INSTRUCTION FOR THE ASSEMBLY, ADJUSTMENT, HANDLING AND MAINTENANCE OF THE QUARTER TURN GAS OVER OIL ACTUATORS

GENERAL NOTES:
- The actuators are delivered with plugged connections. Above connections must remain plugged if not utilized or must be replugged with the relevant plug or reconnected after any testing operation;
- The manual can not replace the experience of the user / maintainer;
- Keep this manual for future reference;
- Please keep this manual near the actuator so that it is available for consultation;
- For questions or clarifications please refer to Ledeen Facility;
- To get / request new copies of the manual please refer to Ledeen Facility;
- The manufacturer's option for changes to production and manual without entailing the obligation to update products and manuals previous

**WARNING:**

*In case the actuators are installed in a closed ambient, it shall be required the same to be adequately ventilated, to prevent from high level gas concentration that creates a potentially dangerous atmosphere.*

**WARNING:**

*Before to carry out any operation on the actuator, the electric power supply must be shut-off (If applicable).*

**WARNING:**

*Before to carry out any operation on the actuator, the actuator control group must be isolated from the pneumatic/hydraulic supply source.*

**WARNING:**

*Before to carry out any operation on the actuator, the control group must be discharged from the pressure therein trapped, particular care shall be taken on storage tanks and pressure filters.*

**WARNING:**

*Every operation on the actuator must be performed by skill personnel equipped with safety clothes and devices (gloves, helmet, glasses, ecc.)*
1) ASSEMBLY

**Warning:**

NOTE: No special tools are required for these operations, but only some Allen wrenches and hexagonal wrenches of the required sizes.

**Before the installation, please check that the actuator was not damaged during the transportation.**

The actuator is shipped mounted on the valve. In case it is necessary to assemble the actuator onto the valve, proceed as follows:

a) Clean the flange of the valve.

b) Lubricate the shaft of the valve with oil or grease.

c) Set up the actuator into the same valve position.

d) Lift the actuator by means of adequate hooks and cable to render the actuator perfectly horizontal (this is very important for easy coupling) utilizing the existing eyebolt on the actuator.

e) Clean the actuator flange.

f) Connect the valve shaft inside the bush of the actuator and lower the actuator on the valve.

g) Uniformly tighten the nuts of the holding down screws.

**WARNING** (for HT, MT and ST actuators without adaptor piece only):

While tightening the nuts of the hold down screws always verify the hold down screw does not turn together with the nut.

Always verify the hold down screw protrusion under the actuator frame is the same as the one shown in the following figure.
2) ADJUSTMENT

Warning: 🚨

NOTE: No special tools are required for these operations, but only some Allen wrenches and hexagonal wrenches of the required sizes.

The actuator is shipped already adjusted. If it is necessary to change the adjustment, proceed as follows:

a) **Actuators equipped with Ledeen Microswitch Housing with Mechanical Switches**
   Electric microswitch adjustment: remove the cover from the microswitch housing, loosen the screw clamping the cam. Rotate the cam on the shaft until the microswitch is actuated in the desired working position. Tighten the screw of the cam. For correct adjustment it is necessary that the microswitch is actuated slightly before the mechanical stop.

![Diagram of microswitch housing with mechanical switches]

b) **Actuators equipped with Ledeen Microswitch Housing with Proximity Switches**
   Proximity switch adjustment: remove the cover from the proximity switches housing, loosen the screw clamping the cam. Rotate the cam on the shaft until the proximity switch is actuated in the desired working position. Tighten the screw of the cam. For correct adjustment it is necessary that the proximity switch is actuated slightly before the mechanical stop.

