CAUTION！

The applicable place of the product should be based on the nameplate and followed our safety instructions, explosion-proof standards and local relevant specifications. The explosion-proof standards and important notices are not universal.

II2GD Ex db IIB T4 Gb, Ex tb IIIC T130℃

SE series Explosion-proof Spring Return Fail-safe Electric Valve Actuator (referred as "actuator"). It is a control device for valves and can be used in places, where is classified as Zone 1 or Zone 2, contained Group ⅡA and Group ⅡB gases, Zone 21 or Zone 22, contained combustible dust atmosphere or mixture circumstance with explosive gas atmospheres and combustible dust atmospheres. Temperature group T1 - T4.

This product is certified to be used in the following locations:
Atmospheric pressure：80 - 110 kPa
Ambient temperature：- 30 ℃ to + 70 ℃ (- 22 ℉ to + 158 ℉)
Relative humidity：Not more than 95 % (+ 25 ℃ / 77 ℉)
The actuator can operate normally within tolerated variation of ±10% of rated supply voltage or 1 % of rated frequency.

II2GD Ex db IIB T4 Gb, Ex tb IIIC T130℃

TD0404XY

SE series Explosion-proof Spring Return Fail-safe Electric Valve Actuator (referred as "actuator"). It is a control device for valves and can be used in places, where is classified as Zone 1 or Zone 2, contained Group ⅡA and Group ⅡB gases, Zone 21 or Zone 22, contained combustible dust atmosphere or mixture circumstance with explosive gas atmospheres and combustible dust atmospheres. Temperature group T1 - T4.

This product is certified to be used in the following locations:
Atmospheric pressure：80 - 110 kPa
Ambient temperature：- 30 ℃ to + 70 ℃ (- 22 ℉ ~ + 158 ℉)
Relative humidity：Not more than 95 % (+ 25 ℃ / 77 ℉)
The actuator can operate normally within tolerated variation of ±10 % of rated supply voltage or 1% of rated frequency.

Installation Notices

a. Please read Operation Manual and Wiring Diagram carefully before installation.
b. Check for correct voltage prior to wiring, otherwise it may cause electric shock or fire.
c. Turn power off before servicing or for maintenance purpose.
d. To avoid functional failure caused by static, do not touch any components on the PCB with metal tools or bare hands.
e. Do not parallel wire multiple actuators together without using an extra relay.
f. There are grounding devices both inside and outside of the actuator and the ground wires should be connected properly.
g. Use proper techniques when installing conduit and properly seal the connection. Do not mount conduit in an upright position so as to prevent condensation from entering the unit.
h. After using the 『manual override』 for positioning,the user must manually return the actuator to its unloaded position before the electrical operation of actuator.
i. The actuator is delivered with two conduit entries plugged by metal plugs. Use cable glands with certification and in accordance with the technical characteristics required by ATEX Ex db IIB Gb, Ex tb IIIC Db. The withstand temperature of the cable shall not less than 105℃ (221℉).
j. Actuator should be installed in an upright or horizontal position. Do not mount upside down or below a horizontal position.
k. Periodically inspect the enclosures of actuators to keep clean from dust accumulation. When dusts are accumulated, gently brush or wipe away.
⚠ **Please do not use the tool that can cause static, avoid the danger from dust explosion.**
l. Peform below inspections prior to installation. Not allowed to adopt if any item is unqualified.
✓ Check the marking and certificate number is conforms to the application.
✓ All the parts of the housing are assembled in the right manner and fastened.
⚠ **USE FASTENERS WITH YIELD STRESS ≥ 700MPa.**

C US

SE series Explosion-proof Spring Return Fail-safe Electric Valve Actuator (referred as "actuator"). It is a control device for valves and can be used in following places:

Division System where is classified as North American Division 1 or Division 2 of hazardous location, contains Group C and Group D gases and temperature group T1～T4; or contains one or several flammable dusts with minimum flaming point over 130 ℃; or include both above flammable gases and dusts.

Zone System where is classified as North American Zone 1 or Zone 2 of hazardous location, contains Group ⅡA and Group ⅡB gases and temperature group T1 - T4; or in Zone 21 or Zone 22, contained one or several flammable dusts with minimum flaming point over 130 ℃; or include both above flammable gases and dusts.

