Invest in Confidence
SQ & ST RANGES
Weatherproof
INTELLI+® Actuators 
by
Reliability
Security
User Friendly

BERNARD® CONTROLS

Weatherproof
INTELLI+® Actuators
SQ & ST RANGES
BERNARD CONTROLS introduces the BC Premium label. The BC Premium label is the guarantee of high performance, reliable and innovative actuator solutions designed to sustain severe environmental and operational conditions. Decades of return of experience from very demanding applications such as nuclear qualified valves actuation have shaped our technical orientations and our commitment to quality and safety. Moreover, BC Premium labelled products offer user-friendliness and extremely low level of maintenance requirements.

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Expertise and innovation
Expertise is our business specialty. Our credo follows from the technical requirements of our products’ fields of application. Our products are qualified and approved by the largest prime contractors and industrial players in France and abroad. By improving our competencies and the efficiency of our processes, we enhance the quality of our products and services.

Performance and Security
The nuclear market has shaped our expertise, our commitment to quality and to the control of your processes. By fulfilling these requirements, we undertake to make no compromise on security.

Controls and Confidence
BERNARD CONTROLS is an international industrial technological company acknowledged for its know-how and expertise in the most demanding markets. The control of processes is our business and the cornerstone of your confidence.
Installation and commissioning

Commissioning electric actuators requires specific expertise and care. This is specially true when the motorised valve is controlled by a complex system such as a fieldbus. That is the reason why our specialists are available to provide the adequate support to our customers for:

- adaptation on the valve
- installation
- set-up
- start-up

Maintenance and repair

Everyday, our technicians are available to quickly go on site for:

- periodic actuator functional check-up
- preventative maintenance operations
- diagnosis and repair

Training

Regular training sessions are organised for our customers and our distribution network. These sessions are held either in France, at our local service centre or at customer site. Actuator technology, setting, operating and maintenance are among the most popular topics covered.
Range overview

Quarter-turn actuators

SQ Range description

• Available torque range from 530 to 4,425,370 lbs.in
• IP67/NEMA4 as standard (IP68 / NEMA6 in option)
• EN 15714-2 Duty Classification: On-Off (Class A), Inching/Positioning (Class B), Modulating (Class C)
• INTELLI+® controls as standard

Other Weatherproof solutions

• Quarter-turn failsafe
  
  Failsafe with reliable spring-return technology
  
  Fast and shock-free valve travel during emergency operation
  
  Maintenance-free
  
  EEx d/NEMA 7 explosion proof enclosure
  
  IP67 as standard

• Continuous Modulating Class II
  
  100 % duty service
  
  Change of position every 2 to 3 seconds
  
  Quarter-turn, linear, multi-turn and lever movements
Multi-turn actuators

ST Range description

- Available torque range from 530 to 177,010 lbs.in
- IP68 (5m/72h) / NEMA6 as standard
- EN 15714-2 Duty Classification: On-Off (Class A), Inching/Positioning (Class B), Modulating (Class C)
- INTELLI+® controls as standard

![ST actuator with INTELLI+ integrated controls](image)

- **Foot and lever**
  - Main application: dampers controls
  - Lever position can be set over 360°

- **Linear systems**
  - Main application: modulating valves controls
  - Up to 7.87 in travel
  - Up to 200 kN thrust
  - Optional yoke mounting
Reliability

Heavy duty mechanical design

Trouble-free operation

• Gearing is self-locking at all speeds
• Continuous gear drive between motor and valve
• Thermal cut-out on motor
• Unaffected by vibration on main mechanical parts
• Requires no preventative maintenance. Gearing has long-life lubrication

Powerful motors

• Asynchronous motor with high starting torque
• Excellent starting torque / nominal torque ratio
• On/Off operation (complying with EN15714-2 Class A) and Inching/Positioning (complying with EN15714-2 Class B): 30% motor duty rating. Up to 360 starts per hour at peak of operation.
• BC Modulating Class III (complying with EN15714-2 Class C): 50% motor duty rating. Up to 1,200 starts per hour at peak of operation.
• Motors easy to remove with sealed ball bearings fitted at front and rear

Handwheel without clutch release

• Patented manual override system
• Differential geardrive allows the handwheel to be operated without releasing a clutch beforehand (except for very low torque values on model ST6, SQ6 and SQ15)
• The handwheel can therefore be operated under all conditions, even when the valve is blocked by the torque limiter
Reiablity

Accurate information

Thanks to ABSOLUTE SENSORS, which constantly measure the position & torque of your valve, get precise and reliable information.

- Proven measurement principles
  - Torque is measured by a dynamometric balance (calibrated springs) offering a high level of precision, an excellent repeatability as well as a very low long-term drift. The short response time of the system allows an early detection of the valve seat reach thus reducing the over-torque applied to the valve. On the two smallest models (SQ6-SQ15), torque monitoring is based on motor intensity measurement.
  - The position sensor is mechanically linked to the output shaft and delivers a proportional signal with no risk of loss of position with time.

- Actual valve information
  - Both position and torque are measured as close as possible of the output of the actuator (see picture below). This means that what is measured is really representative of the actual valve torque and position.

  - The valve position/torque curve is available at any time directly on the INTELLI+® graphical display (see page 16).

- Absolute sensors
  - Thanks to absolute sensors, the position and torque information are not lost even after a loss of power supply. In fact, as soon as the power comes back, the INTELLI+® electronics has just to read the value given by the sensors and update the feedback signals to the control room. Therefore, this system does not require any battery back-up.
The separated control box configuration can be specially useful when the actuator has to be mounted:

- in a difficult access (manhole, in a high position, ...)
- on a highly vibrating device
- in an excessively high or low temperature area

The maximum distance between control and actuator is 54 yd.

Special cover

A special cover can be added to protect INTELLI+® display and local control buttons in case of difficult environmental conditions such as desert sand blast.

Double-sealing protector

Two barriers fitted with O-rings insure an optimum protection against water ingress into the electronic compartment.

This protection remains effective even if the cover has not been closed properly or if the cable glands have not been tightened.

Protection is also ensured for the local control selectors thanks to internal reed switches which prevent moisture ingress.
User friendly controls
Intuitive interface

Graphical display

- Menu guided settings using clear messages. Language can be freely selected among: Chinese, English, French, German, Italian, Polish, Portuguese, Russian and Spanish.
- The LCD display gives a clear status of the actuator and of the control system:
  - Position in percentage (for example 5% Open)
  - When the valve is fully closed, “closed” is displayed
  - When the valve is fully open, “open” is displayed
  - Actual torque expressed as % of actuator maximum torque
  - Alarm/fault flag

Display indications

- 5% Open Torque 20%
  - Valve position in % of opening valve torque can also be displayed in % of actuator maximum torque.

