BERNARD®
CONTROLS

INSTRUCTIONS FOR START-UP
SQX & STX INTELLI+ RANGES

(CSA certified)

Range SQX STX

NR 1212_rev.04'
Art : 5100150

CONTENTS

WARNING
READ THESE INSTRUCTIONS CAREFULLY BEFORE USE

1 > SAFETY INFORMATION

The following documents should also be consulted:
a) IEC/EN60079-14 standard (electric installations in gaseous explosive atmosphere),
b) IEC/EN60079-17 standard (inspection and maintenance operations in dangerous areas),
c) For USA, NFPA70 National Electrical Code®
d) Decrees, ministerial orders, laws, directives, standards, procedures and any other document relative to the area where the actuator has to be installed.

BERNARD CONTROLS cannot be judged responsible for the non-respect of these rules.

Our actuators have been designed for a use in hazardous (Classified) locations:

Zone 1 and 2 : Gaz Group II

Zone 21 and 22 : Dust

Actuators CSA marked : our equipments comply with CSA certifications - CSA zones
Actuators INMETRO CEPEL marked : our equipments comply with the INMETRO CEPEL certification

Divisions 1 : Gaz Class I / Dust Class II

Actuators CSA marked : our equipments comply with CSA divisions c and us certifications (CSA and FM standard)

Please check the compatibility between the indications written on the identification plate and the explosive atmosphere type, the ambient and the admissible surface temperature of the installation area. The actuator installation and maintenance must be carried out by qualified, trained and certified personnel.

1.1 > MARKING

	CSA zones Explosionproof enclosure "d"	IEx Explosionproof enclosure "d"	CSA divisions Explosionproof
Name and address of the manufacturer	BERNARD CONTROLS 4 rue d'Arsonval 95505 Gonesse France	BERNARD CONTROLS 4 rue d'Arsonval 95505 Gonesse France	BERNARD CONTROLS INC 4 rue d'Arsonval 95505 Gonesse France
Actuator type	Type STX...	Type STX...	Type STX...
Serial number and year of construction	99605 001 - 2011	99605 001 - 2011	
Certificate number	CSA Zone	IEx	CSA division
Specific marking			CSA c and us
Notified audit body	CSA		CSA
Gaz marking	Ex d IIB T4 Gb	Ex d IIB T4 Gb	Class I div1, Gr C, D, T4
Dust marking	Ex tb IIIC T135°C Db	Ex tb IIIC T135°C Db	Class II div1, Gr E, F, G
Ambiant temperature	-4°F +158°F	-20°C +70°C	-4°F +158°F

1.2 > INSTALLATION AREA

This actuator is an explosion-proof equipment and can be used in the following areas depending on the marking :

Zones Classification

Actuator type	STX..,		ST175, ST220		SQX	
Protection	Ex d, Ex tb		Ex d, Ex tD		Ex d, Ex tb	
Zone	1 or 2	21 or 22	1 or 2	21 or 22	1 or 2	21 or 22
Atmosphere	G Gas	D Dust	G Gas	D Dust	G Gas	D Dust

Zone 1 (gas) & 21 (dust): the explosive atmosphere is likely to occur occasionally in normal operation.

Zone 2 (gas) & 22 (dust): the explosive atmosphere is not likely to occur in normal operation but if it does occur, it will persist for a short period of time only.

Divisions Classification

Actuator type	STX..,	ST175, ST220	SQX
Protection	Class I, Gr B, C, D Class II, Gr E, F, G	Class I, GR C, D	Class I, Gr B, C, D Class II, Gr E, F, G
Division	1	1	1

WARNING
This device has not been designed to be operated in areas where the risk of getting explosive atmosphere, frequently or during long periods, is high (Zone 0).

Gaz groups

CSA divisions	CSA Zones	Typical gas (*)
C, D	IIB	Ethylene
B	IIB + H2	Hydrogen
-	IIC	Hydrogen, Acetylene

(*) Other gas, please consult a notified body (INERIS or LCIE i.e)

Class	Max surface temperature
T4	135°C
T5	100°C
T6	85°C

The temperature class corresponds to the actuator maximum surface temperature.

1.3 > CAUTIONS FOR ELECTRICAL CONNECTION

Opening the covers

To avoid any risk of explosion, do not open when explosive atmosphere may be present. It is preferable that the actuator electric control and power supply are switched off before opening the cover.
Be careful not to damage the joint surfaces of the cover.
The explosion proof joint may be lubricated with a grease that does not become hard and is anticorrosion (example TOTAL N31271 or SHELL TIVELLA GL00).
Be careful not to damage the gaskets when repositioning the cover onto the actuator body. Tighten each cover screw.

Screws of explosion-proof actuator body must be of a minimum 8.8 quality grade or made of stainless steel with a minimum 70 daN/mm2 tensile strength.
In case of use in explosive dust atmosphere, check that cover tightness gaskets are intact and make sure not to degrade the gaskets while closing the cover. Cable entries shall provide a level of protection equal or higher than the one indicated on the actuator identification plate. The user shall ensure a regular cleaning of the product housing to avoid dust build-up.

Overheating

A motor thermal protection switch is (refer to actuator electric diagram) integrated into the motor control circuit in order to switch off the motor power supply in case of overheating conditions. This protection is mandatory to respect maximum surface temperatures.

Cable entries

Check that cable glands are used and wiring done according to the explosion-proof equipment standards ; take a special care of the compatibility between the cable diameter and the cable gland size. If one of the cable entries is not used, seal it with a certified metal plug and without adapter.
If an adapter is necessary to fit a cable gland, only one is allowed by cable entry and use a certified one.

Conduit entries

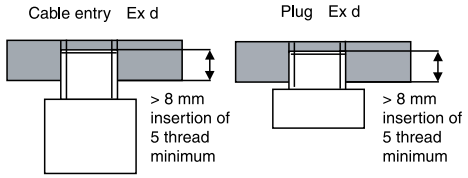
Check that conduit entries are used and wiring done according to the explosionproof equipment standards ; seals are required to prevent the passage of flames through the conduit system. A certified sealing fitting has to be mounted at maximum 55mm (2 in) from the housing. Only explosionproof unions coupling are permitted. If one of the conduit entries is not used, seal it with a certified pipe plug.

The actuator is delivered with a yellow sticker,in the connection compartment, that obstruates the cable entries. The danger symbol ⚠ and a notice warns the installer of the obligation to equip each cable entry with a certified plug or cable gland or conduit.

For cable gland and plug take care of the marking:
ATEX : Exd (or Exe in case of an increased safety « e » connexion compartment)
IECEx : Exd (or Exe in case of an increased safety « e » connexion compartment)
Brazil : Brazilian certification Exd.
For Exd box, the thread type is indicated in the connection box to avoid confusion (NPT or ISO).
If the ambiant temperature exceeds 60°C, consider an additional 10°C at the cable entry. I.e, at a maximum ambiant temperature of 70°C, the temperature at the cable entry will be 80°C.

Wiring

Maximum acceptable voltage for the power supply terminal (M4) is 690V and 160V for control terminals unless otherwise specified on the wiring diagram. Connection is done with isolated and crimped ring tongue terminals. The maximum cable section is 6mm2 for the power supply (M4) and 4mm2 for controls (M3).
An external earth rod allows connection to the earth (4 or 6mm2 according to the actuator model).
Make sure to wire both internal and external groundings.



Water-proofness

Because the NPT cable gland thread is not IP68, it's necessary to mount it with a thread sealant for ex: Loctite 577 (Henkel). In case of ISO thread, sealing is assured by an O ring or by a thread sealant as noticed above.
Please note : For Exd enclosure, thread type (NPT or ISO) is indicated in the connection box to avoid any mistake.

1.4 > OPERATION

Do not open the cover when an explosive atmosphere may be present.Never leave the cover open, in order to avoid any risk of water inlet.

Respect the actuator duty cycle indicated on the identification plate. For example, for a 30% duty and a 40s operating time, the minimum time between two operations is 93 s. In case of over-heating, the thermal protection will disrupt the motor power supply in order to limit the actuator body temperature elevation.

INTELLI+ VERSION CAUTION
Never use the Intellisoft infrared communication kit in an explosive area. This module is not explosion-proof. In explosive areas, set-up the actuator only by using the local control buttons or Explosionproof PDA

Actuator equipped with the battery option.

When the battery is too low, the « battery low » message is displayed or is sent remotely according to the actuator setting. For the explosionproof actuators you must replace the batteries by the following models: 2 OMNICEL ER14505HD model batteries or 2 MICROBATT ER 14505 M model batteries or 2 EVE ER 14505M model batteries.
Please read carrefully the message before opening the cover: "DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE MAY BE PRESENT".

1.5 > MAINTENANCE

Regularly check that the actuator explosion-proof body has not been degraded by a mechanical shock or any other type of agression. The cable glands are explosion-proof components and, as such, must be kept intact.

CAUTION:
« WARNING– DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE MAY BE PRESENT »

Check that the glands and the cables aspect is normal and also that there is no risk of water entering into the actuator (avoid placing the cable glands upwards i.e).

Do not bring any modification of any kind to the actuator.

The actuator mechanical parts are lubricated and do not necessitate any specific maintenance. In the event of a dismounting/remounting operation, make sure that all moving parts are correctly lubricated in order to prevent any electric spark. The oil for lubrification must have an auto-ignition temperature ≥200°C. Please consult Bernard Controls.
Although a thermal protection is built in the motor, it is important to check that there is no risk of bearings jamming.

Bearings change frequency: 10000h of operation.
Any repair on the explosion proof or the increased safety device requires a prior manufacturer agreement and generally necessitates to return it to the manufacturer workshop in order to secure the explosion proof and increased safety protection integrity. Dimensions of explosion proof joints are specifics. Consult BERNARD CONTROLS for information.

1.6 > ELECTRICAL AND TEMPERATURE PARAMETERS

The power supply voltage and frequency are indicated on the identification tag and (or) on the electric wiring diagram.
The minimum ambiant temperature is -20°C and the maximum +40°C unless an other information is mentioned on the identification tag.

1.7 > SPECIAL OPERATION CONDITIONS INCLUDING UNCORRECT PRACTICES

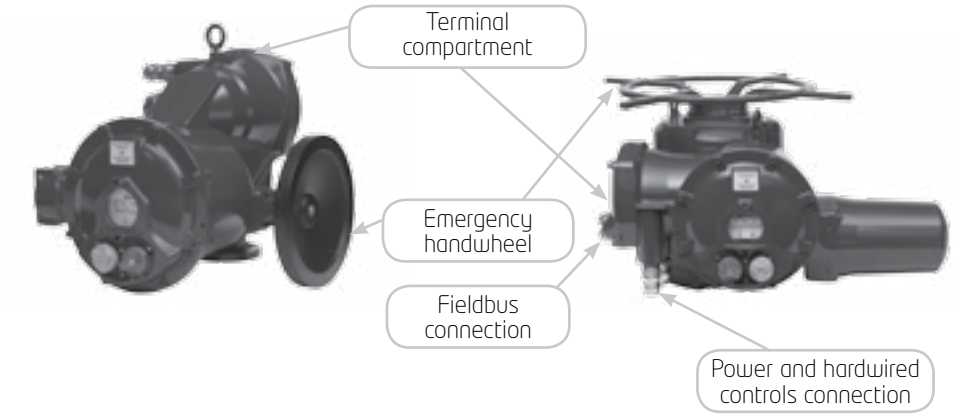
Duty cycle: the motors are designed for an intermittent operation ; it means that they should be stopped for a sufficient period of time after each operation in order to enable it to cool down (see §1.4 operation). If the operating time is too high, the motor temperature will raise and will eventually activate the thermal protection. This event must remain exceptional and everything must be carried out to avoid switching the thermal protection during normal operation phases.

