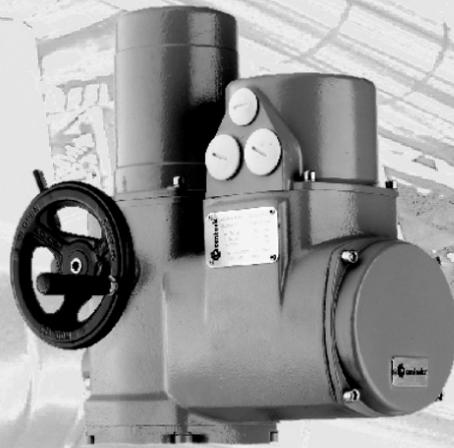




# Centork electric actuator 40A, 40B, 41A and 41B series



*Hazardous areas*

*Installation and maintenance  
User manual*



THIS USER MANUAL HAS BEEN DEVELOPED FOR **centork** ELECTRIC ACTUATOR 40A, 41A, 40B and 41B SERIES FOR USE IN POTENTIALLY EXPLOSIVES ATMOSPHERES, ATEX VERSION.



## CAUTION

**centork** Electric actuators are high value devices. In order to prevent damage in their handling, setting and use it is essential to follow and observe all the points in this user manual, operate under actuators' designated use, and observe health and safety rules, standards and directives for devices and apparatus designed to operate in potentially explosives atmospheres, as other national regulations as well.

**centork** Electric actuators must be handled with care and caution.

### IMPORTANT NOTE

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The contents in this manual are subject to change due to the quality improvement without individual notice.



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## 1. CENTORK ELECTRIC ACTUATORS: INTRODUCTION

The electric actuator is a device designed to be coupled to a general-purpose industrial valve, to carry out its movement. The movement is stopped by limit switching or by torque (thrust) switching.

Other applications should be consulted CENTORK before. CENTORK is not liable for any possible damages resulting from use in other than designated applications. Such risk lies entirely on the user.

## 2. SAFETY INSTRUCTIONS

The scope of this manual is to enable a competent user to install, operate, adjust and inspect a CENTORK electric actuator. These instructions must be observed, otherwise a safe operation of the actuator in no longer warrantee.

**When handling electric equipment, the health and safety standards (EN 60.204, 73/23/EEC directives) and any other national legislation applicable must be observed.**

**For works carried out in hazardous areas special regulations and directives must be observed; 89/655/EEC directive and EN 60079 standard. Areas classification, where devices and work take place under potentially explosives atmospheres, is a user responsibility, according to 1999/92/CE directive.**



**Work at the open actuator under voltage must only be performed if it is assured that for the duration of the work there is no danger of explosion. In other conditions actuator should be carry to a safe area.**



**As electric device, during electrical operation certain parts inevitably carry lethal voltages and currents (ELECTRICAL RISKS).**

Works on the electrical system or equipment must only be carried out by a skilled electrician himself or by specially instructed personnel, in accordance with the applicable electrical engineering rules, health and safety Directives and any other national legislation applicable.

**Electric actuators are powerful apparatus. A negligence handling might cause severe damages to valves, people, and actuator as well. Under no circumstances should any modification or alteration be carried out on the actuator as this could very well invalidate the conditions which the device was designed.**



**Under operation, motor enclosure surfaces can reach high temperatures (up to 100°C). Protection measures should be taken into account in order to prevent people and goods from it.**



### **3. TRANSPORT AND STORAGE**

#### **3.1 Transport**

- **CENTORK electric actuators must be transported in sturdy packing.** During transport measures should be adopted in order to prevent impacts, hits. CENTORK delivers its actuators ex-work.
- **For transport purposes, handwheels are supplied separately.**
- **Hits or impacts against wall, surfaces or objects might cause severe damage on Electric actuator.** In these cases, after such events, a technical inspection must be done by CENTORK technicians.
- **Do not attach to the handwheel ropes or hooks to lift by hoist.**
- The valve-actuator unit cannot be lifted/manipulated employing any lifting point of the actuator; Actuator has been designed and sized in order to motorize industrial valves, and withstand the forces and torque required.
- **Covers have to be properly closed (Tight) and sealed. Cable entries on electrical connection cover must be sealed. Protection plug supplied by CENTORK are only adequate for storing in dry and ventilated places, for short period of time. In other conditions protection plug must be replaced with metallic plug sealed with PTFE tape.**
- Each Actuator is delivered with a set of technical documentation (User manual, datasheet, diagrams...), which has to be carefully stored.



#### **3.2 Storage and commissioning**

**Despite of their high degree of protection (IP67 as standard, and IP68 optional) condensation – presence of water- can occur inside the electric actuators by incorrect and negligent handling of the actuators. This may damage sensitive internal parts during the storage. This problem can be avoided by observing the following points.**

##### **3.2.1 Commissioning**

- Verify the actuator to insure correct model number, torque, operating speed, options and special components, voltage and enclosure type, and the actuator control before installation or use. It is important to verify that the actuator is appropriate for the requirements of the valve and the intended application. If there is any discrepancy, please contact with your local distributor, or CENTORK, to solve that discrepancy. Once the electric actuator has been set up, CENTORK declines any responsibility related to discrepancies.
- Check (Visual inspection) in order to detect possible damages caused during transport or storage. **Checking should include a visual inspection of electric compartment, and switching and signalling unit compartment.**
- Check that the painting work of the actuator is not been damaged. Retouch it when damaged.
- Check that electrical connection cover, centronik frontal panel and switching and signalling unit cover and are correctly closed and tight. Cable entries on electrical connection cover must be sealed. Protection plug supplied by CENTORK are only adequate for storing in dry and ventilated places, for short period of time. In other conditions **protection plug must be replaced with metallic plug sealed with PTFE tape.**
- Each Actuator is delivered with a set of technical documentation (User manual, datasheet, diagrams...), which has to be carefully stored.
- If damages like shocks, cracks, hits or others due to an improper handling, or humidity inside the equipment due to improper storage appear, contact CENTORK or your nearest distributor.

### 3.2.2 Storage



- **Store in a clean, cool, dry and ventilated place. Protect against humidity from the floor. Use pallets, wooden frames, cage boxes or shelves.**
- Check that electrical connection cover and switching and signalling unit cover and are correctly closed and tight.



- Cable entries on electrical connection cover must be sealed. Protection plug supplied by CENTORK are only adequate for storing in dry and ventilated places, for short period of time. **In other conditions protection plug must be replaced with metallic plug sealed with PTFE tape.**
- Do not store the actuator directly on the ground!
- Cover it to protect it from dust and dirt. Cover the machined parts with suitable protection against corrosion. Do not employ plastic bags, as they can cause condensation.
- Each Actuator is delivered with a set of technical documentation (User manual, datasheet, diagrams...), which has to be carefully stored.

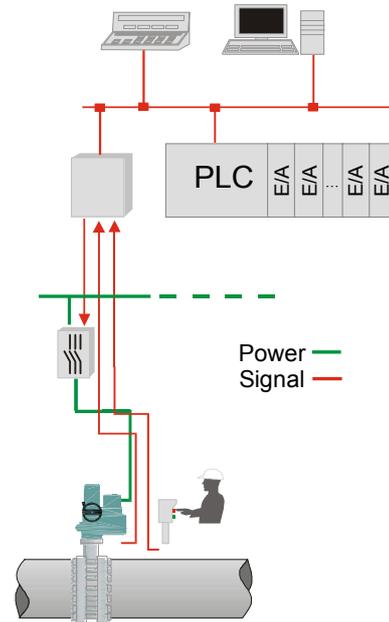


**For other storage conditions or, and long time periods (More than 5 months) contact to manufacturer.**

## 4. CONDITIONS OF SERVICE FOR ELECTRIC ACTUATORS

### 4.1 Electric actuator: Main description and purpose

- Electric actuator is an apparatus or device formed by a electric motor, coupled to a main gearbox unit, which transmits motion and torque to valves.
- A switching and signalling unit, inside of Electric actuator, allows providing torque and limit switching operation. **Limit and torque switches must be included on the Electric manoeuvre in order to prevent overloads on valve and actuator which might cause a fatal damage on valve and actuator.**
- Electric actuator must be controlled by a external electric cabinet with all elements needed (Transformer, contactors, relays, lamps, fuses...), designed according to actuator technical features and
- Electric actuators actuators are provided with a declutchable manual override system in order to operate manually in case of emergency or fail of power supply.
- Electric actuator can be coupled directly to valve, or maybe, through gearbox units (Bevel, spur and worm gearboxes).



The electric actuator is a device designed to be coupled to a general-purpose industrial valve, to carry out its movement. The movement is stopped by limit switching or by torque (thrust) switching. Other applications should be consulted CENTORK before. **CENTORK is not liable for any possible damages resulting from use in other than designated applications. Such risk lies entirely on the user.**

### 4.2 Technical data: Explosion protection

The marking of the electrical actuator is:  II 2G EEx de IIC T4

The electrical actuator is made up of a **flame-proof electrical motor, reduction gears, control and signalling devices, increased safe connection box** that include, optionally intrinsic safe terminals.

**For works carried out in hazardous areas special regulations and directives must be observed; 89/655/EEC directive and EN 60079 standard. Areas classification, where devices and work take place under potentially explosives atmospheres, is a user responsibility, according to 1999/92/CE directive.**

**The electrical actuators with single-phase motors, the capacitors will have to be installed in safety zone or to be equipped with a valid way of protection for the zone of use.**

**In the APPENDIX it appears certificates of the electrical actuators, as well as the declaration of conformity.**

### 4.3 Actuator and motor duty service

Electric actuator has been designed for valve motorization, which requires ON-OFF and inching (Modulating) duty service.

- ON-OFF duty service: Electric actuator has been designed as S2-15 min (Three phases motor) or S2-10 min (Single phases motors) duty cycle at nominal torque, according to IEC standards: Nominal torque is rated to 50% of max tripping torque (100%), value marked on actuator nameplates. Higher nominal torques can reduce the actuator's service life and S2 duty cycle.
- Inching or modulating duty service: Electric actuators has been designed as S4-25%, at 1.200-800 starts per hour, at nominal torque. Nominal torque is rated to 50% of max tripping torque (100%), value marked on actuator nameplates. Higher nominal torques can reduce the actuator's service life and S4 duty cycle conditions.

#### 4.4 Temperature range

CENTORK Electric actuators work in a temperature range from -20°C to +70°C.

