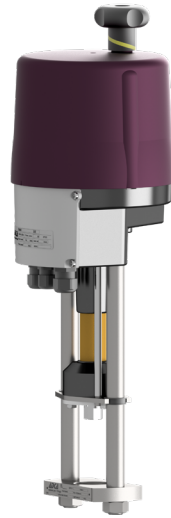


ELS INTELLIGENT LINEAR ELECTRIC ACTUATORS

INSTALLATION AND MAINTENANCE INSTRUCTIONS



GENERAL INFORMATION

- These instructions must be carefully read before performing any work involving VALSTEAM ADCA products. Failure to observe these instructions may result in hazardous situations.
- These instructions describe the entire life cycle of the product. Keep them in a location that is accessible to every user and make these instructions available to every new owner of the product.
- Current regional and plant safety regulations must be considered and followed during installation, operation, and maintenance work.
- The images shown in these instructions are for illustration purposes only.
- For problems that cannot be solved with the help of these instructions, please contact VALSTEAM ADCA or its representative.

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We reserve the right to change the design and material of this product without notice.

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1. SAFETY INFORMATION

1.1. Explanation of symbols



DANGER

Hazardous situation which, if not avoided by applying the correct preventive measures, will result in fatal or serious injury and/or considerable damage to property.



WARNING

Hazardous situation which, if not avoided by applying the correct preventive measures, could result in fatal or serious injury and/or considerable damage to property.



CAUTION

Hazardous situation which, if not avoided by applying the correct preventive measures, could result in moderately severe or minor injury.



NOTICE

Situation which, if not avoided, can result in property damage or product malfunction.



NOTE

Indicates additional information, tips and recommendations.

1.2. Intended use

Refer to the markings on the product, such as nameplate and laser markings, Information Sheet (IS) and these Installation and Maintenance Instructions (IMI) to check that the product was designed for the intended use and meets the specifications used for sizing and selection. This includes checking application, material suitability, process medium, pressure and temperature as well as their respective limiting values.

VALSTEAM ADCA does not assume any responsibility for damage resulting from inappropriate use of the product, damage caused by external stresses or any other external factors. Correct installation of the product is the full responsibility of the contractor.

Inappropriate use of the product is any use other than the one described in this chapter. Inappropriate use also includes:

- Use of spare parts which are not genuine;
- Performance of maintenance work not described in these instructions;
- Use outside the limits defined by the accessories connected to the product.
- Unauthorized modifications to the product.

If the product is to be used for an application or with a fluid other than the one it was designed for, contact VALSTEAM ADCA.

1.3. Qualification of personnel

The product may be hazardous if operated by personnel that has not been sufficiently trained or at least instructed. If the actuator is not handled properly or not used as specified, the result may:

- Cause danger to life and limb of the user or a third party.
- Damage the actuator and other property belonging to the owner.
- Hinder safety and performance of the actuator.

To prevent such problems ensure that handling, installation, operation and maintenance work must be carried out by fully trained and qualified personnel, capable of judging the work which they are assigned to perform and recognizing potentially hazardous situations. They should be trained to properly use this product according to these Installation and Maintenance Instructions.

Where a formal “Permits to Work” system is implemented in the plant it must be complied with.

1.4. Notes on electric equipment

The following precautions must be followed when dealing with electric equipment:

- Personnel which comes into contact with the product must be qualified to work with equipment containing hazardous live voltage. Life-threatening risks may occur due to electrical voltages.
- Before removing the cover from the unit, ensure that it is isolated from the supply voltage and protected against unintended reconnection. Supply voltage may only be switched on after the proper closure of the main cover or terminal box.
- The unit is designed as an installation category II product, and as such is reliant on the building installation for overcurrent protection and primary isolation.
- Wiring should be carried out in accordance with IEC 60364 or equivalent.
- Fuses should not be fitted in the protective earth conductor. The integrity of the installation protective earth system must not be compromised by the disconnection or removal of other equipment.

- A circuit breaker or other type of switching device must be included in the installation. The requirements for the switching device are specified in IEC 60947-1 and IEC 60947-3 or equivalent. The switching device must be of easy reach and located in close proximity of the equipment; Marked as a disconnecting device for the equipment in question; Must not interrupt the protective earth conductor.

1.5. Personal protective equipment

Personal protective equipment should always be worn during work in order to protect against hazards posed by e.g. the process medium, dangerous temperatures, noise, falling or projected objects and working at height. These equipment includes a helmet, safety glasses, safety harness, protective clothes, safety shoes, hearing protection, etc.



NOTE

Always assess whether you or others in your vicinity require any protective equipment. When in doubt, check with the plant's health & safety responsible personnel for details on required protective equipment.

1.6. The system

The complete system should be assessed as well as every action (e.g. closing of shut-off valves, disconnection of the power supply) to ensure this will not bring additional risk to personnel or property.

Dangerous actions that can result in a hazardous situation include isolation of protective devices such as safety valves, vents, vacuum relief valves, disconnection of electric safety devices, sensors and alarms.

1.7. ATEX

If the product is in the scope of the ATEX 2014/34/EU directive and as such bears the Ex marking, consult its specific Additional Instructions for use in Potentially Explosive Areas (IMI EX). In such cases, handling, installation, operation and maintenance work must only be performed by personnel qualified and authorized to work in potentially explosive areas.

1.8. General safety notes



DANGER

RISK OF ELECTRIC SHOCK

Before connecting wiring, opening or performing any work on the instrument, disconnect the supply voltage and protect it against unintentional reconnection.

- Do not perform work on live parts.
- Only use power interruption devices that are protected against unintentional reconnection of the power supply.
- An earth connection must be made to the earth terminal of the instrument.



WARNING

RISK OF INJURY AS A RESULT OF ILLEGIBLE INFORMATION

Important information written in the product nameplate, markings and warning signs may wear overtime or get illegible due to e.g. dirt accumulation, resulting in hazardous situations and personal injury or property damage.

- Keep nameplates, markings and warning signs in a legible state, replacing when illegible, missing or damaged.

2. PRODUCT INFORMATION

The ADCATrol ELS series of intelligent linear electric actuators is designed for operating control valves in both modulating and on/off applications in process engineering and industrial environments.

These actuators are equipped as standard with positioner and active feedback function, automatic commissioning as well as comprehensive diagnostic functions. These actuators are optionally available with super capacitors for fail-safe operation, returning to their respective fail-safe position in case of power failure/interruption.

2.1. Principle of operation

Mechanical power is generated by a motor which is controlled by the electronics processor via a pulse width modulation (PWM) signal. The motor rotation is transmitted through a multi-step low wear and low backlash spur gear to a spindle with trapezoidal thread. The spindle is fitted with an anti-rotation plate, preventing its rotation during operation. This results in a linear movement of the actuator spindle with a direction which depends on the motor direction of rotation.

