PNEUMATICS

Compressed Air Solutions

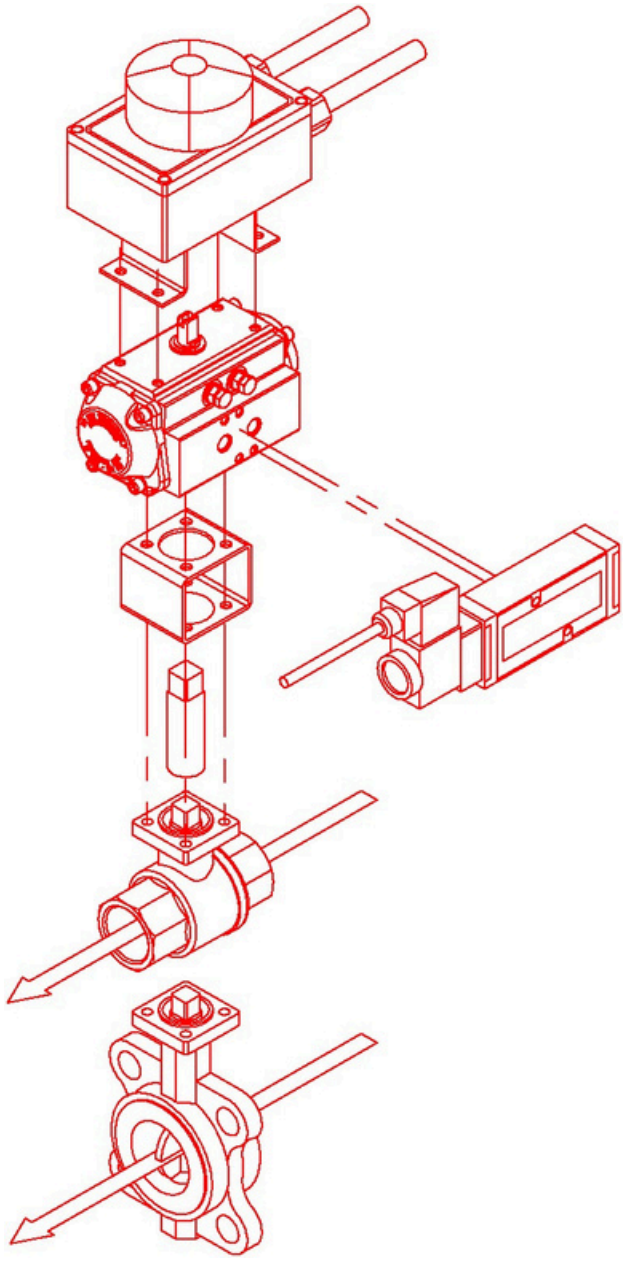
RE Series - Aluminium

internal rotation adjustment

INSTRUCTION MANUAL

FOR INSTALLATION, USE AND MAINTENANCE

PNEUMATIC
RACK&PINION ACTUATORS
90° ROTATION



Rev. - 01/12/2022

CONTENTS

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”.

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.

