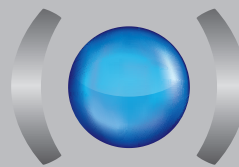


Reliability,
Security,
User Friendly.



**BERNARD
CONTROLS**

//////////////////// Invest in Confidence //////////////////////



**WEATHER PROOF
INTELLI+[®] ACTUATORS
SQ & ST RANGES**



LABEL



- Reliability
- User Friendly
- Security

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.

Contents

Invest in experience	>	4
Range overview	>	6

Reliability

Heavy duty mechanical design	>	8
Accurate information	>	9
Enclosure adapted to field constraints	>	10

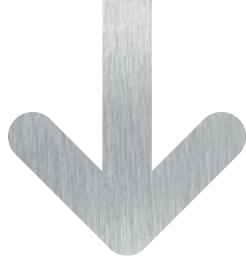
User friendly controls

Intuitive interface	>	12
Non intrusive settings	>	14
Preventative maintenance	>	16
Easy on-site management	>	17

Security

Plant installations protection	>	18
Motorised valve protection	>	19

Controls overview	>	20
Technical data	>	24



invest in experience

***BERNARD CONTROLS RELIES ON 75 YEARS
OF CONTINUOUS EXPERIENCE AND KNOW-HOW
TO OFFER TOTAL & DURABLE SOLUTIONS
FOR INDUSTRIAL VALVES' AUTOMATION***

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.



Power Generation



Industries, HVAC & Marine



Water



Oil & Gas

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 60 to 500 000 N.m
- IP67/NEMA4 as standard (IP68 / NEMA6 in option)
- Available for ON/OFF and Modulating Class III applications
- INTELLI+ controls as standard



*Direct quarter-turn compact actuator,
for torques lower than 150 N.m*



*Direct quarter-turn compact actuator,
for torques in the range
150 to 1,000 N.m*



*Actuator + quarter-turn gearbox,
for torques exceeding 800 N.m*

> 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

• Intensive Modulating Class II



- > 100 % duty service
- > Change of position every 2 to 3 seconds
- > Quarter-turn, linear, multiturn and lever movements

> Multiturn actuators

ST Range description

- Available torque range from 60 to 20 000 Nm
- IP68 (5m/72h) / NEMA6 as standard
- Available for ON/OFF and Modulating Class III applications
- INTELLI+ controls as standard



ST actuator with INTELLI + integrated controls

• Foot and lever



- > Main application: dampers controls
- > Lever position can be set over 360°

• Linear systems



- > Main application: modulating valves controls
- > Up to 200mm 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

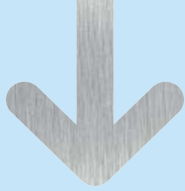
> Powerful motors

- Asynchronous motor with high starting torque
- Excellent starting torque / nominal torque ratio
- On/Off operation: 30% duty rating for peak service conditions of up to 360 starts per hour
- Modulating class III: 50% duty rating for peak service conditions of up to 1,200 starts per hour
- 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



Reliability

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 main gear 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.



BERNARD CONTROLS' position & torque absolute sensors are mechanically linked to the output shaft



Reliability

Enclosure adapted to field constraints

> Separated box (option)

The separated control box configuration can be specially useful when the actuator has to be mounted:

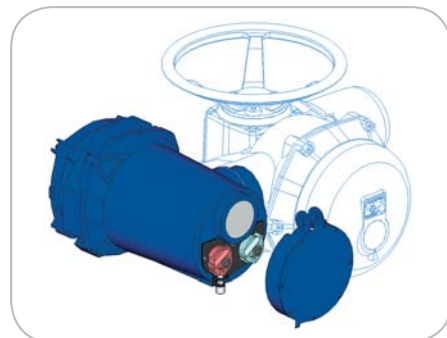
- > *in a difficult access (manhole, in a high position,...)*
- > *on a highly vibrating device*
- > *in an excessively high or low temperature area*

The maximum distance between control and actuator is 50 meters.



> 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.



Double-sealing principle





User friendly controls

Intuitive interface



> Graphical display

- Menu guided settings using clear messages. Language can be freely selected among: Chinese, English, French, German, Italian, 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.



