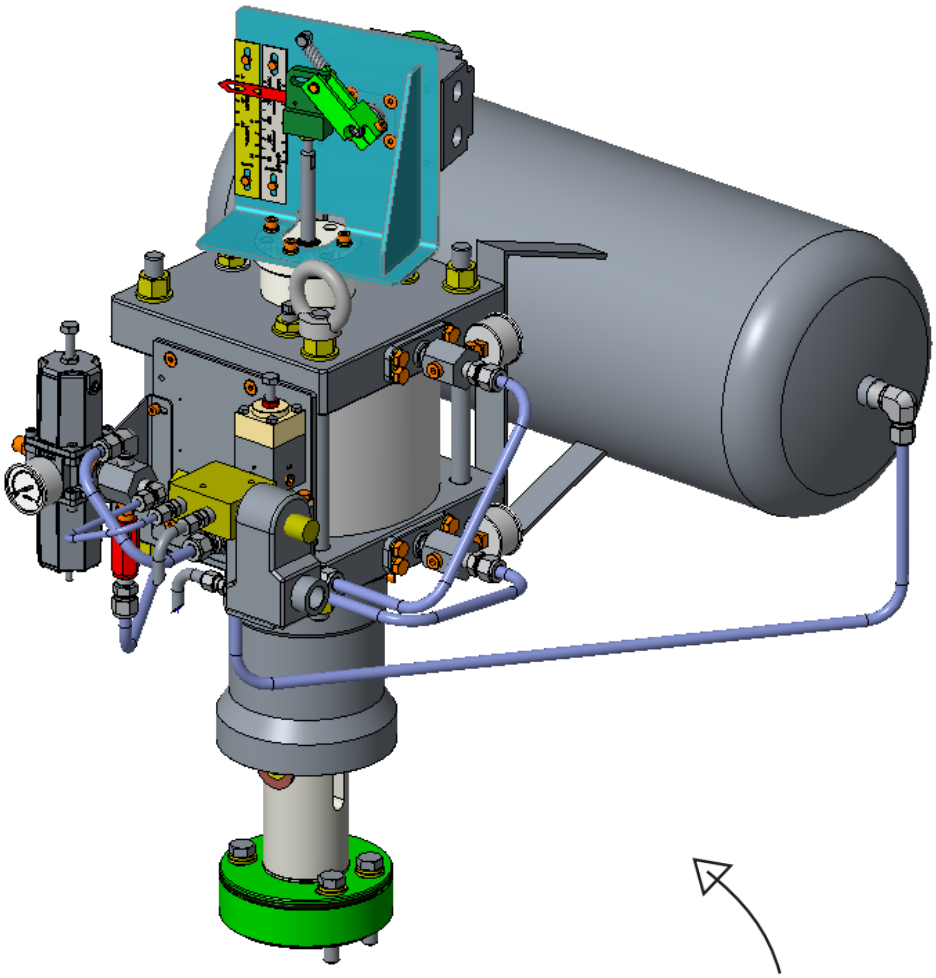
IMI STI

LT - VALVE ACTUATOR

INSTRUCTION MANUAL 5023



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1 GENERAL INFORMATION

Important	**This Instruction Manual is an integral part of the machine, it should be carefully read before carrying out any operation and it should be kept for future references. The operators shall adopt the safety precautions required by the country where the product is installed.** **This Instruction Manual is realized in accordance with the Directive 2006/42/CE.**

1.1 Generalities

STI S.r.l. actuators are conceived, manufactured and controlled according to the Quality management System in compliance with EN ISO 9001 International Standard.

1.2 Manufacturer

With respect to Machinery Directive 2006/42/EC, the Manufacturer of the described LT valve actuator is STI S.r.l. as specified on the label.

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1.3 Terms and conditions

STI S.r.l. guarantees each single product to be free from defects and to conform to current goods specifications. The warranty period is two years from the date of shipment to the first user. The warranty does not cover special products or components not covered by warranty in their turn by subcontractors. No warranty is given for products which have been subject to improper storage, improper installation, improper maintenance or which have been modified or repaired by unauthorised personnel.