The electronics processor controls the bottom and top positions, which can be defined by measurement of the spindle force (torque mode) or its position (position mode).

The actuator is secured to the valve bonnet with the spindle connected to the valve stem in order to transmit its force.

The actuator is fitted with a handwheel which is used to operate the actuator during installation work (e.g. mounting the actuator onto the valve) or in case of power supply failure. The handwheel is permanently engaged and turns during motor operation, except with the ELS200 and ELS250 models, where the handwheel is engaged by depressing a button on the actuator cover. Manual adjustment must only be executed with the motor being at standstill.

2.2. Certification

This product complies with the requirements of the European LVD - 2014/35/EU Low Voltage Directive, EMC - 2014/30/EU Electromagnetic Compatibility Directive and RoHS - 2011/65/EU and 2015/863/EU Restriction of Hazardous Substances Directive.

The product declaration of conformity is available on request.

2.3. Product identification

The following items are indicated on the product nameplate or directly on its body:

- Manufacturer
- Product model (e.g. ELS20)
- Power supply (e.g. 230 V AC 50/60 Hz)
- Power consumption (e.g. 13 W)
- IP rating (e.g. IP 65)
- Thrust (e.g. 2.3 kN)
- Speed (e.g. 0.9 mm/s)
- Ambient temperature (e.g. Amb. Temp. (S2) -20 °C...+60 °C)
- Serial number and year of manufacturing (e.g. Reg.:17483/19)
- CE Marking (when applicable – see section 2.2 – Certification)

2.4. Technical data

For technical data including dimensions, materials, limiting conditions and versions refer to the product's respective Information Sheet (IS).

3. TRANSPORT, STORAGE AND PACKAGING



WARNING

RISK DUE TO FALLING LOADS

Loads may tip or fall over resulting in damage to property, serious injury or death.

- Use suitable equipment when moving or lifting suspended loads.
- Make sure no one is standing below the suspended load.



CAUTION

RISK OF INJURY DUE TO IMPROPER HANDLING

Manual handling (e.g. lifting, carrying, pushing, pulling) of large and/or heavy products may result in personal injury such as back injury.

- Assess the risk associated with the handling task.
- Use adequate handling methods and appropriate auxiliary handling equipment.



NOTICE

RISK OF PRODUCT DAMAGE DUE TO IMPROPER STORAGE

- Do not remove any packaging or protective covers until immediately before installation at the site.
- Store the product in a solid base in a dry, cool and dust-free environment.
- Until its installation, protect it from the weather, dirt, corrosive atmospheres and other harmful influences.

RISK OF PRODUCT DAMAGE DUE TO LONG TERM STORAGE

Some product components may deteriorate with time (e.g. valve packings, seals).

- Do not store the product for more than 12 months.
- If for any reason the product must be stored for longer periods of time contact VALSTEAM ADCA.

Products are individually wrapped in plastic film, thermo shrinkable plastic and/or stored in a cardboard box as they leave VALSTEAM ADCA. Avoid removing packaging and any protective cover until immediately before installing the product at the site.

Ensure the product is stored at a temperature of -20 to +60°C and relative humidity of 5 to 95% in a non-condensing environment.

i **NOTE**

If the transport packaging has any shipping damage contact VALSTEAM ADCA or its representative.

Before storing and transporting the actuator, protect it from impacts and mechanical damage, paying special care with fragile parts. When lifting the valve assembly (valve body and actuator), attach slings around the valve body capable of withstanding the entire weight and use these to lift the assembly. Slings around the actuator should not be fitted, but care must be taken to prevent tilting.

i **NOTE**

If the corrosion protection (paint and other surface coatings) of the product is damaged during transport or other handling procedures repair it immediately.

4. INSTALLATION

Before performing any installation work or electrical installation procedure, refer to section 1 – Safety Information.

! **WARNING**

RISK OF INJURY DUE TO INSUFFICIENT SUPPORT DURING INSTALLATION

Insufficient support of the product during installation may cause it to fall and cause personal injury.

- Ensure the product is safely held in place during installation.
- Wear protective safety shoes.

! **NOTICE**

RISK OF PRODUCT DAMAGE DUE TO STRESS

The product is not intended to withstand external stresses that may be induced by the system to which it is being connected to.

- Do not use the product as an elevation point.



NOTICE

LOCAL WIRING AND SAFETY REGULATIONS SHOULD BE STRICTLY ADHERED TO WHEN INSTALLING THE PRODUCT

- Should these regulations conflict with the following instructions, contact VALSTEAM ADCA or its representative for advice.

4.1. Preparation for installation

Before installation, make sure the following conditions are met:

- The installation area has easy access and the device is to be installed in a position where operation and maintenance work can be performed safely. Ensure there is enough space to remove the actuator cover.
- The product will be installed with proper support and free of any stresses that can be induced by the system. The necessary precautions are recommended during system design.
- Ensure correct installation of the product. Safety may be compromised if the installation is not carried out as specified in these Installation and Maintenance Instructions (IMI).
- Remove plastic film and other packaging, as well as protective covers.
- The product is not damaged.
- Make sure all the necessary materials and tools are readily available during installation work.
- Referring to this Installation and Maintenance Instructions (IMI), Information Sheet (IS) and nameplate, check that the device is suitable for the intended installation – see section 1.2 – Intended use.
- Check voltage, frequency and electric cable section to make sure that the electrical supply meets the specifications stated on the product nameplate.
- Check any mounted pressure gauges and make sure these function properly.
- When using the actuator in environments with high temperature fluctuations or high humidity, it is recommended to use a heating resistor as well as a higher enclosure rating (optional accessories). A heating resistor should be installed in case condensation is present.
- The actuator IP rating is guaranteed only when the top cover is correctly fitted and secured with the screws properly tightened. It is recommended to provide adequate shelter in case the actuator is to be installed outdoors.
- When selecting the location, make sure that the actuator is not exposed to ambient temperature exceeding the range -20 °C to +60 °C. If necessary, provide insulation to prevent overheating.
- When designing the system make sure the system will fail safe. This could include the provision of an additional monitoring device, depending upon the particular

application and any consequences of an instrument or sensor failure.

- See separate Installation and Maintenance Instructions (IMI) for the control valve.
- The recommended installation position is with the actuator cover pointing upwards. Horizontal installation without support is only suggested for lightweight actuators otherwise a means of support must be provided. When installing the actuator in the horizontal position with a yoke composed of two columns be sure these are above each other in the vertical plane.
- The actuator must not be installed with the drive pointing downwards. This position can lead to malfunction or damage due to inadequate protection against condensation as well as increased mechanical stress.
- If the actuator is to be mounted onto a valve which is already connected to the pipeline ensure that it has been isolated from the line.