- E
  - Local controls inhibited by the remote controller.

- ESD
  - Emergency shutdown signal received.

- i
  - Infrared link is detected.

- !
  - This icon is displayed in case of alarm.

- Bluetooth link is detected.

- 0%
  - When a positioner is built-in, the set point value is displayed in percentage. This indication is blinking in case of loss of control signal.

- BUS
  - This icon indicates that the fieldbus board is installed. The square displays the status of the communication: no communication, communication in progress or faulty module.

- 1 2
  - In case of redundant fieldbus interface, two squares are displayed. The squares display the status of each communication line: no communication, a channel is acting as primary or backup, communication in progress or a faulty module.
Autonomous

- INTELLI+® user interface is intuitive.
- INTELLI+® operation does not rely on a battery.
- No tool is needed to have access to the menu in any case.

Local signaling

- 2 LEDs (red/green) indicate the position (close/open) at ends of travel, and direction of running (blinking).
- Red and green LED can be freely assigned to open or closed positions.

Local commands

- The red selector enables the operator to choose remote control, local control function and stop during operation. It can also inhibit all use of the actuator (OFF position). This selector switch can be locked in each position (padlock not supplied).
- The blue selector allows local operation of the actuator in either direction: OPEN or CLOSE.
- Local commands can be inhibited remotely.

User friendly menu

- **Selector to validate the choice (ok)**
- **Selector to navigate up and down into the menu**

**LANGUAGE**: to change the language of the display (9 languages available)

**CHECK**: to read all the actuator parameters and configuration (activity, alarms, commands, torque, data sheet, position, positioner, signaling, timer, fieldbus)

**SET UP**: to set up the actuator on the valve (closing mode, close direction, position setting)

**CHANGE**: to modify the actuator configuration (activity, commands, torque, data sheet, position, positioner, signaling, timer, fieldbus)

**EXIT SETUP**: to exit the actuator setup
User friendly controls
Non intrusive settings

Thanks to INTELLI+®, commissioning is simplified and can be performed in a non-intrusive way. Upon user’s request the actuator parameters can be preset at the factory. In this case, start-up simply consists in setting the actuator on the valve.

➤ Manual or automatic setting

During the actuator on valve setting procedure, the user is guided step by step by INTELLI+®:
➤ Choice of closing (on torque or on position),
➤ Choice of direction to close,
➤ Drive the actuator to the closed and the open position and validate the position.

For certain valves, as an example gate valves equipped with back seat, INTELLI+® can automatically perform this setting: the actuator detects the extreme positions (using the torque limiter), tests the inertia in order to optimize this setting.

➤ Infrared communication

INTELLI+® offers the possibility to communicate with a standard laptop through an infra-red link with INTELLIKIT or INTELLIPOCKET.
- INTELLIPOCKET is a real industrial pocket PC which eases the engineer’s job on site both for setting up and throughout product lifetime. Exists in Explosion proof version.
- INTELLIKIT is a communication kit necessary to communicate with INTELLI+®, made of the INTELLISOFT communication software developed by BERNARD CONTROLS and an infrared transmitter receiver connected to USB. All functions (use, settings/configuration, status, etc...) are available through the computer.

➤ Bluetooth communication (option)

As an alternative to infrared communication, Bernard Controls proposes the Bluetooth technology which uses radio signals to communicate between the PC with INTELLISOFT and the INTELLI+® controls.
- Accessibility: the user does not need to position himself in front of the actuator and can move its computer without loss of communication.
- Simplicity and security: the PC/PDA automatically detects all devices located at a maximum distance of 10m. Each actuator holds a unique identifier and the connection can be protected with a password.

➤ Parameters modification

If necessary, operating parameters can be modified with the local control buttons by following information on the display.
User-friendly operation

Preventative maintenance

Thanks to its absolute sensors and its microprocessor technology, INTELLI+® continuously monitors its components as well as the actuator status and measures some important valve parameters. INTELLI+® provides users with a great deal of information to help with system diagnosis and aid in scheduling their valves preventative maintenance. INTELLI+® helps maximise process availability by reducing maintenance downtime.

Actuator activity

Parameters are available on the display through the menu to check the activity of the actuator:
- Number of starts: total starts since the actuator manufacturing
- A partial counter can be selected
- Running time: total running time since the actuator manufacturing
- Starts last 12h: number of starts in the last 12 hours (to check the modulating activity i.e.)
- Handwheel action: indicates if the handwheel was operated by manual operation since the last electrical command

Data sheet

INTELLI+® stores in its memory the data sheet of the actuator: customer tag number, BERNARD CONTROLS serial number, duty rating, classification level, manufacturing date, etc.

Self-monitoring functions

INTELLI+® checks the operation of its components, particularly torque sensor, position sensor, microprocessor and EEPROM memory.
INTELLI+® constantly monitors its performance in order to detect any problem of over-travel, jammed motor, rotation direction, lost phase, motor thermal overload and many others.
Refer to Configuration page 35 for a complete list of alarms.

Valve torque curve

INTELLI+® memorizes the valve torque data during its last opening and closing operation.
This information can be recalled on the actuator display. The curve displays the position from 0 to 100% and the torque from 0 to 100%.
The data can be uploaded in the computer with INTELLIKIT on the INTELLIPOCKET or by fieldbus (optional) in order to be displayed with the INTELLISOFT software as a curve (torque vs. position) or data in a spreadsheet.

SIL 2 (option)

Safety Integrity Level (SIL) option is guaranteeing a very high level of confidence with diagnostic capabilities on the valve position measurement and ESD command chains. Through its innovative INTELLI+® interface and according to IEC61508 & 61511 standards, Bernard Controls is the first to propose a SIL2 function guaranteeing also the valve position monitoring. Refer to our dedicated catalogue SIL ACTUATORS (A124).
User-friendly operation
Easy on-site management

▷ Declutch-free handwheel
- Patented manual override system.
- Differential geardrive allows the handwheel to be operated without releasing a clutch beforehand.
- The handwheel can therefore be operated under all conditions, even when a high torque is applied to the valve (i.e. wedge gate valve closed tight).
- Electric command has priority over manual override.

▷ Detachable thrust unit
For rising stem valves applications, the STX actuators thrust unit is detachable. In fact, the A form is bolted on both actuator and valve flanges.
This offers a lot of flexibility and safety at the installation phase as well as for maintenance operations.
For example, if the actuator has to be dismounted from the valve, the thrust unit can be left in place. This enables to lift up the heavy actuators without “unscrewing” them and also keeps the valve stem in position.