Local controls inhibited by the remote controller.

ESD

Emergency shutdown signal received.



Infrared link is detected.



This icon is displayed in case of alarm.



In the case of signalling option (only for subsidiaries functions), this icon is blinking if the battery voltage is getting low.

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 signalling

- 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 (8 languages available)

CHECK: to read all the actuator parameters and configuration (activity, alarms, commands, torque, data sheet, position, positioner, signalling, 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, signalling, 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

- 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. INTELLI+ offers the possibility to communicate with a standard laptop through an infra-red link with INTELLIKIT or INTELLIPOCKET.
- 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.

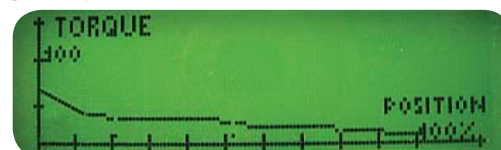
Refer to Configuration page 35 for a complete list of alarms.

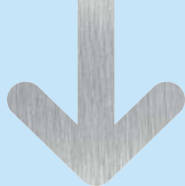
> Valve torque curve

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.





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.

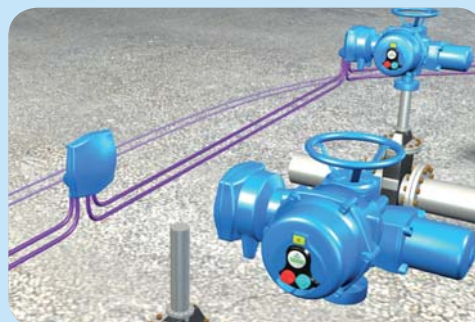
This offers a lot of flexibility and safety at the installation phase as well as for maintenance operations.

For example, if the actuator has to be dismantled 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.

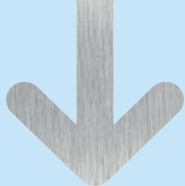
This test consists in the execution of a very short return travel.

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 occurring 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.

➤ Signalling continuity (option)

The actuator is totally autonomous and does not require a battery to operate. However, a signalling battery back-up optional board can be added for signalling purpose only.

This battery is activated in case of loss of power supply and allows:

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

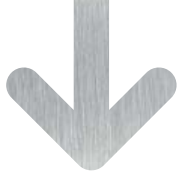
Low battery condition is automatically detected by the INTELLI+ and a warning message is sent.

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.



