centork
VALVE CONTROL

Centork electric actuators centronik units with Profibus DP

Installation and maintenance user manual

THIS USER MANUAL HAS BEEN DEVELOPED FOR centork ELECTRIC ACTUATOR 402, 412, 403, 413, 404, 414, 405 AND 415 SERIES WITH PROFIBUS-DP, AND CENTRONIK UNIT

⚠ 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
The contents in this manual is 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.

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 100ºC). Protection measures should be taken into acount 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 adopt in order to prevent impacts, hits. CENTORK delivers its actuators ex-work.
- Hits or impacts against wall, surfaces or objects might cause severe damage on Electric actuator. In this 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 can NOT be lifted/manipulated employing any lifting point of the actuator; Actuator has beend designed and sized in order to motorize industrial valves, and withstand the forces and torque required.
- Each Actuator is delivered with a set of technical documentation (User manual, datasheet, diagrams…) which has to be carefully stored.

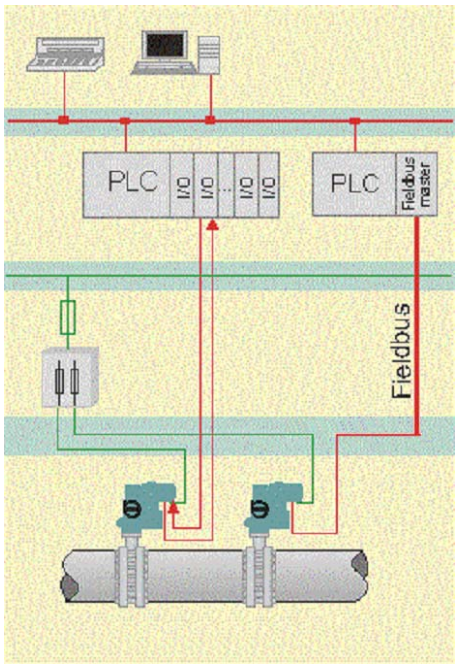
3.2 Storage and commissioning

- **Store in a clean, cool, dry and ventilated place. For other storage conditions or, and long time periods (More than 5 months) contact to manufacturer.**
- Check that electrical connection cover and switching and signalling unit cover and are correctly closed ant 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 handle it by picking it up by the handwheel.
- **Just when commissioning, CENTORK recommend a visual inspection in order to detect any anomaly caused during the transport, and during the storage as well. Checking should include a visual inspection of electric compartment, and switching and signalling unit .**
- Each Actuator is delivered with a set of technical documentation (User manual, datasheet, diagrams…) which has to be carefully stored.
- For further details, consult the technical sheet ‘Conditions for Transport and Storage’.

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.
- Power supply and controls elements (transformer, relays, leds, electronic boards…) are included in the Centronik unit. Centronik unit has CPU microprocessor and electronic boards: Electric actuator is operated and controlled by means of these electronic and electric device of the centronik unit, being supplyied with main power.
- Electric actuator can be controlled in LOCAL mode from the centronik front panel or in REMOTE mode.
- 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 Operation modes: OFF, LOCAL and REMOTE mode

Electric actuator can be controlled by the control station (REMOTE mode) and at the local control (LOCAL mode). Centronik unit is equipped with local controls. The lockable selector switch LOCAL/OFF/REMOTE allows the operation mode to be set.

4.2.1 OFF mode.

- In this operation mode, the actuator remains connected but does not responds to any order from the front panel or from the remote control. The front panel control indicates only the power supply status (led 5).

4.2.2 LOCAL mode.

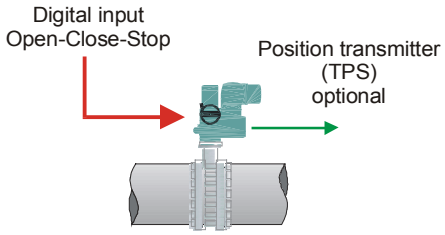
- With the push buttons OPEN-CLOSE-STOP located on the centronik front panel, the actuator is operated locally. 5 indication lights (LEDs) show the actuator status from the centronik front panel (chapter 9.12.2).
- Push buttons are self-retaining type: Once the push button has been pressed , its order or action is generated, and it remains “active” until a new order or command is generated, or any operation event takes place such us a limit switch or torque signal, an anomaly action or any centronik function or event. It is NOT necessary to keep “pressing” the pushbutton or the remote input.

4.2.3 REMOTE mode.

Electric actuator with ON/OFF duty control:

- Electric actuator can be controlled by the control station (REMOTE) with the commands OPEN-CLOSE-STOP (self- retaining) or OPEN-CLOSE as option (push to run operation), or with Fieldbus communication.
- ON/OFF duty control means open loop control.
- With self-retaining operation, the actuator continues to run as long as the STOP command from the control system (digital input) is not being generated, or any centronik operation condition takes place.
- With push to run operation (Inching mode) the actuator continues to run as long as this command from the control system (digital input) remains. It is necessary to keep "pressing" the pushbutton or the remote input.
- Electronic position transmitter (0-4/20mA, 0-2/10V or resistive value) can be employed, as option, which in order to provide the real valve position indication.

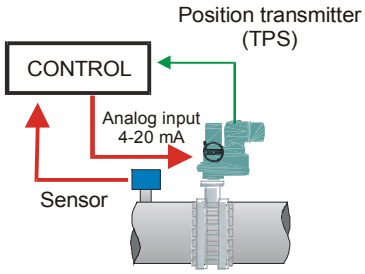
OPEN loop control
centronik ON/OFF duty



Electric actuator with Modulating duty control:

- Electric actuator is equipped with an electronic integral positioner which automatically positions the valve in accordance with the analog input control signal (4/20mA current signal and voltage signal as option) or the input control from Fieldbus communication.
- Modulating duty control means close loop control. The modulating duty registers and compares the analog input control and the actual position value (Feedback signa given by actuator position transmitter). The electric actuator runs to OPEN or CLOSE direction, according to the deviation detected.
- The modulationg behaviour is stabilised by determining inner (internal) and outer (external) dead bands, rest time and therefore the wear of valve and actuator can be reduced.

CLOSE loop control
centronik Modulating duty



4.3 Temperature range

CENTORK Electric actuators work in a temperature range from -20ºC to +65ºC.

4.4 Actuator and motor duty service

Electric actuator has been designed for valve motorization which requires ON-OFF and inching or 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.

4.5 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 CONNNECTIONS) .
- 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 technical datasheets.
- 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.

5 ABOUT PROFIBUS-DP

Nowadays information technology (IT) is increasingly determining growth in the world of automation. The communications capability of devices and continuous, transparent information routes are indispensable components of future-oriented automation concepts. ProfiBus represents one of the best-known industrial FieldBus protocols from Europe. ProfiBus can be used in a very wide range of applications as a multi-application communications link for industrial devices, as well as cell-level communication.

Standardized as EN50.170, ensures manufacturers and users investments and guarantees the independence of the manufacturer.

These user manual does not pretend to provide a detailed introduction to PROFIBUS-DP. If more detailed information were needed, please refer to specialized bibliography.

5.1 General description

ProfiBus utilizes a non-powered two-wire (RS485) network. A ProfiBus Network may have up to 126 nodes. It can transfer a maximum of 244 bytes data per node per cycle. Communication (baud) rates are selectable but overall end-to-end network distance varies with speed. Maximum Communication (baud) rate is 12Mbps with a maximum distance of 100M (328ft). The maximum distance is 1200M (3936 ft) at 93.75Kbps without repeaters.

ProfiBus connects to a wide variety of field devices including discrete and analog I/O, drives, robots, HMI/MMI products, pneumatic valves, actuators, transducers, and flow measuring equipment.

The data flows by the field cyclically. The Master devices of the fieldbus, are the ones to control the data flow cycles in the fieldbus. They are capable of sending messages without an external request. The Slave devices are those that only can listen to the messages sent by a master and answer that message if was sent to its address. CENTRONIK PROFIBUS-DP actuators can only be slave devices. Typical slave devices are input/output devices, actuators and plant sensors. They never have bus access, they only acknowledge or reply messages coming from a master.

5.2 Network overview

The media for the fieldbus is a shielded copper cable consisting of a twisted pair. The baudrate for the bus is between 9.6 Kbaud to max. 12 Mbaud. The PROFIBUS-DP network can consist of 126 nodes and the total amount of data for PROFIBUS-DP are 244 Byte out per node and 244 Byte in per node.

NOTE: Node No. 126 is only used for commissioning purposes and should not be used to exchange user data.

5.3 Technical features for PROFIBUS-DP

The table below gives a summary of the technical features and the figure on the next side shows the bus cycle time of a PROFIBUS-DP system.

Summary Technical Features for PROFIBUS-DP	
Transmission technique: **PROFIBUS DIN 19245 Part 1**	EIA RS 485 twisted pair cable or fiber optic 9.6 Kbit/s up to 12Mbit/s, max. distance 200m at 1.5 Mbit/s extendible with repeaters
Medium access: Hybrid medium access protocol according to DIN 19245 Part 1	Mono-Master or Multi-Master systems supported Master Slave Devices, max. 126 stations possible
Communications: Peer-to-Peer (user data transfer) or Multicast (synchronization)	Cyclic Master-Slave transfer and acyclic Master-Master data transfer
Operation Modes:	Operate: cyclic transfer of input and output data Clear: inputs are read and outputs are cleared Stop: Only Master-Master functions are possible
Synchronization: enables synchronization of the inputs and/or outputs of all DP Slaves	Sync-Mode: Outputs are synchronized Freeze-Mode: Inputs are synchronized
Functionality:	Cyclic user data transfer between DP-Master(s) and DP Slave(s) Activation or deactivation of individual DP-Slaves Checking of the configuration of the DP-Slaves Powerful diagnosis mechanisms, 3 hierarchical levels of the diagnosis messages Synchronization of inputs and/or outputs Address assignments for the DP-Slaves over the bus with Master class 2 Configuration of the DP-Master (DPM1) over the bus Max. 244 bytes input and output data per DP-Slave, typical 32 bytes
Security and protection mechanisms:	All messages are transmitted with Hamming Distance HD=4 Watch-Dog Timer at DP-Slaves Access protection for the inputs/outputs at the DP-Slaves Data transfer monitoring with configurable timer interval at the DP-Master (DPM1)
Cabling and installation:	Connecting or disconnecting of stations without affection of other stations

6 CENTORK PROFIBUS-DP INTERFACE OVERVIEW

This section provides an overview over the PROFIBUS-DP interface of the CENTRONIK electric actuators.

6.1 Mechanical overview

The interface for Profibus-DP, located in the centroniik unit, is a slave node that can be read and written to, from a Profibus-DP master station. The interface Profibus-DP will not initiate communication to other nodes, it will only respond to incoming commands.

6.2 Protocol & Supported Functions

- Fieldbus type: PROFIBUS-DP EN 50.170 (DIN 19.245)
- Protocol version: ver. 1.10
- Protocol stack supplier: SIEMENS
- Extended functions supported: Diagnostics & User Parameter data.
- Auto baudrate detection supported. Baudrate range: 9.6 Kbit-12Mbit
- Hardware prepared for DP-V1 extensions.
- Save/Load configuration in Flash supported.

6.3 Physical Interface

- Transmission media: Profibus bus line, type A or B specified in EN50.170
- Topology: Master-Slave communication
- Fieldbus connectors: Standard Centork connecting terminals,9 pin female DSUB, on demand.
- Cable: Shielded copper cable, Twisted pair
- Isolation: The bus is galvanically separated from the other electronics with an on board DC/DC converter. Bus signals (A-line and B-line) are isolated via opto-couplers.
- Profibus-DP communication ASIC: SPC3 chip from Siemens.

6.4 Configuration & Indications

- Address range: 1-99.
- Maximum cyclic I/O data size: 244 bytes in, max 244 bytes out, max. 416 bytes total
- Maximum User Parameter data/Diagnostics length: 237 bytes.
- Bus termination switch onboard.
- LED-indications: ON-line, OFF-line, Fieldbus related diagnostic.

6.5 Data Exchange

- I/O data transmission: The interface only supports cyclic I/O data transmission.

7 MOUNTING TO THE VALVE

7.1 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

7.2 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.

7.3 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 .

7.4 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).
- The valve output shaft must be inline with the actuator output drive to avoid side-loading the shaft. To avoid any backlash no flexibility in the mounting bracket or mounting should be allowed.
- Using ISO Class 8.8 quality bolts, fasten crosswise controlling the applied torque according to the table in Appendix

8 ELECTRICAL CONNECTIONS

CAUTION: Safety instructions on chapter 2 must be observed. Work on electrical system or equipment must only be carried out by skilled electrician.

8.1 Wiring diagram (electric manoeuvre)

Electric actuator datasheet, supplied with the actuator, includes a **PROPOSED WIRING DIAGRAM**, delivered with other technical documentation**.**

Capacitors for single-phase A.C. motors are delivered with electric actuators. In case of external connection, when due to capacitor dimension it is not possible to mount it inside of the centronik unit (Capacitors C>30 μF), capacitors have to be installed on electric cabinet (External), as it is depicted on the actuator terminal plan. Each capacitor is dimensioned according to motor voltage and power.

Features of electric and electronic components listed on appendix. Wiring diagram are included on appendix.

8.2 Terminal plan and wiring

The electric connection diagram or terminal plan is depicted on Electric actuator datasheet, supplied with the electric 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.**

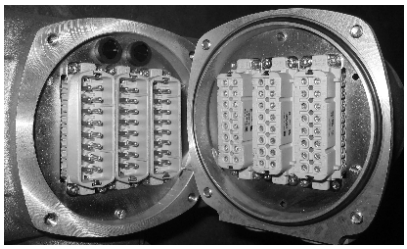


Figure 8.2.1

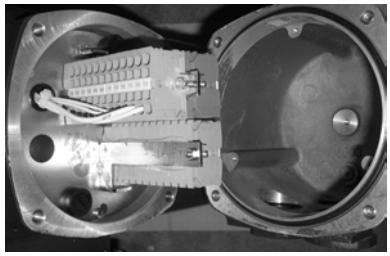


Figure 8.2.2

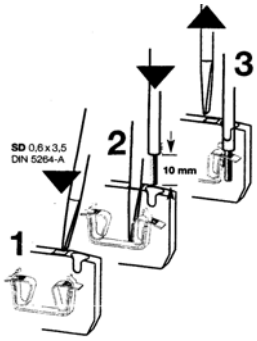


Figure 8.2.3

A) Electric actuator with **Plug-socket connectors** (Figure 8.2.1) 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** (Figure 8.2.2)

- 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 8.2.3).

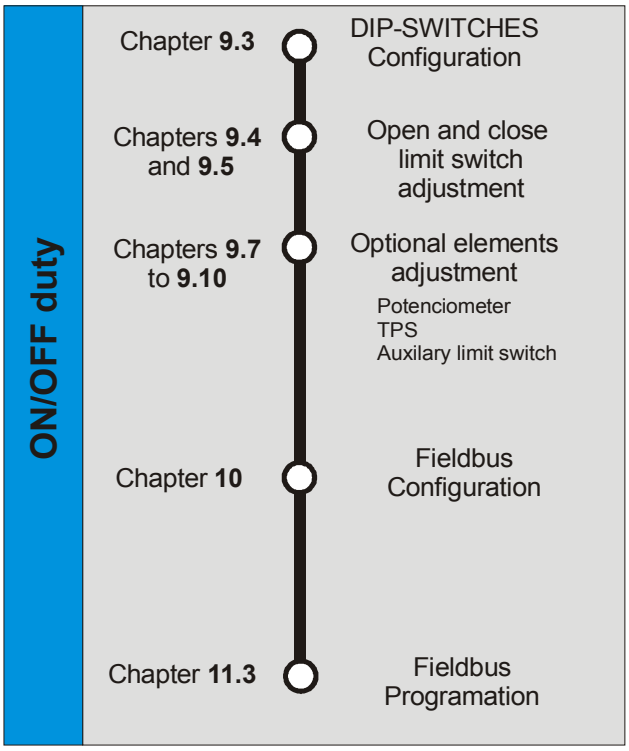
Caution!

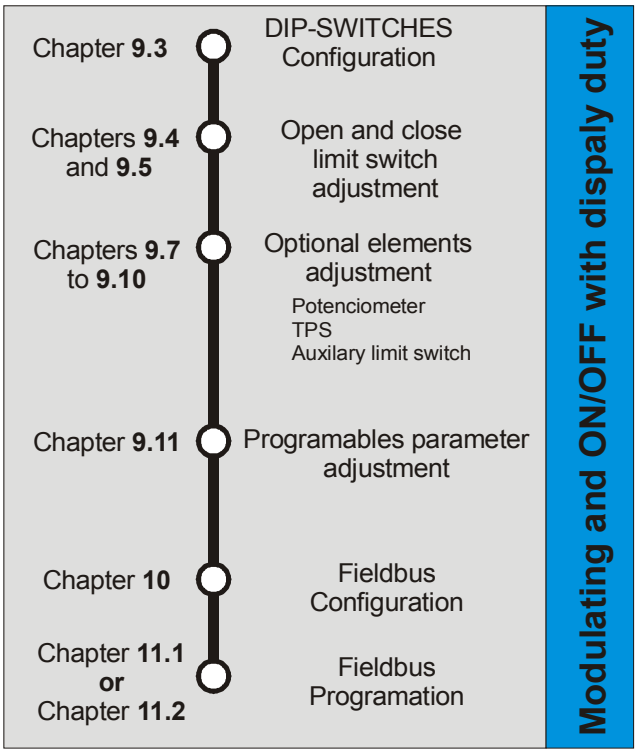
- Connect the earth cable terminal ⏚ to the earth connection located inside of electric connection cover (M5 screw hole).
- Once you have checked that the connections have been properly carried out, close the connection cover and check the proper connection, the state of the o-ring seal and the proper installation of the latter, greasing it slightly. Fasten the 4 screws crosswise.
- Fix proper cable glands according to IP67 or IP68 protection degree. **Replace the protection plug with suitable metallic protection plug sealed with PTFE** . Tighten cable glands and protection plugs to ensure enclosure IP67 (IP68 if applicable).
- Check that all cable glands are correctly tighten.
- Clean sealing faces at terminal cover and check whether O-ring is in good condition. Mount cover and tighten cover bolts.