▷ Bus continuity
Fieldbus is advantageous because it allows getting more information while reducing the overall wiring on site. However, when you break up the continuity of the line, for instance because of one actuator being retrieved from the field for maintenance, your whole installation is affected since the signal cannot circulate anymore.

BERNARD CONTROLS actuators can host a special optional Profibus connection board, located in the cover of the wiring compartment. This cover can simply be removed from the actuator and closed tight by a special type plate. The resulting so-called “BU” type box ensures continuity of signal throughout the line even when the actuator is removed from the field. Maintenance is then facilitated since you can disconnect an actuator for repair or replacement, while maintaining signal transmission.
Security

Plant installations protection

Alarms indication

INTELLI+® continuously monitors the actuator performances. Up to 17 different types of faults and alarms can be reported (refer to Configuration on page 35 for a complete list of alarms).

An exclamation mark in a triangle on the local display indicates an alarm.

The actuator can still operate normally in case of an alarm, for example there is an alarm after ‘Too many starts’. The alarm will automatically reset when the fault no longer exists.

Emergency shutdown (ESD)

ESD (Emergency Shut Down) is a remote emergency control signal with priority over all other commands. Depending upon the valve operation, ESD can be configured as an Open, Close or Stop command.

To increase the availability of the actuator in extreme conditions, ESD can be set to ignore a torque overload condition.

Timer

This function enables an increase in the operating time of the actuator, i.e. to avoid water-hammer effect in a pipe.

Travel time can be programmed independently in both opening and closing directions.

It is also possible to apply the timer function to a limited section of the stroke.

Partial stroking

Partial stroking is a key specification of BERNARD CONTROLS actuators which enable to check the availability of the connected MOVs.

This test consists in the execution of a very short return travel.

Starting position as well as partial stroke amplitude are programmable.

This command can be either hardwired or sent by fieldbus. A warning is generated in event of problems occuring during this test.

Protection by password

A password can be entered to protect access to parameters modification and actuator on valve setting.
Security

Motorised valve protection

➤ Phase monitoring

INTELLI+® includes an automatic phase correction device. In case of 3 phase power supply, whatever the power connection, the actuator always rotates in the correct direction. If one of the phases is not present, the actuator stops automatically and the fault relay drops.

➤ Protection of change in direction

An automatic delay protects the actuator and valve from all rapid rotational direction changes while limiting the effects of the mechanical pieces in inertia.

➤ Signaling continuity (option)

The actuator is totally autonomous and does not require a battery to operate. However, a signaling battery back-up optional board can be added for signaling purpose only. This battery is activated in case of loss of power supply and allows:

- to use the INTELLI+® display.
- to update remote signaling (valve position, alarms, ...)
- to refresh fieldbus information

Low battery condition is automatically detected by the INTELLI+® and a warning message is sent. A low battery condition does not have any consequence on actuator operation.

Note: a 24VDC external power supply input is also present on the INTELLI+® board to achieve the same functionality and more.

➤ Fault monitoring relay

One changeover (SPDT) relay indicates that the actuator is unavailable. This fault monitoring relay reports 5 types of defaults as a standard. Additional defaults to be reported can be easily added by the user (see Configuration on page 34). The monitoring relay is always energized and drops out only in event of a fault.
Wire by wire command

Remote control can be achieved using a 10 to 250 V external voltage supply or by dry contacts, which uses the actuators internal 24 VDC voltage supply.
This control can be configured as a pulse or self-holding remote command. Inputs on the board are completely isolated by opto-isolators. It is also possible to control the actuator with a unique external contact, using one of the two functions «Priority to open» or «Priority to close».

Remote indications

Remote indication is done through 4 relays, with the possibility of 23 available information. Voltage free relays maintain their positions without battery backup. Normally open or normally closed contact can be chosen. An optional board with 3 single option relays allows reporting of 3 additional indications.

Position and torque transmitter

INTELLI+® can be equipped with an analogue position and torque feedback board. This module delivers a 0/4-20mA signal proportional to the percentage of the valve opening. A voltage signal (i.e. 0-10V) can also be obtained by connecting an external resistance. The board can be either supplied by an external (12 to 32 VDC) source of power or internally, by the INTELLI+® electronics. This module also delivers a 4 - 20mA signal proportional to the real torque of the valve.

Positioner

A positioner board can be installed into the INTELLI+® to allow the operator to drive the valve to intermediate positions (Class III modulating).
The positioner module has been designed to work with either current (i.e. 4-20mA) or voltage (i.e. 0-10V) analogue signals:
- One input signal: the set-point
- One output signal: the actual valve position feedback
The input and output signals are fully isolated from each other. The setting procedure is fully automatic and is performed in a non-intrusive way. The dead band can be adjusted by the user.
ACTUATOR

INTELLI+ CONTROLS

Power supply
Emergency supply 24V DC
Auxiliary DC
Setpoint Feedback 4-20 mA
Positionner (OPTIONAL)
Remote commands OR On/Off
Remote indication of:
• position
• status
• alarms

OPTIONAL OUTPUT board

Internal supply

Supply 24V DC

Fuse

Reversing starter

Auto phase correction

Rotation direction

Position sensor
Torque sensor

LCD display

Contactless

LOCAL CONTROL

Remote
Off
Local

TOGGLE

INTELLI+

INTELLI+® layout

Weatherproof INTELLI+® Actuators
The fieldbus, present on a large number of installations, is used more and more to communicate information and commands with multiple actuators and devices wired in series on a single pair of wires. Thus, the number of information available from each actuator can be multiplied while reducing the overall cost of wiring on the site.

BERNARD CONTROLS actuators can be connected to most of the standard fieldbuses available on the market:

- PROFIBUS DP
- FOUNDATION FIELDBUS
- MODBUS RTU
- Other fieldbus on demand.

For more security, redundant fieldbus ensures continuous operation, even in case of a bus line disruption. Indeed, all elements of the bus line (bus controller, lines, actuators interfaces) are doubled.

Open versus Proprietary systems:

Two physical concepts of fieldbus are available from various providers.

- The «Proprietary» so-called system: This is a technology designed by a device manufacturer for his own needs. A «Proprietary» system always includes the actuators with the specific bus interface, but also the bus controller located at the line head-end. Only the products proposed by the bus controller manufacturer can be installed on the bus.

- «Open» systems: One using standard international fieldbuses so various manufacturers can supply compatible controllers and interfaces. This type of technology is proven, reliable and offers fast response time.