This product is certified to be used in the following locations:
Class I, Division 1, Groups C, D T4
Class II, Division 1, Groups E, F, G T130°C
Type 4X
Ex db IIB T4 Gb (For Canada)
Class I, Zone 1, AEx db IIB T4 Gb (For US)
Ex tb IIIC T130˚C Db (For Canada)
Zone 21, AEx tb IIIC T130˚C Db (For US)
IP68 (72h, 7m)

Installation Notices

a. Please read Operation Manual and Wiring Diagram carefully before installation.
b. Check for correct voltage prior to wiring, otherwise it may cause electric shock or fire.
c. Turn power off before servicing or for maintenance purpose.
d. To avoid functional failure caused by static, do not touch any components on the PCB with metal tools or bare hands.
e. When more than one electric actuator needs to operate simultaneously, please connect with the individual cables. Recommendation: When needed, please install an extra relay.
f. There are grounding devices both inside and outside of the actuator and the ground wires should be connected properly.
g. Use proper sealant to seal the conduit connection after wiring procedure to prevent dust or water from entering the actuator.
h. After using the 『manual override』 for positioning,the user must manually return the actuator to its unloaded position before the electrical operation of actuator.
i. The actuator is delivered with two conduit entries plugged by metal plugs. Use cable glands with CSA certification. The withstand temperature of the cable shall not less than 105℃ (221℉).
j. The angle of electrical actuator installation must be between 0 - 180 degree. Do not install upside down or below the horizontal plane. The conduit entries should not face up.
k. Periodically inspect the enclosures of actuators to keep clean from dust accumulation. When dusts are accumulated, gently brush or wipe away.
l. Perform below inspections before installing. Not allow to adopt if any items fail
✓ Check the directive marking and certificate number, to see if it conforms to the indicated application.
✓ All the parts of the housing are assembled in the right manner and fastened.
⚠ **Use fasteners with tield stress ≥ 700 Mpa.**
✓ All the parts of the housing are assembled in the right manner and fastened.
m. Keep cover tight while circuits are alive
⚠ **After de-energizing, delay 10 minutes before opening the cover.**
n. Seal required within 180 inches (450mm) of enclosure (for divisions only).
o. Seal required within 2 inches (450mm) of enclosure (for zones only).

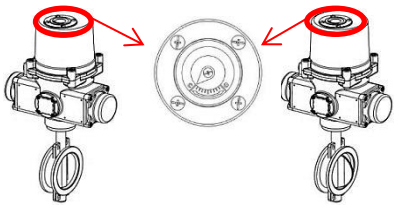
CAUTION !

a. **For the safety reason, do not remove or inspect the SPRING STRUCTURE in any cases. That can cause seriously injured if the applicable tools are not used.**
b. **Be sure that the O-ring cannot be damaged or lost. Secure the seals to ensure the sufficient protection.**
c. **Actuator installation and maintenance must be performed by certified personnel.**

Valve Mounting Instructions

a. Before mounting actuator, verify that the torque requirement is less than the output torque of the actuator. (As a MINIMUM, use 1.3 as a safety factor when calculating the torque requirement. Refer to the example below.)

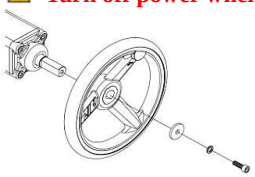
If the maximum torque of valve is 80 N·m → 80 x 1.3 (safety factor) = 104 N·m
104 N·m < 130N·m (SE1300) →OK!
104 N·m > 90N·m (SE500) →NO!



b. Confirm valve position when mounting to actuator. To ensure actuator selected meets the application.
c. When mounting actuator to valve, ensure that they are both in the correct position. Refer to illustration above.
d. Remove all manual valve components, for example, the handle or open/close mechanical stops so as to not interfere with the actuator.
   ⚠ **Do not remove packing gland or other working valve components..**
e. Check again that the valve and actuator are in the same position. (fully-open or close)
f. Once mounted together, either directly or with a mounting kit, ensure that they are properly secured together and all fasteners are tightened
g. In order to ease the process of removing the top cover, unscrew the conduit entries. This also allows for built in pressure relief inside the unit. Gently remove the cover.
   ⚠ **Make sure the power is off.**
h. Wire the actuator using the wiring referred to in the diagram.
i. Supply power to actuator.
   ⚠ **Care must be taken at all times as there are live circuits present that may cause electrical shock or even death.**
j. Re-calibration may be required for the end positions, refer to actuator set-up for further instructions.
k. Install the cover and secure cover screws after setting.
   ⚠ **Please ensure that the O-ring seal is in good condition prior to cover installation.**

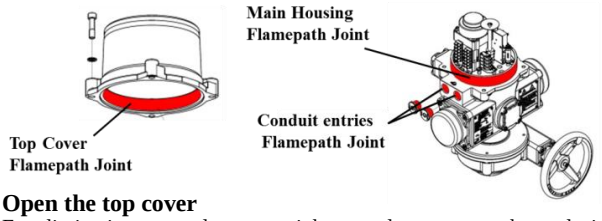
Handwheel Installation

a. Slide handwheel assembly onto shaft and secure with screw and washer as shown below. (See the picture as below)
   ⚠ **Turn off power when installing handwheel**



b. Completed assembly should resemble the illustration below.