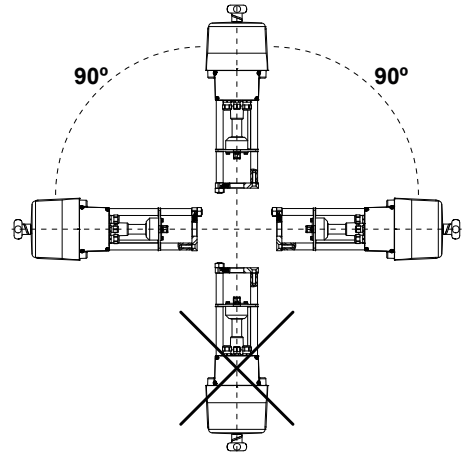


Fig. 1 – Installation positions

4.2. Manual operation



CAUTION

RISK OF PRODUCT DAMAGE DUE TO IMPROPER MANUAL OPERATION

Improper manual handwheel operation may result in malfunction or damage to the actuator.

- Do not exceed the adjusted electrical stroke limits while operating the actuator manually.
- Do not operate the handwheel using excessive force.
- Manual operation must only be performed with the supplied handwheel.
- Do not remove the manual handwheel to operate the actuator with a tool, e.g. wrench or pliers, or any other means.
- Do not try to block the rotating handwheel while the actuator is operating.

The handwheel is used to operate the actuator during installation work (e.g. mounting the actuator onto the valve), or in case of power supply failure. The handwheel is permanently engaged and turns during motor operation, except with the ELS200 and ELS250 models, where the handwheel is engaged by depressing a button on the actuator cover. Manual adjustment must only be executed with the motor being at standstill.

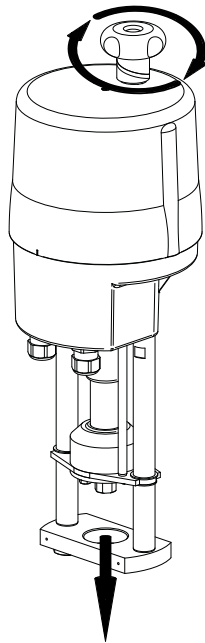


Fig. 2 – Manual operation ELS20 to ELS140

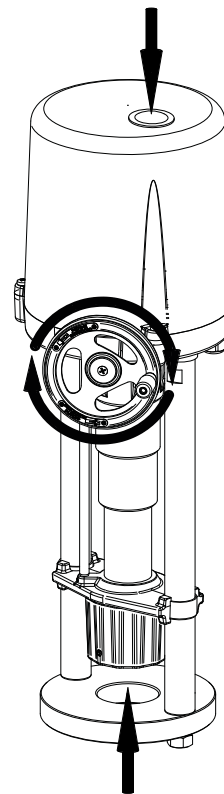


Fig. 3 – Manual operation ELS200 and ELS250

4.3. Mounting the actuator onto the valve



CAUTION

RISK OF VALVE SEATING DAMAGE DUE TO IMPROPER ASSEMBLY

Valve stem rotation during actuator assembly or tuning may damage the seating surface.

- Do not rotate the valve plug while it is seated.

RISK OF INJURY OR ACTUATOR DAMAGE DUE TO ELECTRIC ACTUATION WHILE MOUNTING

Mounting the actuator while it is electrically driven may cause personal injury or damage to the actuator.

- When mounting the actuator onto the valve, do not drive the actuator electrically.
- When mounting the actuator onto the valve, always drive it by means of the handwheel.

RISK OF IMPROPER MOUNTING

Incorrect alignment during installation may lead to malfunction or mechanical damage.

- Pay close attention to the instructions described in the following sections.



NOTICE

When mounting the actuator onto the valve, it is recommended to keep the polystyrene packaging on the actuator head. This will protect the actuator from damage in case it is dropped or topples onto a hard surface.

ADCATrol control valves which are to be fitted with ELS series electric actuators are generally delivered with the actuator already mounted. When delivered separately mount the actuator on the valve according to the instructions on the following sections.

4.3.1. ELS20 to ELS140

1. Use the handwheel to raise the actuator spindle until reaching the end stop.
2. Untighten the four bolts (7) about 10 mm each. The adaptor (6) will become loose and the spring washers (10) visible.
3. Screw the lock nut (5) onto the valve stem until reaching the end stop and manually push the valve stem (4) downwards until the valve plug touches the seat.
4. Carefully place the actuator yoke over the valve stem with the actuator lock nut (3), and lower until the yoke flange (2) touches the valve bonnet (1) shoulders.
5. Align the actuator columns and secure the actuator with the actuator lock nut (3) using a C-hook wrench and a soft faced hammer – see section 8.1 – Tightening torques.
6. Use the handwheel to lower the actuator spindle until the adaptor (6) touches the valve stem (4).
7. Lower the actuator spindle a further 3 to 5 mm and screw the adaptor (6) onto the valve stem the same amount. Repeat the process until the stem is screwed into the coupling nut by 12 mm (M10 or M12 stem thread) or 16 mm (M16 stem thread).
8. Lower the actuator further until the securing and coupling flanges (8, 9) touch each other and gradually tighten the four bolts (7) in a crisscross pattern until the recommended torques are achieved – see section 8.1 – Tightening torques.
9. Use the handwheel to raise the actuator spindle slightly so that the valve plug lifts away from the seat, and tighten the lock nut (5) against the adaptor (6).
10. Align the crimp clamps with the tip of the coupling (stroke indicator) at the end positions.

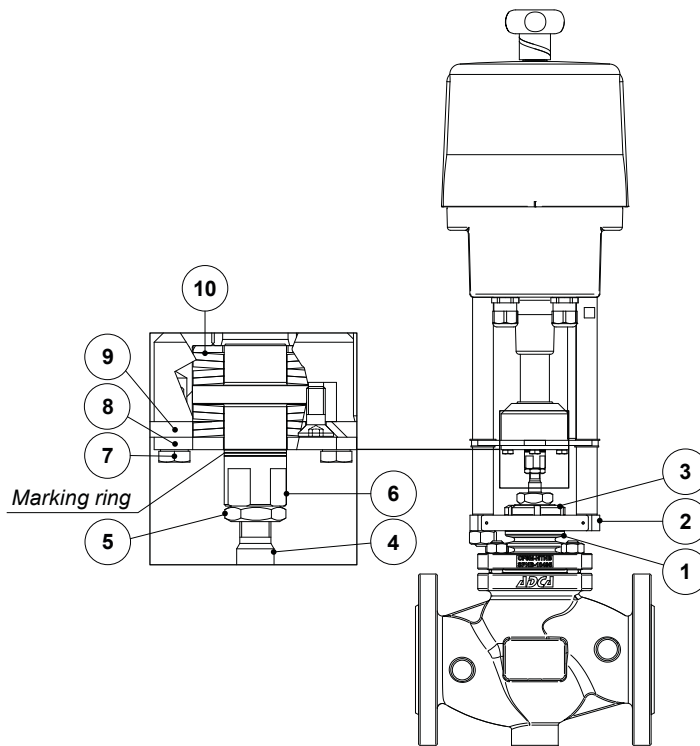


Fig. 4 – Mounting the actuator onto the valve (ELS20 to ELS140)

4.3.2. ELS200 and ELS250

1. Unscrew the retaining nut (11) from the coupling unit (12) using a pin wrench and remove the adaptor (6) and disc springs (10).
2. Place the disc spring stacks according to Fig. 3, with the first set of three disc springs above the adaptor (6), and the second set below. The convex side of a spring must be assembled to the convex side of the next spring. Conversely, the concave side of the spring must be assembled to the concave side of the next spring.
3. Fit the assembly inside of the coupling unit (12) securing loosely with the retaining nut (11).