BERNARD CONTROLS chooses the «open» system for all its fieldbus solutions.
• Based on robust PLC technology and open fieldbus protocol

• Up to 120 actuators and 6.2 mi distance

• Fast response time. Standard scan time 1 to 3 s whatever the distance and number of actuators connected

• 1 to 3 lines starts

• Simple or redundant configurations

• Overall start up time reduced to the minimum
# Torque Range

**Multi-turn**
- Direct mount: 530 to 19,470 lbs.in
- With gearbox: up to 177,010 lbs.in

**Quarter-turn**
- Direct mount: 1,770 to 7,080 lbs.in
- With gearbox: up to 4,425,370 lbs.in

# Type of Duty
Comply with following EN15714-2 Duty Classes: A - On/Off, B - Inching/Positioning and C - Modulating

# Casing
- Cast aluminium
- Ductile cast iron for models STX175 / STX220

# Tightness
- SQ Range: IP67 as standard - IP68 as an option
- ST Range: IP68 5m/72h and NEMA6 as standard (C.S.A C&US Certified)

# Controls Location
- As standard, the INTELLI+® controls are integral to the actuator
- On option, the INTELLI+® can be mounted in a separated box (maximum distance between actuator and controls = 50m)

# Ambient Temperature
- Standard version: -4 … +158°C
- Low temperature version: -40 … +158°C

# External Corrosion Protection
- Standard paint system: Zinc rich primer, epoxy undercoat and RAL5002 blue protection polyurethane top coat
- Optional special anti-corrosion protection for marine, aggressive or abrasive atmospheres
- All cover fasteners captive and stainless

# Double Sealing Protection
- The control section of the actuator is totally isolated from the terminal compartment to protect electronic components

# Motor Technology
- TENV type Totally Enclosed Non Ventilated, asynchronous motors (VAC)
- Class F insulation class
- Integral thermal overload protection
- Easy to remove with sealed ball bearings fitted at front and rear

# Motor Duty Rating
- S4 motor service (intermittent service on start-up) to IEC 34-1
  - S4 - 30% for On/Off operation - up to 360 starts per hour
  - S4 - 30% for Inching/Positioning - up to 360 starts per hour
  - S4 - 50% for Modulating class III - up to 1,200 starts per hour

# Gearing
- Self-locking at all speeds

# Handwheel
- The handwheel does not rotate during motor operation
- Automatic switch from motor to handwheel without declutching, except ST6, SQ6 and SQ15
- Handwheel gear ratio: ST6 1/1 / ST14-30 1/2 / ST70 1/21 / SQ20-1000 1/1 / SQ6-SQ15 (9 to 21 turns for 90° travel)
- Force to apply conform to EN 12570 standard

# Output Flange
- Multi-turn actuators flanges comply with ISO 5210
- Quarter-turn actuators flanges comply with ISO 5211
- Flanges for valve special top works available on request

# Vibration Resistance
- 1g (9.8 m/s²) at 10-500 Hz
- (Contact our marketing dept. for higher vibration levels)

# Lubrication
- Actuators are lubricated for product lifetime and do not require any specific periodic maintenance

# Power Supply
- The actuators can operate on a wide variety of power supplies:
  - 3-phase, single-phase or DC
  - up to 690 V
  - 50 or 60 Hz ...

# Cable Entries
- Standard configuration: 3 x M20
- Additional 2 x M16 in case of fieldbus (4 x M16 if the bus is redundant)
- Other configurations available on request (number of entries, adaptators...)

# Electrical Connection
- Ring tongue terminals
- Internal and external ground rod

# Fuse Protection
- Primary fuse (0.25 x 1.26 in - 0.5 A) located on the transformer board
- Two automatic fuses for low voltages
### POSITION AND TORQUE SENSORS

| Position | • Movement read directly on the main shaft (direct mechanical link)  
|          | • Absolute sensor (without battery)  
|          | • Range ST: 1.5 to 900 turns. (Range above 900 turns available as an option) |
| Torque   | • Torque measured by a dynamometric balance or motor intensity (SQ6 and SQ15)  
|          | • Absolute sensor (without battery)  
|          | • Setting range: From 40 to 100% of actuator maximum torque by steps of 1%  
|          | • Reading range: From 10 to 100% of actuator range with a resolution of 1% |

### CONTROLS

| Power circuit | Integral motor reversing starters (electromagnetic contactors for On-Off / Modulating Class III) |
| Display       | Back-lit graphics display with a choice of 9 different languages |
| On-Off remote Control | Command by:  
|          | • voltage: 10 to 250 V DC/AC (current 10 mA at 24V)  
|          | • dry contact (use INTELLI+® auxiliary 24 VDC supply)  
|          | Isolated by opto-couplers  
|          | Minimum pulse duration: 100ms  
|          | Time of rotational direction change: 200ms (factory setting range 50 to 500 ms) |

| Signaling relays | 4 latching relays: each information can be freely selected among a total of 23 available information  
|                  | • Contact configuration: normally open or normally closed  
|                  | • Minimum current 10mA at 5V  
|                  | • Maximum current 5A at 250V AC or 5A at 30V DC (inductive load)  
|                  | Additional 3 relay boards on option. |

| Fault relay | • Monostable relay, normally SPDT switch  
|            | • Minimum current 10mA at 5V  
|            | • Maximum current 5A at 250V AC or 5A at 30V DC (inductive load) |

| Proportional control Modulating Class III (option) | Input (setpoint) and output (feedback) signals are fully isolated from each other  
|                                                    | Signal configurations (selectable):  
|                                                    | • Input signal 4-20 mA - output signal : 4-20mA  
|                                                    | • Input signal 0-20 mA - output signal : 0-20mA  
|                                                    | • Input signal 0-10 V - output signal : 0-20mA (0-10V with an external resistance)  
|                                                    | Analogue inputs:  
|                                                    | • in current: impedance of 160 Ohms  
|                                                    | • in voltage: impedance of 11 KOhms  
|                                                    | Analogue outputs:  
|                                                    | • in current: maximum acceptable load of 750 Ohms at 24 VDC supply  
|                                                    | • In voltage: minimum acceptable load of 50 KOhms (with a shunt resistance of 500 Ohms) |

| Fieldbus Control | See table on next page |
| Transmitter (option) | Proportional position (0/4-20 mA) and torque (4-20 mA) feedback board |
| Signaling battery (option) | Allows to use the display and update the open and closed position information (through the signaling relays or Proibus DP) in case of lack of power supply |
| Auxiliary power supply | 24VCC in standard  
|                        | 48VCC in option  
|                        | Remote/Off/Local selector is padlockable |