![Diagram of microswitch housing with proximity switches]
c) **Actuators equipped with Westlock Microswitch Housing with Proximity Switches**

Proximity sensor adjustment: remove the cover (5) from the Westlock proximity sensor housing (22), by unscrewing the clamping screws(6). In order to adjust the upper proximity sensor (17) lower the cam (11) laying over the spring (14); the lower proximity sensor (17) is adjusted by lifting the cam (11) under spring (14). Rotate the cam (11) until the proximity switch (16) is actuated in the desired working position. Reassemble the cover (5) on the proximity sensor housing (22), by screwing the clamping screws (6). For correct adjustment it is necessary that the proximity sensor is actuated slightly before the mechanical stops.
d) **Actuators equipped with GLOBTOP Microswitch Housing with Proximity Switches**

Proximity sensor adjustment:
1) Place the actuator pinion in “close” position and check that the indicator is above the desired sensor (make the same check in “open” position).
   In contrary cases extract the regulating block (fig.1) rotate 90 degrees and re-insert in the requested position.
2) Push in the regulating blade, relative to the proximity sensor under adjustment, and turn until the sensor is activated (fig.2) then release.
   The blade can be regulated in steps of 2 degrees up to a maximum of ±10, whereas the notches present on the cover corresponds with 4 degrees of adjustment.
3) Put actuator pinion in the open position and repeat point 2

![Fig.1](image1)

![Fig.2](image2)

e) **Actuators equipped with I-TORK Microswitch Housing with Proximity Switches**

I-Tork proximity sensor adjustment: remove the cover from the microswitch housing.
Push the cam, turn to adjust the setting of the cam on the shaft until the microswitch is actuated in the desired position, release the cam. For correct adjustment it is necessary that the proximity switch is actuated slightly before the mechanical stop.
f) Adjustment of mechanical stops: screw or unscrew the dowels placed on the frame for “GS” and “SY” actuators on the spring container and the cylinder for “HT”, “MT” and “ST” spring return actuators on the cylinder and the frame for “HT”, “MT” and “ST” double acting actuators after having loosened the locking nuts. By screwing the dowels the angular stroke is reduced: unscrewing the angular stroke is increased.

NOTE: In case of Spring Return Actuators, before adjusting the end stop relevant to the cylinder, it is necessary to pressurize the same with low pressure in order to reduce the pressure provided by the spring thrust against the end stop to be adjusted.
g) **Actuators equipped with Pneumatic Microswitch**

Adjustment of pneumatic microswitch: remove the position indicator or the microswitch housing, loosen the screw clamping the cam.

Rotate the cam of the shaft until the pneumatic microswitch is actuated in the desired working position and fix the screw clamping the cam.

The pneumatic microswitch is normally open type, so it remains closed until the cam acts on the microswitch pusher. This means that the adjustment of the microswitch must be carried out in the relevant actuator end position.
h) Operation speed adjustment:

For gas over oil tanks with capacity < Lts.1,5:

The time of manoeuvre can be adjusted by screwing or unscrewing the threaded pin (1) of the flow control valve after having removed the cover (2) and loosened the lock nut (3). By screwing the threaded pin, the time of manoeuvre is reduced; by unscrewing it, the time of manoeuvre increases.

Once the speed is adjusted, tighten the lock nut (3) and screw on the protection cover (2).

For gas over oil tanks with capacity > Lts.1,5:

The time of manoeuvre can be adjusted by screwing or unscrewing the threaded pin (1) of the flow control valve after having removed the cover (2) and loosened the lock nut (3). By screwing the threaded pin, the time of manoeuvre increases; by unscrewing it, the time of manoeuvre is reduced.

Once the speed is adjusted, tighten the lock nut (3) and screw on the protection cover (2).

NOTE: the speed setting during closing is obtained by actuating the flow control valve of the opening tank and vice versa, since the setting is made on the exhaust.

After actuating the flow control valves, as above described, it is necessary to check that the operation time is the required one.
3) ACTUATOR HANDLING, TRANSPORTATION AND SHIPMENT

**Warning:**

Handling and transportations shall be carried out using the proper actuator lifting points (see the following sketch).

During transportation and storage phases the gas over oil tanks must be kept always in vertical position.

The actuator is normally shipped by Ledeen with the gas over oil tanks on board. In case the gas over oil tanks are provided separated from the actuator, the upsetting of the tanks must be absolutely avoided, in order to prevent any malfunctioning during the actuator start-up. In any case, the paking systems must be designed to ensure that the gas over oil tanks are firmly kept in vertical position (with the upper side always on the top position) for the entire duration of the shipment.