#### 4.5 IP protection degree

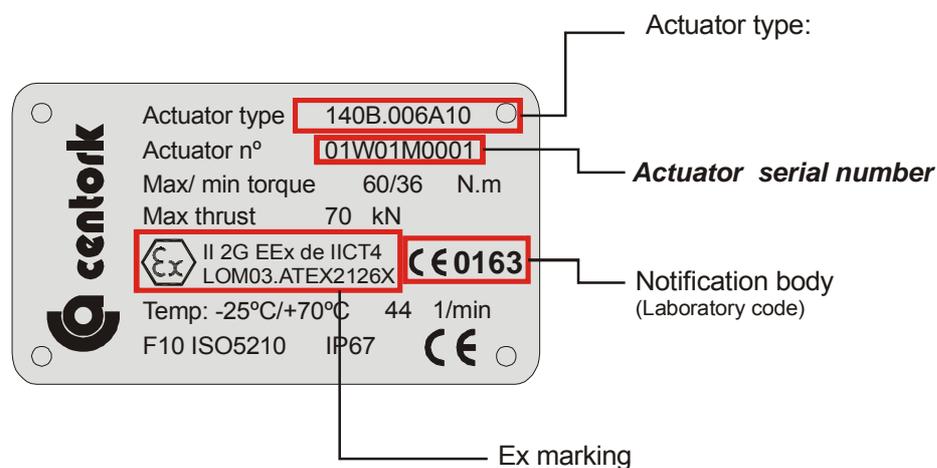
- CENTORK Electric actuators are designed in their standard version with IP67 (acc. EN 60.529) environmental protection although IP68 protection may be supplied on request. **IP67 and IP68 protection degree is only guarantee employing proper protection plug and cable gland (For cable entries)**, according to IP degree (See chapter ELECTRIC CONNECTIONS) . It is necessary to observe storing and maintenance rules written on TRANSPORT AND STORAGE chapter as well.

#### 4.6 Painting and protection against corrosion

- CENTORK has designed three protection degree: Standard protection, P1 and P2. For technical details, consult CENTORK.
- CENTORK standard protection: Electric actuator are coated with a epoxy- two components primer (Film thickness depends on protection class selected, actuators are coated with intermediates primers) followed by a polyurethane component paint coat. The standard colour is blue RAL 5.003. Other colours are possible (Option). Other film thickness under request.

#### 4.7 Actuator identification

The actuator serial number allows defining and identifying all actuator data. It will be required for any consult concerning to the electric actuator.



## 5. MOUNTING TO THE VALVE

### 5.1 Pre-Installation Inspection

- Verify the actuators nameplate to insure correct model number, torque, operating speed, voltage and enclosure type before installation or use.
- It is important to verify that the output torque of the actuator is appropriate for the torque requirements of the valve and that the actuator duty cycle is appropriate of the intended application

### 5.2 Output size

Check whether actuator output flange suits the flange of the valve to be driven. The latter should have been designed following the ISO5210 or ISO5211 standard, for standard application, or following the customer's specifications, for special application.

### 5.3 Output type

Check that the type of flange-coupling of the actuator suits the valve to be driven (diameters and lengths). Those manufactured as Standard at CENTORK follow the ISO5210/5211 standards. Types of output drive:

- **Output type A:** If not otherwise specified in the order, it is supplied blank. The thread must be machined according to the stem of the valve to be driven. For the dismantling and machining of this type of output, see Appendix . Output type A models can withstand axial loads and torque
- **Output type B0, B1, B2, C:** It is supplied machined to the dimensions stated in the ISO 5210/5211 or DIN 3338 standard. Output type B and C models **cannot withstand axial loads.**
- **Output type B3, B4:** It is supplied blank. For the dismantling and machining of this type of output, see Appendix .

### 5.4 Mounting:

- Check size and the type of output match the valve to be driven.
- Degrease the mounting surfaces at actuator and valve thoroughly.
- Slightly grease the input shaft of the valve to be driven.
- Fit the actuator into the valve. In the event of a threaded output (type A), use the handwheel for turning the nut over the threaded stem.
- **Do not lift the actuator by the handwheel**
- The actuator may be mounted in any position. Before mounting, check proper orientation actuator and valve in order to simplify access to handwheel, switching and terminal compartments (Maintenance and start-up tasks).
- Reserve the space for maintenance routines and tasks.
- Using ISO Class 8.8 quality bolts, fasten crosswise controlling the applied torque according to the table in Appendix

## 6. ELECTRIC CONNECTIONS



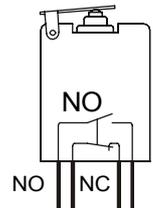
**CAUTION:** Safety instructions on chapter 2 must be observed. Work on electrical system or equipment must only be carried out by skilled electrician, according to safety standards. Work at the open actuator under voltage must only be performed if it is assured that for the duration of the work there is no danger of explosion. In other conditions actuator should be carry to a safe area.

### 6.1 Wiring diagram (electric manoeuvre)



Electric actuator must be controlled by a external electric cabinet with all elements needed (Transformer, contactors, relays, lamps, fuses...) Wiring diagram should be designed according to electric actuator features. Electric actuator datasheet, supplied with the actuator, includes a **PROPOSED WIRING DIAGRAM**, delivered with other technical documentation. **The following points should be observed:**

- We recommend switching off the corresponding contactor/relay always directly by the limit or torque switch (opening and closing). **Torque switches must be included on Electric/electric manoeuvre in order to protect actuator and valve from undesired overloads.** Each valve manufacturer decides whether the switching off at both ends is made by torque switching or by limit switching.
- The maximum delay for switching off the motor with the signal of the torque or limit microswitch cannot exceed 40 ms.
- **Torque and limit microswitches have 1NO+1NC contacts, only the same potential can be connected through both circuits. For different potentials, two double microswitches must be used.**
- Torque microswitches signals are **non-maintained signals**, when motor stops after a over-torque condition torque signals may reset (Non-maintained). Relays or another device must be employed (See wiring diagram)



- **Capacitors for single-phase A.C. motors are not delivered with electric actuators. They should be installed on electric cabinet (External) in a safe area, or capacitors should be Ex type, suitable for applicable hazardous area .** Each capacitor must be dimensioned according to motor voltage and power.



- CENTORK actuators are provided with **thermo-switches** mounted in the windings of the motor (TRM). **The protection of the motor and actuator is only achieved with a proper connection for these thermostats, it is recommended to switch off the corresponding contactor/relay always directly by this thermo-switches. Centork guarantee for the motor is not valid if this connection is not properly done.**

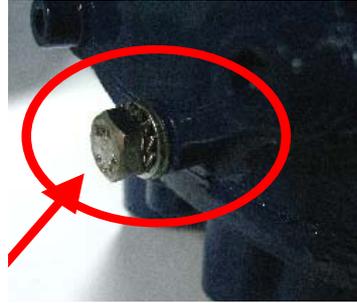
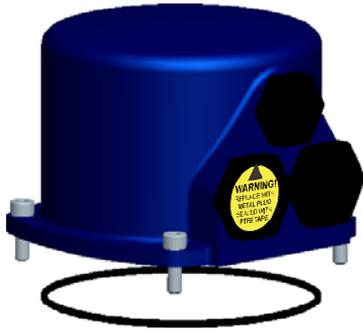
Features of electric and electronic components must be observed, they are listed on appendix. Wiring diagram are included on appendix: D0015X2 for A.C. three-phase, D0043X2 for A.C. single-phase.

### 6.2 Terminal plan and wiring

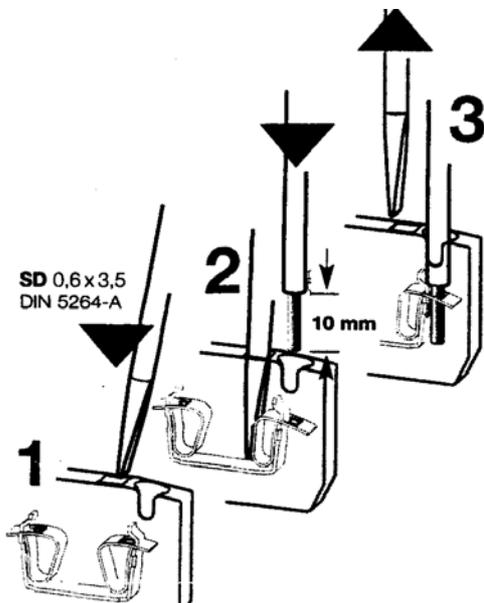
**The electric connection diagram or terminal plan is depicted on Electric actuator datasheet, supplied with the actuator, and it can be found printed on a label inside of electrical compartment cover.**



- Open the electrical cover.
- **Feed the cable(s) through the cable glands . Fix proper cable glands according to IP67 or IP68 protection degree.** Fix proper cable glands according to IP67 or IP68 protection degree. **Replace the protection plug with suitable metallic protection plug sealed with PTFE .** (Figure 6.3) Tighten cable glands and protection plugs to ensure enclosure IP67 (IP68 if applicable).
- With a suitable screwdriver (SD 0,6x3,5 DIN 5264-A), connect the cables for the control signals according to the electric connection diagram. (Figure 6.2 and Figure 6.4)



- Connect the **internal earth cable terminal**  to the earth connection located inside of electric connection cover (M5 screw hole).
- Connect the external earth cable terminal  to the earth connection terminal (See picture)
- Once you have checked that the connections have been properly carried out, close the connection cover and check the proper connection, the state of the o-ring seal and the proper installation of the latter, greasing it slightly. Fasten the 4 screws crosswise.
- Once you have checked that the connections have been properly carried out, close the connection cover and check the proper connection, the state of the o-ring seal and the proper installation of the latter, greasing it slightly. Fasten the 4 screws crosswise.



## 7. MANUAL OPERATION

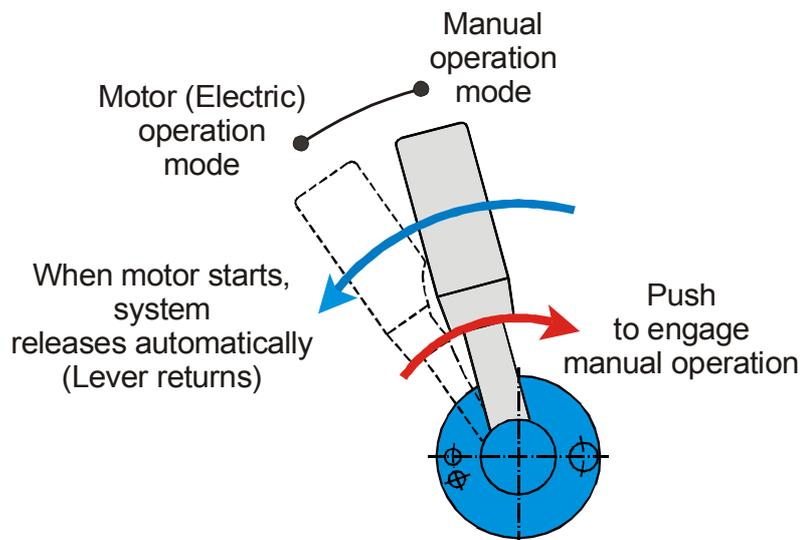
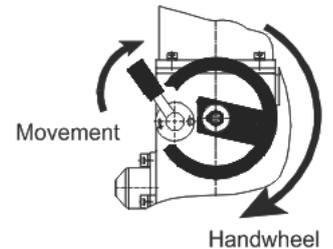
CENTORK actuators are fitted with a handwheel for the manual actuation of the valve. In the case of simultaneous motorised and manual working, the motorised one will always be the preferential one, "**motor priority**".



