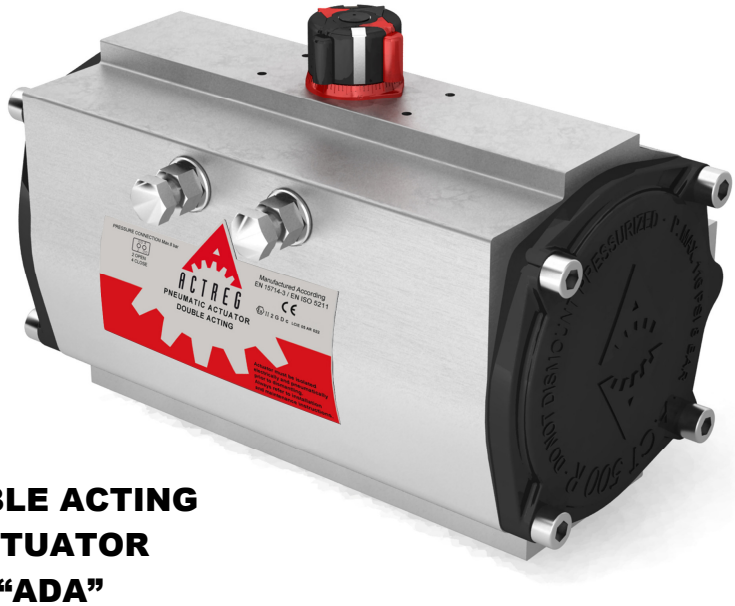
PNEUMATIC ACTUATORS
ASSEMBLY & MAINTENANCE PROCEDURES

Ref. Doc. MMMACTREGDRE English Rev.2 – January 2012

ADA & ASR SERIES

SPRING RETURN ACTUATOR "ASR"



DOUBLE ACTING ACTUATOR "ADA"

CE

Ex II 2 G D c - LCIE 05 AR 022

REVIEW CONTROL

PROCEDURE REF. DOC. MMMACTREGDRE

Rev.	*Date*	*Carried out by*	*Approved*	*Description*
0	02-01-2006	J. Rubio	J.Tejedor	First Edition
1	10-12-2008	J. Rubio	J.Tejedor	General update
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1. APPLICABLE RANGE

The Pneumatic Actuators ***ACTREG*** use a rack and pinion sliding system that creates a linear torque with a quarter turn operation. The range is the following:

SERIE ADA
Double Acting

- ADA-10
- ADA-20
- ADA-40
- ADA-80
- ADA-130
- ADA-200
- ADA-300
- ADA-500
- ADA-850
- ADA-1200
- ADA-1750
- ADA-2100
- ADA-2500
- ADA-4000

SERIE ASR
Spring Return

SPRING COMBINATIONS

ASR-20 →	S04	S06	S08			
ASR-40 →	S04	S06	S08	S10	S12	S14
ASR-80 →	S04	S06	S08	S10	S12	S14
ASR-130 →		S06	S08	S10	S12	S14
ASR-200 →		S06	S08	S10	S12	S14
ASR-300 →		S06	S08	S10	S12	S14
ASR-500 →		S06	S08	S10	S12	S14
ASR-850 →		S06	S08	S10	S12	S14
ASR-1200 →		S06	S08	S10	S12	S14
ASR-1750 →		S06	S08	S10	S12	S14
ASR-2100 →		S06	S08	S10	S12	S14
ASR-2500 →		S06	S08	S10	S12	S14
ASR-4000 →		S06	S08	S10	S12	S14

1.1 SPRING COMBINATION BY TYPE OF ACTUATOR

ACTREG actuators use a maximum of seven springs on each side, always using a same type of spring independently of the combination of springs that will be used.

The quantity of springs is identified as follows:

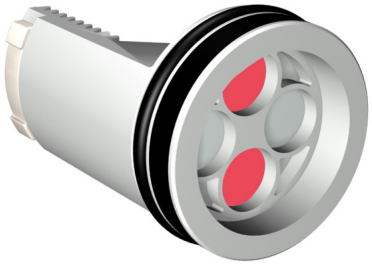
eg: **S14**

S = springs & **14** is the total number of springs assembled in the actuator.

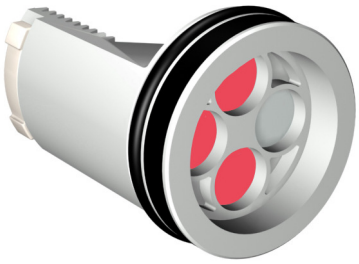
1.1.1 ACTUATOR SIZE ASR-20

The actuator ASR-20 uses a minimum of 2 springs and a maximum of 4 springs on each side, according to the diagrams below, depending on the springs combination that require to be assembled.

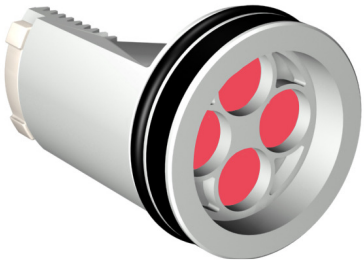
S04



S06
STANDARD



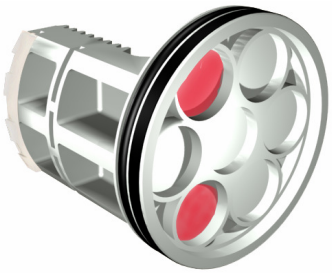
S08



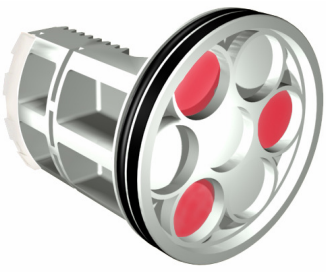
1.1.2 ACTUATORS SIZES ASR-40 & 80

The actuators ASR-40 & 80 use a minimum of 2 springs and a maximum of 7 springs on each side, according to the diagrams below, depending on the springs combination that require to be assembled.

S04



S06



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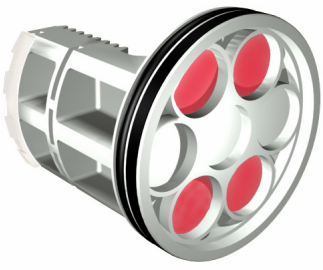
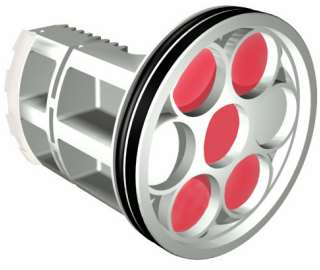
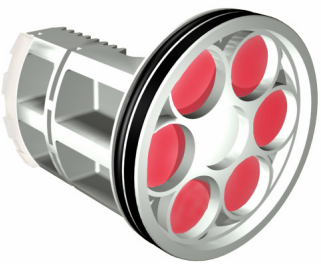


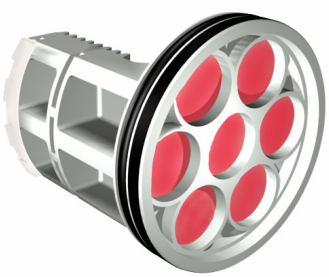
S10



S12



S14
STANDARD



1.1.3 ACTUATORS SIZES ASR-130 ~ 4000

The actuators ASR-130 ~ 4000 use a minimum of 3 springs and a maximum of 7 springs on each side, according to the diagrams below, depending on the springs combination that require to be assembled.