Flameproof Joint



Open the top cover

For eliminating external pressure tightness, please remove the explosion-proof metal plugs at first. Then open the top cover in parallel gently. DO NOT attempt to lever off the cover with a screwdriver as this will damage the "O" ring seal and may damage the flamepath on the unit.

Install the top cover

CAUTION: Make sure the O-ring seal is in good condition before installing the top cover. The O-ring seal is dispensed before the actuator goes out, please don't remove O-ring seal.

Please follow this table to tighten the top cover screws:

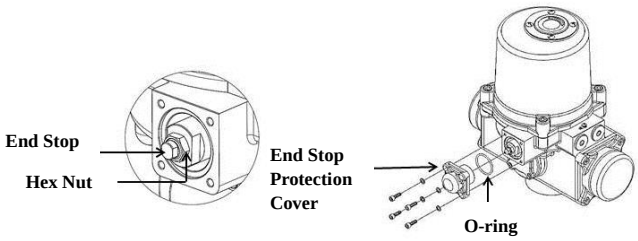
Model	Screw Specification	Allen Key mm	Torque N·m
SE500	M10	8	43
SE1300	M14	12	120
SE2000 - SE2600	M16	14	185

Actuator Set-up

a. If purchase the manual override actuator, after use the hand-wheel operation, it has to turn the fully-close position before supply the power.
b. Tighten the Explosion-proof cable.

The spring return actuator provides fail-safe positioning which is controlled by the buffer or the mechanical stops. (ON-OFF type is controlled by buffer, / floating and modulating type are controlled by mechanical stops.) When you supply power for operating, the end position is controlled by limit switches..

⚠ **Open and close settings are pre-set at the factory. To modify these settings, follow the procedure below:**

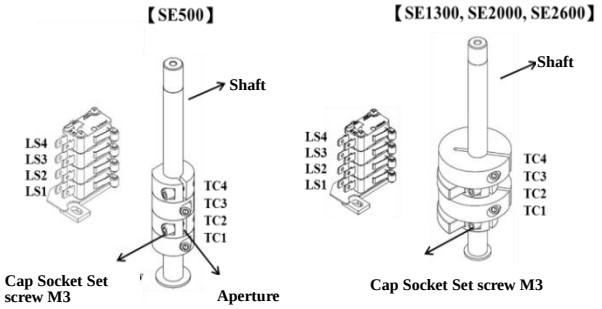


- **Full Close adjustment procedure for spring-return actuator in the fail-close position**
  a. Turn power off and loosen the end stop cover.
  b. Loosen the hex nut of the end stop.
  c. Adjusting the end stop position.
     - To increase the angle, adjust clockwise.(S500: One full rotation=2.3 degrees)(S1300-S2600: One full rotation=1.4 degrees)
     - To decrease the angle, adjust counter-clockwise.(S500: One full rotation=2.3 degrees)(S1300-S2600: One full rotation=1.4 degrees)
  d. Once completed, tighten the hex nut, replace cover and tighten screws.
     ⚠ **If the end stop position was modified, cam TC2 must be re-set.**
  e. Loosen the cap screw on cam TC2.
  f. Rotate cam TC2 counter-clockwise until a light click is heard
     Slowly rotate the cam TC2 clockwise until a light click is heard
  g. Tighten the cap screw on cam TC2.

- **Full Open adjustment procedure for spring-return actuator in the fail-close position:**

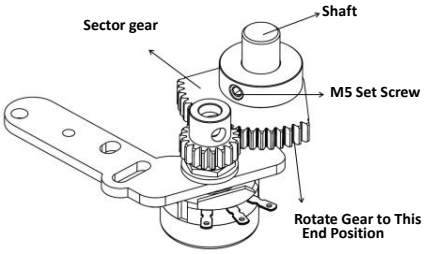
a. Apply power to the actuator and run to the fully-open position, check the angle.
b. To adjust this angle, slightly loosen the cap screw on cam TC1.
⚠ **Do not rotate the cam, any sudden movement will cause the actuator to rotate.**
c. Turn off power to the actuator. Actuator will close..
d. Use a flat-head screwdriver to adjust cam TC1.
- To increase the angle, adjust the cam clockwise.
- To decrease the angle, adjust the cam counter-clockwise..

e. After adjusting the cam, apply power to the actuator. It will move to the fully-open position.
f. Confirm that this position is correct. Once correct, open position is achieved, turn off power to the actuator and tighten the cap screw.
g. Adjust feedback cam TC3 and TC4.
- Adjust cam TC3 so it trips just before cam TC1 trips.
- Adjust cam TC4 so it trips just before cam TC2 trips..



