

Models: 581856, 581857, 581876, 581877

READ THESE INSTRUCTIONS CAREFULLY BEFORE INSTALLING OR CONNECTING POWER TO THE ACTUATOR. THE ACTUATOR MUST BE INSTALLED, COMMISSIONED, OPERATED AND REPAIRED BY QUALIFIED PERSONNEL. COMPLY WITH ALL APPLICABLE CODES, STANDARDS AND SAFETY REGULATIONS.

INTRODUCTION

This document provides installation, operation and maintenance instructions for Valworx 5818 series electric actuators with EPS Positioner. These actuators are typically used to operate quarter-turn valves. Every actuator has been fully tested prior to shipment to ensure trouble free operation.

CONDITIONS FOR USE

Failure to follow any of these conditions and warnings may void the warranty. Valworx expressly disclaims any and all damages including consequential damages resulting therefrom.

1. If the entry point, connecting pipe or contained cable exceeds 60°C the user shall select the appropriately rated cable, cable gland and/or conductors in the conduit and shall install per the IOM.
2. The minimum yield strength and minimum tensile strength of the explosion proof conduit connector are 450MPa and 700MPa respectively.
3. The rated load is 50Nm (58185X series) and 200Nm (58187X series). Do not exceed the rated load.
4. The lens plate shall not be loosened or removed at any time.
5. This unit contains the adhesives TSE3854DS-W and WCC-87 and cannot be used in an atmosphere containing the following saturated vapors: Acetic Acid (glacial), Acetone, Ammonium Hydroxide (20% by weight), ASTM reference fuel C, Diethyl Ether, Ethyl Acetate, Ethylene Dichloride, Furfural, n-Hexane, Methyl Ethyl Ketone, Methanol, 2-Nitropropane, and Toluene.
6. This explosion proof actuator is rated for T5. Ambient temperatures shall not exceed -25°C ~ +55°C (-13°F ~ 131°F).



WARNING

1. To prevent the ignition of flammable gases, do not remove the cover while circuits are energized.
-avertissement- pour éviter l'inflammation des gaz inflammables, de vapeurs ou de poussière, ne pas retirer le couvercle pendant que le circuit est sous tension
2. Explosion-proof sealing material shall be used to seal the explosion proof connecting pipe, and the distance from the seal to the actuator shall not exceed 500mm.
-avertissement- un scellement doit être installé à moins de 500 mm du boîtier
3. The lens plate shall not be loosened or removed at any time.
4. The cable entry and connecting conduit shall not exceed 66°C(150.8°F) & 77°C(170.6°F) respectively.
5. Do not damage or otherwise make the nameplate illegible.
6. Avoid damaging or scratching the flameproof joints when servicing or installing the actuator. Ensure the fastening screws connecting electric elements, junction box cover, and motor box cover are appropriately tightened.
7. The electric motor cavity of this product is an independent explosion proof cavity. Do not remove the motor cover or faying surface of the outlet lead.
8. This product must be grounded internally and externally. Ensure ground connections are secure and check regularly.
9. Wiring connections shall comply with applicable codes and standards. Connecting cables shall have an explosion proof rating of at least Exdb IIC T5 Gb.
10. Actuator is shipped with temporary connector plugs. These must be replaced with appropriate explosion proof-rated plug, conduit, pipe, or other approved connection as part of installation and prior to operation.

STORAGE

Actuators should be stored in a clean, dry environment at all times. Do not install the actuator outdoors or in humid environments without immediately supplying power to activate the internal heater. The thermostatically controlled heater will help prevent possible damage caused by condensation build up inside the actuator.