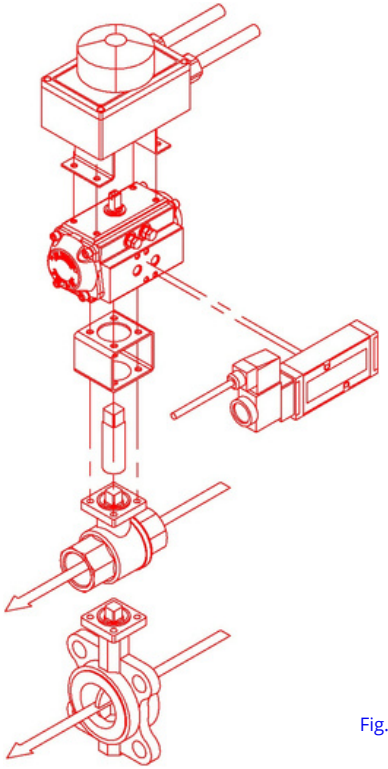


Fig.01

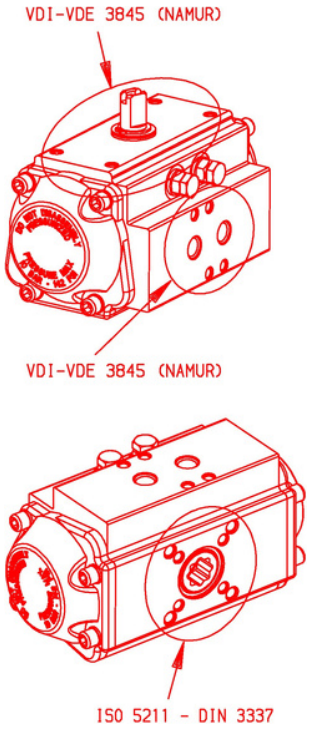


Fig.02

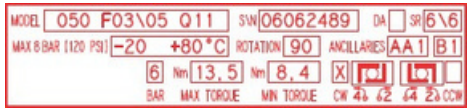


Fig.03

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 Actingair-air operation

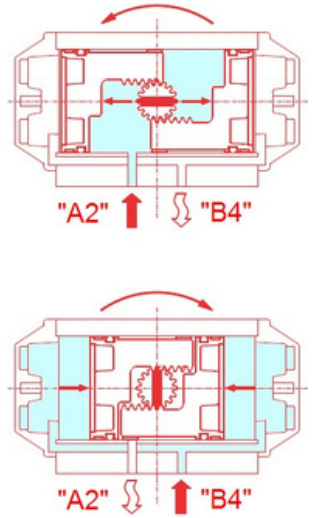


Fig.04

SR
Spring Return air-spring operation

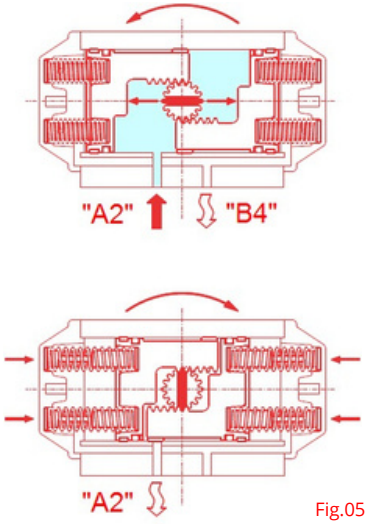
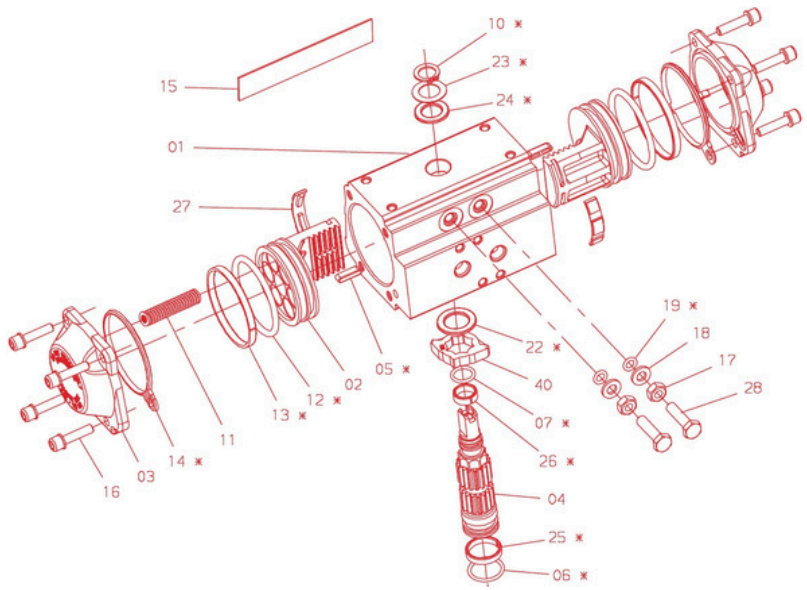


Fig.05

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	№	Description	Material
1	1	Body	Aluminium EN AW 6063 T6
2	2	Piston	Aluminium EN AB 46100 T6
3	2	Cover	Aluminium EN AB 46100 T6
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
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
17	2	Nut	AISI 304
18	2	Washer	AISI 304
* 19	2	O-Ring	NBR - FPM/FKM - Silicone
* 22	1	Antifriction washer	Acetalic Resin - PA66 - LEXAN
* 23	1	Shaft thrust washer	AISI 304
* 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	Rotation adjusting screw	AISI 304
40	1	Rotation stop gear	AISI 304

5-WARNINGS AND NOTES FOR THE USE IN EXPLOSIVE ENVIRONMENTS

"RE" Series - Pneumatic Rack & Pinion Actuators, made of ALUMINIUM alloy 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

Because of the relevant safe condictions 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 l ong 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 parst'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!

• To move and install models starting to RE 161 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 wich 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.