The above recommendations are applicable either for transportations at the valve manufacturers facilities and at final site destination.
4) ACTUATOR START UP

Warning:

NOTE: No special tools are required for these operations, but only some Allen wrenches and hexagonal wrenches of the required sizes.

a) Carry out the electrical in accordance with the electrical wiring diagram. Protect the cables by means of a flexible tubing, explosion-proof type.
b) Check the correct tightening of the connections.
c) Check the oil level in the tanks by means of the measuring rod and if necessary, add a little oil.
d) Bleed the air from the cylinder, if necessary, by removing the plug mounted on the flange.
e) Check the correct working of the actuator with the pneumatic supply and the spring (if applicable) in open and closed direction.
f) Check the correct working of the actuator by means of the manual override (hand-lever or hand-pump).
g) Check the correct pneumatic and/or hydraulic piping seal.
h) Restore the paintwork of the components which have been damaged during transportation and assembling after having removed the rust.

Actuators equipped with Hand-Pump

If the hand pump working is not effective, carry out the following draining procedure (refer to DWG. STC212):
a) completely lift the hand pump lever (1);
b) loosen the socket head screw (2), in order to exhaust the air from the pump;
c) completely lower the hand pump lever (1);
d) tighten the socket head screw (2);
e) repeat points from a) to d) until the oil drops out from the socket head screw (2).
5) MAINTENANCE

Every maintenance operation on the actuator must be carried out only after having closed the pressure taps, to prevent undesired operation and enable the operating personnel to work in safe conditions.

5-1) ROUTINE MAINTENANCE

**Warning:**

Every 6 months:

a) Remove the accumulated condensation in the dehydrator filter cartridge through the suitable draining plugs (if applicable).

b) Check the correct valve position signalling on the control panel.

c) Check the status of the filter placed upstream the flow control valves.

d) Check the oil level in the tank by means of the measuring rods (see also para. 4-2 “oil tanks balancing”). The oil level must correspond to that shown on the plate fixed to the bracket. Excess oil can be drawn off through the drain plugs at the base of the tanks.

e) Check the correct working of the actuator with pneumatic supply by manually stroking the same for a small percentage not to affect the flow in the main line. The actuator shall be operated back just after the partial stroke end line is reached. This operation can be automatically performed by means of the partial stroke test facility, if any.

f) Check the correct working of the manual override (hand-lever or hand-pump) by operating the actuator for a small percentage not to affect the flow in the main line. The actuator shall be operated back just after the partial stroke end line is reached.

Every year:

a) Check the lubrication of the scotch yoke and if necessary lubricate with RENOCAL FN20 or equivalent grease.

b) Substitute the dehydrator filter (if applicable).

c) Check that there is no leakage from the stem of the cylinder.

d) Remove, if any, the condensation in the housing, by actuating the pressure relief valve placed on the bottom of the housing.

Every 3 year:

a) Check that the oil is in good condition and that it is always clear.

b) The oil should be changed after a certain period of time, as per the oil manufacturer’s MSDS

c) A replacement of all the soft seals in the control panel (where applicable) is suggested.
5-2) EXTRAORDINARY MAINTENANCE

**Warning:**

a) In case of leakage from the hydraulic cylinder, disassemble, clean the o-ring grooves and substitute the o-ring if damaged.

b) If there is a leakage from the pneumatic or hydraulic piping, tighten the fitting nuts, or, if necessary, change them if damaged.

c) In case of malfunction or leakage from the pneumatic or hydraulic valves, disassemble referring to the technical literature, clean with care and replace damaged components.

d) **Oil tanks balancing**

   In case the oil contained in one tank is in excess and the oil in the other one is lower it is possible to reset the right quantity proceeding as follows:

   In order to transfer the oil from a gas-oil tank to the other, keep the actuator in the middle position, then turn the pump distributor valve on the by-pass position so to allow the oil passage from the high level oil tank to the other. The eventual excess of oil can be removed by unscrewing the plugs at the lower end of the same tank.

5-3) INSTRUCTION FOR REPLACEMENT OF TEFLOW SEALS

**Warning:**

When the seals need to be replaced, it is necessary to check before assembly, that their seats are clean and lubricated.