| Settings | Non-Intrusive  
|          | All actuator settings and parameters are stored in a non-volatile EEPROM memory. Protection by password. |

| Local selectors | The INTELLI+® can be fully set via its local display and selectors  
|                 | Does not require any specific setting tool  
|                 | Local / Remote selector is padlockable |

| INTELLIKIT (option) | • INTELLISOFT CD-ROM for laptop PC  
|                     | • Infrared module to connect to the laptop (USB) and clip on the actuator window  
|                     | • USB cable (2 meters length max.) |

| INTELLI Pocket (option) | • Protection: IP65 (option: RTEX II2G EEEx ia IICT4)  
|                         | • Shock resistance: 1.2 m on concrete  
|                         | • Communication:  
|                         | - with INTELLI+®: infrared link (40 cm maximum distance) or bluetooth (up to 10m)  
|                         | - with PC: bluetooth, IRDA, Wifi (802.11b) as a standard  
|                         | • Optional USB station  
|                         | • Operating system : Windows Mobile 2005  
|                         | • 64Mb RAM = 256Mb storage card |
### Conformity to EC Directives

<table>
<thead>
<tr>
<th>EC Directives</th>
<th>The actuators comply with:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- The 2004/108/EC electromagnetic compatibility</td>
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<tr>
<td></td>
<td>- The 2006/95/EC Low Voltage</td>
</tr>
<tr>
<td></td>
<td>- The following harmonized standards:</td>
</tr>
<tr>
<td></td>
<td>- Generic emission standard - Industrial environment EN 61000-6-4</td>
</tr>
<tr>
<td></td>
<td>- Generic immunity standard - Industrial environment EN 61000-6-2</td>
</tr>
<tr>
<td></td>
<td>- Rotating electrical machines EN 60034-1</td>
</tr>
<tr>
<td></td>
<td>- Degrees of protection provided by enclosures (IP code) EN 60529</td>
</tr>
</tbody>
</table>

### Fieldbus Controls

<table>
<thead>
<tr>
<th>Fieldbus</th>
<th>PROFIBUS-DPV1 (option)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PROFIBUS-DPV1 - RS 485</td>
</tr>
<tr>
<td></td>
<td>Baud rate: 9.6 kbit/s up to 1.5 Mbit/s (autodetection)</td>
</tr>
<tr>
<td></td>
<td>Communication protocol: PROFIBUS DPV1 slave-cyclic and acyclic</td>
</tr>
<tr>
<td></td>
<td>Type of connection: single line (standard) or redundant line (option)</td>
</tr>
<tr>
<td></td>
<td>Cable specification: PROFIBUS certified cable only</td>
</tr>
<tr>
<td></td>
<td>Line connection without repeater:</td>
</tr>
<tr>
<td></td>
<td>- Actuators per line: 31 max</td>
</tr>
<tr>
<td></td>
<td>- Line length: 0.75 mi max (0.75 mi)</td>
</tr>
<tr>
<td></td>
<td>Line connection with repeaters:</td>
</tr>
<tr>
<td></td>
<td>- Number of repeaters per line: 9 max</td>
</tr>
<tr>
<td></td>
<td>- 30 actuators and 1 km max. per segment</td>
</tr>
<tr>
<td></td>
<td>- Number of actuators per line with repeater: 124 maximum</td>
</tr>
<tr>
<td></td>
<td>- Line length with 9 repeaters: 10.2 km max. (6.2 mi)</td>
</tr>
<tr>
<td></td>
<td>Scan speed (30 units &amp; 1.2 km): 0.1s (at a baud rate of 93.75 Kbit/s)</td>
</tr>
<tr>
<td></td>
<td>Power supply: internal and isolated via INTELLI+®. Optional signaling battery or 24VDC external backup supply</td>
</tr>
<tr>
<td></td>
<td>Technical approval: operability approved by PNO (Profibus Nutzer Organisation)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fieldbus</th>
<th>MODBUS (option)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MODBUS RTU - RS 485</td>
</tr>
<tr>
<td></td>
<td>Transmission medium: 1 shielded pair cable</td>
</tr>
<tr>
<td></td>
<td>Functions: Half Duplex, asynchronous mode, multidrop</td>
</tr>
<tr>
<td></td>
<td>Baud rate: 1.2k to 115 Kbit/s</td>
</tr>
<tr>
<td></td>
<td>Format: 8 data bits, 1 stop bit, no parity</td>
</tr>
<tr>
<td></td>
<td>Communication protocol: Modbus (slave)</td>
</tr>
<tr>
<td></td>
<td>Modbus address: configurable by the actuator menu</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fieldbus</th>
<th>Foundation Fieldbus (option)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>H1 speed = 31.25kBit/s</td>
</tr>
<tr>
<td></td>
<td>Fully compliant with fieldbus standard IEC 61158</td>
</tr>
<tr>
<td></td>
<td>Physical layer: IEC 61158-2, 2 wires communication</td>
</tr>
<tr>
<td></td>
<td>Current consumption: 20mA</td>
</tr>
<tr>
<td></td>
<td>Operating voltage: 9 to 32 VDC</td>
</tr>
<tr>
<td></td>
<td>Cable specification: Type A (for example: 3076F Belden)</td>
</tr>
<tr>
<td></td>
<td>Line connection</td>
</tr>
<tr>
<td></td>
<td>- Actuators per line without repeater: 31 max</td>
</tr>
<tr>
<td></td>
<td>- Line length without repeater: 1.9 km max. (1.2 mi)</td>
</tr>
<tr>
<td></td>
<td>- Number of repeaters per line: 4 max</td>
</tr>
<tr>
<td></td>
<td>- Maximum number of actuators and line length depends on consumption available</td>
</tr>
<tr>
<td></td>
<td>Technical approval: Foundation tested. Several DCS manufacturer operability checked</td>
</tr>
</tbody>
</table>

For further information on electrical data, dimensions and wirings, please consult our Technical Handbooks.
Technical data

Performances - Multi-turn ST Range

Max. Torque (in.lbs)

Output speed 50Hz (rpm)
Output speed 60Hz (rpm)