Covers opening: remove the covers only if there is no explosive atmosphere. It is important not to degrade the explosion proof protections (surfaces, cable glands, gaskets, ...).

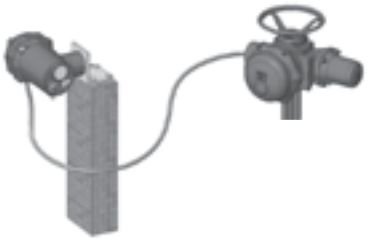
1.8 > LIST OF APPLICABLE STANDARDS

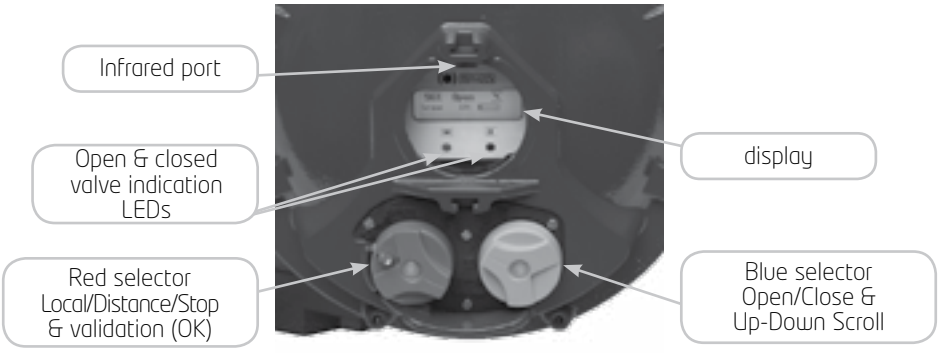
CSA C22.2 N°30 M1986 (R2007), CSA C22.2 N°25 1966 (R2009), CSA C22.2 N°139 - 1982, UL STD N°429 - CAN/CSA, C22.2 60079-0-07, CAN/CSA C22.2 60079-1-07, CAN/CSA E61241-1-1-02 (R2006), UL 60079-0-2009, UL 60079-1-2009, FM 3600 1998, FM 3615 2006, FM 3611 2004.

2 > PRODUCT OVERVIEW



Remote control box configuration





Manual override
All INTELLI+ actuators incorporate a handwheel for manual control with an automatic clutch system with motor-drive priority. The direction of rotation is normally clockwise for closing unless otherwise specified.

3 > STORAGE

Introduction
An actuator consists of electrical components plus mechanical parts which have life-long lubrication. Although the assembly is contained in a waterproof housing, the actuators may suffer from oxidation, become clogged or seize during commissioning if it has not been stored correctly.

Storage
Actuators must be stored under cover in a clean, dry place which is protected against variations in temperature.
Avoid storing directly on the ground. If stored in areas subject to damp, apply power to the actuator to dry it out electrically. Check to ensure that the cable entries are sealed.
Ensure electrical component covers and compartments are properly sealed.
In case of a valve with an important stem lift, check that the stem protection cover is mounted on the actuator. If not, assemble it with a weak sealing paste.

Inspection following storage

1. If stored for less than one year:
   - Visual inspection of electrical parts.
   - Operate buttons, selectors, etc. manually to ensure that they can be used without difficulty.
   - Perform a few movements manually.
   - Check consistency of grease.
   - Commission the actuator.
2. If stored for more than one year:
   - Long-term storage causes the consistency of the grease to change. To avoid any grease-drying problem, do some rotations of the actuator several times a year by using motor or manual override.
   - Visual inspection of electrical parts.
   - Operate buttons, selectors, etc. manually to ensure that they can be used without difficulty.
   - For the actuators equipped with battery option. During the storage period, the circuit is in low comsumption mode which allows to get a long lifetime of the battery. Beyond a storage time of 3 years it is better to replace the batteries at the commissioning. You can check the battery status at any time on the display.

4 > ACTUATOR ON VALVE ASSEMBLY

Actuator should be secured directly to the valve using proper bolts or via a proper interface.
After assembly, the actuator can operate in any position. However, cable glands should not be oriented upwards (loss of water tightness) and the motor will preferably not be positioned at the bottom (potential internal condensation trap)

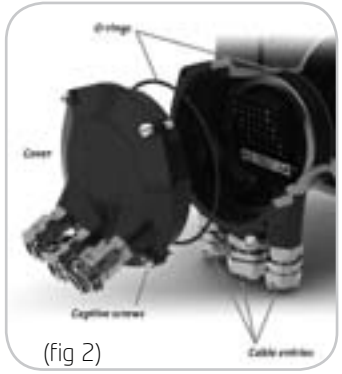
Note 1: do not lift the actuator by handwheel, it could damage the wormwheel gear.

Note 2: see § 31 for details on storage precaution prior to starting-up.

Note 3: Greasing of A form drive bush has to be done prior to mounting actuator on valve (in the case of a rising stem valve).

5 > ELECTRICAL CONNECTION

Only the cover of the connection box/compartment (Fig. 2) requires to be open for electrical connection. The other covers should not be removed at the risk of introducing moisture into the electronic controls.
A wiring diagram is normally supplied with the actuator. If this is not the case, please ask our customer service.


(fig 2)

Operating procedure :

a) Check the power supply characteristics with respect to the rating nameplate. In 3 phase, the phases order is not important as the INTELLI+ system corrects the direction of rotation automatically.
b) Open the terminal box (fig. 2), connect the power and control circuits (ring tongue not supplied). The screw diameters is 3mm for the control and 4mm for the power.
Check the wiring.
c) make sure that the cover screws, cable glands are properly tighten and IP68 waterproofness is assured by an O ring or by a thread sealant as noticed §1.3.

6 > ACTUATOR ON VALVE SETTING INTRODUCTION

Each INTELLI+ actuator is set and checked at the factory.
If the actuator is delivered mounted on top of a valve, the open and closed positions as well as the maximum torque values should have been adjusted by the valve supplier.
If an actuator on valve setting has to be performed or optimised, it can be done by simply connecting the power supply. All settings and configurations can then be performed in a non-intrusive way using the blue and red rotating knobs together with the graphical display.

WARNING
On quarter-turn actuators, mechanical end stops, located either on the actuator or the gearbox, mechanically limit the actuator travel during manual operation.
It is mandatory that the motor stops, in both directions, on the travel limit switch and not on the mechanical end stop (check available extra travel to the stop with the handwheel).

The following chapters of this document include all the information necessary to perform actuator on valve settings:

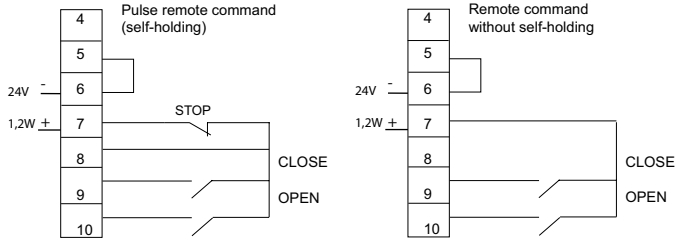
§9. NAVIGATING IN THE MENUS
§10. SELECTING THE DISPLAY LANGUAGE
§18. SETTING AND VIEWING TORQUE VALUES (in case of closing on torque)
  §18.1 Closing type
  §18.2 Torque setting
§14. ADJUSTING AN ACTUACTOR ON A VALVE

7 > REMOTE CONTROL

The INTELLI+ actuator's remote control system can be operated using an external or an integral voltage supply.
The input circuits are fully opto-isolated. The self-hold pulse command system requires four connecting wires on the client terminal strip: Common, stop, open and close. If the stop push-button is not used, do not connect the STOP wire, open (or close) contact must be maintained to operate the actuator.

7.1 > DRY CONTACT CONTROL

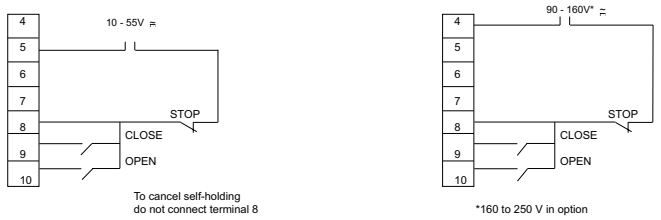
In case of dry contact control, a jumper must be fitted across customer terminal 5-6.



7.2 > VOLTAGE CONTROL

Remote control can use either in AC or DC voltage.
Use common terminal 5 for low voltages from 10 to 55V.
Use common terminal 4 for voltages from 90 to 160V (250V with optionnal insulation).

Caution: never connect voltage sources above 55V on common terminal 5.



8 > LOCAL CONTROL USING BUTTONS AND DISPLAY

The local control facility provides a means of operating the actuator electrically without using an external control circuit. There is a switch for selecting remote control, local control or disabled (off). The local open/close switch is used to operate the actuator in the direction required. Movement can be halted locally by turning the local/ remote selector switch briefly to the STOP position.

The display shows the position of the valve as a percentage of opening when it is partially open.
The display shows "Closed" when the valve is closed.
The display shows "Open" when the valve is open.
The display is factory set to show the instantaneous torque as a percentage of the maximum actuator torque value
< 10% indicates the minimum torque value.

20% Open

Closed

Open

Torque 60%

Symbols that may appear on the display:

- A remote command inhibits the local controls (see § 16.2)
- ESD — The actuator receives an emergency shutdown command (see § 16.2)
- An infrared link is detected (see § 17.1)
- A bluetooth link is detected (see § 17.2)
- indicates the presence of an alarm. (see §22.2 for the types of alarm)
- In case of a battery option, the icon blinks if the battery voltage is low.
- 0% — This icon indicates that the control is proportional (4-20 mA i.e) and the value of the input signal (setpoint) is indicated in %. Blinking if 4-20 mA signal is missing.
- BUS — The BUS marker indicates there is a bus communication card. The marker is followed by a square that shows you the communication status (see specific documentation of the installed bus).
- 1 2 — 1 and 2 indicate the presence of a redundant communication card (2 communication channels). The number is followed by a square indicating the status of each communications channel (see the specific doc. of the installed bus).

9 > NAVIGATING IN THE MENUS

The selector switches used for operating the actuator's electrical motor drive is also used to navigate into the INTELLI+ menus and thus to have access to the settings.

9.1 > SELECTORS

Blue selector (on the right)
- choice selection

Red selector (on the left)
- selector on OK: choice validation
- selector on OFF: exit the menu at any time

9.2 > MAIN MENU

- Set the selector on local
- Keep the red selector on local stop and at the same time move the blue selector upwards and then downwards.

The display shows:

MENU
exit setup

- Release the selector, it goes to "local" position.