**Once the handwheel has been engaged is not possible to disengage, the override engagement lever returns automatically to motor position when the motor is operated. Do not press the lever when motor is running.**

Procedure of engagement of manual operation:

- Turn the changeover lever 20° clockwise while slightly turning the handwheel.
- When you notice an increase in the resistance of the wheel, the manual control is engaged.
- Run the valve in the desired direction. Standard sense of rotation is clockwise to close. For greater operating speed you can connect any powertool, pneumatic or electric, to the hand-wheel shaft. The maximum speed allowed is 150 rpm.



## 8. SETTING AND PRELIMINARY TEST

Safety rules and standard should be observed (See SAFETY INSTRUCTIONS chapter). Work at the open actuator under voltage must only be performed if it is assured that for the duration of the work there is no danger of explosion. In other conditions actuator should be carry to a safe area.

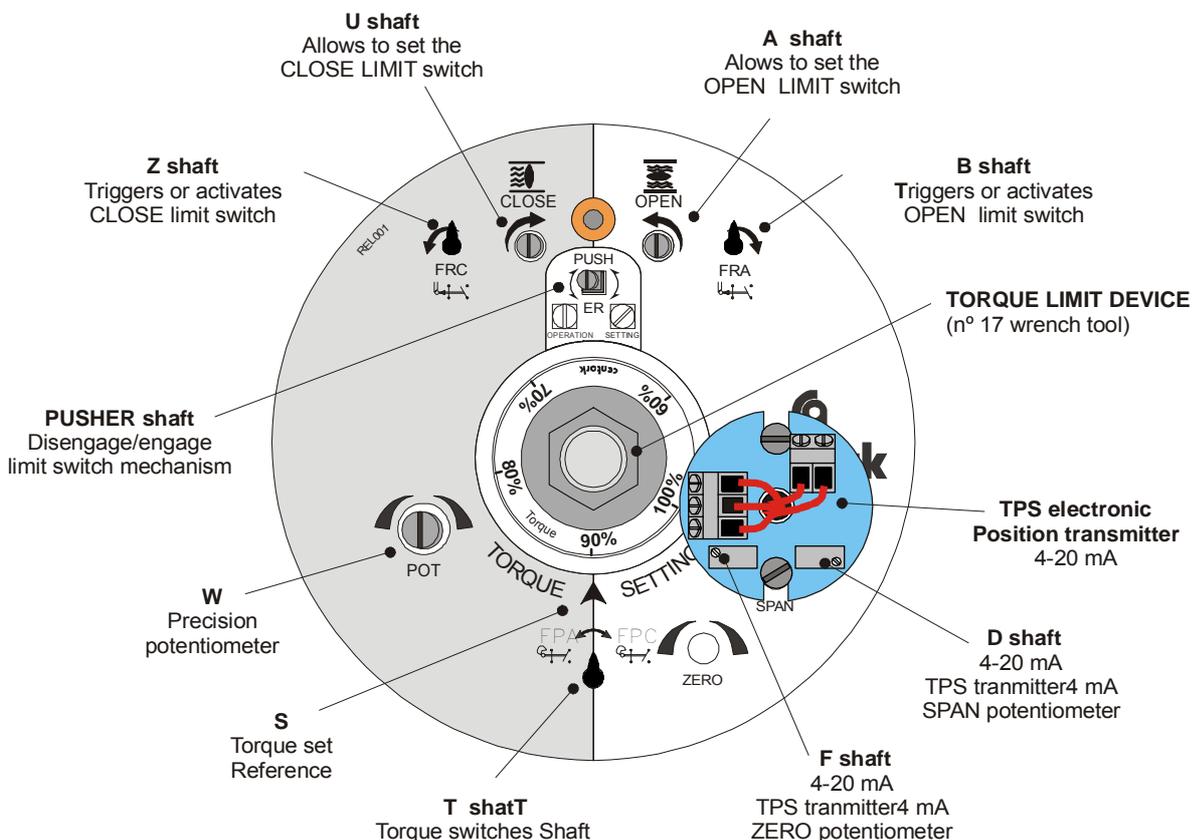
- Setting and preliminary test can only be done when finished the wiring (See 6 chapter) and mounting on valve (See 5 chapter). Electric manoeuvre (Electric cabinet) and devices should be ready and checked.
- A commissioning routine is recommended (Visual inspection) according to instructions described on 3.2.1 chapter.
- Both the torque and the limit switches setting must be carried out in accordance with the characteristics of the valve to be driven. **Each valve manufacturer decides whether the switching off at both ends is made by torque switching or by limit switching.**
- **If actuator has been supplied already assembled onto the valve, valve manufacturer should NOT modify the settings made originally by the manufacturer modified on site without the authorisation of the latter, otherwise, serious damage may be caused both to the valve and to the actuator.**



CENTORK recommend to move the valve to an intermediate position manually, -via handwheel device- (According to 7 chapter) in order to execute the test routines described below, avoiding problems due to incorrect routines or user's mistakes.

**Just when user finishes a setting routine, covers must be closed, checking their O-ring (Sealing)!**

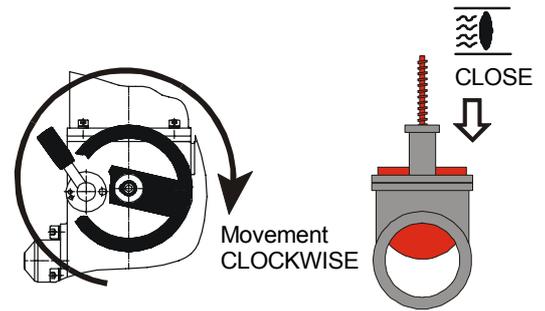
### 8.1 Switching and signalling unit



### 8.2 Actuator and valve (Sense of rotation)

Electric actuator and valve sense of rotation must be the same. Electric actuator sense of rotation criteria is **CLOCKWISE TO CLOSE**. Sense of rotation is critical for many components (Microswitches, potentiometer, 4-20 mA transmitter). **A correct operation cannot be warranty in case of different sense of rotation valve/actuator)**

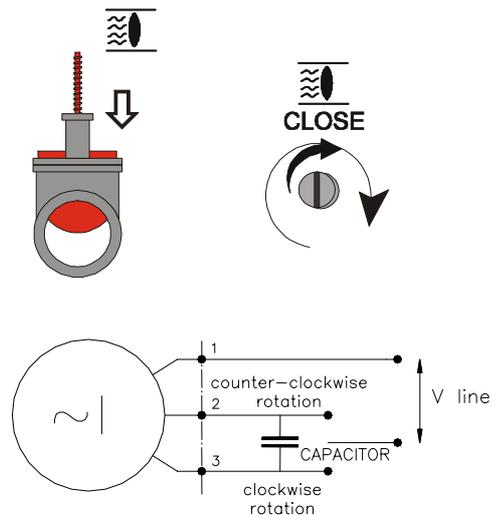
- Operate the Electric actuator via handwheel (See Manual operation chapter).
- Check that running the handwheel clockwise, valve moves to close. If the turn direction is not correct, stop immediately and verify.



### 8.3 Motor and power supply (Sense of rotation)

When running to close, check that U shaft turns in clockwise rotation sense (See picture). At the same time electric actuator output shaft should turn in clockwise sense of rotation as well. If this does not happen, stop immediately!, check:

- For **three-phase A.C. motors**: Check that U-V-W phase sequence (Main voltage supply) is correct. Notice that U-V-W phases are wired to 1-2-3 motor contacts or terminals. Change two phases U-V-W on terminal blocks (e.g. U and V) and try it again.
- For **single-phase A.C. motors**: Verify the wiring (See figure)



### 8.4 Closed position limit switch setting

- Manually turn the valve to the desired CLOSED position.
- Disengaged **PUSHER SHAFT**: With a suitable screwdriver press the **PUSHER SHAFT** 3 mm and turn it 45°, ensure that it does not return to its original height (See figure 8.4.1)
- Note: Pusher shaft allow to engage/disengage the switching and signalling unit from Electric actuator gears. (Figures 8.4.1 and 8.4.2)
- Turn **U spindle** clockwise (Figure 8.4.3) until **Z spindle** turns Counter-clockwise (At this moment FRC microswitch triggers). Just before FRC microswitch was tripped, red arrow of **Z spindle** should be pointed to vertical: When **Z spindle** (Red arrow) turns to left the FRC microswitch is tripped.
- If, by accident, it has been carried on turning past the tripping of the FRC microswitch, turn **U spindle** in the opposite direction (counter-clockwise) until the Z spindle returns vertical (Figure 8.4.5)

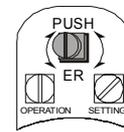


Fig. 8.4.1

Switching and signalling unit engaged to actuator.

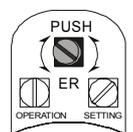


Fig. 8.4.2

Switching and signalling unit disengaged

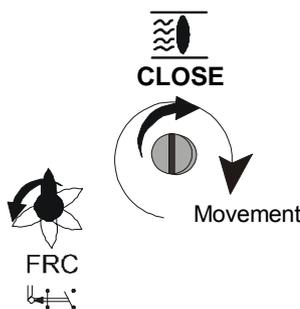


Fig. 8.4.1

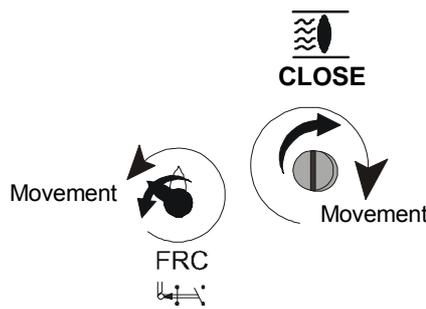


Fig. 8.4.2

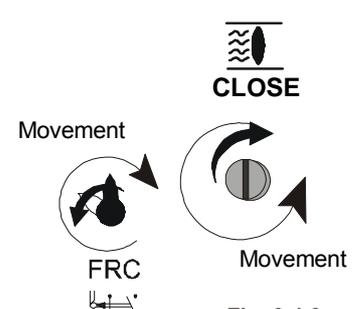


Fig. 8.4.3

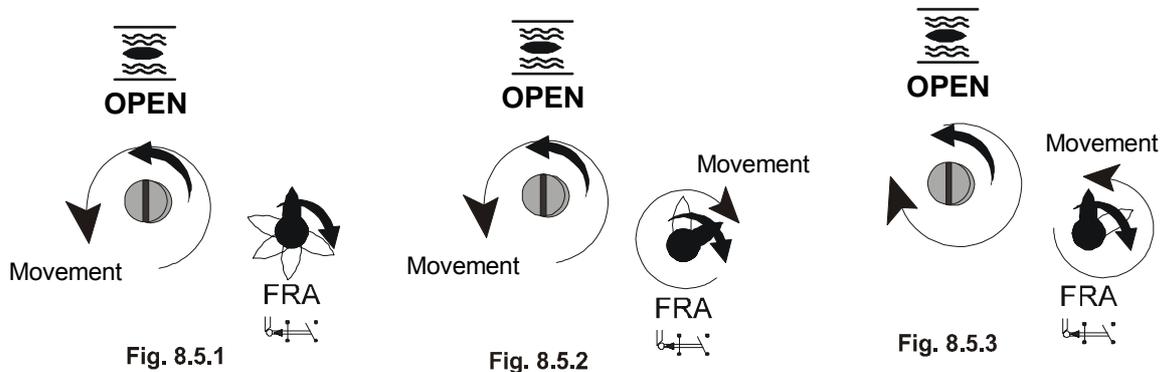


- ENGAGE **PUSHER SHAFT**: Turn back selector 'PUSHER'. Check that go back to its initial position (Figure 8.4.2). **This point is fundamental for the correct setting of the limit switches: Ensure that PUSHER shaft is correctly engaged.**

NOTE: For greater speed in long runs, small electric or pneumatic screwdriver can be used.

