

Assembly manual

According to Directive 2006/42/EC of the European Parliament and of the Council
on machinery

Translation of the original manual in Czech language

Linear actuator, type – LA

Design ver. LAx10, LAx20, LAx40, LAx60

Table of content

1.	Basic information.....	1
1.1.	General information.....	1
1.2.	Use of the Linear Actuator.....	1
2.	General safety.....	2
2.1.	Safety information meanings.....	2
2.2.	Basic safety precaution.....	2
2.3.	Warnings.....	3
2.4.	Safety clutches and power limit (torque limit).....	3
3.	Completeness check.....	3
4.	Technical information.....	5
4.1.	Type designation.....	5
4.2.	Axial design.....	5
4.3.	Parallel design.....	6
4.4.	Stroke and speed.....	6
4.5.	Operating forces.....	7
4.6.	End position sensor.....	8
4.7.	Working environment.....	8
5.	Installation.....	8
5.1.	Mechanical installation of the actuator.....	8
5.2.	Electric installation of the actuator.....	9
5.3.	Sensors instalation.....	9
5.4.	Mechanical manipulation.....	12
6.	Maintenance and inspections.....	13
6.1.	Recommended inspection period.....	13
6.2.	Lubrication.....	13
6.3.	Visual inspection.....	14
6.4.	Inspection During run.....	14
6.5.	Belt inspection.....	15
6.6.	Belt tension.....	15
6.7.	Inspection table.....	16
7.	Disposal.....	16
8.	Dimensions.....	17

1. Basic information

1.1. General information

Before installation, maintenance and operation of The Linear Actuator read this manual carefully and follow the instructions. ELEKTROPOHONY s.r.o. company assumes no responsibility for damage of health of any persons, animals or property caused by disrespect for instructions in this manual, operators fault or improper use of the Linear Actuators. Improper installation or operation of the Linear Actuator can cause serious injury of the persons or damage of the Actuator.

Manual to a driving part or another third parties parts are not included in this manual. If this parts are supplied by producer of the Linear Actuator, appropriate manuals and other documents are enclosed to technical documentation supplied with the Actuator.

In this manual can be described or illustratively show some of this parts.

If the Actuator is mounted together with drive (usually an electric motor), it is necessary to follow also manual to this motor. The Linear Actuators are supplied proved without load.

1.2. Use of the Linear Actuator

In principle the Linear Actuator (LA) changes rotational motion into linear motion and makes pushing or pulling force against reference point. The Actuator consists from the very body and the drive (usually electric motor). This manual describes only the very body of the actuator.

The actuator is the partly completed machinery and has to be installed into another machinery. LA is completed with the machinery by the piston end and the flange.

Risk assessment and risk analysis must be performed during the machinery design process according to current regulations in place of the machinery production. Due to the nature of LA operation it may be a reserved machinery. In all cases it is necessary to ensure to measures for safety operation of the machinery.

Risk estimation according to EN ISO 12100 was performed for the linear actuator. This manual is consistent with this estimation. Partly completed machinery can't be performed before conformity of complete machinery will be verified and EC Declaration of Conformity will be issued (according to Directive 2006/42/EC of the European Parliament and of the Council on machinery).

⚠WARNING

Performance in an explosive environments (ATEX) is prohibited.

2. General safety

2.1. Safety information meanings

⚠DANGER

Indicates a hazardous situation, which, if not avoided, will result in death or serious injury.

⚠WARNING

Indicates a hazardous situation, which, if not avoided, could result in death or serious injury.

⚠CAUTION

Indicates a hazardous situation, which, if not avoided, could result in minor or moderate injury.

NOTICE

Indicate a property damage and other important message.

2.2. Basic safety precaution

⚠CAUTION

- Read and understand this manual before installing the linear actuator.
- Read and understand a manual to drive (motor) before you connect it to power supply and put into motion. Manual to drive is not included in this assembly manual.
- Read and understand the manuals to all third part devices installed on the linear actuator body (gearbox, sensors, piston end, drive, brake, clutch, etc.).
- Operator is fully responsible for any injuries and damages caused by omission or breach of instruction in this Manual.
- Don't use the linear actuator if it is damaged or some parts is missing.
- Installation, maintenance and other works with electric parts must be performed only by authorized personnel familiar with electric drives.

NOTICE

- Assembly manual as well as specifications are subject to change without notice for ongoing linear actuator modifications and improvements. See revision number.
- The linear actuator must be performed in such a state as it was supplied by the producer. It means especially including safety covers. In this assembly manual can be shown some parts of actuator without safety covers for better recognition.
- Any unauthorized changes on the linear actuator will cause warranty loss and the producer is not liable for them.
- The linear actuator is partly completed machinery and as such must be installed into another machinery. Design of machinery must comply with the applicable regulations and the relevant standards. Risk estimation and resulting measures must be performed during machinery design and construction processes.
- Proposal to use and installation of the linear actuator must be performed only by personnel with appropriate technical expertise.

⚠DANGER

Don't perform any manipulation with the linear actuator when its drive isn't safely disconnected from power supply and precautions for safe handling are not performed.

2.3. Warnings

⚠WARNING

Transport: For transport use only appropriate wooden pallets and fix the actuator to it with strapping tape. It is not allowed to fix another load to the actuator. Transporting and lifting equipment must be designed for appropriate load capacity. When the drive or gearbox is mounted to the actuator respect also this equipment during transport.

Installation and maintenance: Installation and maintenance must be provided only when the actuator is standstill. The drive parts must be disconnected from power supply and unintentional switch on must be prevented.

Installation, operation and control: Unprofessional installation, use the device for different purpose than it is designed for, unrespect to safety instructions, remove safety covers or other parts of the actuator, unauthorized changes of the actuator body or of the drive as well as incorrect design of the drive may cause serious injury of persons or animals and property damage.

⚠CAUTION

End of life time and disposal: The linear actuator must be after end of life time liquidated in accordance with applicable waste regulations and laws so as to avoid threat of persons, animals and environment. The actuator must be dismantled and selected according used materials. All waste must be liquidated by a specialist company.

2.4. Safety clutches and power limit (torque limit)

⚠CAUTION

When the actuator should be used in machinery with possibility of shock in load or blocking, resulting forces may not exceed maximum permitted load of actuator body. In case of such possibility must be safety clutch installed or must be drive torque limited by different way. Non-compliance of this safety requirement may result in threat of persons, animals or property damage and warranty loss.

3. Completeness check

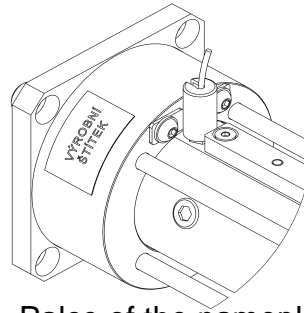
Upon receipt of the linear actuator and before commissioning verify the correctness of type and completeness of delivery according to below listed items.

- **Delivery report** with correct type of the linear actuator. Delivery report includes also list of third part components delivered with actuator (sensors, gearbox, timing belt, drive, piston end eye, etc.). Check correctness of this components. Delivery must contains also technical documents and manuals to this components.
- **Declaration of incorporation of partly completed machinery.**

- **Nameplate** The nameplate is placed on the linear actuator body.