1.4 Manufacturer's liability

The LT valve actuator is designed in accordance with the applicable International Rules and Specifications, but the following regulations must be observed in any case:

- the general and safety regulations;
- the plant specific regulations and requirements;
- the proper use of personal devices, protective devices (glasses, clothing, gloves, etc), tools and transport equipment.

STI S.r.l. declines all liability in the event of:

- use LT valve actuator in other applications than the designated ones;
- use of the LT valve actuator in contravention of local safety at work legislation;
- lack of care during transport, installation, operations, maintenances of the LT valve actuator or incorrect application of the instructions provided on the LT valve actuator label and in this manual;
- modifications or repairs without STI S.r.l. authorisation;
- work done on the unit by unqualified or unsuitable operators.

Considering that STI S.r.l. has no direct control over particular applications, operation or maintenance conditions, it is the operator's responsibility to comply with all applicable safety rules; it is the sole responsibility of the operator to ensure that the local health and safety regulations are adhered to. Depending on the specific working conditions, additional precautions may be requested.
Please inform STI S.r.l. urgently if you face unsafe situations not described in this Instruction Manual.

1.5 Applicable Standards and Directives

EN ISO 12100:2010	Safety of machinery - General principles for design - Risk assessment and risk reduction
IEC 61508:2010	Functional safety of electrical / electronic / programmable electronic safety-related systems
2006/42/EC	Machinery Directive
97/23/EC	Pressure Equipments Directive (PED)
94/9/CE	Equipments used in potentially explosive atmospheres (ATEX)

1.6 Symbology used

Dangerous symbols: be careful where these symbols are shown, they indicate a potentially hazardous situation and they warn that if the steps are not properly performed, may result causing serious injury, death or long-term risks to the health of exposed persons.

GENERAL DANGER

DANGER POWER SUPPLY

CRUSHING HAZARD

Obligation symbols: if these symbols are shown, the corresponding direction shall be followed.

General obligation (with the possible supplementary signboard)

Must wear protective clothing.

Must wear protective footwear.

Must wear protective helmet.

Must wear protective glasses

Must wear earplugs

2 DEVICE DESCRIPTION

The LT valve actuator is made by two main parts:

- the cylinder group, with a piston inside that divides the internal volume in two chambers. The actuator stem connects the piston to the valve stem;
- the yoke, that fix the cylinder to the valve and defines the valve movement (linear and rotary movement).

Different kind of pneumatic accessories could be mounting on the LT valve actuator depending on the performance required.

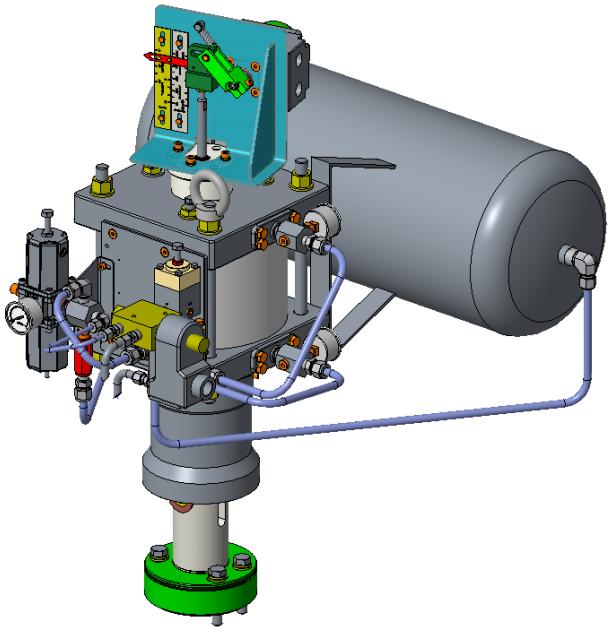


Figure 1 – LT valve actuator

3 TECHNICAL DATA

Model	Double Acting
Cylinder material	Carbon steel, Stainless steel
Size (cylinder diameter)	160mm, 200mm
Valve linear movement	Up to 50mm
Valve rotary movement	90°
Standard design pressure (*)	10bar
Standard operating temperature range (**)	-20°C/+70°C
Expected lifetime	20 years

(*) For some special application the design pressure is 12 bar.
(**) For some special application the operating temperature range could be another one included in the extended temperature range from -60°C to 100°C.