2. GENERAL INFORMATION

2.1 STATEMENT

ACTREG Actuators sizes 300 and smaller

ACTREG S.A. states that Actreg Actuators covered by this Certificate have been designed and manufactured in accordance with the following European Directives requirements:

- European Pressure Equipment Directive 97/23/CE: classified according to Article 3, Part 3, Cat. SEP, must not carry the CE label.
- Machines Directive 89/392/CEE.
- Directive 94/9/CE ATEX, classification Group II, Cat. 2 for use in explosive atmospheres, Zones 1,2 & 21,22. Conformity evaluation according to Appendix VIII.
  Marking CE Ex II2GDc.

-EN 15714-3

Applied harmonized and non-harmonized Technical Standards:

- See ACTREG's Catalogue & Assembly & Maintenance Procedures.
- EN 13463-1:2001, EN 1127-1.

The electrical & mechanical accessories are not covered by this statement and will have to carry their own certificate in order to be assembled with the Actreg Actuators.

ACTREG Actuators sizes 500 & larger

ACTREG S.A. states that Actreg Actuators covered by this Certificate have been designed and manufactured in accordance with the following European Directives requirements:

- European Pressure Equipment Directive 97/23/CE: classified according to Category I, Module A Evaluation Procedure of Conformity mod. A certified by the manufacturer ACTREG. Marking CE.
- Machines Directive 89/392/CEE.
- Directive 94/9/CE ATEX, classification Group II, Cat. 2 for use in explosive atmospheres, Zones 1,2 & 21,22. Conformity evaluation according to Appendix VIII. Marking CE Ex II2GDc.

-EN 15714-3 Pneumatic Part-Turn Actuators For Industrial Valves

Applied harmonized and non-harmonized technical Standards:

- EN 13463-1:2001, EN 1127-1.

The electrical and mechanical accessories are not covered by this statement and will have to carry their own certificate in order to be assembled with Actreg actuators.

The suitability of the materials and design of the actuator type in terms of its working conditions are the responsibility of the actuator's end user.

ADA & ASR SIZES

DESCRIPTION OF THE PRESSURE EQUIPMENTS

Type	*Serie*	*Size*	*PN*
ADA	Double Acting	10	PN-10
		20	PN-8
		40	
		80	
		130	
		200	
		300	
ASR	Spring Return	500	
		850	
		1200	
		1750	
		2100	
		2500	
		4000	

Material: Aluminium

Service conditions for standard actuators:

- Maximum Pressure: 8 bars (Except ADA 10, 10 bars)
- Minimum Temperature: -30 ºC
- Maximum Temperature: +100 ºC

Agreement evaluation process used: Category I Module A

Technical Standards & applied Specifications:

- Solenoid direct assembly according to Standard NAMUR VDI / VDE 3845
- Accessories assembly according to Standard NAMUR VDI / VDE 3845
- Connections to valves according to Standard EN ISO 5211

3. INSPECTION AT DELIVERY & STORAGE

3.1 All actuators must be examined upon delivery to ensure that they have not suffered any damage during transport. Inform the supplier immediately if there is any damage.

3.2 As standard, actuators will leave the factory in closed position. Open position configuration must be specially requested.

3.3 ***WARNING!!***
Actuators must be stored under cover and protected from inclement weather conditions and dampness with air conducts properly covered.

3.4 Actuators should not be unpacked until their definitive installation, except for inspection purposes.

4. INSTALLATION

4.1 The handling and transportation of actuators must be carried out with extreme precaution and using the necessary and adequate means depending on their size and weight in order to avoid risks to the operators handling them.

WARNING !!
Check the physical conditions of actuators in order to detect any damage incurred during transport and/or handling.

4.2 Actuators should be installed in such a way that they are easy to access in order to do the periodic inspections and corresponding maintenance operations necessary to guarantee the performance qualities that they have been designed for.

WARNING !!
Actuators must not support unexpected stress. It is important to do the assemble with a correct alignment and parallelism to guarantee that it is not submitted to unexpected stress.

IMPORTANT !!
After the installation carry out a final operational check of the actuator by making some opening and closing operations to ensure that it works properly.

The use of dry air increases the lifetime of the actuators, as well as the lifetime of their accessories, solenoids and other pneumatic accessories.

4.2.1 RECOMMENDED MINIMUM AIR QUALITY

For best possible service life and trouble-free operation, ISO 8573-1 quality class 5.4.4 should be used. This means 40 µm filter, dew point +3ºC for indoor operation (a lower dew point should be selected for outdoor operation, Quality class 3) and oil concentration 5.0mg oil/m³.

Quality Class	Pollution		Water	Oil
	Particle size (µm)	Max. concentration (mg/m³)	Max. press. dew point (ºC)	Max. concentration (mg/m³)
1	0.1	0.1	-70	0.01
2	1	1	-40	0.1
3	5	5	-20	1.0
4	15	8	+3	5.0
5	40	10	+7	25
6	-	-	+10	-

4.2.2 LUBRICATION

Actuators are factory lubricated for the lifetime in normal working conditions.
The standard lubricant is suitable for use from -30ºC (-22º F) up to 100ºC (212º F).
For low and high temperature execution, where special grease is required please contact ACTREG.

For our standard execution we recommend to use Molicote B2.2 Plus grease or silimar.

WARNING !!

Actuators are lubricated during assembly and do not require any further lubrication.

4.3 Make sure that both the actuator and valve are in the same position, open or closed.

4.4 When assembling the actuator on the valve, check their alignment to ensure that the coupling parts work perfectly aligned.

4.5 The coupling bolts, whether the actuator connects directly to the valve or uses a bracket, must be tightened proportionally, distributing the stress, before tightening them completely.

4.6 The normal performance of the actuators is to close clockwise and to open anticlockwise. However, this may be inverted under request.

4.7 ACTREG pneumatic actuators are provided with bi-directional pinion travel stops. Side located stops allow a full ±5º travel adjustment between 85º and 95º. Adjustment of the counter clockwise and clockwise rotation limits is accomplished by unscrewing the locking nuts. 1/3 turn of those locking nuts means 1º of the stroke.

WARNING!!

Do not adjust more than 2.5º each side, designed by the manufacturer. Internal parts could be damaged.

IMPORTANT !!