To read the menu, turn the blue selector up or down to scroll through the menu options on the bottom line of the display.

9.3 > SELECT A MENU OR AN OPTION

MENU
exit set up
language
check
setup
change
exit set up

MENU
language
check
setup
change
exit set up

LANGUAGE
French
English
Deutsch
Spanish
Portugues
Italian
Russian
Chinese
Polish

Select (blue selector) → Confirm (red selector) → Select then confirm (red selector then blue selector)

When the option you want is displayed, turn the red selector from local stop to OK. The option is then displayed in upper-case characters on the first line and sub-menu items can be viewed on the second line.

9.4 > SAVING THE CHANGES

To save changes made in the CHANGE menu, you have to exit each menu in turn by selecting return until the display shows: (change ok?)

TORQUE
return
torque setting
measured torque
torque curve
closing type
return

CHANGE
return
activity
commands
torque
data sheet

CHANGE
(change ok?)
(no change)

Select → Confirm → Select then confirm

BERNARD CONTROLS

9.5 > EXITING THE MENU AT ANY TIMES

To exit the menu at any time, turn the red selector to the "OFF" position.

9.6 > MAIN MENU DESCRIPTION

MENU
exit set up
language
check
setup
change
exit set up

Language: to choose the displayed language.
Check: to view all actuator settings and configuration data. No changes can be made and this option can be accessed without a password.
Setup: to adjust the actuator on the valve. A password is needed to access this option if a password has been registered.
Change: to change the actuator configuration. A password is needed to access this option if a password has been registered.
Refer to §12 to get details about the Check, Setup and Change menus.

10 > SELECTING THE DISPLAY LANGUAGE

Select language in the MENU and turn to OK to confirm.

Select the language you want and turn to OK to confirm.

LANGUAGE
French
English
Deutsch
Spanish
Portugues
Italian
Russian
Chinese
Polish

11 > PASSWORD

Users wishing to access the change or set up menus are prompted to enter a password.
The default setting is no password and the change or set up menus can be accessed by selecting OK.
The user can opt to add a password to restrict access to changes

user code
OK

ok

Create password
Refer to section §24 "How to create or change a password"

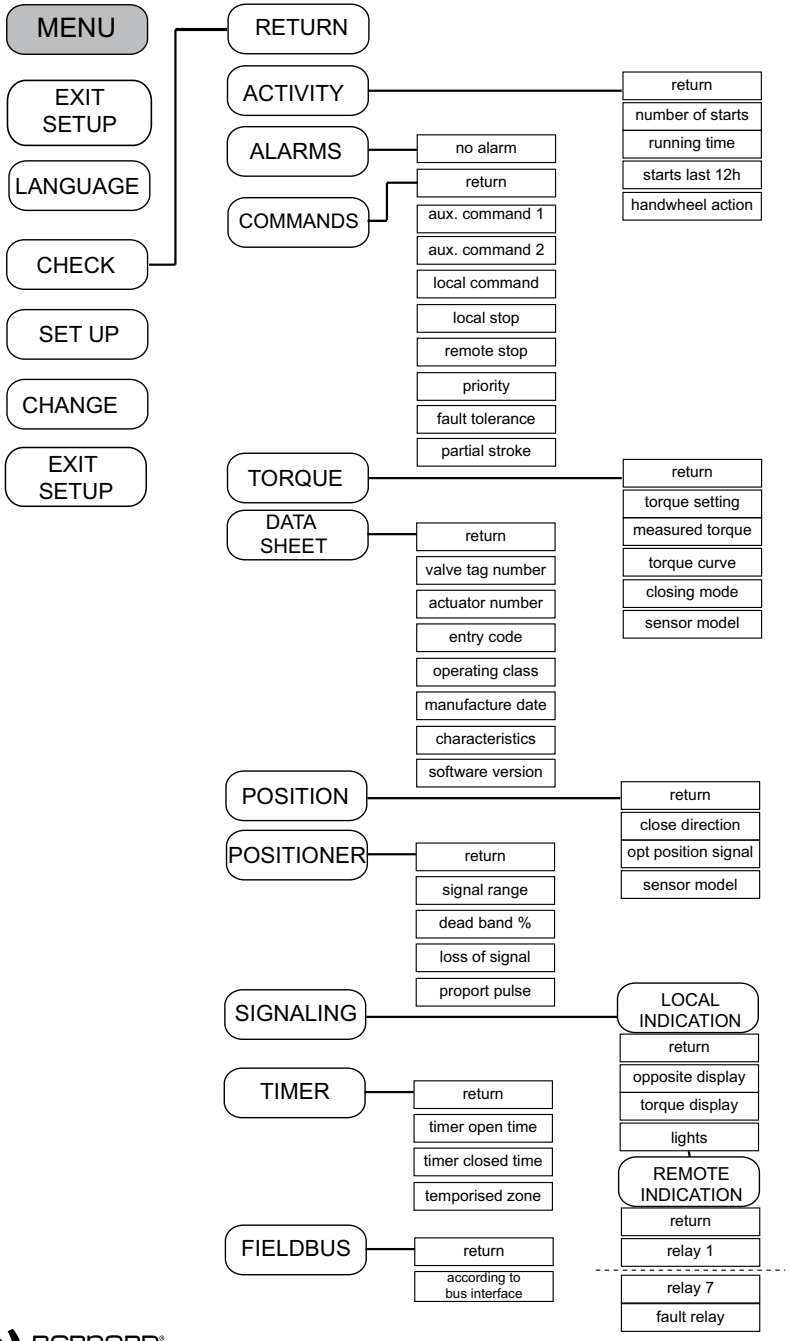
Enter password
To enter password at the prompt CODE ?
Enter 1st digit with the blue selector and then turn to OK to confirm.
Enter 2nd digit with the blue selector and then turn to OK to confirm.
Enter 3rd digit with the blue selector and then turn to OK to confirm.
The user can continue if the access code is correct.
Select OK to confirm.

CODE?
0

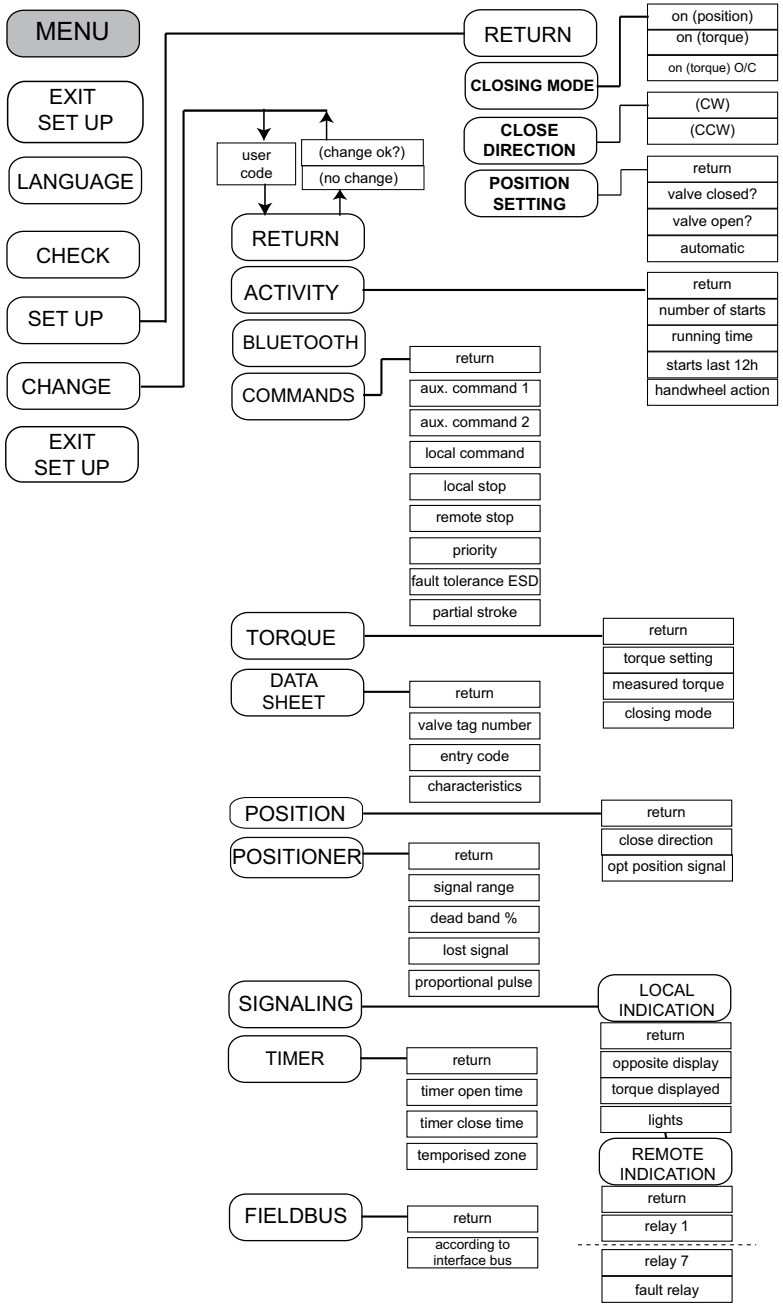
user code
OK

ok

12 > CHECK MENU FLOWCHART



13 > SET UP AND CHANGE MENU FLOWCHART



14 > ADJUSTING AN ACTUACTOR ON A VALVE

The SET UP menu is used to set the open and closed positions when the actuator has been installed on the valve. Settings can be made manually by choosing the open and closed positions, or automatically. In automatic mode, the actuator rotates and halts at the end positions in response to the torque limiter. INTELLI+ then determines the stop positions. Set up manually if you want to avoid having the actuator stop in response to the torque limiter or if you want to choose the stop positions yourself.

SET UP
return
closing mode
closing direction
position setting
return

14.1 > MANUAL SET UP

Select **set up** in the MENU and turn to **OK** to confirm.
Select **closing mode** in the SET UP menu and turn to OK to confirm.
Select whether valve to close on basis of torque or position (both open and close actions can also be set on torque).
Select **OK** to confirm.
Select **close direction** and turn to **OK** to confirm.
Indicate normal close direction (generally clockwise).
Select **OK** to confirm.

POSITION SETTING
return
valve closed?
valve open?
automatic
return

close by button
return = local stop

Select **position setting** and turn to **OK** to confirm.
Select **valve closed ?** to make closure setting Turn to **OK** to confirm. When (no) is displayed, turn to **OK** to confirm. The display shows:

position ok

ok

Note: At this stage of the set up operation, the selectors used to navigate through the menu become active for performing actuator control functions again. The knob has to be held until the required position is obtained. The self-hold capability is not active during set up.

Set the valve in the closed position either with the handwheel or using the motor control. Use the same closing mode as previously, i.e. close to the torque limiter for torque-type closure and without torque limiter activation for position-type closure
When the valve is in the correct position perform **local stop** to return to the menu. When (**yes**) is displayed, turn to **OK** to confirm. If any doubt about the setting, select (no) and start again
Position ok is displayed. Turn to **OK** to continue. Now set the valve open position.
When **valve open ?** is displayed turn to **OK** to confirm.
When (**no**) is displayed turn to **OK** to confirm. The display shows:

0°
return = local stop

Set the valve in the closed position either with the handwheel or using the motor control. Ensure that there is no possibility that the actuator will reach the mechanical stop.
When the valve is in the correct position, perform **local stop** to **return to the menu**.
When (**yes**) is displayed turn to OK to confirm. If in doubt about the setting, select (no) and start again **Position ok** is displayed. Turn to **OK** to continue. The display shows the stroke (in degres for SQX, in turns or mm for STX) at the end of the set up process.

measured stroke
90°

or

measured stroke
37 turns

Turn to **OK** to confirm and return to control mode.