4 LABEL

Every LT valve actuator is provided with a label contains the main operating conditions and serial number. The label may change if the LT valve actuator is sold with reference to a Certificate of product and/or system issued by Notified Body Exterior or Certificate of Conformity issued by STI S.r.l..

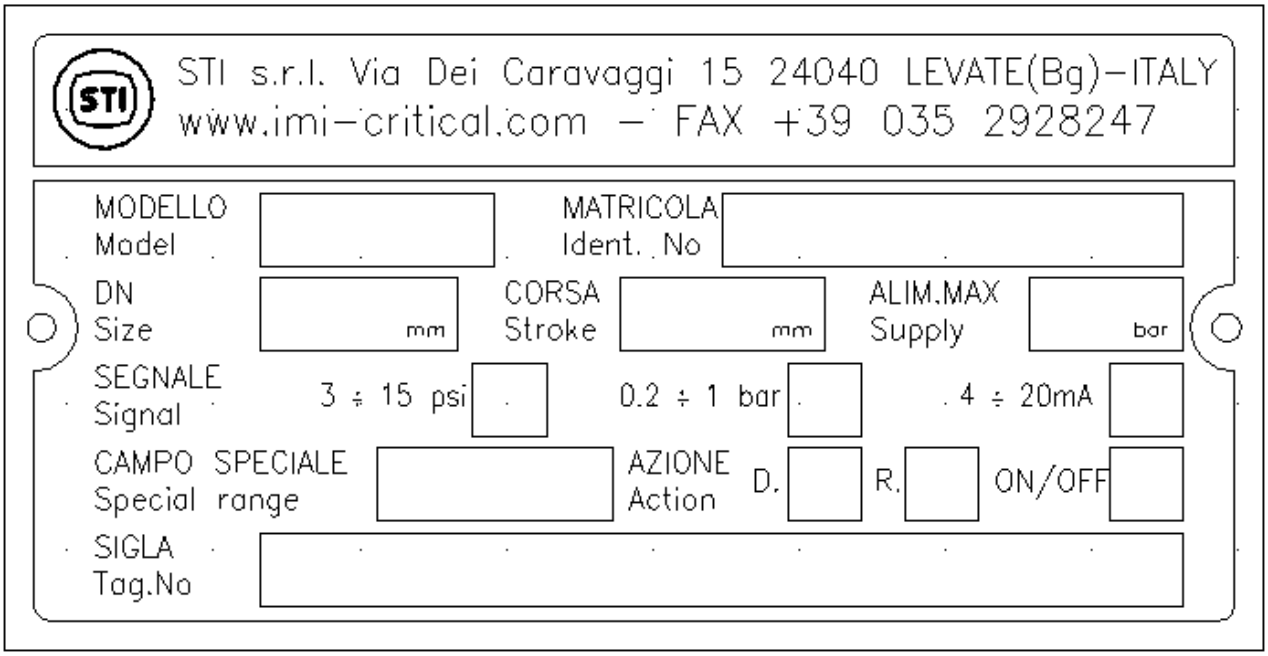


Figure 2 – LT standard label

Warning	**It is severely forbidden to use the LT valve actuator under conditions other than those provided on the label.**

Important	**It is forbidden to modify the information and the marks without previous written authorization by STI S.r.l..** **Do not remove the label and/or replace with other label.**

5 OPERATING CONDITIONS AND INTENDED USE

Warning	
	**It is severely forbidden to use the LT valve actuator for purpose or application other than those for which it was designed and here specified.**

5.1 Operating conditions

The label fastened on the LT valve actuator contains the main operating conditions for the specified application (see Section 4). Other operating conditions are reported on the documents accompanying the actuator. For general operating conditions see Section 3.

