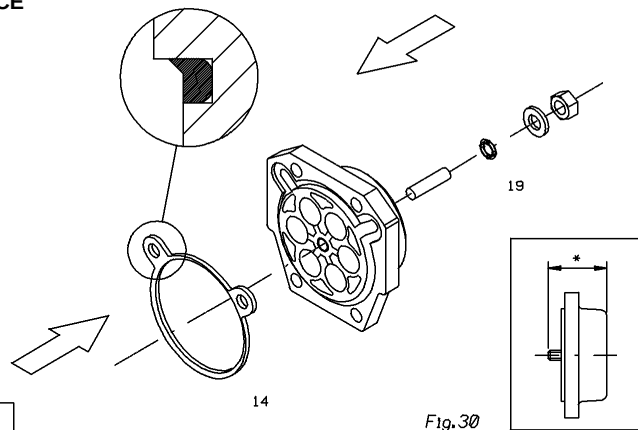
REPLACE



10 - Replace new spare-parts on covers: cover gasket (part 14), O-ring (part 19), Fig.30.

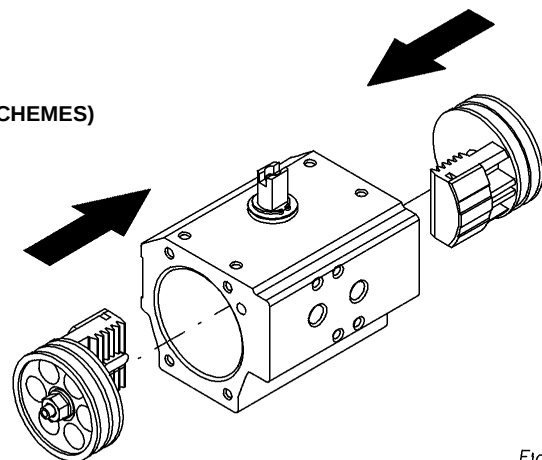
* P.N. previous dowel's projection *

REPLACE



ASSEMBLY (A, B, C, D, SCHEMES)

11 - Assembly pistons in the body in accordance to the required assembly variation, see Fig.31 and the Part 10 - A, B, C, D, ASSEMBLY SCHEMES.



PAY ATTENTION!

12a - Pay attention! Make sure the pistons are "in right phase", this means they are engaged with the same tooth on shaft, and verify rotation, Fig.32-A.

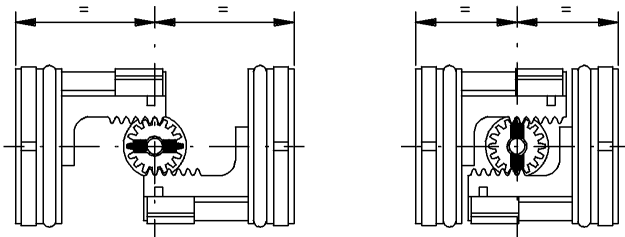


Fig.32-A

12b - Pay attention! Make sure the pistons are "in right phase", this means they are engaged with the same tooth on shaft, and verify rotation, Fig.32-B.

PAY ATTENTION!

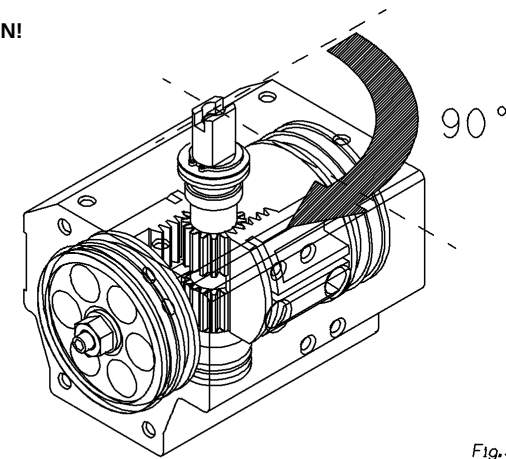


Fig.32-B

PAY ATTENTION!

SR 2 (2 springs)

SR 3 (3 springs)

SR 4 (4 springs)

SR 5 (5 springs)

SR 6 (6 springs)

13 - Pay attention! Replace eventual springs, following Fig.33.

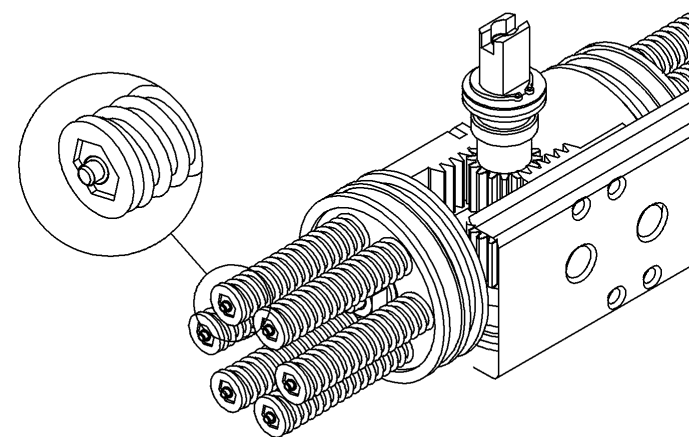
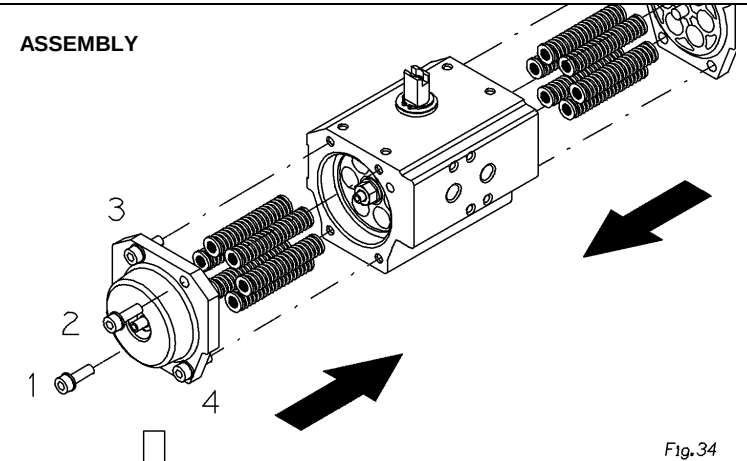


