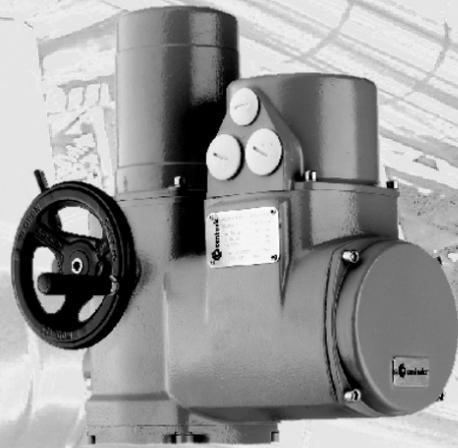




Multi-turn electric actuator 400, 410, 401 and 411 series



***Installation and maintenance
User manual***

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THIS USER MANUAL HAS BEEN DEVELOPED FOR **centork** ELECTRIC ACTUATOR 400, 410, 401 and 411 SERIES



CAUTION

centork Electric actuators are a 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, 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.

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.



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 decline 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.**

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 dismounting 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 dismounting 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).
- Using ISO Class 8.8 quality bolts, fasten crosswise controlling the applied torque according to the table in Appendix

6. ELECTRIC CONNECTIONS



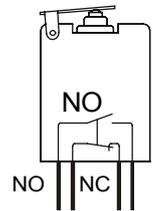
CAUTION: Safety instructions on chapter 3 must be observed. Work on electrical system or equipment must only be carried out by skilled electrician.

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 delivered with electric actuators. They should be installed on electric cabinet (External). Each capacitor is 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 is only achieved with a proper connection for these thermostats. Centork guarantee for the motor is not valid if this connection is not properly done. DC motor do not have thermo-switches on windings. Max current should be limited.**



Features of electric and electronic components listed on appendix. Wiring diagram are included on appendix: D0015X2 for A.C. three-phase, D0043X2 for A.C. single-phase, and D0042X3 for DC actuators

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.

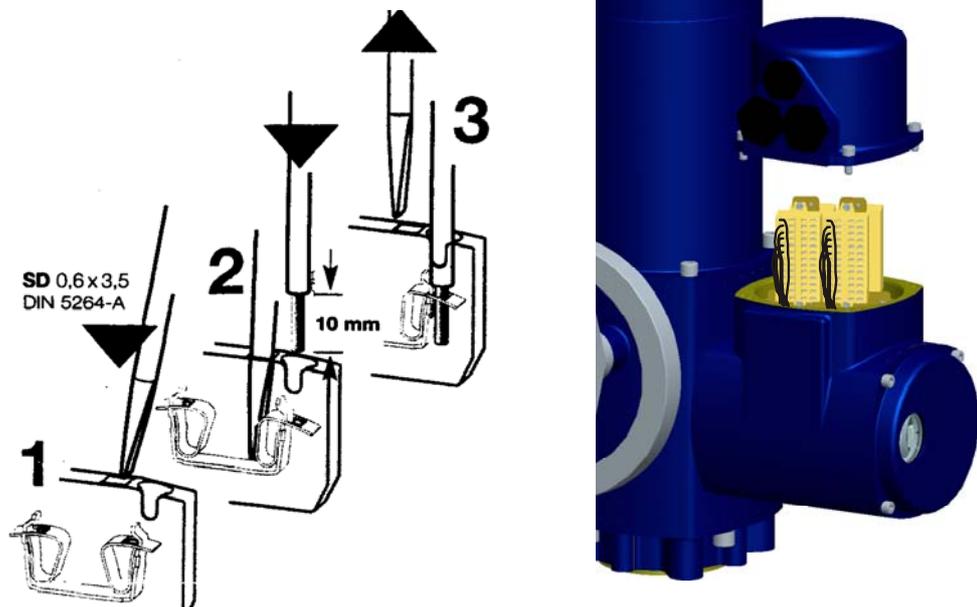


- Open the electrical cover. Feed the cable(s) through the cable glands. **Fix proper cable glands according to IP67 or IP68 protection degree.**
- A) Electric actuator with **Plug-socket connectors** with screws
- Unscrew the attachment plate from the connection cover.
 - With a suitable screwdriver, connect the cables for the control signals according to the electric connection diagram.



B) Electric actuator with **Terminals** connection

With a suitable screwdriver (SD 0,6x3,5 DIN 5264-A), connect the cables for the control signals according to the electric connection diagram.



- 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

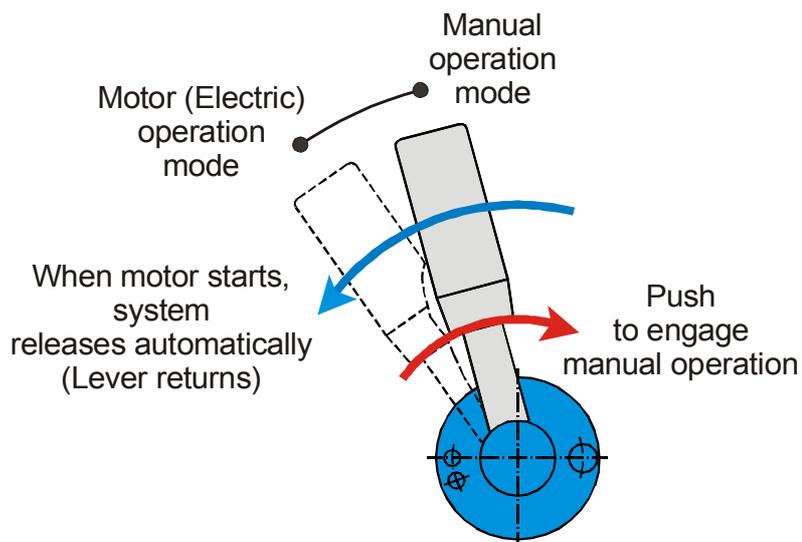
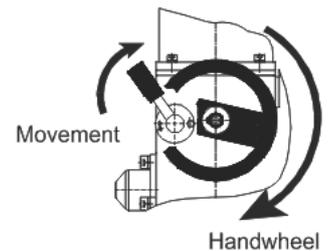
CENTORK actuators are fitted with a handwheel for the manual actuation of the valve. In the case of simultaneous motorised and manual working, the motorised one will always be the preferential one, "**motor priority**".