9 PRELIMINARY TEST AND SETTINGS

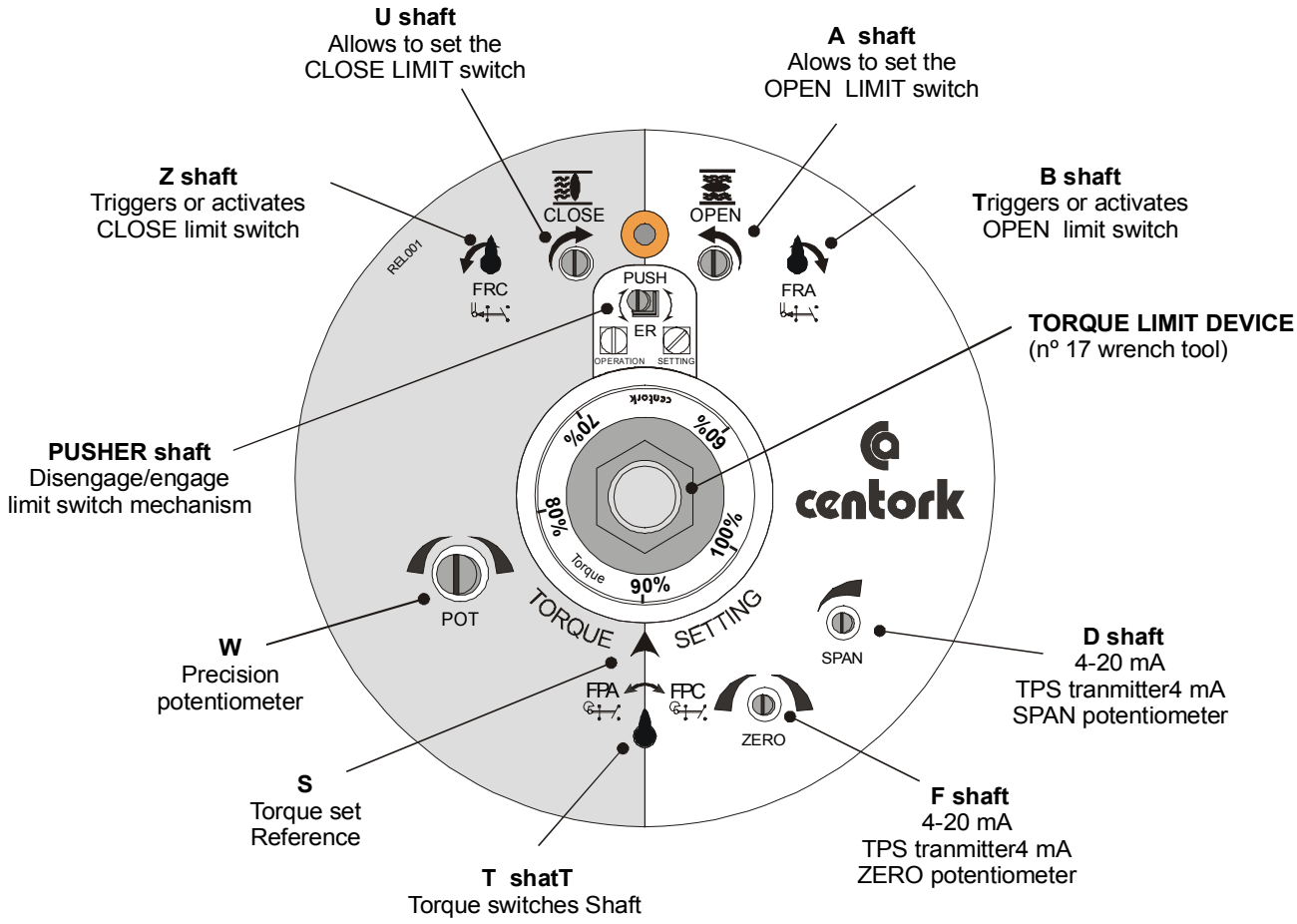
CAUTION: SAFETY INSTRUCTIONS described on chapter 2 must be observed. Work on electrical system or equipment must only be carried out by skilled electrician.

- Before to start with the preliminary test, actuator should be correctly mounted on valve and correctly wired as well, according to previous chapters (7 and 8I).
- Operate or move the valve manually (Chapter 9.2) and check that the actuator rotates in the right direction (Visual disc indicator or valve shaft could help for this). Instructions have been made for standard electric actuators: CLOCKWISE TO CLOSE.
- Achieve the following setting procedure:





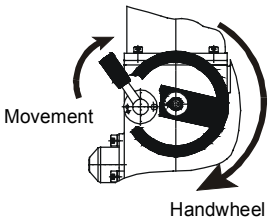
9.1 Switching and signalling unit



9.2 Manual operation

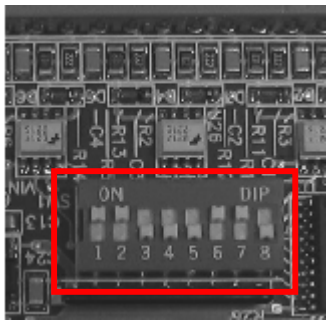
- CENTORK actuators are fitted with a handwheel for the manual actuation of the valve.
- In the case of simultaneous motorised and manual working, the motorised one will always be the preferential one.
- Once the handwheel has been engaged is not possible to disengaged, **the override engagement lever returns automatically to motor position when the motor is operated. Do not press the lever when motor is running.**

Engagement of manual operation:



- Turn the change-over lever 20º 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.

9.3 DIP-SWITCHES configuration



Caution!

This is a sensitive electronic device. Manipulation of setting switches should be mde very carrefuly, in a way that other electronic components are not damaged.

In order to confugurate the Dip-switches, switch-off the Centronik unit (led 5 OFF) and open the centronik front panel carefully. In the CPU board, the Dip-switches are located as indicated in the next figure.

9.3.1 Operation mode

SW1	SW2	SW3	Operation mode
ON	**OFF**	**OFF**	Open by limit switching and close by torque switching
OFF	**ON**	**OFF**	Open and close by limit switching
ON	**ON**	**OFF**	Open and close by torque switching

Note: Open or close by torque switching means that the Centronik consider that the valve is close or open when the open/close limit switch and the open/close torque switch are activated. Limit switch must be adjust as in Open and close by limit switch.

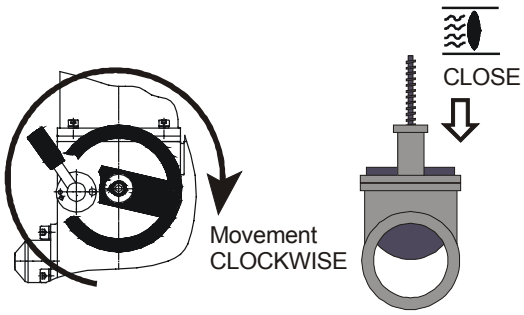
9.3.2 Digital or Relay Outputs configuration (only in ON/OFF duty)

SW5	SW6	SW7	OUTPUT 1	OUTPUT 2	OUTPUT 3	OUTPUT 4	OUTPUT 5
OFF	**OFF**	**OFF**	Valve OPEN	Valve CLOSE	LOCAL	REMOTE	ANOMALY
ON	**OFF**	**OFF**	Overtorque reached in OPEN	Overtorque reched in CLOSE	LOCAL	REMOTE	ANOMALY
OFF	**ON**	**OFF**	Valve OPEN	Overtorque reched in CLOSE	LOCAL	REMOTE	ANOMALY
ON	**ON**	**OFF**	Valve OPEN	Valve CLOSE	Overtorque reched in OPEN	Overtorque reched in CLOSE	ANOMALY
OFF	**OFF**	**ON**	Valve OPEN	Valve CLOSE	Overtorque	Motor protection tripped	ANOMALY

Anomaly: Motor protection tripped, limit switch fault, torque switch fault, blinker fault or lost phase.

9.3.3 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 CLOCK. 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.
- Configurate the dip-switch 4

SW4	Direction to close
ON	Anti-clockwise
OFF	Clockwise

Instructions have been made for standard electric actuators: CLOCKWISE TO CLOSE

9.3.4 Posicion transmitter range (only in Modulating duty and ON/OFF duty with display)

SW6	TPS range
OFF	0/20mA
ON	4/20mA

Note: the SW6 must be configurated in accordance to the TPS setting (Chapter 9.10).

9.3.5 Remote mode selection

SW8	Remote mode selection
ON	Analog input control (modulating duty) Paralel input control (ON/OFF duty):
OFF	Fieldbus control.

Once the dip switches have been configureted, close the frontal panel: Check that any wire is not tripped by frontal planel, when closing and verify that o-ring is not damaged or cut. Centronik frontal panel has to be correctly tighten.

9.4 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 45º, ensure that it does not return to its original height (See figure 9.4.1)
- Note: Pusher shaft allow to engage/disengage the switching and signalling unit from Electric actuator gears. (Figures 9.4.1 and 9.4.2)

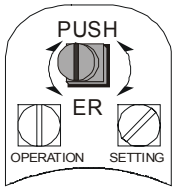


Fig. 9.4.1

Switching and signalling unit engaged to actuator.

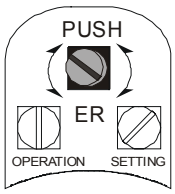


Fig. 9.4.2

Switching and signalling unit disengaged

- Turn U spindle clockwise (Figure 9.4.3) 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 (Figure 9.4.4).
- 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 9.4.5)

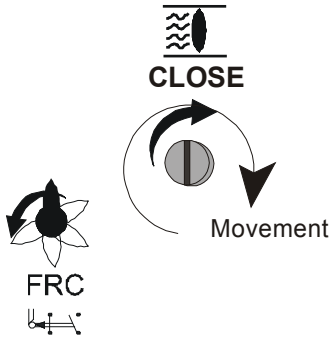


Fig. 9.4.3

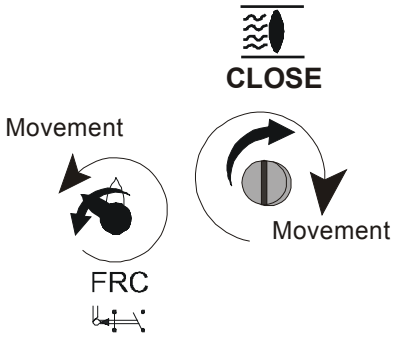


Fig. 9.4.4

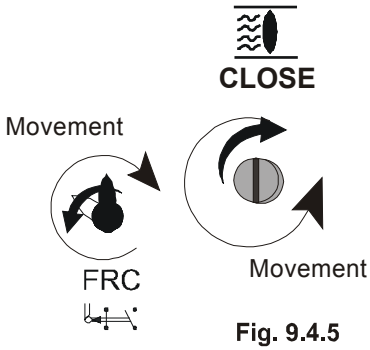


Fig. 9.4.5

- ENGAGE PUSHER SHAFT: Turn back selector 'PUSHER'. Check that go back to its initial position (Figure 9.4.2). **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. Max allowable input speed can not exceed 200 rpm.

9.5 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 45º, ensure that it does not return to its original height (See figure 9.4.1)
- Turn A spindle Counter-clockwise (Figure 9.5.1) 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 (Figure 9.5.2).
- 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 9.5.3)
- ENGAGE PUSHER SHAFT: Turn back selector 'PUSHER'. Check that go back to its initial position (Figure 9.4.2). **This point is fundamental for the correct setting of the limit switches: Ensure that PUSHER shaft is correctly engaged.**

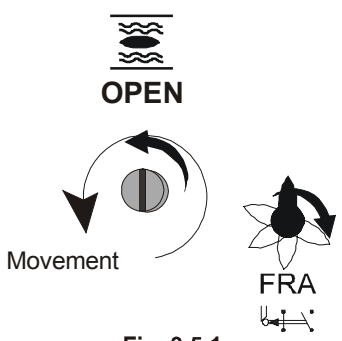


Fig. 9.5.1

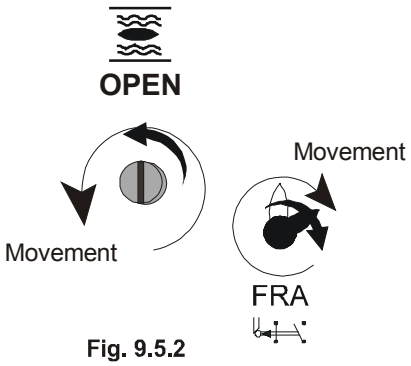


Fig. 9.5.2

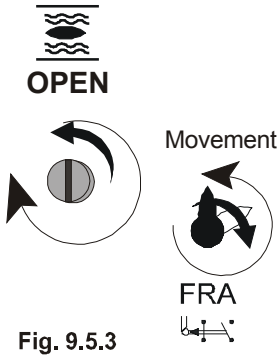


Fig. 9.5.3

9.6 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.

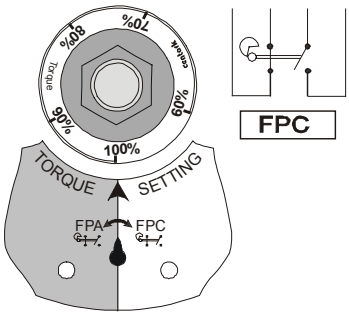
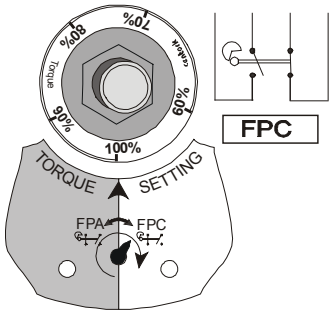


Fig. 9.6.1



(OverTORQUE)

Fig. 9.6.2

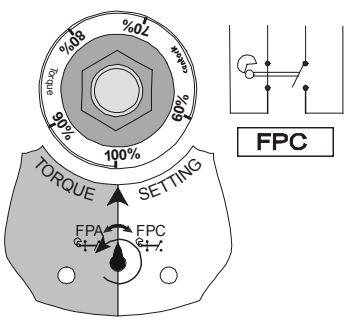


Fig. 9.6.3

- 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 9.6.1 and 9.6.2). FPC microswitch is tripped. Automatically, or when actuator starts running to opposite direction, mechanism returns or resets. Notice that central SHAFT latches again. (Figure 9.6.3)

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 9.6.4 and 9.6.5)

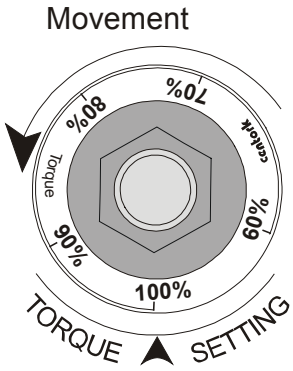


Fig 9.6.4

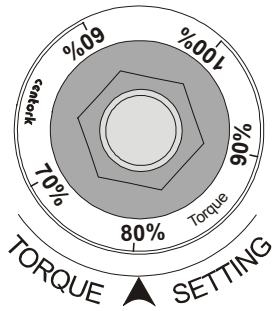
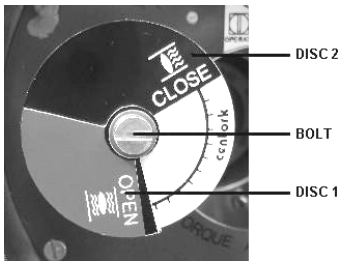


Fig 9.6.5

9.7 Mechanical position indicator setting (optional)

Limit switches must be set before!

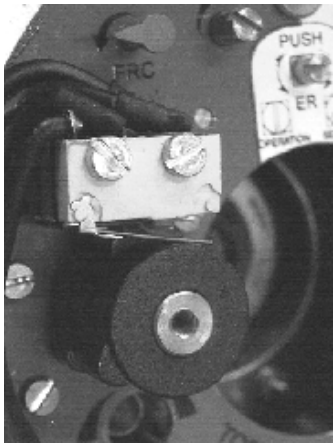
Mechanical Position Indication dial turns between CLOSE and OPEN position depending on the model and valve stroke. This is achieved with the addition of a suitable gearing according to the number of turns per valve stroke. If the latter varies, the gearing must be changed.



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.

9.8 Auxiliary microswitches setting (optional)

Limit switches must be set before!



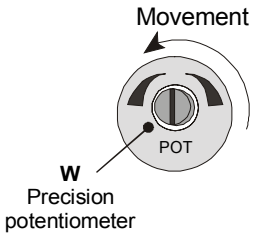
Procedure:
- When actuator is fitted with a mechanical position indicator, remove its discs with a screwdriver.
- Run the actuator to the position needed to set auxiliary microswitch AUX1
- With a No. 2 Allen key loosen the bolt in the cam corresponding to the auxiliary microswitch AUX1. Turn this cam 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.

9.9 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.



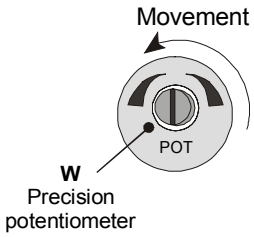
Procedure:
- Run the actuator to the CLOSED position.
- With a suitable screwdriver, turn the spindle (W) of the potentiometer POT, counter-clockwise, to its top end.
- Check that potentiometer value is 0 Ohms.
- Run the actuator to the OPEN position.
- Check that potentiometer value reaches its maximum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

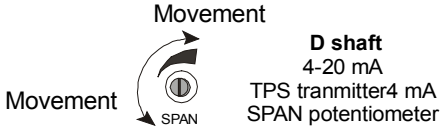
9.10 0/4-20 mA transmitter TPS setting (optional)

Limit switches must be set before!

0/4-20 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.



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 or 0mA
- 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 or 0mA. If this is not the case, repeat points 2, 3, 4 and 5 until optimum adjustment values are reached.