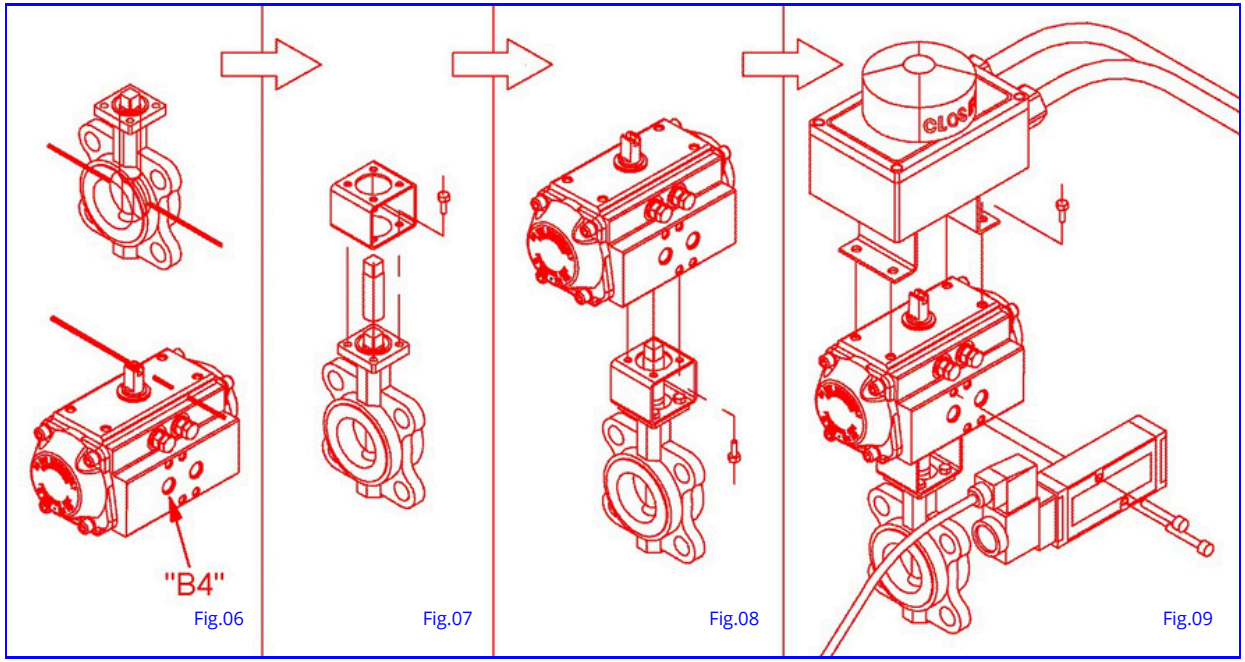


Fig.06 Fig.07 Fig.08 Fig.09

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
RE 043	-	-	6,5	8,7	10,9	13,0	15,2	17,3	19,5	21,7
RE 051	3,3	6,7	10,0	13,4	16,7	20,1	23,4	26,8	30,1	33,5
RE 064	5,9	11,8	17,8	23,7	29,6	35,5	41,4	47,4	53,3	59,2
RE 076	11,8	23,5	35,3	47,1	58,9	70,6	82,4	94,2	105,9	117,7
RE 086	17,2	34,5	51,7	68,9	86,1	103,4	120,6	137,8	155,0	172,3
RE 101	27,5	54,9	82,4	109,8	137,3	164,8	192,2	219,7	247,1	274,6
RE 116	43,7	87,4	131,1	174,9	218,6	262,3	306,0	349,7	393,4	437,1
RE 126	56,6	113,3	169,9	226,5	283,2	339,8	396,4	453,0	509,7	566,3
RE 146	88,4	176,7	265,1	353,4	441,8	530,1	618,5	706,9	795,2	883,6
RE 161	114,9	229,7	344,6	459,5	574,3	689,2	804,1	918,9	1034	1149
RE 181	156,6	313,1	469,7	626,3	782,9	939,4	1096	1253	1409	1565
RE 201	215,3	430,6	646,0	861,3	1077	1292	1507	1723	1938	2153
RE 241	372,5	745,0	1118	1490	1863	2235	2608	2980	3353	3725
RE 271	539,2	1078	1617	2157	2696	3235	3774	4314	4853	5392
RE 331	911,5	1823	2734	3646	4558	5469	6835	7292	8204	9115
RE 421	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°
RE 043	3	-	-	-	-	7,1	4,1	9,3	6,3	11,5	8,5	13,7	10,7			6,8	3,8
	4							8,1	4,1	10,2	6,2	12,4	8,4			9,0	5,0
RE 051	3	5,8	4,3	9,1	7,6	12,5	10,9	15,8	14,3	19,2	17,6	22,5	21,0			5,8	4,3
	4			7,8	5,7	11,1	9,0	14,4	12,3	17,8	15,7	21,1	19,0			7,8	5,7
	5					9,7	7,1	13,0	10,4	16,4	13,8	19,7	17,1			9,7	7,1
	6					8,2	5,1	11,6	8,5	14,9	11,8	18,3	15,2			11,6	8,5
RE 064	3	10,7	7,1	16,6	13,0	22,5	18,9	28,5	24,8	34,4	30,8	40,3	36,7			10,7	7,1
	4			14,3	9,4	20,2	15,4	26,1	21,3	32,0	27,2	38,0	33,1			14,3	9,4
	5					17,8	11,8	23,8	17,7	29,7	23,6	35,6	29,6			17,8	11,8
	6					15,5	8,2	21,4	14,1	27,3	20,1	33,2	26,0			21,4	14,1
RE 076	3	21,1	14,3	32,8	26,0	44,6	37,8	56,4	49,6	68,1	61,3	79,9	73,1			21,1	14,3
	4			28,1	19,0	39,8	30,8	51,6	42,5	63,4	54,3	75,2	66,1			28,1	19,0
	5					35,1	23,8	46,9	35,5	58,6	47,3	70,4	59,1			35,1	23,8
	6					30,3	16,7	42,1	28,5	53,9	40,3	65,6	52,0			42,1	28,5
RE 086	3	33,8	17,8	51,1	35,1	68,3	52,3	85,5	69,5	102,7	86,7	120,0	104,0			33,8	17,8
	4			45,1	23,8	62,3	41,0	79,6	58,2	96,8	75,5	114,0	92,7			45,1	23,8
	5				12,5	56,4	29,7	73,6	47,0	90,8	64,2	108,1	81,4			56,4	29,7
	6					50,4	18,5	67,7	35,7	84,9	52,9	102,1	70,1			67,7	35,7
RE 101	3	50,1	32,3	77,5	59,7	105,0	87,2	132,5	114,7	159,9	142,1	187,4	169,6			50,1	32,3
	4			66,8	43,0	94,2	70,5	121,7	98,0	149,2	125,4	176,6	152,9			66,8	43,1
	5					83,5	53,8	110,9	81,3	138,4	108,7	165,9	136,2			83,5	53,8
	6					72,7	37,1	100,2	64,6	127,6	92,0	155,1	119,5			100,2	64,6
RE 116	3	80,7	50,5	124,4	94,2	168,1	137,9	211,8	181,6	255,5	225,3	299,3	269,0			80,7	50,5
	4			107,6	67,3	151,3	111,0	195,0	154,7	238,7	198,4	282,4	242,1			107,6	67,3
	5					134,5	84,1	178,2	127,8	221,9	171,5	265,6	215,2			134,5	84,1
	6					117,7	57,2	161,4	100,9	205,1	144,6	248,8	188,3			161,4	100,9
RE 126	3	105,0	64,9	161,6	121,5	218,2	178,2	274,9	234,8	331,6	291,4	388,1	348,0			105,0	64,9
	4			140,0	86,5	196,6	143,2	253,2	199,8	309,9	256,4	366,5	313,0			140,0	86,6
	5					175,0	108,2	231,6	164,8	288,2	221,4	344,8	278,1			175,0	108,2
	6					153,3	73,2	210,0	129,8	266,6	186,4	323,2	243,1			210,0	129,8
RE 146	3	165,2	102,6	250,8	190,9	339,2	279,3	427,5	367,7	519,9	456,0	604,3	544,4			162,5	102,6
	4			216,6	136,8	305,0	225,1	393,3	313,5	481,7	401,9	570,1	490,2			216,6	136,8
	5					270,8	171,0	359,1	259,3	447,5	347,7	535,9	436,0			270,8	171,0
	6					236,6	116,8	324,9	205,2	413,3	293,5	501,7	381,9			325,0	205,2
RE 161	3	202,7	141,9	317,5	256,8	432,4	371,6	547,3	486,5	662,1	601,4	777,0	716,2			202,7	141,9
	4		74,3	270,2	189,2	385,1	304,1	499,9	418,9	614,8	533,8	729,7	648,7			270,2	189,2
	5			222,9		337,8	236,5	452,6	351,4	567,5	466,2	682,4	581,1			337,8	236,5
	6					290,4	168,9	405,3	283,8	520,2	398,6	635,0	513,5			405,3	283,8
RE 181	3	281,6	188,2	438,1	344,7	594,7	501,3	751,3	657,9	907,8	814,5	1064	971,0			281,5	188,2
	4			375,4	250,9	532,0	407,5	688,5	564,0	845,1	720,6	1002	877,2			375,4	250,9
	5					469,3	313,6	625,8	470,2	782,4	626,8	939,0	783,3			469,3	313,6
	6					406,5	219,8	563,1	376,3	719,7	532,9	876,2	689,5			563,1	376,3
RE 201	3	386,2	259,8	601,5	475,1	816,8	690,5	1032	905,8	1247	1121	1436	1336			386,2	259,8
	4			514,9	346,4	730,2	561,8	945,5	777,1	1160	992,4	1376	1208			514,9	346,4
	5					643,6	433,0	858,9	648,4	1074	863,7	1290	1079			643,6	433,0
	6					557,0	304,3	772,3	519,6	987,6	735,0	1203	950,3			772,3	519,6
RE 241	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
RE 271	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
RE 331	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
RE 421	3	2999	2014	4670	3685	6340	5356	8011	7026	9682	8697	11353	10368			2999	2014
	4			3998	2685	5669	4356	7340	6027	9011	7698	9369	9369			3998	2685
	5					4998	3356	6669	5027	8340	6698	8369	8369			4998	3356
	6					4327	2357	5997	4028	7668	5698	7369	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°