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 on electrical system or equipment must only be carried out by skilled electrician.

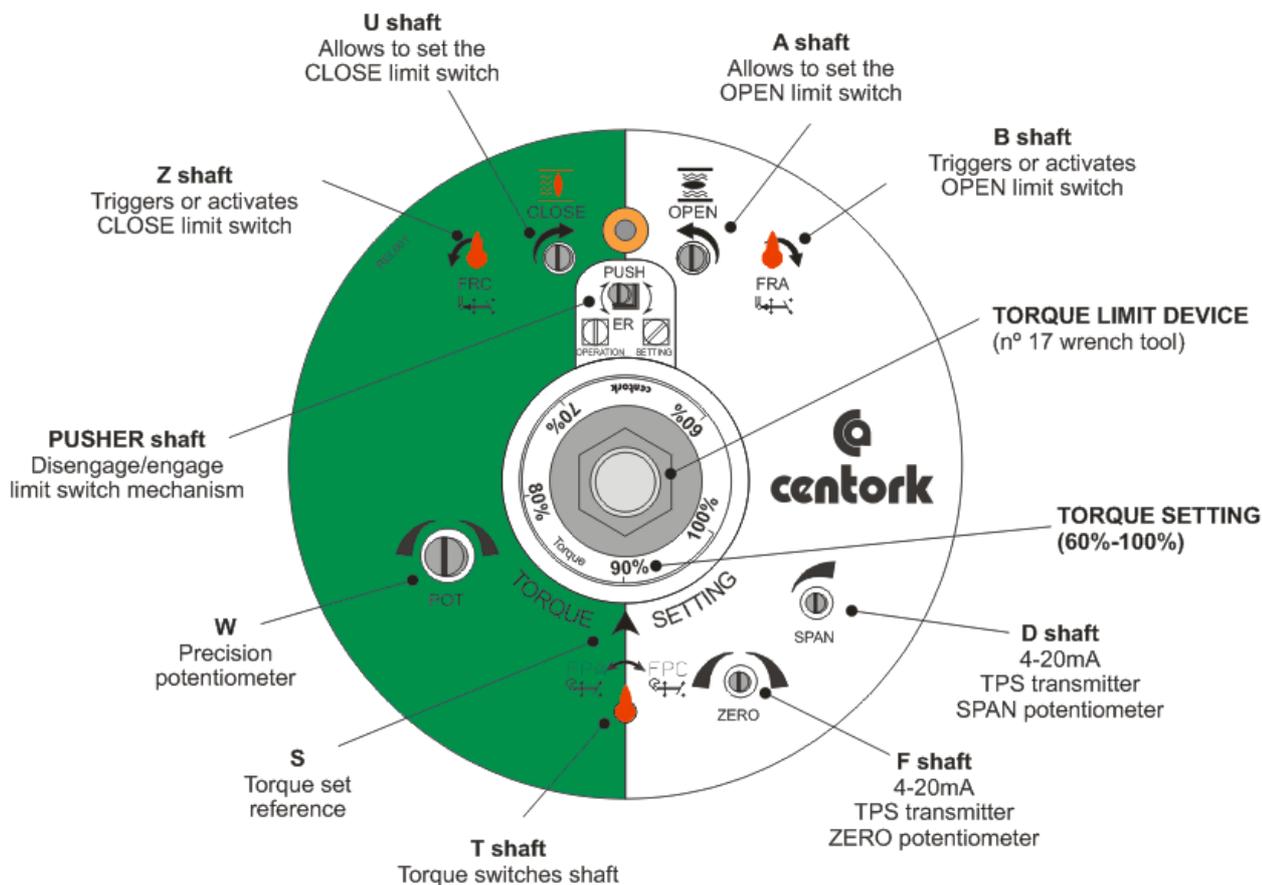


- Setting and preliminary test can only be done when finished the wiring and mounting on valve. Electric manoeuvre (Electric cabinet) and devices should be ready and checked.
- Both the torque and the limit switches setting must be carried out in accordance with the characteristics of the valve to be 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 by valve manufacturer, the settings made originally by the manufacturer should NOT be 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 section 6) 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) !

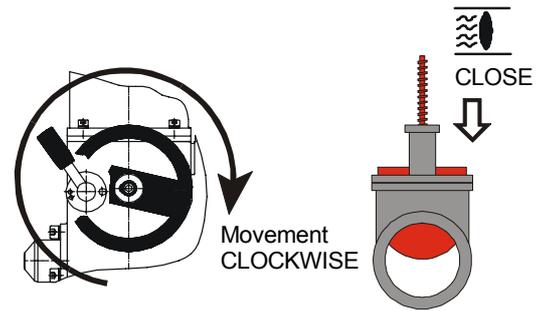
8.1 Switching and signalling unit



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)**

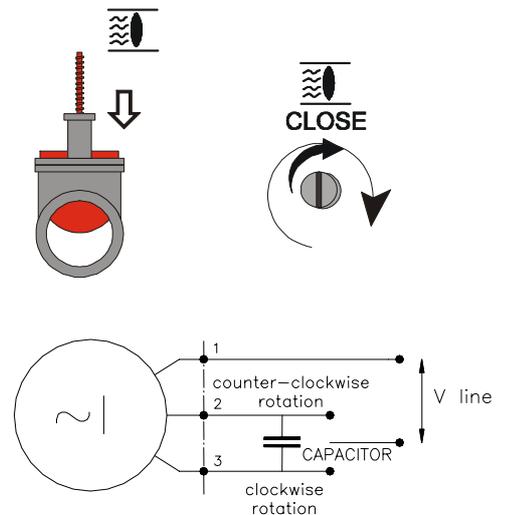
- Operate the Electric actuator via handwheel (See Manual operation chapter).
- Check that running the handwheel clockwise, valve moves to close. If the turn direction is not correct, stop immediately and verify.



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)
- For **DC motors**: Check polarity on terminals!



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' selector 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, Z red arrow 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 spindle U in the opposite direction (counter-clockwise) until the Z spindle returns vertical (Figure 8.4.5)

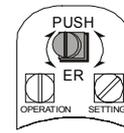


Fig. 8.4.1

Switching and signalling unit engaged to actuator.