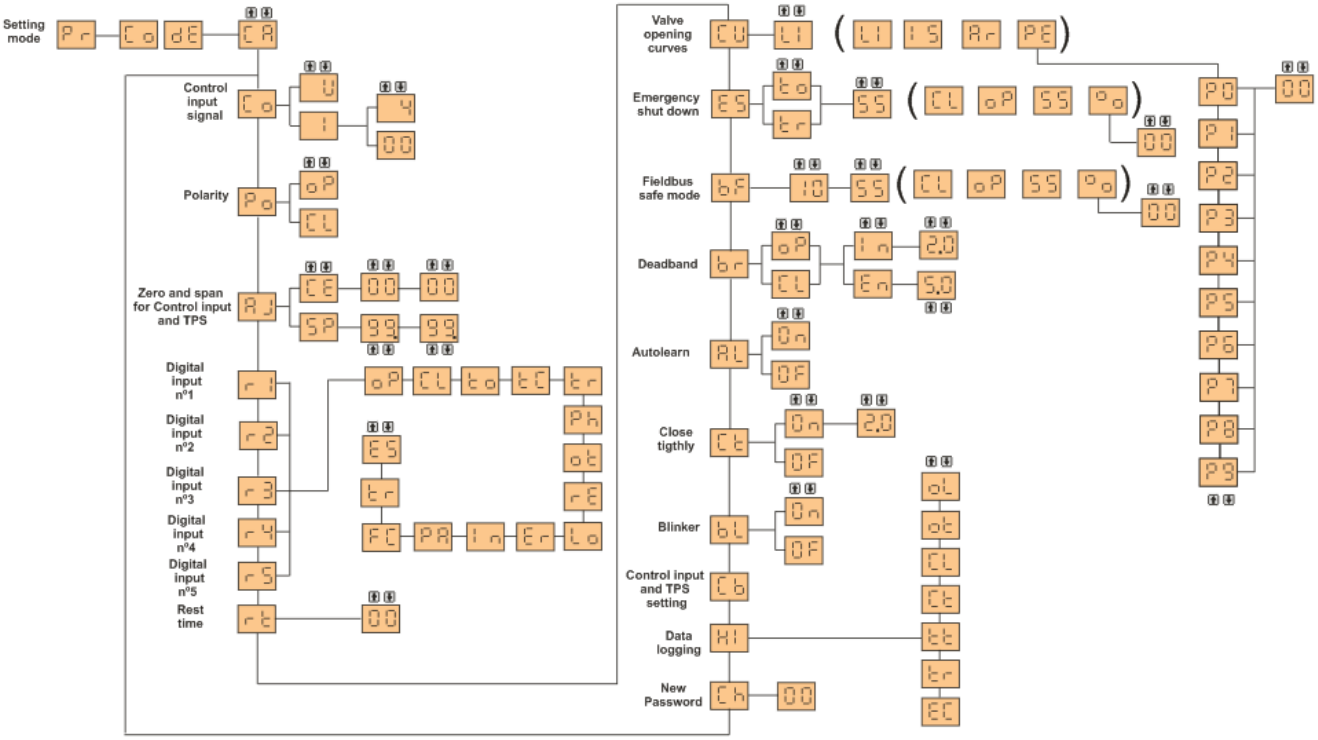
CAUTION: The TPS electronic position transmitter is a high precision electronic device and should be handled carefully. It is necessary to use a suitable screwdriver for its setting.

9.11 CENTRONIK setting procedure (only in Modulating and ON/OFF with display duty)

All the setting functions are stored in a non-volatile memory in the CENTRONIK unit. The front panel enables the user to view all the functions via the display. As each function is viewed its setting can be checked and, if required, changed within the bounds of that function.

The setting procedure include the following functions:

- Control input signal
- Polarity
- Control input and TPS setting
- Deadband
- Rest time
- Close tightly
- Valve opening curves
- Zero and span for Control input and TPS
- Autolearn
- Digital outputs
- Emergency shut down
- Fieldbus safe mode
- Blinker
- Data logging
- Password



9.11.1 Setting mode – Password

To enable setting and adjustment of the actuator functions the selector must be in LOCAL position and the correct password must be entered. The factory set (default) password is **"CA"**.

Procedure:

- Press the ↵ key during 3 seconds.
- The display will change to Pr .
- Press the ↵ key.
- The display will change to Co dE .
- Press the ↵ key.
- The display will change to 00 .
- Use the ↑ or ↓ keys to scroll through the available password 00-FF (hexadecimal).
- With the correct password diplay press the ↵ key.
- If the password is incorrect, diplay will cahnge to 88 . Press the ↵ key and enter the correct password.
- In order to return to the valve position display there are 2 ways: Press the DES key or select OFF Control using the selector.

9.11.2 Control input signal (only in Modulating duty)

Note: Only necesary if SW6 adjusted in ON (Analog input control). The control input signal is factory standard 4-20mA.

Procedure:

- Enter in the setting mode (chapter 9.11.1)
- Press the ↑ or ↓ key to select the Control input signal menu Co.
- Press the ↵ key.
- The display will change to 00 .
- Use the ↑ or ↓ keys to scroll through the available password 00-FF (hexadecimal). The password will only b provided if necessary. Consult CENTORK.
- With the correct password diplay press the ↵ key.
- Press the ↵ key.
- Press the ↑ or ↓ key to select the Control input mode:

  U Voltage control input I Current control input

Note: Voltage control input is an optional control device. Check actuator wiring diagram for inclusion.

- With the selected mode press the ↵ key.
- Press the ↵ key.
- Press the ↑ or ↓ key to select the Control input range in case of Current control input:

  4 4-20mA 00 0-20mA

- With the selected range press the ↵ key.
- Press the ↵ key.

9.11.3 Polarity (only in Modulating duty)

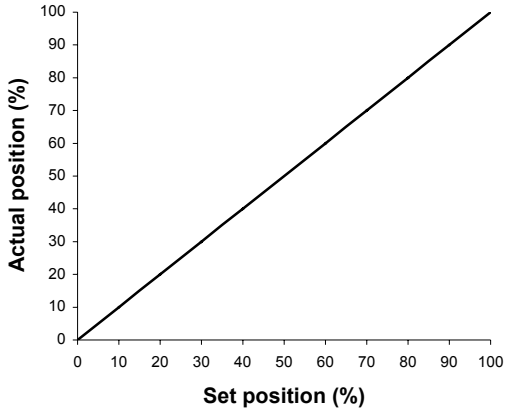
Note: Only necesary if SW6 adjusted in ON (Analog input control). The Polarity is factory standard CLOSE.

Procedure:

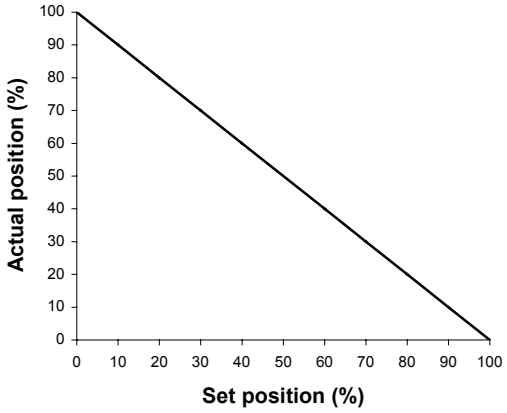
- Enter in the setting mode (chapter 9.11.1)
- Press the ↑ or ↓ key to select the Polarity menu Po .
- Press the ↵ key.
- Press the ↑ or ↓ key to select the Polarity mode:

  CL Minimal control input for CLOSE oP Minimal control input for OPEN

- With the selected polarity press the ↵ key.
- Press the ↵ key.



Minimal control input for CLOSE



Minimal control input for OPEN

9.11.4 Zero and span for Control input and TPS (only in Modulating duty)

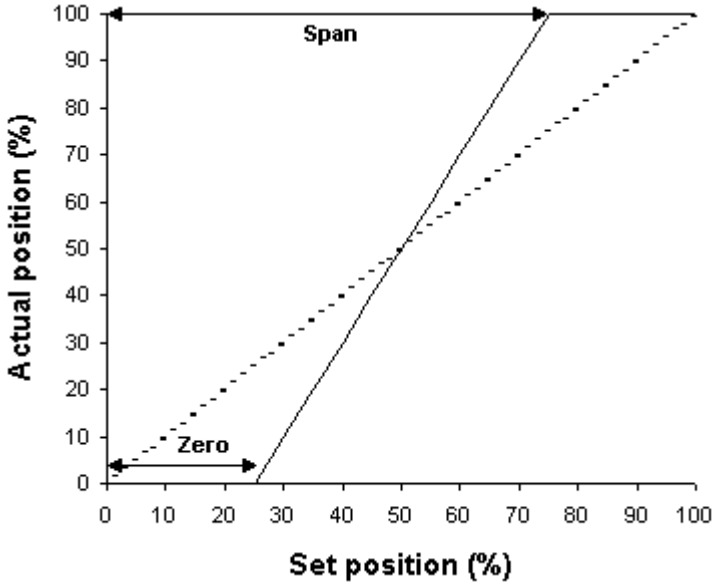
This additional function enables the Control input range (zero, span) to be fitted to the valve stroke and this one to be limited to a given MIN (zero) and MAX (span) percentage. This section is also useful for programming the split range working mode. Split range allows the adaptation of the positionner to control input ranges which are for example necessary to individually control several actuators with the same control input signal. Typical values for two actuators are 0-10mA and 10-20mA.

The zero for Control input and TPS is factory standard 0%(00). The span for Control input and TPS is factory standard 100% (99.).

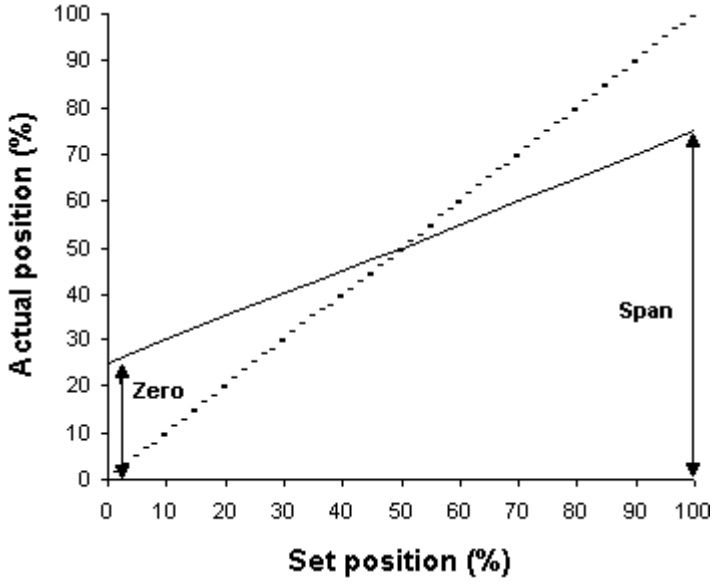
Procedure:

- Enter in the setting mode (chapter 9.11.1)
- Press the ↑ or ↓ key to select the zero and span menu RJ.
- Press the ↵ key.
- The display will change to CE .
- Press the ↵ key.
- Press the ↑ or ↓ key to select the zero for Control input.
- With the selected value press the ↵ key.

- Press the ↵ key.
- Press the ↑ or ↓ key to select the zero for TPS.
- With the selected value press the ↵ key.
- Press the ↵ key.
- The display will change to SP .
- Press the ↵ key.
- Press the ↑ or ↓ key to select the span for Control input.
- With the selected value press the ↵ key.
- Press the ↵ key.
- Press the ↑ or ↓ key to select the span for TPS.
- With the selected value press the ↵ key.
- Press the ↵ key.



Zero and span for Set position (Control input)

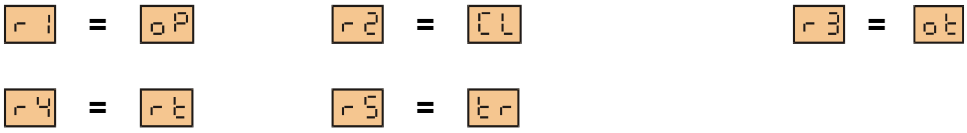


Zero and span for TPS (position transmitter)

9.11.5 Digital outputs

Digital outputs R1, R2, R3, R4 and R5 may each be set to trip for the desired function.

The digital outputs is factory standard:



Procedure:

- Enter in the setting mode (chapter 9.11.1)
- Press the ↑ or ↓ key to select the digital outputs menu r1.
- Press the ↵ key.
- Press the ↑ or ↓ key to select the required function:

oP	Valve OPEN	Er	Anomaly
CL	Valve CLOSE	Lo	Local selected
to	Overtorque reched in OPEN	In	Intermediate position
tC	Overtorque reched in CLOSE	PA	Position reached
tr	Motor protection tripped	FC	Command signal failure
Ph	Lost phase	rt	Rest time
ot	Overtorque	ES	ESD signal
rE	Remote selected		

Anomaly: Motor protection tripped, limit switch fault, torque switch fault, blinker fault or lost phase.

- With the selected function press the ↵ key.
- Press the ↵ key.

The procedure for setting up digital outputs R2, R3, R4 and R5 are the same as those shown for R1.

9.11.6 Rest time

The Rest time prevents the operation to a new nominal position within a predetermine time.

The rest time is factory standard 0s.

Procedure:

- Enter in the setting mode (chapter 9.11.1)
- Press the ↑ or ↓ key to select the Rest time menu tr.
- Press the ↵ key.
- Press the ↑ or ↓ key to select between Opening oP and Closing CL deadbands.
- Press the ↵ key.

- Press the ↑ or ↓ key to select between Inner In or Outer En deadbands.
- Press the ↵ key.
- Press the ↑ or ↓ key to change the Rest time between 0 and 60 in 1s step.
- With the selected deadband value press the ↵ key.
- Press the ↵ key.

Note: LEDs 1, 2 and 3 light yellow when the Centronik unit execute the rest ime

CAUTION: **It must be ensured via the control that the maximum permissible number of starts of the actuator is not exceeded. This can be achieved by setting the rest time to a sufficiently high enough value.**

9.11.7 Valve opening curves (only in Modulating duty)

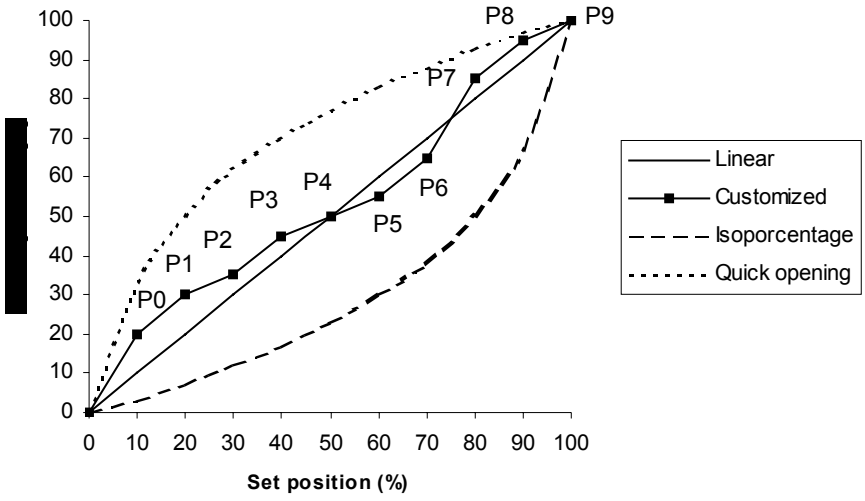
This additional function enables a transmition characteristic curve with regard to the desired value of set position (Control input) and vlve stroke for correction of the flow or operating curve to be chosen.

The Valve opening curves is factory standard Linear.

Procedure:

- Enter in the setting mode (chapter 9.11.1)
- Press the ↑ or ↓ key to select the valve opening curves menu CU.
- Press the ↵ key.
- Press the ↑ or ↓ key to select the valve opening curve required:

LI Linear opening curve	Ar Quick opening opening curve
IS Isoporcentage opening curve	PE Customized opening curve



Valve opening curve

- With the selected valve opening curve press the ↵ key.
- Press the ↵ key.
- If the customized opening curve is selected, press the ↑ or ↓ key to select the valve opening point (P0 to P9.).

Point	P0	P1	P2	P3	P4	P5	P6	P7	P8	P9
Control input (%)	10	20	30	40	50	60	70	80	90	100
Position required (%)										

- Press the ↵ key.
- With the selected point value press the ↵ key.
- Press the ↵ key.
- Repeat this procedure for each valve opening point (P0 to P9.)
- In order to return to previous menu press the DES key.

9.11.8 Emergency shut down

In remote mode, an ESD signal applied to the actuator will override any existing or applied remote control signal. ESD can be configured to ignore all securities except the override setting (motor thermostat or torque limit switches).

The factory standard under an active signal is “standstill” position considering motor thermostat.

Procedure:

- Enter in the setting mode (chapter 9.11.1)
- Press the ↑ or ↓ key to select the ESD menu  .
- Press the ↵ key.
- Press the ↑ or ↓ key to select the required ESD override setting:

   Motor thermostat  Torque limit switches

- With the selected ESD override press the ↵ key.
- Press the ↵ key.
- Press the ↑ or ↓ key to select the required ESD action:

   OPEN on ESD  “Standstill” on ESD

   CLOSE on ESD  Reach the ESD desired position.

- With the selected ESD action press the ↵ key.
- Press the ↵ key.
- In case of  action, Use the ↑ or ↓ keys to scroll through the available desired position 00-100.
- With the selected value press the ↵ key.
- Press the ↵ key.

9.11.9 Fieldbus safe mode (BF)

In remote mode, a safety operation is only initiated when SW8 OFF (Fieldbus control) and if fieldbus communication fail.The actuator will operate in these conditions the BF action).

The factory standard under is “standstill” position and 10s for BF time.

- Enter in the setting mode (chapter 9.11.1)
- Press the ↑ or ↓ key to select the BF menu bF .
- Press the ↵ key.
- Press the ↑ or ↓ key to select the required BF time between 0 and 100 in 1s step (this parameter refers to the time after which a bus signal fail will be considered as a BusFail error).
- Press the ↵ key.
- Press the ↑ or ↓ key to select the required BF action:

oP	OPEN	SS	“Standstill”
CL	CLOSE	Po	Reach the BF desired position.