5.2 Intended use

The LT valve actuator series has been specifically designed for control valves, typically used in on-off application or regulation mode.

6 TRANSPORT

Warning	
	**The following instructions must be respected:** - **operations must be carried out only by skilled operators;** - **always wear protective clothing, gloves, and eyewear to prevent personal injury. Check with your process or safety engineer for any additional measures that must be taken to protect against process media.**

Important	
	**The lifting and handling should be made in compliance with the laws and provisions in force.**

Lift the LT valve actuator with belts, using its eyebolts. Make sure that the belts never scratches the accessories and pneumatic/electric connection.

7 RECEPTION

LT valve actuator leave the factory in perfect condition. Performances of each unit are guaranteed by tests and data reported on a specific Test Report. At the reception of the LT valve actuator:

- check that the model correspond with that of order confirmation;
- check that the pneumatic diagrams, wiring diagrams and dimensional drawing are furnished with document accompanying the actuator;
- check that the LT valve actuator was not damaged during transportation. If necessary renovate the painting according to the specification reported on the order confirmation.

8 STORAGE

In order to maintain the guaranteed actuator performances until the LT valve actuator is installed on site, proper attention must be observed for preservation during the storage period. If the LT valve actuator needs storage before installation:

- place it in a dry, clean place and take all necessary measures to avoid contact with dust, dirt and humidity during storage;
- make sure that connection protections and/or the mechanical locks will not be removed during the storage;
- storage temperature must be between -20°C and +40°C.

9 INSTALLATION

Warning 	**The following instructions must be respected:** - **operations must be carried out only by skilled operators;** - **always wear protective clothing, gloves, and eyewear to prevent personal injury. Check with your process or safety engineer for any additional measures that must be taken to protect against process media.**

Important 	**Not performing the following procedures will invalidate the product warranty.**

9.1 Checks to be performed before installation

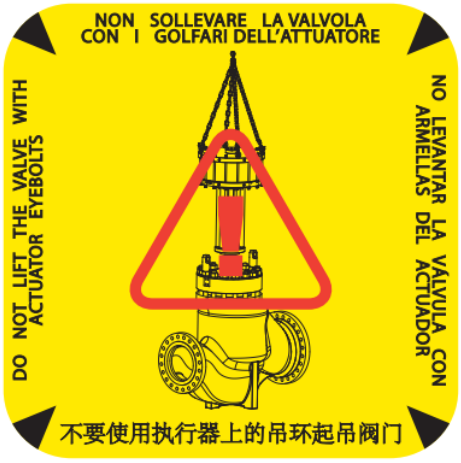
It is recommended to check the LT valve actuator conditions before the installation, then:

- prepare the necessary tools for the assembly and setting of the unit;
- check that the coupling dimensions meet the specified coupling dimensions;
- clean the LT valve actuator surfaces and remove anything that might prevent a perfect adherence with the valve;

9.2 Alignment of the LT valve actuator

After installation on the valve:

- check that the LT valve actuator are correctly mounted on the valve and the actuator is perfectly aligned with the valve stem;
- make sure that there is no abnormal binding, sticking or jumping in the motion of the system (actuator/applied load) for the whole shaft;

Warning 	**Do not lift the valve with the LT valve actuator eyebolts**	

9.3 Pneumatic connections

Warning 	**Check that the values of pneumatic supply available are compatible with those reported on the label of the LT valve actuator: a pressure regulator is absolutely necessary when supply pressure is higher than max operating pressure.** **User must consider and take all precautions to avoid that pressurized parts are not used out of specified range and to avoid exposure to fire.**

Important 	**For easier maintenance, it is recommended to install a filter with five micron cartridge and shut-off valve on the supply connection.**

It is required to follow this steps during the pneumatic connection:

- no lubricators on supply fluid line is required;
- use pipes and connections appropriate as for type, rating, material and dimensions;
- properly deburr the ends of rigid pipes;
- properly clean the interior of pipes sending through them plenty of the supply fluid;
- use pipe sealant sparingly and only on male threads. A non-hardening sealant is strongly recommended;
- fasten the connection pipes so that no irregular strains or loosening of threaded connections occur;
- make the pneumatic connections according to the pneumatic diagram;
- check the absence of leakages from pneumatic connections. If necessary tighten the nuts of the pipe-fittings;
- after connecting the actuator, gradually increase the supply pressure up to the maximum operating pressure.