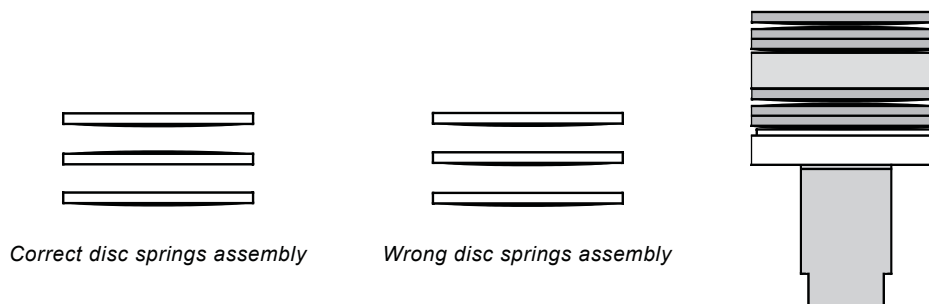


Fig. 5 – Assembling the disc spring stacks onto the coupling unit



NOTICE

Disc springs must be assembled in the correct orientation and sequence.

4. Use the handwheel to raise the actuator spindle until reaching the end stop.
5. Screw the lock nut (5) onto the valve stem (4) 1.5 to 2 times the stem diameter.
6. Carefully place the actuator yoke over the valve stem, with the actuator lock nut (3), and lower until the yoke flange (2) touches the valve bonnet (1) shoulders.
7. Align the actuator columns and secure the actuator with the actuator lock nut (3) using a c-hook wrench and a soft faced hammer – see section 8.1 – Tightening torques.
8. Use the handwheel to lower the actuator spindle until the adaptor (6) touches the valve stem (4).
9. Lift the valve stem up and screw the adaptor (5) onto the stem until it meets the lock nut (7) or comes to a stop (whichever occurs first).
10. Use the supplied peg spanner to screw the retaining nut (11) into the coupling unit (12) until the nut is level with the housing. It may be necessary to further extend the actuator spindle so that the plug pushes against the seat to help compress the disk springs. Tighten the socket headed grub screw (13) to fix the retaining nut to the coupling unit.
11. Align the crimp clamps with the tip of the coupling (stroke indicator) at the end positions.

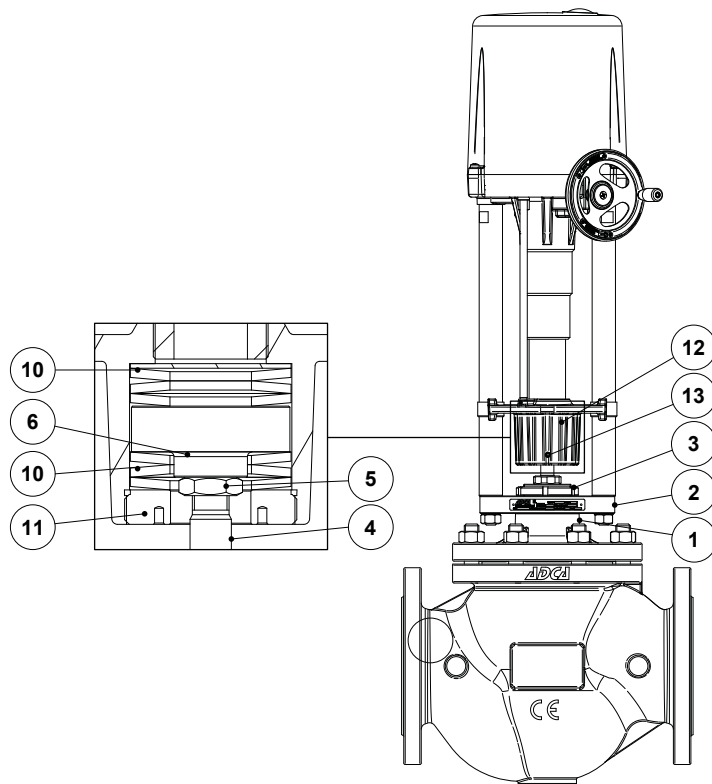


Fig. 6 – Mounting the actuator onto the valve (ELS200 and ELS250)



NOTICE

When the retaining nut (11) is hand-tightened, the valve plug must not be seated. Ensure that one marking ring remains visible 1 mm below the bottom of the retaining nut.

4.4. Removing and fitting the actuator cover



NOTICE

Before removing the cover, touch grounded parts and ensure the actuator is properly grounded.

4.4.1 ELS20 to ELS140

The actuator covers protect internal components and must be handled with care during removal and installation.

The front cover is removed by loosening the four securing screws.

Proceed as follows to remove the top cover:

1. Remove the handwheel by loosening the socket-head grub screw using a 4 mm A/F Allen key.
2. Hold both actuator pillars at the top.
3. Use your thumbs to gently lift the top cover and ease it off the actuator.
4. Pull the cover straight upwards to remove it completely.

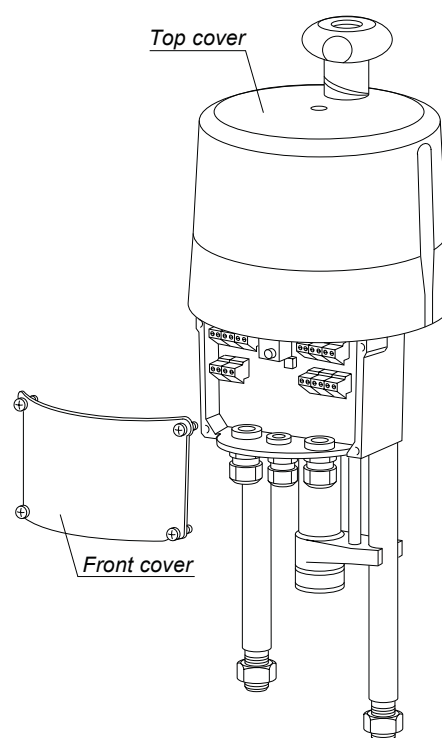


Fig. 7



NOTE

The top cover does not need to be removed for electrical connections. It shall only be removed for adjustment of limit switches and retrofitting of the heating resistor.