- With the selected BF action press the ↵ key.
- Press the ↵ key.
- In case of Po action, Use the ↑ or ↓ keys to scroll through the available desired position 00-100.
- With the selected value press the ↵ key.
- Press the ↵ key.

9.11.10 Deadband (only in Modulating duty)

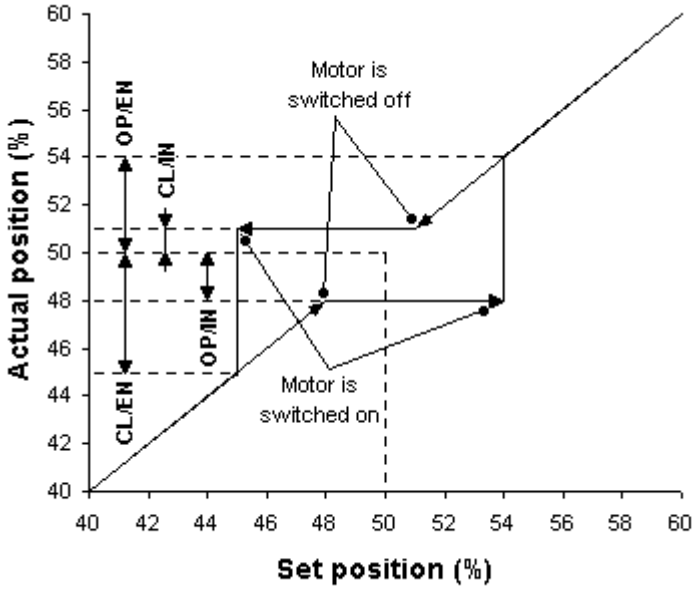
There are two deadbands for each operation sense (opening and closing), the outer deadband and the inner deadband:

- The outer deadband determines the switching-on point of the actuator.
- The inner deadband determines the switching-off point of the actuator.

The deadband is factory standard 2% for inner deadbands and 5% for outer deadbands.

Procedure:

- Enter in the setting mode (chapter 9.11.1)
- Press the ↑ or ↓ key to select the Deadband menu br .
- Press the ↵ key.
- Press the ↑ or ↓ key to select between Opening oP and Closing CL deadbands.
- Press the ↵ key.
- Press the ↑ or ↓ key to select between Inner In or Outer En deadbands.
- Press the ↵ key.
- Press the ↑ or ↓ key to change the value for the selected deadband between 0,5 and 2,0 for the inner deadband and between 0,5 and 5,0 for the outer deadband in 0,5% step.
- With the selected deadband value press the ↵ key.
- Press the ↵ key.
- In order to return to previous menu press the DES key.



Example for 50% Set position

CAUTION: Outer deadbands must be greater than inner deadband. If the actuator hunts or responds unnecesarily to a fluctuating set position signal (control input) the deadband must be increased. If more accurate control is required the deadband may be decreased.

If the Autolearn menu is activated (ON), it is not necessary to adjust the deadband values.

9.11.11 Autolearn (only in Modulating duty)

An automatic adaptation of the deadbands is suitable with Autolearn function.

The Autolearn is factory standard 0FF (deactivated).

Procedure:

- Enter in the setting mode (chapter 9.11.1)
- Press the ↑ or ↓ key to select the autolearn menu AL.
- Press the ↵ key.
- Press the ↑ or ↓ key to select between On (autolearn activated) or OF (autolearn deactivated).
- With the selected activation/deactivation press the ↵ key.
- Press the ↵ key.

9.11.12 Close tightly (only in Modulating duty)

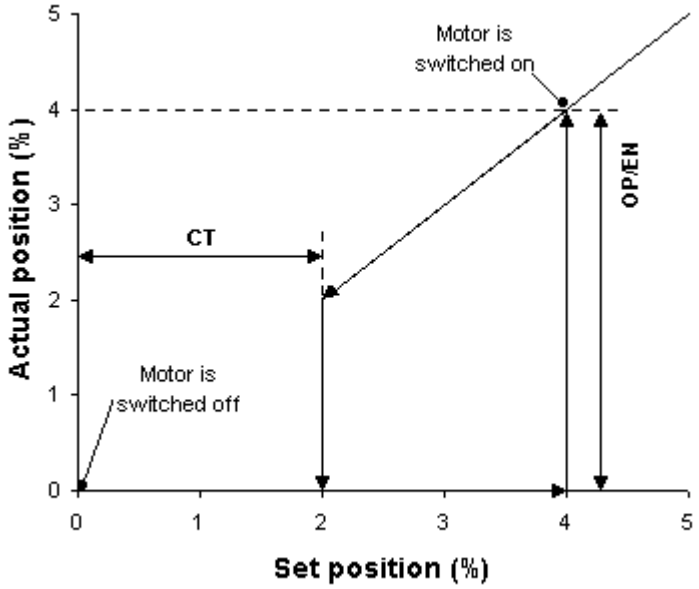
Close tightly ensures that the actuator opens and closes fully.

If the set position (control input) value 0/4mA or 20mA for the approaching of the end positions is not reached, a “close tightly” value for the nominal value can be set. If the set position exceed or reached the “close tightly” value, the actuator continues the operation until the full end position has been reached.

The close tightly is factory standard OFF (deactivated).

Procedure:

- Enter in the setting mode (chapter 9.11.1)
- Press the ↑ or ↓ key to select the Close tightly menu [Ct].
- Press the ↵ key.
- Press the ↑ or ↓ key to select between [On] (close tightly activated) or [OF] (close tightly deactivated).
- With the selected activation/deactivation press the ↵ key.
- Press the ↵ key.
- If close tightly is activated (ON), press the ↑ or ↓ key to select the close tightly range between 0.5 and 2 in 0,5 step.
- With the selected value press the ↵ key.
- Press the ↵ key.



Close tightly functionality in CLOSE position

9.11.13 Blinker

Blinker transmitter allows to detect movement of the actuator. Blinker detection can be switched on or off. If the detection is switched off, the movement detection is suitable with the position transmitter (TPS).

The blinker is factory standard 0N (activated).

Procedure:

- Enter in the setting mode (chapter 9.11.1)
- Press the ↑ or ↓ key to select the blinker menu [bL].
- Press the ↵ key.
- Press the ↑ or ↓ key to select between [On] (blinker activated) or [OF] (blinker deactivated).
- With the selected activation/deactivation press the ↵ key.
- Press the ↵ key.

9.11.14 Control input and TPS setting

Limit switches and 0/4-20 mA transmitter must be set before! This calibration will ensure a correct operation in Remote mode.

Procedure:

- Before making the calibration, the valve should be brought to the maximum opening position, therefore the TPS should be supplying the maximum current (20mA). If SW6 adjusted in ON (Analog input control), the control input signal should be supplying the maximum current (20mA).
- Enter in the setting mode (chapter 9.11.1)
- Press the ↑ or ↓ key to select the Calibration menu [Cb].
- Press the ↵ key.
- The display will change to a blinking hexadecimal value. If SW6 adjusted in ON (Analog input control), the value will be close to E3 (control input signal value). If SW6 adjusted in OFF (Fieldbus control), the value will change to 00.
- Press the ↑ and ↵ key simultaneously to record the calibration. The disply will stop blinking.
- Press the ↵ key.

9.11.15 Data logging

Procedure:

- Enter in the setting mode (chapter 9.11.1)
- Press the ↑ or ↓ key to select the data logging menu [HI].
- Press the ↵ key.
- Press the ↑ or ↓ key to select the data logging required.

[oL]	Nº of opening operations	[tt]	Total running hours
[ot]	Nº Open torque faults	[tr]	Nº Termal faults
[CL]	Nº of closing operations	[EC]	Nº of powerings
[Ct]	Nº Close torque faults		

- With the selected data logging press the ↵ key.
- As an example, if the Total running hours is 130012, it will display “” (blank),”13”,”00”,”12”,””blank,…
- Press the ↵ key.
- In order to return to previous menu press the DES key.

9.11.16 New Password

Procedure:

- Enter in the setting mode (chapter 9.11.1)
- Press the ↑ or ↓ key to select the Password menu [Ch] .
- Press the ↵ key.
- Use the ↑ or ↓ keys to scroll through the desired password 00-FF (hexadecimal).
- Press the ↵ key.

CAUTION: Password changing is a delicate operation. Write it down.

9.12 LOCAL mode: Control and displays elements

The Centronik unit is equipped with local controls. The selector LOCAL - OFF - REMOTE allows the control mode to be set. With the push buttons OPEN - STOP - CLOSE, the actuator can be operated locally.

Push buttons are self-retaining type.

5 indication lights and a “position” display (only in Modulating and ON/OFF with display duty) shows the actuator status from the front panel (chapter 9.12.2).

9.12.1 Lockable selector

The selector LOCAL - OFF –REMOTE is lockable in all three positions. Unauthorized operation at the local controls is therefore prevented.

- **OFF**: In this operation mode, the actuator remains connected but does not responds to any order from the front panel or from the remote control. the front panel control indicate only the power supply status (led 5).
- **LOCAL**: With the push buttons OPEN-CLOSE-STOP located on the front panel, the actuator is operated locally.
- **REMOTE**: With the remote commands, the actuator is operated remotely.

9.12.2 Push-buttons

 OPEN

 "UP" scroll/change value

STOP or ALARM RESET

 "ENTER" confirm selection

 CLOSE

 "DOWN" scroll/change value

UNLOCK or "ESCAPE"

Pressing 

and  with an open troque fault enable the user to open.

Pressing 

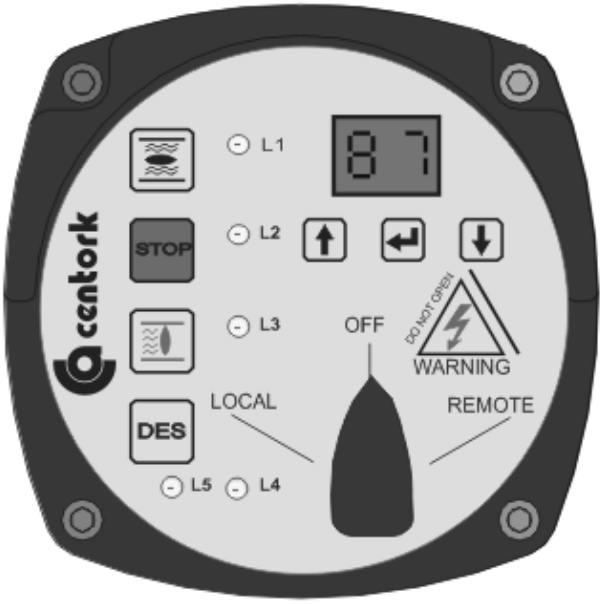
and  with an open troque fault enable the user to close.

Unlock command is desable when the Centronik unit detect a movement (blinker).

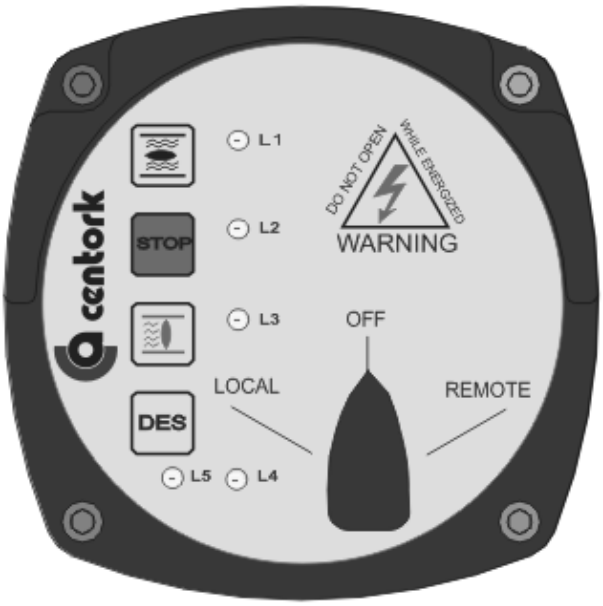
9.12.3 LED indications

Five local LEDs indicate different signal:

L1	Red: Red blinking: Yellow blinking:	OPEN OPENING Limit switch failure
L2	Red: Red blinking: Yellow:	Motor protection tripped Motor protection tripped and has desapeared Blinker fault
L3	Green: Green blinking: Yellow blinking:	CLOSE CLOSING Limit switch failure
L4	Red: Green: Yellow blinking::	OPEN torque fault CLOSE torque fault Torque switch failure
L5	Green: Red: Yellow:	Correct phase connection Lost Phase Inverse phase connection



Modulating and ON/OFF with display duty front panel



ON/OFF front panel

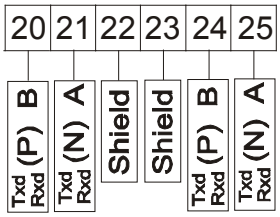
10 FIELDBUS CONFIGURATION

10.1 Fieldbus Connector

Depending on the protection class and type of application, other connector designs are also allowed.

Guideline: If the interface should be used with larger data transfer rates than 1500kbit/s, the 9 pin female D-sub connector is recommended to use.

10.1.1 Centork connector



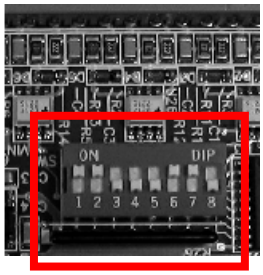
10.1.2 D-SUB connector pinout (OPTIONAL)

Pin	Name	Function
Housing	Shield	Connected to PE
1	Not Connected	-
2	Not Connected	-
3	B-Line	Positive RxD/TxD according to RS 485 specification
4	Not Connected	-
5	Not Connected	-
6	Not Connected	-
7	Not Connected	-
8	A-Line	Negative RxD/TxD according to RS 485 specification
9	Not Connected	-

10.2 Configuration

10.2.1 CENTRONIK unit configuration

Before configuring the PROFIBUS-DP interface, make sure that the DIP switches of the CENTRONIK are correctly configured. Overall, make sure that switch 8 is set to OFF for fieldbus control (Chapter 9.3.5).



10.2.2 Baudrate

The baudrate on a Profibus-DP network is set during configuration of the master and only one baudrate is possible in a Profibus-DP installation. The Profibus-DP interface has an auto baudrate detection function and the user does not have to configure the baudrate on the interface. Baudrates supported by the Profibus-DP interface are listed on table:

Baudrates supported by Profibus DP Interface
9.6 kbit/s
19.2 kbit/s
93.75 kbit/s
187.5 kbit/s
500 kbit/s
1.5 Mbit/s
3 Mbit/s
6 Mbit/s
12 Mbit/s

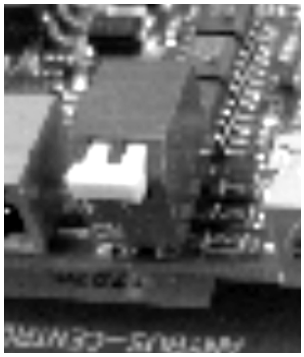
10.2.3 Termination

The end nodes in a Profibus-DP network has to be terminated to avoid reflections on the bus line. The Profibus-DP interface is equipped with a termination switch to accomplish this in an easy way. If the actuator is used as the first or last device in a network the termination switch has to be in ON position. Otherwise the switch has to be in OFF position.

Termination switch is located on BUS electronic board, mounted on centronik unit. Open centronik frontal to access. Handle with care, wires and cables may be damaged.

PLEASE NOTE: If an external termination connector is used the switch must be in OFF position. Warning: An incorrect setting of termination switch may cause problems and Fails on BUS COMUNICATION!

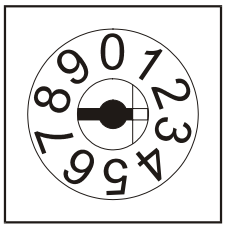
Termination switch ON	Bus termination enabled. If the actuator is the last or first device, the bus termination has to be set on, or an external termination connector has to be used
Termination switch OFF	Bus termination disabled

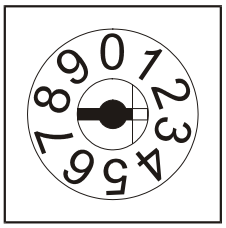


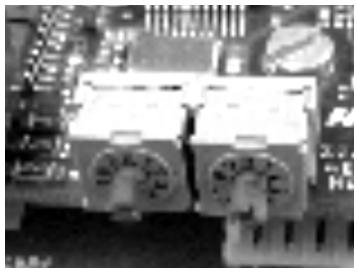
10.2.4 Node Address

Before powering the Centronik Unit address has to be set. This is done with two rotary switches on the interface, located on BUS electronic board, mounted on centronik unit. This enables address settings from 1-99 in decimal format. Looking at the front of the interface, the leftmost switch is used for the ten setting and the rightmost switch is used for the setting of the integers.

Address = (Left Switch Setting x 10) + (Right Switch Setting x 1)







The node address can not be changed during operation. Incorrect node address may cause problems and Fails on BUS COMUNICATION!

10.2.5 GSD file

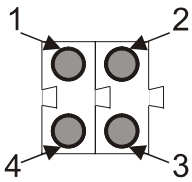
Each device on a Profibus-DP network is associated with a GSD file, containing all necessary information about the device. This file is used by the network configuration program during configuration of the network.

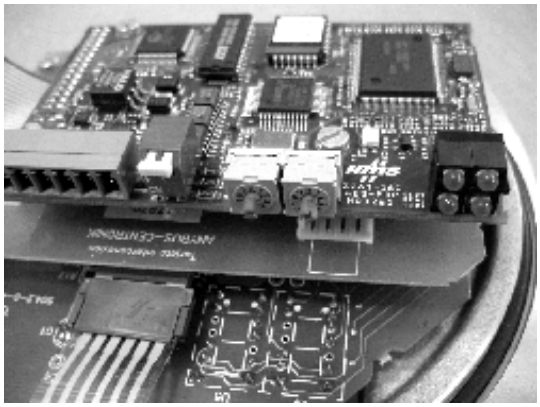
The latest version of GSD file can either be delivered by contacting CENTORK.