14.2 > AUTOMATIC SET UP

Select **set up** in the MENU and turn to **OK** to confirm.
Select **closing mode** in the SET UP menu and turn to **OK** to confirm. Select whether valve to close on basis of torque or position both open and close actions can be set on torque). Turn to OK to confirm. When close direction is displayed turn to OK to confirm. Indicate normal close direction (generally clockwise).
Turn to OK to confirm.
When **position setting** is displayed turn to **OK** to confirm.
Select **automatic** on POSITION SETTING menu

Warning: during automatic setting the actuator halts on mechanical stops so take care according the type of valves you are commissionning

Note: The cycle can be halted immediately during automatic set up. Use the local stop command to return to the menu . This action cancels the set up procedure.

The automatic setting cycle begins when the user turns to OK.
The actuator detects the end positions by means of the torque limiter and then positions itself at mid-stroke to test its inertia in both directions of travel.
INTELLI+ determines stop positions at 0 and 100% on the basis of the closing mode setting and the actuator inertia.
The display shows the stroke travel distance at the end of the set up process
Turn to OK to confirm and return to control mode.

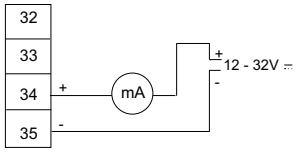
measured stroke
37 turns


ok

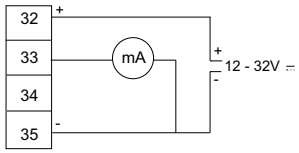
15 > POSITION SIGNAL AND POSITIONER

Position signal

Some actuator configurations can incorporate an analogue position signal.
No prior set up is required as the signal is automatically adjusted to the 0 to 100% positions. The default signal is in 4-20 mA format (4 mA at 0% and 20 mA at 100%)
2 or 3-wire connections.



2 wires connection

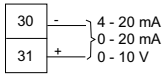


3 wires connection

See §25 for further details and information on analog signals.

Positioner

Some actuator configurations can perform control functions in response to a control signal (e.g. 4 – 20 mA). No prior set up is required as the signal is automatically adjusted to the 0 to 100% positions.
To check positioning locally, local control has to be configured for proportional control from 0 to 100%. When this setting has been completed, return to the local control mode.
The display shows the opening position and the command in %.
Adjust the control value up or down with the blue button and ensure that the actuator adopts the position required.



One of the auxiliary commands has to be set to AUTO / ON-OFF to operate remotely (see §16.3). The actuator is on positioner control when this setting has been completed. The auxiliary command must be switched for On-Off commands. This auxiliary command is used for selecting positioner or on-off control remotely.
See §26 for further details, particularly regarding deadband settings.

16 > COMMANDS

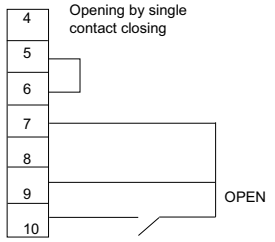
Standard remote command modes are described in §7 above. This section covers additional control methods.

16.1 > REMOTE CONTROL VIA SINGLE CONTACT

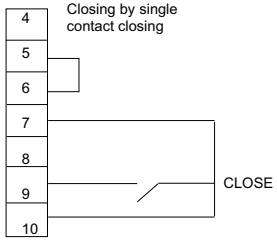
The actuator can be controlled via a single external contact.
- Contact closed: valve opens
- Contact open: valve closes

The actuator has to be configured for priority to open (see §16.6)
The command can be made the other way round:
- Contact closed: valve closes
- Contact open: valve opens

In this case, the actuator has to be configured for priority to close (see §16.6)



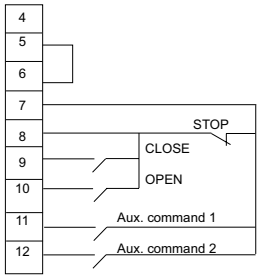
Configuration: priority to open

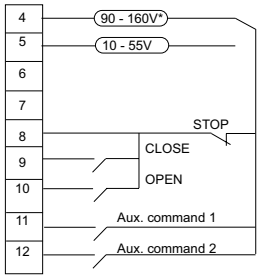


Configuration: priority to close

16.2 > AUXILIARY REMOTE CONTROLS

Two further remote commands are available and can be configured for the installation.





*160 to 250V in option

These commands can be assigned to specific functions.

Select change in the MENU and turn to OK to confirm.
Select commands in the CHANGE menu and turn to OK to confirm.
Select aux. command 1 or aux. command 2
in the COMMANDS menu and turn to OK to confirm. Select a command with the blue selector.
By default, aux. command 1 is assigned to local command inhibit and aux. command 2 to ESD close.
If aux. command 1 and aux. command 2 are set to emergency functions, aux. command 2 has priority.

AUX. COMMAND 1
no assigned
local/remote
local+remote/remote
local command inhibit
open inhibit
close inhibit
auto / on-off
ESD close
ESD open
ESD stop
partial stroke

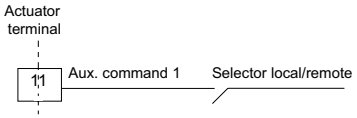
Description of the commands:

- **local/remote** replaces local/remote switch on the actuator for enabling remote control or local control from a remote location.

Turn to OK to confirm and then select contact status for performing this command:
Turn to OK to confirm.

LOCAL / REMOTE
contact (c) = remote
contact (o) = remote

If you just want to check settings without making changes, select check instead of change in the main menu.



1rst choice: closed contact = remote commands.
2nd choice: open contact = remote commands

- **local + remote/remote:** same as above, but this command allows local and remote modes to be enabled at the same time.

- **local command inhibit:** local command inhibit is a remote command. This command overrides any open or close commands made locally and enables remote commands, even if the local/ remote selector on the actuator is on local.

Turn to OK to confirm and then choose whether or not to maintain local stop capability.
The standard setting is for local stop and general shutdown to remain possible on the actuator.
Select local off (no) to inhibit local stop as well.
Turn to OK to confirm and then select contact status for performing this command (as described above).
Turn to OK to confirm.

LOC CMD INHIBIT
local off (yes)
local off (no)

- **open / close inhibit:** this command is used to prevent the actuator from opening or closing.

For example, a main valve has a by-pass valve and should not open unless the by-pass valve is already open. In this case, a limit switch on the by-pass valve could be used to prevent the main valve from opening unless the limit switch has been activated.
Turn to OK to confirm and then select contact status for performing this command (as described above). Turn to OK to confirm.

LOC CMD INHIBIT
contact (c) = inhibit
contact (o) = inhibit

OPEN INHIBIT
contact (c) = inhibit
contact (o) = inhibit

- **auto/on off:** actuators used to control equipment with the positioner function can be a DC signal driven (e.g. 4-20 mA) or via open/close/stop commands. The auto/ on-off command provides a means of switching over from one command mode to the other.

AUTO / ON - OFF
contact (c) = auto
contact (o) = auto

Turn to OK to confirm and then select contact status for performing this command (as described above).
Turn to OK to confirm.

- **ESD close / open: ESD** (Emergency Shut Down) commands are emergency commands and have priority over all other commands. The emergency command may be to open or close the valve or to cause an immediate stop, depending on the use of the valve.

ESD CLOSE
contact (c) = command
contact (o) = command

Turn to OK to confirm and then select contact status for performing this command (as described above).
Turn to OK to confirm

Note: the emergency command cannot be executed when the local / remote selector is on the OFF position.
Degraded mode see §16.7

- **partial stroke:** partial stroke is a command for performing periodic function tests (see §16.8).

16.3 > LOCAL COMMANDS

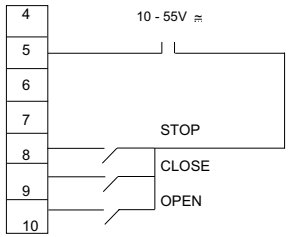
Local commands are self-held in the standard configuration (The control only needs to be pressed once to perform an open or close command).
Proceed as follows to override this feature and require open or close commands to be held down throughout the action:
Select **change** from the MENU and turn to **OK** to confirm.
Select **commands** in the CHANGE menu and turn to **OK** to confirm.
Select **local** command in the COMMANDS menu and turn to **OK** to confirm.
Select (**maintained**) and turn to **OK** to confirm.
For a local command with increments from 0 to 100%, select (0 – 100%).
The command then takes the value of the current position and is displayed under the position. The right-hand selector can then be used to change the command value in increments of 1%.

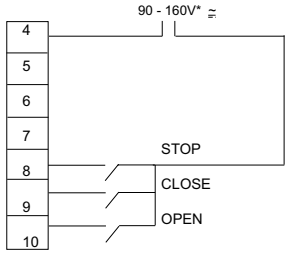
16.4 > LOCAL STOP

The actuator can be stopped locally in the standard configuration, even if it is set on remote control.
To disable the local stop action when the selector is on remote, select **local stop** in the COMMANDS menu and then select (no).

16.5 > REMOTE STOP

In the standard configuration, remote stops are performed by opening a contact (whereas the open or close command is made by closing a contact). To control the remote stop in the same way as open or close actions, select **remote stop** in the COMMANDS menu and then select **contact (c)=stop**
Note: The open and close commands have priority over stop.





*160 to 250V in option

16.6 > OPEN OR CLOSE PRIORITY

There are no priorities on open or close in the standard configuration. Priorities are used to reverse the direction of travel when an action is in progress without having to give a stop command. In this case, priority must be given to open and close actions.

Assign priority to one direction of rotation: if the opening action is assigned priority and the actuator receives an open and a close command simultaneously, the actuator will open. See §16.1 for making single contact commands.
Select **change** in the MENU and turn to **OK** to confirm.
Select **commands** in the CHANGE menu and turn to **OK** to confirm.
Select **priority** in the COMMANDS menu and turn to **OK** to confirm.
Select (open), (close) or (open and close) and turn to **OK** to confirm.

16.7 > ESD IN DEGRADED MODE

Protection devices are active in the standard configuration and therefore halt the operation of the actuator if a fault occurs.
It is possible to allow the actuator to deliver up to 100% of its nominal torque to ensure fault-tolerant operation if an emergency command is given (see description of auxiliary commands 1 or 2).
Select **change** in the MENU and turn to **OK** to confirm.
Select **commands** in the CHANGE menu and turn to **OK** to confirm.
Select fault tolerance ESD in the COMMANDS menu and turn to OK to confirm.

FAULT TOLERAN. ESD
return
(100% torque)
return

When an option is selected, the brackets are removed and an asterisk is displayed in front of the selected item. Turn to OK to cancel selection.