### 8.5 Open position limit switch setting

- Manually turn the valve to the desired OPEN position.
- Disengaged **PUSHER SHAFT**: With a suitable screwdriver press the **PUSHER SHAFT** 3 mm and turn it 45°, ensure that it does not return to its original height (See figure 8.4.1)
- Turn **A spindle** Counter-clockwise (Figure 8.5.1) until **B spindle** turns clockwise (At this moment FRA microswitch triggers). Just before FRA microswitch was tripped, red arrow of **B spindle** should be pointed to vertical: When **B spindle** (Red arrow) turns to right the FRA microswitch is tripped.
- If, by accident, it has been carried on turning past the tripping of the FRA microswitch, turn **A spindle** in the opposite direction (clockwise) until the **B spindle** returns to vertical. Figure 8.5.3)
- ENGAGE **PUSHER SHAFT**: Turn back selector 'PUSHER'. Check that go back to its initial position (Figure 8.4.2). **This point is fundamental for the correct setting of the limit switches: Ensure that PUSHER shaft is correctly engaged.**



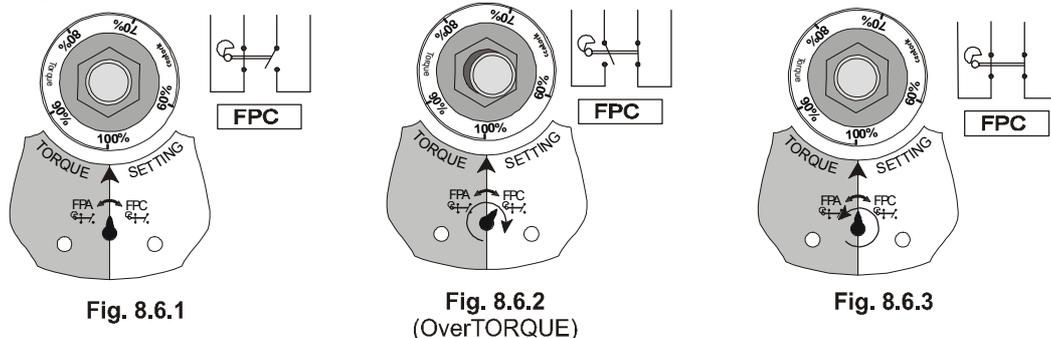
### 8.6 Torque switching setting

CENTORK Electric actuators leave the factory tested and set for its Max. Torque (100%), as standard. Adjustment torque range is 60% up to 100% of Max. Torque rated on nameplates. **Guarantee is not valid if the user exceeds this range (60%-100%), or if torque microswitches are not employed.**



#### Torque mechanism design

Torque mechanism always acts as soon as actuator output torque exceeds the value set (Torque setting) It is used as protection throughout the whole valve travel and during the limit switch tripping. It also remains active during manual operation, thereby protecting the valve from any torque excess caused by the handwheel.



- When torque on valve shaft exceeds the value set, e.g. running to close, **T shaft** turns to the right (Pointing to FPC), at the same time central SHAFT releases (See figures 8.6.1 and 8.6.2). FPC microswitch is tripped. Automatically, or when actuator starts running to opposite direction, mechanism returns or resets. Notice that central SHAFT latches again. (Figure 8.6.3)

Torque setting Procedure:

- Using a No.17 wrench, turn the P Torque regulator or **Torque Limit Device** until the desired torque matches with the **S torque reference** arrow on the dial. (Figures 8.6.4 and 8.6.5)

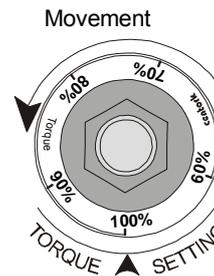


Fig. 8.6.4

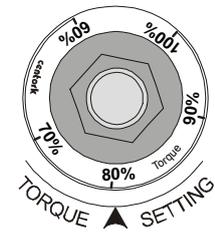


Fig. 8.6.5

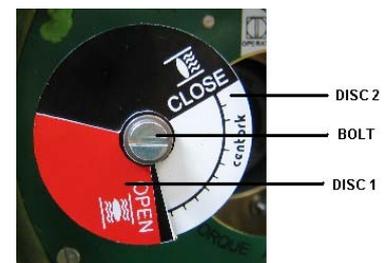
**8.7 Mechanical position indicator setting (optional)**

**Limit switches must be set before!**

Mechanical Position Indication dial turns between CLOSE and OPEN position depending on the model and valve stroke. This is achieved with the addition of a suitable gearing according to the number of turns per valve stroke. If the latter varies, the gearing must be changed.

Procedure:

- Run actuator to the CLOSED position.
- Unscrew the bolt and turn the dial with the symbol (CLOSED) until it matches with the mark ◀ on cover.
- Run actuator to the OPEN position, and proceed exactly with disc containing OPEN symbol.
- Screw the bolt

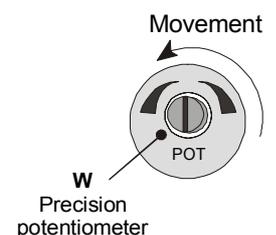


**8.8 Potentiometer POT setting (optional)**

**Limit switches must be set before!**

Potentiometer is selected according to valve stroke. A suitable gearing unit reduce valve stroke (Number of turns) to less than one turn, this movement is measured by potentiometer located on switching and signalling unit.

- Run the actuator to the CLOSED position.
- With a suitable screwdriver, turn the **spindle (W)** of the potentiometer POT, counter-clockwise, to its top end.
- Check that potentiometer value is 0 Ohms.
- Run the actuator to the OPEN position.
- Check that potentiometer value reaches its maximum (Ohms)



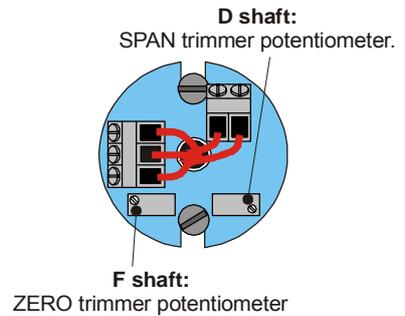
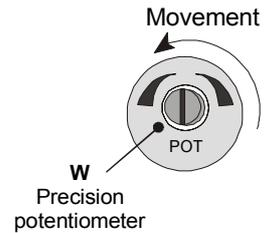
**CAUTION: The potentiometer is a high precision electromechanical device and should be handled carefully. It is necessary to use a suitable screwdriver for its setting.**

### 8.9 4-20 mA transmitter TPS setting (optional)

- Limit switches must be set before.
- 4-20 mA transmitter are selected according to valve stroke. A suitable gearing unit reduce valve stroke (Number of turns) to less than one turn, this movement is measured by potentiometer, and converted to current signal by TPS transmitter. If valve stroke changes, TPS may not work properly.
- 4-20 mA TPS for ATEX versions: **2 wires mode**. Type of protection: EEX ia IIC T6/T5/T4 according to LCIE 90.C6099X

Procedure:

- Run the actuator to the CLOSED position (sensor in minimum signal).
- With a suitable screwdriver, turn the **spindle (W)** of the potentiometer **POT**, counter-clockwise, to its top end.
- Adjust the output current with the **ZERO (F)** trimmer potentiometer until its reading is close to 4 mA
- Run the actuator to the OPEN position (sensor in maximum signal).
- Adjust the output current with the **SPAN (D)** trimmer potentiometer until its reading is close to the maximum current of 20mA.
- Run the actuator back to the CLOSED position and check that the minimum current is 4 mA. If this is not the case, repeat previous points until optimum adjustment values are reached.



**CAUTION:** The TPS electronic position transmitter is a high precision electronic device and should be handled carefully. It is necessary to use a suitable screwdriver for its setting. Technical data are enclosed on annexe.

## 9. MAINTENANCE

**CAUTION: Safety instructions on 2 chapter must be observed. Work at the open actuator under voltage must only be performed if it is assured that for the duration of the work there is no danger of explosion. In other conditions actuator should be carry to a safe area.**

CENTORK actuators are supplied greased from the factory for their lifetime, needing practically no maintenance.

### 9.1 After commissioning

- Check for damage on paint caused by transport, assembly or handling and repair the damage carefully in order to ensure complete protection against corrosion.
- **Make sure that all the o-ring seals are correctly mounted and that the cable glands are firmly fastened, and protection plug for cable entry not used have been replaced with metallic protection plug sealed with PTFE tape, in order to ensure the IP67, IP68 protection.**
- Check that switching and signalling cover and connection cover screws are correctly fastened.
- **Check the correct tightening of the bolts between the actuator and the valve.**
- Check the correct greasing of the gear housing.
- The most important condition for reliable service of the CENTORK actuators is the fact of having carried out a correct commissioning and set-up procedure.

### 9.2 Maintenance for service

CENTORK recommends for a preventive maintenance programme. Approximately 3 months after commissioning and then every 9/12 months:

- **Check the correct tightening of the bolts between the actuator and the valve.**
- **Take advantage of each revision to check the proper tightening of the covers, of the handwheel lock and the external electric connection.**
- **Check cable entries.**
- **Visual inspection inside of switching and signalling, and electrical compartments.**
- Contact with valve manufacturer in order to know about maintenance routines of valve.

In the event of infrequent service, perform a test run every 6 months in order to ensure the availability of service of the actuator.

### 9.3 Electric actuator's service life

- Electric actuator service life is rated to 20.000 cycles.
- Each cycle is formed by an opening manoeuvre (Valve close position to valve open position) and a closing manoeuvre (Valve open position to valve close position).
- 50 turns has been considered as standard valve stroke reference.