APPLICABLE STANDARDS

CAN/CSA C22.2 No.30-M1986 (Reaffirmed 2016)	Explosion proof enclosures for use in class I hazardous locations
CAN/CSA C22.2 No. 145-11 (Reaffirmed 2015)	Electric Motor and Generators for Use in Hazardous (Classified) locations
CSA C22.2 No. 139-13	Electrically Operated Valves
CSA C22.2 No.60079-0-2019	Explosive atmospheres-Part 0: Equipment-General requirements
CSA C22.2 No.60079-1-2016	Explosive atmospheres-Part 1: Equipment protection by flameproof enclosure "d"
UL 674 Fifth Edition	Electric Motors and Generators for Use in Hazardous (Classified) Locations
UL 1203-2013	Explosion Proof and Dust Ignition Proof Electrical Equipment for Use in Hazardous (Classified) Locations
UL60079-0:2020	Explosive atmospheres-Part 0: Equipment-General requirements
UL 60079-1:2020	Explosive atmospheres-Part 1: Equipment protection by flameproof enclosure "d"
UL 429 (Seventh Edition)	Electrically Operated Valves

ANTI EXPLOSION GRADE

The anti-explosion grade of these actuators is

- ◆ Class 1, Division 1, Groups C & D T5
- ◆ Ex db IIC T5 Gb Class 1 Zone 1
- ◆ AEx db IIC T5 Gb

Where:

Class I – Hazard Class
Division I/ Zone 1 – Area Classification
db – Explosion Proof Type
II – Electrical Equipment design for explosive atmospheres (except colliery)
C – Magnitude of the explosion
T5 – Highest allowed surface temperature of the actuator (+ 55C)
Gb – Protection Grade

The grades of combustible gas, steam and temperature group are listed in CSA 22.2 No 60079-0-2019, CSA 22.2 No 60079-1-2016, CSA 22.2 No 30-M1986(R2016), CSA 22.2 No 145-11(R2015), ANSI/UL 60079-2:2020, ANSI/UL 1203-2013, ANSI/UL 674 Fifth Edition. It is the user's responsibility to ensure compatibility with the applicable regulations.

STORAGE

Actuators should be stored in a clean, dry environment at all times. Do not install the actuator outdoors or in humid environments without immediately supplying power to activate the internal heater. The thermostatically controlled heater will help prevent possible damage caused by condensation build up inside the actuator.

CONSTRUCTION AND EXPLOSION PROOF REGULATIONS

The casing construction of each anti-explosion component of the actuator can withstand the explosive pressure generated by an interior explosion caused by an explosive gas mixture, and prevent transmission and explosion to the external explosive gas atmosphere.

*A detailed drawing of the explosion proof construction can be found in Figure 8.

MOUNTING

The actuator can be mounted in any orientation. Allow enough room around actuator for manual operation as well as any maintenance. Valves can be direct mounted to the actuator using standard ISO5211 international mounting pad.



Standard ISO5211
valve mounting
interface

Figure 1

TEMPERATURE RATING

Ambient temperature range of the actuator is -13 to +131°F (-25 to +55°C). Heat from the working medium (fluid) should not allow actuator to exceed these temperature limits.

ENCLOSURE RATING

The rugged aluminum housing is rated Type 4X and IP67 weatherproof.

VISUAL POSITION INDICATOR

Actuators are supplied with a local visual valve position indicator. This indicator is yellow and located on top of the actuator. Indicator will show the open and closed (on-off) position of the quarter-turn actuator (valve).

Visual position indicator

(do not remove)

Standard heater and
position confirmation limit
switches under this cover



Figure 2

ANTI-CONDENSATION HEATER

The actuator has a standard integral thermostatically controlled 4 watt anti-condensation heater. Power should be maintained either in the open or closed position to activate internal heater. This heater will help prevent condensation build-up inside the actuator.

DUTY CYCLE AND MOTOR PROTECTION

The rugged 5818 series actuators are rated 70% duty cycle. Actuators are equipped with thermal overload protection with automatic reset to guard against over torque situations.

POSITION CONFIRMATION SWITCHES AND MECHANICAL STOPS

Two auxiliary limit switches are provided to confirm the actuator (valve) open and closed positions. (use of these switches is optional). In addition, rotation of the output drive is limited by adjustable mechanical stops. These stops are preset at the factory, no adjustment required.