16.8 > PARTIAL STROKE

It may be useful to operate motorised valves which are rarely used from time to time to ensure that they remain available for service.
INTELLI+ has the ability to test actuator functions when requested by the user. This test consists of rotating the valve a certain distance (e.g. 10% of full travel) and then returning it to the original position. The time taken to travel the distance is monitored and an alarm is activated if the specified time is exceeded.
The user gives this command using an auxiliary input on the actuator (see configuration information). The test runs automatically. Signals - partial stroke in progress and partial stroke fault, need to be configured on two relays.

In the COMMANDS menu, set Auxiliary 1 (or 2) to «Partial Stroke» and adjust the following parameters :
- Type of command contact (open or closed contact)
- Operating time : input the full stroke time in seconds
- Start pos. Select if the test shall start from an open or a closed valve position.
  If the start position is not the one selected, then a warning «Partial Stroking Default» is sent out.
- Stroke%. Set the travel in % for the partial stroking (default value 10%).

In the SIGNALLING\REMOTE menu and set the relays as desired (relays 3 and 4 are generally used for this purpose)
- Type of contact for this signal (open or closed contact)
- Information : Partial stroking in progress or in fault.

If the actuator is equipped with a fieldbus interface, signals are available through the bus. In this case, no relay configuration is necessary. The signal «Partial Stroke fault is automatically acknowledged as soon as the actuator position changes of 2% or more.

17 > LOCAL COMMUNICATION WITH PC

The actuator has a 2-way read/write interface for communicating with a Pocket PC or laptop computer. The INTELLIPOCKET and INTELLISOFT software provides access to all INTELLI+ functions. Versions prior to version 3.0 need to be updated.
Preset configurations can be uploaded instantly and it is also possible to view the torque/position curve for the most recent movement (See the software handbook for further details).
Pocket PC : BERNARD CONTROLS can supply a rugged Pocket PC for site use: waterproof or explosion-proof versions are available. The device is supplied with the software pre-installed.

17.1 > LOCAL INFRARED COMMUNICATION

The system must be in «local» mode in order to perform CHANGE or SET UP functions (i.e. local / remote selector on local).
Use INTELLI KIT to communicate with a laptop computer. The kit includes an infrared module plus a CD-ROM with the INTELLISOFT software. The infrared module can be attached to the actuator display window to ensure easy communication, even if the window is not facing in the right direction. The infrared module is to be connected to the laptop's USB port. A 2-metre cable is supplied (longer length available as an option).
The Pocket PC must have an infrared port and be running INTELLIPOCKET software. Contact us for information on Pocket PC interface compatibility.
Once communication is established, the Ir (infrared) symbol is shown on the actuator display. The PC interface has priority over the local controls.

17.2 > LOCAL BLUETOOTH COMMUNICATION (OPTION)

From INTELLISOFT V3.01 software and only if Bluetooth option has been installed inside INTELLI+ control board, it's possible to communicate without cable, up to a distance of 10 meters.
Important : For a PC conection, use a Bluetooth key, class II - Version 2.1 + EDR (Minimum). If your computer has an internal Bluetooth connectivity, disable this option in advance.

Connection

From factory, the Bluetooth option is activated on actuator. The red selector knob has to be positioned on remote or local position to be able to communicate. INTELLISOFTor INTELLIPOCKET will automatically detect the actuator. When connecting, the two leds below INTELLI+ display will blinck simultaneously and Bluetooth logo will appear. A specific Bluetooth password will be requested. Factory setting is **0000**. To secure the programming, it's highly recommended to change this password.
In «local» position, it is possible to : Check, Set up, Change, Drive the actuator, Retrieve the torque curves
In «remote» position, it is possible to Check, Change, Retrieve the torque curves

Bluetooth menu
To access the Bluetooth menu :
Select CHANGE in the MENU and OK
Enter the password and OK
Select BLUETOOTH and OK.

BLUETOOTH
Return
PIN Code
On/Off
Return

The PIN code can be modified. This code will be requested when attempting to connect to the actuator. On/off allows to activate/desactivate the Bluetooth connection. This option is 'on' by default and is not memorized in case of actuator reboot.
Note : The infrared communication is desactivated on actuators equipped with a Bluetooth interface .

18 > SETTING AND VIEWING TORQUE VALUES

18.1 > CLOSING TYPE

The actuator closes on position in the standard configuration. The option to close on torque is normally selected in the SET UP menu, although this can also be done via the CHANGE menu:
Select **change** in the MENU and turn to **OK** to confirm.
Select **torque** in the CHANGE menu and turn to **OK** to confirm.
Select the **closing type** in the TORQUE menu and turn to **OK** to confirm.
Select **on (torque)** and turn to **OK** to confirm.
The (torque) o/c option is for opening and closing on torque.

18.2 > TORQUE SETTING

The actuator is delivered with a torque limiting system set in accordance with the order. Check the following points if the torque limiter is activated during operation:
- valve stem is clean and properly lubricated,
- valve stem not seized in the stem nut,
- valve gland not too tight.

If the torque needs to be increased, first obtain the approval of the valve supplier and then proceed as follows:
Select **change** in the MENU and turn to **OK** to confirm.
Select **torque** in the CHANGE menu and turn to **OK** to confirm.
Select **torque setting** in the TORQUE menu and turn to **OK** to confirm.

To view settings without making changes, select check instead of change in the menu.

TORQUE SETTING
return
closing %
close tight %
open breakout %
opeing %
return

Select the setting you want and turn to OK to confirm.
Use the blue selector to increase or decrease the value.
The minimum setting is 40%. Hold the selector in the up or down position to scroll through values faster.

CLOSING %
(100)

Description of torque limit system:
All torque values are expressed as percentages.
100% corresponds to the maximum setting for the actuator.
This value is shown in Nm on the actuator nameplate.
- **closing %** : limits torque during closing
- **close tight %**: this option is only displayed if closing is on torque limit. In this case, the torque applied on the valve seat may be not be the same as the torque limit during the closing movement.
- **open breakout %**: this option is only displayed if closing is on torque. In this case, the torque limit to unseat the valve may be different from - generally higher than - the torque limit during the opening movement.

If the setting is above 100% the display shows no limitation (equivalent to override on the torque limiter at the start of the opening movement).
- **opening %**: limits torque during opening movement.

Note: Actuator settings must be made again after making changes to the tight torque setting (valves closing on torque)

Reminder: to save changes, exit menus by selecting return until the (change ok?) message is displayed

18.3 > TORQUE READINGS AND COMPARISON WITH ORIGINAL TORQUE VALUES

Maximum resistive torque values are measured for all motorised movements and can be viewed later.
Operating torque values for a movement can be stored in memory to allow comparison against torque values for the most recent motorised movement.
Select **change** in the MENU and turn to **OK** to confirm.
Select **torque** in the CHANGE menu and turn to **OK** to confirm.
Select **measured torque** in the TORQUE menu and turn to **OK** to confirm.
Select the torque value required and turn to OK to confirm.
The display shows the maximum torque value measured during the most recent motorised movement. (note: movements are not measured when settings are being made)

To view settings without making changes, select check instead of change in the menu.

MEASURED TORQUE
return
closing %
closing tight %
open breakout %
opening %
save
return

If the torque values for a previous motorised movement have been stored in memory, these values can be viewed in the next line for reference.
Example: in this example, the torque reading on the initial movement was 12% and the torque on the most recent movement is 18%.
The two values can be compared to determine whether any preventive maintenance is required.

CLOSING%
18
ref.12

Storing motorised movement torque values
To save torque values for a motorised movement, select SAVE in the menu and then select: **torque => ref (yes)**.
Reference torque readings take the torque values for the most recent motorised movement. If an error occurs, select: torque => ref (no) to restore the existing reference torque values.
Values are only stored in memory when the user exits the CHANGE menu confirms (change ok?)

SAVE
torque => ref (no)
torque => ref (yes)

Displaying the position / torque curve for the most recent motorised movement
Select **torque** curve in the torque menu and turn to **OK** to confirm.
Select **open or close movement** and then turn to **OK** to confirm.
The curve is shown on the display screen with position from 0 to 100% and torque from 0 to 100% (100% is the maximum torque value on the actuator nameplate)

19 > CUSTOMIZING STATUS AND CONTROL INDICATIONS

19.1 > LOCAL INDICATION

The local display can be configured as follows:

Invert display: the display can be inverted (rotated 180 degrees). Select Change in the menu, then signaling, then local then invert display (yes).

Display torque: select this option to have the real-time torque value displayed on the actuator display at the same time as the position.
Select Change in the menu, then signaling, then local then display torque (yes).

LOC INDICATION
return
opposite display
torque display
lights
return

Torque 60%

Red & Green LEDs: in the standard configuration, the red light indicates that the valve is closed and the green light means it is open. The assigned colours can be changes so that the red light indicates that the valve is open and the green one means it is closed.
Select **change** in the menu, then **signaling**, then **local** then **lights**: Red=(open)
To keep the valve open and valve closed labels in the correct position on the indicator, you must also open the cover with the window and turn round the display indicator plate.

19.2 > REMOTE INDICATIONS

Signals giving actuator status data are transmitted via bistable relays. Each relay can be configured applying a list of available options.
INTELLI+ has four bistable relays in the standard configuration. A further three bistable relays can be added as an option (the contact is open when there is no power).
The equipment is configured at the factory in accordance with the order.

Changes can be made as follows:
Select **change** in the MENU and turn to **OK** to confirm.
Select **signaling** in the CHANGE menu and turn to **OK** to confirm.
Select **remote** in the SIGNALING menu and turn to **OK** to confirm.
Select the **relay** in the SIGNALING menu and turn to **OK** to confirm.
Choose **contact type** (i.e. activated contact status) and turn to **OK** to confirm.

REMOTE INDICATION
return
relay 1
relay 2
relay ...

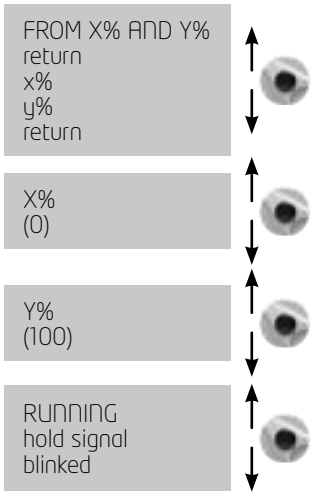
RELAY 1
(closed contact)
(open contact)

RELAY 1
return
*valve open
(closed valve)
(torque limit open)
(...

Choose function or functions required:
Several options can be selected for a single relay.
When an option is selected, the brackets are removed and an asterisk * is displayed in front of the selected item. Turn to OK again to cancel selection.