Nameplate



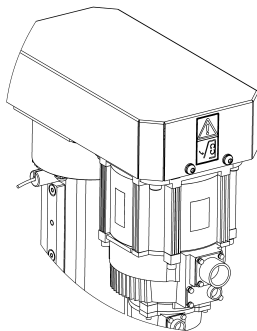
Palce of the nameplate

- **Belt cover.** The linear actuators designed as LAP must be equipped by belt cover.

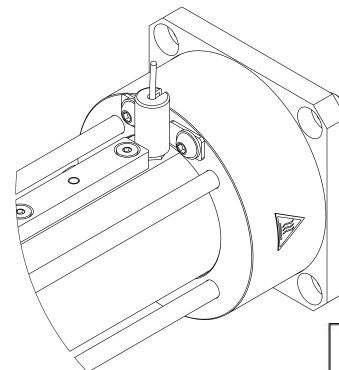
⚠ CAUTION

Don't use the linear actuator without the safety cover. Never use damaged actuator. Risk of personnel injury.

- **Warning labels.** The actuator is provided with warning labels.



Rotation parts under the cover



Risk of burns

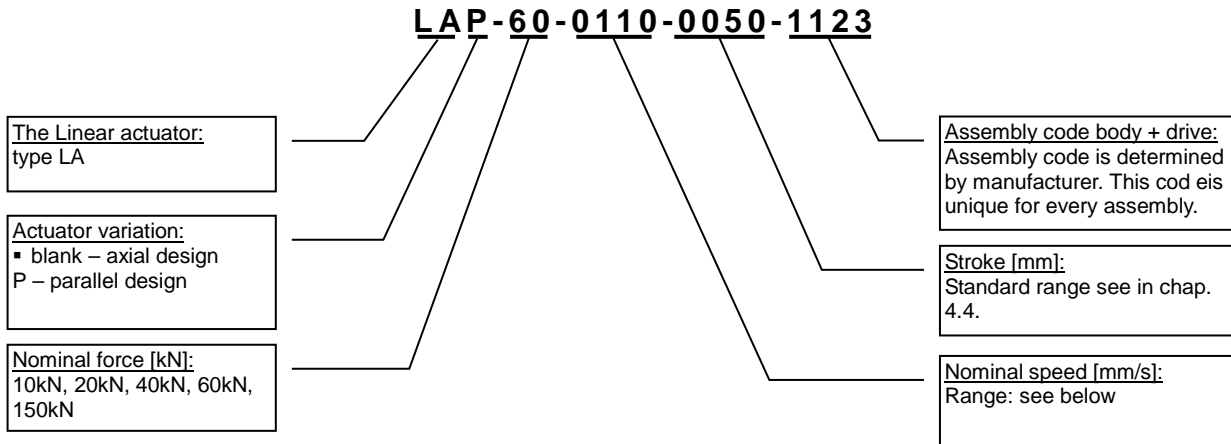


- Lubricant according to lubricating plan including extended lubricator. The lubricating plan is included in the delivery report.

4. Technical information

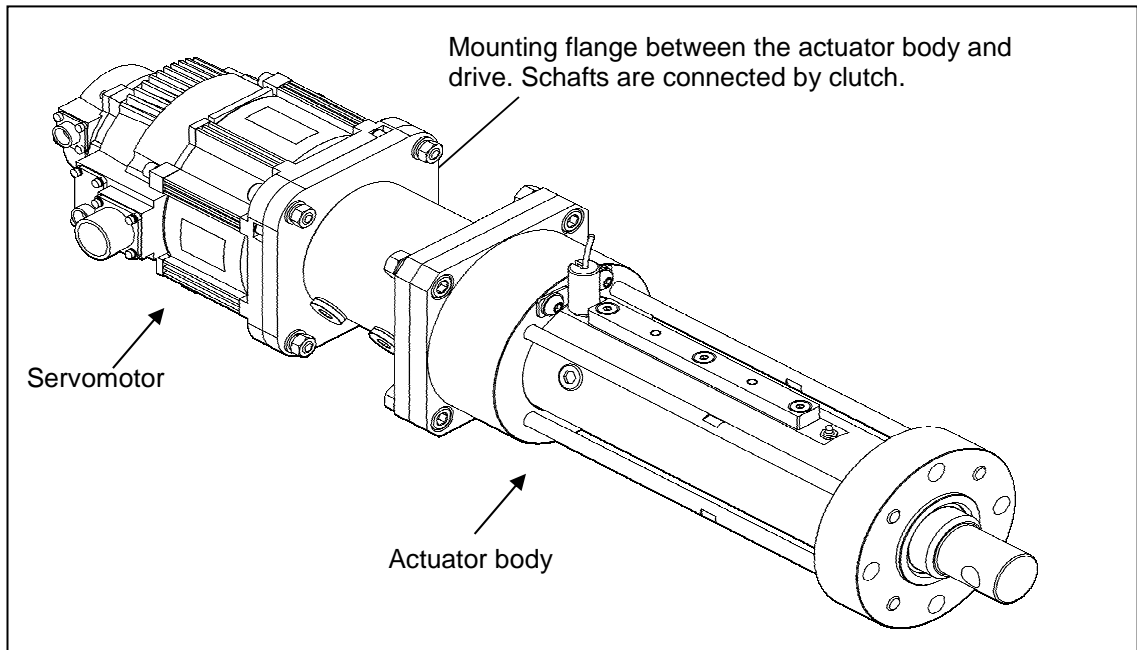
4.1. Type designation

Designation example LAP-60-0110-0050-1123:



4.2. Axial design

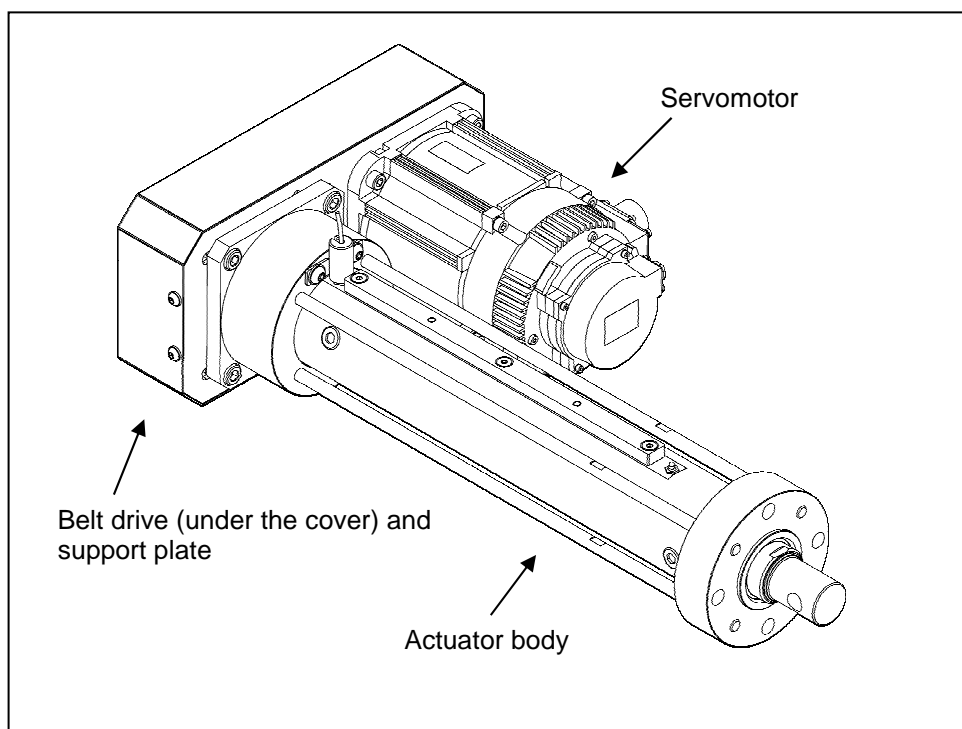
Axial design of the linear actuator represents in line arrangement of the actuator body and the drive. Drive is mounted in axis with the piston stroke. The drive can constitute by only electric motor or electric motor with all types of gearboxes (worm gear planetary gear etc.). Connection of the drive and the actuator body is through rigid coupling and mounting flange.