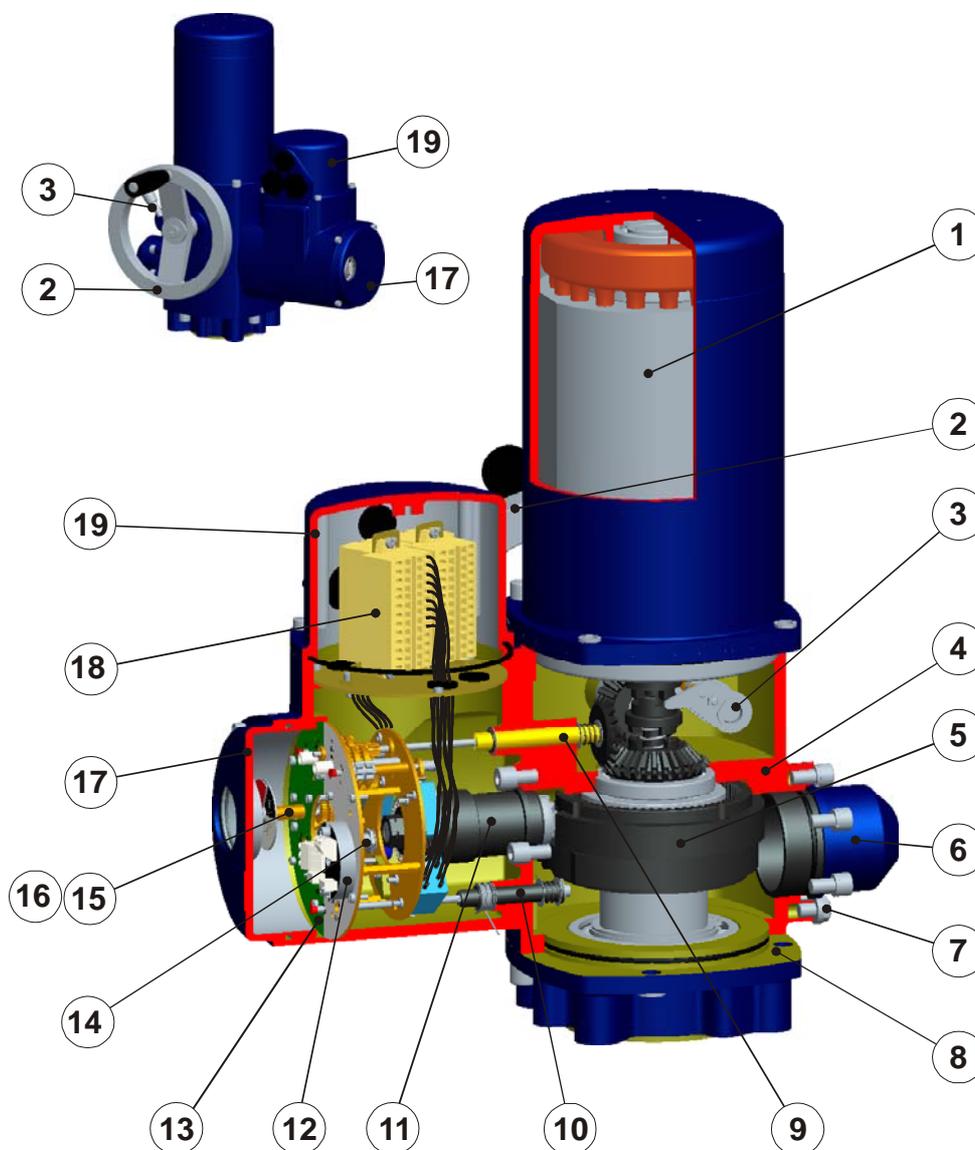
## 10. TECHNICAL SUPPORT

Each actuator is supplied with a datasheet on A4 format. The following is included:

- Electric actuator datasheet.
- The electric connection diagram for each actuator (also stuck inside the connections cover of the actuator).
- This electric actuator user manual.

For any claim or information request, the SERIAL NUMBER included on this datasheet or on the Electric actuator nameplates should be used. Electric actuator manufacturer address: See on Manual covers.

## 11. SPARE LIST



<i>Electric actuators, 40A series</i>					
Mark	Description	QTY	Mark	Description	QTY
1	Flame-proof electric motor	1	12	TPS electronic position transmitter EEX ia	1
2	Handwheel and manual shaft subassembly	1	13	Switching and signalling unit	1
3	Override and declutch lever subassembly	1	14	Potentiometer subassembly	1
4	Housing	1	15	Gearing unit subassembly	1
5	PTCS planetary subassembly	1	16	Visual indicator subassembly	1
6	Energy absorber springs subassembly	1	17	Switching and signalling unit cover	1
7	External ground earth terminal	1	18	Terminal blocks with limit and torque switches	1
8	Actuator output flange	1	19	Electric cover	1
9	Motion measuring shaft subassembly	1			
10	Torque switching shaft subassembly	1			
11	Torque regulator subassembly	1			

## APENDIX: OUTPUT TYPES

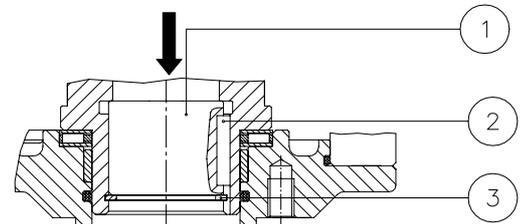
### OUTPUT TYPE A Size F-07 (ISO 5210)

#### Disassembly:

Employing a suitable tool, remove the retaining ring (3) which fix the removable bronze bush (1).  
Push in order to extract this piece.

#### Assembly:

Having machined the removable bush according to valve stem dimensions, refit the drive bus (1) into the output shaft bore, align the keyway (2) in its output shaft shape.  
Refit the retaining ring (3).



**Figure 1**

### OUTPUT TYPE A Size F-10/F-16/F-25 (ISO 5210)

#### Disassembly:

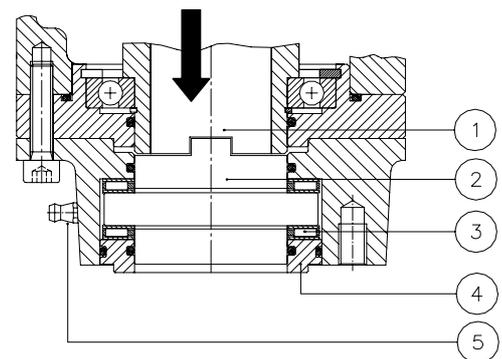
Push and press the removable bronze bush (2) in order to extract the cover (4), axial bearings (3) and removable bronze bush (2)

#### Assembly:

Having machined the removable bronze bush according to valve shaft, clean thoroughly this piece. Apply grease on axial bearings and discs (3). Assemble axial disc on removable bush (2), finally insert the cover (4). Check O-rings on cover.

Apply grease on. Insert the removable bush on output type A base casting unit and output shaft, notice that dog coupling (Tooth) on bushing should match with actuator hollow output shaft (1). Verify O-ring (4).

For maintenance, grease can be supply thought grease nipple (5).



**Figure 2**

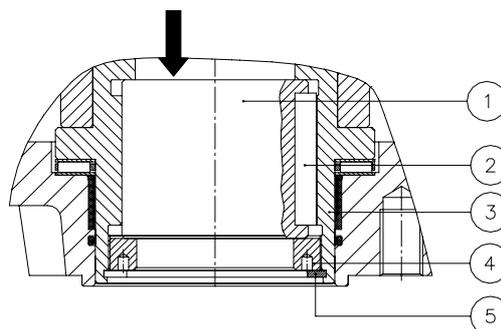
### **OUTPUT TYPE A Size F-14 (ISO 5210)**

#### **Disassembly**

- Remove retaining ring (5) and unscrew the stop ring (4) employing a suitable tool.
- Push and press the removable bronze bush (1) in order to extract it.

#### **Assembly:**

- Having machined the removable bush according to valve stem dimensions, refit the drive bus (1) into the output shaft bore (3), align the keyway (2) in its output shaft shape.
- Screw the stop ring (4) employing a suitable tool.
- Refit the retaining ring (5).



**Figure 3**

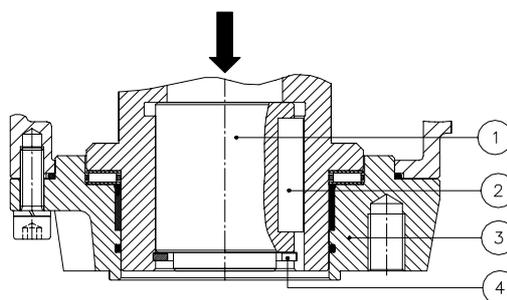
### **OUTPUT TYPE B3 Size F-07/F-10/F-14/F-16/F-25 (ISO 5210)**

#### **Disassembly:**

- Employing a suitable tool, remove the retaining ring (4) which fix the removable steel bush (1).
- Push in order to extract this piece.

#### **Assembly:**

- Having machined the removable steel bush according to valve stem dimensions, refit the drive bus (1) into the output shaft bore, align the keyway (2) in its output shaft shape.
- Refit the retaining ring (4).



**Figure 4**

### **OUTPUT TYPE B0 Size F-10 / F-14**

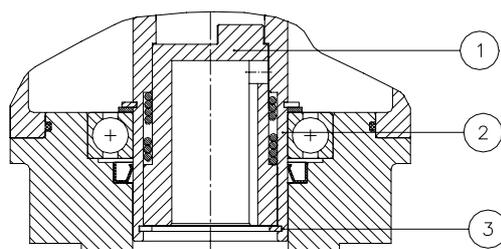
B0 output type is supplied, already machined, according to dimensions published in technical datasheets.

#### **Disassembly:**

- Employing a suitable tool, remove the retaining ring (3) which fix the removable steel bush (1). Removable bush is located inside of output shaft (2)
- Push in order to extract this piece.

#### **Assembly:**

- Having machined the removable steel bush according to valve stem dimensions, refit the drive bus (1) into the output shaft bore
- Refit the retaining ring (3).



**Figure 5**

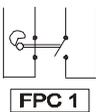
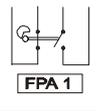
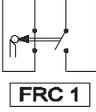
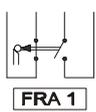
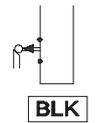
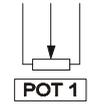
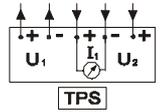
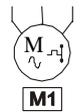
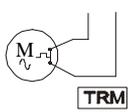
**APENDIX: FASTEN BOLTS (CLASS 8.8)**

<b>BOLT</b>	<b>FRICION FACTOR</b>		
	<b>LOW</b>	<b>MEDIUM</b>	<b>HIGH</b>
<b>M4</b>	4.2	6	8
<b>M6</b>	6.2	8.2	10
<b>M8</b>	15	21	24
<b>M10</b>	30	41	48
<b>M12</b>	49	68	85
<b>M14</b>	85	108	130
<b>M16</b>	130	165	200
<b>M18</b>	170	240	280
<b>M20</b>	240	340	410
<b>M30</b>	800	1150	1350
<b>M36</b>	1450	2050	2400

Torque values in N.m  
Steel bolts class 8.8

## WIRING DIAGRAMS, TERMINAL PLANS, LEGENDS AND SYMBOLS.

For further technical information, consult CENTORK technical datasheet or contact directly with CENTORK. CENTORK address can be found printed on manual covers.