In order to replace the sealing, proceed as follows:

a) **O-ring and pistons (applicable to Piston Type Cylinders only):**

   First of all mount the rubber o-ring. Insert then the teflon glider over the o-ring by enlarging it with the fingers (see dwg. STC043).

   The elastic memory of the glider will recover its original dimensions after a while.

b) **Rod seals:**

   Mount the rubber o-ring in the seat. Collapse the teflon glider and insert it inside the o-ring (see dwg. STC042 or dwg. STC159 for Plunger Type Cylinders).
5-4) HOW TO RESTORE THE EFFICIENCY OF THE MOLECULAR SIEVE OF DEHYDRATING FILTER CARTRIDGE

**Warning:**

The utilized molecular sieve has the property to absorb both the hydrogen sulphide and the water. When the molecular sieve is saturated, it is necessary to regenerate it.

For the regeneration proceed as follows (ref. dwg. STC237A/B/C and STC891):

- Close the stop valve related to the involved dehydrating unit.
- Open the vent valve assembled at the bottom of the dehydrating filter cartridge container to be substituted in order to exhaust the gas there contained (pay attention not to breathe the gas).
- Disassemble the container (1) after unscrewed the screws (2) which fasten it to the plate (3).
- Unscrew the cartridge (4) from the dehydrating unit support plate and turn it upside-down.
- Remove the ring (5), the body (6), the ring (7) and the filter (8).
- Remove the molecular sieve (9) and put it into a container full of water for 12 hours so that the molecular sieve absorbs the water and releases the hydrogen sulphide there contained.
- Take off the molecular sieve from the water and put it on the drying unit pierced plate.
- Perform the drying cycle: the molecular sieve has to be crossed by a hot air flow at a 300 degrees temperature for 8-12 hours (depending on the quantity of molecular sieve which has to be dried).
- Clean the filter and the interior of the filter cartridge.
- Put the molecular sieve into the filter cartridge; assemble the filter (8), the ring (7), the body (6) and the ring (5).
- Screw the cartridge (4) on the dehydrating unit support plate and mount the container (1) on the plate (3), by screwing the screws (2).
- If the filter cartridge is not immediately utilized, put it in an air tight enclosure, suitable to protect the molecular sieve from ambient humidity.

STC237-A
DESCRIPTION OF DRYING UNIT (STC891)

The drying unit has a pierced plate to support the molecular sieve which has to be dried. The flow of air is supplied by a ventilator and the air is heated by electric resistances or by a radiator supplied by stem or smoke. The hot air flows through the holes of the pierced plate through the molecular sieve to be dried. The air, containing the water vapour and the hydrogen sulphide, is conveyed to the atmosphere by a chimney.
6) REMARKS

6.1 ORIGINAL SPARE PARTS
Failure on the part of the Customer to use genuine Ledeen Facility spare parts, exempt Ledeen Facility from any responsibility for indemnity on claims.

6.2 OPERATIVE STAFF
The maintenance-staff assigned to the product Ledeen Facility must have the qualified technical preparation to perform the function. The lack of the above-mentioned preparation, included therein, the non disposability to effect adequate instructional courses by specialized technicians Ledeen Facility at the workshops of the maintenance firm, cannot be imputed to the company Ledeen Facility, who will be considered exempt from any responsibility on claims. Also the lack of knowledge, on the part of the operative personnel, of the manuals and instruction books supplied by Ledeen Facility in the languages indicated in the supply contract, cannot be imputed to Ledeen Facility.

6.3 DAMAGES DERIVED FROM USE
Any damage derived from corrosion, encrustations, pollution, oxidation, dust, wear or gradual deterioration of the materials, for which the customer did not specify the adaptability limits, will be at the Customer’s own loss.

6.4 INTERRUPTIONS AND SUSPENDING
Damages derived from a period of instrument use failure, during which the instrument wasn’t in maintenance condition to assure a perfect preservation, will be at the customer’s own loss.

6.5 MODIFICATION OF THE ACTUATOR
Damages derived from any modifications made by the customer without the preventive approval Ledeen Facility especially if in dissimilarity to the initial conditions established in the buying order, will be at the Customer’s own loss.