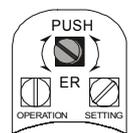
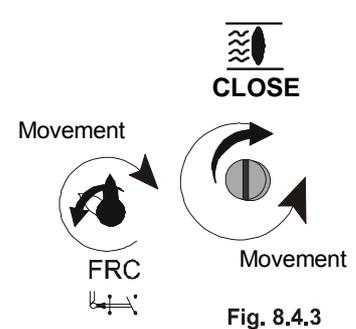
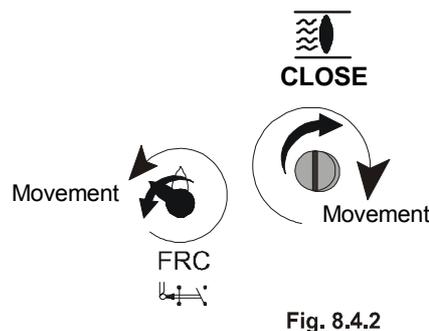
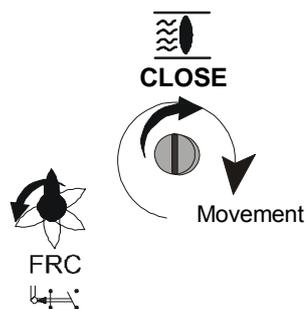


Fig. 8.4.2

Switching and signalling unit disengaged



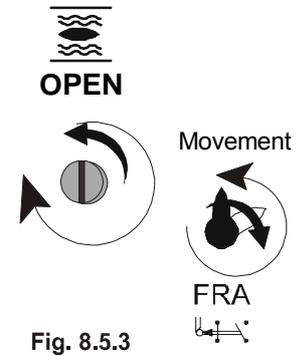
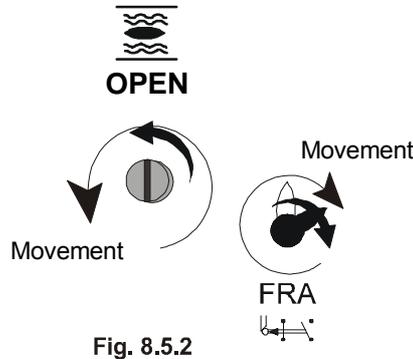
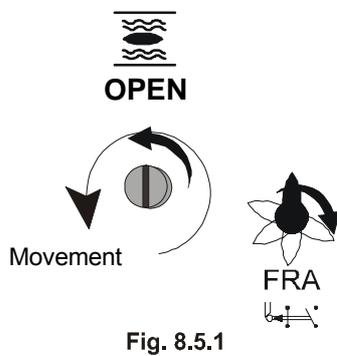


- ENGAGE PUSHER SHAFT: Turn back selector 'PUSHER'. Check that the shaft goes back to its initial position (Figure 8.4.2). **This point is fundamental for the correct setting of the limit switches: Ensure that PUSHER shaft is correctly engaged.**

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' selector 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, B red arrow 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 spindle A 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.**



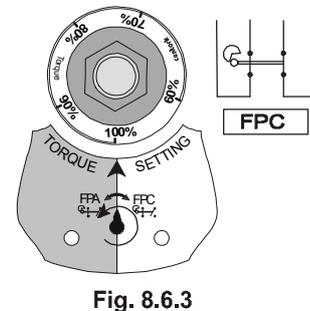
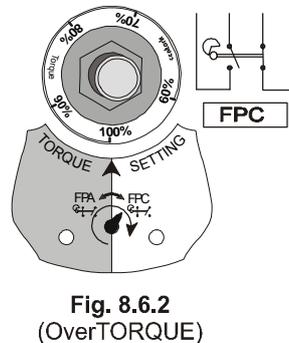
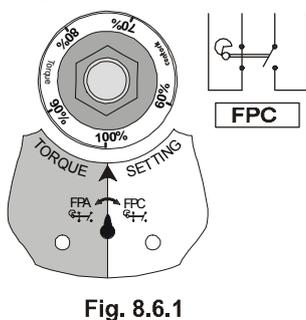
8.6 Torque switching setting

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, shaft T 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 arrow S on the dial. (Figures 8.6.4 and 8.6.5)

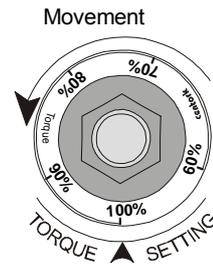


Fig. 8.6.4

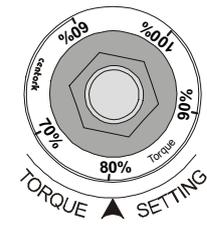


Fig. 8.6.5

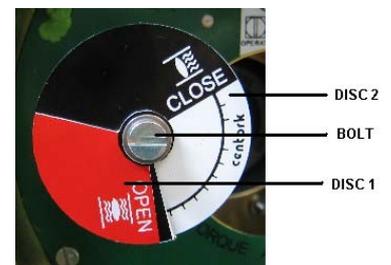
8.7 Mechanical position indicator setting (optional)

Limit switches must be set before!

Mechanical Position Indication dial turns between CLOSE and OPEN position depending on the actuator 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 Auxiliary microswitches setting (optional)

- When actuator is fitted with a mechanical position indicator, remove its discs with a screwdriver.
- Run the actuator to the position needed to set auxiliary microswitch AUX1
- With a No. 2 Allen key loosen the bolt in the cam corresponding to the auxiliary microswitch AUX1. Turn this cam until it triggers or trips the microswitch AUX1.
- Work the actuator in both directions, checking that the microswitch AUX1 correctly switches.
- Repeat points 2 to 4 for auxiliary microswitch AUX2, and AUX3.
- Check that the bolts in each cam are tightened and do not allow the shift of the cam over the cam spindle.
- If the actuator was fitted with a mechanical position indicator, reinstall it.

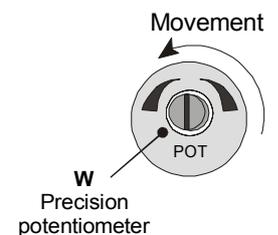


8.9 Potentiometer POT setting (optional)

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.