SYMBOL	DESCRIPTION	TECHNICAL FEATURES																				
	<b>FPC:</b> CLOSE torque microswitch, EEx d.	<ul style="list-style-type: none"> <li>- Flame-proof microswitch EEx d IICT6</li> <li>- Microswitch with silver contacts</li> <li>- Type of contact: 1 NA / 1 NC</li> <li>- Protection degree: IP67</li> <li>- Contacts: One fast acting</li> <li>- Mech. Life: <math>5 \cdot 10^5</math></li> <li>- Electr. live: <math>5 \cdot 10^6</math></li> <li>- Microswitch circuits NO+NC contacts, only the same potential can be connected through both circuits. For different potentials, two double microswitches must be used.</li> </ul> <table border="1" data-bbox="753 862 1319 981"> <tr> <td rowspan="2">Silver contacts</td> <td colspan="3">AC</td> <td colspan="3">DC</td> </tr> <tr> <td>30V</td> <td>125V</td> <td>250V</td> <td>30V</td> <td>125V</td> <td>250V</td> </tr> <tr> <td>Resistance</td> <td>8A</td> <td>6A</td> <td>5A</td> <td>2A</td> <td>0.6A</td> <td>0.4A</td> </tr> </table>	Silver contacts	AC			DC			30V	125V	250V	30V	125V	250V	Resistance	8A	6A	5A	2A	0.6A	0.4A
Silver contacts	AC			DC																		
	30V		125V	250V	30V	125V	250V															
Resistance	8A		6A	5A	2A	0.6A	0.4A															
	<b>FPA:</b> OPEN torque microswitch, EEx d.																					
	<b>FRC:</b> CLOSE limit microswitch, EEx d. (CLOSE end position)																					
	<b>FRA:</b> OPEN limit microswitch, EEx d. (OPEN end position)																					
	<b>BLK:</b> Movement signalling microswitch. As actuator output shaft rotates or moves, a cam acts and switches ON-OFF this BLK microswitch, EEx d.																					
	<b>POT:</b> Precision Potentiometer.	<ul style="list-style-type: none"> <li>- 10 kOhms (other values on request).</li> <li>- Ohmic value tolerance : <math>\pm 20\%</math> std. (<math>\pm 10\%</math> optional).</li> <li>- Linearity : <math>&lt; 1\%</math>.</li> <li>- Power : 1W max.</li> <li>- Turning angle : <math>340^\circ \pm 5\%</math></li> <li>- Life : 106 cycles.</li> <li>- Temperature range : <math>-55^\circ\text{C}</math> , <math>+125^\circ\text{C}</math>..</li> </ul> Safety parameters: <ul style="list-style-type: none"> <li>- Pi: 804 mW for T4</li> <li>- Pi: 314 mW for T5</li> </ul>																				
	<b>TPS:</b> 4-20 mA transmitter (2 wires)  EEx ia IIC T6/T5/T4 according to LCIE 90.C6099X	Features of intrinsically safe power source of Transmitter should not exceed: <table data-bbox="774 1489 1189 1635"> <tr> <td>U: 30 V</td> <td>i.e. PU <math>\leq</math></td> <td>0,82 W</td> </tr> <tr> <td>U: 27 V</td> <td>i.e. PU <math>\leq</math></td> <td>0,98 W</td> </tr> <tr> <td>U: 24 V</td> <td>i.e. PU <math>\leq</math></td> <td>0,99 W</td> </tr> <tr> <td>U: 21 V</td> <td>i.e. PU <math>\leq</math></td> <td>0,87 W</td> </tr> <tr> <td>U: 18 V</td> <td>i.e. PU <math>\leq</math></td> <td>0,75 W</td> </tr> </table> Temp. classification: T6, Tamb $<50^\circ\text{C}$ T5, Tamb $<65^\circ\text{C}$ T4, Tamb $<80^\circ\text{C}$	U: 30 V	i.e. PU $\leq$	0,82 W	U: 27 V	i.e. PU $\leq$	0,98 W	U: 24 V	i.e. PU $\leq$	0,99 W	U: 21 V	i.e. PU $\leq$	0,87 W	U: 18 V	i.e. PU $\leq$	0,75 W					
U: 30 V	i.e. PU $\leq$	0,82 W																				
U: 27 V	i.e. PU $\leq$	0,98 W																				
U: 24 V	i.e. PU $\leq$	0,99 W																				
U: 21 V	i.e. PU $\leq$	0,87 W																				
U: 18 V	i.e. PU $\leq$	0,75 W																				
	<b>M1</b> A.C. motor (single and three-phase)	<ul style="list-style-type: none"> <li>- Squirrel cage motor.</li> <li>- Isolation class F.</li> <li>- Main power supply: See motor nameplates.</li> <li>- Main voltage supply tolerance: <math>\pm 5\%</math></li> </ul>																				
	<b>TRM:</b> Motor thermal protection via thermostatic switches (PTC thermistors on request).	<ul style="list-style-type: none"> <li>- The thermo-switches will open the circuit when the temperature of the windings reach <math>140^\circ\text{C}</math> and will close it when the temperature drops under <math>120^\circ\text{C}</math>.</li> </ul> <table border="1" data-bbox="753 1937 1401 2072"> <tr> <td rowspan="2"></td> <td colspan="2">AC 250V / 50-60Hz</td> <td colspan="3">DC</td> </tr> <tr> <td>Cos <math>\varphi = 1</math></td> <td>Cos <math>\varphi = 0.6</math></td> <td>60V</td> <td>42V</td> <td>24V</td> </tr> <tr> <td>current</td> <td>2 A</td> <td>1.2 A</td> <td>1A</td> <td>1.2A</td> <td>1.8A</td> </tr> </table>		AC 250V / 50-60Hz		DC			Cos $\varphi = 1$	Cos $\varphi = 0.6$	60V	42V	24V	current	2 A	1.2 A	1A	1.2A	1.8A			
	AC 250V / 50-60Hz			DC																		
	Cos $\varphi = 1$	Cos $\varphi = 0.6$	60V	42V	24V																	
current	2 A	1.2 A	1A	1.2A	1.8A																	

## APENDIX: CERTIFICATES.



### DECLARATION OF CONFORMITY

CENTORK VALVE CONTROL S.L. hereby declares under sole responsibility that the electric actuators, series listed below

**140A. 140B. 140C. 140D. 140E. 140F. 146G. 146H.  
141A. 141B. 141C. 141D. 141E. 141F. 141G. 141H.**

are designed and produced to be installed on industrial valves in hazardous zone and in compliance with the essential safety requirements of the ATEX directive 94/9/EC Annexe II and

*94/9/EC directive: Equipment and protective systems intended for use in potentially explosive atmospheres.*

*89/336/EC Directive: Electromagnetic compatibility*

*73/23/EC directive: Low-voltage equipment*

*98/37/EC directive. Mechanical equipment-Machinery.*

Compliance with the Essential health and Safety Requirements has been assured by compliance with:

ISO 5210: 1.991

ISO 5211: 2.001

EN 292-1: 1.993

EN 292-2: 1.993

EN 50081-2:1994

EN 50082-2:1998

EN 61000-4:1999

EN50014: 2000

EN50018: 1995

EN 50019: 1996

EN50020: 1996

EN 60204-1: 1.999

EN60034-1: 1.998

EN50178: 1.998

DIN VDE 0100: 1.997

DIN VDE 0530: 1982

The models has EC-type examination certificate LOM03ATEX2126X, and the marking of the equipment:

 II 2G EEx II de IIC T4..T5

Actuators has been manufactured in CENTORK VALVE CONTROL S.L., Pol. Ind. 110 Txatxamendi 24-26 LEZO 20.100 –SPAIN-, certified by the *Laboratorio Oficial J. M. Madariaga* notified body LOM N°163, who authorized to mark the equipment as follow:



San Sebastián, 21 de Enero de 2.008

  
Francisco Lazcano  
-General manager-

(Centro fabricación y sede social)  
**Centork Valve Control S.L.**  
Pol ind. 110 Txatxamendi 24-26  
Lezo 20.100 SPAIN



## LABORATORIO OFICIAL J. M. MADARIAGA



### (1) EC-TYPE EXAMINATION CERTIFICATE

- (2) Equipment or protective system intended for use in potentially explosive atmospheres  
Directive 94/9/EC
- (3) EC-Type Examination Certificate number **LOM 03ATEX2126 X**
- (4) Equipment or Protection System   Electrical actuators  
Type CENTORK 14\*\* \*\*\*\*\*
- (5) Applicant:                               Centork Valve Control, S.L.
- (6) Address:                                 Cl. Portuete, 23  
20018-SAN SEBASTIÁN  
SPAIN
- (7) This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.
- (8) Laboratorio Oficial J.M. Madariaga (LOM), notified body number 0163 in accordance with Article 9 of the Directive 94/9/EC of the European Parliament of 23 March 1994, certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.  
The examination and test results are recorded in confidential report nr. **LOM 03.372 SP**
- (9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:  
- Standards                   **EN 50014:1997 + A1:1999 + A2:1999**  
                                      **EN 50018:2000 + A1:2002**  
                                      **EN 50019:2000**  
                                      **EN 50020:2002**
- (10) If the sign X is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.
- (11) This EC-Type Examination Certificate relates only to the design and construction of this specified equipment or protective system in accordance with the Directive 94/9/EC. Further requirements of the Directive applies to the manufacture and supply of this equipment or protective system. These are not covered by this certificate.
- (12) The marking of the equipment or protective system shall include the following:

II 2 G    EEx de IIC T4...T5 / EEx de IIC T4...T5  
Ta: -20 °C /+70 °C

Carlos Fernández Ramón  
DIRECTOR OF THE LABORATORY



Madrid, 29 September 2003

Angel Vega Remesal  
Head of TEX area

(This document may only be reproduced in its entirety)  
This Certificate is a translation from the original in Spanish. The LOM liability applies only on the Spanish text

Page 1/3



## LABORATORIO OFICIAL J. M. MADARIAGA

(A1) **SCHEDULE**

(A2) EC-Type Examination Certificate: **LOM 03ATEX2126 X**

(A3) Description of equipment or protective system

Electrical actuators for valves composed by a flameproof electrical motor, gear box, control and signalling devices, increased safe connection box that include, optionally, intrinsic safe terminals; the last ones are marked and segregated from power terminals.