10.2.6 Indications

The interface is equipped with four LED's mounted at the front and one LED on the board, used for debugging purposes. The function of the LED's are described in the table and figure below.

1. Not used
2. On-Line
3. Off-Line
4. Fieldbus diagnostics





Name	Colour	Function
Fieldbus Diagnostics	**Red**	Indicates certain faults on the Fieldbus side.
On-Line	**Green**	Indicates that the interface is On-Line on the fieldbus.
		Green- Interface is On-Line and data exchange is possible.
		Turned Off - Interface is not On-Line
Off-Line	**Red**	Indicates that the interface is Off-Line on the fieldbus.
		Red- Interface is Off-Line and no data exchange is possible.
		Turned Off - Interface is not Off-Line

11 FIELDBUS PROGRAMMING

11.1 MODULATING CENTRONIK units

This section describes the input and output data to/from the interface and that form the communication during the data exchange.

The data exchanged in this model, has the following configuration:

Master outputs↔Centork Inputs

Nominal	
T	Instr.Code.

Centork Outputs↔Master inputs

Opening	
Diagnostic	
T	Instr.Code / Error
Data 1	
Data 2	

Data n

The structure is formed by 22 bytes max. that will be transferred by the PROFIBUS-DP fieldbus.

Master instructions:

- Nominal is the % of opening the user wants to open the valve.
- Command is composed by the instruction code and the Toggle bit.

  The possible instruction codes are:

  0x01 Read Status
  0x02 Read Data logging
  0x04 Read parameter group1
  0x05 Actuator reset in case of alarm.
  0x08 Read parameter group2

Slave response:

- Opening: Is the actual % of opening of the valve.
- Diagnostic: Alarm codes from the actuator. Possible values are:

  0x01 Motor thermo-switches tripped
  0x02 Travel limit switches error
  0x04 Torque limit switches error
  0x08 Lost phase
  0x10 Blinker error.
  0x20 ESD signal received
  0x40 Nominal signal (4/20mA) fail
- Response : The CENTRONIK unit will answer giving back an echo and a changed toggle, indicating that the command was correctly processed. If any kind of error occurred in the communication, in the code, etc., an error code will be sent instead of the echo. The structure of this code will be:

  b7: Toggle

  b6: Error in Instruction code

  b5: Not used

  b4…b0: Instruction code

– The data bytes, depending on the instruction, are defined as indicated in the next table:

Byte Nr	Status	Parameter Group 1	Parameter Group 2	Historics (Data logging)
Data 1	Selector-dip	Nominal input type	Close Tightly	Nr. OP Limit
Data 2	P1	Nominal input (mA)	Tightly value (%)	Nr. OP Limit + 1
Data 3	P2	Polarity	BF Mode	Nr. OP Limit + 2
Data 4	Remote inputs	Nominal input zero	BF Time	Nr. CL Limit
Data 5	Remote outputs	% opening zero	BF(%)	Nr. CL Limit + 1
Data 6	Phase	Nominal input span	Curve Type	Nr. CL Limit + 2
Data 7	Overtravel Opening	% opening span	Curve P0	Nr. OP Torque
Data 8	Overtravel Closing	Rest time	Curve P1	Nr. OP Torque + 1
Data 9	Nominal input	Autolearn	Curve P2	Nr. OP Torque + 2
Data 10		Relay 1	Curve P3	Nr. CL Torque
Data 11		Relay 2	Curve P4	Nr. CL Torque + 1
Data 12		Relay 3	Curve P5	Nr. CL Torque + 2
Data 13		Relay 4	Curve P6	Nr. Hours
Data 14		Relay 5	Curve P7	Nr. Hours + 1
Data 15		Int. Dead Band OP	Curve P8	Nr. Hours + 2
Data 16		Ext. Dead Band OP	Curve P9	Nr. thermic trippings
Data 17		Int. Dead Band CL	ESD Mode	Nr. thermic trippings + 1
Data 18		Ext . Dead Band CL	ESD	Nr. powering
Data 19		Blinker	ESD (%)	Nr. powering +1

The “Command toggle bit” sent must be equal to the “Response toggle bit”. The “Response toggle bit” will be always the opposite of the “Command toggle bit”. When “the Repsonse toggle” bit change, the slave device indicate that the last instruction was received.

11.1.1 Status

The following data will be exchanged when a *Read Status* instruction is sent.

11.1.1.1 Selector-dip

Indicates the state of the DIPSWITCHES of the CENTRONIK unit.

11.1.1.2 P1

Indicates the state of every microswitch located inside the actuator

P1.0:Closed limit switch
P1.1 Open limit switch
P1.2 Opening overtorque switch
P1.3 Closing overtorque switch
P1.4 Blinker
P1.5 Thermal switch
P1.6 Lost phase
P1.7 Inverse phase connection.

11.1.1.3 P2

Variable only available for CENTORK technicians.

11.1.1.4 Remote inputs

Indicates the state of the remote inputs at the user connector.

11.1.1.5 Remote outputs

Indicates the state of the remote outputs at the user connector.

11.1.1.6 Phase

Indicates the state of the valve, previous to the byte stream reception.

1: Stop
2: Opening
3: Opened
4: Closing
5: Closed
6: Unlock & Closing
7: Unlock & Opening
8: Unlock deactivated
9: Overtorque openining
10: Overtorque closing
11: Travel limit switch fault
12: Thermal stop
13: Torque limit switch fault
14: Lost phase
15: Blinker Stop
16: Alarm ESD

11.1.1.7 Overtravel OP

Variable only available for CENTORK technicians.

11.1.1.8 Overtravel CL

Variable only available for CENTORK technicians.

11.1.1.9 Nominal input

Variable only available for CENTORK technicians.

11.1.2 Parameter group1

The following data will be exchanged when a Read Parameter group 1 instruction is sent.

11.1.2.1 Nominal input type

Not used in ProfiBus control. Possible values for this variable are enclosed on table:

Nominal Input Type	Data 1
Voltage nominal input	30
Current nominal input	31

The default value for this parameter is **31**.

11.1.2.2 Nominal input (mA)

Not used in ProfiBus control. Possible values for this variable are enclosed on table:

Nominal input (mA)	Data2
Current nominal input 4...20 mA	32
Current nominal input 0...20 mA	33

The default value for this parameter is **32**.

11.1.2.3 Polarity

Not used in ProfiBus control. Possible values for this variable are enclosed on table:

Polarity type	Data3
Closed	22
Open	23

- **Closed** means, a 4 mA nominal input, will make the actuator run to close position.
- **Open** means, a 4 mA nominal input, will make the actuator run to open position.

The default value for this parameter is **22**.

11.1.2.4 Nominal input zero

Not used in ProfiBus control. Possible values for this variable are enclosed on table:

Nominal input zero	Data4
Value	0-100 %

This parameter refers to the % of the nominal input value for the zero position of the split range setting.

The default value for this parameter is **0**.

11.1.2.5 % opening zero

Not used in ProfiBus control. Possible values for this variable are enclosed on table:

% opening	Data5
Value	0-100 %

This parameter refers to the % of opening of the valve stroke for the zero position of the split range setting.

The default value for this parameter is **0**.

11.1.2.6 Nominal input span

Not used in ProfiBus control. Possible values for this variable are enclosed on table:

Nominal input span	Data6
Value	0-100 %

This parameter refers to the % of the nominal input value for the span position of the split range setting. The default value for this parameter is **100**.

11.1.2.7 % opening span

Not used in ProfiBus control. Possible values for this variable are enclosed on table:

% opening	Data7
Value	0-100 %

This parameter refers to the % of opening of the valve stroke for the span position of the split range setting.

The default value for this parameter is **100**.

11.1.2.8 *Rest time*

Possible values for this variable are enclosed on table:

Reset time	Data8
Value	0-60 s

This parameter refers to the minimum time the motor will be stopped between two start commands. This parameter allows to fulfil the motor service requirements independently of the valve service requirements.

The default value for this parameter is **0**.

11.1.2.9 *Autolearn*

Possible values for this variable are enclosed on table:

Autolearn	Data9
Off	0
On	1

This parameter refers to the capability of the CENTRONIK of learning about the state of the valve and making the modulation referring to this state.

The default value for this parameter is **0**.

11.1.2.10 *Relay 1*

Possible values for this variable are enclosed on table:

Relay 1	Data10
Valve opened	15
Valve closed	14
Overtorque opening	13
Overtorque closing	12
Motor switch tripped	11
Phase missing	10
Overtorque	9
Error	8

Relay 1	Data10
Local mode	7
Remote mode	6
Intermediate position	5
Position reached	4
Nominal input missing	3
Rest time	2
ESD	1

The default value for this parameter is **15.**

11.1.2.11 *Relay 2*

Possible values for this variable are enclosed on table:

Relay 2	Data11
Valve opened	15
Valve closed	14
Overtorque opening	13
Overtorque closing	12
Motor switch tripped	11
Phase missing	10
Overtorque	9
Error	8

Relay 2	Data11
Local mode	7
Remote mode	6
Intermediate position	5
Position reached	4
Nominal input missing	3
Rest time	2
ESD	1

The default value for this parameter is **14.**

11.1.2.12 Relay 3

Possible values for this variable are enclosed on table.

The default value for this parameter is **9.**

Relay 3	Data12
Valve opened	15
Valve closed	14
Overtorque opening	13
Overtorque closing	12
Motor switch tripped	11
Phase missing	10
Overtorque	9
Error	8

Relay 3	Data12
Local mode	7
Remote mode	6
Intermediate position	5
Position reached	4
Nominal input missing	3
Rest time	2
ESD	1

11.1.2.13 Relay 4

Possible values for this variable are enclosed on table.

The default value for this parameter is **2**

Relay 4	Data13
Valve opened	15
Valve closed	14
Overtorque opening	13
Overtorque closing	12
Motor switch tripped	11
Phase missing	10
Overtorque	9
Error	8

Relay 4	Data13
Local mode	7
Remote mode	6
Intermediate position	5
Position reached	4
Nominal input missing	3
Rest time	2
ESD	1

11.1.2.14 Relay 5

Possible values for this variable are enclosed on table.

The default value for this parameter is **11**

Relay 5	Data14
Valve opened	15
Valve closed	14
Overtorque opening	13
Overtorque closing	12
Motor switch tripped	11
Phase missing	10
Overtorque	9
Error	8

Relay 5	Data14
Local mode	7
Remote mode	6
Intermediate position	5
Position reached	4
Nominal input missing	3
Rest time	2
ESD	1

11.1.2.15 Internal Dead Band OP (Opening)

Int. Dead Band OP	Data15
Value	5-20

Possible values for this variable are enclosed on table.

This parameter refers to the % of the valve stroke for the internal dead band setting in open direction. The value xx in Data15, will be fixed as the desired value multiplied by ten (e.g. if the internal dead band has to be 1.5% the stroke of the valve, the value at Data15 will be adjusted to 15).

The default value for this parameter is **20**.

11.1.2.16 External Dead Band OP(Opening)

Ext. Dead Band OP	Data16
Value	5-50

Possible values for this variable are listed on table.

This parameter refers to the % of the valve stroke for the external dead band setting in open direction. The value xx in Data16, will be fixed as the desired value multiplied by ten (e.g. if the external dead band has to be 3.5% the stroke of the valve, the value at Data16 will be adjusted to 35).

The default value for this parameter is **50.**

11.1.2.17 Internal Dead Band CL (Closing)

Possible values for this variable are listed on table.

Int. Dead Band CL	Data17
Value	5-20

This parameter refers to the % of the valve stroke for the internal dead band setting in close direction. The value xx in Data17, will be fixed as the desired value multiplied by ten (e.g. if the internal dead band has to be 1.5% the stroke of the valve, the value at Data17 will be adjusted to 15).

The default value for this parameter is **20**

11.1.2.18 External. Dead Band CL (Closing)

Ext. Dead Band CL	Data18
Value	5-50

Possible values for this variable are listed on table

This parameter refers to the % of the valve stroke for the external dead band setting in close direction. The value xx in Data18, will be fixed as the desired value multiplied by ten (e.g. if the external dead band has to be 3.5% the stroke of the valve, the value at Data18 will be adjusted to 35).

The default value for this parameter is **50**

11.1.2.19 Blinker

Possible values for this variable are listed on table.

Blinker	Data19
Blinker ON	1
Blinker OFF	0

This parameter refers to the possibility of ignoring the blinker as actuators shaft movement detector. In case of adjusting to zero, the output shaft movement detection will be done with the potentiometer.

The default value for this parameter is **0**

11.1.3 Parameter group2

The following data will be exchanged when a Read Parameter group 2 instruction is sent.

11.1.3.1 Close tightly

Possible values for this variable are listed on table :

Close tightly	Data1
Close tightly ON	1
Close tightly OFF	0

This parameter sets the possibility of activating a mode in which, when a modulation command inside a % of opening (in the close zone) is received, the actuator will close totally.

The default value for this parameter is **0**.

11.1.3.2 Tightly Value

Possible values for this variable are listed on table:

Tightly	Data2
Value	50

The value xx in Data2, will be fixed as the desired value multiplied by ten (e.g. if the Tightly Value has to be 4.5% the stroke of the valve, the value at Data2 will be adjusted to 45).

The default value for this parameter is **50**.

11.1.3.3 BF Mode

Possible values for this variable are listed on table:

BF Mode	Data3	Data4
Open	103	
Close	102	
Stand Still	101	
% opening	100	0-100%

This parameter controls the action to do when the bus lines fails in the Fieldbus. The % opening refers to the % of the opening of the valve stroke the actuator will run the valve. The value xx in Data3, will be fixed as the desired value multiplied by ten (e.g. if the close tightly has to be 4.5% the stroke of the valve, the value at Data3 will be adjusted to 45).

The default value for this parameter (data3) is **101**, and the default value for data4 is **0**.

11.1.3.4 BF Time

Possible values for this variable are listed on table:

BF Time	Data5
Value	0-100

This parameter refers to the time after which a bus signal fail will be considered as a BusFail error.

The default value for this parameter is **10**.

11.1.3.5 Curve Type

Possible values for this variable are:

Curve Type	Data6	Data7	Data8	Data9	Data10	Data11	Data12	Data13	Data14	Data15	Data16
Linear	43										
Isopercentage	42										
Quick openning	41										
Customized	40	**P0**	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**

This parameter controls the type of modulation will run the actuator.

In the P_n values, a % of opening, between 10 and 100% should be selected. The ten P_n parameters, correspond to each 10 % split of the nominal input signal.

The default value for this parameter is **43** and the default value for each P_n is **0**.

11.1.3.6 ESD Mode

Possible values for this variable are:

This parameter, controls the actuators protection mode when an ESD signal is received. In the Torque mode, the actuator will run until a torque signal occurs. In the Thermo-switch Tripping Mode, the actuator will run until the Thermo-switches trip.

ESD Mode	Data17
Torque mode	98
Thermo-switch Tripping Mode	99

The default value for this parameter is **99**.

11.1.3.7 ESD

Possible values for this variable are:

The *percentage open*, refers to, the % of opening of the valve stroke, the actuator will run the valve, when an ESD order is input.

ESD	Data18	Data19
Open	103	
Close	102	
Stand Still	101	
Percentage open	100	**0-100%**

The default value for this parameter is **101**.

The default value for data19 is **0**.

11.1.4 Records (Data logging)

The following parameters will be replaced whenever a command “read records” is send.

11.1.4.1 Num Op Limit

Specifies the number of opening manoeuvrings made using the travel limit switching. It’s a decimal number composed by three two-digits groups: Num Op Limit; Num Op Limit+1; Num Op Limit+2. Whereas Num Op Limit is the most significant group.

Num Op Limit	Data 1	Data 2	Data 3
	Num Op Limit	Num Op Limit +1	NumOp Limit +2

Example:

If the number of opening manoeuvrings achieved by travel limit switching is 215365 the value of these parameters must be:

Num Op Limit = 21

Num Op Limit +1= 53

Num Op Limit +2= 65

11.1.4.2 Num Cl Limit

This parameter specifies the number of closing manoeuvrings achieved by travel limit switching. It is a decimal number composed by three two-digits groups: Num CL Limit; Num CL Limit+1; Num CL Limit+2. Whereas Num CL Limit is the most significant group.

Num Cl Limit	Data 4	Data 5	Data 6
	Num Cl Limit	Num Cl Limit +1	Num Cl Limit +2

Example:

If the number of closing manoeuvrings achieved by travel limit switching is 215365 the value of these parameters must be:

Num Cl Limit = 21

Num Cl Limit +1= 53

Num Cl Limit +2= 65

11.1.4.3 Num Op torque

Specifies the number of opening manoeuvrings made using the torque limit switching. It's a decimal number composed by three two-digits groups:: Num Op torque; Num Op torque +1; Num Op torque +2. Whereas Num Op torque is the most significant group.

Num Op Par	Data 7	Data 8	Data 9
	Num Op torque	Num Op torque +1	Num Op torque +2

Example:

If the number of opening manoeuvrings achieved by torque limit switching is 215365 the value of these parameters must be:

Num Op torque = 21

Num Op torque +1= 53

Num Op torque +2= 65

11.1.4.4 Num Cl torque

This parameter specifies the number of closing manoeuvrings achieved by torque limit switching. It's a decimal number composed by three two-digits groups: Num CL torque; Num CL torque +1; Num CL torque +2. Whereas Num CL torque is the most significant group.

Num Cl torque	Data 10	Data 11	Data 12
	Num Cl torque	Num Cl torque +1	Num Cl torque +2

Example:

If the number of closing manoeuvrings achieved by torque limit switching is 215365, the value of these parameters must be:

Num Cl torque = 21

Num Cl torque +1= 53

Num Cl torque +2= 65

11.1.4.5 Num Hours

This parameter specifies the number of service hours (with the motor running)

It's a decimal number composed by three two-digits groups: Num hours; Num hours +1; Num hours +2. Whereas Num hours is the most significant group.