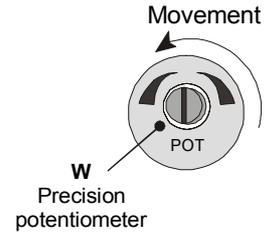
- Run the actuator to the CLOSED position.
- With a suitable screwdriver, turn the spindle (W) of the potentiometer POT, counter-clockwise, to its top end.
- Check that potentiometer value is 0 Ohms.
- Run the actuator to the OPEN position.
- Check that potentiometer value reaches its maximum (Ohms)



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.

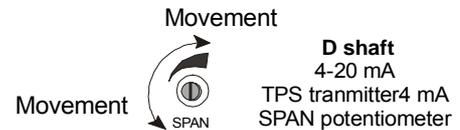
8.10 4-20 mA transmitter TPS setting (optional)

- 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 standard versions: Different configurations are possible: Two wires, three wires and four wires modes.



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 points 2, 3, 4 and 5 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.

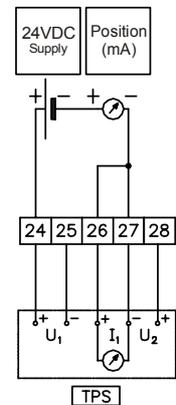
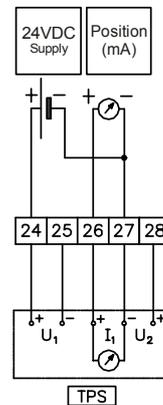
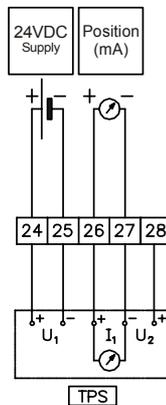
4-Wires configuration

3-Wires configuration

2-Wires configuration

8.10.1 Current (mA) output signal

(4-20 mA or 0-20 Ma)

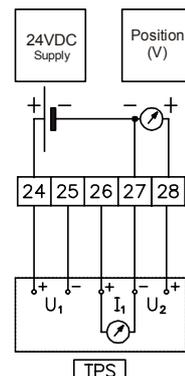
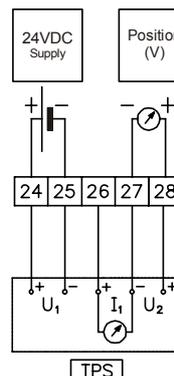


8.10.2 Voltage (V) output signal:

(0-10V or 2-10V)

4-Wires configuration

3-Wires configuration



9. MAINTENANCE

CAUTION: Safety instructions on n°2 chapter must be observed. CENTORK actuators are supplied greased from the factory for their lifetime, needing practically no maintenance.

9.1 Commissioning, after the start-up

- 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

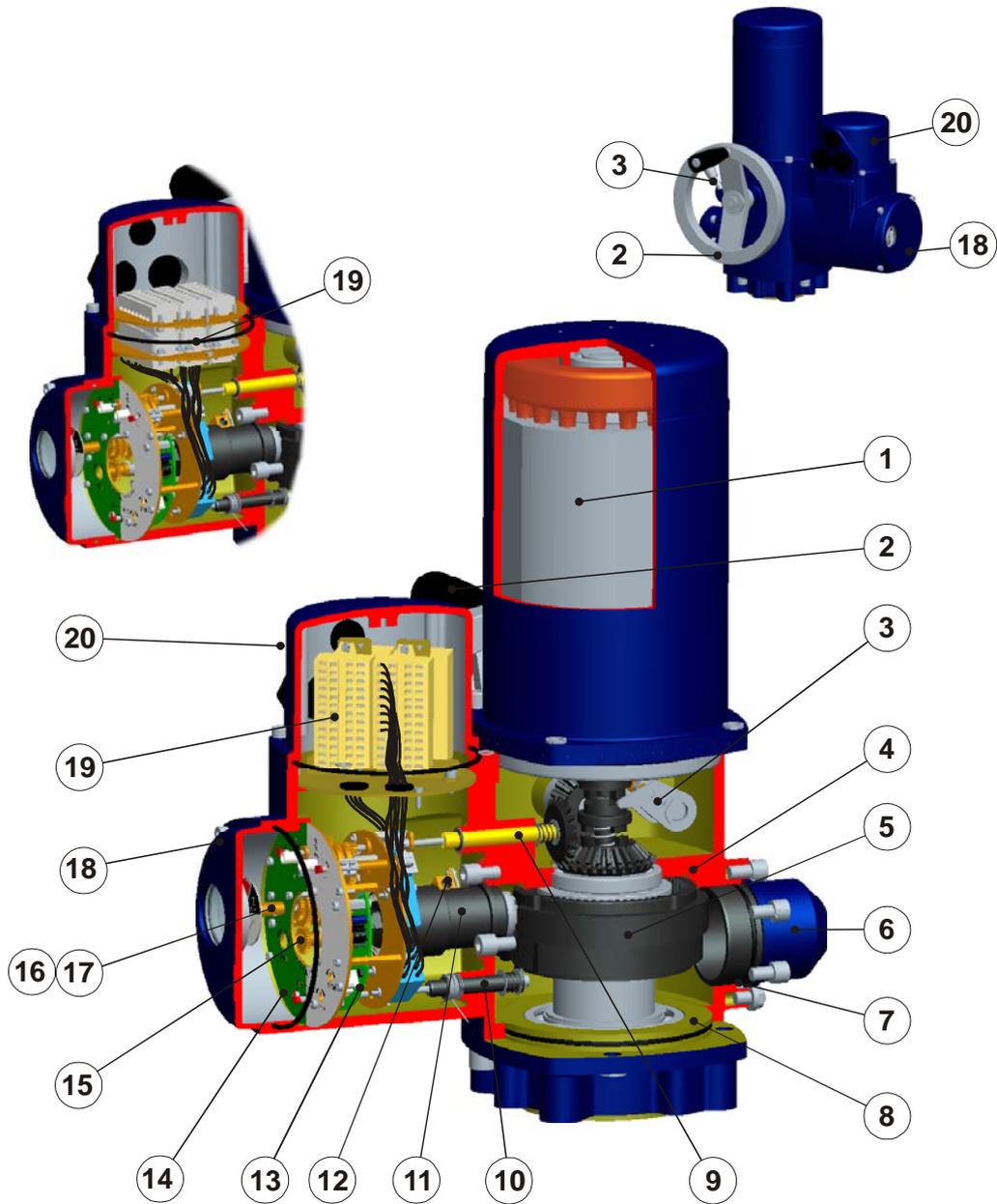
Each actuator is supplied with a datasheet on A4 format. The following is included:

- The nameplates attached to the actuator.
- 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 PART LIST



<i>Electric actuators, 400 series</i>					
Mark	Description	QTY	Mark	Description	QTY
1	Electric motor	1	12	TPS electronic position transmitter EEX ia	1
2	Handwheel and manual shaft subassembly	1	13	Heater	1
3	Override and declutch lever subassembly	1	14	Switching and signalling unit	1
4	Housing	1	15	Potentiometer subassembly	1
5	PTCS planetary subassembly	1	16	Gearing unit subassembly	1
6	Energy absorber springs subassembly	1	17	Visual indicator subassembly	1
7	External ground earth terminal	1	18	Switching and signalling unit cover	1
8	Actuator output flange	1	19	Terminal blocks with limit and torque switches	1
9	Motion measuring shaft subassembly	1	19	Plug-and-socket connector with limit and torque switches	1
10	Torque switching shaft subassembly	1	20	Electric cover	1
11	Torque regulator subassembly	1			

APPENDIX 1: 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).

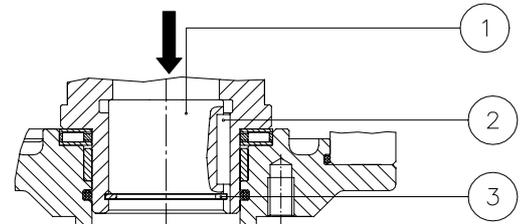


Figure 1

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).

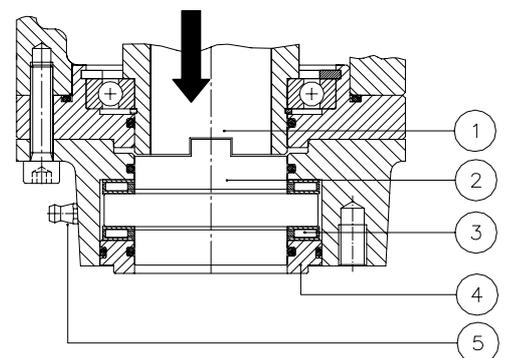


Figure 2

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).

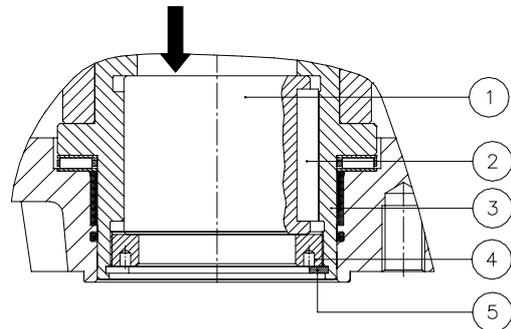


Figure 3

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).

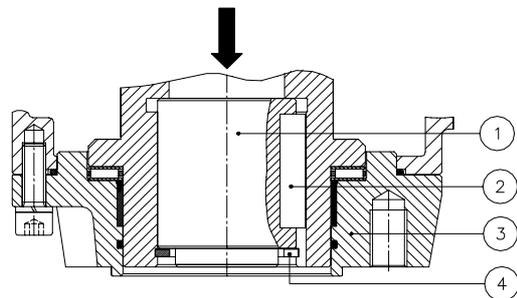


Figure 4

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).

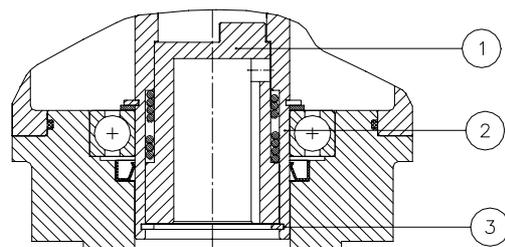


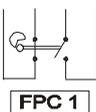
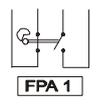
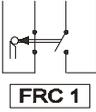
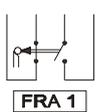
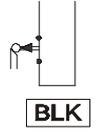
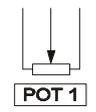
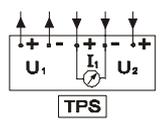
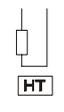
Figure 5

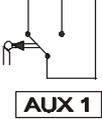
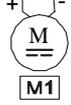
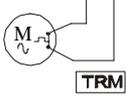
APPENDIX 2: FASTEN BOLTS (CLASS 8.8)

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

Torque values in N.m
Steel bolts class 8.8

APPENDIX 3: WIRING AND TERMINAL PLANS, LEGENDS AND SYMBOLS.