Axial design actuator

4.3. Parallel design

LAP designation represents parallel design of the actuator body and the drive combination. The drive is mounted in parallel with piston axis. Connection between drive and actuator body is provided by belt drive and support plate. A gearbox can be added to the drive.



Parallel design actuator

4.4. Stroke and speed

Tab. 1 Standard strokes and maximal speed (• possible design, - non-standard design)

Typ aktuátoru	Stroke [mm]								Max. speed [mm/sec]
	50	150	300	450	600	750	900	1050	
LAx10	•	•	•	•	•	-	-	-	1000
LAx20	•	•	•	•	•	•	-	-	1000
LAx40	•	•	•	•	•	•	-	-	1000
LAx60	•	•	•	•	•	•	•	•	500 (1000) ^{*1}
LAx150	•	•	-	-	-	-	-	-	250

*1) Maximal speed of the LAx60 actuator is 500mm/sec. Higher speed can be used only for rapid traverse with respect to high performance of the drive.

Nominal speed of each actuator (combination of actuator body, drive, gearbox and ball screw) is indicated on the nameplate. Speed indicated on the nameplate is nominal, not maximal.

Maximal speed can't be exceeded during run, it may cause permanent damage of some parts. Maximal speed mentioned in Tab. 1 relate only to possible design! Nominal and maximal speed for each actuator is mentioned in the delivery report.

4.5. Operating forces

⚠CAUTION

- Don't exceed performance conditions during run it may cause permanent damage of the actuator and endanger personal safety. Failure to comply with may cause reduction in actuator lifetime.
- Don't perform the actuator without safety cover. Never use damaged actuator. Risk of personal injury.

Nominal and Maximal force relate to mechanical load rating of the actuator body. This forces are mentioned with respect to actuator lifetime. Maximal axial force can't be exceeded, risk of permanent damage of some parts. The drive have to be designed appropriately to the actuator body or it has to be equipped with torque limitation device. Standard drives have always possibility of short time overload therefore be careful to maximal torque of the drive. It must not perform higher force than is maximal force of the actuator body. The actuator perform push or pull force which value depends on drive power. Radial load of piston is not allowed. The actuator is designed for continuous performance.

Tab. 2 Maximal allowed torque of actuator input shaft

Maximal torque [Nm]	Pitch [mm]			
	5	10	15	20
Type				
LAx10	18,7	37,5	56,2	74,9
LAx20	37,5	74,9	112,4	149,9
LAx40	74,9	149,9	224,8	299,7
LAx60	93,7	187,3	281,0	374,7
LAx150	-	468,3	-	-

Note: Upper listed torque values take account actuator efficiency 85% apply to maximal force without reduction depending on maximal stroke.

Tab. 3

Permissible axial forces

Type	Stroke [mm]	50	150	300	450	600	750	900	1050
LAx10	Nominal force [kN]	10	10	10	10	10	-	-	-
	Maximal force [kN]	20	20	20	20	10	-	-	-
LAx20	Nominal force [kN]	20	20	20	20	20	20	-	-
	Maximal force [kN]	40	40	40	40	20	20	-	-
LAx40	Nominal force [kN]	40	40	40	40	40	40	-	-
	Maximal force [kN]	80	80	80	80	40	40	-	-
LAx60	Nominal force [kN]	60	60	60	60	60	60	60	60
	Maximal force [kN]	100	100	100	100	100	100	60	60
LAx150	Nominal force [kN]	150	150	-	-	-	-	-	-
	Maximal force [kN]	250	250	-	-	-	-	-	-

4.6. End position sensor

If the actuator is not equipped with limit sensors by manufacturer it is necessary to provide end position detection by external sensors. Sensors have to be placed in such position where it stops the piston before mechanical stop. Every actuator has stroke by 20mm longer than is its nominal stroke (it means 10mm on each side). It is recommended to install the sensors at least 10mm before mechanical stops. It is possible to reach the mechanical stops during run but maximal force must not be exceeded and speed before touch must not be higher than 5mm/s.

4.7. Working environment

Below listed conditions are related only to the actuator body. For determine the environment respect also instructions for all parts installed on the actuator (it means drive, gearbox, sensors, etc.)

Do not expose the actuator to below listed influences

- ❑ Extremely low or high temperature, respect working temperature range from -20°C up to +50°C
- ❑ Relative humidity max. 85% (noncondensing)
- ❑ Dirt, chemical influences
- ❑ Direct sunshine
- ❑ Corrosive gasses and fluids
- ❑ Dust and soft metal parts in environment
- ❑ Shock and vibration
- ❑ Radioactive materials
- ❑ Flammables

5. Installation

5.1. Mechanical installation of the actuator

The actuator can be standardly fastened using the front flange, side pegs on front flange or side pegs on back flange (see chapter Actuator dimensions of this manual). Load is standardly fixing to the end of piston by peg, male thread or female thread (see chapter Actuator dimensions of this manual). Design of each actuator is shown in 3D drawing which is available on demand.

The actuator can be installed in any position but there have to be no radial load on piston in whole range of stroke. The actuators with higher stroke than 300mm and actuators installed in different position than vertically have to be fixed in two points it means by front and back flange. In case of uncertainties please consult actuator fixing with producer or seller.

⚠ CAUTION

- During installation the actuator into the machinery take extra care to prevent personal injury by compression or wrong manipulation. Follow the safety instructions.
- Fixing provide by fasteners with appropriate strength. It is recommended to design fixing for at least three times higher load than is nominal force of the actuator. Wrong fixing may cause thread of personal safety or actuator damage.

- During installation of the actuator into machinery respect point of gravity of the machinery. Non respect to point of gravity position may cause machinery down fall.
- Use safety equipment (gloves, shoes with metal toe, helmet) during actuator installation.

NOTICE

To keep the optimal lifetime install and perform the actuator in environment specified in chap.4.7.

5.2. Electric installation of the actuator

As drive for the actuator can be used different types of electric motor with wide range of accessories (electromagnetic brakes, external fan cooling, encoders, etc.). On the actuator can be also used limit sensors – see chap.5.3. Before connection of this devices to a power supply source check if it has appropriate parameters.

⚠DANGER

Electric shock hazard! Do not connect or disconnect wiring while power is on. Failure to comply will result in death or serious injury.