• Actuators with assembly variations “A” (standard) and “B” (see Part 10 - A, B, C, D, ASSEMBLY SCHEMES) are identified by CW rotation on the nameplate: for adjustment in closing, please adjust the RIGHT screw, see Fig.11.

• Actuators with assembly variations “C” and “D” (see: 10 - A, B, C, D, ASSEMBLY SCHEMES) are identified by CCW rotation on the nameplate has got reverse rotation: for adjustment in closing, please adjust the LEFT screw.

1 - Unscrew the counter-bolt of the rotation adjusting screw.

2 - Keep the stem slightly in tension, and adjust the rotation through the appropriate screw.

3 - When reaching the wanted position, tighten the counter-bolt.

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

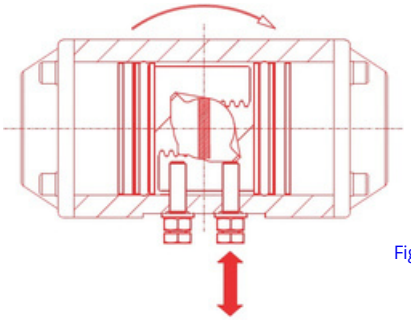


Fig.11

ADJUSTMENT IN OPENING - 90°

•• Actuators with assembly variations “A” (standard) and “B” (see Part 10 - A, B, C, D, ASSEMBLY SCHEMES) are identified by CW rotation on the nameplate: for adjustment in opening, please adjust the LEFT screw, see Fig.12.

• Actuators with assembly variations “C” and “D” (see: 10 - A, B, C, D, ASSEMBLY SCHEMES) are identified by CCW rotation on the nameplate has got reverse rotation: for adjustment in opening, please adjust the RIGHT screw.

1 - Unscrew the counter-bolt of the rotation adjusting screw.

2 - Keep the stem slightly in tension, and adjust the rotation through the appropriate screw.

3 - When reaching the wanted position, tighten the counter-bolt.