SYMBOL	DESCRIPTION	TECHNICAL FEATURES																				
	FPC: CLOSE torque microswitch.	<ul style="list-style-type: none"> Microswitch with silver contacts Type of contact: 1 NA / 1 NC Protection degree: IP67 Contacts: One fast acting Mech. Life: $5 \cdot 10^6$ Electr. live: $5 \cdot 10^6$ Microswitch circuits NO+NC contacts, only the same potential can be connected through both circuits. For different potentials, two double microswitches must be used. <table border="1"> <thead> <tr> <th rowspan="2">Silver contacts</th> <th colspan="3">AC</th> <th colspan="3">DC</th> </tr> <tr> <th>30V</th> <th>125V</th> <th>250V</th> <th>30V</th> <th>125V</th> <th>250V</th> </tr> </thead> <tbody> <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> </tbody> </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															
	FPA: OPEN torque microswitch.																					
	FRC: CLOSE limit microswitch. (CLOSE end position)																					
	FRA: OPEN limit microswitch. (OPEN end position)																					
	BLK: Movement signalling microswitch. As actuator output shaft rotates or moves, a cam acts and switches ON-OFF this BLK microswitch.	<ul style="list-style-type: none"> Microswitch with silver contacts Type of contact: 1 NA (SPDT) Protection degree: IP67 Contacts: One fast acting Mech. Life: $3 \cdot 10^7$ Electr. live: $3 \cdot 10^7$ <table border="1"> <thead> <tr> <th rowspan="2">Silver contacts</th> <th colspan="3">AC</th> <th colspan="3">DC</th> </tr> <tr> <th>30V</th> <th>125V</th> <th>250V</th> <th>30V</th> <th>125V</th> <th>250V</th> </tr> </thead> <tbody> <tr> <td>Resistance</td> <td>4A</td> <td>4A</td> <td>4A</td> <td>2A</td> <td>0.6A</td> <td>0.4A</td> </tr> </tbody> </table>	Silver contacts	AC			DC			30V	125V	250V	30V	125V	250V	Resistance	4A	4A	4A	2A	0.6A	0.4A
Silver contacts	AC			DC																		
	30V	125V	250V	30V	125V	250V																
Resistance	4A	4A	4A	2A	0.6A	0.4A																
	POT: Precision Potentiometer	<ul style="list-style-type: none"> 10 kOhms (other values on request). Ohmic value tolerance : $\pm 20\%$ std. ($\pm 10\%$ optional). Linearity : $< 1\%$. Power : 1W max. Turning angle : $340^\circ \pm 5\%$ Life : 106 cycles. Temperature range : -55°C , $+125^\circ\text{C}$. 																				
	TPS: 4-20 mA transmitter	<p><u>Output Signal (current) :</u> 2 wires : 4...20 mA . 3 and 4 wires : 0/4...20 mA.</p> <p><u>Output signal (voltage) (option) :</u> 4 wires : 0-10 V.</p> <p>Maximum supply : 30 V. AC/DC Maximum resistance : 600 Ohms</p> <p>2 wires : $R_{Lmax} = \frac{V_{cc} - 18}{2 \cdot 10^{-3}} \text{ (Ohms)}$</p> <p>Precision : $< 1\%$. R_{Lmin} (voltage reference) : 1.2 kOhms. Temperature : -25°C to $+70^\circ\text{C}$</p>																				
	HT: Heater (space heater for anti-condensation)	<ul style="list-style-type: none"> Supply voltage : 220V A.C . or 24V DC. Power consumption : 5 - 7 W. 																				

	<p>AUX1: Auxiliary switches for middle- valve positions</p>	<ul style="list-style-type: none"> - Microswitch with silver contacts - Type of contact: 1 NA (SPDT) - Protection degree: IP67 - Contacts: One fast acting - Mech. Life: $3 \cdot 10^7$ - Electr. live: $3 \cdot 10^7$ <table border="1" data-bbox="831 371 1398 474"> <thead> <tr> <th rowspan="2">Silver contacts</th> <th colspan="3">AC</th> <th colspan="3">DC</th> </tr> <tr> <th>30V</th> <th>125V</th> <th>250V</th> <th>30V</th> <th>125V</th> <th>250V</th> </tr> </thead> <tbody> <tr> <td>Resistance</td> <td>4A</td> <td>4A</td> <td>4A</td> <td>2A</td> <td>0.6A</td> <td>0.4A</td> </tr> </tbody> </table>	Silver contacts	AC			DC			30V	125V	250V	30V	125V	250V	Resistance	4A	4A	4A	2A	0.6A	0.4A
Silver contacts	AC			DC																		
	30V	125V	250V	30V	125V	250V																
Resistance	4A	4A	4A	2A	0.6A	0.4A																
	<p>M1 A.C. motor (single and three-phase)</p>	<ul style="list-style-type: none"> - Squirrel cage motor. - Isolation class F. - Main power supply: See motor nameplates. - Main voltage supply tolerance: $\pm 5\%$ 																				
	<p>M1 DC. motor</p>	<ul style="list-style-type: none"> - Main power supply: See motor nameplates. - Main voltage supply tolerance: $\pm 5\%$ 																				
	<p>TRM: Motor thermal protection via thermostatic switches (PTC thermistors on request).</p>	<ul style="list-style-type: none"> - The thermo-switches will open the circuit when the temperature of the windings reach $140\text{ }^\circ\text{C}$ and will close it when the temperature drops under $120\text{ }^\circ\text{C}$. <table border="1" data-bbox="831 898 1477 1021"> <thead> <tr> <th rowspan="2"></th> <th colspan="2">AC 250V / 50-60Hz</th> <th colspan="3">DC</th> </tr> <tr> <th>Cos $\varphi = 1$</th> <th>Cos $\varphi = 0.6$</th> <th>60V</th> <th>42V</th> <th>24V</th> </tr> </thead> <tbody> <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> </tbody> </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			
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	Cos $\varphi = 1$	Cos $\varphi = 0.6$	60V	42V	24V																	
current	2 A	1.2 A	1A	1.2A	1.8A																	

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



DECLARATION OF CONFORMITY

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

**1400. 1401. 1402. 1403. 1404. 1405. 1460. 1461. 1462. 1603. 1464. 1465.
1410. 1411. 1412. 1413. 1414. 1415. 1470. 1471. 1472. 1473. 1474. 1475**

are designed and produced to be installed on industrial valves in compliance with the essential safety requirements of the following directives