⚠WARNING

- Connection of the drive to power supply can perform only qualified person familiar with electric installation according to appropriate local regulations. Failure to comply may result in death or serious injury caused by electric shock eventually it may cause fire.
- Always ground the drive grounding terminal.
- Do not manipulate with the actuator before it is safely disconnected from power supply.
- Verify that the rated voltage of the drive match the voltage in power supply network before you connect it.

NOTICE

Get familiar with the actuator parameters before you design its wiring. Also get familiar with parameters of the machinery especially with respect to possible risks. Risk assessment have to be provided during machinery design process. Founded risks have to be decreased as much as possible in accordance with applicable regulations and standards.

5.3. Sensors instalation

The actuators can be equipped with one or two limit sensors eventually moreover with basic position sensor. Limit sensors are usually source (PNP) normally closed (NC) type, basic position sensor is usually source normally open (NO) type. On the actuators equipped with sensors by producers are sensors installed in the correct position. If the sensors are not included and when they have to be changed, verify sensor parameters in datasheet. Limit sensors as well as basic position sensor are induction sensors shielded type with male thread M8x1. Sensors have to be set up in correct distance from sensed surface. Sensing distance is usually 2mm, sensor is thus installed in half of this distance it means 1mm from piston surface. During sensor installation process first move the piston under the sensor's hole. Piston edge should be in the middle of sensor's hole. If the hole is clogged by lubricant use for example screw driver to verify piston position. Then screw the sensor up to stop (to piston) after that release it by one turn back. Then it has to be fixed

with middle solid glue and ensured with a nut. Sensor should be 1mm from piston surface. Verify sensor function before commissioning the actuator.

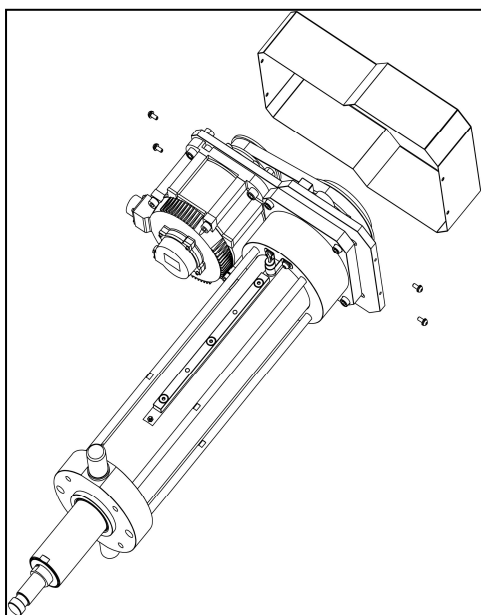
⚠CAUTION

Install the sensor in voltage-free state. Machinery have to be turned off, actuator drive power supply have to be disconnected.

Example of removal and installation of limit sensor in slip state of actuator is shown on below listed steps.

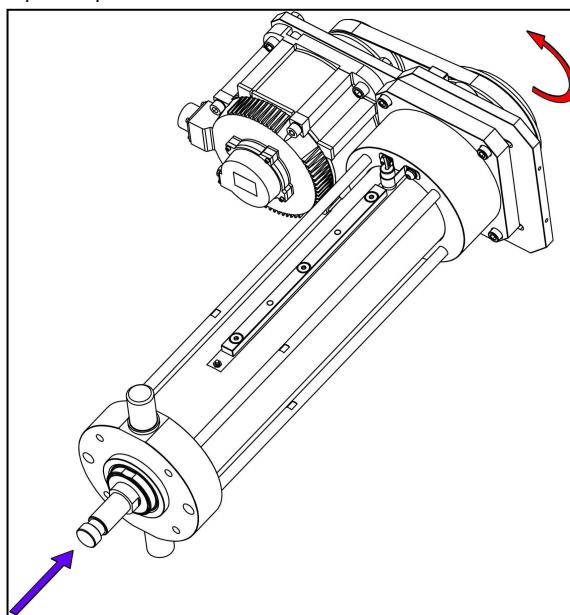
STEP 1:

Remove the cover.



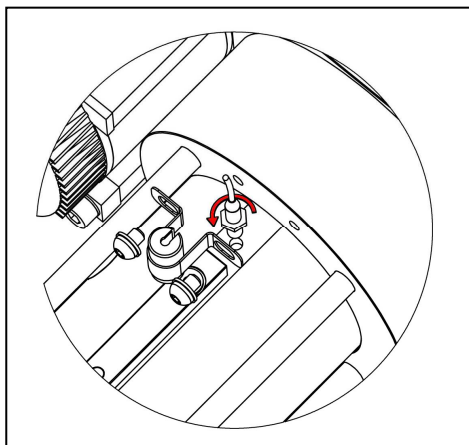
STEP 2:

By hand rotation with belt pinion slip in the piston up to stop



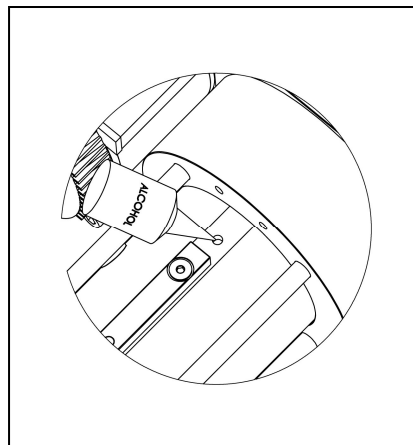
STEP 3:

Remove sensor cover and screw the sensor out



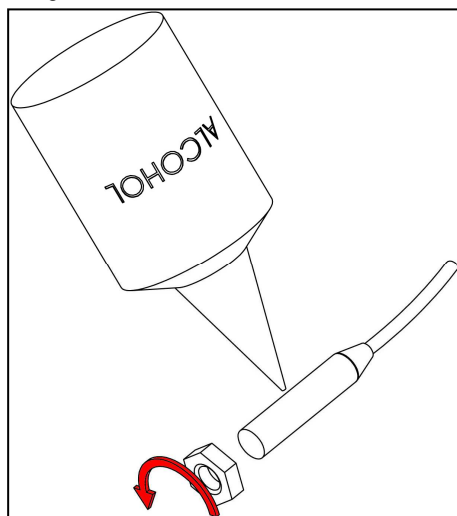
STEP 4:

Degrease the thread in the actuator body using cloth moistened with alcohol



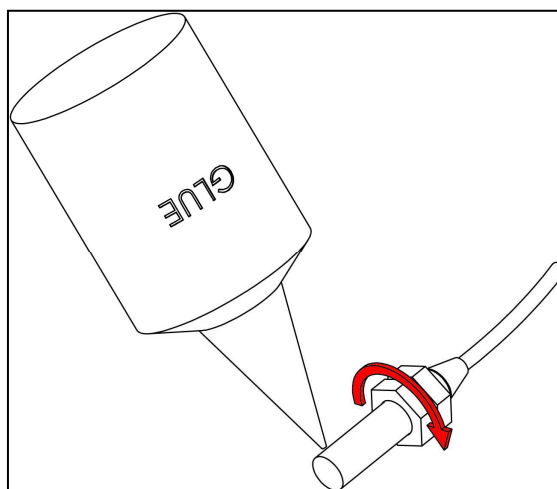
STEP 5:

Screw out the nut from sensor, degrease the thread using cloth moistened with alcohol