9.4 Earthing connection

Warning 	**Check if the LT valve actuator has a properly earthling connection.**

The earthing connection is guaranteed trough the fixing flange of the LT valve actuator. If the earthing connection of the system where LT valve actuator is mounted is not guaranteed, it is required to ensure a directly earthing connection.

10 INSTRUCTION FOR THE OPERATORS

Warning	The following instructions must be respected: - **operations must be carried out only by skilled operators;** - **always wear protective clothing, gloves, and eyewear to prevent personal injury. Check with your process or safety engineer for any additional measures that must be taken to protect against process media.**

Important	**Any repair work other than the operations outlines in this Instruction Manual is allowed only if STI S.r.l. authorises it.**

10.1 Field activities

During the start-up of the LT valve actuator:

- check that the pressure and quality of the supply fluid (filtering degree, dehydration, etcetera) are as prescribed;
- check if the operating condition are as prescribed;
- check if the actuator is perfectly aligned with the valve stem;
- check that there are no leak of the pneumatic connections;
- check that there are no leak of the accessories mounted on the LT valve actuator;
- check that there are no leak of the cylinder of LT valve actuator;
- remove all rust on the LT valve actuator surfaces;
- repair paint-coat that has been damaged, in accordance with the applicable painting specifications;
- perform a complete functional test.

10.2 Residual Risks

Reasonably foreseeable misuse:

- risk due to movements of loads during transport and installation;
- crushing during transport and installation;
- installation in ambient with not planned conditions;
- metal temperature at high or very low values as consequence of ambient temperature as to be considered as a risk of person injury in case of contact;
- insert incorrect motive fluid into the system;
- supply pressure out of planned range;
- emissions of hazardous substances where dangerous gases are used as motive fluid.

11 MAINTENANCE

Warning	
	**The following instructions must be respected:** - **operations must be carried out only by skilled operators (STI operators or operators qualified by STI are recommended);** - **always wear protective clothing, gloves, and eyewear to prevent personal injury. Check with your process or safety engineer for any additional measures that must be taken to protect against process media.**

Before any type of operation and/or maintenance is performed, make sure that:

- actuator, accessories and all connected equipment are not under pressure and in safe conditions;
- fluid supply, power or other energy sources and signals are disconnected;
- actuator is free from any mechanism able to move.

11.1 Periodic Inspections and maintenance

Periodic visual inspections are recommended. The user shall:

- plan and provide for a periodic cleaning/maintenance program that will maintain the external surface of the LT valve actuator free from excessive layer of dust;
- lubrication of the actuator yoke moving parts every six months (see Section 12.3 for the correct grease type);
- check painting status of the entire actuator at least every three months. If any damage on the painting film is present, the user shall immediately carry out an adequate painting touch-up;
- replace the gaskets and the grease every 2- 3 years depending on the actuator operating conditions.

11.2 Extraordinary maintenance

In case of extraordinary maintenance, following malfunction and related troubleshooting, proceed as written in Section 13.