Controls overview

Hardwired controls

➤ 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

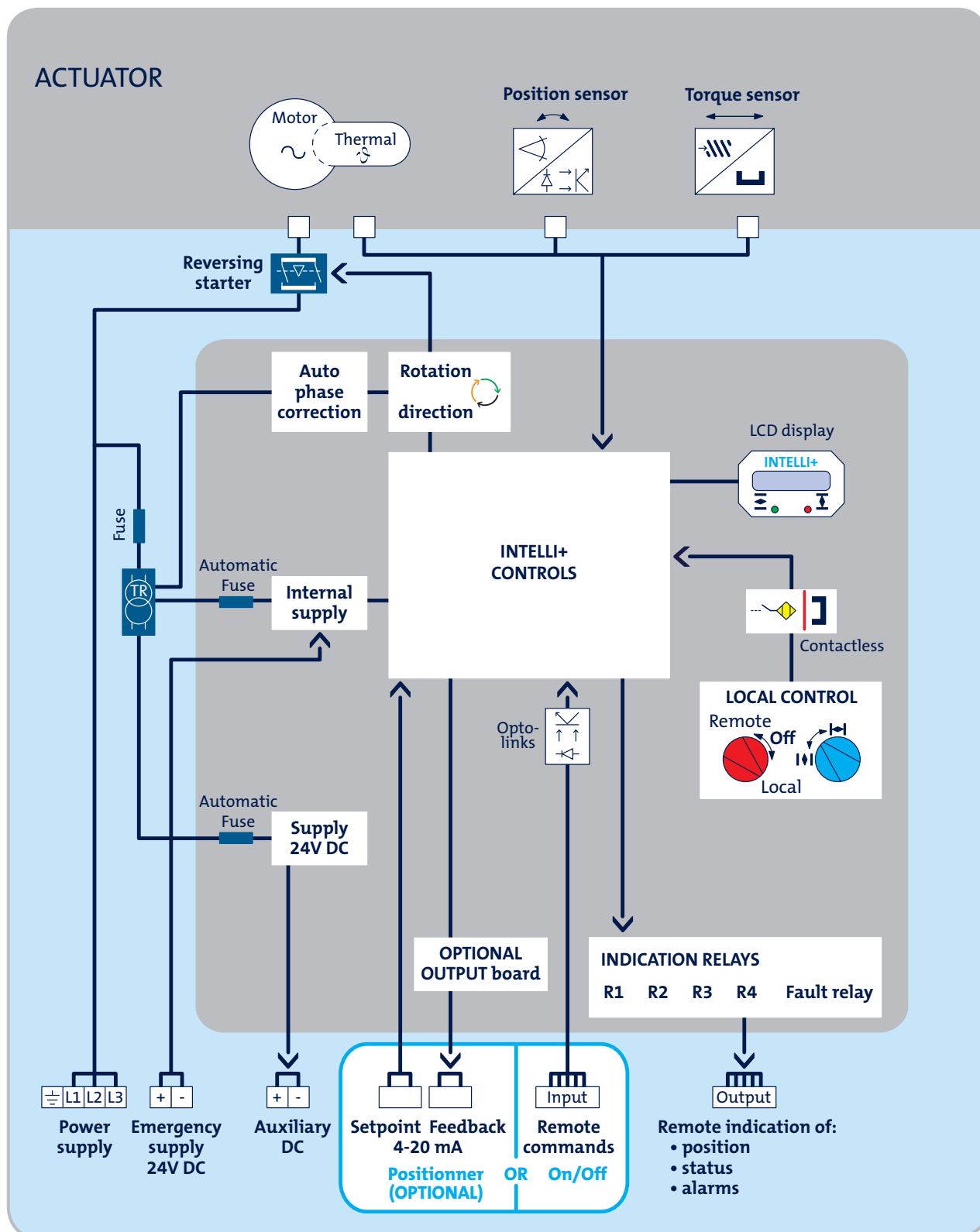
A positioner board can be installed into the INTELLI+ to allow the operator to drive the valve to intermediate positions (Class III modulating).

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.

> INTELLI+ layout





Controls overview

Fieldbus communication

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.

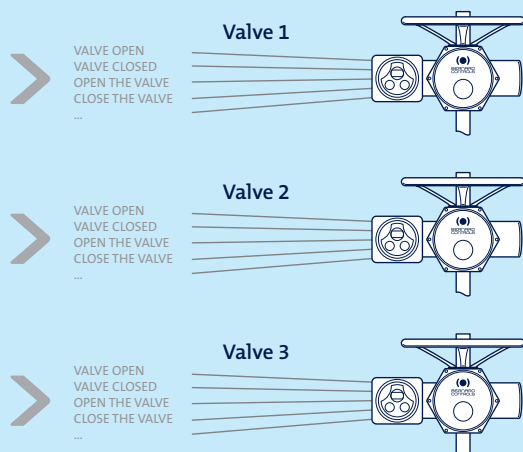
BERNARD CONTROLS actuators can be connected to most of the standard fieldbuses available on the market:

- 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.