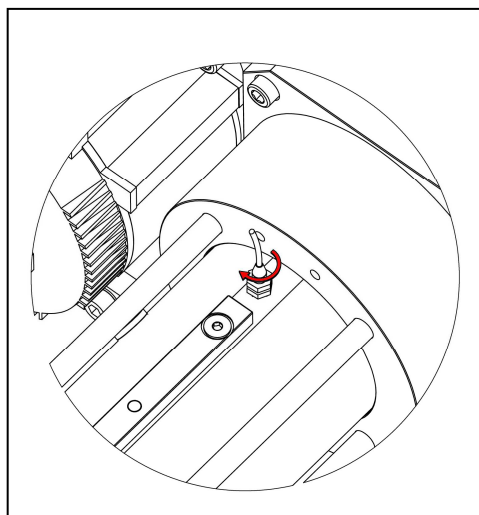
STEP 6:

Screw the nuts to the end of sensor. To the start of thread put a drop of middle solid glue for screw fixing



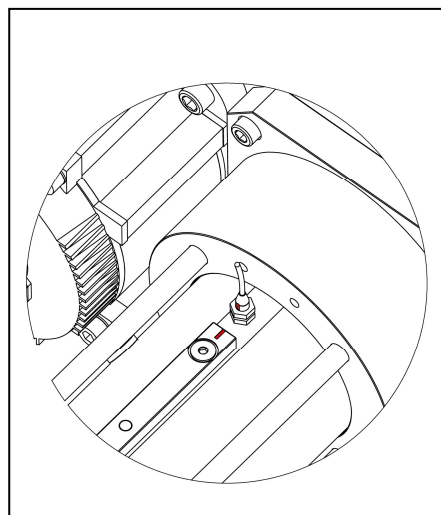
STEP 7:

Screw the sensor into actuator body up to stop



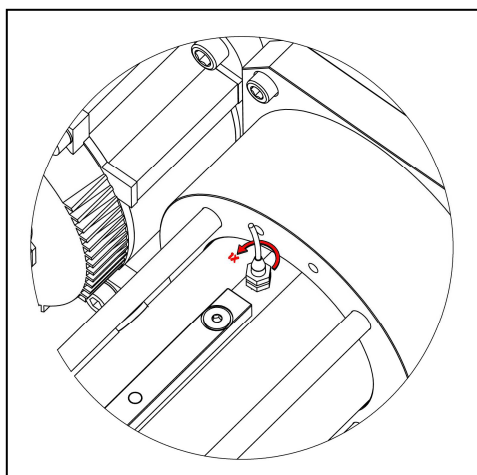
STEP 8:

Mark the sensor position on the actuator body



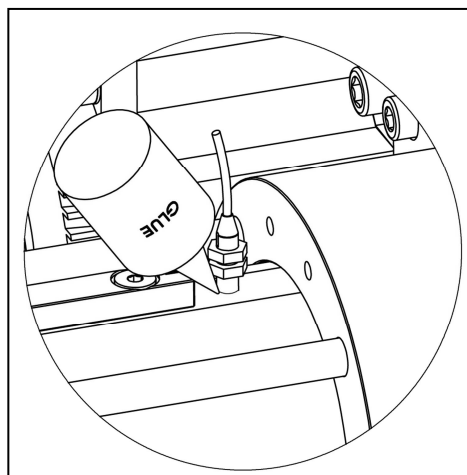
STEP 9:

Rotate with sensor by one turn back (1 turn = 1 mm).



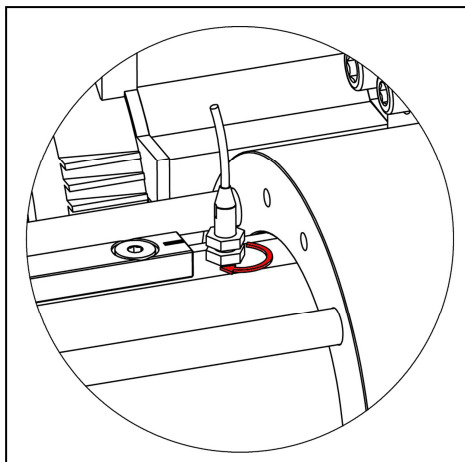
STEP 10:

Put drop of glue to the sensor thread root



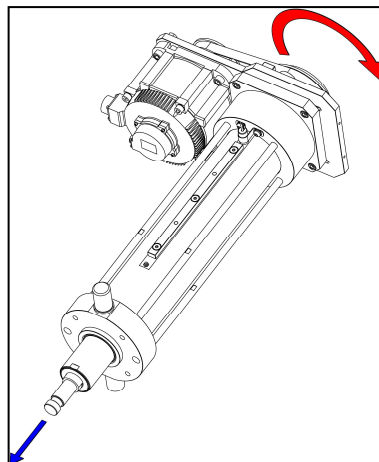
STEP 11:

Tighten the nut and fix it by locknut (Maximal torque 8Nm).
Také care to keep the relative position between marks!!!



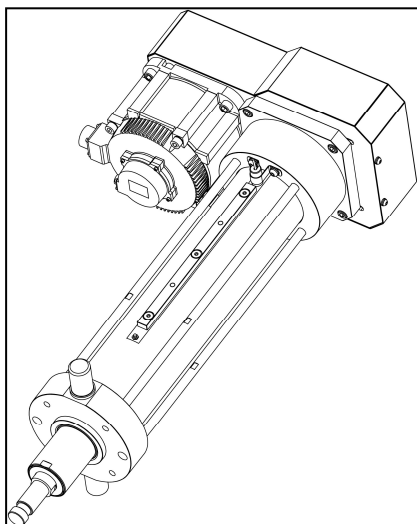
STEP 12:

By hand rotation with belt pulley eject the piston cca 4 cm.



STEP 13:

Install covers of sensor and belt transmission



STEP 14:

Connect power supply to the actuator drive

5.4. Mechanical manipulation

⚠CAUTION

During manipulation use extra care and follow safety regulations.

For manipulation use appropriate manipulation equipment in accordance with local safety regulations. According to weight (weight is mentioned in the delivery report, in dimension section in manual and on the nameplate) use lifting equipment with appropriate load capacity. For fixing use textile binding equipment with appropriate load capacity which can be fixed to actuator body tube, between front and back flange if possible. The actuator must not be lifted by the drive it means electric motor and gearbox. During lifting check correct position of the point of gravity to prevent slipping out. Some types of the actuator are equipped by hole with thread for transport eye.

6. Maintenance and inspections

Maintenance of the linear actuator takes some regular operations in prescribed periods. If the maintenance is neglected it may result into worse operation characteristics or damage of the actuator. It is recommended to create own maintenance rules with a respect to the actuator application in machinery. All maintenance operations described in this manual must be respected.

6.1. Recommended inspection period

Table of maintenance operations and periods

Period	Operation	Description
½ of a year or after 30 hours of piston moving.	Lubrication	Lubricate the linear actuator according to below mentioned procedure, quantity according to the Delivery report.
¼ of a year	Visual inspection	Check for damages and dirt.
¼ of a year	Inspection during run.	Check for noise and temperature.
¼ of a year	Belt inspection (LAP only)	Visual belt inspection
½ of a year or during lubrication	Belt inspection (LAP only)	Belt tension inspection

6.2. Lubrication

It is necessary to lubricate the actuator body during operation regularly. First lubrication is performed by the manufacturer. Lubrication points should be lubricated whole life time by the same lubricant. Type and quantity of lubricant for each point are mentioned in the delivery report. Quantity of lubricant and lubrication periods must be respected. Don't use higher quantity of lubricant than is prescribed. Over lubrication or under lubrication may cause higher power losses and overheating.