Electrical motor is protected with switch-off thermo-devices having two ranges: 120 °C and 140 °C that correspond to T4 or T5 temperature classes, respectively.

Control and signalling devices include flameproof type of protection micro-switches with certificate LCIE 02ATEX0034U.

Optionally are included intrinsical safe devices for position measurement in two versions

- a) Potentiometer, with three wire connection  
 Parameters: Pi: 804 mW para T4  
                   Pi: 314 mW para T5
- b) 4-20 mA transmitter with certificate LCIE 02ATEX6073 X, with 2 wire external connection and internal connection to potentiometer  
 Parameters: same as indicated in certificate LCIE 02ATEX6073 X for the external connection

Different versions can have A.C. triphase electrical motors and also monophasic motors as follows:

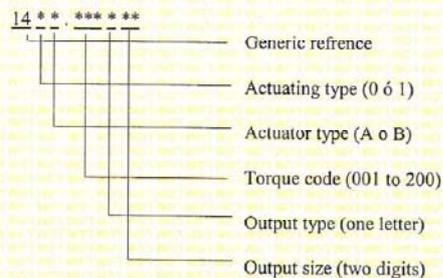
*Thriphase motors*

- Power (kW): 0,022 - 0,045 - 0,09 - 0,18 - 0,37 - 0,55 - 0,75 - 1,1 - 1,5 - 2,2 - 3
- Voltage at 50 Hz (V): 230 - 380/415 - 500
- Voltage at 60 Hz (V): 230 - 440/460

*Monophase motors*

- Power (kW): 0,022 - 0,045 - 0,09 - 0,18 - 0,37 - 0,55
- Voltage at 50 Hz (V): 220/240
- Voltage at 60 Hz (V): 110/120

*Type nomenclature*



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## LABORATORIO OFICIAL J. M. MADARIAGA

(A1) **SCHEDULE**

(A2) EC-Type Examination Certificate: **LOM 03ATEX2126 X**

(A4) Tets report nr. **LOM 03.372 SP**

(A5) Special conditions for a safe use

- Electrical motor must be protected by means pf the appropriated circuit connected to protection thermal devices

(A6) Individual tests

Each manufactured motor must be submitted to pressure tests at 930 kPa according the paragraph 15.1.3 of the standard EN 50018:2000

(A7) Essential Health and Safety Requirements

Explosion safe requirements are covered by application of the standards indicated in page 1/3 of this certificate.

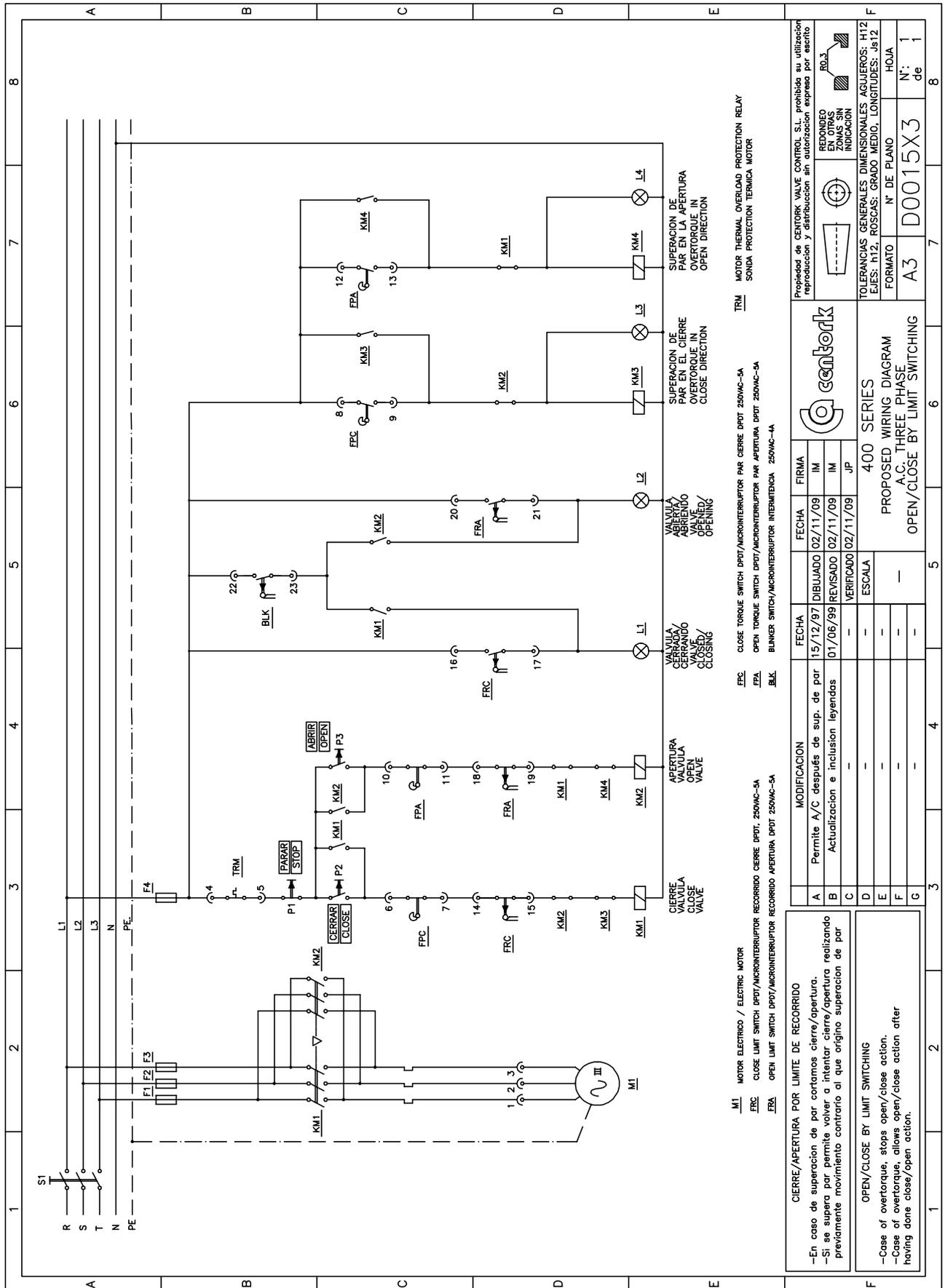
(A8) Descriptive documents

		<u>Rev.</u>	<u>Date</u>
- Description		-	2003-05-20
- Drawings nr.	00034XA	A	2000-04-18
	00035XA	A	2000-04-19
	00036XA	A	2000-04-19
	00037XX	-	2000-04-25
	00038XX	-	2000-04-25
	00056XA	A	2001-01-30
	00130XX	-	2002-01-09
	60974XA	A	2003-07-15



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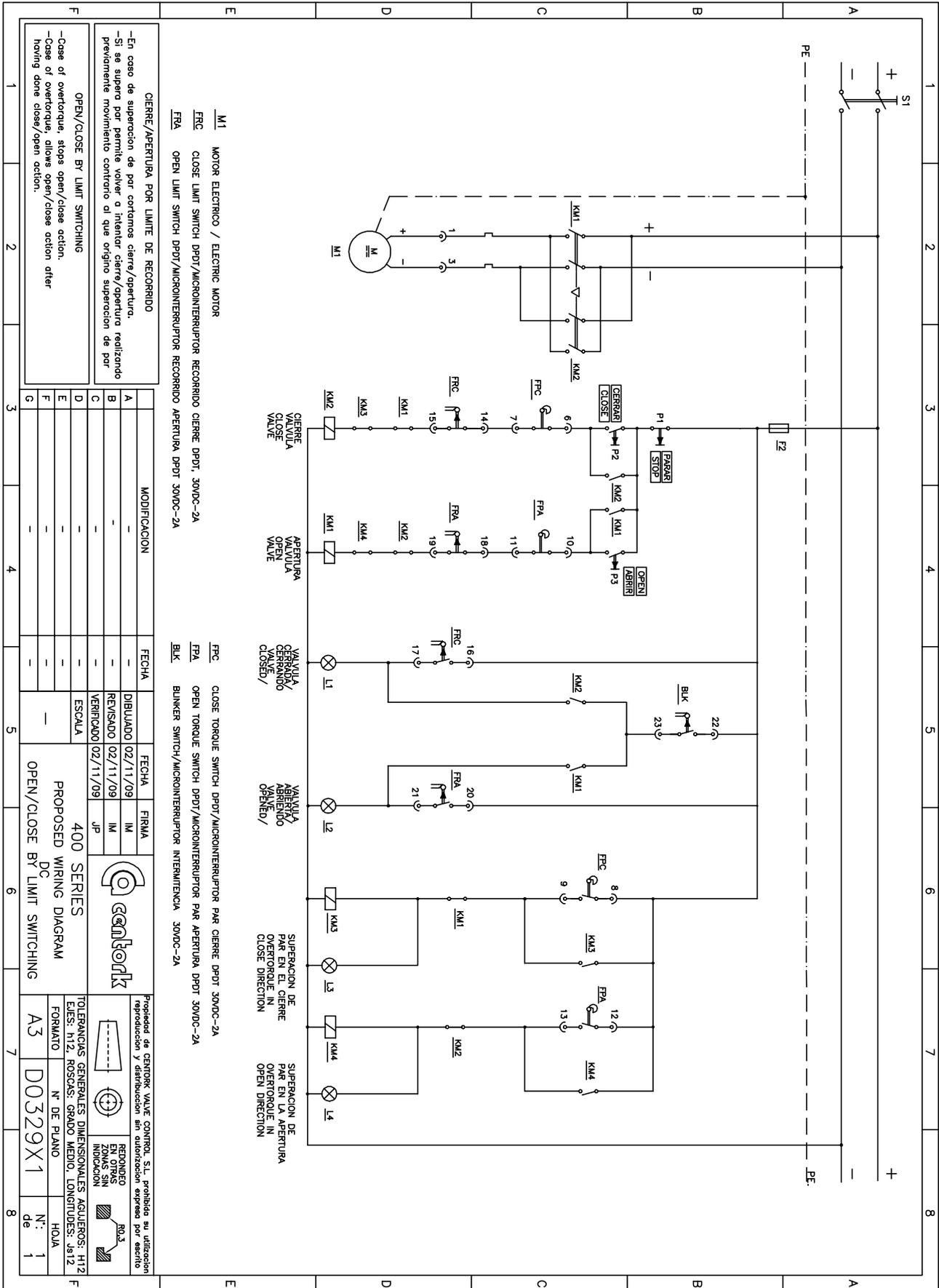


Propiedad de CENTORK VALVE CONTROL S.L. prohibida su utilización reproducción y distribución sin autorización expreso por escrito	
	REDONDO ZONA SIN INDICACION
TOLERANCIAS GENERALES DIMENSIONALES AGLIEROS: H12 EJES: h12, ROSCAS: GRADO MEDIO, LONGITUDES: js12	
FORMATO	N° DE PLANO
A3	D0015X3
	Hoja N° de 1 de 1

		400 SERIES	
		PROPOSED WIRING DIAGRAM A.C. THREE PHASE OPEN/CLOSE BY LIMIT SWITCHING	
FECHA	FECHA	FIRMA	FIRMA
15/12/97	02/11/09	IM	IM
01/06/99	02/11/09	IM	IM
-	VERIFICADO	02/11/09	JP
-	ESCALA	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

**CIERRE/APERTURA POR LIMITE DE RECORRIDO**  
 -En caso de superacion de par cortamos cierre/apertura.  
 -Si se supera par permite volver a intentar cierre/apertura realizando previamente movimiento contrario al que origino superacion de par

**OPEN/CLOSE BY LIMIT SWITCHING**  
 -Case of overtorque, stops open/close action.  
 -Case of overtorque, allows open/close action after having done close/open action.