• Direct mounting
• Mounting with gear box

Weatherproof INTELLI+® Actuators
Performances - Quarter-turn SQ Range

For higher torques, please consult us.
**Technical data**

**Dimensions - Multi-turn ST Range**

> Overall dimensions ST6 to ST70 INTELLI+®

<table>
<thead>
<tr>
<th></th>
<th>Weigh (lb)</th>
<th>Ø B (in)</th>
<th>a1 (in)</th>
<th>a2 maxi (in)</th>
<th>a3 (in)</th>
<th>a4 (in)</th>
<th>a5 (in)</th>
<th>s1 (in) Form B3/C</th>
<th>s2 (in) Form A</th>
<th>s2 (in) Form B1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ST6 INTELLI+®</strong></td>
<td>70.55</td>
<td>11.81</td>
<td>13.86</td>
<td>26.50</td>
<td>5.91</td>
<td>18.58</td>
<td>12.32</td>
<td>11.14</td>
<td>13.43</td>
<td>13.43</td>
</tr>
<tr>
<td><strong>ST14 INTELLI+®</strong></td>
<td>88.18</td>
<td>11.81</td>
<td>13.86</td>
<td>26.77</td>
<td>5.91</td>
<td>17.72</td>
<td>13.07</td>
<td>12.48</td>
<td>14.76</td>
<td>14.76</td>
</tr>
<tr>
<td><strong>ST30 INTELLI+®</strong></td>
<td>134.48</td>
<td>17.72</td>
<td>13.62</td>
<td>30.67</td>
<td>8.86</td>
<td>22.44</td>
<td>14.33</td>
<td>14.33</td>
<td>17.36</td>
<td>17.72</td>
</tr>
<tr>
<td><strong>ST70 INTELLI+®</strong></td>
<td>187.39</td>
<td>21.65</td>
<td>13.15</td>
<td>32.17</td>
<td>9.84</td>
<td>25.11</td>
<td>17.60</td>
<td>17.60</td>
<td>21.54</td>
<td>21.54</td>
</tr>
</tbody>
</table>

> Overall dimensions ST175 and ST220 INTELLI+®

<table>
<thead>
<tr>
<th></th>
<th>Weigh (lb)</th>
<th>Ø B (in)</th>
<th>a1 (in)</th>
<th>a2 maxi (in)</th>
<th>a3 (in)</th>
<th>a4 (in)</th>
<th>s1 (in) Form B3/C</th>
<th>s2 (in) Form A</th>
<th>s2 (in) Form B1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ST175 INTELLI+®</strong></td>
<td>648.16</td>
<td>39.37</td>
<td>13.18</td>
<td>41.57</td>
<td>19.69</td>
<td>35.28</td>
<td>\</td>
<td>20.59</td>
<td>20.62</td>
</tr>
<tr>
<td><strong>ST220 INTELLI+®</strong></td>
<td>648.16</td>
<td>39.37</td>
<td>13.18</td>
<td>41.57</td>
<td>19.69</td>
<td>35.28</td>
<td>\</td>
<td>20.59</td>
<td>25.91</td>
</tr>
</tbody>
</table>
## Technical data

### Valve interface - Multi-turn ST Range

#### ST INTELLI+® range

<table>
<thead>
<tr>
<th>Flange</th>
<th>Max. stem diameter (in)</th>
<th>Max. stem diameter (in)</th>
<th>Max. stem diameter (in)</th>
<th>Max. stem diameter (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Type A (max)</td>
<td>Type B1 (max)</td>
<td>Type B3</td>
<td>Type C (max)</td>
</tr>
<tr>
<td>ST6</td>
<td>F10</td>
<td>1.18</td>
<td>1.65</td>
<td>0.79</td>
</tr>
<tr>
<td>ST14</td>
<td>F10</td>
<td>1.50</td>
<td>1.65</td>
<td>0.79</td>
</tr>
<tr>
<td>ST30</td>
<td>F14</td>
<td>1.65</td>
<td>2.36</td>
<td>1.18</td>
</tr>
<tr>
<td>ST70</td>
<td>F16</td>
<td>2.13</td>
<td>3.15</td>
<td>1.57</td>
</tr>
<tr>
<td>ST175</td>
<td>F25</td>
<td>3.35</td>
<td>3.94</td>
<td>1.97</td>
</tr>
<tr>
<td>ST220</td>
<td>F30</td>
<td>3.54</td>
<td>4.72</td>
<td>2.36</td>
</tr>
</tbody>
</table>

#### ISO 5210 requirements

<table>
<thead>
<tr>
<th>Flange</th>
<th>Max torque</th>
<th>Max. thrust with stem nut</th>
<th>Mounting bolts</th>
</tr>
</thead>
<tbody>
<tr>
<td>F10</td>
<td>885 lbs.in</td>
<td>8992 lbf</td>
<td>4 x M10 / d=4.02 in</td>
</tr>
<tr>
<td>F14</td>
<td>3,540 lbs.in</td>
<td>22481 lbf</td>
<td>4 x M16 / d=5.51 in</td>
</tr>
<tr>
<td>F16</td>
<td>6,200 lbs.in</td>
<td>33721 lbf</td>
<td>4 x M20 / d=6.50 in</td>
</tr>
<tr>
<td>F25</td>
<td>10,620 lbs.in</td>
<td>44962 lbf</td>
<td>8 x M16 / d=10 in</td>
</tr>
<tr>
<td>F30</td>
<td>22,130 lbs.in</td>
<td>73063 lbf</td>
<td>8 x M20 / d=11.73 in</td>
</tr>
</tbody>
</table>
Technical data

Dimensions - Quarter-turn SQ Range

Overall dimensions SQ6 and SQ15 INTELLI+®

<table>
<thead>
<tr>
<th></th>
<th>Weight (lb)</th>
<th>Ø B (in)</th>
<th>a1 maxi (in)</th>
<th>a2 (in)</th>
<th>a3 (in)</th>
<th>a4 (in)</th>
<th>a5 (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SQ6 INTELLI+®</td>
<td>30.8</td>
<td>3.54</td>
<td>15.94</td>
<td>7.95</td>
<td>2.87</td>
<td>15.75</td>
<td>8.86</td>
</tr>
<tr>
<td>SQ15 INTELLI+®</td>
<td>33.1</td>
<td>3.54</td>
<td>17.64</td>
<td>7.95</td>
<td>2.87</td>
<td>15.75</td>
<td>8.86</td>
</tr>
</tbody>
</table>