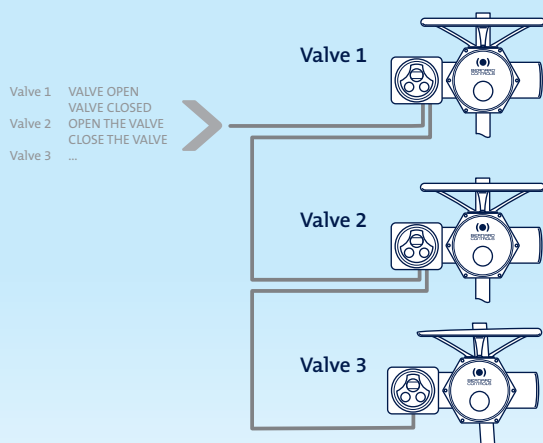
POINT-TO-POINT CONNECTION

EACH ACTUATOR HAS TO BE CONNECTED TO THE CONTROL CABINET



MULTIDROP CONNECTION

MANY UNITS CONNECTED ON A SINGLE PAIR OF WIRES;
ALL COMMANDS AND SIGNALS CAN BE TRANSMITTED BY THE BUS



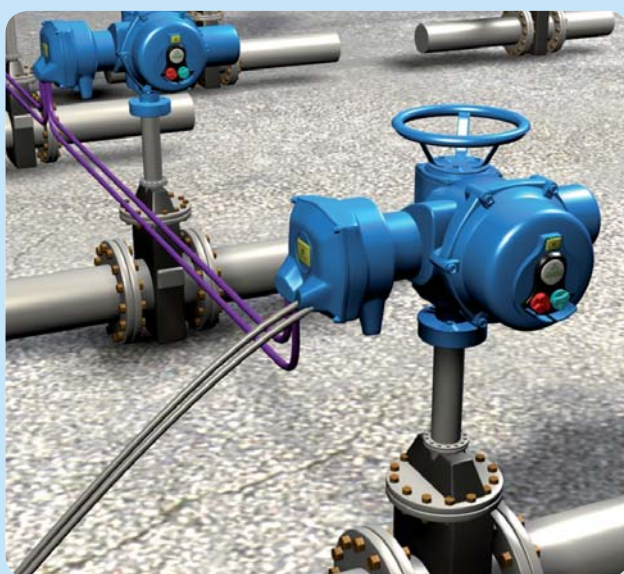
Open versus Proprietary systems:

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.

➤ BERNARD CONTROLS Master Station



- Based on robust PLC technology and open fieldbus protocol
- Up to 120 actuators and 10km 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



Technical data

General specifications

GENERAL SPECIFICATIONS	Torque range	Multiturn <ul style="list-style-type: none">• direct mount: 60 to 2200 N.m• with gearbox: up to 20,000 N.m Quarter-turn <ul style="list-style-type: none">• direct mount: 200 to 800 N.m• with gearbox: up to 500,000 N.m
	Type of service	ON/OFF - Modulating Class III. Class II: refer to specific documentation
ENCLOSURE - PROTECTION	Casing	Cast aluminium Ductile cast iron for models STX175 / STX220
	Tightness	SQ Range: IP67 as standard - IP68 on option ST Range: IP68 5m/72h and NEMA6 as standard (C.S.A CGUS 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: -20 ... +70°C • Low temperature version: -40 ... +70°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	Motor technology	TENV type Totally Enclosed Non Ventilated, squirrel cage 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 <ul style="list-style-type: none">• S4 - 30% for ON/OFF operation - up to 360 starts per hour• S4 - 50% for Modulating class III - up to 1,200 starts per hour
MECHANICAL SPECIFICATIONS	Gearing	Self-locking at all speeds
	Handwheel	The handwheel does not rotate during motor operation <ul style="list-style-type: none">• Automatic switch from motor to handwheel without declutching, except ST6, SQ6 and SQ15• Handwheel gear ratios 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	• Multiturn actuators flanges comply with ISO 5210 • Quarter-turn actuators flanges comply with ISO 5211 Flanges for valve special top works available on request
	Output drive	Removable sockets on SQX and STX models Direct machining in the output quadrant on larger quarter-turn gearboxes
	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
ELECTRICAL SPECIFICATIONS	Power supply	The actuators can operate on a wide variety of power supplies: <ul style="list-style-type: none">• 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 (6.3 x 32mm - 0.5 A) located on the transformer board Two automatic fuses for low voltages