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

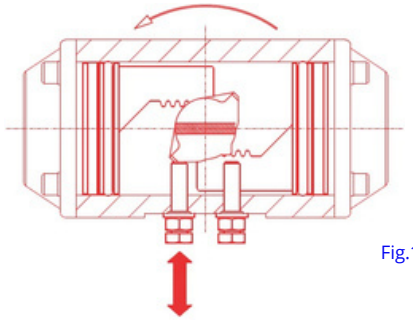


Fig.12

9-MAINTENANCE, SPARE PART SOBSTITUTION

Actuator must be absolutely taken off from the plant where it is installed, disconnected from pneumatic and electrical feeding, and from possible accessories, see Fig. 14.
WARNING! Installation, adjustment and maintenance must be effected under safety conditions. Do not connect pneumatic/electrical feeding until all operations are terminated.

1- Take off external adjusting screws, see Fig. 15.

2- Disassemble covers loosening screws as per indicated numeration; pull out springs, if any, from pistons seats, see Fig. 16.

TAKE OFF

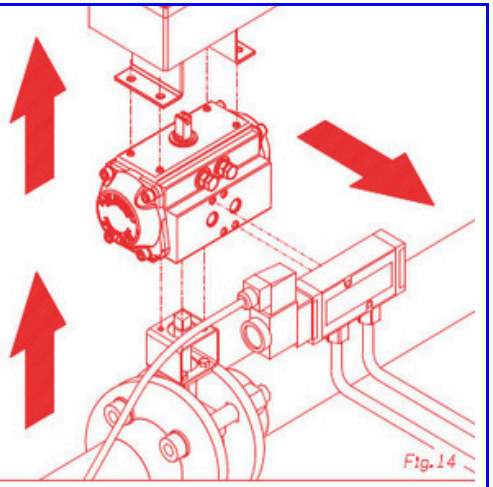


Fig.14

DISASSEMBLY

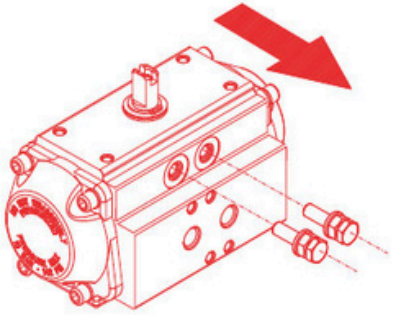


Fig.15

DISASSEMBLY

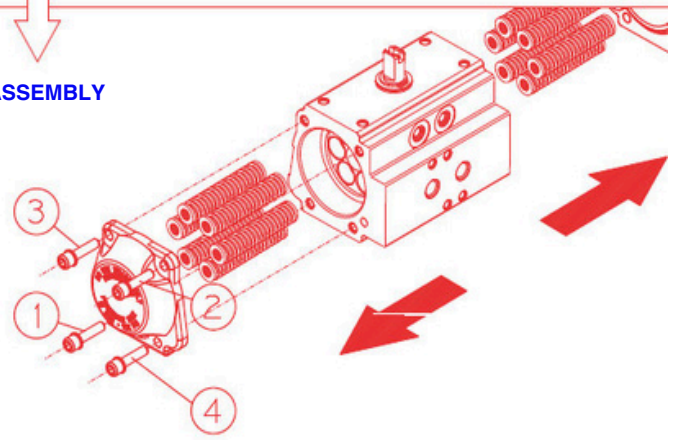


Fig.16

3- Rotate stem in order to release pistons from shaft's rack. Take off pistons through a pair of pincers, see Fig. 17.

-4- Release seeger ring (Part 10) from the shaft top and take away: shaft thrust washer (Part 23), anti-friction washer (Part 24), gear antifriction washer (Part 22), external adjusting gear (Part 40), and the shaft too, see Fig. 18.

ROTATE AND TAKE OFF

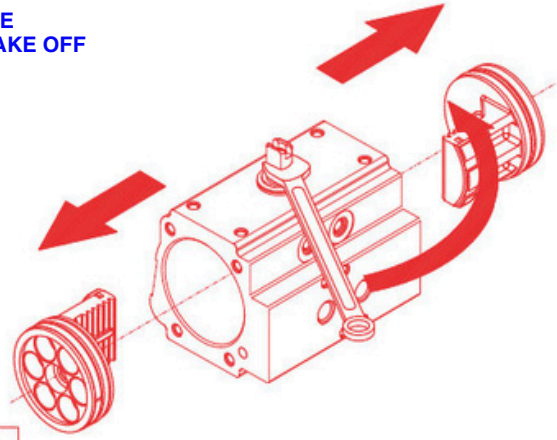
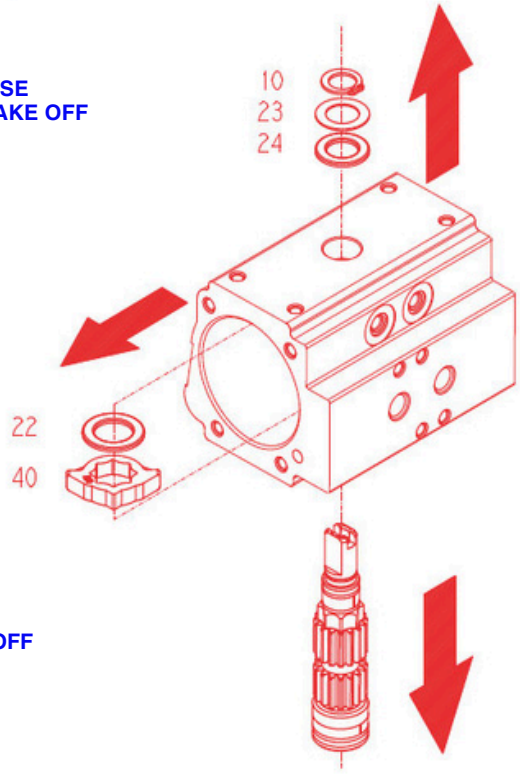