It is advisable to operate the actuator twice before fully tightening the coupling bolts in order to ensure a good centring.

5. PREVENTIVE MAINTENANCE

5.1 This basically consists in a periodic inspection to check the actuator function.

5.2 Actuators must be operated at least once every six months. However, depending on the application of the actuator, this may be done within shorter periods.

5.3 It is the end user's responsibility to establish these operation plans depending on the working conditions.

WARNING !!
Never leave the actuators opened or closed during a long period of time.

5.4 It is recommended to replace O-rings, guides and washers when an in-depth revision of the installation is made.

6. MAINTENANCE OPERATIONS

6.1 *PRECAUTIONS BEFORE DISASSEMBLY!!*

6.1.1 Disconnect the actuator and its accessories from the air and electrical network.

6.1.2 Disassembly the solenoid from the actuator.

6.1.3 Disassembly the actuator from the valve and/or from its couplings.

WARNING !!
Always wear adequate protective clothing (Follow the safety guidelines established by your company!)

Any parts replacement should be done with the original ACTREG spare parts!!

The manufacturer will not be responsible of the wrong functioning of the actuator if original ACTREG parts have not been used.

7. REASONS FOR PARTS REPAIR AND REPLACEMENT

Parts of the actuator will have to be repaired or replaced as soon as leakage is detected through the upper O-ring (111) or lower O-ring (110) of the pinion, through the O-ring (109) of the piston or through the O-rings (118) of the end caps.

As soon as this happens, proceed with the disassembly of the actuator and replacement of all the O-rings, bushings, slide guides and washers as listed in the spares parts.

8. DISASSEMBLY OF THE ACTUATOR

Once the precautions prior to the disassembly have been taken, follow the next steps:

8.1 Disassembly the end caps (4) of the actuator by un-tightening the external bolts (113).

WARNING !!
With SPRING RETURN ACTUATORS there is no danger during this operation as the fastening bolts of the caps are designed with adequate length to absorb spring stress.

8.2 Unfasten the nuts (934) in order to remove the levelling screws (16).

8.3 Turn the pinion (3) anticlockwise to disengage the pistons (2) in normally closed actuators and clockwise in normally open ones. Remove the pistons from the cylinder.

8.4 Disassemble the position indicator (20), the degree indicator (24), the slip washer (471), the soft pinion washer (5) and the metallic pinion washer (8) from the upper side.

8.5 Disassemble the pinion (3) from the lower part of the body (1) of the actuator. To do this operation, disassemble the upper pinion bearing (10) and the stop (12) through the inside of the body.

8.6 Clean all the parts of the actuator.

8.7 Examine all the parts in order to see if there is any wear due to an over-use.

WARNING!!
Carefully examine the inside of the cylinder.

8.8 If everything is in good conditions, replace the O-rings, bushings, slide guides included in the ACTREG Maintenance kits, before reassembling the actuator.

8.9 Lubricate the parts of the actuator with Molicote B 2-2 plus grease. Apply a thin layer of grease on the O-rings (109, 110 & 111).

9. ASSEMBLY OF THE ACTUATOR

After the disassembly, the inspection and lubrication of the different parts proceed to the assembly following the sequence below:

9.1 Correctly assembly all the parts included in ACTREG Maintenance kits previously lubricated.

9.2 Place the pinion (3) in the body's (1) actuator from underneath. Once the pinion appears through the inside of the body, assemble the pinion stop (12) in its correct position and the upper pinion bearing (10).

9.3 Place the soft pinion washer (5), the metallic pinion washer (8), the slip washer (471), the degree indicator (24) and the position indicator (20) in the upper part of the pinion.

9.4 Assemble both pistons, checking that they engage at the same time when turning the pinion (3) clockwise for normally closed actuators and anticlockwise for normally open actuators.

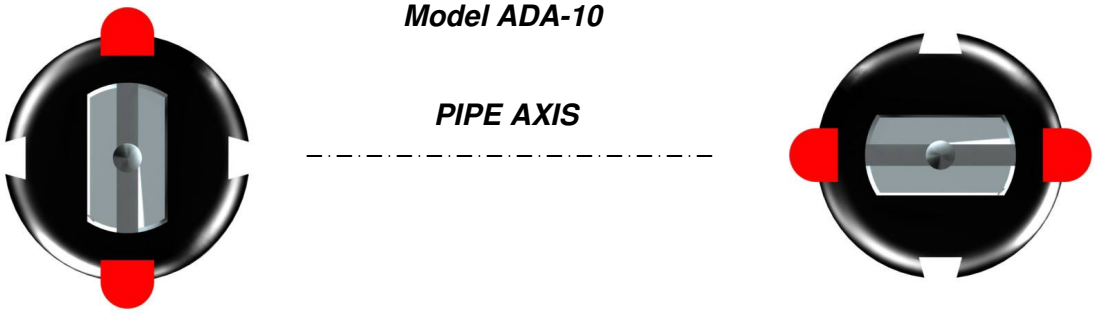
9.5 Assemble actuators end caps (4) tighten the bolts (113) adequately distributed.

9.6 Check that the open and closed positions coincide with the position indicated in the upper part of the pinion, then assembly the cover.

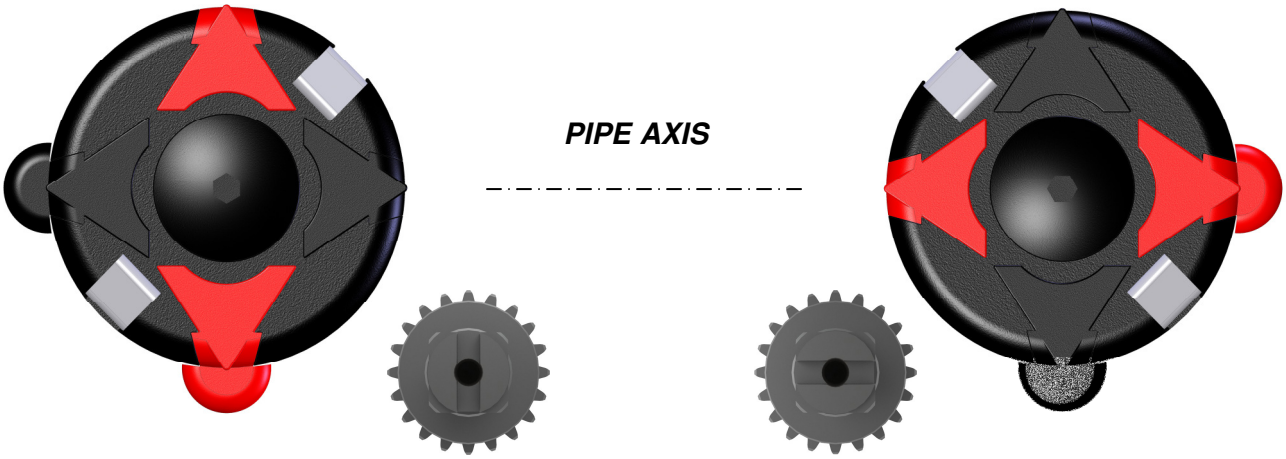
IMPORTANT !!
Once the assembly is done, operate the actuator a few times.