POSITION AND TORQUE SENSORS	Position	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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 8 different languages
	On-Off remote Control	Command by: <ul style="list-style-type: none"> • 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)
	Signalling relays	4 relays: each information can be freely selected among a total of 23 available information <ul style="list-style-type: none"> • Contact configuration: normally open or normally closed • Minimum current 10mA at 5V • Maximum current 5A at 250V AC or 5A at 30VDC (inductive load) Additional 3 relay boards on option.
	Fault relay	<ul style="list-style-type: none"> • Normally closed & energized SPDT contact • 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): <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • in current: impedance of 160 Ohms • in voltage: impedance of 11 KOhms Analogue outputs: <ul style="list-style-type: none"> • 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
	Signalling battery (option)	Allows to use the display and update the open and closed position information (through the signaling relays or Profibus DP) in case of lack of power supply
	Auxiliary power supply	24VCC in standard 48VCC in option Remote/Off/Local selector is padlockable
SETTINGS	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)	<ul style="list-style-type: none"> • 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)	<ul style="list-style-type: none"> • Protection: IP65 (option: ATEX II2G EEx ia IICT4) • Shock resistance: 1.2 m on concrete • Communication: <ul style="list-style-type: none"> - 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	EC Directives	<p>The actuators comply with:</p> <ul style="list-style-type: none"> • The 2004/108/EC electromagnetic compatibility • The 2006/95/EC C Low Voltage • The following harmonized standards: <ul style="list-style-type: none"> - Generic emission standard-Industrial environment EN 61000-6-4 - Generic immunity standard - Industrial environment EN 61000-6-2 - Rotating electrical machines EN 60034-1 - Degrees of protection provided by enclosures (IP code) EN 60529
	Profibus DPV1 (option)	<ul style="list-style-type: none"> • PROFIBUS-DPV1 - RS 485 • Baud rate: 9.6 kbit/s up to 1.5 Mbit/s (autodetection) • Communication protocol: PROFIBUS DPV1 slave-cyclic and acyclic • Type of connection: single line (standard) or redundant line (option) • Cable specification: Profibus certified cable only • Line connection without repeater: <ul style="list-style-type: none"> - Actuators per line: 31 max. - Line length: 1.2 km max. (0.75 mi) • Line connection with repeaters: <ul style="list-style-type: none"> - Number of repeaters per line: 9 max - 30 actuators and 1 Km max. per segment - Number of actuators per line with repeater: 124 maximum - Line length with 9 repeaters: 10.2 km max. (6.2 mi) • Scan speed (30 units & 1.2 km): 0.1s (at a baud rate of 93.75 Kbit/s) • Power supply: internal and isolated via INTELLI+. Optional signalling battery or 24VDC external backup supply update the open and closed position information in case of loss of power supply • Technical approval: operability approved by PNO (Profibus Nutzer Organisation)
	Modbus (option)	<ul style="list-style-type: none"> • MODBUS RTU - RS 485 • Transmission medium: 1 shielded pair cable • Functions: Half Duplex, asynchronous mode, multidrop • Baud rate: 1.2k to 115 Kbit/s • Format: 8 data bits, 1 stop bit, no parity • Communication protocol: Modbus (slave) • Modbus address: configurable by the actuator menu
	Foundation Fieldbus (option)	<ul style="list-style-type: none"> • H1 speed = 31.25KBit/s • Fully compliant with fieldbus standard IEC 61158 • Physical layer: IEC 61158-2, 2 wires communication • Current consumption: 20mA • Operating voltage: 9 to 32 VDC • Cable specification: Type A (for example: 3076F Belden) • Line connection <ul style="list-style-type: none"> - Actuators per line without repeater: 31 max. - Line length without repeater: 1.9 km max. (1.2 mi) - Number of repeaters per line: 4 max. - Maximum number of actuators and line length depends on consumption available • Technical approval: Foundation tested. Several DCS manufacturer operability checked.