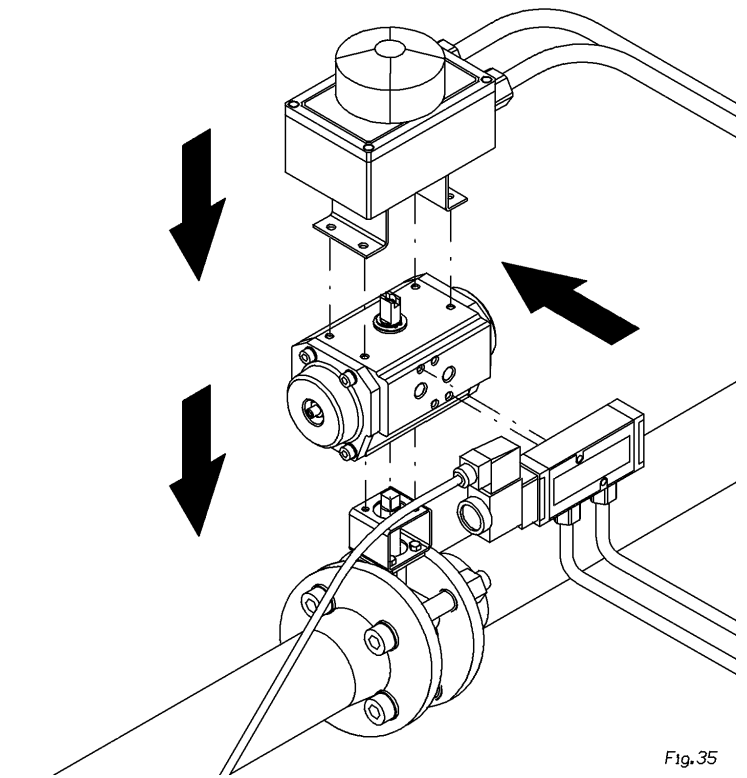
Fig.33

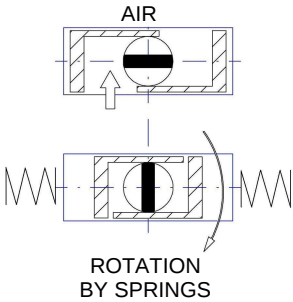
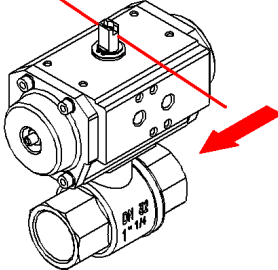
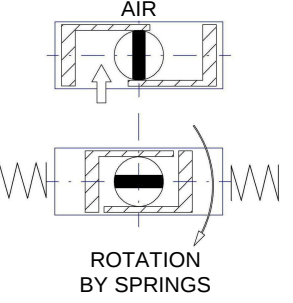
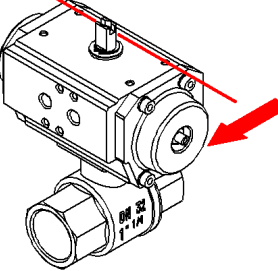
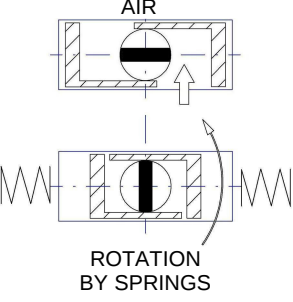
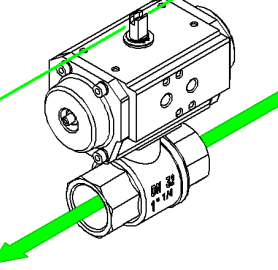
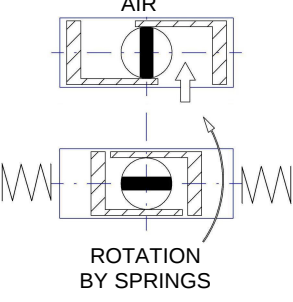
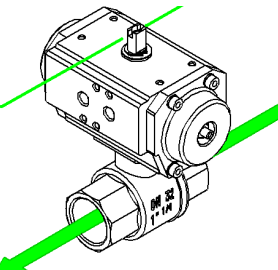
14 - Assembly covers tightening screws following stated numeration, Fig.34.



RE-INSTALL AND CHECK

15 - Re-install and check. Connect pneumatic/electrical feeding and verify correct operation, Fig.35.



10 - A, B, C, D, ASSEMBLY SCHEMES			
TYPE	ASSEMBLY SCHEME	TYPICAL APPLICATION	UTILITY
A			SPRINGS CLOSE THE VALVE STANDARD In case of fail, the valve is closed (fail-safe)
B			SPRINGS CLOSE THE VALVE In case of fail, the valve is closed (fail-safe)
C			SPRINGS OPEN THE VALVE In case of fail, the valve is opened
D			SPRINGS OPEN THE VALVE In case of fail, the valve is opened