MANUAL OVERRIDE

Valworx 5818 series electric actuators have a manual override for use during setup or loss of electrical power. To operate the manual override, first "REMOVE ALL ELECTRICAL POWER TO THE ACTUATOR" then open the manual override protective cover located on the side of the actuator. Insert a hex wrench (provided) and rotate to open (counter-clockwise) or close as required.



Figure 3



WARNING: Disconnect electrical power prior to operating manual override, removing covers or service

MAINTENANCE

There are no internal parts that require regular maintenance. The gear drive is pre-lubricated for life. The housing may be cleaned with warm soapy water (no solvents). The actuator should be cycled at least once per month. DO NOT PRESSURE WASH.

OPERATION

Valworx 5818 series electric actuators with EPS- Electronic Positioning System provide an accurate valve positioning function whereby the movement of the actuator is controlled by a 4-20mA input control signal. Any change in the control input signal results in a corresponding and proportional change in the position of the actuator drive output.

This is achieved with a unique built in electronic positioning module. The module is fully potted to help protect the electronics from vibration and moisture.

An internal microprocessor on the EPS circuit board continuously monitors the analog input and output signals and compares them to the physical position via a precision potentiometer feedback system, moving the drive output as required to balance the signals.

Actuator stays in last position upon loss of power.

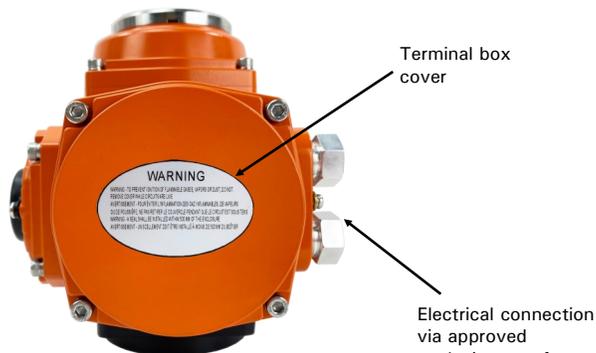


Figure 4

Terminal box
cover

Electrical connection
via approved
explosion-proof
connection

ELECTRICAL WIRING

Confirm the actuator VOLTAGE is correct, then remove the terminal box cover and connect wiring to terminal strip according to appropriate wiring diagram.

Wiring diagrams for each actuator are attached to the inside of the terminal box cover.

Input control signal type is 4-20mA. Actuator should have its own fused and isolated circuit. Do not connect actuators in parallel. Power to actuator should be maintained to activate the internal heater. This heater will help prevent condensation build-up inside the actuator.



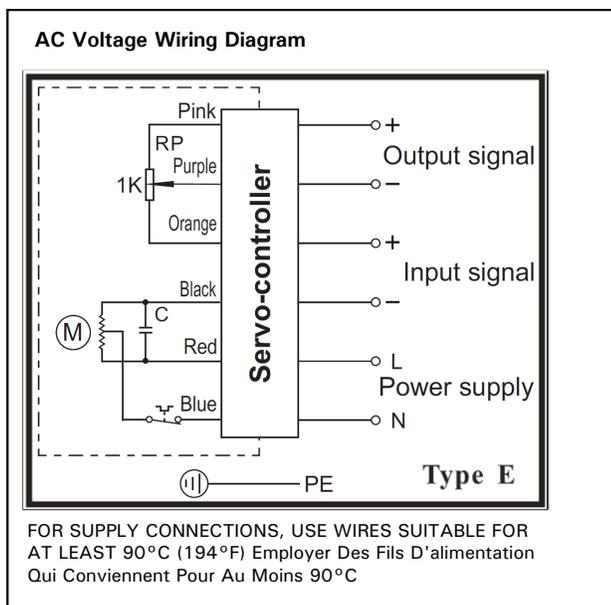
Before connecting power, confirm correct VOLTAGE is being applied. Incorrect voltage may damage actuator and void the warranty.

OPERATION

Valworx 5818 series electric actuators with EPS- Electronic Positioning System provide an accurate valve positioning function whereby the movement of the actuator is controlled by a 4-20mA input control signal. Any change in the control input signal results in a corresponding and proportional change in the position of the actuator drive output.