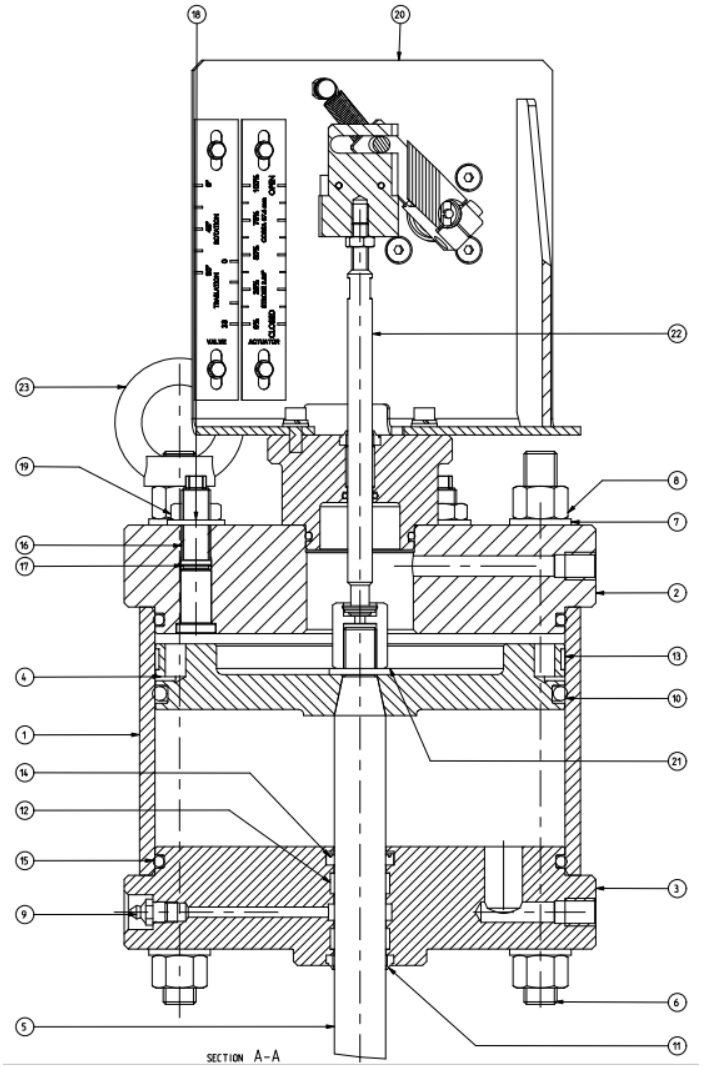
11.3 Greases

LT cylinder material	Very Low temperature (Tmin ≤-40°C)	Low temperature (-40°C<Tmin<-20°C)	Standard temperature (-20°C≤ T ≤70°C)	High temperature (Tmax >70°C)
Nickel plated carbon steel	RHEOLUBE 361F (Tecnolube seal)	RHOESIL 500F (Tecnolube seal)	MOLYGUARD IDROSFER	SYNTHY 101 (Tecnolube seal)
Chrome plated carbon steel	RHEOLUBE 361F (Tecnolube seal)	RHOESIL 500F (Tecnolube seal)	POLIMER 400/1 (Tecnolube seal)	SYNTHY 101 (Tecnolube seal)
Stainless steel	RHEOLUBE 361F (Tecnolube seal)	RHOESIL 500F (Tecnolube seal)	POLIMER 400/1 (Tecnolube seal)	SYNTHY 101 (Tecnolube seal)

Yoke material	Very Low temperature (Tmin ≤-40°C)	Low temperature (-40°C<Tmin<-20°C)	Standard temperature (-20°C≤ T ≤70°C)	High temperature (Tmax >70°C)
All material	MOLIKOTE	MU EP (Agip)	MU EP (Agip)	MU EP (Agip)

12 PARTS LIST GENERAL ASSEMBLY

12.1 LT actuator



POS.	Q.TY'	DESCRIPTION
1	1	CYLINDER
2	1	UPPER CAP
3	1	LOWER CAP
4	1	PISTON
5	1	STEM
6	4	TIE-ROD
7	8	FLAT WASHER
8	8	HIGH NUT
9	1	GREASE NIPPLE
10	1	SEALING RING OR 235
11	1	DUST SEAL GASKET ASOB 25-6
12	2	STEM SLYD RING ATS-N
13	1	PISTON SLYDRING
14	1	DUST COVER (PDF C1 N71 2058
15	2	SEALING RING OR 6745
16	3	END PIN
17	3	SEALING RING OR 114
18	3	FLAT WASHER
19	3	LOW NUT
20	1	POSITION TRANSDUCER ASSEMBLY
21	1	FLAT WASHER
22	1	STEM ASSEMBLY
23	2	FEMALE EYEBOLT DIM 582