*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
EN 60204-1: 1.999*

*EN60034-1: 1.998
EN50178: 1.998
DIN VDE 0100: 1.997
DIN VDE 0530: 1982*

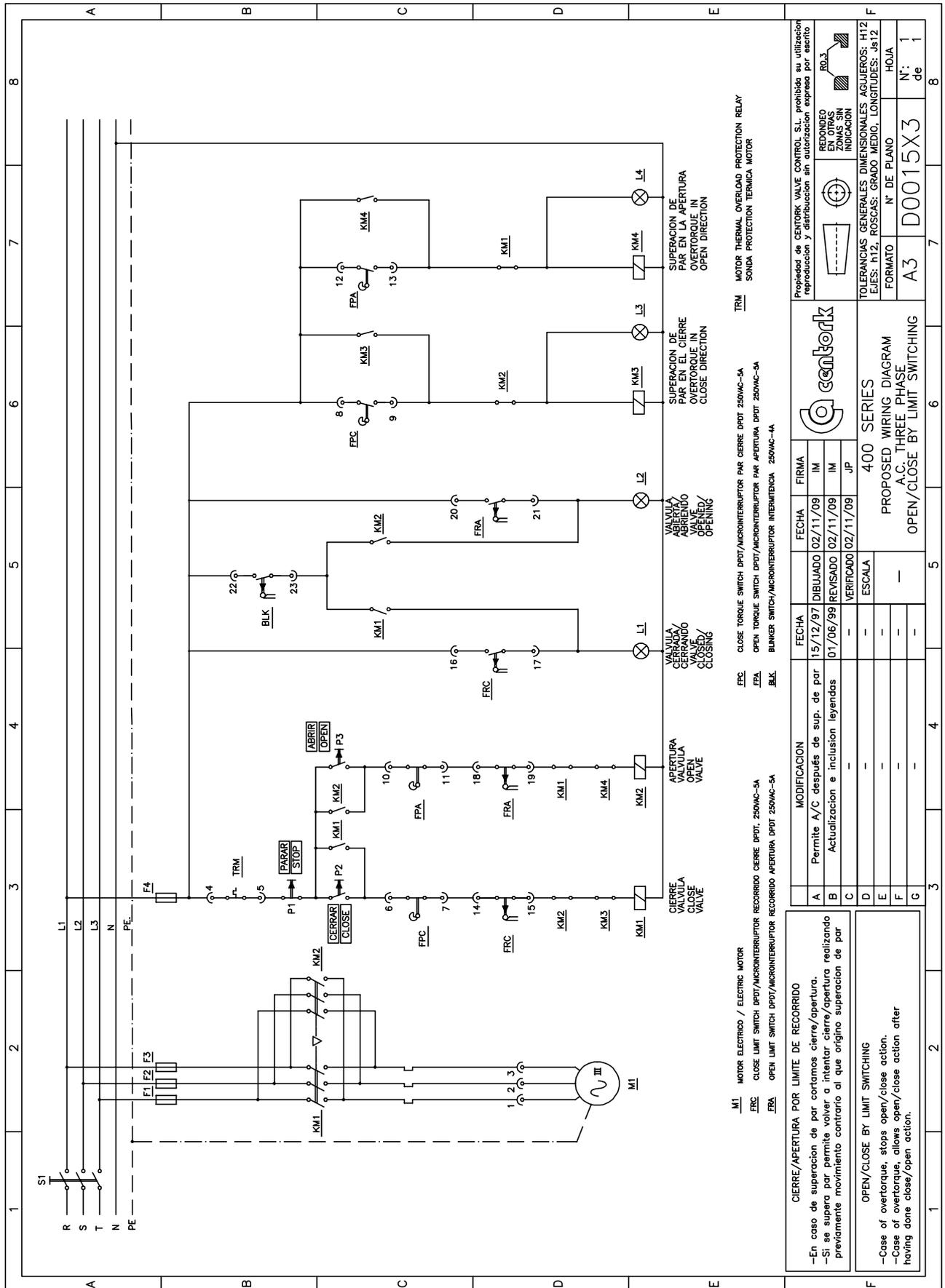
Centork actuators covered by this Declaration must not be put into service until the equipment into which they are incorporated, has been declared in conformity with the provisions of the Machinery Directive.

Lezo, 21 de Enero de 2.008



Francisco Lazcano
-General manager-

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



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

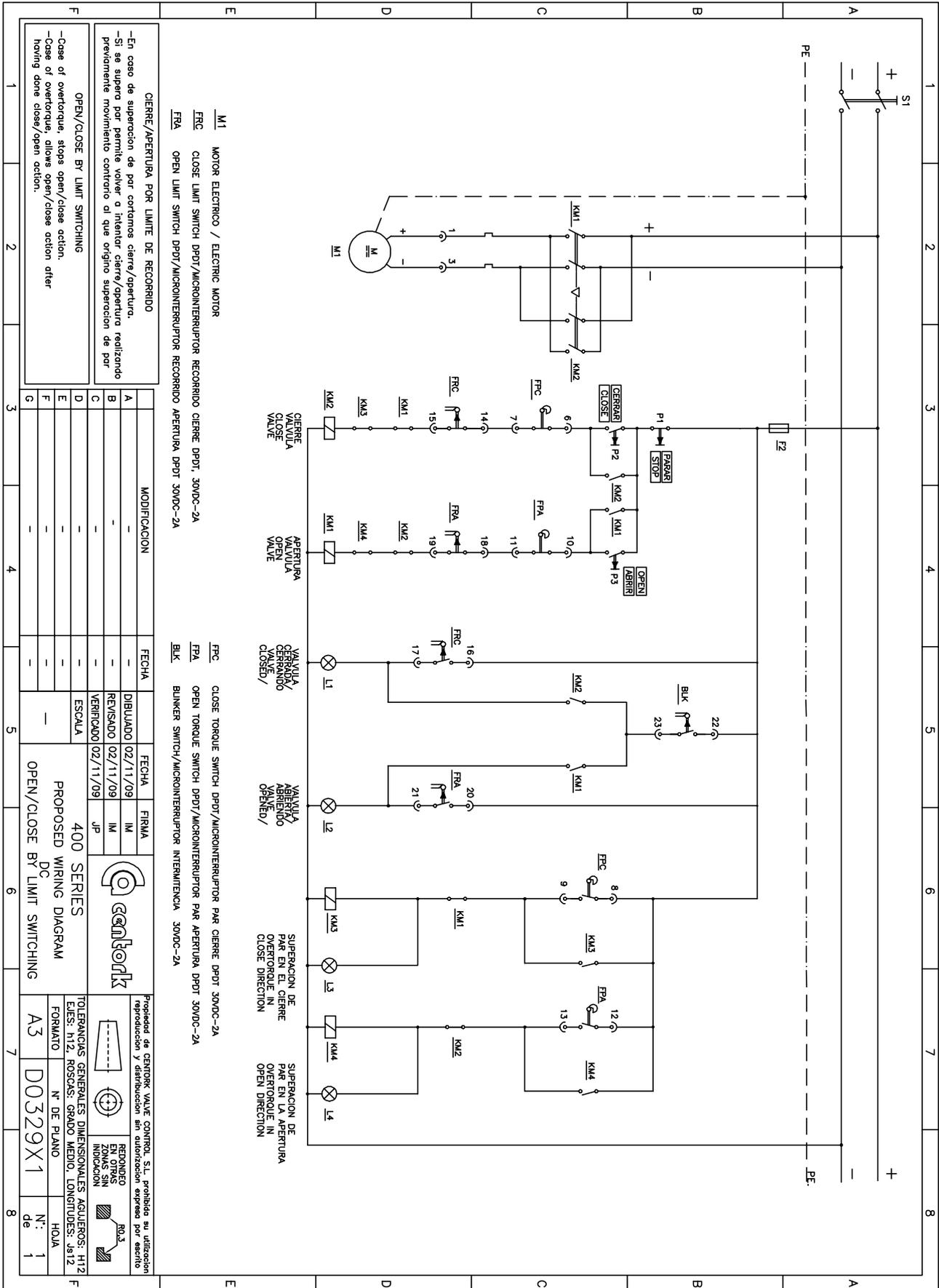
		400 SERIES	
		PROPOSED WIRING DIAGRAM A.C. THREE PHASE OPEN/CLOSE BY LIMIT SWITCHING	
FECHA	FECHA	FIRMA	FIRMA
15/12/97	02/11/09	IM	IM
01/06/99	02/11/09	IM	IM
-	VERIFICADO	02/11/09	JP
-	ESCALA	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