Fig.17

RELEASE AND TAKE OFF

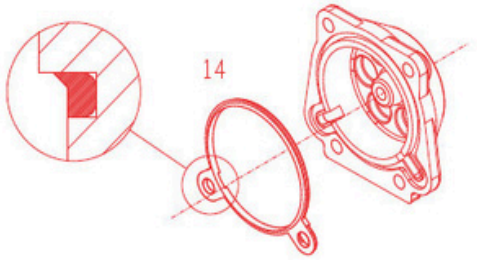


TAKE OFF

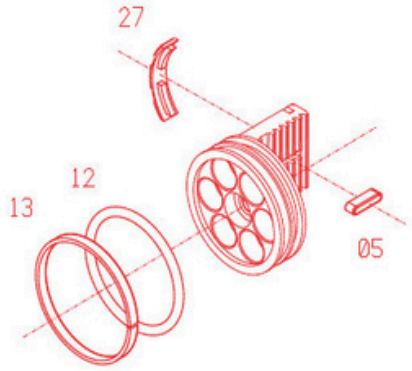
Fig.18

TAKE OFF AND REPLACE

5a - From both covers take off: cover gasket (Part 14).



5b - From both pistons take off: piston bearing (part 27), anti- ejection key (Part 05), o-rings (Part 12), piston head bearing (Part 13).



5c - From the shaft take off: upper pilot ring for shaft (Part 26), o-rings (Part 06-07), lower pilot ring for shaft (Part 25), see Fig. 19.

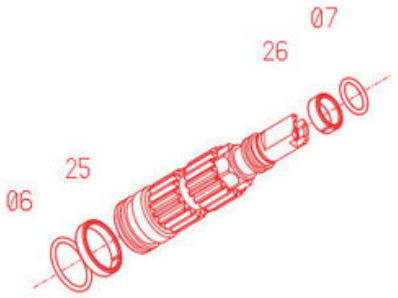


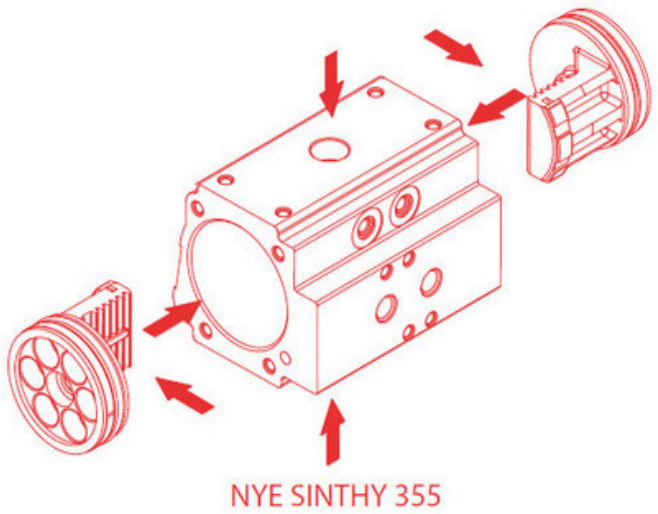
Fig. 19

WARNING!
After disassembly all particulars to be substituted, and before proceeding with their replacement, carefully clean all components: body, pistons, covers and shaft.

Replace now the old particulars with the new ones.

Before assembly, please lubricate where indicated with high performances synthetic type grease NYE SINTHY 355 or similar, see Fig. 20.

LUBRICATE



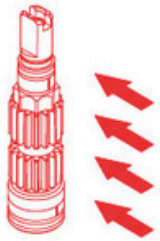


Fig. 20

RE-INSERT TO THE BODY

Re-insert the shaft in the body, with external adjusting gear and gear anti-friction washer on its inside. Slip the external washers and clip the securing ring; please be sure that they are well engaged, see Fig. 21.

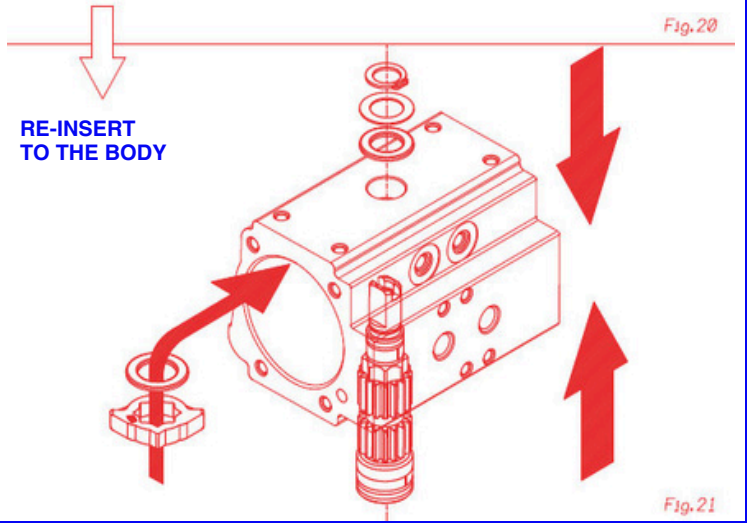


Fig. 21

7- Fig. 22 shows the correct gearing by gear and shaft, and the direction of the gear's arrow in reference to the body (actuator top vision). In order to easy subsequent operation (inserting pistons in the body), itis suggested to respect this schema.