Figure 3 – LT cylinder: section & parts list

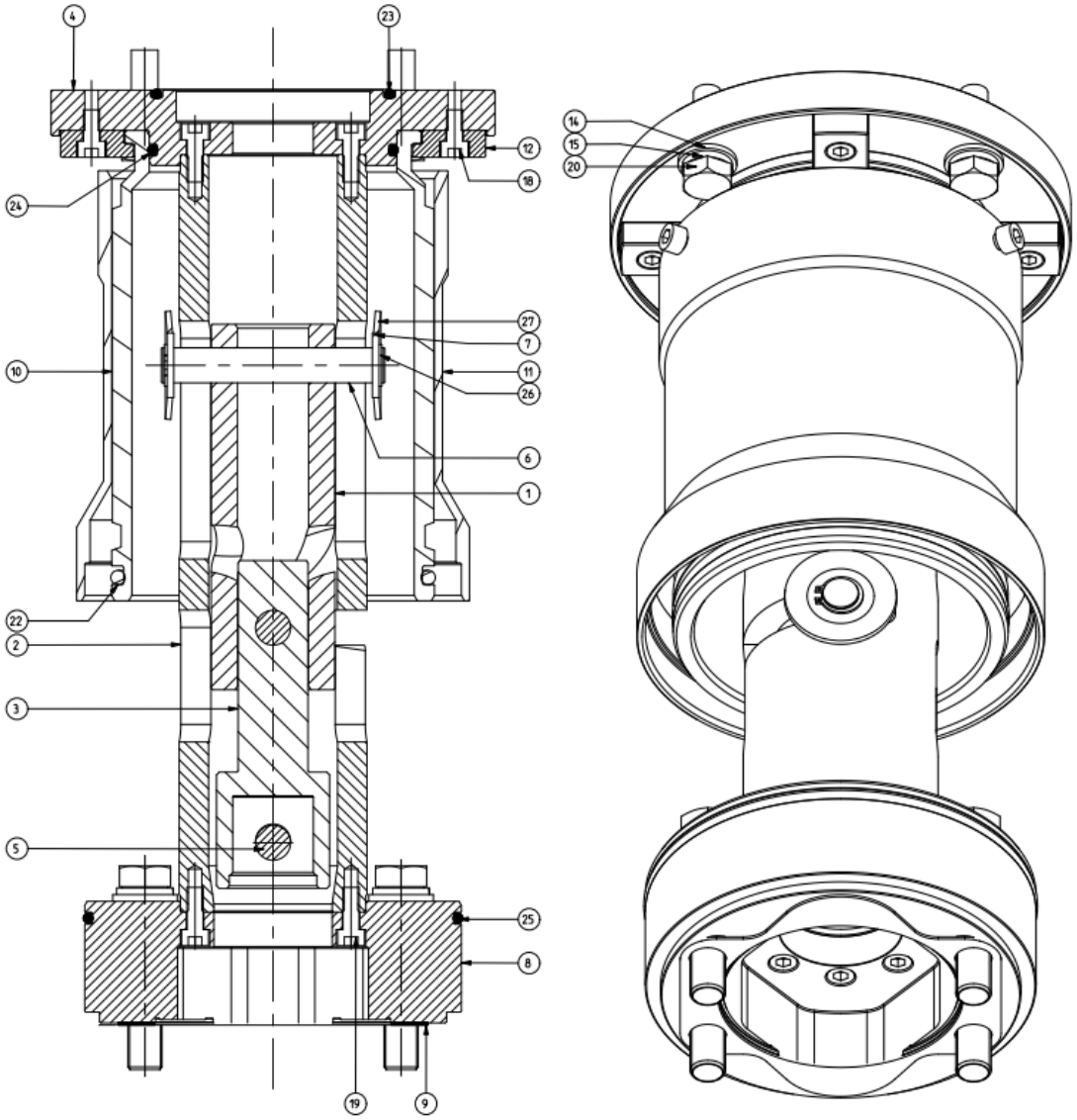


Figure 4 – LT yoke: section

POS.	Q.TY'	DESCRIPTION
1	1	CAM
2	1	CAM YOKE
3	1	VALVE STEM EXTENSION
4	1	YOKE UPPER FLANGE
5	1	VALVE STEM PIN
6	2	ACTUATOR STEM PIN
7	4	FLAT WASHER
8	1	YOKE LOWER FLANGE
9	1	YOKE-VALVE SEALING
10	1	FIXED PROTECTION
11	1	DYNAMIC PROTECTION
12	4	SUPPORT PLATE FOR FIXED PROTECTION
13	4	FLAT WASHER
14	4	FLAT WASHER
15	4	LOCK WASHER
16	4	LOCK WASHER
18	7	SCREW TCEI
19	16	SCREW TCEI
20	4	SCREW TE
21	4	SCREW-TE-UNC-1-2X13
22	1	SEALING RING OR 193
23	1	SEALING RING OR 4325
24	1	SEALING RING OR 4337
25	1	SEALING RING OR 4525
26	4	STOP RING
27	4	BELLEVILLE SPRING BN805

Figure 4 – LT yoke: part list

13 TROUBLESHOOTING

EVENT	POSSIBLE CAUSE	REMEDY
LT valve actuator doesn't move	Lack of pneumatic supply	Check supply line
	Low supply pressure	Adjust supply pressure
	Pneumatic circuit failure	Call STI S.r.l.
	Thrust on stem not enough (valve seizing)	Call valve manufacturer
	Thrust on stem not enough (wrong actuator sizing)	Call STI S.r.l.
	Presence of an external obstruction	Put the LT valve actuator in a safety condition and remove the obstruction
	Damaged actuator internal component	Call STI S.r.l.
LT valve actuator doesn't move in a linear way	Lubricators unsuitable	Replace the lubricators
		Call STI S.r.l.
	Stem misalignment	Check the actuator stem alignment
		Call STI S.r.l.
	Thrust on stem not enough (valve seizing)	Call valve manufacturer
	Thrust on stem not enough (wrong actuator sizing)	Call STI S.r.l.
Opening/Closing time not satisfy	Incorrect positioner calibration	Call STI S.r.l.
	Pneumatic circuit not suitable	Call STI S.r.l.
	Wrong actuator sizing	Call STI S.r.l.
	Wrong spring selection	Call STI S.r.l.