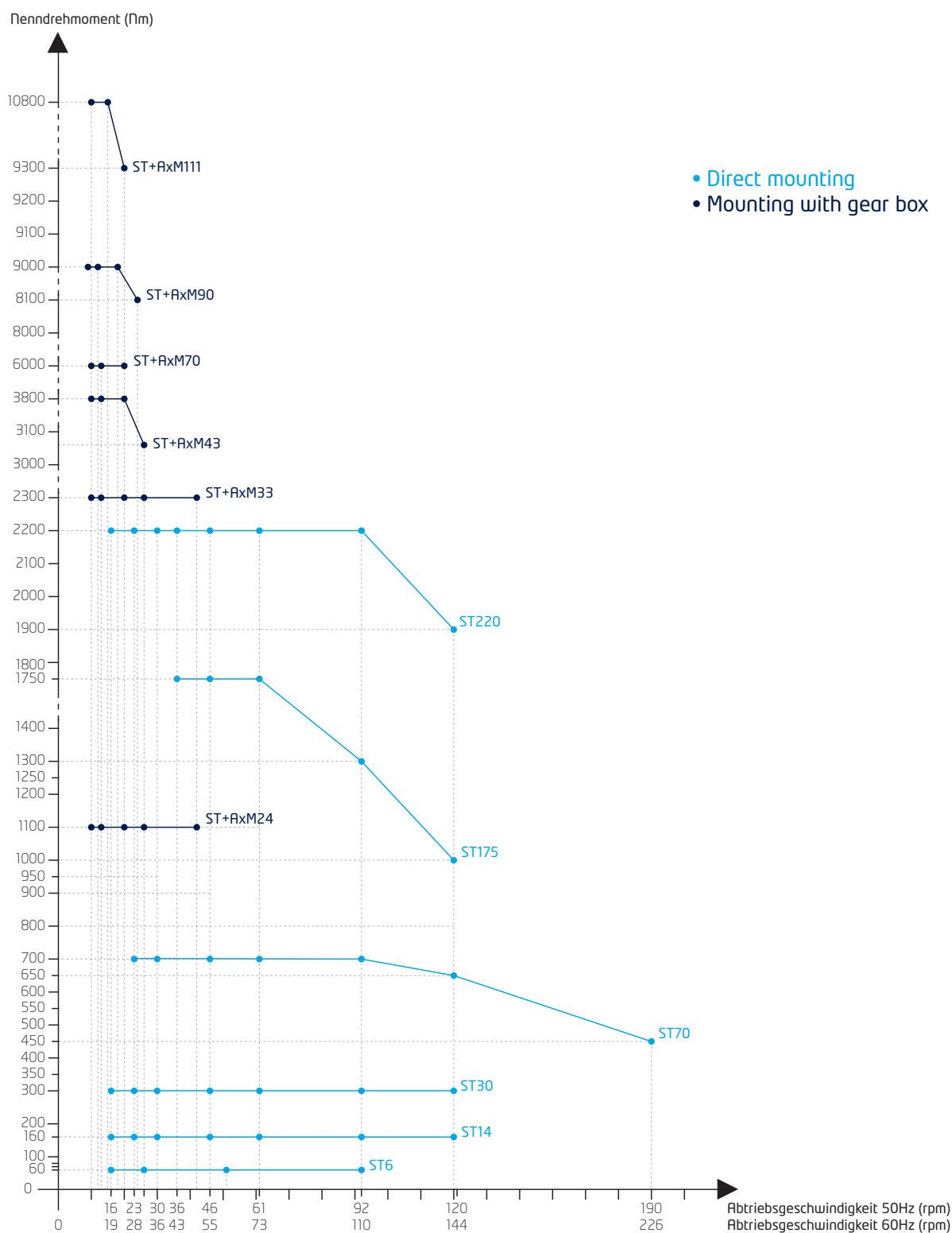
For further information on electrical data, dimensions and wirings, please consult our Technical Handbooks