Proceed as follows to reinstall the top cover:

1. Place the cover on the actuator, ensuring the two fixing screws are aligned with the corresponding threaded holes.
2. Slightly tighten the fixing screws with an Allen key. If the screws do not engage, slightly adjust the cover position.
3. Press the cover downwards ensuring it slips over the actuator sealing ring.
4. Fully tighten the fixing screws.

4.4.2. ELS 200 and ELS250

The actuator cover protects internal components and must be handled with care during removal and installation.

Proceed as follows to remove the top cover:

1. Remove the handwheel by loosening the socket-head grub screw.
2. Unscrew the three fixing screws around the bottom edge of the top cover.
3. Gently lift the top cover off the actuator.

Proceed as follows to reinstall the top cover:

1. Ensure the sealing ring around the housing is correctly seated in its groove.
2. Place the cover on the actuator, aligning the three threaded holes and the button over the release pin of the actuator housing.
3. Tighten the fixing screws using a suitable tool.

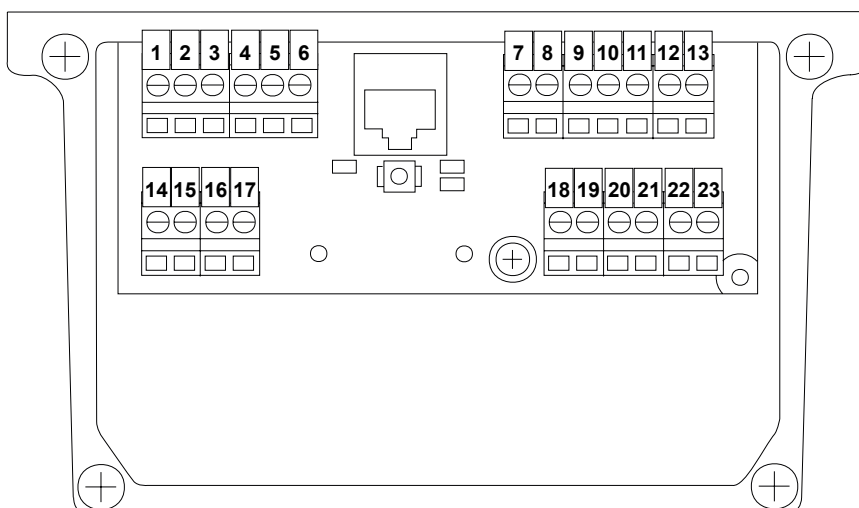


NOTE

After fitting the top cover, press down the handwheel button cap to engage the handwheel.

4.5. Electrical installation

- Terminations at the connectors should not have excess wire trimmed, leaving a minimal length of wire free to reduce electromagnetic pick-up inside or near the instrument housing.
- Connect cable screens as shown to comply with electromagnetic compatibility requirements.
- The use of CE marked equipment to build a system does not automatically ensure that the system as a whole will comply with the requirements laid out by the EMC - 2014/30/EU Electromagnetic Compatibility Directive.
- If an interlock function is required, it must be provided in the follow-up (safety) circuitry. The circuitry must meet the requirements of EN 50156.
- Depending on the actuator size, electrical terminals are provided either in a terminal box at the actuator or inside the cover. Once wiring is completed, ensure the terminal box and actuator cover are properly closed, and tighten the cable glands to preserve the enclosure protection rating. Note that wiring diagrams may differ for special actuator versions.



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	RJ45
+ 0(2) to 10 V	+ 0(4) to 20 mA	GND	+ 0(2) to 10 V	+ 0(4) to 20 mA	GND	24 V DC	Maximum load	L /+ open	N / -	L /+ close	L /+ (24 V AC/DC)	N /- (24 V AC/DC)	24 V DC / 100 mA	+ 0(2) to 10 V	+ 0(4) to 20 mA	GND					(see name plate) L / +	(see name plate) N / -	
Set value input	Active position feed back	Monitor relay (volt-free)	Binary input signals	Fail safe signal	Supply	Actual value (process sensor)	Position switches (volt-free)	Power supply	PC comm.														

Fig. 8 – Electric terminals

4.5.1. Power supply



NOTICE

Connecting the actuator to an incorrect power supply may result in permanent damage to the actuator. Ensure the supply voltage and maximum power consumption correspond to the values specified on the actuator nameplate. Connect the supply and control lines to the designated terminals as shown in the wiring diagram.

1. Slow blow fuses must be installed in all phases, with the exception of the protective earth conductor.
2. The protective earth internal must be connected to the installation protective earth system. The integrity of this system must not be compromised by the disconnection or removal of other devices.
3. For supply connections, use 1.5 mm² wire, double insulated in compliance with IEC 60364 (or equivalent), if wires are exposed to touch.
4. The length of the power line determines the required wire section increase.
5. Ensure the safety transformer in the supply line is properly dimensioned.
6. Inrush currents must not cause an excessive voltage drop.

4.5.2. Galvanically isolated binary input (3-point-step)

i NOTE

The binary inputs take priority over the modulating set-value. If the actuator is configured for modulating service, the set-value settings are ignored whenever a binary signal is applied. The actuator will only return to the set-value position once the binary signal is disconnected.

i NOTE

If the actuator is configured for modulating service and set to move to a predefined position upon input signal failure (standard factory setting), it will automatically move to that position as soon as a binary inputs signal is disconnected.

This behaviour makes 3-point step service (open–stop–close) incompatible with such a configuration. The actuator will not respond correctly to binary commands, as it interprets the absence of signal as a fault condition.

Therefore, when 3-point step service is required, it is essential to ensure that the actuator is properly configured for this mode. This includes disabling any fail-safe positioning that may override binary inputs and verifying that the control logic aligns with the actuator's operating mode.