Closed Position *Open Position*

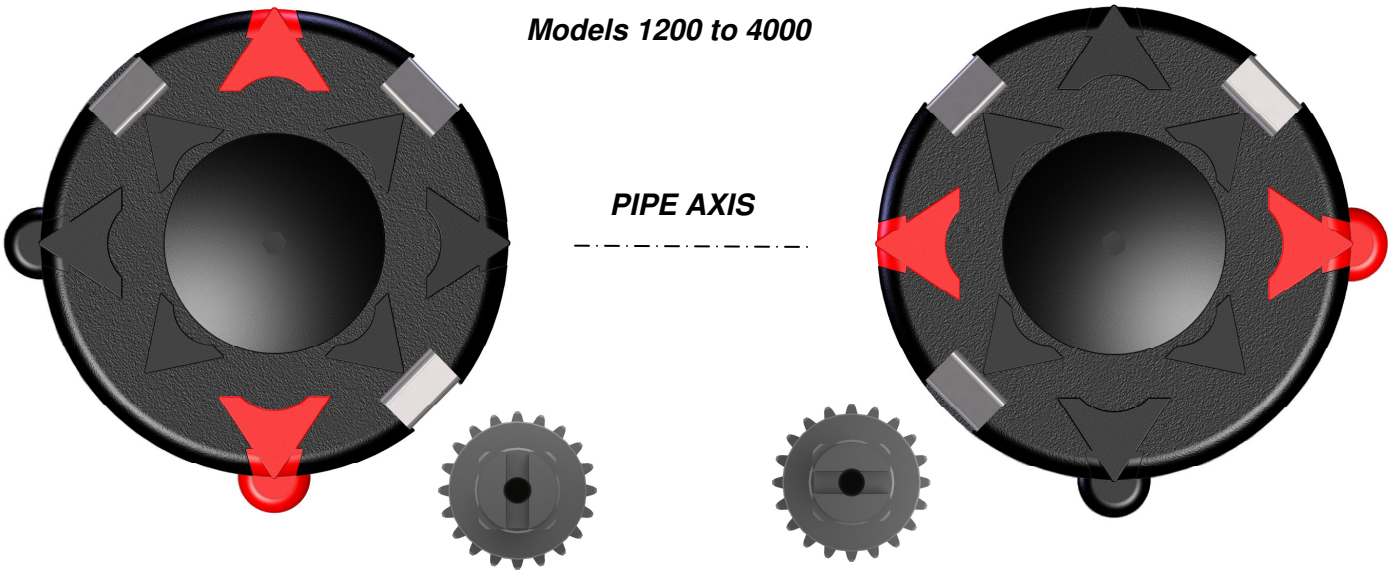
Model ADA-10



Models 20 to 850



Models 1200 to 4000

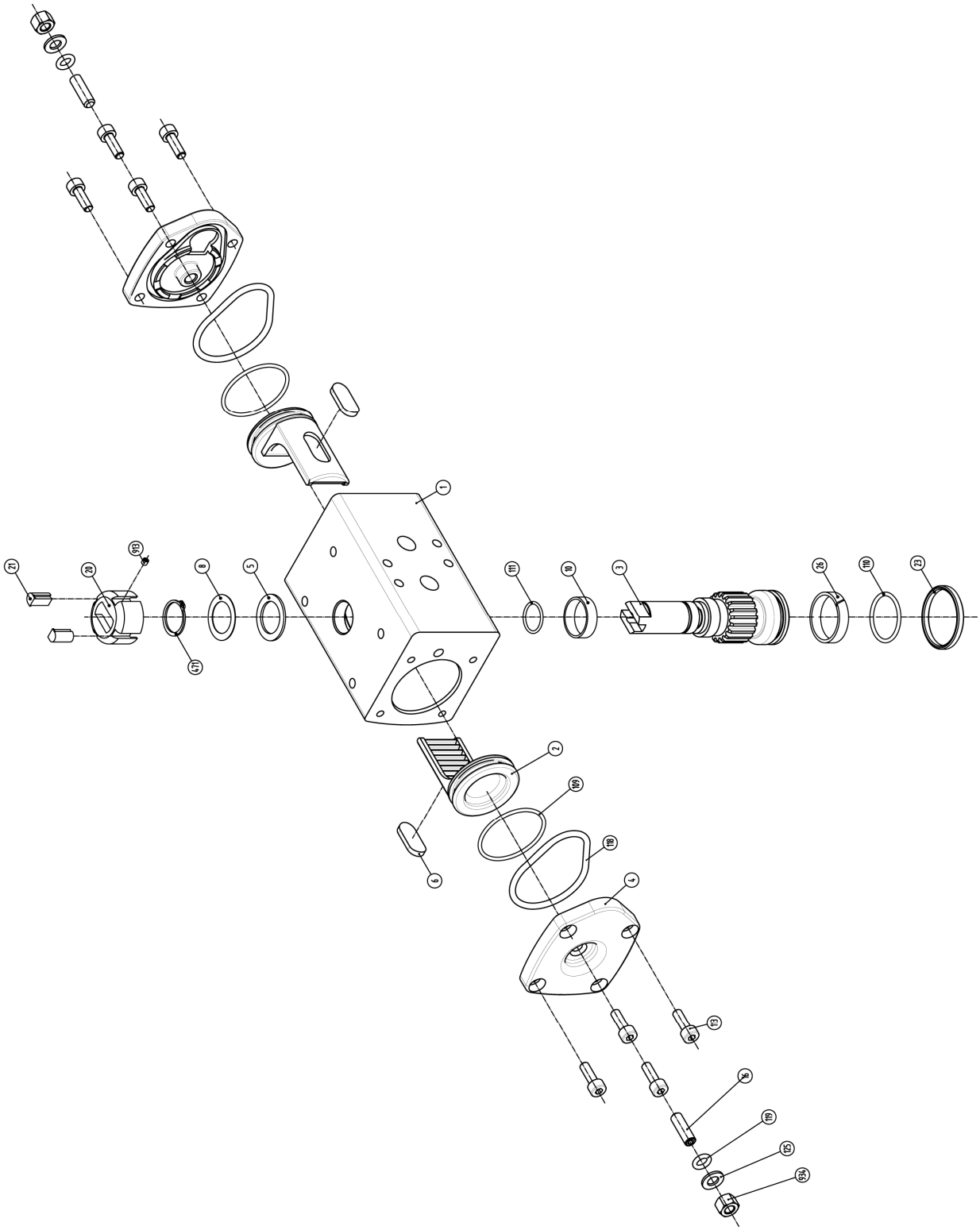


10. RECOMMENDED SPARE PARTS

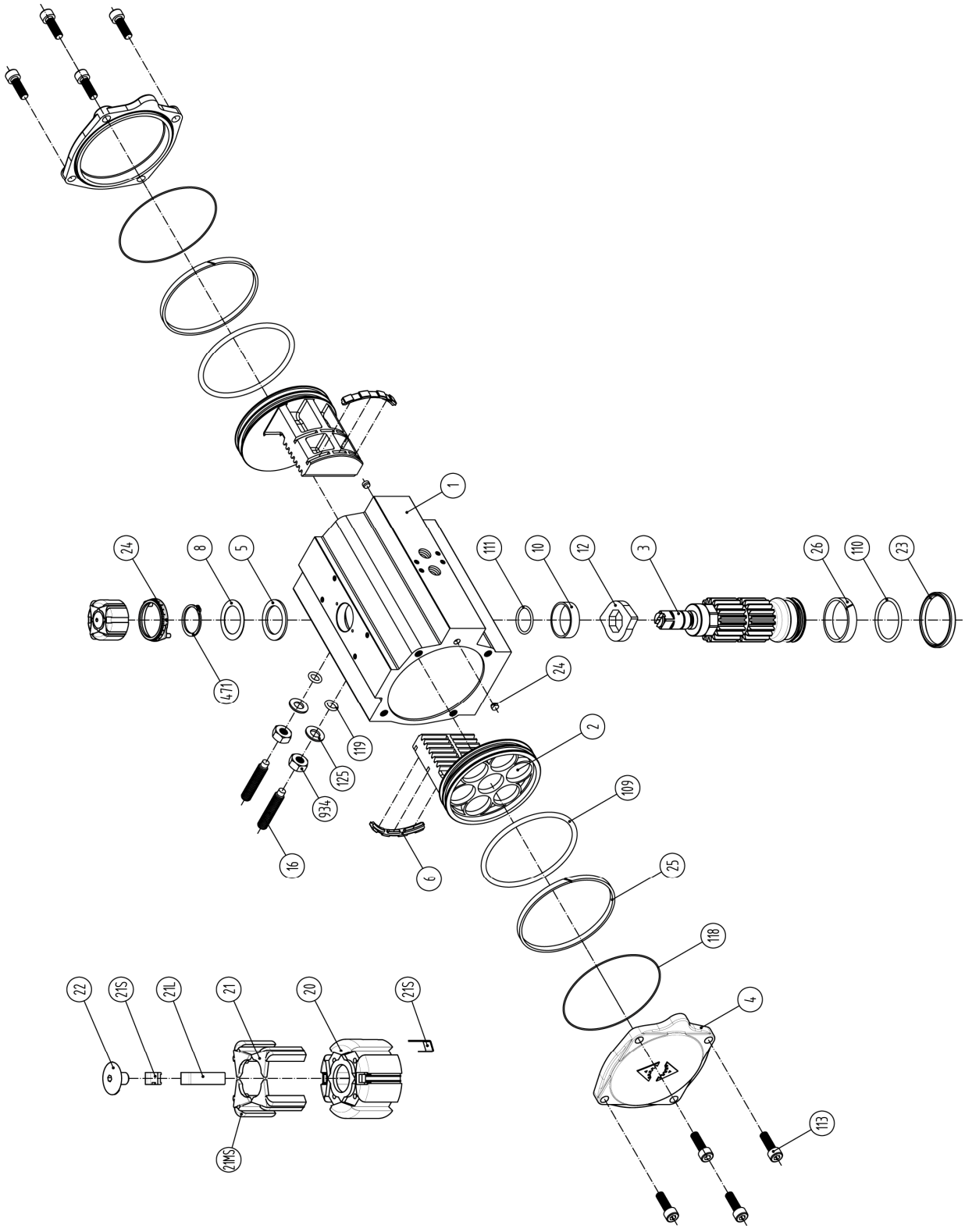
The spare parts kit of the ADA & ASR ACTREG actuator is made up of the following parts:

Nº	*Quantity*	*Name*
5	1	Soft Pinion Washer
6	2	Slide Piston
8	1	Metallic Pinion Washer
10	1	Upper Pinion Bearing
24	2	Rubber Plug
25	2	Slide Guide
26	1	Lower Pinion Bearing
109	2	Piston's O-ring
110	1	Lower Pinion's O-ring
111	1	Upper Pinion's O-ring
118	2	Cap's O-ring
119	2	O-ring
471	1	Slip Washer