Num hours	Data 13	Data 14	Data 15
	Num hours	Num hours +1	Num hours +2

Example:

If the number of service hours (with the motor running) is 215.365, the value of these parameters must be:

Num hours = 21

Num hours +1= 53

Num hours +2= 65

11.1.4.6 Num thermic trippings

This parameter specifies the number of thermal stops

It is a decimal number composed by two two-digits groups: : Num therm. Tripp; Num therm. Tripp. +1. Whereas Num therm. Tripp is the most significant group.

Num therm. Tripp	Data 16	Data 17
	Num therm. Tripp	Num therm. Tripp +1

Example:

If the number of thermal trippings is 2153, the value of these parameters must be:

NumTherm. Tripp = 21

Num therm. Tripp +1= 53

11.1.4.7 Num Powering

Specifies how many times has been powered on the main power supply.

It is a decimal number composed by two two-digits groups: Num powering; Num powering +1. Whereas Num powering is the most significant group.

Num powering	Data 18	Data 19
	Num powering	Num powering +1

Example:

If the device has been powered on 2153 times, the value of these parameters must be:

Num powering = 21

Num powering +1= 53

11.1.5 Writing and reading code samples

If we want to make a records reading (instruction code 0x02), the bytes stream to send is showed in the following table. It's supposed that the real valve's opening is 50% and we do not want to change it.

Bytes to send:

Byte 0	Nominal	50
Byte 1	Command	0x82
Byte 2	Data 1	-
Byte 3	Data 2	-
…	…	…

Received Bytes:

Byte 0	Opening	50
Byte 1	Diagnostic	0x00
Byte 2	Response	0x02
Byte 3	Num OP Rec	6 (Examp.)
…	…	…

If, later, we want to make a reading of the parameters included in the group 1 (instruction 0x04) we must change the Toggle bit (most significant bit in the control Byte) to indicate that this is a new instruction. We want to change the valve opening to 80%. The byte stream to send is:

Bytes to send:

Byte 0	Nominal	80
Byte 1	Command	0x04
Byte 2	Data 1	-
Byte 3	Data 2	-
Byte 4	Data 3	-
…	…	…

Received Bytes :

Byte 0	Opening	80
Byte 1	Diagnostic	0x00
Byte 2	Response	0x84
Byte 3	Nominal Input Type	30 (Ex.)
Byte 4	Nominal Input (mA)	32 (Ex.)
…	…	…

11.2 ON /OFF with position display CENTRONIK units

This section describes the input and output data to/from the interface and that form the communication during the data exchange.

The data exchanged in this model, has the following configuration:

Master outputs↔Centork Inputs

T	Control
T	Instruction Code

Centork Outputs↔Master inputs

Opening	
Diagnostic	
	Instruction code./ Error
Data 1	
Data 2	

Data n

The structure is formed by 22 bytes max. that will be transferred by the PROFIBUS-DP fieldbus.

Master instructions:

- Control: The meaning of the process variables is the same as in the previous case but the variable Control which has the following code:

  0x01 Close valve

  0x02 Open valve

  0x04 Stop.

  0x08 Unlock opening

  0x10 Unlock closing

  Inside the “Control” process variable the toggle bit is used just in case that an order needs to be resent; this is usually done to resend the “stop” Control to rearm the valve in case that an alarm is detected. No echo of this toggle is generated.

- Command: Is composed by the instruction code and the Toggle bit.

  The possible instruction codes are:

  0x01 Read Status

  0x02 Read Data logging

Slave response:

- Opening: Is the actual % of opening of the valve.
- Diagnostic: Alarm codes from the actuator. Possible values are:

  0x01 Motor thermo-switches tripped

  0x02 Travel limit switches error

  0x04 Torque limit switches error

  0x08 Lost phase

  0x10 Blinker error

  0x20 ESD signal received

- Response : The CENTRONIK unit will answer giving back an echo and a changed toggle, indicating that the command was correctly processed. If any kind of error occurred in the communication, in the code, etc., an error code will be sent instead of the echo. The structure of this code will be:

  b7: Toggle

  b6: Error in Instruction code

  b5: Error in Control

  b4…b0: Instruction code

– The data bytes, depending on the instruction, are defined as indicated in the next table:

Byte Nr	Status	Historics (Data logging)
Data 1	Selector-dip	Nr. OP Limit
Data 2	P1	Nr. OP Limit + 1
Data 3	P2	Nr. OP Limit + 2
Data 4	Remote inputs	Nr. CL Limit
Data 5	Remote outputs	Nr. CL Limit + 1
Data 6	Phase	Nr. CL Limit + 2
Data 7		Nr. OP Torque
Data 8		Nr. OP Torque + 1
Data 9		Nr. OP Torque + 2
Data 10		Nr. CL Torque
Data 11		Nr. CL Torque + 1
Data 12		Nr. CL Torque + 2
Data 13		Nr. Hours
Data 14		Nr. Hours + 1
Data 15		Nr. Hours + 2
Data 16		Nr. thermic trippings
Data 17		Nr. thermic trippings + 1
Data 18		Nr. powering
Data 19		Nr. powering +1

The “Command toggle bit” sent must be equal to the “Response toggle bit”. The “Response toggle bit” will be always the opposite of the “Command toggle bit”. When “the Repsonse toggle” bit change, the slave device indicate that the last instruction was received.

11.2.1 Status

The following data will be exchanged when a *Read Status* instruction is sent.

11.2.1.1 Selector-dip

Indicates the state of the DIPSWITCHES of the CENTRONIK unit.

11.2.1.2 P1

Indicates the state of every microswitch located inside the actuator

P1.0:Closed limit switch
P1.1 Open limit switch
P1.2 Opening overtorque switch
P1.3 Closing overtorque switch
P1.4 Blinker
P1.5 Thermal switch
P1.6 Lost phase
P1.7 Inverse phase connection.

11.2.1.3 P2

Variable only available for CENTORK technicians.

11.2.1.4 Remote inputs

Indicates the state of the remote inputs at the user connector.

11.2.1.5 Remote outputs

Indicates the state of the remote outputs at the user connector.

11.2.1.6 Phase

Indicates the state of the valve, previous to the byte stream reception.

1: Stop
2: Opening
3: Opened
4: Closing
5: Closed
6: Unlock & Closing
7: Unlock & Opening
8: Unlock deactivated
9: Overtorque openining
10: Overtorque closing
11: Travel limit switch fault
12: Thermal stop
13: Torque limit switch fault
14: Lost phase
15: Blinker Stop
16: Alarm ESD

11.2.2 Records (Data logging)

The following parameters will be replaced whenever a command “read records” is send.

11.2.2.1 Num Op Limit

Specifies the number of opening manoeuvrings made using the travel limit switching. It’s a decimal number composed by three two-digits groups: Num Op Limit; Num Op Limit+1; Num Op Limit+2. Whereas Num Op Limit is the most significant group.

Num Op Limit	Data 1	Data 2	Data 3
	Num Op Limit	Num Op Limit +1	NumOp Limit +2

Example:

If the number of opening manoeuvrings achieved by travel limit switching is 215365 the value of these parameters must be:

Num Op Limit = 21

Num Op Limit +1= 53

Num Op Limit +2= 65

11.2.2.2 Num Cl Limit

This parameter specifies the number of closing manoeuvrings achieved by travel limit switching. It is a decimal number composed by three two-digits groups: Num CL Limit; Num CL Limit+1; Num CL Limit+2. Whereas Num CL Limit is the most significant group.

Num Cl Limit	Data 4	Data 5	Data 6
	Num Cl Limit	Num Cl Limit +1	Num Cl Limit +2

Example:

If the number of closing manoeuvrings achieved by travel limit switching is 215365 the value of these parameters must be:

Num Cl Limit = 21

Num Cl Limit +1= 53

Num Cl Limit +2= 65

11.2.2.3 Num Op torque

Specifies the number of opening manoeuvrings made using the torque limit switching. It’s a decimal number composed by three two-digits groups:: Num Op torque; Num Op torque +1; Num Op torque +2. Whereas Num Op torque is the most significant group.

Num Op Par	Data 7	Data 8	Data 9
	Num Op torque	Num Op torque +1	Num Op torque +2

Example:

If the number of opening manoeuvrings achieved by torque limit switching is 215365 the value of these parameters must be:

Num Op torque = 21

Num Op torque +1= 53

Num Op torque +2= 65

11.2.2.4 Num Cl torque

This parameter specifies the number of closing manoeuvrings achieved by torque limit switching. It's a decimal number composed by three two-digits groups: Num CL torque; Num CL torque +1; Num CL torque +2. Whereas Num CL torque is the most significant group.

Num Cl torque	Data 10	Data 11	Data 12
	Num Cl torque	Num Cl torque +1	Num Cl torque +2

Example:

If the number of closing manoeuvrings achieved by torque limit switching is 215365, the value of these parameters must be:

Num Cl torque = 21

Num Cl torque +1= 53

Num Cl torque +2= 65

11.2.2.5 Num Hours

This parameter specifies the number of service hours (with the motor running)

It's a decimal number composed by three two-digits groups: Num hours; Num hours +1; Num hours +2. Whereas Num hours is the most significant group.

Num hours	Data 13	Data 14	Data 15
	Num hours	Num hours +1	Num hours +2

Example:

If the number of service hours (with the motor running) is 215.365, the value of these parameters must be:

Num hours = 21

Num hours +1= 53

Num hours +2= 65

11.2.2.6 Num thermic trippings

This parameter specifies the number of thermal stops

It is a decimal number composed by two two-digits groups: : Num therm. Tripp; Num therm. Tripp. +1. Whereas Num therm. Tripp is the most significant group.

Num therm. Tripp	Data 16	Data 17
	Num therm. Tripp	Num therm. Tripp +1

Example:

If the number of thermal trippings is 2153, the value of these parameters must be:

NumTherm. Tripp = 21

Num therm. Tripp +1= 53

11.2.2.7 Num Powering

Specifies how many times has been powered on the main power supply.

It is a decimal number composed by two two-digits groups: Num powering; Num powering +1. Whereas Num powering is the most significant group.

Num powering	Data 18	Data 19
	Num powering	Num powering +1

Example:

If the device has been powered on 2153 times, the value of these parameters must be:

Num powering = 21

Num powering +1= 53

11.2.3 Reading and writing examples

Let's assume that we want to open the valve and read the Status. Then the byte stream to send is:

Bytes to send:

Byte 0	Control	0x02
Byte 1	Instruction Code	0x81
Byte 2	-	-
Byte 3	-	-
Byte 4	-	-
Byte 5	-	-
Byte 6	-	-

Received Bytes:

Byte 0	Opening	55
Byte 1	Diagnostic	0x00
Byte 2	Instruction Code	0x01
Byte 3	High Word,high byte	0x60
Byte 4	High Word, Low byte	0x00
Byte 5	Low Word,High byte	0x90
Byte 6	Low bajo, Low byte	0x60

If later we want to open the valve…

Bytes to send:

Byte 0	Control	0x04
Byte 1	Instruction Code	0x01
Byte 2	-	-
Byte 3	-	-
Byte 4	-	-
Byte 5	-	-
Byte 6	-	-

Received Bytes:

Byte 0	Opening	45
Byte 1	Diagnostic	0x00
Byte 2	Instruction Code	0x81
Byte 3	High Word,High byte	0x60
Byte 4	High Word,Low byte	0x94
Byte 5	Low Word,High byte	0x00
Byte 6	Low Word,Low byte	0x60

11.3 ON/OFF CENTRONIK units

This section describes the input and output data to/from the interface and that form the communication during the data exchange.

The data exchanged in this model, has the following configuration:

Master outputs↔Centork Inputs

T	Control
T	Instruction code

Centork Outputs↔Master inputs

Diagnostic	
T	Instruction code/ Error
Data 1	
Data 2	

Data n

The structure is formed by 10 bytes max. that will be transferred by the PROFIBUS-DP fieldbus.

Master instructions:

- Control: The meaning of the process variables is the same as in the previous case but the variable Control which has the following code:

  0x01 Close valve

  0x02 Open valve

  0x04 Stop.

  0x08 Unlock opening

  0x10 Unlock closing

  Inside the “Control” process variable the toggle bit is used just in case that an order needs to be resent; this is usually done to resend the “stop” Control to rearm the valve in case that an alarm is detected. No echo of this toggle is generated.

- Command: Is composed by the instruction code and the Toggle bit.

  The possible instruction code is:

  0x01 Read Status

Slave response:

- Diagnostic: Alarm codes from the actuator. Possible values are:

  0x01 Motor thermo-switches tripped

  0x02 Travel limit switches error

  0x04 Torque limit switches error

  0x08 Lost phase

  0x10 Blinker error

- Response : The CENTRONIK unit will answer giving back an echo and a changed toggle, indicating that the command was correctly processed. If any kind of error occurred in the communication, in the code, etc., an error code will be sent instead of the echo. The structure of this code will be:

  b7: Toggle

  b6: Error in Instruction code

  b5: Error in Control

  b4…b0: Instruction code

– The data bytes, depending on the instruction, are defined as indicated in the next table:

Byte Nr	Status
Data 1	Selector-dip
Data 2	P1
Data 3	P2
Data 4	Remote inputs
Data 5	Remote outputs
Data 6	Phase
Data 7	
Data 8	

The "Command toggle bit" sent must be equal to the "Response toggle bit". The "Response toggle bit" will be always the opposite of the "Command toggle bit". When "the Repsonse toggle" bit change, the slave device indicate that the last instruction was received.

11.3.1 Status

The following data will be exchanged when a *Read Status* instruction is sent.

11.3.1.1 Selector-dip

Indicates the state of the DIPSWITCHES of the CENTRONIK unit.

11.3.1.2 P1

Indicates the state of every microswitch located inside the actuator

P1.0:Closed limit switch

P1.1 Open limit switch

P1.2 Opening overtorque switch

P1.3 Closing overtorque switch

P1.4 Blinker

P1.5 Thermal switch

P1.6 Lost phase

P1.7 Inverse phase connection.

11.3.1.3 P2

Variable only available for CENTORK technicians.

11.3.1.4 Remote inputs

Indicates the state of the remote inputs at the user connector.

11.3.1.5 Remote outputs

Indicates the state of the remote outputs at the user connector.

11.3.1.6 Phase

Indicates the state of the valve, previous to the byte stream reception.

1: Stop
2: Opening
3: Opened
4: Closing
5: Closed
6: Unlock & Closing
7: Unlock & Opening
8: Unlock deactivated
9: Overtorque openining
10: Overtorque closing
11: Travel limit switch fault
12: Thermal stop
13: Torque limit switch fault
14: Lost phase
15: Blinker Stop
16: Alarm ESD

11.3.2 Reading and writing examples

Let's assume that we want to open the valve and read the Status. Then the byte stream to send is:

Bytes to send:

Byte 0	Control	0x02
Byte 1	Command	0x81
Byte 2	-	-
Byte 3	-	-
Byte 4	-	-
Byte 5	-	-

Received Bytes:

Byte 0	Diagnostic	0x00
Byte 1	Response	0x01
Byte 2	High Word,high byte	0x60
Byte 3	High Word, Low byte	0x00
Byte 4	Low Word,High byte	0x90
Byte 5	Low bajo, Low byte	0x60

If later we want to open the valve…

Bytes to send:

Byte 0	Control	0x04
Byte 1	Instruction Code	0x01
Byte 2		
Byte 3		
Byte 4		
Byte 5		

Received Bytes:

Byte 0	Diagnostic	0x00
Byte 1	Instruction Code	0x81
Byte 2	High Word,High byte	0x60
Byte 3	High Word,Low byte	0x94
Byte 4	Low Word,High byte	0x00
Byte 5	Low Word,Low byte	0x60

12 TROUBLE SHOOTING

The following instructions are offered for the most common difficulties encounter during installation and start-up.

12.1 Front panel indication fault

- **L1 and L3 yellow blinking**:
  - **Cause**: Limit switch failure. Both limit switch are activated or an opposite limit switch is activated during a CLOSE or OPEN operation.
  - **Solution**: Check the limit switch setting (Chapter 9.4 and 9.5) and SW4 setting(Chapter 9.3.3).
- **L4 yellow blinking**:
  - **Cause**:Torque switch failure. An opposite limit switch is activated during a CLOSE or OPEN operation.
  - **Solution**: Check the SW4 setting(Chapter 9.3.3).
- **L2 yellow**:
  - **Cause:** Blinker fault. During a CLOSE or OPEN operation and after 7 seconds, the state of the blinker transmitter not changed, movement is not detected. Switching unit disengaged or motor damaged
  - **Solution**: Check the limit switch setting (Chapter 9.4) and if the motor work correctly.
- **L2 red or red blinking**:
  - **Cause:** Motor protection tripped. Duty service exceed.
  - **Solution:** Check that the valve is correctly lubricated. It must be ensured via the control that the duty service of the actuator is not exceeded. This can be achieved by setting the rest time to a sufficiently high enough value and to increase the deadbands values.
- **L5 red**:
  - **Cause:** Lost Phase.
  - **Solution:** Check if the 3 phases power supply is correct.
- **L5 yellow**:
  - **Cause:** Inverse phase connection. The Centronik unit include a 3 phase correction system therefore this indication is not an alarm/fault.
  - **Solution:** Change the 3 phases sense.
- **L1, L2 and L3 yellow:** Rest time executing (Chapter 9.11.6)
- **All LEDs switch off:**
  - **Cause:** Power supply fault, fuse burned or display board disconnected.
  - **Solution:** Check if the 3 phases power supply is correct, fuses state and display board connection.

12.2 Actuator does not operate in LOCAL mode

- Check front panel indication fault.
- Check SW1, SW2 and SW3 setting (Chapter 9.3.1).
- Check the connection between the front panel board and the CPU board .

12.3 Actuator does not operate correctly in REMOTE mode

- Check front panel indication fault.
- Check SW8 setting (Chapter 9.3.5).
- In case of Fieldbus control, check the communication and the response errors. Check if ESD is not activated.
- In case of analog input control (Modulating duty), check the correct connection, the SW6 setting (Chapter 9.3.4) and the setting procedure (Chapter 9.11) . Check if ESD is not activated.
- In case of parallel control (ON/OFF duty), check the correct connection. Check if ESD is not activated.