Terminals 9 to 11 are used for binary open/close signals. Standard input voltage is 24 V, with optional 115/230 V (must be specified when ordering, as it is not retrofittable). In 3-point-step service, the actuator operates as follows:

9 = Opening (extend valve stem)

10 = Neutral

11 = Closing (retract valve stem)

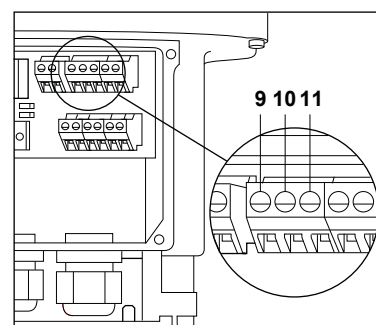


Fig. 9

4.5.3. Set-value

Terminals 1 to 3 receive a parameterisable modulating set-value for control operation. The actuator can be driven with either a 0 to 10 V or a 0(4) to 20 mA input signal (split range control also possible), connected as follows:

1 = 0 to 10 V

2 = 0(4) to 20 mA

3 = Ground (GND)

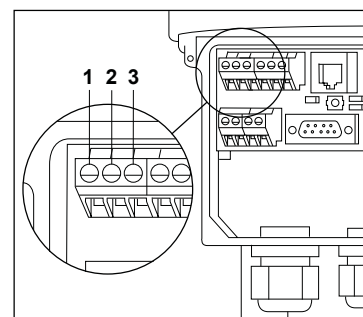


Fig. 10

4.5.4. Active position feedback

Terminals 4 to 6 provide an active position feedback signal, parameterised within the ranges 0 to 10 V or 0(4) to 20 mA. This feature is especially useful when position-based cut-off is required. Connections are as follows:

- 4 = 0 to 10 V
- 5 = 0(4) to 20 mA
- 6 = Ground (GND)

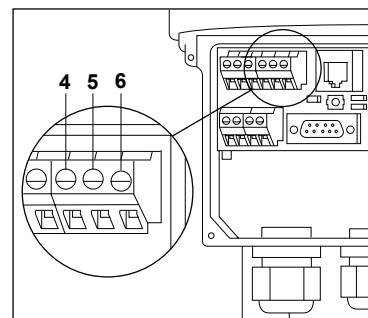


Fig. 11

4.5.5. Fail safe (optional)

When equipped with the FSCP fail-safe function via super capacitors, the actuator can be powered with a 24 V signal via terminals 12 (L/+) and 13 (N/-) to move automatically to a predefined safety position.

This option is not retrofittable and must be specified when ordering.

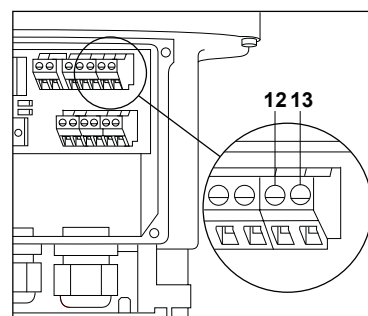


Fig. 12

i NOTE

The fail safe signal takes priority over the binary inputs (terminals 9 to 11) and set-value (terminals 1 to 3).

4.5.6. Sensor feedback (optional)

Terminals 15 to 17 receive an active process sensor/transmitter signal for the (optional) process controller, which can be parameterised within the ranges 0 to 10 V or 0(4) to 20 mA. Connections are as follows:

- 15 = 0 to 10 V
- 16 = 0(4) to 20 mA
- 17 = Ground (GND)

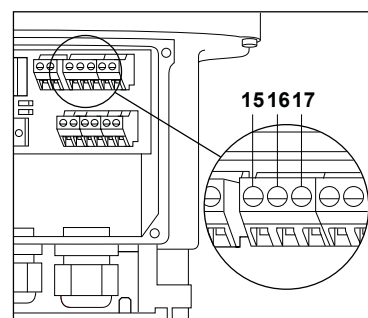


Fig. 13

4.5.7. Additional 2WE limit switches (optional)

The actuator can be equipped with two optional limit switches for feedback, provided as potential-free changeover contacts (2WE). The standard switches have silver contacts rated for currents between 10 mA and 5 A at a maximum of 230 V, while gold-plated contacts (2WE-G) are available for low-power applications (0.1 to 30 mA, up to 30 V). Terminals 18/19 and 20/21 are used for connecting the switches.

The activation points are freely adjustable via cams on the switch plate, using a small screwdriver. Cam 1 is used for retracting the spindle nut, while cam 2 is used for extending it. When ordering switches, it please specify whether they should be supplied as normally closed or normally open.

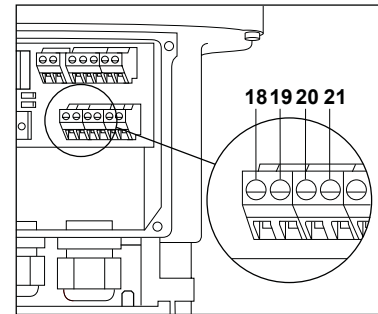


Fig. 14

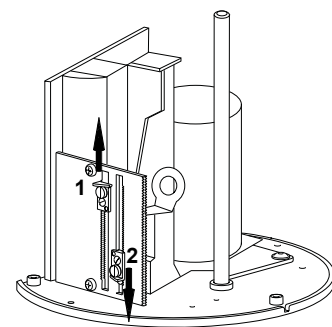


Fig. 15 - Adjustment of the cams



NOTICE

Potentiometer must not be adjusted. Failure to comply may result in damage to the actuator.

4.5.8. Voltage supply to process sensor/transmitter (optional)

Terminals 14 and 17 provide an unregulated output voltage of 21 to 40 V DC, with a maximum current of 100 mA, to power an external process sensor. Connections are as follows:

14 = 24 V DC / 100 mA

17 = Ground (GND)

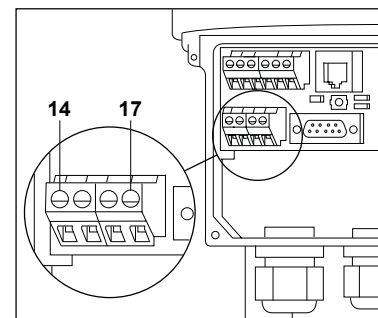


Fig. 16

4.5.9. Fault indicating relay

Terminals 7 and 8 provide a potential-free relay contact for displaying a parameterisable fault indication to the control room. The relay is normally closed and can be configured using the communication software.

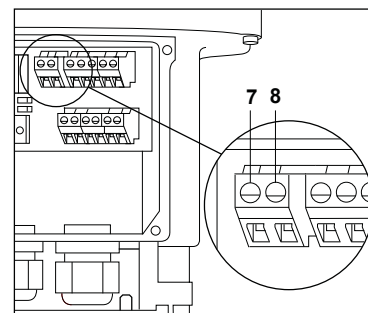


Fig. 17

4.6. Fitting the heating resistor

The heating resistor is powered via the power supply of the actuator, so it does not have to be fed separately. For retrofitting the heating resistor, wiring of the two cables has to be made to the terminals on the main board as per Fig. 18.

The heating resistor is available in two different versions (for 24 V AC/DC or 115-230 V AC). Please choose according to the voltage supply of the actuator.

Mouting of the heating resistor has to be made to the indicated place on the base plate by using the screws (30). Route the cables in a way to prevent them from being squashed by the main cover, and from being touched by moving parts inside the actuator.