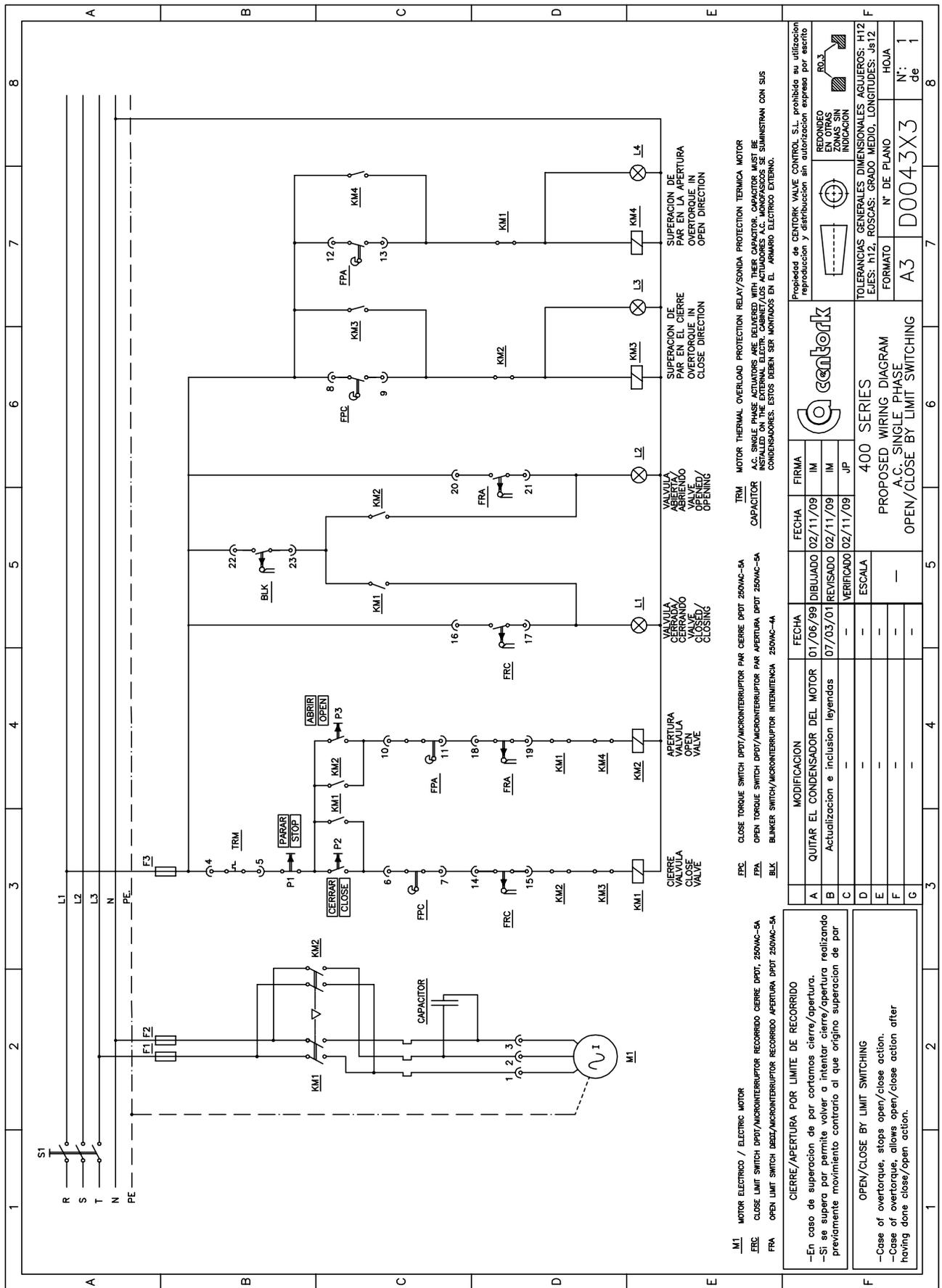
CIERRE/APERTURA POR LIMITE DE RECORDADO

-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 ELECTRIC / ELECTRIC MOTOR
FRC CLOSE LIMIT SWITCH DPDT/MICROINTERRUPTOR RECORRIDO CIERRE DPDT, 250VAC-5A
FRA OPEN LIMIT SWITCH DPDT/MICROINTERRUPTOR RECORRIDO APERTURA DPDT 250VAC-5A
TRM MOTOR THERMAL OVERLOAD PROTECTION RELAY/SONDA PROTECTION TERMICA MOTOR
CAPACITOR 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.

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.

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

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REDONDEO EN LAS UNIDADES DE INDICACION

TOLERANCIAS GENERALES DIMENSIONALES AGUJEROS: H12 ELES: h12, ROSCAS: GRADO MEDIO, LONGITUDES: js12

FORMATO N° DE PLANO: A3 D0043X3

HOJA N°: 1 de 1



CENTORK Valve Control S.L.

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Email: actuator@centork.com <http://www.centork.com>

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Edition: 12.09