12.4 Actuator turn in the wrong sense

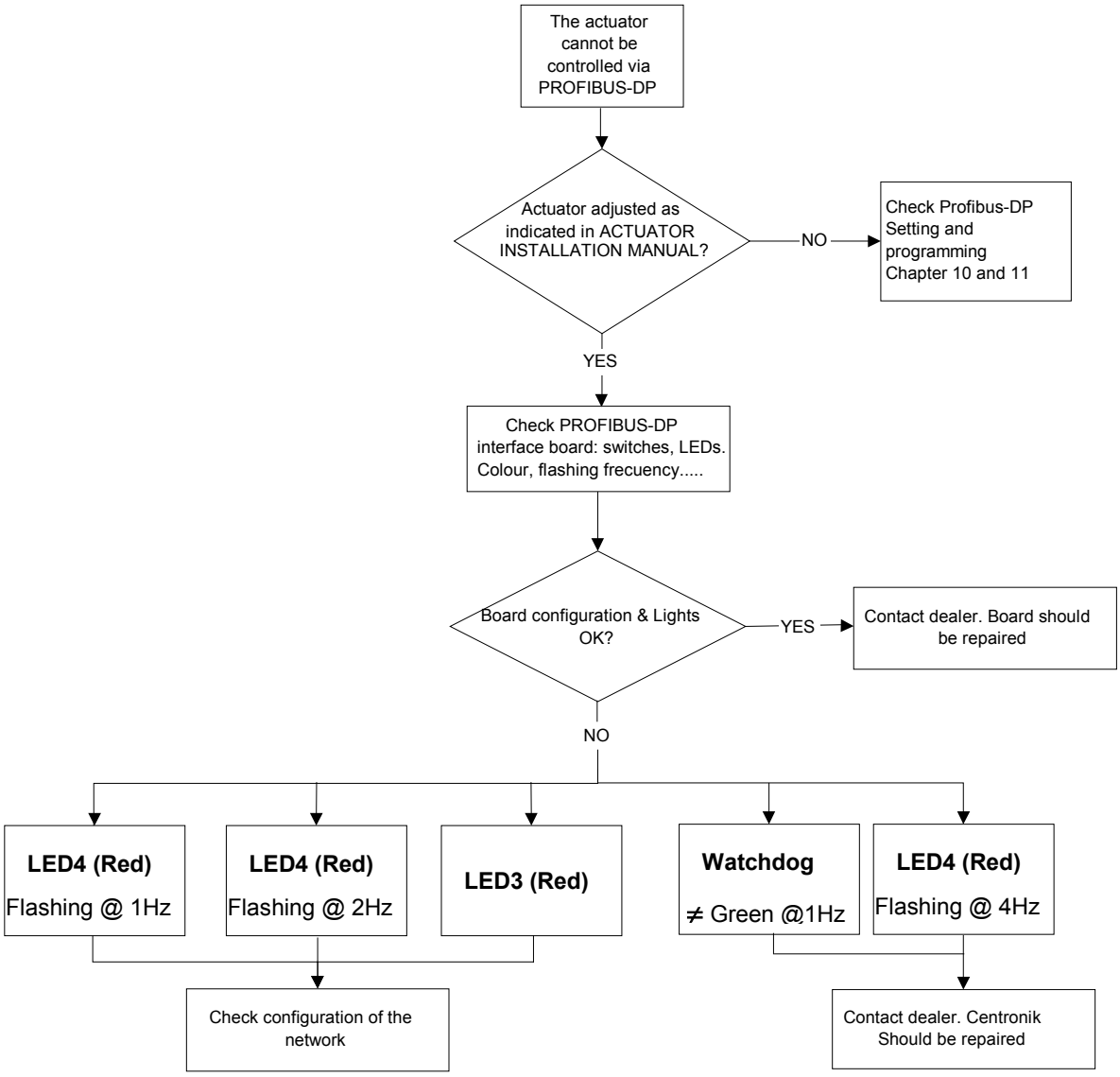
- Check the SW4 setting(Chapter 9.3.3).

12.5 Digitals outputs does not work

- Check the digitals outputs setting(Chapter 9.3.2 for ON/OFF duty and chapter 9.11.5 for Modulating and ON/OFF with display duty).
- Check the correct connection.

12.6 Fieldbus communication

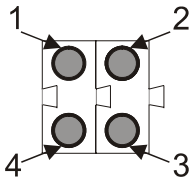
12.6.1 Troubleshooting diagram



12.6.2 Front mounting LED's

The interface is equipped with four LED's mounted at the front and one LED on the board, used for debugging purposes. The function of the LED's are described in the table and figure below.

1. Not used
2. On-Line
3. Off-Line
4. Fieldbus diagnostics



Name	Colour	Function
Fieldbus Diagnostics	**Red**	Indicates certain faults on the Fieldbus side.
		Flashing Red 1 Hz - Error in configuration: IN and/or OUT length set during initialisation of the interface is not equal to the length set during configuration of the network.
		Flashing Red 2 Hz - Error in User Parameter data: The length/contents of the User Parameter data set during initialisation of the interface is not equal to the length/contents set during configuration of the network.
		Flashing Red 4 Hz - Error in initialisation of the Profibus communication ASIC.
		Turned Off - No diagnostics present
On-Line	**Green**	Indicates that the interface is On-Line on the fieldbus.
		Green- Interface is On-Line and data exchange is possible.
		Turned Off - Interface is not On-Line
Off-Line	**Red**	Indicates that the interface is Off-Line on the fieldbus.
		Red- Interface is Off-Line and no data exchange is possible.
		Turned Off - Interface is not Off-Line

12.6.3 Watchdog LED

There is also a bicolour (red/green) watchdog LED on the circuit board, indicating the interface status according to the table below.

Watchdog function	Colour	Frequency
ASIC and FLASH ROM check fault	**Red**	**2Hz**
Interface not initialised	**Green**	**2Hz**
Interface initialised and running OK	**Green**	**1Hz**
RAM check fault	**Red**	**1Hz**
DPRAM check fault	**Red**	**4Hz**

13 MAINTENANCE

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

13.1 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.
- 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.

13.2 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.

13.3 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.

13.4 Fuse replacement

- The Centronik unit presents 2 fuses. In order to replace the fuses SAFETY INSTRUCTION must be observed (Chapter 2).
- With power off, open the electrical cover.
- Open the fuse holders and replace the fuses according to the table below.

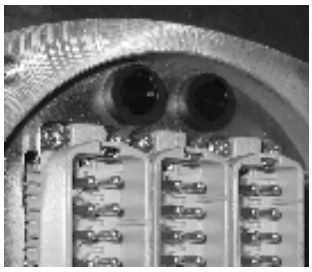


Figure 13.4.1

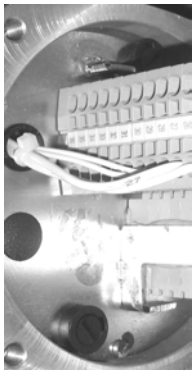


Figure 13.4.2

TENSION	CARACT. FUSE
110/120Volts	2A (5X20mm)
220/230Volts	1A (5X20mm)

TENSION	CARACT. FUSE
380 to 440 Volts	500mA (6.3X32mm)
460 to 600 Volts	250mA (6.3X32mm)

- Once you have checked that the fuse holders have been properly carried out, close the connection cover, the state of the o-ring seal and the proper installation of the latter, greasing it slightly. Fasten the 4 screws crosswise.

14 TECHNICAL SUPPORT

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

- The nameplates attached to the actuator.
- Electric actuador 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.

APPENDIX

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.

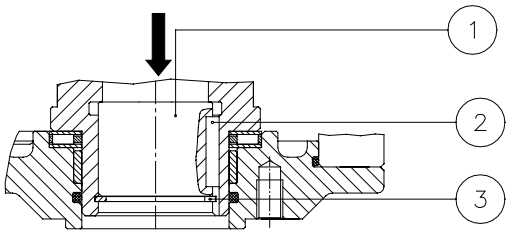


Figure 1

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).

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)

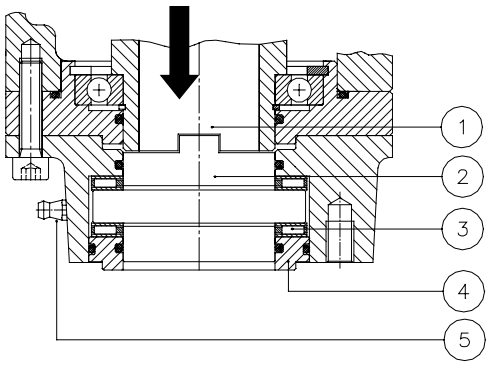


Figure 2

Assembly:

Having machined the removable bronze bush according to valve shaft, clean toughly 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).

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).

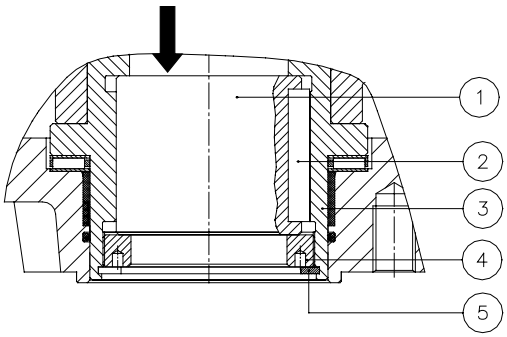


Figure 3

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).

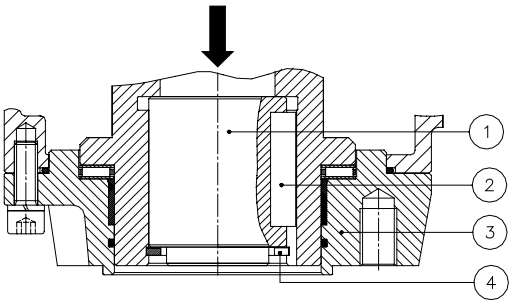


Figure 4

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).

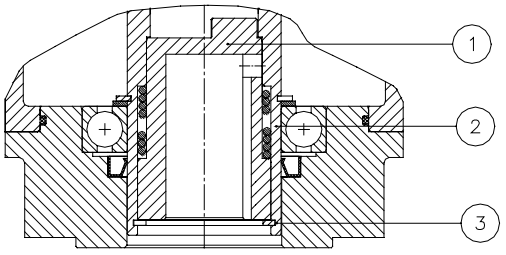


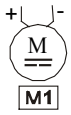
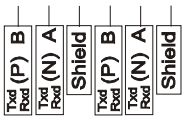
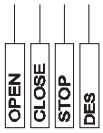
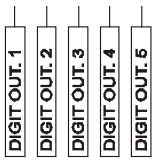
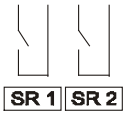
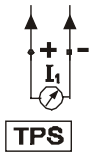
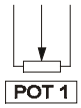
Figure 5

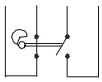
FASTEN BOLTS (CLASS 8.8)

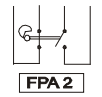
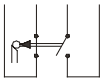
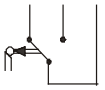
	FRICTION FACTOR		
BOLT	LOW	MEDIUM	HIGH
M4	4.2	6	8
M6	6.2	8.2	10
M8	15	21	24
M10	30	41	48
M12	49	68	85
M14	85	108	130
M16	130	165	200
M18	170	240	280
M20	240	340	410
M30	800	1150	1350
M36	1450	2050	2400

Torque values in N.m
Steel bolts class 8.8

WIRING DIAGRAMS, TERMINAL PLANS, LEGENDS AND SYMBOLS

SYMBOL	DESCRIPTION	TECHNICAL FEATURES
	M1 Main power supply (single and three-phase)	Main power supply: See Centronik nameplates. Main voltage supply tolerance: ±5% Frequency tolerance: ±5%
	M1 Main power supply (DC)	Main power supply: See Centronik nameplates. Main voltage supply tolerance: ±5%
	Profibus network	Non-powered two-wire (RS485) network (See Chapter 5, 6 and 10).
	remotel inputs: OPEN, CLOSE, STOP, UNLOCK remote input signal	
	ESD Emergency Shut Down remote input signal	
	Digital outputs	Programmable digital outputs 24VDC, 100mA max.
	SR1, SR2....SR5 Relay outputs	Programmable relay outputs SR1 to SR4: 250VAC/24VDC, 5A max. SR5: 250VAC/24VDC, 2A max.
	POSIC./COMUN Control input	Analog input 0/4-20mA or 0/5V (0/10V as option)
	TPS: 0/4-20 mA transmitter	Output Signal (current) : 2 wires :0/4-20 mA . Maximum resistance :600 Ohms Precision : <1%. Temperature : -25ºC to +70ºC
	POT: Precision Potentiometer	10 kOhms (other values on request). Ohmic value tolerance : ±20% std. (±10% optional). Linearity : <1%. Power : 1W max. Turning angle : 340º± 5% Life : 10^6 cycles.

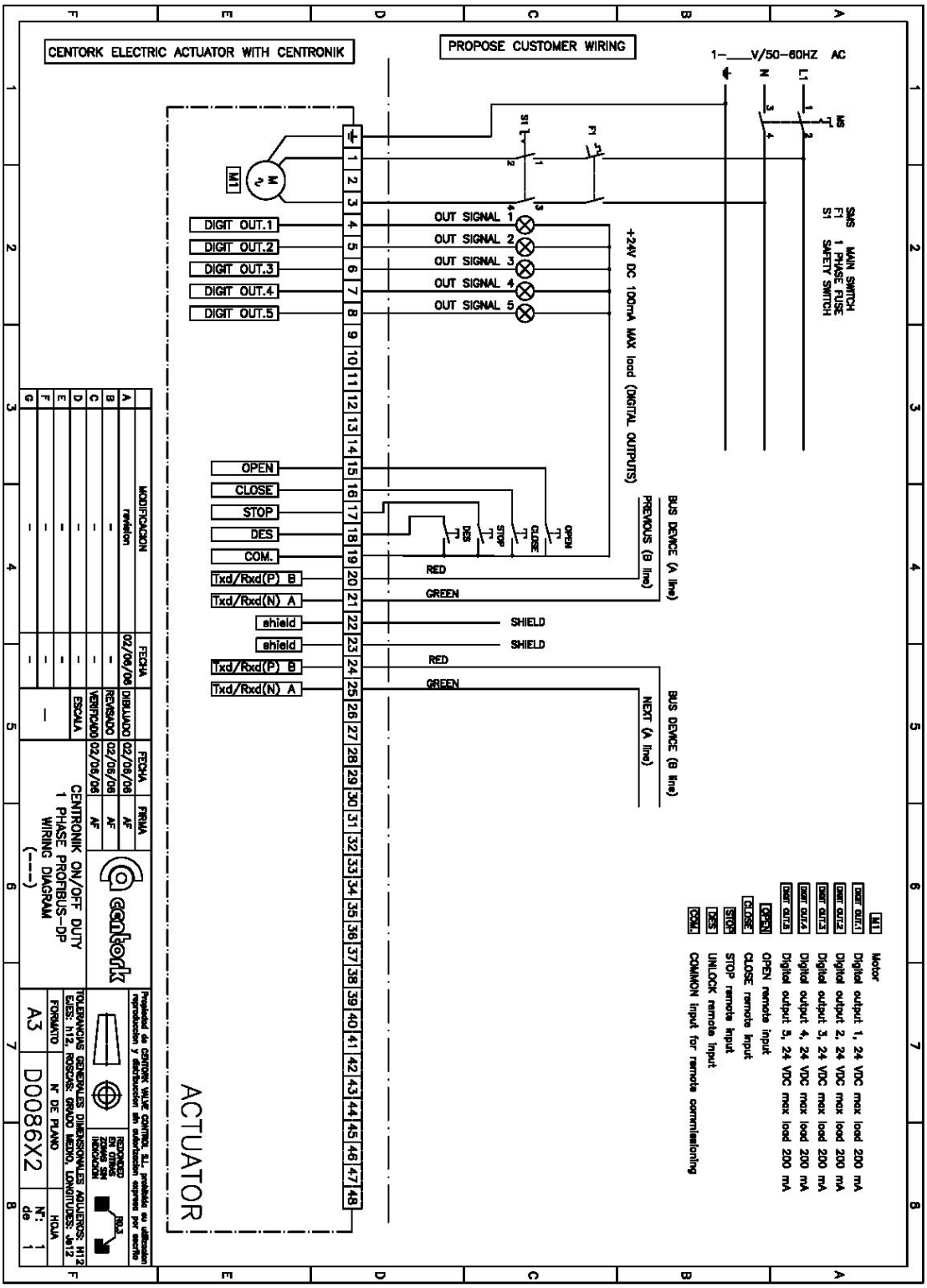
<table>
<tr>
<td> 
FPC 2</td>
<td><u>FPC:</u>
CLOSE torque microswitch.</td>
<td rowspan="4">Microswitch with silver contacts
Type of contact: 1 NA / 1 NC
Protection degree: IP67
Contacts: One fast acting
Mech. life: 5.10^6
Electr. life: 5.10^6
Microswitch circuits NO+NC contacts, only the same potential can be connected through both circuits. For different potentials, two double microswitches must be used.