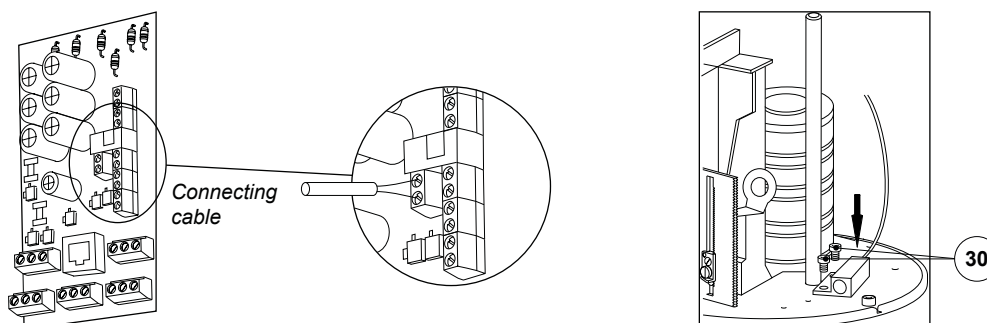


Fig. 18 – Wiring and mouting the heating resistor

5. COMMISSIONING

Before performing the start-up procedure, refer to section 1 – Safety Information and to section 4 – Installation.

Actuators supplied mounted on control valves are delivered pre-commissioned. If commissioning is required, the following procedure must be followed.

Actuators supplied separately are in a non-commissioned condition, indicated by a slowly flashing green LED. In this state, the actuator does not respond to any input,

whether a set-value or an open/close signal. To make the actuator operational, it must be commissioned to the valve. Commissioning can be performed in two ways, depending on the type of cut-offs programmed:

- Automatic commissioning: Used if at least one cut-off is set to “by force/torque” or “by position automatically”.
- Manual commissioning: Required if both cut-offs are set “by position”, and can be carried out via the communication software or the LCS local control display (optional).

Actuator status is indicated by red and green LEDs mounted together inside the terminal box. An optional single red LED signals the status of the fieldbus interface. The commissioning button, used to start an automatic commissioning run and adjust the actuator to the valve, is located inside the terminal box, below the communication port – see Fig. 19.



NOTICE

Electrical operation of the actuator is allowed only after mouting to a valve. Observe all handling precautions, as the actuator contains electrostatic-sensitive components.

5.1. Preparation for commissioning

Before starting up, make sure the following conditions are met:

- The actuator voltage corresponds to the required specification.
- The wiring has been carried out in accordance with the instructions outlined in section 4.5.
- The valve and actuator assembly has been performed according to the instructions in section 4.3.
- All works on the system have been completed.
- All the necessary safety devices have been installed.
- When required, warning notices are used to alert others that the system is starting up.
- The actuator is correctly installed – see section 4 – Installation.
- Referring to these Installation and Maintenance Instructions (IMI), Information Sheet (IS) and nameplate, check that the actuator is suitable for the intended installation: temperature, medium, pressure, etc. – see section 1.2 – Intended use.
- A safety check was performed by qualified personnel. Checking for leaks, structural damage and integrity of system components.

5.2. Automatic commissioning procedure

To perform automatic commissioning of the actuator, make sure to follow these steps:

1. Cut-offs have to be set "by force/torque" for linear valves or "by position automatically" for butterfly valves. During automatic commissioning the actuator moves through the entire programmed valve stroke. Parameters specific to the valve are measured and stored permanently in the actuator. Set-value and position feedback ranges are scaled accordingly.
2. When the actuator is mounted on the valve and all wiring connections are completed, switch the power on by pressing the commissioning button for 3 seconds.

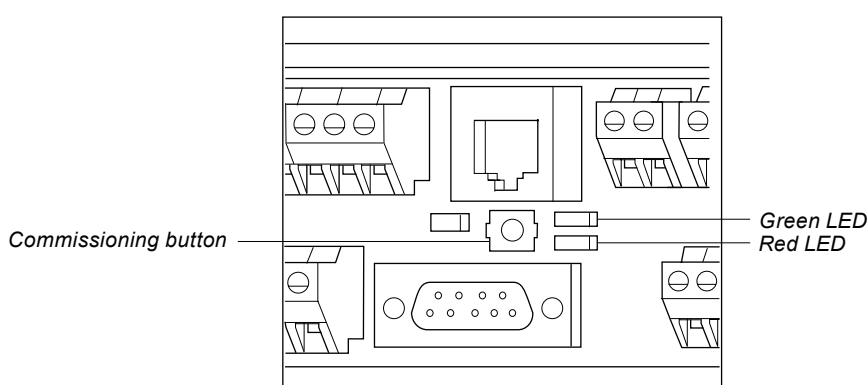


Fig. 19

3. The actuator moves through the full valve stroke and the green LED flashes quickly.
4. Once the commissioning is finished and the actuator is ready for operation, the green LED glows permanently.

5.3. Manual commissioning procedure

The following procedure describes the steps for performing manual commissioning of the actuator. Manual commissioning is carried out via the communication software or the LCS local control display (optional).

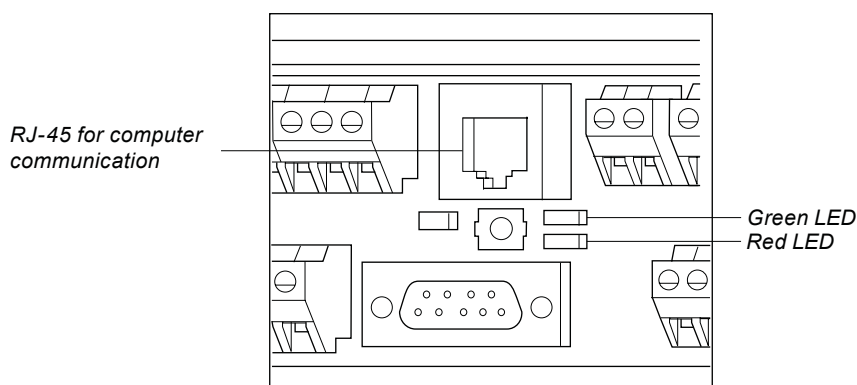


Fig. 20

1. Ensure the actuator is mounted on the valve and all wiring connections are completed, then switch the power on. Permanently apply the set-value for the closed position or the “close” input signal.
2. Set the valve stroke using the communication software or LCS local control display. Not necessary if set to "by torque" in both open and close positions.
3. Drive the actuator to the closed position. Take care to ensure the disc spring is fully compressed. The open position of the valve will be calculated based on the programmed valve stroke.
4. Depending on the parameterised mode of operation, ensure that the correct set-value for the closed position or the binary signal for closing is permanently applied during commissioning.
5. After successfully manually commissioning, the actuator is ready for operation, indicated by the green LED glowing permanently.



NOTE

If the programmed valve stroke from the adjusted closed position exceeds the actuator maximum stroke, the operating range will automatically be limited to the maximum achievable stroke.

6. OPERATION

Before operating the product refer to section 1 – Safety Information.

Immediately after completing the commissioning procedure, the product is ready for operation.