BE SURE

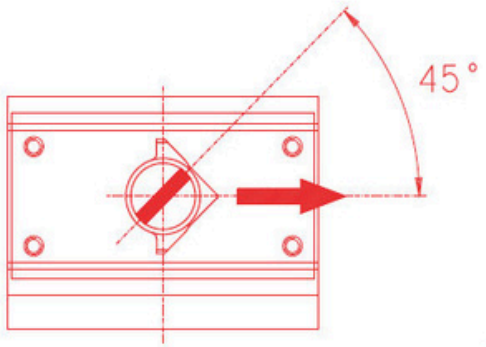


Fig.22

8 - Insert the pistons in the body, see Fig. 23.

WARNING!
If the assembly variation is not STANDARD = A
(see Part 10 - A, B, C, D, ASSEMBLY SCHEMES"), then it need to reverse the gearing angle by gear and shaft (Fig. 22), or the rotation of the pistons in reference to the body (Fig. 23), or both.

RE-INSERT
(A, B, C, D, SCHEMES)

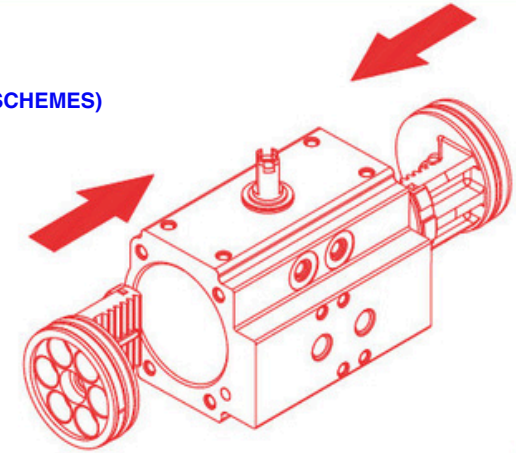


Fig.23

BE SURE

9- Verify the piston's "right phase": this means they are engaged with the same tooth on shaft, and verify that shaft rotation induces a piston's symmetrical opening, see Fig. 23-A.

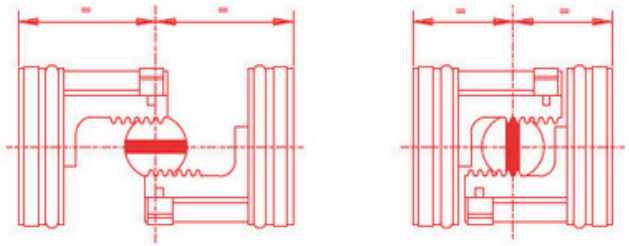


Fig.23-A

10 - verify that after a 90+5° shaft rotation the pistons rest inside to the body, see Fig. 23-B.

BE SURE

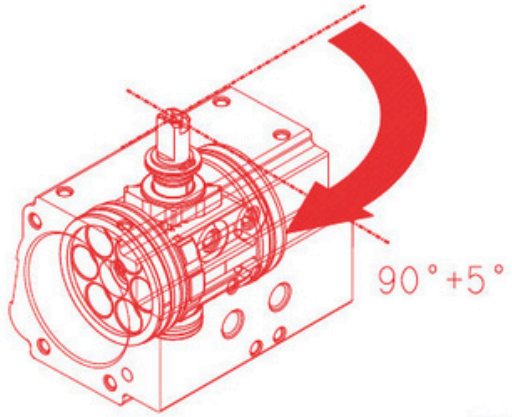


Fig.23-B

11 - Adjust the 90° actuator rotation, re-inserting the appropriate external adjusting screws, see Fig. 24.

ADJUST

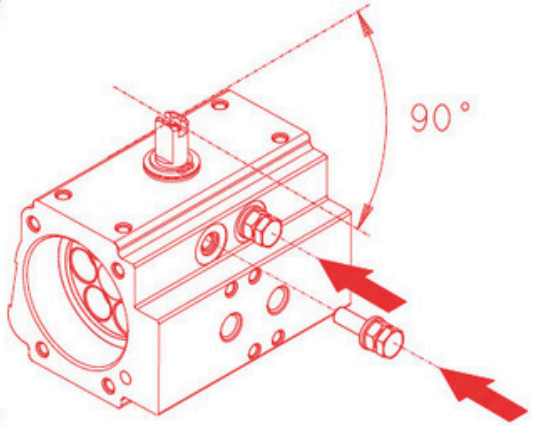


Fig.24

12 - Fig. 25 shows the optimal spring layouts, if springs are presents.

PAY ATTENTION

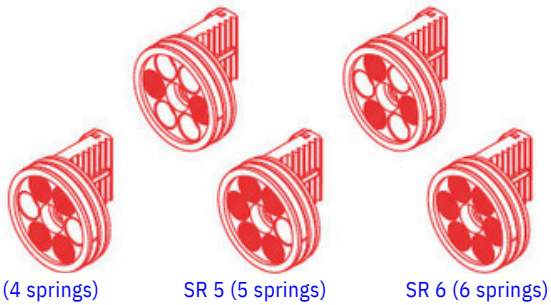


Fig.25

13 - Assemble the covers tightening screws as per indicated numeration. Please note the screw tightening torque table, see Fig. 26. In order to easy that operation, it is better to dispose the actuator in vertical position.