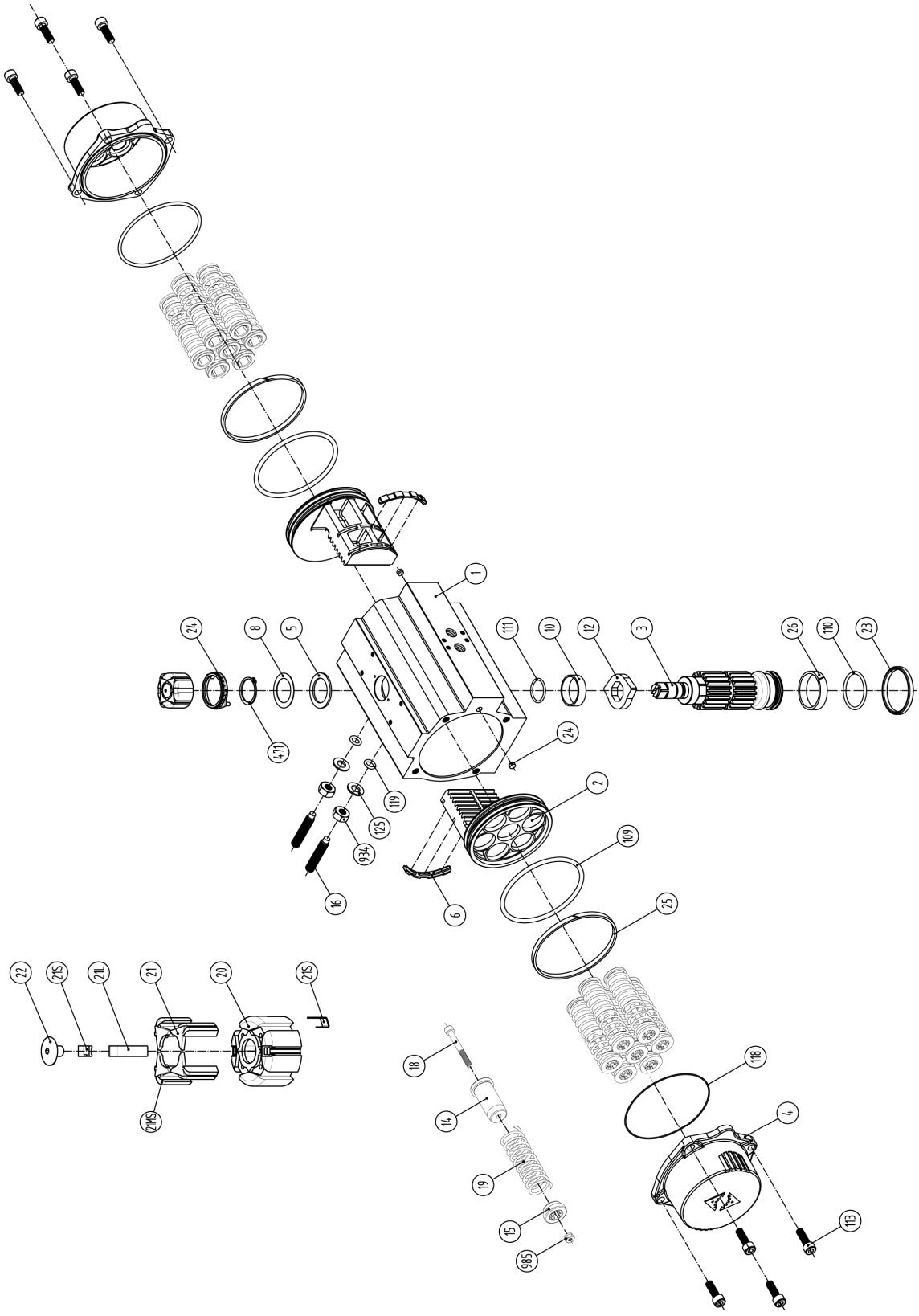
11. EXPLODED VIEW ACTREG ACTUATOR, SIZE *ADA 10.*



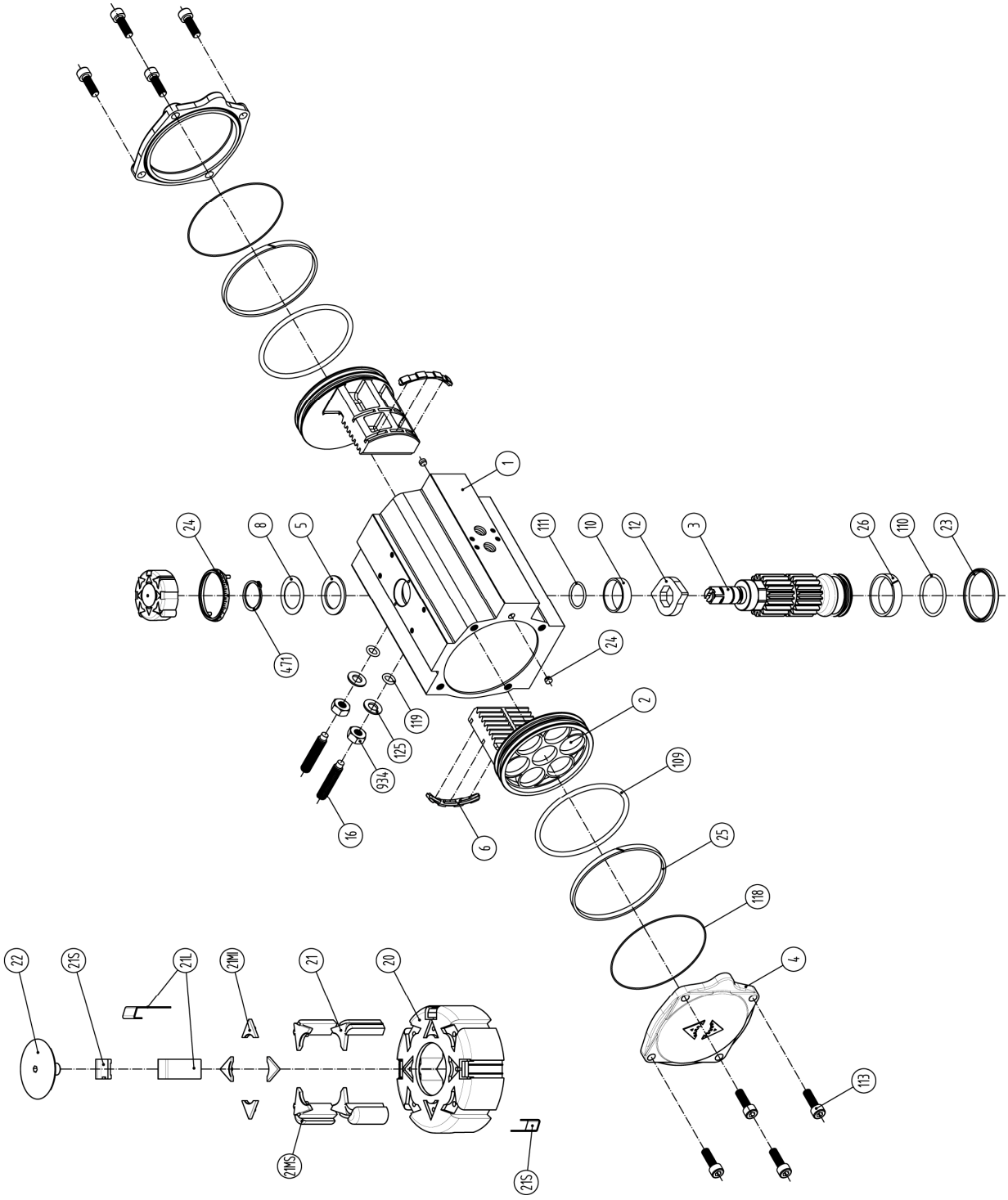
12.EXPLODED VIEW ACTREG ACTUATOR, SIZE *ADA (20 ~ 850).*



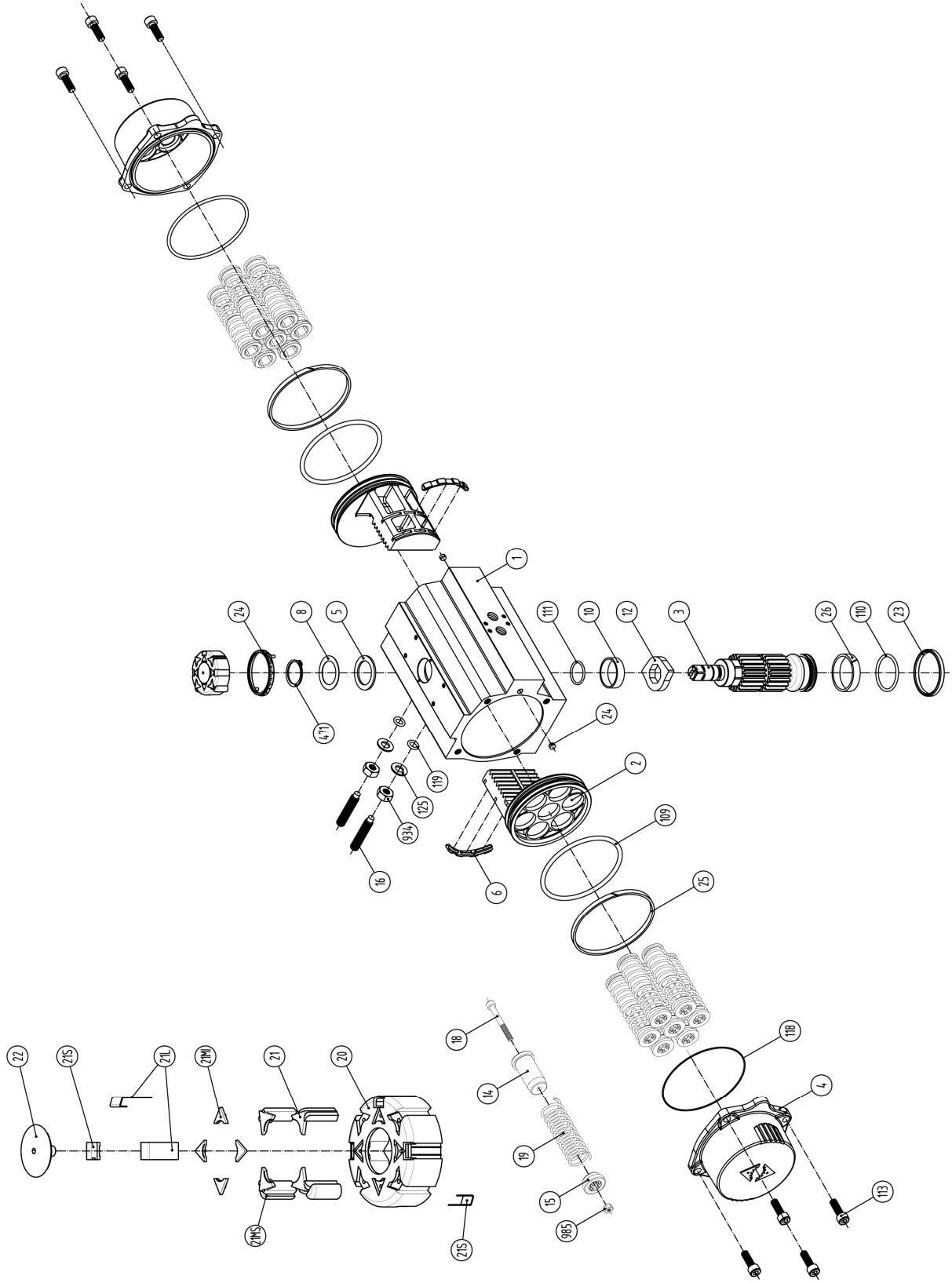
13. EXPLODED VIEW ACTREG ACTUATOR, SIZE *ASR (20~ 850).*



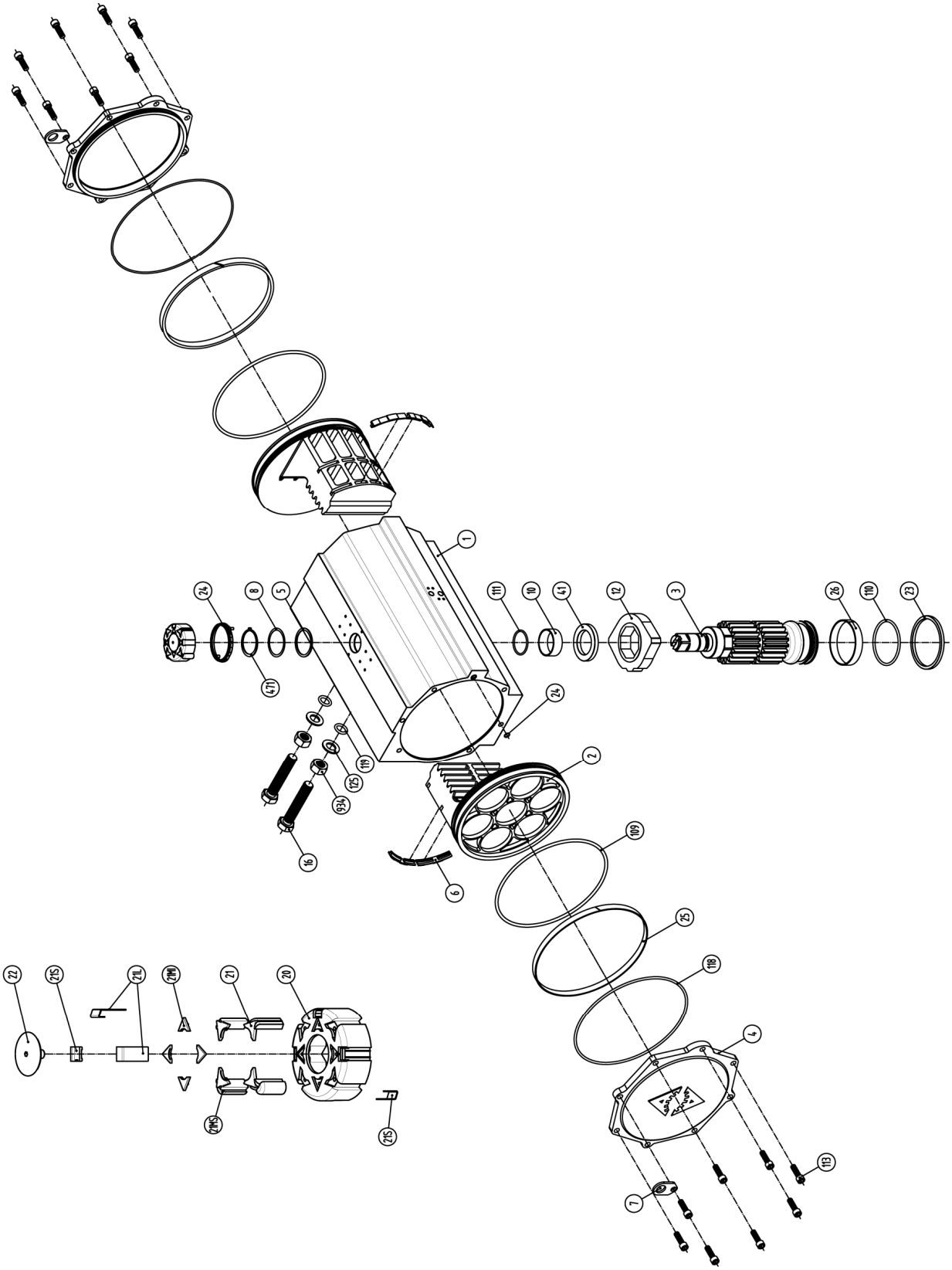
14. EXPLODED VIEW ACTREG ACTUATOR, SIZE *ADA (1200 ~ 1750).*



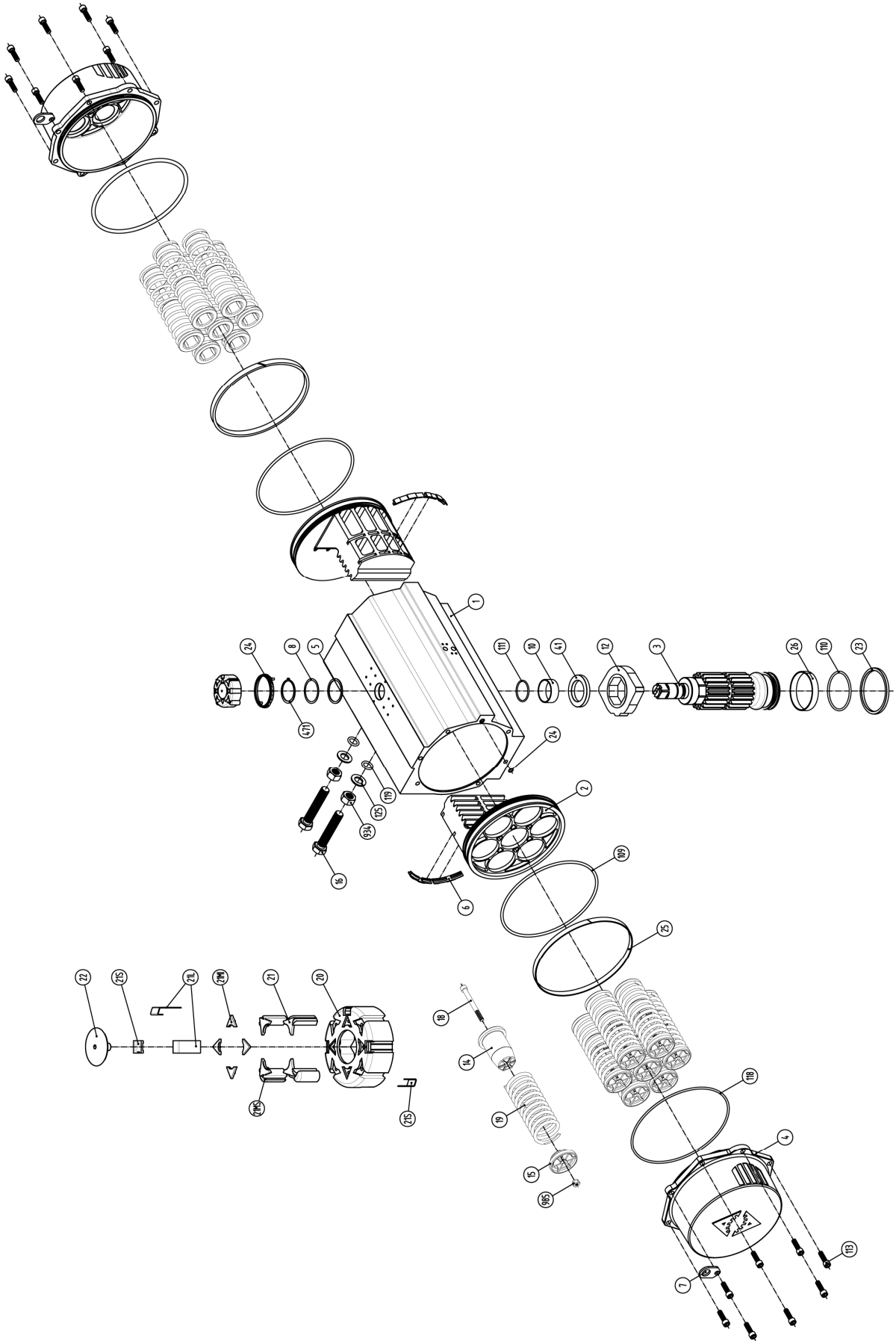
15. EXPLODED VIEW ACTREG ACTUATOR, SIZE *ASR (1200 ~ 1750)..*



16. EXPLODED VIEW ACTREG ACTUATOR, *SIZE ADA (2100 ~ 4000).*



17. EXPLODED VIEW ACTREG ACTUATOR, SIZE ASR (2100 ~ *4000).*



18. FAULT FINDING

WARNING !!

Before disassembling the actuator, follow the instructions given below:

18.1 Actuator with solenoid valve

A If the actuator does not function check as follows:

1. The valve is free to rotate
2. The actuator is of the correct size
3. The correct voltage is supplied to the solenoid (the valve coil is tagged with the correct voltage
4. Sufficient compressed air is supplied to the solenoid valve

B If the proper voltage and air pressure have been verified and the valve is free to move proceed as follows:

1. Apply the correct voltage to the solenoid valve. Check for a clicking sound.
2. If sound is not detected:
   - I) Carefully unscrew the solenoid and solenoid stem from the block.
   - II) Re-apply voltage and observe the solenoid plunger. If it does not retract replace the solenoid valve.
3. If the solenoid functions, remove both the solenoid and the mounting block for testing. Connect with a minimum 3 bar g air supply and correct voltage. Switch it on off and check the air flow. Air should flow out of only one outlet port when the solenoid is energised.

C If the actuator functions but exhibits leak or power loss accompanied by leakage proceed as follows:

1. Check the voltage. It must be within 10% of the specified voltage.
2. Check compressed air supply. Ensure that no intense pressure drops occur as the unit is cycled. Loss of pressure can cause incomplete shifting of the spool valve in the block or at one of the piston seals of the actuator. A leaking piston seal will usually leak on either cycle, on spring return actuators, piston seal leakage will show at port B on the air manifold flange. A leaking spool valve will require replacing. Leaking piston seals can be restored by replacing the “O” rings with new ones.

a. Actuator without a solenoid valve.

For actuators without solenoid valve, (or those where the solenoid valve and mounting block are working correctly), remove the actuator from the valve, disassemble and check the following:

1. Make sure all porting is clear of obstructions.
2. Make sure that the actuator is lubricated and that there is no solidified grease between the pinion and piston racks. If solidified grease is present, clean, dry, regrease and reassemble.
3. Verify that the actuator pinion shaft and / or pistons are not seized. If seized, reassemble as per instructions in section 8.
4. If the unit exhibits excessive backlash, check the teeth on the piston racks for wear.
5. With spring return actuators, check for misplaced or broken springs. If spring are broken check the body for scoring.
6. If the actuator and valve are free reassemble the actuator and retest. If the unit still fails to operate, contact ACTREG.

ACTREG, S.A.
C/ Cantabria, 2
Poligono Industrial Les Salines
08830 Sant Boi de Llobregat
Barcelona (Spain)
Phone : + 34 93 661 44 10
Fax : + 34 93 654 33 93
e-mail : actreg@actreg.com
http://www.actreg.com