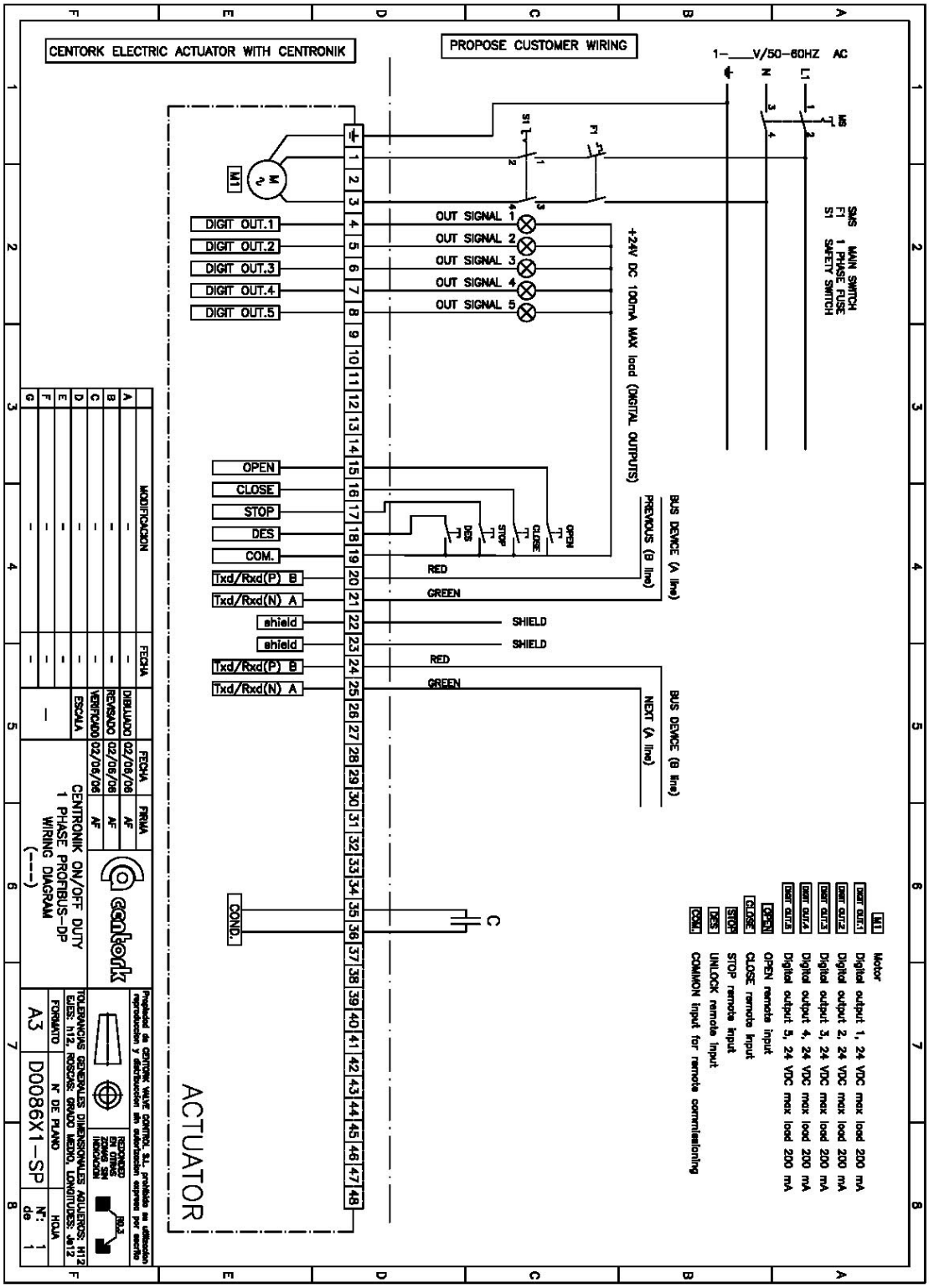
<table><tr><td rowspan="2">Silver contacts</td><td colspan="3">AC</td><td colspan="3">DC</td></tr><tr><td>30V</td><td>125V</td><td>250V</td><td>30V</td><td>125V</td><td>250V</td></tr><tr><td>Resistence</td><td>8A</td><td>6A</td><td>5A</td><td>2A</td><td>0.6A</td><td>0.4A</td></tr></table></td>
</tr>
<tr>
<td> 
FPA 2</td>
<td><u>FPA:</u>
OPEN torque microswitch.</td>
</tr>
<tr>
<td> 
FRC 2</td>
<td><u>FRC:</u>
CLOSE limit microswitch.
(CLOSE end position)</td>
</tr>
<tr>
<td> 
FRA 2</td>
<td><u>FRA:</u>
OPEN limit microswitch.
(OPEN end position)</td>
</tr>
<tr>
<td> 
AUX 1</td>
<td><u>AUX1:</u>
Auxiliary switches for middle-valve positions</td>
<td>Microswitch with silver contacts
Type of contact: 1 NA (SPDT)
Protection degree: IP67
Contacts: One fast acting
Mech. life: 3.10^7
Electr. life: 3.10^7

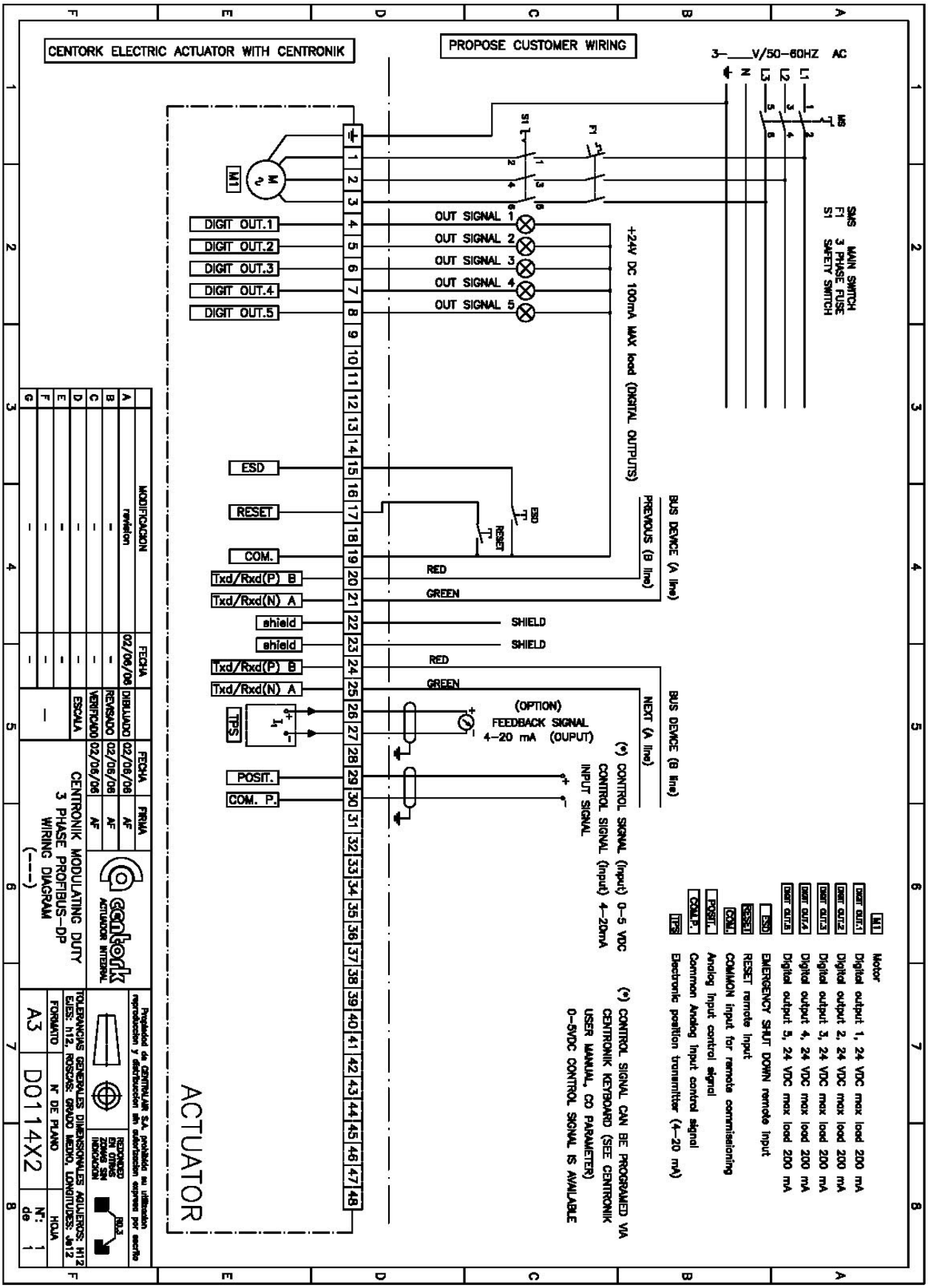
<table><tr><td rowspan="2">Silver contacts</td><td colspan="3">AC</td><td colspan="3">DC</td></tr><tr><td>30V</td><td>125V</td><td>250V</td><td>30V</td><td>125V</td><td>250V</td></tr><tr><td>Resistence</td><td>4A</td><td>4A</td><td>4A</td><td>2A</td><td>0.6A</td><td>0.4A</td></tr></table></td>
</tr>
</table>

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

OTHER wiring diagram are available and are included with each actuator provided.


CENTORK ELECTRIC ACTUATOR WITH CENTRONIK
PROPOSE CUSTOMER WIRING
1-___V/50-60HZ AC
L1
N
MS
SMS MAIN SWITCH
F1 1 PHASE FUSE
S1 SAFETY SWITCH
M1
DIGIT OUT.1
DIGIT OUT.2
DIGIT OUT.3
DIGIT OUT.4
DIGIT OUT.5
OUT SIGNAL 1
OUT SIGNAL 2
OUT SIGNAL 3
OUT SIGNAL 4
OUT SIGNAL 5
+24V DC 100mA MAX load (DIGITAL OUTPUTS)
OPEN
CLOSE
STOP
DES
COM.
Txd/Rxd(P) B
Txd/Rxd(N) A
shield
shield
Txd/Rxd(P) B
Txd/Rxd(N) A
RED
GREEN
SHIELD
SHIELD
RED
GREEN
BUS DEVICE (A line)
PREVIOUS (B line)
BUS DEVICE (B line)
NEXT (A line)
M1 Motor
DIGIT OUT.1 Digital output 1, 24 VDC max load 200 mA
DIGIT OUT.2 Digital output 2, 24 VDC max load 200 mA
DIGIT OUT.3 Digital output 3, 24 VDC max load 200 mA
DIGIT OUT.4 Digital output 4, 24 VDC max load 200 mA
DIGIT OUT.5 Digital output 5, 24 VDC max load 200 mA
OPEN OPEN remote input
CLOSE CLOSE remote input
STOP STOP remote input
DES UNLOCK remote input
COM. COMMON input for remote commissioning
ACTUATOR
MODIFICACION
DIBUJADO
REVISADO
VERIFICADO
ESCALA
FECHA
FIRMA
CENTRONIK ON/OFF DUTY
1 PHASE PROFIBUS-DP
WIRING DIAGRAM
(---)
TOLERANCIAS GENERALES DIMENSIONALES AGUJEROS: H12
EJES: h12, ROSCAS: GRADO MEDIO, LONGITUDES: Js12
FORMATO
A3
D0086X2
HOJA
Nº de PLANO


CENTORK ELECTRIC ACTUATOR WITH CENTRONIK
PROPOSE CUSTOMER WIRING
1~___V/50~60HZ AC
L1
N
MS
SMS MAIN SWITCH
F1 1 PHASE FUSE
S1 SAFETY SWITCH
M1
DIGIT OUT.1
DIGIT OUT.2
DIGIT OUT.3
DIGIT OUT.4
DIGIT OUT.5
OUT SIGNAL 1
OUT SIGNAL 2
OUT SIGNAL 3
OUT SIGNAL 4
OUT SIGNAL 5
+24V DC 100mA MAX load (DIGITAL OUTPUTS)
OPEN
CLOSE
STOP
DES
COM.
Txd/Rxd(P) B
Txd/Rxd(N) A
shield
shield
Txd/Rxd(P) B
Txd/Rxd(N) A
BUS DEVICE (A line)
PREVIOUS (B line)
BUS DEVICE (B line)
NEXT (A line)
RED
GREEN
SHIELD
SHIELD
RED
GREEN
COND.
C
M1 Motor
DIGIT OUT.1 Digital output 1, 24 VDC max load 200 mA
DIGIT OUT.2 Digital output 2, 24 VDC max load 200 mA
DIGIT OUT.3 Digital output 3, 24 VDC max load 200 mA
DIGIT OUT.4 Digital output 4, 24 VDC max load 200 mA
DIGIT OUT.5 Digital output 5, 24 VDC max load 200 mA
OPEN OPEN remote input
CLOSE CLOSE remote input
STOP STOP remote input
DES UNLOCK remote input
COM COMMON input for remote commissioning
MODIFICACION
FECHA
DIBUJADO 02/05/06 AF
REVISADO 02/05/06 AF
VERIFICADO 02/05/06 AF
ESCALA —
CENTRONIK ON/OFF DUTY
1 PHASE PROFIBUS-DP
WIRING DIAGRAM
(---)
A3
D0086X1-SP
ACTUATOR


CENTORK ELECTRIC ACTUATOR WITH CENTRONIK
PROPOSE CUSTOMER WIRING
3~___V/50-60HZ AC
L1
L2
L3
N
MS
SMS MAIN SWITCH
F1 3 PHASE FUSE
S1 SAFETY SWITCH
M1
DIGIT OUT.1
DIGIT OUT.2
DIGIT OUT.3
DIGIT OUT.4
DIGIT OUT.5
OUT SIGNAL 1
OUT SIGNAL 2
OUT SIGNAL 3
OUT SIGNAL 4
OUT SIGNAL 5
+24V DC 100mA MAX load (DIGITAL OUTPUTS)
ESD
RESET
COM.
Txd/Rxd(P) B
Txd/Rxd(N) A
shield
shield
Txd/Rxd(P) B
Txd/Rxd(N) A
TPS
POSIT.
COM. P.
BUS DEVICE (A line) PREVIOUS
BUS DEVICE (B line) NEXT
RED
GREEN
SHIELD
SHIELD
RED
GREEN
(OPTION)
FEEDBACK SIGNAL
4-20 mA (OUPUT)
(*) CONTROL SIGNAL (input) 0-5 VDC
CONTROL SIGNAL (input) 4-20mA
INPUT SIGNAL
(*) CONTROL SIGNAL CAN BE PROGRAMED VIA CENTRONIK KEYBOARD (SEE CENTRONIK USER MANUAL, CO PARAMETER)
0-5VDC CONTROL SIGNAL IS AVALABLE
M1 Motor
DIGIT OUT.1 Digital output 1, 24 VDC max load 200 mA
DIGIT OUT.2 Digital output 2, 24 VDC max load 200 mA
DIGIT OUT.3 Digital output 3, 24 VDC max load 200 mA
DIGIT OUT.4 Digital output 4, 24 VDC max load 200 mA
DIGIT OUT.5 Digital output 5, 24 VDC max load 200 mA
ESD EMERGENCY SHUT DOWN remote input
RESET RESET remote input
COM. COMMON input for remote commisioning
POSIT. Analog Input control signal
COM.P. Common Analog Input control signal
TPS Electronic position transmitter (4-20 mA)
MODIFICACION
revision
FECHA
DIBUJADO
REVISADO
VERIFICADO
ESCALA
FIRMA
CENTRONIK MODULATING DUTY
3 PHASE PROFIBUS-DP
WIRING DIAGRAM
(---)
ACTUATOR INTERNAL
FORMATO A3
Nº DE PLANO D0114X2
HOJA Nº: 1 de 1
ACTUATOR

centork VALVE CONTROL

Declaración de Conformidad

Centork Valve Control S.L. declara que los actuadores eléctricos, series:

1400. 1410. 1402. 1414.
1401. 1411. 1403. 1415.

han sido diseñados, producidos como accionamientos eléctricos para operar válvulas industriales y de acuerdo con los requerimientos de las Directivas CE reseñadas,

Directiva 98/37/CE Máquinas, 22 de Junio 1.998
Directiva 73/23/CE Directiva de Baja Tensión, 19 Febrero 1.973
Directiva 89/336/CE Directiva Compatibilidad Electromagnética.

aplicándose las siguientes normas,

ISO 5210 Sept. 1.991	**EN 50.014 Dic.1.999**	**EN 60.204-1 Febr. 1.999**
ISO 5211 Febr. 2.001	**EN 50.018 Dic. 2.001**	**EN 60529 Marzo 2.000**
EN 292-1 Abr. 1.993	**EN 50.019 Ene. 2.002**	**DIN VDE 0100 Ene 1.997**
EN 292-2 Abr.1.993	**EN 50.020 Sept. 2.003**	**DIN VDE 0530 Dic. 1982**

Si el mencionado aparato es montado en una máquina o instalado junto con otras máquinas o dispositivos, está prohibida la puesta en marcha de la máquina o conjunto de máquinas hasta que se verifique su conformidad con los requisitos de las directivas aplicables, así como con los requisitos y normas de seguridad aplicables.

Esta declaración queda sin efecto si el aparato ha sido modificado sin nuestra autorización escrita.

San Sebastián, 3 de Octubre de 2.003

Francisco Lazcano
–Director general-

(Sede social)
Centork Valve Control S.L.
Portuetxe 23-25
San Sebastián 20.018 ESPAÑA

(Centro fabricación)
Centork Valve Control S.L.
Zikuñaga 19
Hernani 20.120 ESPAÑA

PROFIBUS CERTIFICATE

Certificate

PROFIBUS Nutzerorganisation e.V. grants to

HMS Industrial Networks AB
Pilefeltsgatan 93 - 95, S-30250 Halmstad
the Certificate No.: **Z00456** for the following product:

Name: **Anybus-S PDP**
Model: **Fieldbus Interface**
Revision: 1.4; SW: 1.2
GSD: **HMS_1003.gsd**

This certificate confirms that the device has successfully passed the conformance tests for PROFIBUS DP Slave devices.

The tests were executed according to "Test Specifications for PROFIBUS DP Slaves, Version 2.0" from February 2000, at Siemens AG in Fürth which is an authorized test laboratory of PROFIBUS Nutzerorganisation. The detailed test procedure and the test results are recorded in the inspection report 296-2.

This certificate is granted according to the PNO guideline for testing and certification (PRZ) dated August 1, 1999 and is valid for 3 years, i.e. until November 18, 2006.

Karlsruhe, December 19, 2003

.....
(Official in Charge)

Board of PROFIBUS Nutzerorganisation e. V.

(Edgar Küster)

(Prof. K. Bender)

NOTES

centork
VALVE CONTROL

CENTORK Valve Control S.L.

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