14 - Re-assemble the actuator to the plant where it was installed, connect pneumatic and electrical feeding and verify the correct operation, see Fig. 27.

ASSEMBLY

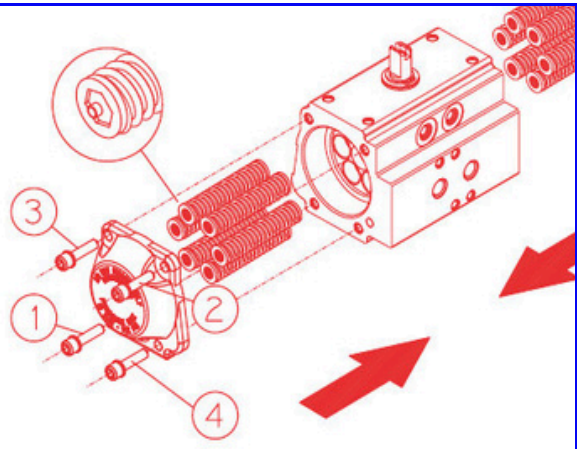


Fig.26

M 5	M 6	M 8	M 10	M 12	M 14	M 16
4,5 Nm	8 Nm	19 Nm	38 Nm	65 Nm	115 Nm	160 Nm

RE-INSTALL AND CHECK

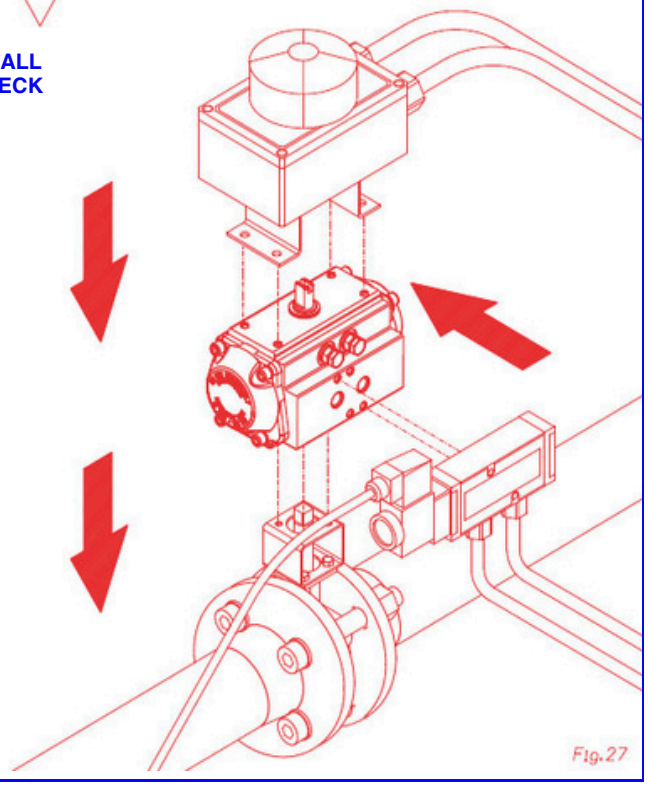
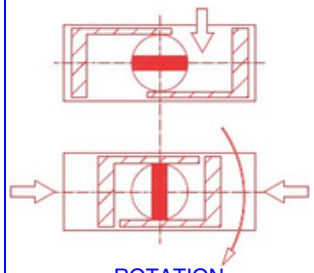
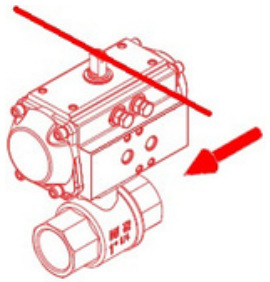
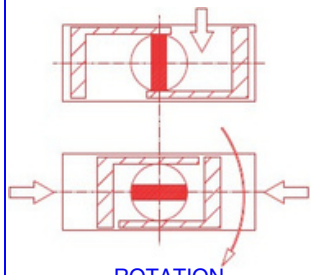
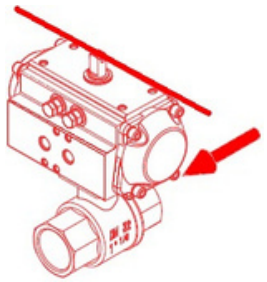
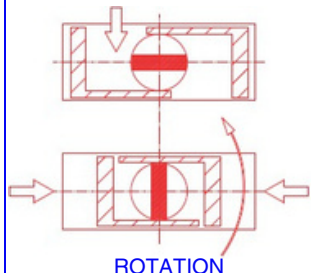
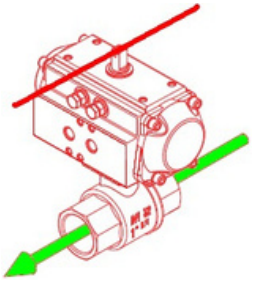
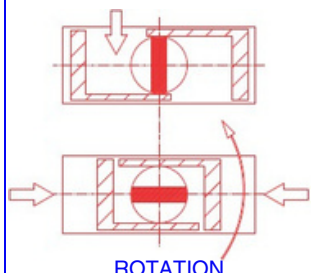
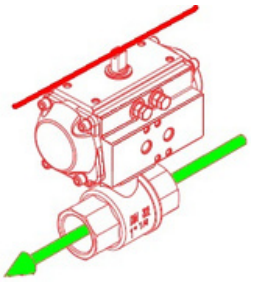


Fig.27

10 - A, B, C, D, ASSEMBLY SCHEMES

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