Liste		Details
*valve open		confirms valve open
(valve closed)		confirms valve closed
(torque limiter on opening)		torque limiter active on opening
(torque limiter on closing)		torque limiter active on closing
		(indicates torque limiter action even if the valve is normally closed on torque limiter)
(from x% to y%)	(1)	intermediate travel indication
(selector on local)		selector status
(selector on remote)		selector status
(selector on off)		selector status
(running)	(2)	actuator in running
(opening)	(2)	actuator performing opening action
(closing)	(2)	actuator performing closing action
(emergency command)		actuator has received an emergency command
(stop mid-travel)		actuator is halted (neither open nor closed)
(power on)		actuator powered normally
(thermal overload)		motor thermal relay tripped
(jammed valve)		movement could not be completed due to excessive torque
(lost phase)		phase missing on 3-phase supply
(lost signal)		4-20 mA signal lost (if positioner option active)
(handwheel action)		handwheel has been used since last motorised movement
(bus command)		if fieldbus option installed, this relay is assigned to an external command.
(battery low)		If battery option used, the battery needs to be changed
(p.t. in progress)		A "partial stroke" test is in progress.
(p.t. fault)		A partial stroke operating error has occurred following start of partial travel test, or it has not been possible to perform test as the valve was not in the expected position.

Some of the selections have further options, see next page;



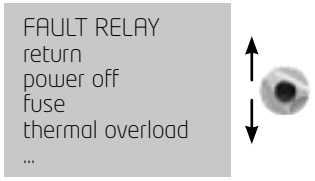
(1) **(from x% to y%)**
Specify contact action range after turning to OK to confirm:
Select **x%** and turn to **OK** to confirm.
Use the blue selector to increase or decrease the value.
Select y% and turn to OK to confirm.
Use the blue selector to increase or decrease the value. Turn to **OK** to confirm.

(2) **(running)**
(opening)
(closing)
Turn to **OK** to confirm and then specify whether status to be steady or flashing indication. Turn to **OK** to confirm.

(3) **(bus command)**
This function is only applicable if the fieldbus option is active. In this case, this relay can be used to control a device located outside the actuator, with commands transmitted from the control room via the fieldbus and then forwarded via the actuator (refer to documentation relating to bus).

20 > CUSTOMIZING FAULT RELAY

Fault signals are sent via a changeover relay which is normally energised and returns to the break position if power is lost or if the actuator is unavailable.
This relay can be configured applying a list of options.
The equipment is configured at the factory in accordance with the order. Changes can be made as follows:
Select **change** in the MENU and turn to **OK** to confirm
Select **signaling** in the CHANGE menu and turn to **OK** to confirm.
Select **remote** in the SIGNALING menu and turn to **OK** to confirm.
Select **fault relay** in the SIGNALING menu and turn to **OK** to confirm.



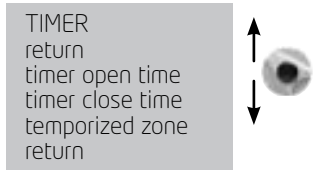
Including additional faults
Included faults which cannot be altered are shown without brackets. Options are in brackets and selections are shown with an asterisk *.
Turn to OK again to cancel selection.

List Details	Details
power off	loss of power on control circuit
fuse	blown fuse
thermal overload	thermal relay tripped
lost phase	phase missing on 3-phase supply
motor blocked	motor immobilised
(jammed valve)	movement could not be completed due to excessive torque
* selector on local	local / remote selector on local
* selector on off	local / remote selector on off
(emergency command)	actuator has received an emergency command
(command override)	actuator has received command override
(overtravel)	position overshoot >5% after motor cut off.
(lost signal)	4-20 mA signal lost (if positioner option active)

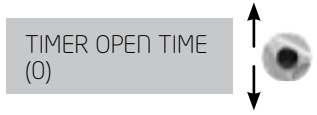
21 > TIMING MOVEMENT TRAVEL

INTELLI+ includes a timing module for reducing the actuator's operating speed (for example to protect a line against pressure surges).
The timing system applies a series of on / off commands to the motor when an open or close command is transmitted. The time spent operating the valve can be very long. Times can be adjusted in situ.
Settings for the opening and closing directions are separate.
It is also possible to apply timing to just a section of the stroke, with the remainder being completed at normal speed.
The user just has to specify the total time required for the movement and INTELLI+ calculates on and off times.

Select **change** in the MENU and turn to OK to confirm .
Select **timer** in the CHANGE menu and turn to OK to confirm.

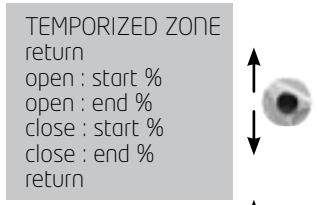


Select **timer open time** and turn to OK to confirm.
Indicate the total time in which you want to open the valve and turn to OK to confirm.
Select **timer close time** and turn to OK to confirm.
Indicate the total time in which you want to close the valve and turn to OK to confirm.

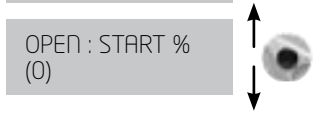


To cancel the time function: check to ensure timer opening and closing times are not higher than operating time (Value indicated in the 'data sheet' menu..

To apply timing to one part of travel only:
select temporised zone and turn to OK to confirm.



To start opening timer from a specific position,
select **open: start %** and turn to OK to confirm.
Use the blue selector to increase or decrease the value until you obtain the required position between 0 and 100% and then turn to OK to confirm.
Do the same for the other values to establish a timer-controlled opening zone and a timer-controlled closing zone.



Check default values when applying timer to entire stroke:

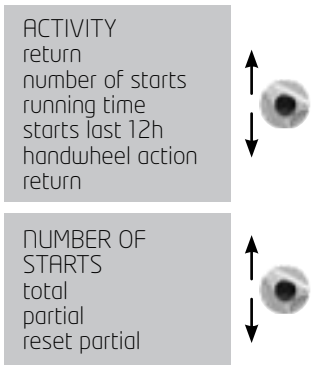
open:	start % (0)	close: start %	(100)
open:	end % (100)	close: end %	(0)

22 > VIEWING ACTUATOR HISTORY

22.1 > ACTIVITY

To check settings without making changes, select check instead of change in the menu.

Select **change** in the MENU and turn to **OK** to confirm.
Select **activity** in the CHANGE menu and turn to **OK** to confirm.
Select **number of starts or running time** to view total figures since the actuator was manufactured. The system also includes a separate counter which can be reset by the user.
Select **total** to view total number of starts.



To reset the partial counter, select reset partial and then choose yes or no (this option is only displayed when the user is in the change menu).

starts / 12 hour: this data relates to the number of times the actuator has started during the previous 12 hours and tells the user about recent service. This is particularly useful when trying to establish whether the actuator has been subjected to excessive use when performing modulating actions.

handwheel action: indicates whether the handwheel has been used since the last time a motorised movement was made. (changes are only registered if they exceed 10% of travel).

22.2 > ALARMS

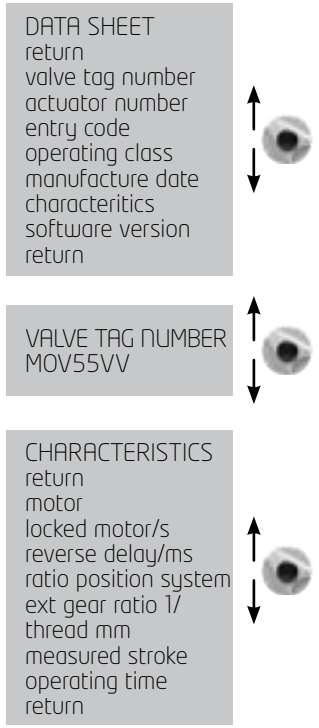
Alarms are used to pinpoint the source of malfunctions. They are not permanent and are deactivated when the fault is cleared. A blinking black square is shownon the screen to indicate that an alarm has been activated. To read alarms: Select **check** in the MENU and turn to OK to confirm .
Select **alarms** in the menu CHECK menu and turn to **OK** to confirm.
Use the right-hand selector to scroll through any active alarms.

List Details	Details
locked motor open	Motor immobilised in open direction
locked motor close	Motor immobilised in close direction
jammed valve	Max torque reached during operation
torque sensor	Torque sensor fault
position sensor	Position sensor fault
direc of rot open	Opening direction of rotation anomaly
direc of rot close	Closing direction of rotation anomaly
overtravel	Position overshoot >5% after motor cut off
config. memory	Stored configuration data error
activity memory	Stored activity data fault
base memory	Base memory fault
excess starts	Start-up rate exceeds average for class of actuator. See criteria for class in §23 This alarms never causes the actuator to stop operating.
lost phase	Phase missing on 3-phase supply
lost signal	4-20 mA signal lost (if positioner option active)
thermal overload	Motor thermal switch tripped
pumping	Actuator hunting action detected
24V auxiliary	Auxiliary power supply fault for external circuits (terminals 6-7)
battery low	If battery option used, the battery needs to be changed
no alarm	

23 > ACCESSING DATA SHEET

To check settings without making changes, select check instead of change in the menu.

Select **change** in the MENU and turn to **OK** to confirm.
Select **data sheet** in the CHANGE menu and turn to OK to confirm.



valve tag number
Select valve tag number to read or write valve ID.
Use the blue selector to change the first character and turn to OK to confirm.
Change remaining characters using the same method.
Turn to OK when all of the characters have been entered and continue until the menu is displayed again.

actuator number: this is the actuator's serial number. This information is entered at the factory and is only shown in the CHECK menu.

entry code: for entering or changing a password, see below: "Creating or changing passwords".
characteristics: parameter settings for correct operation of the actuator (see details next page).

The following data is only shown in the CHECK menu.

operating class: indicates whether the actuator is designed for on/off operation, class III control or class II control functions. This item can be used to activate an alarm if the number of starts is excessive (excess. starts alarm).
The number is the counted over the previous 12-hour period. Limits are as follows:

On / Off:	360 starts in previous 12 hours
Class III:	1,200 starts in previous 12 hours
Class II:	21,600 starts in previous 12 hours

This alarms never causes the actuator to stop operating.
manufacture date: gives date product shipped from factory software version: installed software release

Characteristics menu details

motor : this data indicates whether the motor has a 3-phase, single phase or DC power supply (data from manufacturer)
protection: waterproof or explosion-proof version. The explosion-proof version prevents overriding the thermal relay in the degraded mode/commands menu.
locked motor/s: Indicates the time the motor left energised when immobilised before power cut off. Default: 10 seconds (manufacturer's data)
reverse delay/ms: Indicates time actuator halted following change in direction of rotation. Default: 200 ms (manufacturer's data).
ratio position system: indication of gear stepdown ratio between output shaft and position sensor for displaying stroke in number of revolutions (or in degrees for fractions of a revolution) (manufacturer's data).

external gear ratio 1/: indication of gear stepdown ratio for an additional gear. For example, for a quarter-turn gear with a ratio of 1:120, enter 120.
Travel will then be indicated in degrees.
thread in mm: Indication of pitch of a linear system to allow travel to be displayed in mm, rather than in number of revolutions
stroke: Indication of stroke value measured when adjusting valve.

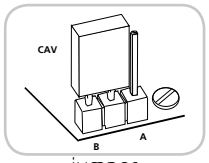
24 > CREATING OR CHANGING PASSWORD

Select **change** in the MENU turn to **OK** to confirm.
Select **data sheet** in the CHANGE menu and turn to **OK** to confirm.
Select **entry code** in the DATA SHEET menu and turn to **OK** to confirm.
Enter **1st digit** with the blue button, then turn to **OK** to confirm.
Enter **2nd digit** with the blue button, then turn to **OK** to confirm.
Enter **3rd digit** with the blue button, then turn to **OK** to confirm.