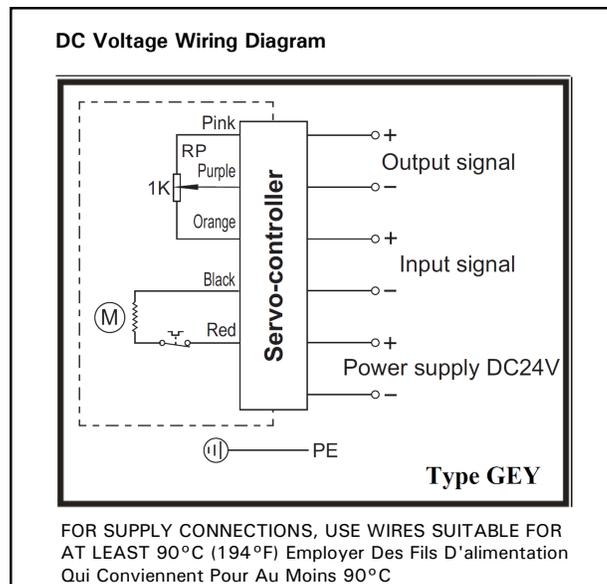
This is achieved with a unique built in electronic positioning module. The module is fully potted to help protect the electronics from vibration and moisture.

An internal microprocessor on the EPS circuit board continuously monitors the analog input and output signals and compares them to the physical position via a precision potentiometer feedback system, moving the drive output as required to balance the signals



AC Voltage Wiring:

1. AC power - Neutral
2. AC power - Line/Hot
3. Input control signal - Negative (-)
4. Input control signal - Positive (+)
5. Output monitoring signal - Negative (-)
6. Output monitoring signal - Positive (+)



DC Voltage Wiring:

1. DC power - Negative (-)
2. DC power - Positive (+)
3. Input control signal - Negative (-)
4. Input control signal - Positive (+)
5. Output monitoring signal - Negative (-)
6. Output monitoring signal - Positive (+)

EPS POSITIONER TECHNICAL DATA

Input Signal: 4-20mA

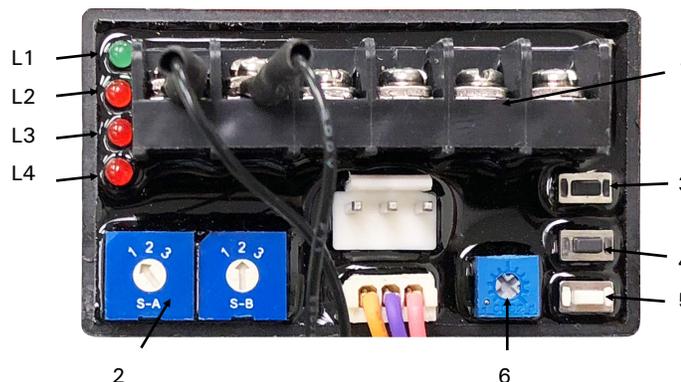
Output Signal: 4-20mA

Deadband: 0.5% to 5.0%

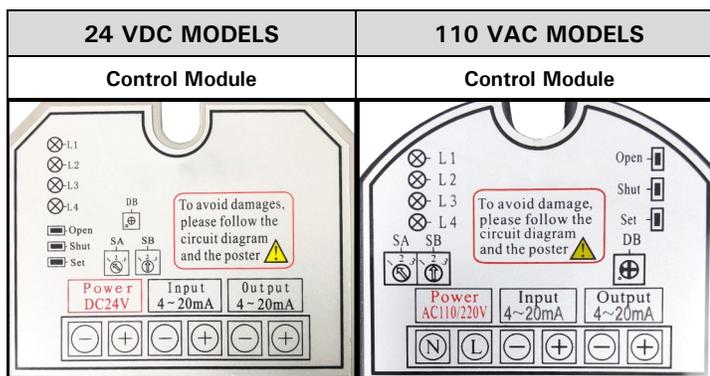
NOTES: 1. Actuator should have its own fused and isolated circuit. 2. Do not wire actuators in parallel. 3. Output signal is 4-20mA. Use of the output is optional.