Overall dimensions SQ20 to SQ120 INTELLI+®

<table>
<thead>
<tr>
<th></th>
<th>Weight (kg)</th>
<th>Ø B (in)</th>
<th>a1 (in)</th>
<th>a2 maxi (in)</th>
<th>a3 (in)</th>
<th>a4 (in)</th>
<th>a5 (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SQ20 INTELLI+®</td>
<td>55.1</td>
<td>6.30</td>
<td>8.74</td>
<td>20.98</td>
<td>12.01</td>
<td>15.31</td>
<td>14.88</td>
</tr>
<tr>
<td>SQ25 INTELLI+®</td>
<td>48.5</td>
<td>6.30</td>
<td>8.74</td>
<td>20.20</td>
<td>12.01</td>
<td>15.31</td>
<td>14.88</td>
</tr>
<tr>
<td>SQ60 INTELLI+®</td>
<td>59.5</td>
<td>9.84</td>
<td>8.78</td>
<td>22.91</td>
<td>12.01</td>
<td>15.31</td>
<td>14.88</td>
</tr>
<tr>
<td>SQ80 INTELLI+®</td>
<td>61.7</td>
<td>9.84</td>
<td>8.78</td>
<td>22.91</td>
<td>12.01</td>
<td>15.31</td>
<td>16.10</td>
</tr>
<tr>
<td>SQ120 INTELLI+®</td>
<td>81.6</td>
<td>9.84</td>
<td>8.86</td>
<td>25.12</td>
<td>15.16</td>
<td>20.67</td>
<td>14.49</td>
</tr>
</tbody>
</table>
Technical data

Dimensions - Quarter-turn SQ Range

Overall dimensions SQ100 to SQ1000 INTELLI+®

<table>
<thead>
<tr>
<th>Model</th>
<th>Weight (kg)</th>
<th>Ø B (in)</th>
<th>a1 (in)</th>
<th>a2 (in)</th>
<th>a3 (in)</th>
<th>a4 (in)</th>
<th>a5 (in)</th>
<th>a6 (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SQ100 INTELLI+®</td>
<td>156.5</td>
<td>11.81</td>
<td>15.28</td>
<td>19.09</td>
<td>14.61</td>
<td>17.80</td>
<td>4.49</td>
<td>20.52</td>
</tr>
<tr>
<td>SQ250 INTELLI+®</td>
<td>156.5</td>
<td>11.81</td>
<td>17.32</td>
<td>19.09</td>
<td>14.65</td>
<td>17.80</td>
<td>\</td>
<td>26.15</td>
</tr>
<tr>
<td>SQ400 INTELLI+®</td>
<td>147.7</td>
<td>11.81</td>
<td>19.13</td>
<td>24.21</td>
<td>16.07</td>
<td>19.22</td>
<td>7.41</td>
<td>26.15</td>
</tr>
<tr>
<td>SQ600 INTELLI+®</td>
<td>200.6</td>
<td>15.75</td>
<td>19.06</td>
<td>24.96</td>
<td>15.40</td>
<td>19.77</td>
<td>\</td>
<td>29.22</td>
</tr>
<tr>
<td>SQ1000 INTELLI+®</td>
<td>218.3</td>
<td>11.81</td>
<td>19.09</td>
<td>25</td>
<td>16.82</td>
<td>19.22</td>
<td>\</td>
<td>30.71</td>
</tr>
</tbody>
</table>
## Technical data

### Valve interface - Quarter-turn SQ Range

#### SQ INTELLI+® range

<table>
<thead>
<tr>
<th>Flange</th>
<th>Fixing screws</th>
<th>Bore (in)</th>
<th>Square (in)</th>
<th>Flat head (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Direct</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SQ6 INTELLI+® (530 lbs.in)</td>
<td>F05, F07</td>
<td>4 x M6, 4 x M8</td>
<td>0.55 - 0.71</td>
<td>0.35 - 0.43 - 0.55 - 0.63</td>
</tr>
<tr>
<td>SQ15 INTELLI+® (1325 lbs.in)</td>
<td>F05, F07</td>
<td>4 x M6, 4 x M8</td>
<td>0.79 - 0.87</td>
<td>0.55 - 0.63</td>
</tr>
<tr>
<td>SQ20 INTELLI+® (1770 lbs.in)</td>
<td>F07, F10</td>
<td>4 x M8, 4 x M10</td>
<td>0.79 - 0.87</td>
<td>0.55 - 0.67 - 0.75 - 0.87</td>
</tr>
<tr>
<td>SQ25 INTELLI+® (2650 lbs.in)</td>
<td>F07, F10</td>
<td>4 x M8, 4 x M10</td>
<td>0.98 - 1.10</td>
<td>0.55 - 0.67 - 0.75 - 0.87</td>
</tr>
<tr>
<td>SQ30 INTELLI+® (3290 lbs.in)</td>
<td>F12</td>
<td>4 x M12</td>
<td>0.98 - 1.10</td>
<td>0.55</td>
</tr>
<tr>
<td>SQ60 INTELLI+® (5310 lbs.in)</td>
<td>F12, F14</td>
<td>4 x M12 (4 x M16)</td>
<td>0.98 - 1.10 - 1.18 - 1.38 - 1.57</td>
<td>0.87 - 1.06 - 1.42</td>
</tr>
<tr>
<td>SQ80 INTELLI+® (7080 lbs.in)</td>
<td>F12, F14</td>
<td>4 x M12 (4 x M16)</td>
<td>0.98 - 1.10 - 1.18 - 1.38 - 1.57</td>
<td>0.87 - 1.06 - 1.42</td>
</tr>
<tr>
<td>SQ120 INTELLI+® (8850 lbs.in)</td>
<td>F12, F14</td>
<td>4 x M12 (4 x M16)</td>
<td>0.98 - 1.10 - 1.18 - 1.38 - 1.57</td>
<td>0.87 - 1.06 - 1.42</td>
</tr>
<tr>
<td>SQ100 INTELLI+® (8850 lbs.in)</td>
<td>F12, F14</td>
<td>4 x M12 (4 x M16)</td>
<td>0.98 - 1.10 - 1.18 - 1.38 - 1.57</td>
<td>0.87 - 1.06 - 1.42</td>
</tr>
<tr>
<td>SQ250 INTELLI+® (22125 lbs.in)</td>
<td>F14, F16</td>
<td>4 x M16 (4 x M20)</td>
<td>1.38 - 1.57 - 1.77 - 1.89 - 1.97 - 2.17 - 2.36 - 2.83 - 3.15</td>
<td>0.87 - 1.06 - 1.42 - 1.81</td>
</tr>
<tr>
<td>SQ 400 INTELLI+® (35400 lbs.in)</td>
<td>F16</td>
<td>4 x M20</td>
<td>1.97 - 2.17 - 2.36 - 2.83 - 3.15</td>
<td>1.06 - 1.42 - 1.81 - 1.97</td>
</tr>
<tr>
<td>SQ 600 INTELLI+® (51330 lbs.in)</td>
<td>F16</td>
<td>4 x M20</td>
<td>1.97 - 2.17 - 2.36 - 2.83 - 3.15</td>
<td>1.06 - 1.42 - 1.81 - 1.97</td>
</tr>
<tr>
<td>SQ 1000 INTELLI+® (88500 lbs.in)</td>
<td>F25</td>
<td>8 x M16</td>
<td>1.97 - 2.17 - 2.36 - 2.83 - 3.15</td>
<td>1.81 - 1.97 - 2.17</td>
</tr>
</tbody>
</table>

Other machinings, please consult us.
INTELLI+® offers lot of information, many of them can be configurable by the user as it is shown in the following table.