	Spring vent clopping (if any)	Check the spring vent
Leakages from pneumatic cylinder	Deterioration and/or damage of gasket	Replace the gaskets
		Call STI S.r.l.
	Deterioration and/or damage of the cylinder or the upper/lower cap	Call STI S.r.l.
	Incorrect tie rods tighten	Call STI S.r.l.
Leakages from pneumatic circuit	The nuts of pipe fittings are not tighten enough	Tighten the nuts
	An accessory does not work correctly	Call STI S.r.l.

Important	
	**If another event happens or another possible cause of the above events has been detected, call STI S.r.l.**

14 SPARE PARTS

Contact STI S.r.l. for the gasket kit required for the gaskets replacement. Other spare parts can be sent to the customer if required.

15 DISASSEMBLING

Important	
	**The customer can disassemble the LT valve actuator only for the gaskets/grease replacement (see Section 11).** **In other cases, the disassembling is not allowed if it is not authorized by STI.**

16 DECOMMISSIONING

Warning	
	**The following instructions must be respected:** - **operations must be carried out only by skilled operators;** - **always wear protective clothing, gloves, and eyewear to prevent personal injury. Check with your process or safety engineer for any additional measures that must be taken to protect against process media.**

Important	
	**Check local authority regulation before disposal.**

SUBJECT	HAZARDOUS	RECYCABLE	DISPOSAL
Metals	No	Yes	Use licensed recyclers
Plastics	No	Yes	Use specialist recyclers
Rubber (seals, o-rings)	Yes	No	May require special treatment before disposal, use specialist waste disposal companies
Oil and grease	Yes	Yes	May require special treatment before disposal, use specialist waste disposal companies

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