All internal parameters, such as required motor torque, actual position, functional status, etc., are permanently monitored during operation of the actuator. This ensures that the actuator positions with optimum accuracy, and closes the valve tightly. Deviations can be read out via the communication software or via the LCS local control display (if fitted), or can be displayed to the control room using the fault indication relay. This provides maximum safety of the process.

7. SHUTDOWN

Before performing the shutdown procedure, refer to section 1 – Safety Information.

7.1. Shutdown procedure

1. Put the control valve out of operation, referring to its respective Installation and Maintenance Instructions (IMI).
2. Switch off the electric supply and disconnect it from the actuator.

8. MAINTENANCE

Before performing a maintenance procedure, refer to section 1 – Safety information.

When used according to the conditions specified in the datasheet, ELS actuators are maintenance-free.

All gears are lubricated for the actuator service life and do not require re-lubrication. Clean the actuator with a soft and dry cloth and do not use any cleaning agents or abrasive materials.



NOTICE

Always ensure electrical supply is completely disconnected before performing any work on the actuator or valve.

8.1. Tightening torques

POS. No.	DESIGNATION	TORQUE (Nm)			
		M40 x 1,5	M40 x 1,5	M65 x 2	M80 x 2
3	Actuator lock nut	100	120	180	250

POS. No.	DESIGNATION	TORQUE (Nm)
7	Bolt	8

9. TROUBLESHOOTING

Before applying any corrective measure, refer to section 1 – Safety information.

If the malfunction cannot be solved with the help of the following table, contact VALSTEAM ADCA or its representative.

Malfunction	LED indication	Possible cause	Corrective measure
Actuator does not respond.	Red: Off Green: Off	No supply voltage applied.	• Check mains supply.
		Applied voltage does not match the actuator voltage on the tag table.	• Apply correct supply voltage.
Actuator does not drive the full stroke.	Red: Off Green: Glowing permanently	Actuator not correctly commissioned.	• Repeat commissioning.
		Stroke programmed is too small (mode: "one position-dependent cut-off").	• Check valve stroke parameters – see section 5.3.
Actuator does not close valve properly.	Red: Off Green: Glowing permanently	Actuator not correctly commissioned.	• Repeat commissioning.
		Closing force / torque too low.	• Check actuator selection.
Actuator in normal operating condition, but does not respond to set-value changes.	Red: Off Green: Glowing permanently	Fixed digital set-value activated.	• Check set-value parameters – see section 5.3.
		Actuator configured to work with process controller.	• Connect process sensor.
Actuator position does not match set-value point.	Red: Off Green: Glowing permanently	Non-linear valve curve has been parameterised.	• Verify parameterised characteristic – see section 5.3.
Normal operating condition.	Red: Off Green: Glowing permanently	–	–
Actuator in commissioning mode.	Red: Off Green: Flashing quickly	–	• Commissioning mode will exit automatically after completion.
Actuator not commissioned.	Red: Off Green: Flashing slowly	–	• Depending on cut-off type, commission actuator automatically or manually.
Excessive high torque detected during valve stroke.	Red: Flashing slowly Green: Glowing permanently	Actuator not correctly commissioned to the valve.	• Repeat commissioning.
		Mechanical blockage within stroke path.	• Check valve and actuator for unobstructed running.
		Improper actuator selection.	• Check actuator selection.
No proper process feedback or maximum control range exceeds (only in combination with PSIC).	Red: Flashing slowly Green: Flashing quickly	Process feedback wrongly connected or not at all.	• Apply correct process feedback signal and check polarity.
		Process feedback outside adjusted range.	• Ensure correct process feedback range.
		No process sensor signal available.	• Check process sensor and supply voltage.
Actuator drives to present position.	Red: Flashing slowly Green: Flashing slowly	Signal applied to binary fail-safe input.	• Disconnect the signal.
		Supply voltage failure on actuators with optional PSCP.	• Check supply voltage.
Set-value disconnected or outside the parameterized range.	Red: Flashing slowly Green: Off	Set-value not connected.	• Apply set-value.
		Wrong polarity of set-value.	• Check set-value polarity.
		Set-value signal outside parameter range, please check.	• Check set-value range.
Stored end position not reached.	Red: Flashing quickly Green: Glowing permanently	Loose or dirty valve seat.	• Check valve seat.
Stored end position exceeded.	Red: Flashing quickly Green: Flashing quickly	Worn or defective valve seat.	• Check valve seat.

Malfunction	LED indication	Possible cause	Corrective measure
Actuator supply voltage too low.	Red: Flashing quickly Green: Flashing slowly	Improper mains supply wiring.	• Check mains wiring.
		Supply voltage jitter.	• Check supply voltages. Consult ELS datasheet.
Actuator lifetime limit reached.	Red: Glowing permanently Green: Glowing permanently	Wear and/or running time.	• Contact VALSTEAM ADCA.
Faulty electronics or invalid parameters.	Red: Glowing permanently Green: Flashing quickly	Supply voltage interrupted during commissioning.	• Reload parameters – see section 5.3., then repeat commissioning.
		Defective electronic component.	• Contact VALSTEAM ADCA.
Critical or maximum temperature reached.	Red: Glowing permanently Green: Flashing slowly	Excessive number of starts.	• Check application and settings.
		Ambient temperature too high.	• Check ambient temperature and reduce it if necessary. Consult ELS datasheet.
Mechanical fault in the actuator.	Red: Glowing permanently Green: Off	Defective mechanical part.	• Contact VALSTEAM ADCA.

10. DISPOSAL

As per Directive 2012/19/EU, once the product has reached the end of its working life, it should be sent for disposal in accordance with the prevailing national and local regulations concerning the disposal of waste electrical and electronic equipment.

Before disposal make sure that the product is clean and free from fluid residues.

During its disposal, pay special attention to rubbers, resins and polymer components (PVC, PTFE, PP, PVDF, FKM, NBR, etc.).

Do not dispose of components and hazardous substances together with household waste.

11. RETURNING PRODUCTS

Information regarding hazards and precautionary measures to be considered due to contaminating fluids and residues or mechanical damage that may represent a health, safety or environmental risk, must be provided in writing when returning products to VALSTEAM ADCA.



WARNING

RISK DUE TO PRESENCE OF HAZARDOUS RESIDUES ON RETURNED PRODUCTS

Contaminated fluids and residues may represent an environmental risk, or risk to VALSTEAM ADCA personnel.

- Information regarding any hazards or precautionary measures to be considered must be provided in writing when returning products to VALSTEAM ADCA.
- Health and Safety information sheets relating to any substances identified as hazardous or potentially hazardous must be provided outside the packaging.
- Use Hazmat labels on the packaging.

IMPORTANT NOTE

Total or partial disregard of these Installation and Maintenance Instructions involves loss of any right to warranty.

The extent and warranty period are specified in the “General sales conditions”.