<table>
<thead>
<tr>
<th>INFORMATION</th>
<th>STANDARD</th>
<th>CONFIGURABLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Close direction</td>
<td>Clockwise</td>
<td>Counter-clockwise</td>
</tr>
<tr>
<td>Closing mode</td>
<td>On position</td>
<td>On torque</td>
</tr>
<tr>
<td>Setting of torque limit system</td>
<td>100%</td>
<td>Other values between 40 and 100%</td>
</tr>
<tr>
<td>Only if closing the valve on torque</td>
<td>100%</td>
<td>Other values between 40 and 100%</td>
</tr>
<tr>
<td>Valve seat torque</td>
<td>100%</td>
<td>Other values between 40 and 100% or without any limitation</td>
</tr>
<tr>
<td>Torque to unseat the valve</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>Auxiliary remote commands (2 chosen from 10)</td>
<td>Local inhibit command but local stop available (auxiliary command 1)</td>
<td>Local plus remote control or remote control only</td>
</tr>
<tr>
<td></td>
<td>In emergency closing (ESD) (auxiliary command 2)</td>
<td>Local or remote control</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Local command inhibited</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Open/Close inhibited</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fluto / modulating / On-Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Emergency closing (ESD)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Emergency opening (ESD)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Emergency stopping (ESD)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Partial stroke</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No thermal overload (weatherproof versions only)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Full torque (100%)</td>
</tr>
<tr>
<td>Fault tolerance degradation (ESD)</td>
<td>None</td>
<td>Normally opened</td>
</tr>
<tr>
<td>Auxiliary command activated by a contact</td>
<td>Normally opened</td>
<td>Normally closed</td>
</tr>
<tr>
<td>Blue selector operating mode</td>
<td>By pulse (a pulse is enough to achieve an opening or closing command)</td>
<td>Maintained (actuator operates while the operator holds the button)</td>
</tr>
<tr>
<td>Stop local, while remote command</td>
<td>Authorized</td>
<td>Inhibited</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>Open priority</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Close priority</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Open and close priority</td>
</tr>
<tr>
<td>Faults reported on fault relay</td>
<td>Control circuit power lost (always included)</td>
<td>Jammed valve</td>
</tr>
<tr>
<td></td>
<td>Fuse blown (always included)</td>
<td>Actuator receives an emergency command (ESD)</td>
</tr>
<tr>
<td></td>
<td>Thermal cutoff has tripped (always included)</td>
<td>The actuator receives an inhibit command</td>
</tr>
<tr>
<td></td>
<td>Lost phase (always included)</td>
<td>Overtravel</td>
</tr>
<tr>
<td></td>
<td>Locked rotor (always included)</td>
<td>4-20 mA signal lost (if positioner option installed)</td>
</tr>
<tr>
<td></td>
<td>Local / remote selector set to local</td>
<td></td>
</tr>
</tbody>
</table>
### INFORMATION

**Information reported on signaling relays**

- Valve open (for R1 and R3)
- Valve closed (for R2 and R4)

For actuator with SIL, please consult 'SIL actuators' catalogue for technical specifications

**Each contact can be:**

- Normally open (when something occurs, contact is closed)

**In case of communication loss**

- Remain in position
- Go to closed position
- Go to opened position

**Position remote indication**

- 4-20mA

**Torque remote indication**

- 4-20mA

**Signal variation direction**

- Signal increases in the open direction
- Signal decreases in the open direction

**Auxiliary command 1**

- Switch: automatic control (proportional command) / On-Off (standard Open / Close command)

**Type of signal**

- 4-20mA

**Signal direction**

- Signal increases in the open direction
- Signal decreases in the open direction

**Dead band setting**

- 1%
- Other value between 0.2 and 5%

**In case of 4-20mA signal loss**

- Remain in position
- Go to fully closed position
- Go to fully open position

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### STANDARD

- Valve open (for R1 and R3)
- Valve closed (for R2 and R4)

**In case of communication loss**

- Remain in position
- Go to closed position
- Go to opened position

**Position remote indication**

- 4-20mA

**Torque remote indication**

- 4-20mA

**Signal variation direction**

- Signal increases in the open direction
- Signal decreases in the open direction

**Auxiliary command 1**

- Switch: automatic control (proportional command) / On-Off (standard Open / Close command)

**Type of signal**

- 4-20mA

**Signal direction**

- Signal increases in the open direction
- Signal decreases in the open direction

**Dead band setting**

- 1%
- Other value between 0.2 and 5%

**In case of 4-20mA signal loss**

- Remain in position
- Go to fully closed position
- Go to fully open position

---

### CONFIGURABLE

- Torque limiter action in the opening / closed direction
- Valve in intermediate position, between x% and y% of opening (for example: 10% to 50%)
- Selector in local/remote/off
- The actuator is moving (fixed signal)
- The actuator is moving (blinking signal)
- Moving in the open/close direction (fixed signal)
- Moving in the open/close direction (blinking signal)
- Emergency command (ESD)
- Stop mid-travel
- The actuator is normally powered
- The motor thermal cutoff has tripped
- Jammed valve
- In three-phase, a phase is missing
- 4-20 mA signal lost (if positioner option installed)
- The handwheel has been activated since the last electrical movement
- If fieldbus option is installed, this relay is assigned to an external command
- Battery low (if installed)
- Partial stroking in progress / in fault
- Normally closed

**In case of communication loss**

- Remain in position
- Go to closed position
- Go to opened position

**Position remote indication**

- 4-20mA

**Torque remote indication**

- 4-20mA

**Signal variation direction**

- Signal increases in the open direction
- Signal decreases in the open direction

**Auxiliary command 1**

- Switch: automatic control (proportional command) / On-Off (standard Open / Close command)

**Type of signal**

- 4-20mA

**Signal direction**

- Signal increases in the open direction
- Signal decreases in the open direction

**Dead band setting**

- 1%
- Other value between 0.2 and 5%

**In case of 4-20mA signal loss**

- Remain in position
- Go to fully closed position
- Go to fully open position

---

* Voltage signal with an external resistance
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