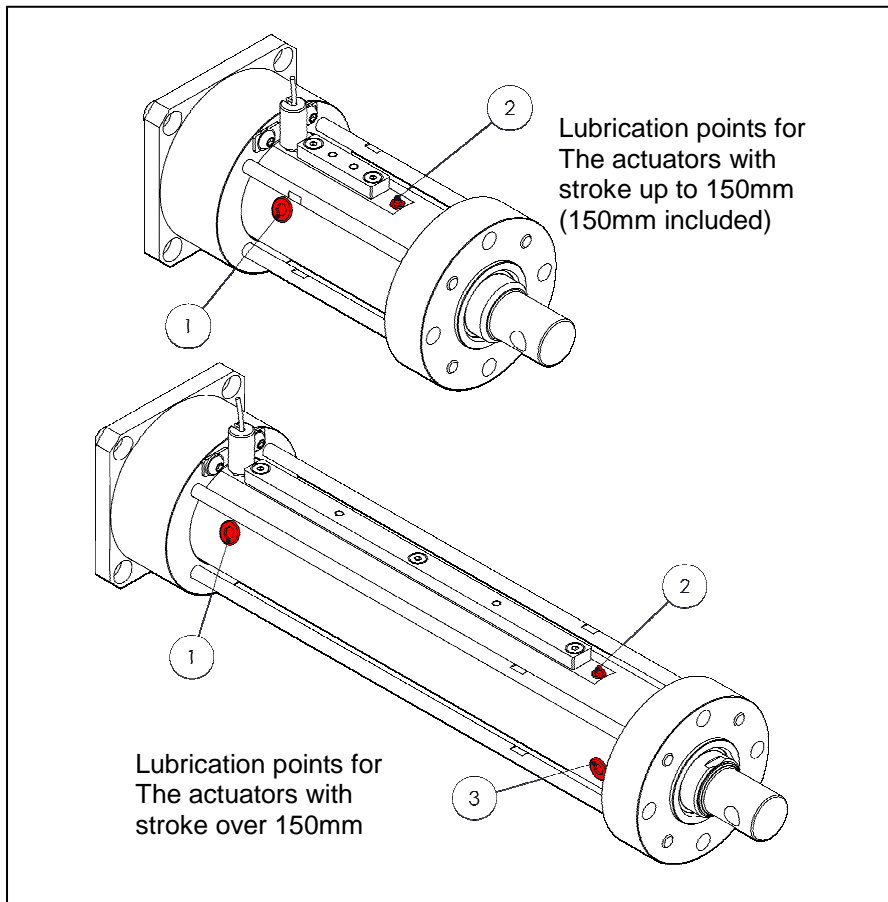
Lubrication of ball nut and screw – is performed through hole covered by stopper (see position 1 on below listed figures). Lubrication hole M8x1 (M6x1 in smaller actuators) is placed on ball nut flange. It must be set up beyond the hole. An extended lubricator delivered with the actuator must be screwed into the nut and lubrication performed. After lubrication the extended lubricator must be removed and the hole covered by the stopper.

Lubrication of front lead of piston – Lubrication is performed only on the actuators with stroke longer than 150mm. Lubrication is performed through hole covered by stopper (see position 3 on below listed figures). Lubrication hole M8x1 (M6x1 in smaller actuators) is placed on the piston which must be set up beyond the hole. Into the piston must be screwed the same extended lubrication as for nut lubrications than it can be lubricated. After lubrication is extended lubricator unscrewed and the hole is covered with stopper.

⚠CAUTION

Never move the piston when the extended lubricator is screwed in the lubrication hole. Also never move the piston when some of the lubrication holes isn't covered. Move of the piston with uncovered hole is possible only during set up of the lubrication hole.

Lubrication of back lead of the piston – is performed through the lubricator M8x1 (M6x1 in smaller actuators) (see position 2 on below listed figures). It is recommended to eject the piston into full eject position.



Lubrication points

6.3. Visual inspection

Check any mechanical damages caused by actuator operation especially condition of piston and wiping cuff on output flange. The piston should be covered a thin layer of lubricant, shiny, without scratches. Cuff should be hidden in the flange, without damage. If it is damaged it must be changed by the manufacturer of the actuator.

Keep the actuator clean, dirt remove by a rug, brush or blow by compressed air.

6.4. Inspection During run

We recommend to adjust a period of inspection during run according to the actuator usage. When it is possible check temperature of the actuator at three points on the flange near the piston, in the middle of actuator body (on tube) and on flange in the drive side. Temperature must not exceed +80°C. When it isn't possible to measure the temperature by thermometer it can be indicatively measured by cursory touch. In case of high temperature feeling measure it by the thermometer. In case of high temperature, overload by high dynamic power from drive, life time exceeding, poor lubrication or soiling can be assumed.

Further during run inspect by hearing if the actuator doesn't produce some shocking noise or squeak. Sound should be clear. There should be also no resonance of the actuator. If something of this occurs, check mounting of the actuator, load parameters and the drive tuning.

6.5. Belt inspection

⚠WARNING

During belt inspection actuator motion must be prevented. In the other case personnel safety can be endangered. Disconnect the actuator drive from power supply.

⚠CAUTION

During hand rotation of the belt or belt pulleys use extra care due to risk of finger compression, pulling of hair or parts of clothes. Also don't interfere in piston working area due to risk of pressing of parts of body.

Belt inspection is performed only on LAP actuators.

Manufacturer equipped actuators with polyurethane timing belts with carbon fibres designed for the heaviest applications. Advantage of this belts is minimal changes of their properties during life time and thus assumption of constant tension and no need of lubrication. Belt is tensioned prescribed load by manufacturer.

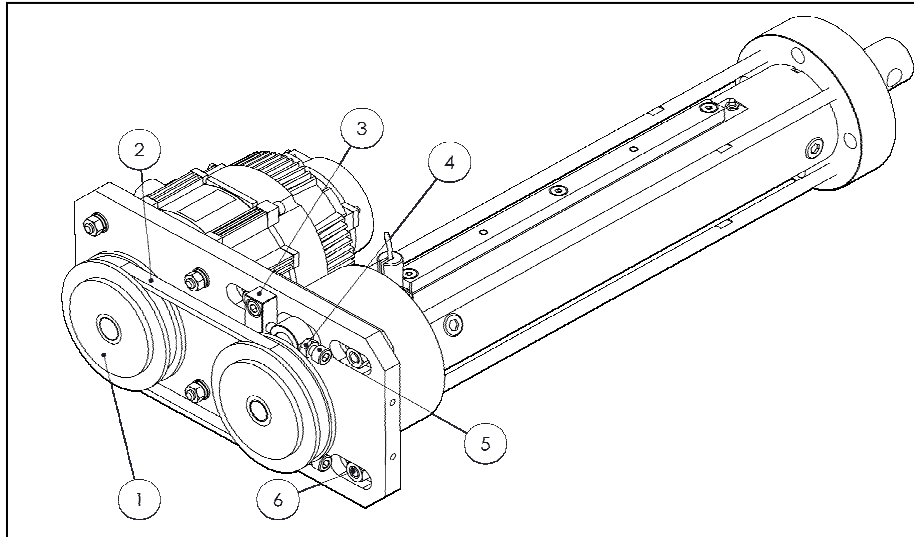
Belt inspection is performed after remove of the belt cover which is mounted with four screws on sides. Visually is checked condition of the belt and belt pinion, it means if there is no significant pilling of belt edges, if the belt doesn't drive over the edges of the belt pinions, if the tooth surface is smooth. If some of this defects is visible it is necessary to check belt tension.