- For modulating actuators, after completing the calibration, turn the actuator to fully-closed position and follow the procedure below:

a. Loosen set screw.
b. Disengage sector gear from round gear.
c. Rotate sector gear in the direction shown below.
d. Reconnect gears and tighten set screw.



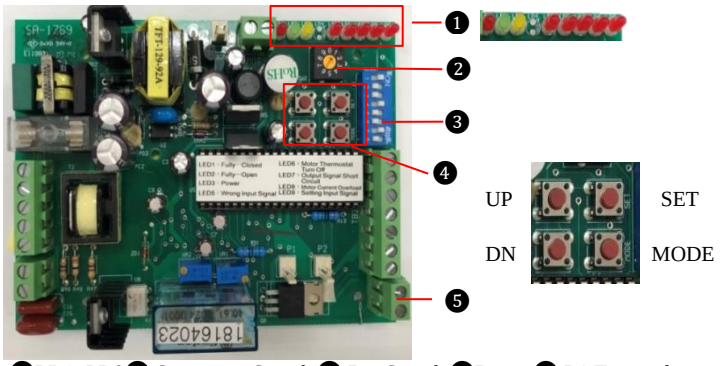
TC2 Detect the " 0° ": The actuator can't operate again when the spring doesn't reach the 0° in the fully closed position. TC2 must trip before end stroke.

TC1 " OPEN " ↻ **Clockwise: decrease opening degree.**
↺ **Counterclockwise: increase opening degree.**

Note:
- **Cam TC2 must be set so that it trips before the actuator reaches its end position.**
- **TC3 & TC4 are optional, refer to section (g.) for calibration.**

Modulating Control Board Adjustment

▲To adjust the following settings, turn power off.



❶LD1~LD9❷ Sensitivity Switch ❸ Dip Switch ❹Button❺ P4 Terminal

Dip-Switch Setting (Factory setting: 1,4,8 ON)

- S1, S2 : Input Signal Select

Input Signal	S1	S2
1 - 5V	OFF	OFF
2 - 10V	OFF	ON
4 - 20mA	ON	OFF

- S3, S4 & S5 : Output Signal Select

Output Signal	S3	S4	S5
2 - 10V	ON	OFF	ON
4 - 20mA	OFF	ON	OFF

- S6, S7 & S8 : Actuator response to the loss of control signal.

Symbol	S6	S7	S8	When signal fails
90° Signal	OFF	OFF	ON	Fully closed
		ON	OFF	Fully open
		ON	ON	Stop
90° Signal	ON	OFF	ON	Fully open
		ON	OFF	Fully closed
		ON	ON	Stop

P4 Terminal

- P4 is a contact for warning. You can connect with alarm or similar components. If the microprocessor sees the actuator doesn't reach the (normal) end of travel previously set within 15 seconds, this would cause the microprocessor to set the P4 (Alarm) output status to ON.

Sensitivity Switch Setting (SW2)

- When switch to "1": The highest sensitive and the 0 - 90 degree can be divided up to around 76 times movement.
- When switch to "0": The lowest sensitive and the 0 - 90 degree can be divided up to around 17 times movement.

Setting for Open and Close

⚠ **The settings are set at factory, though in some cases reset may be required when a particular rate of signal is requested.**

LD1	Fully-closed	LD6	Motor Thermostat Turn On
LD2	Fully-open	LD7	Output Signal Short Circuit
LD3	Abnormal Voltage	LD8	Motor Current Excessive
LD5	Wrong input signal	LD9	Setting Mode

- **Fully-OPEN setting**

a. Keep pressing "SET" for 2 seconds, then when LD 9 comes on, it will enter Setting mode.
b. Keep pressing "UP" until actuator moves to fully-open position, LD2 comes on, and supplies the input signal (5 V or 10 V or 20 mA).
c. Press "MODE" once. The OPEN setting is completed.

- **Fully-CLOSE setting**

a. Keep pressing "DOWN", until actuator moves to fully-closed position, LD1 comes on, and supplies the input signal (1V or 2Vor 4mA).
b. Press "MODE" once. The CLOSE setting is completed.

After completing the above settings, press "SET" once.