**M1** MOTOR ELECTRICO / ELECTRIC MOTOR

**FRC** CLOSE LIMIT SWITCH DPDT/MICROINTERUPTOR RECORRIDO CIERRE DPDT 30VDC-2A

**FRA** OPEN LIMIT SWITCH DPDT/MICROINTERUPTOR RECORRIDO APERTURA DPDT 30VDC-2A

**FPC** CLOSE TORQUE SWITCH DPDT/MICROINTERUPTOR PAR CIERRE DPDT 30VDC-2A

**FPA** OPEN TORQUE SWITCH DPDT/MICROINTERUPTOR PAR APERTURA DPDT 30VDC-2A

**BLK** BLINKER SWITCH/MICROINTERUPTOR INTERMITENCIA 30VDC-2A

**CIERRE/APERTURA POR LIMITE DE RECORRIDO**  
 -En caso de superacion de por certamos cierre/apertura, -Si se supera por permite volver a intentar cierre/apertura, previamente movimiento contrario al que origina superacion de por

**OPEN/CLOSE BY LIMIT SWITCHING**  
 -Case of overtorque, stops open/close action.  
 -Si se supera por permite volver a intentar cierre/apertura, previamente movimiento contrario al que origina superacion de por having done close/open action.

MODIFICACION	FECHA
A	-
B	-
C	-
D	-
E	-
F	-
G	-

FECHA	FIRMA
02/11/09	IM
02/11/09	IM
02/11/09	JP

**400 SERIES**  
 PROPOSED WIRING DIAGRAM  
 OPEN/CLOSE BY LIMIT SWITCHING

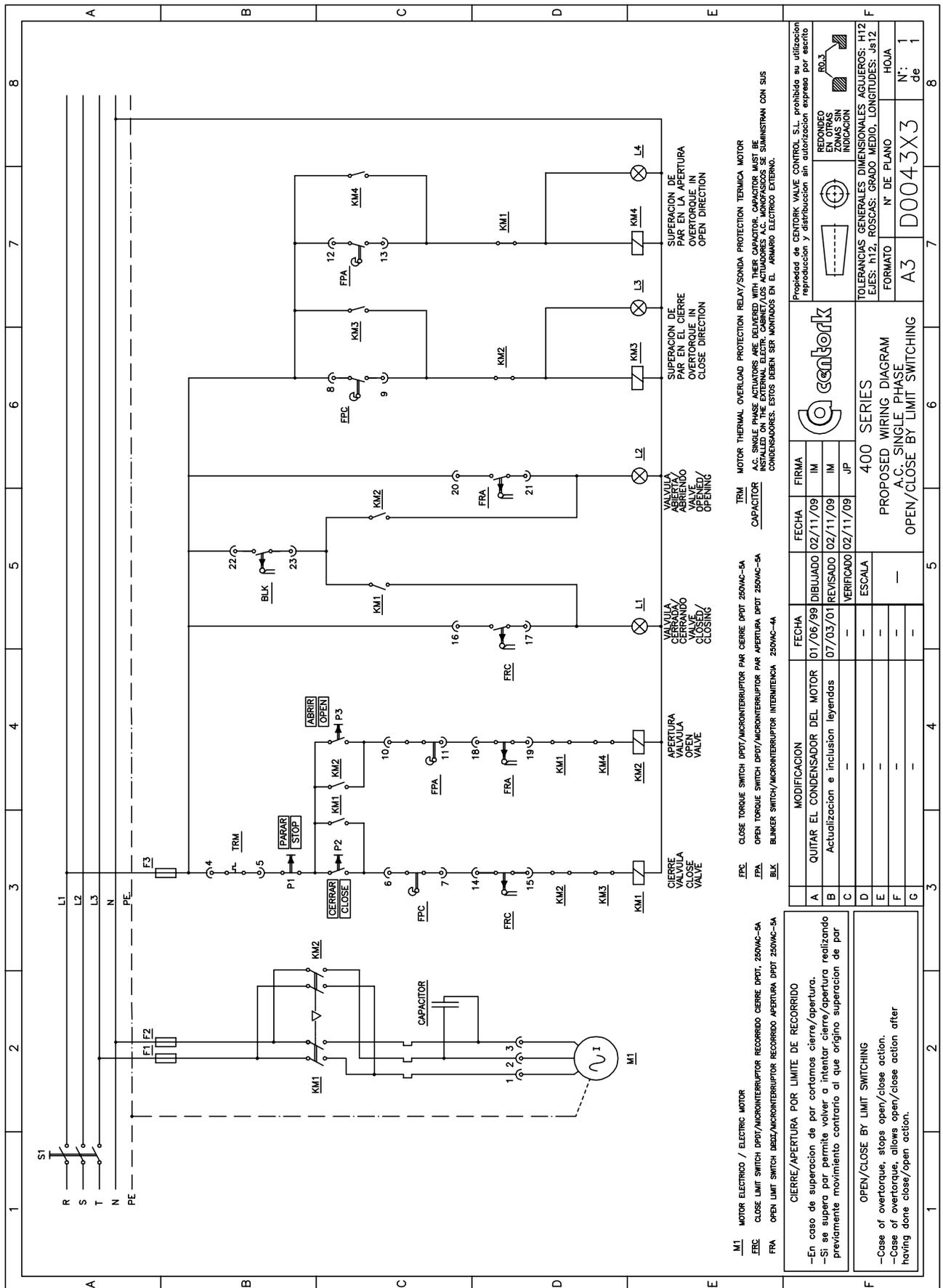
FORMATO	N DE PLANO	N:	de
A3	D0329X1	1	1

Propiedad de CENTORK VALVE CONTROL S.L. prohibida su utilizacion reproduccion y distribucion sin autorizacion expresa por escrito

TOLERANCIAS GENERALES DIMENSIONALES AGUJEROS: H12  
 ELES: h12, ROSCAS: GRADO MEDIO, LONGITUDES: J612

RECORRIDO EN OTROS INDICACION

R0.3



**M1** MOTOR ELECTRIC / ELECTRIC MOTOR  
**FRC** CLOSE LIMIT SWITCH DPDT/MICROINTERRUPTOR RECORDIDO CIERRE DPDT, 250VAC-5A  
**FRA** OPEN LIMIT SWITCH DPDT/MICROINTERRUPTOR RECORDIDO APERTURA DPDT 250VAC-5A  
**TRM** MOTOR THERMAL OVERLOAD PROTECTION RELAY/SONDA PROTECTION TERMICA MOTOR  
**APACITOR** A.C. SINGLE PHASE ACTUATORS ARE DELIVERED WITH THEIR CAPACITOR. CAPACITOR MUST BE INSTALLED ON THE EXTERNAL ELECTR. CABINET/LOS ACTUADORES A.C. MONOFASICOS SE SUMINISTRAN CON SUS CONDENSADORES. ESTOS DEBEN SER MONTADOS EN EL ARMARIO ELECTRICO EXTERNO.  
**BLK** BLINKER SWITCH/MICROINTERRUPTOR INTERMITENCIA 250VAC-4A  
**F1** CIERRE VALVULA VALVE CLOSING  
**F2** VALVULA ABRIENDO VALVE OPENING  
**F3** VALVULA CERRANDO VALVE CLOSING  
**L1** VALVULA CERRANDO VALVE CLOSING  
**L2** VALVULA ABRIENDO VALVE OPENING  
**L3** SUPERACION DE CIERRE PAR EN EL CIERRE OVERTORQUE IN CLOSE DIRECTION  
**L4** SUPERACION DE APERTURA PAR EN LA APERTURA OVERTORQUE IN OPEN DIRECTION  
**KM1** CIERRE VALVULA VALVE CLOSING  
**KM2** APERTURA VALVULA VALVE OPENING  
**KM3** SUPERACION DE CIERRE PAR EN EL CIERRE OVERTORQUE IN CLOSE DIRECTION  
**KM4** SUPERACION DE APERTURA PAR EN LA APERTURA OVERTORQUE IN OPEN DIRECTION  
**FPA** FUSIBLE PARA APERTURA CIERRE FUSE FOR OPENING CLOSING  
**FRA** FUSIBLE PARA APERTURA CIERRE FUSE FOR OPENING CLOSING  
**FFA** FUSIBLE PARA APERTURA CIERRE FUSE FOR OPENING CLOSING  
**P1** PARAR STOP STOP  
**P2** CERRAR CLOSE  
**P3** ABRIR OPEN  
**TRM** MOTOR THERMAL OVERLOAD PROTECTION RELAY/SONDA PROTECTION TERMICA MOTOR  
**TRM** MOTOR THERMAL OVERLOAD PROTECTION RELAY/SONDA PROTECTION TERMICA MOTOR  
**TRM** MOTOR THERMAL OVERLOAD PROTECTION RELAY/SONDA PROTECTION TERMICA MOTOR

MODIFICACION		FECHA	DIBUJADO	REVISADO	VERIFICADO	ESCALA	FIRMA
A	QUITAR EL CONDENSADOR DEL MOTOR	01/06/98	02/11/09	02/11/09	02/11/09	IM	IM
B	Actualizacion e inclusion leyendas	07/03/01	02/11/09	02/11/09	02/11/09	JP	JP
C	-	-	-	-	-	-	-
D	-	-	-	-	-	-	-
E	-	-	-	-	-	-	-
F	-	-	-	-	-	-	-
G	-	-	-	-	-	-	-

Propiedad de CENTORK VALVE CONTROL S.L. prohibida su utilizacion para reproduccion y distribucion sin autorizacion expresa por escrito

REDONDEO EN LA INDICACION

TOLERANCIAS GENERALES DIMENSIONALES AGUJEROS: H12 ELES: H12, ROSCAS: GRADO MEDIO, LONGITUDES: JS12

FORMATO N° DE PLANO: A3 D0043X3

HOJA N°: 1 de 1

400 SERIES PROPOSED WIRING DIAGRAM A.C. SINGLE PHASE OPEN/CLOSE BY LIMIT SWITCHING







## **CENTORK Valve Control S.L.**

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