ENTRY CODE
(000

The new code will not be taken into account until the user exits the change menu and confirms the change (change ok?)
Make sure you can remember this code to access the change menu again.

If you forget your code
Switch off power to the system unit and open the control unity to access the INTELLI+ board (supporting the display). Move the jumper on the board from position A to position B, then turn the power back on. The password has now been reset to zero. Place the jumper back in its original position (A).
If you leave the jumper in position B, you will still be able to enter a new password, but it will be reset to zero the next time you switch the unit on.



jumper

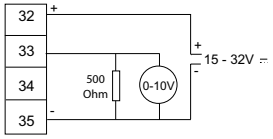
25 > USING ANALOGUE POSITION SIGNAL (DEPENDING ON MODEL)

On some models, the actuator can use an analogue signal to transmit its percentage position (0 - 100%) to a remote device.
The output signals are automatically calibrated on the actuator's stroke (0 - 100%) and so the transmitted position signal does not need any adjustment.

The transmitted signals are totally isolated from the INTELLI+ circuits.
Use a rectified, filtered or stabilised 12 - 32V DC power supply for this position signal. It is also possible to use the internal 24V power supply on terminals 6(-) and 7(+).
Max. permissible loading is shown on the table.

Power supply (volts)	Max. permissible load (ohms)
12	150
34	750
30	1050

The following signals can be used:
4-20 mA, 0-20 mA, 4-12 mA or 12-20 mA.
4-20 mA, 4-12 mA or 12-20 mA outputs can connected with two wires, with the external power supply in series with the signal reading. (see actuator circuit diagram)
The 0-20 mA output can be used to obtain a 0-10V signal using an external 500 ohm (or 499 ohm 1%) resistor.
The power supply voltage will be 15 to 32V.



0-10V position remote signal

To select the signals' direction of variation and type
Select **change** in the MENU and turn to **OK** to confirm.
Select **position** in the CHANGE menu and turn to **OK** to confirm.
Select **opt. posit. signal** in the POSITION menu and turn to **OK** to confirm.
Choose signal's direction of variation and turn to OK to confirm.
Select **signal type** and turn to **OK** to confirm.

OPT POSIT SIGNAL
signal (↗) opening
signal (↘) opening

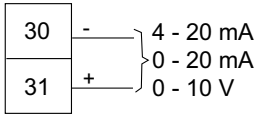
SIGNAL (↗) OPENING
(4-20 mA)
(0-20 mA) / (0-10V)
(4-12 mA)
(12-20 mA)

26 > USE AS A POSITIONER WITH AN ANALOGUE CONTROL SIGNAL (DEPENDING ON MODEL)

26.1 > INPUT SIGNAL

On some models, the actuator can operate as a positioner using a proportional command, such as a 4-20 mA analogue signal.
The input signal is automatically calibrated on the actuator's stroke (0 - 100%) and so there is no need to adjust the actuator's operating range.
The input signal is isolated from the on/off commands and from the remote position signal.
The actuator can still be operated in on/off mode with the open, close and stop commands or using proportional control. One of the auxiliary commands must be used to select between these two control modes.
In the standard configuration, auxiliary command is set for AUTO / ON-OFF to allow the control mode to be selected remotely: AUTO = proportional control (analogue) or ONOFF= on/off control. See section 11.2 for configuration details and information on using this command.

Signal	Input impedance (Ohms)
4-20 mA	160
0-20mA	160
4-12mA	160
12-20mA	160
0-10V	11000

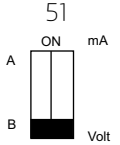


Control signal
4-20 mA, 0-20 mA, 4-12 mA, 12-20 mA or 0-10 V
To select the signals' direction of variation and type:
Select **change** in the MENU and turn to **OK** to confirm.
Select **positioner** in the CHANGE menu and turn to **OK** to confirm.
Select **signal type** in the POSITIONER menu and turn to **OK** to confirm.
Choose **signal's direction** of variation and turn to **OK** to confirm.
Choose signal type and turn to OK to confirm.

SIGNAL RANGEL
signal (↗) opening
signal (↘) opening

SIGNAL (↗) OPENING
(4-20 mA)
(0-20 mA) / (0-10V)
(4-12 mA)
(12-20 mA)

With 0-10 V signals, two contacts are also switched to OFF. The contacts are located on the INTELLI+ board (supporting the display) inside the control unit.



26.2 > SETTING OF DEADBAND VALUE

The deadband value is the maximum allowable difference between the signal and the actuator position when no action occurs.
This setting is made at the factory, but it is possible to adjust it.
If the deadband is too narrow, the actuator could start hunting, i.e opening and closing around the expected position without being able to stabilise. If the deadband is too wide, positioning actions are less precise.
The default deadband setting is 1%.
Select **dead band %** in the POSITIONER menu and turn to **OK** to confirm.
Use the blue selector to increase or decrease the value. Turn to **OK** to confirm.

26.3 > FAIL-SAFE POSITION

When a 4-20 mA input signal is used, it is possible to set up a fail-safe position for use if the control signal is lost.
Caution: this function cannot be used with 0-20 mA signals, as the system cannot distinguish between a lost signal and a 0 mA value.
This function is active in the standard configuration, and the actuator remains in position if the signal is lost.
The user can also choose open or close. Select **lost signal** in the POSITIONER menu and turn to **OK** to confirm. Select the action required and turn to **OK** to confirm.

LOST SIGNAL
(closing
(stayput)
(opening)

26.4 > PROPORTIONAL PULSE MODE

INTELLI+ incorporates a positioning mode which takes account of the actuator's inertia. If the movement time is too short or if the motor has excessive inertia, positioning can be improved by selecting proportional pulse mode.
INTELLI+ calculates and corrects the motor's stopping point to reach the expected position and then applies pulses proportional to any deviation if necessary.
This mode is used for relatively stable control actions where partial compensation can be made the actuator's inertia. The actuator is cycled more often than with a standard command.
Select **proportional pulse** in the POSITIONER menu and turn to OK to confirm. Select **(no)** or **(yes)** and turn to OK to confirm.

27 > USING FIELDBUS CONTROL (DEPENDING ON MODEL)

The fieldbus interface is used for sending commands and data over a single line. Specific documentation details methods for addressing individual actuator and provides a list of addresses for accessing all commands or data sources.
The type of interface is shown in the menu.
Lost communication can be used to configure the fail-safe position. This function is active in the standard configuration, and the actuator remains in position if communication is lost.
The user can also choose open or close.
Select **change** in the MENU and turn to OK to confirm
Select **bus** in the CHANGE menu and turn to OK to confirm.
Select **lost communication** in the BUS menu and turn to OK to confirm.
Select the action required and turn to OK to confirm.

PROFIBUS
return
lost communication
Cmd by fieldbus
slave number
return

LOST COMMUNIC
(closing)
(stayput)
(opening)

Bus control: Bus control is normally selected. For equipment which also uses a standard hard-wired system, this configuration allows the user to chose the command mode: either via bus or hard-wired (see §7.1 and §7.2)

Slave no. Actuator address. All actuators have to have different addresses.
The default address is 2.
Refer to specific documentation for further details on fieldbus interfaces commissionning.

28 > USING IN CASE OF POWER SUPPLY LOST (WITH BATTERY DEPENDING ON MODEL)

Depending on the actuator model, the battery option allows to display the position when the power supply is off. When the power supply is off, the actuator goes into standby mode with very low power consumption.

Regular tests allow to check the valve position, if the position changed the relays are updated.

- In case of actuator with position feedback the position is updated.
- In case of fieldbus communication, the fieldbus board is supplied (5s) to allow the PLC bus controller to read the new position.

Note: even without the battery the actuator operates without risk of loss or configuration of its position

When the power supply is off the display can be read but it cannot possible to navigate into the menu. To wake up the system and illuminate the display, you must act on the command button blue as to give an order to close. The "low battery" information can be read at any time on the display or by remote signalling. The display will be shut down after 30 secondes without activity.

- Temperature: 40°C (For different temperatures (above or below) the life expectancy may be reduced)

29 > FUSE PROTECTION

The INTELLI+ power supply system includes a transformer and a number of fuses.
Primary: 6.3x32 mm - 0.5 A - quick-action fuse (located on the transformer).
Secondary: Internal circuits protected by automatic cut-out (no user action needed) 24V auxiliary power supply on terminal protected by automatic cut-out (no user action needed)

30 > USING IN SEPARATED BOX

INTELLI+ can be provided in separated box to be removed from the actuato up to 50 meters. BERNARD CONTROLS provides weather proof boxes with two weather proof connection boxes: one to be used by the customer, the other to be used to connect INTELLI+ to the actuator.
Explosion proof version is also available.
To plan a power wire and a control wire between the actuator and the box. The control wire must be armoured. Check the wiring before powering up.
The commissioning is the same as the integrated INTELLI+.

31 > MAINTENANCE

ST actuators have life-long lubrication and there need no specific maintenance.
However, the condition of the stem and the stem nut should be checked periodically to ensure that they are clean and properly lubricated.
We recommend establishing a regular programme of test movements on motor drive units which are rarely used.

In the case of the actuator with the battery option

Depending on the actuator configuration, a «Low Battery» message appears on the display or remotely when the battery is too low.
For the explosion proof versions, you must replace the batteries by this type of battery:
2 batteries OMNICEL ER14505HD Lithium Thionyl Chloride (Li-SOCl2) type.
For the non-explosion proof versions, you should replace the batteries by the battery type shown above or choose an other type with this requirement: AA, 2.2Ah, 3.6V, 400mA, -40°/+85°C.

32 > TROUBLESHOOTING

32.1 > INTELLI+

If there is any doubt about the operation of the system, first set the local / remote selector in the local position and then operate the open and close controls.