Internal Diagram	
1.	Terminal strip
2.	Selection switches (S-A, S-B)
L1.	Power light (power on - green)
L2.	Control Signal status light (red)
L3.	Potentiometer status light (red)
L4.	Over torque status light (red)
3.	Manual Open control button
4.	Manual Close control button
5.	Set button (white)
6.	Deadband Adjustment (factory preset) - set actuator to manual mode before altering - see chart below.

Positioner Module



*Note: If any Red LEDs are 'on', there is a malfunction.



OPEN/SHUT POSITION CALIBRATION

ALL ACTUATORS ARE CALIBRATED AND TESTED AT THE FACTORY. NO ADJUSTMENTS REQUIRED FOR MOST APPLICATIONS If recalibration is required, follow these steps: Supply correct power to the actuator. Set switches to manual mode as shown below. Manually operate actuator using chart below. Once new desired "Open" or "Closed" position is reached, hold down both the matching manual control button for the position you wish to set **AND** the White "SET" button simultaneously until the L2 red light comes on - then release both buttons. The position will now be set when you switch S-A back to original position.

Control Mode Selection Switch Setup			S-A	S-B
<p>4-20mA Input (default setting)*</p> <p>*To change setup from default setting, power must first be applied to actuator, control signal OFF</p>	Standard Auto Mode A (default setting)	Actuator closed with 4mA signal, open with 20mA signal. Stops with loss of control signal	1	2
	Standard Auto Mode B	Actuator closed with 4mA signal, open with 20mA signal. Moves to closed position with loss of control signal	1	3
	Standard Auto Mode C	Actuator closed with 4mA signal, open with 20mA signal. Moves to open position with loss of control signal	1	1
	Reverse Acting Mode A	Actuator open with 4mA signal, closed with 20mA signal. Stops with loss of control signal	3	2
	Reverse Acting Mode B	Actuator open with 4mA signal, closed with 20mA signal. Moves to closed position with loss of control signal	3	3
	Reverse Acting Mode C	Actuator open with 4mA signal, closed with 20mA signal. Moves to open position with loss of control signal	3	1
Manual operation of actuator using control button operation	Manual Mode - Open or Closed	Manually move the actuator to open position using OPEN control button. Manually move the actuator to closed position using CLOSED control button. Do not hold OPEN & CLOSED down simultaneously.	2	2

CONDUIT AND CABLE INSTALLATION

1. Remove the explosion-proof plug and tighten the corresponding explosion proof connecting pipe together with the inlet lead cable

Note: Explosion-proof sealing material shall be filled into the explosion proof connecting pipe, and the distance from the filling position to the actuator shall not be greater than 500mm as shown in Fig 5.

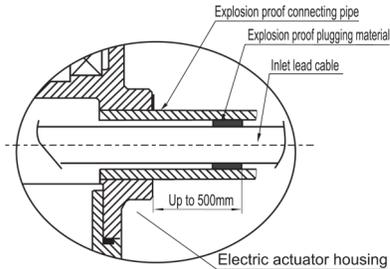


Figure 5

2. Connect the leads per the appropriate wiring diagram.

Note: In order to meet explosion proof requirements, the connectors and hole plugging materials need to meet the requirements of the CSA explosion proof standards and be installed correctly.