7) STORAGE CONDITIONS
The following procedure must be applied during storage in order to guarantee the correct working of the actuator after installation.
The actuator must be stored in a place, which has adequate protection against environmental damage.
The recommended environmental conditions are:

- Ambient temperature: minimum - 20 °C / maximum + 70 °C
- Relative humidity: maximum 90%

Depending on the storage type, the recommendations are the following:

7.1 INDOOR STORAGE
• Restore the paintwork of the components that have been damaged during the transport.
• Keep the actuators higher than ground level.
• Check that the internal electric components (where present) are perfectly dry, then close accurately.
7.2 - OUTDOORS STORAGE
- Restore the paintwork of the components that have been damaged during the transport.
- Keep the actuators above ground level.
- Check that the junction boxes internal parts are perfectly dry and eventually insert a bag with anti-condensation salt, then close accurately.
- Check that the internal electric components (where present) are perfectly dry, when it is not possible to keep the actuator energised, insert a bag with anti-condensation salt, then close accurately.

To store the machine at temperatures below of -30°C and up to +70°C it is necessary to carry out additional checks and tests from time to time, depending on the ambient conditions.

7.3 LONG-STORAGE CONDITIONS
In the event of long-storage we recommend to carry out the ordinary maintenance operations following the times scheduled.

8) ACTUATOR DISABLEMENT
At the end of the operating life of the actuator, to finally disable the actuator please carry out the following operations:
- Open the gearbox enclosure;
- Remove the lubricants taking care not to pollute the environment;
- Clean the gearbox internally using a mixture of water and degreasing soap;
- Dispose of the cleaning fluid and lubricants extracted from the actuator, according to the local laws regarding the disposal of waste material.
- After the actuator’s disablement, all casings must be sent to the scrapping service.
- In case of replacement of any accessory, it must be handled and disposed of as listed in your owner's manual.

9) SAFETY OF THE POWER SUPPLY CONNECTION (IF APPLICABLE)
Before carrying out any operation on the actuator, check that the power supply is off. Before connecting the actuator:
Verify the absence of the power supply and always connect the ground cable to the actuator first.
Check that the power supply line characteristics are in accordance with the nameplate and installation manual data.

10) SAFETY RECOMMENDATIONS
Check that the ground resistance complies with the limits allowed by the National Laws relevant to the country where the actuator is installed.
If the actuator is installed in a hazardous area, do not use naked flames and/or devices that could cause sparks.
At the end of any intervention on the actuator please check that all the boxes and covers are properly closed.
The operators assigned to the actuator's maintenance must be authorised personnel or otherwise must have attended a training course dedicated to the use and maintenance of the actuator.

11) ELECTROSTATIC DISCHARGES PREVENTION
The actuator handling must be carried out using the handling ring supplied with the actuator.
In order to prevent the electro-static charges storage, attention must be paid during the cleaning of any external component made from plastic material.
The plastic material must be cleaned only with a damp cloth or with antistatic products.
12) MARKING (ACCORDING TO 94/9/EC DIRECTIVE)

Please refer to the following marking example:

CE \(\mathcal{E}_x\) II 2 G Ex d IIB T5

Where:

CE = symbol of conformity to the EC applicable directives

\(\mathcal{E}_x\) = Atex symbol

II = group II (surface)

2 = apparatus of category 2

G = explosive atmosphere with presence of gas, vapours, fogs

Ex d IIB T5 = type of protection, gas group, temperature class

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<th>Hazardous area</th>
<th>Installation category according to ATEX directive No. 94/9/CE</th>
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<tr>
<td>Gas, fog or vapours</td>
<td>Zone 1 2G</td>
</tr>
<tr>
<td>Gas, fog or vapours</td>
<td>Zone 2 3G</td>
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13) NAMEPLATE DESCRIPTION

The actuator’s nameplate shows the following data:

2. Purchase Order No.
3. Customer item
4. Year of manufacturing
5. Valve and Actuator Tag Number
6. Actuator S/N
7. Actuator model
8. Actuator supply pressure (if applicable)
9. Action on air failure
10. Valve size and rating
11. Explosion-proof marking, followed by the apparatus group and category
13. CE mark
14. Name and complete address of the manufacturer

See for reference the nameplate drawing below.