If there is visible wear on the belt it must be changed.

Check also if tensioning mechanism isn't released, it means check tightening of screws in positions 4, 5 and 6. If they aren't tightened it is necessary to tension the belt to nominal tension.

6.6. Belt tension

Manufacturer for belt tension use and recommends resonance method which requires appropriate instrumental equipment. Tension is performed by tension screws placed under the belt pinion (positions 4 and 5). First the screws in upper flange cover are slightly slacken (position 6). Then the belt is tensioned to prescribed tension measured in frequency units which is mentioned in Delivery report and on label under the belt cover. For fine tuning are used tension screws by them tightening is belt tighten more. When four consecutive measures in average corresponds with prescribed value, screws in upper flange cover (position 6) are tightened.



Belt inspection

6.7. Inspection table

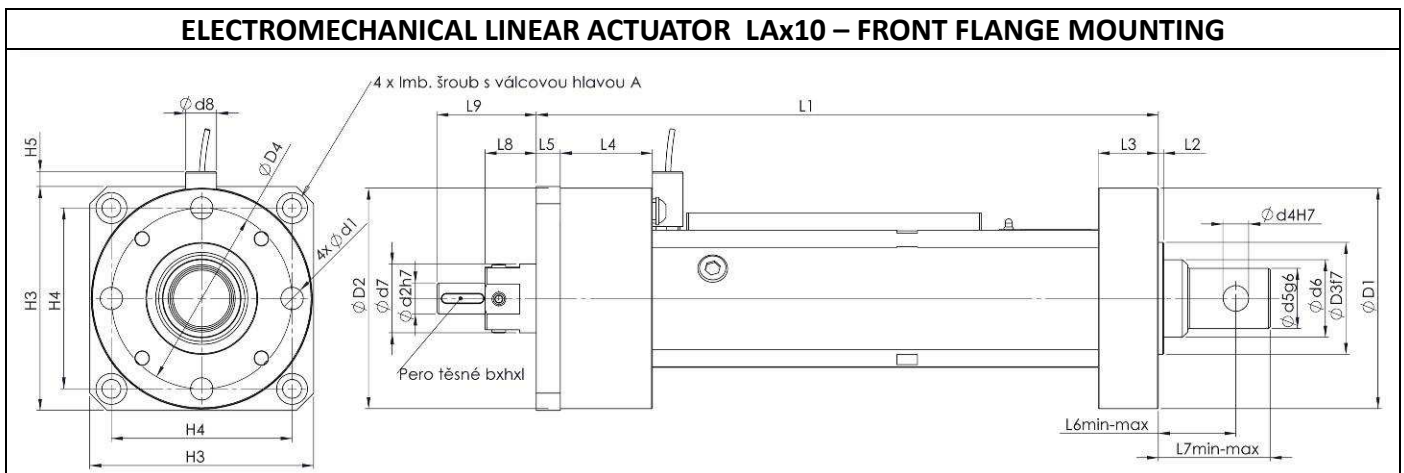
Following table should be fill in during every inspection. It could prove periodic inspection in case of warranty repair.

Date of commissioning:						Name, signature
Date of inspection	Inspection: L-lubrication, V-visual inspection, R-during run, B-belt					
	L	V	R	B	Note	

7. Disposal

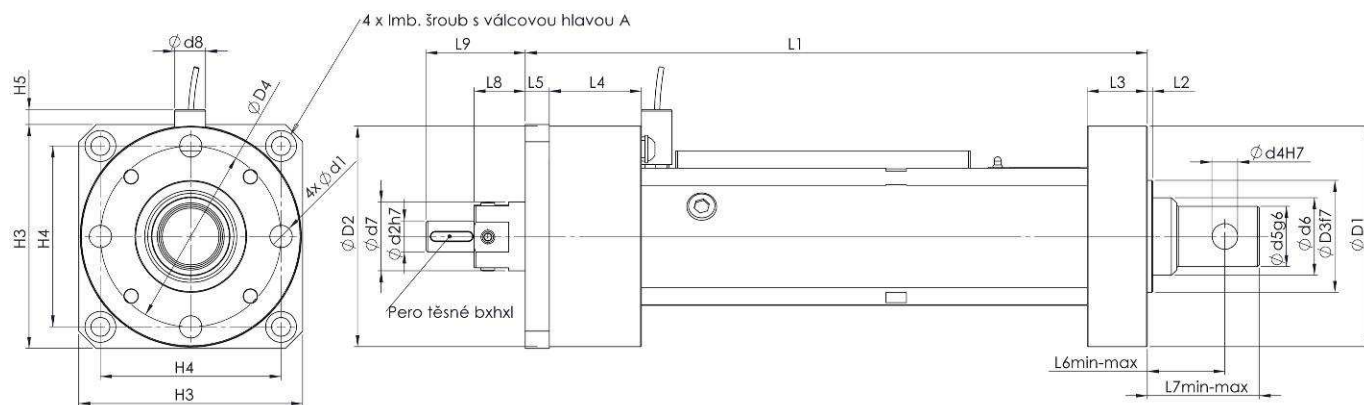
In case of decommissioning unplug and unmount the linear actuator. Disposal must perform specialized company which is engaged in collection and disposal of waste material in accordance with applicable standards and regulations. All works related to unmounting and disposal must be performed by qualified persons.