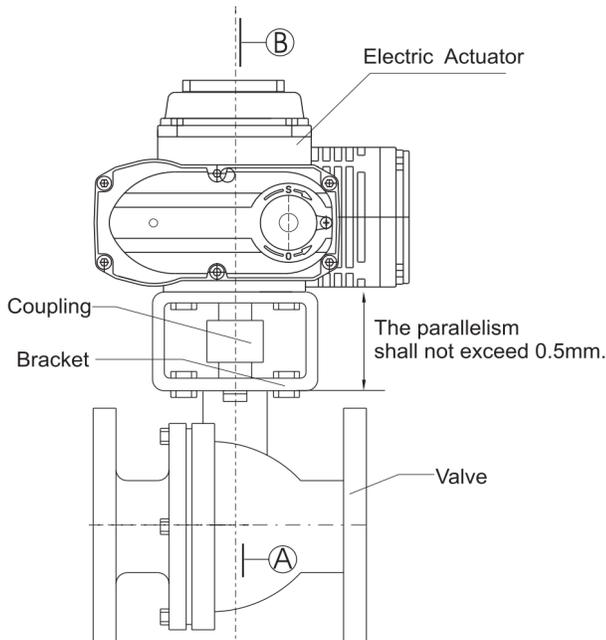
3. Ensure the interior and exterior ground connections are properly made.

Note: the connection method in this manual is for explosion-proof pipe. The user may choose other connection methods provided they meet all applicable explosion-proof requirements.

INSTALLATION WITH BRACKETS AND COUPLERS

Installation with Brackets and Couplers

1. Brackets and couplers shall meet the dimensional tolerances as shown in Fig. 6
2. The coupler stem tolerances should ensure minimal backlash during operation.
3. The positional tolerances of the coupler should ensure they do not exceed the stroke adjustment limits of the actuator.



The coaxiality between axes (A) and (B) shall not exceed $\phi 0.2\text{mm}$.

Figure 6

INSTALLATION WITH BRACKETS AND COUPLERS (CONTINUED)