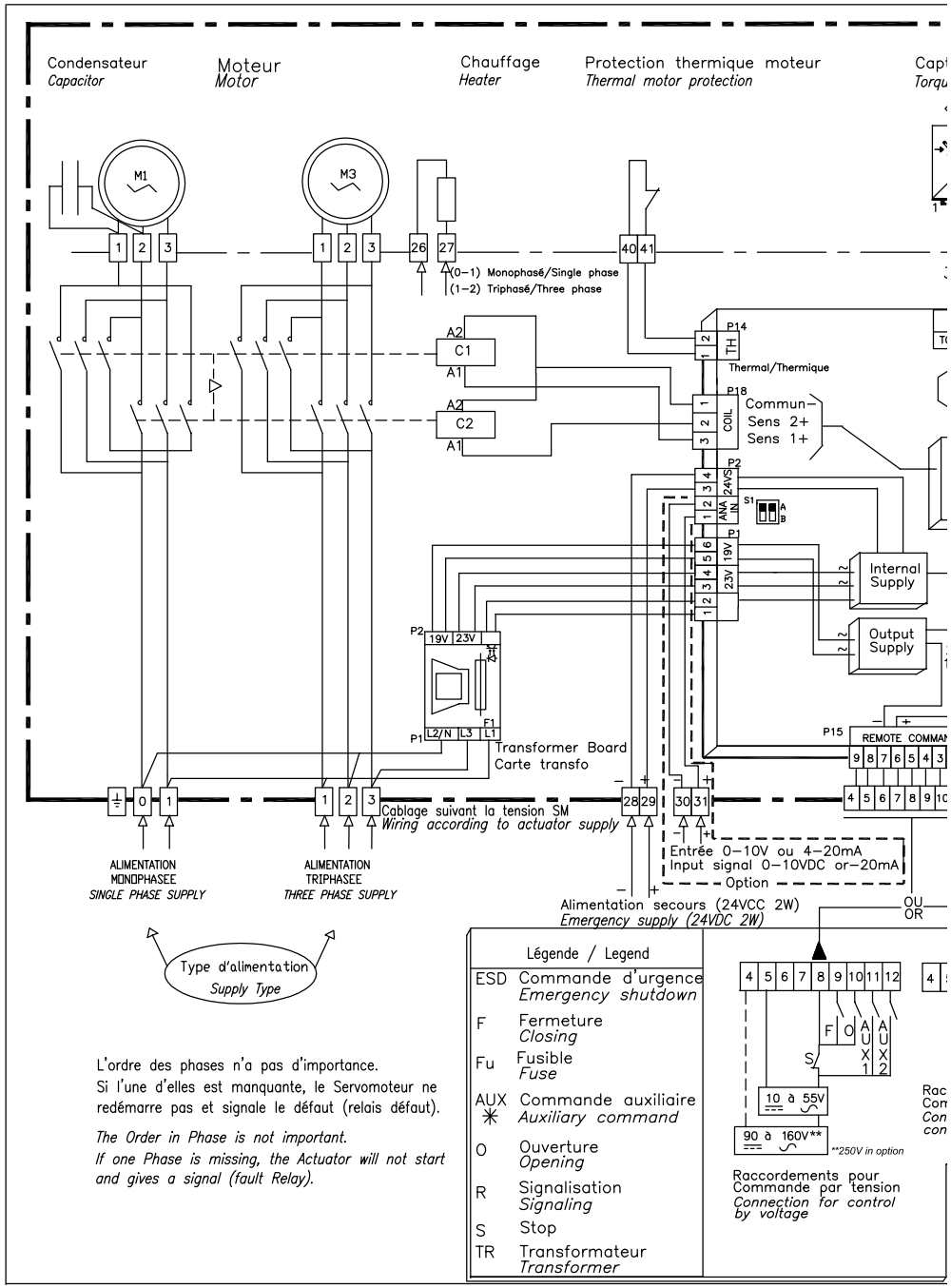
PROBLEM	CAUSE	REMEDY
The display is off	Actuator power supply	Check power supply voltage (terminals L1, L2 and L3 for 3-phase supply). The voltage value is shown on the nameplate.
	Blown fuse	Check fuse and replace if required (the fuse is fitted on the transformer).
No response	Display in menu mode	Set local / remote selector to off and then on local to change to command mode (display: %position)
	IR link active	Commands cannot be made using the selectors if an IR link is active (IR symbol on the display). Turn off the infrared link.
	Motor thermal switch trip	A black square is shown at the bottom centre of the display to indicate that an alarm has been activated. Go to menu / check / alarms to see whether a motor overheating alarm is present. The actuator will be available again when the motor has cooled down
No response and the key or ESD symbol is displayed	Local command override or ESD command active	Check Aux. command 1 or 2 options in the command menu to see whether a command override or emergency command has been set up and check the status (open/closed) of the contact used to perform this remote command. Then check the connection on the client terminal to see whether it corresponds to a command override or emergency command. For example, if the configuration setting is on aux. command 1, loc cmd inhibit and contact (0)= inhibit, a remote contact will have to be established on terminal 11 to cancel the override.
The actuator operates in remote mode, but not in local	Local / remote selector on remote or off (stop)	Switch the local / remote selector to the local position.
	Local command override active (key symbol displayed) or local /remote selection performed remotely	Check Aux. command 1 or 2 options in the command menu to see whether a command override has been set up and check the status (open/closed) of the contact used to perform this remote command. Then check the connection on the client terminal to see whether it corresponds to a command override. For example, if the configuration setting is on aux. command 1, loc cmd inhibit and contact (0)= inhibit, a remote contact will have to be established on terminal 11 to cancel the override.
Menu cannot be accessed	Selector on remote or off, or local command override active	The menu can only be accessed via the selectors in local mode, i.e. with the selector on local and no override on local control. Set the selector on local and carry out checks on aux. commands 1 & 2 indicated above.

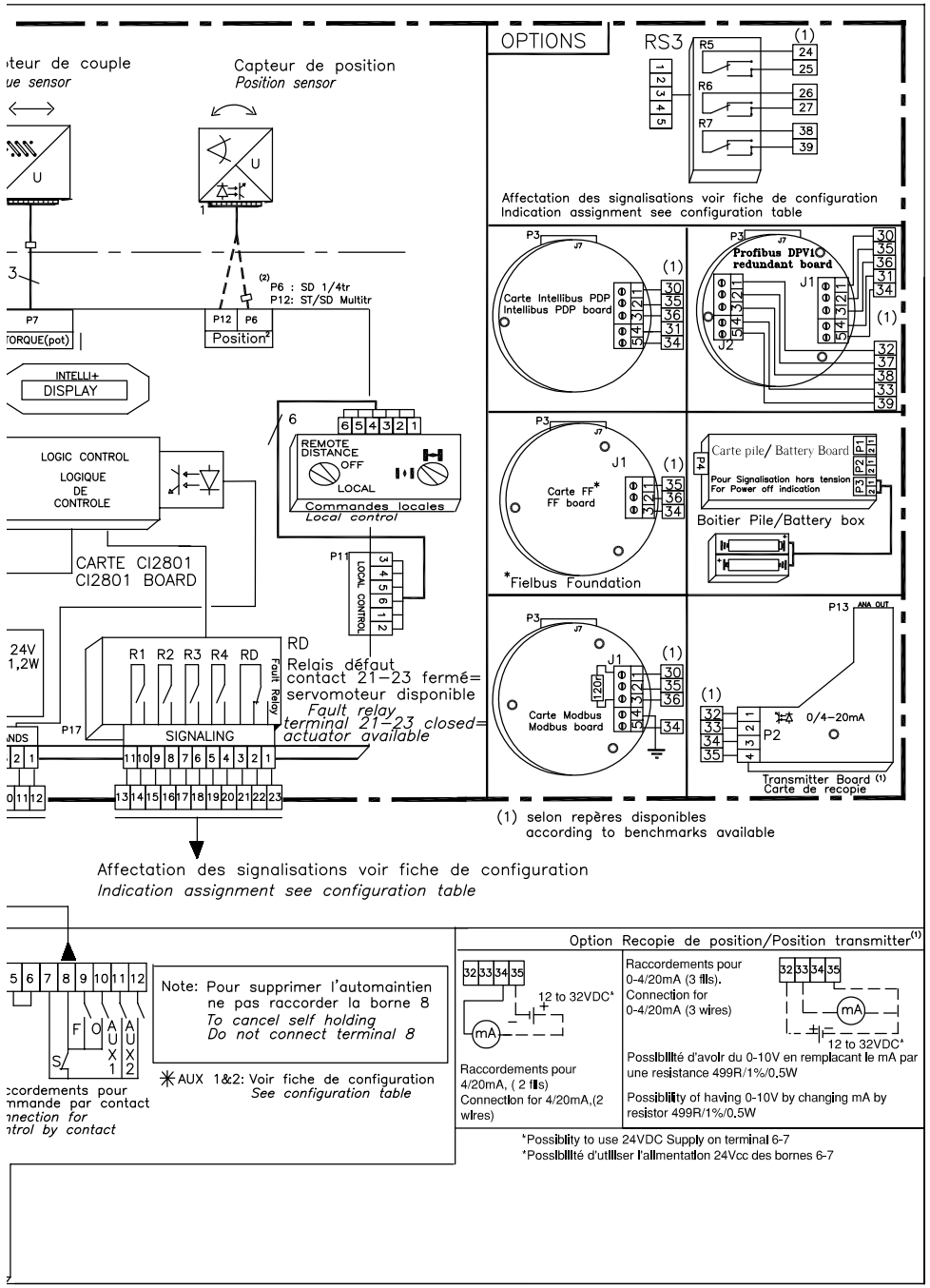
PROBLEM	CAUSE	REMEDY
The actuator rotates in the wrong direction	Incorrect configuration	Check closing direction in the position sub-menu under change to determine whether closing action clockwise or anti-clockwise..
	Motor wiring changed and motor rotates in reverse direction (when motor replaced)	Comply with wiring tags when changing the motor. If in doubt, check motor rotates the right way. The motor's direction of rotation can be reversed by changing over wires 2 and 3 on the motor terminal strip inside the control box.
Menu settings cannot be changed	Changes cannot be made in the check menu	Go to the change menu. Some settings are view-only.
The actuator operates in local mode, but not in remote.	Local / remote selector on remote or off (stop)	Switch the local / remote selector to the local position.
	Dry contact control: no voltage between terminals 6 and 7	Ensure there is a jumper between terminals 5 and 6 on the client terminal strip. Check whether a "24V auxiliary" alarm is present
	Voltage control: voltage not adapted to input	Check voltage control connections: 10 - 55 volts: terminal 5 55 to 250 volts: terminal 4
Changes made not applied.	No modifications made during change process. Changes have to be confirmed before they are saved	After making changes, run back through the menus using return and OK until the display shows: (change ok?) Turn to OK to confirm and save the changes made
Actuator jerky operation during movement	Timing function settings made	The user sets this option in the timer menu to increase the actuator's movement time.
Handwheel action not detected	Handwheel action detected since last motorized movement provided actuator remains switched on. The system only reports movements exceeding 10% of trave	Repeat detection under correct conditions.
Excess starts alarm displayed	INTELLI+ monitors the number of starts performed during the previous 12 hours and checks this number against the actuator's operating class.	This alarm does not restrict operation of the actuator. It just indicates that the actuator is being used intensively. The alarm will cleared when the number of starts returns to the intended frequency for the system concerned.

PROBLEM	CAUSE	REMEDY
The actuator operates in local open / close mode, but not in positioner mode	Local / remote selector set to local or off	Switch local / remote selector to remote position to use the positioner.
	An Auto / On-Off command is active and prevents use of positioner	Check Aux. command 1 or 2 options in the command menu to see whether a command override or emergency command has been set up and check the status (open/closed) of the contact used to perform this remote command. Then check the connection on the client terminal to see whether it corresponds to an On/Off command. For example, if the configuration setting is on aux. command 1, (auto / on-off) and contact (c)=auto, a remote contact will have to be established on terminal 11 to change to auto command mode.
The actuator operates in local open / close mode, but not in positioner mode	Input signal not set up correctly	Check input signal configuration in the menu and check position off switches onthe positioner board
The actuator operates as a positioner in local mode, but not in remote mode	Local / remote selector set to local	Turn the selector to remote
	Input signal fault	Check the setpoint signal with a milliammeter connected in series
	Incorrect signal polarity	Ensure the signal positive (+) goes to terminal 30

32.2 > POSITIONER OPTION

Below are a few additions applicable to the control version by positioner analog signal.





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NOTES

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