8. Dimensions



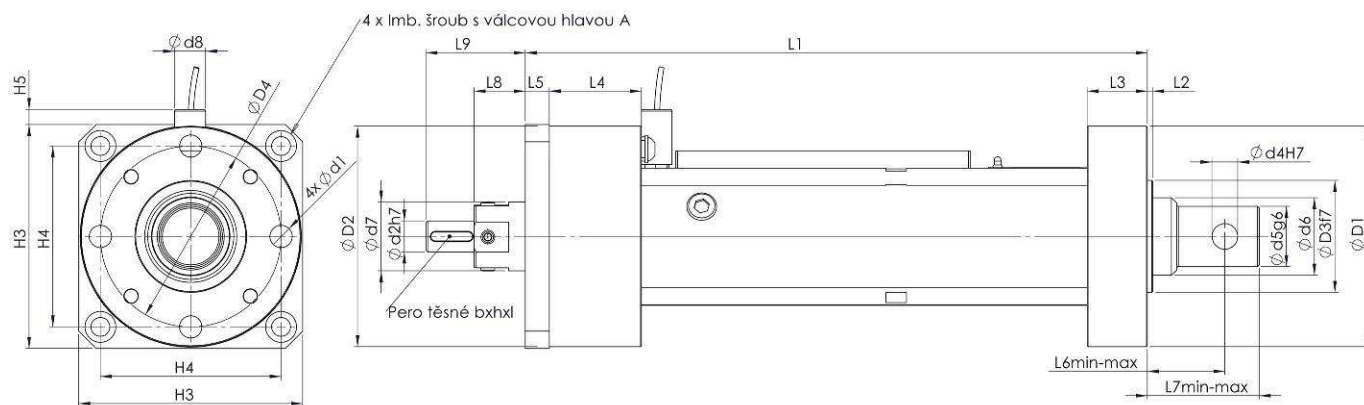
ZDVIH	50	150	300	450	600
D1	128	128	128	128	128
D2	128	128	128	128	128
D3	65	65	65	65	65
D4	105	105	105	105	105
d1	13	13	13	13	13
d4	15	15	15	15	15
d5	35	35	35	35	35
d6	45	45	45	45	45
d8	18	18	18	18	18
L1	261,5	361,5	526,5	676,5	826,5
L4	53,5	53,5	53,5	53,5	53,5
L5	14	14	14	14	14
L6min-max	17-67	17-165	15-317	17-467	17-617
L7min-max	65-115	65-215	65-365	65-515	65-665
L8	30	30	30	30	30
L9	60	60	60	60	60
H3	53,5	53,5	53,5	53,5	53,5
H4	14	14	14	14	14
H5	10	10	10	10	10
A	M10	M10	M10	M10	M10
bxhxl	6x6x25	6x6x25	6x6x25	6x6x25	6x6x25

ELECTROMECHANICAL LINEAR ACTUATOR Lx20 – FRONT FLANGE MOUNTING



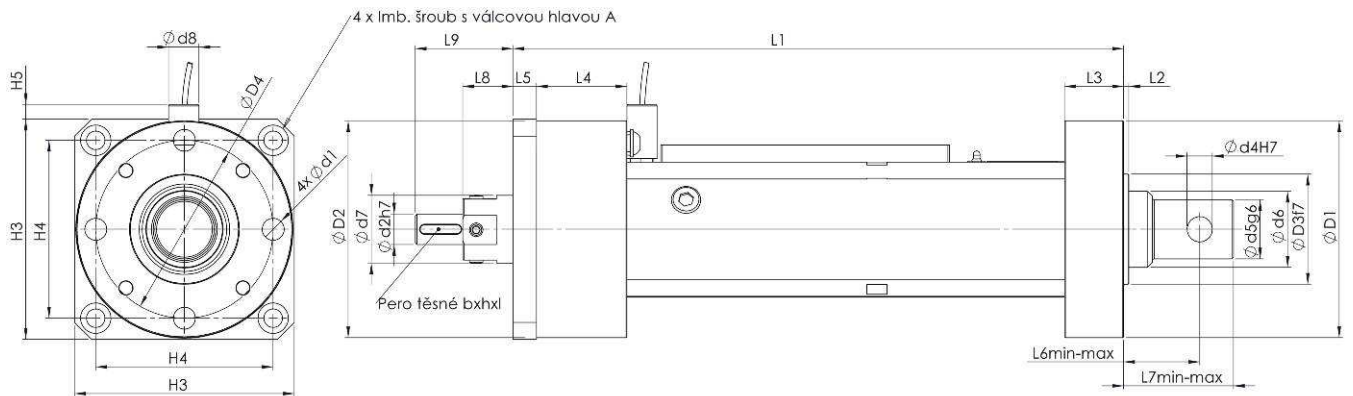
ZDVIH	50	150	300	450	600	750
D1	148	148	148	148	148	148
D2	148	148	148	148	148	148
D3	85	85	85	85	85	85
D4	125	125	125	125	125	125
d1	13	13	13	13	13	13
d4	20	20	20	20	20	20
d5	40	40	40	40	40	40
d6	60	60	60	60	60	60
d8	18	18	18	18	18	18
L1	294,5	394,5	558,5	708,5	858,5	1008,5
L4	64,5	64,5	64,5	64,5	64,5	64,5
L5	14	14	14	14	14	14
L6min-max	20-70	20-170	20-320	20-470	20-620	20-770
L7min-max	80-130	80-230	80-380	80-530	80-680	80-830
L8	30	30	30	30	30	30
L9	63	63	63	63	63	63
H3	150	150	150	150	150	150
H4	122	122	122	122	122	122
H5	10	10	10	10	10	10
A	M10	M10	M10	M10	M10	M10
bxhxl	6x6x25	6x6x25	6x6x25	6x6x25	6x6x25	6x6x25

ELECTROMECHANICAL LINEAR ACTUATOR LAx40 – FRONT FLANGE MOUNTING



ZDVIH	50	150	300	450	600	750
D1	178	178	178	178	178	178
D2	178	178	178	178	178	178
D3	90	90	90	90	90	90
D4	145	145	145	145	145	145
d1	17	17	17	17	17	17
d4	25	25	25	25	25	25
d5	50	50	50	50	50	50
d6	70	70	70	70	70	70
d8	18	18	18	18	18	18
L1	359,5	459,5	624,5	774,5	924,5	1074,5
L4	74,5	74,5	74,5	74,5	74,5	74,5
L5	15	15	15	15	15	15
L6min-max	20-70	20-170	20-320	20-470	20-620	20-770
L7min-max	80-130	80-230	80-380	80-530	80-680	80-830
L8	30	30	30	30	30	30
L9	76	76	76	76	76	76
H3	180	180	180	180	180	180
H4	148	148	148	148	148	148
H5	1	1	1	1	1	1
A	M10	M10	M10	M10	M10	M10
bxhxl	8x7x40	8x7x40	8x7x40	8x7x40	8x7x40	8x7x40

ELECTROMECHANICAL LINEAR ACTUATOR Lx60 – FRONT FLANGE MOUNTING



ZDVIH	50	150	300	450	600	750	900	1050
D1	188	188	188	188	188	188	188	188
D2	188	188	188	188	188	188	188	188
D3	97	97	97	97	97	97	97	97
D4	160	160	160	160	160	160	160	160
d1	17	17	17	17	17	17	17	17
d4	30	30	30	30	30	30	30	30
d5	60	60	60	60	60	60	60	60
d6	70	70	70	70	70	70	70	70
d8	18	18	18	18	18	18	18	18
L1	393,5	493,5	654,5	804,5	954,5	1104,5	1254,5	1404,5
L1*	433,5	533,5	694,5	844,5	994,5	1144,5	1294,5	1444,5
L4	76,5	76,5	76,5	76,5	76,5	76,5	76,5	76,5
L5	25	25	25	25	25	25	25	25
L6min-max	30-80	30-180	30-330	30-480	30-630	30-780	30-930	30-1080
L7min-max	115-165	115-265	115-415	115-565	115-715	115-865	115-1015	115-1165
L8	31	31	31	31	31	31	31	31
L9	94	94	94	94	94	94	94	94
H3	195	195	195	195	195	195	195	195
H4	159	159	159	159	159	159	159	159
H5	4	4	4	4	4	4	4	4
A	M10	M10	M10	M10	M10	M10	M10	M10
bxhxl	10x8x45	10x8x45	10x8x45	10x8x45	10x8x45	10x8x45	10x8x45	10x8x45

Note: L1* - Dimension applies to the actuators with higher piston speed $v \geq 500 \text{ mm.s}^{-1}$

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