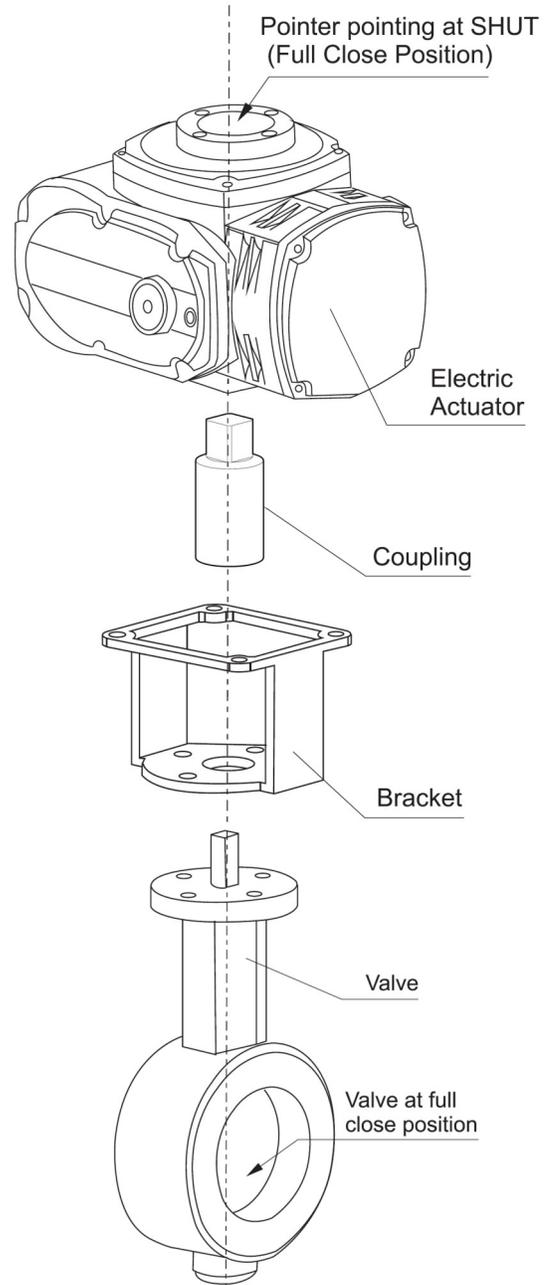
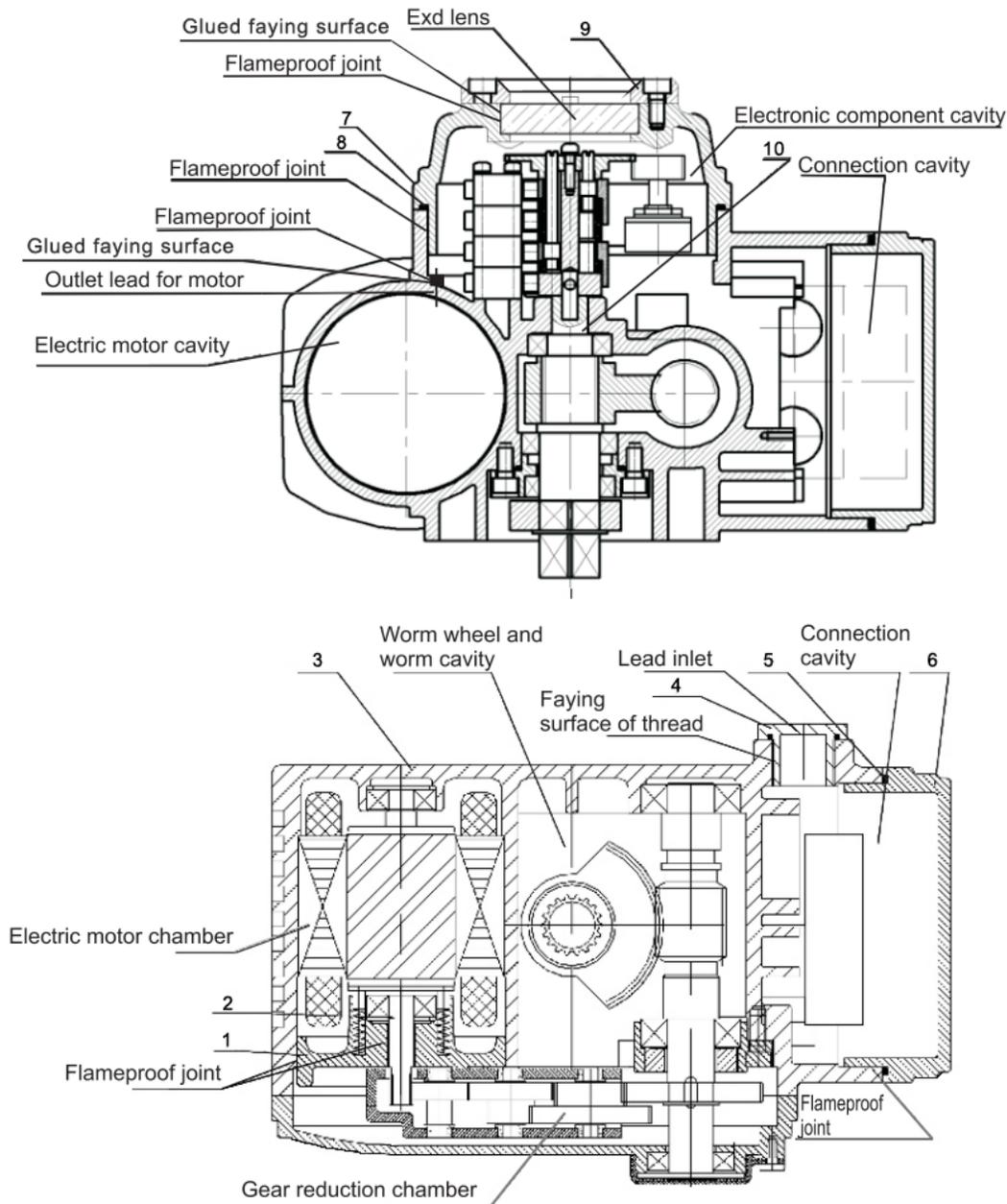


Figure 7

CONSTRUCTION DRAWINGS OF EXPLOSION PROOF TYPE

Figure 8



No.	Part Name	No.	Part Name
1	Motor cover	6	Junction Box cover
2	Electric motor rotor shaft	7	Electric elements cover
3	Box body	8	"O" Washer seal
4	Explosion-proof plug	9	Exd lens
5	"O" washer seal	10	Output shaft