Technical data

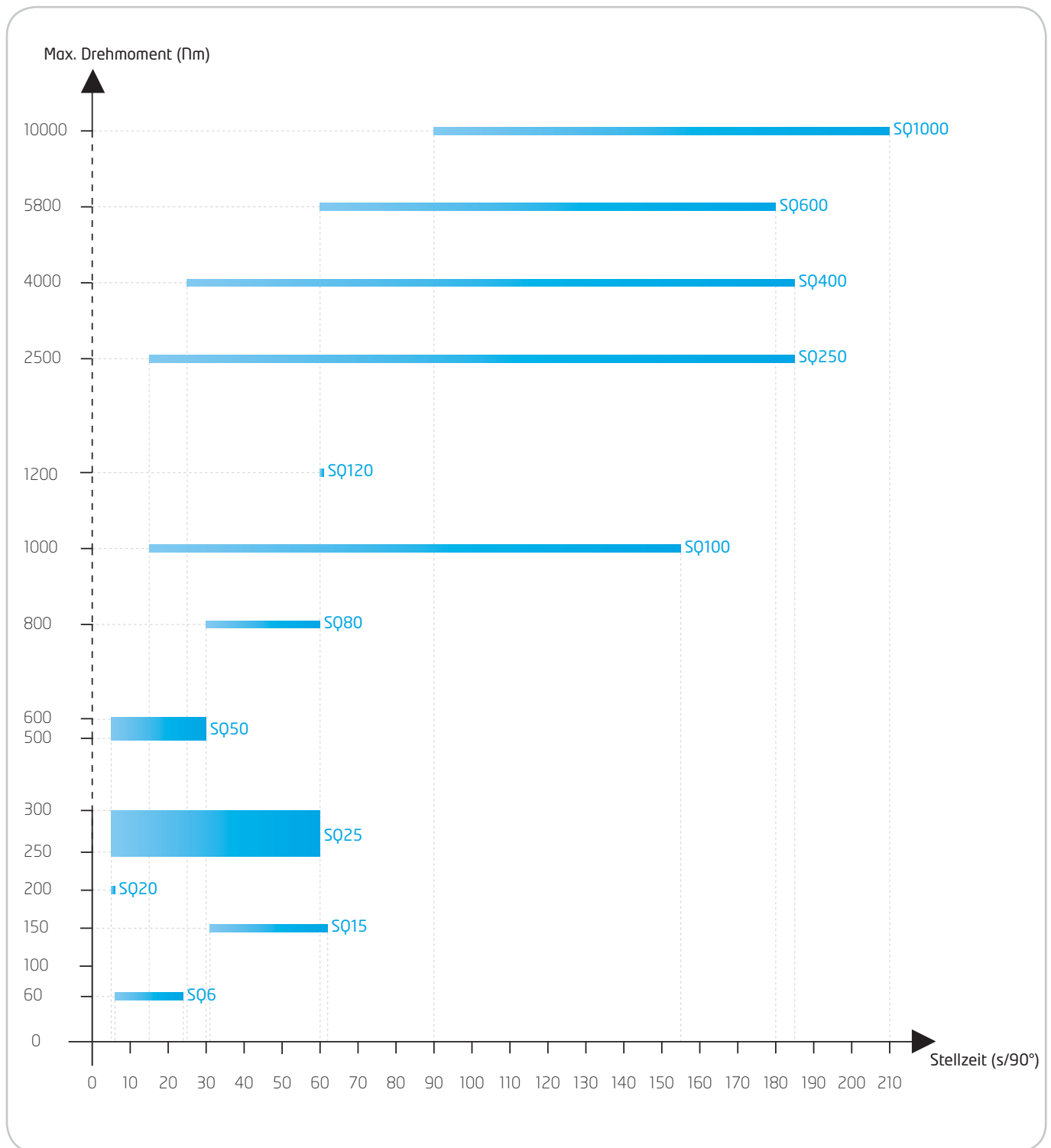
Performances - Multiturn ST Range





Technical data

Performances - Quarter-turn SQ Range

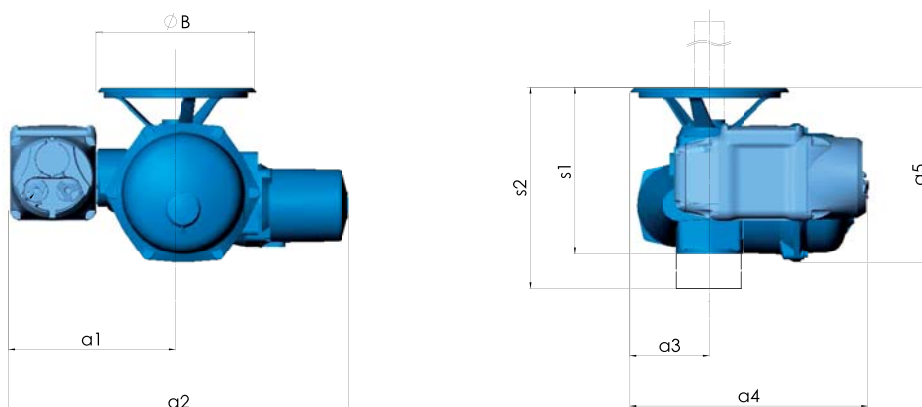


For higher torques, please consult us

Technical data

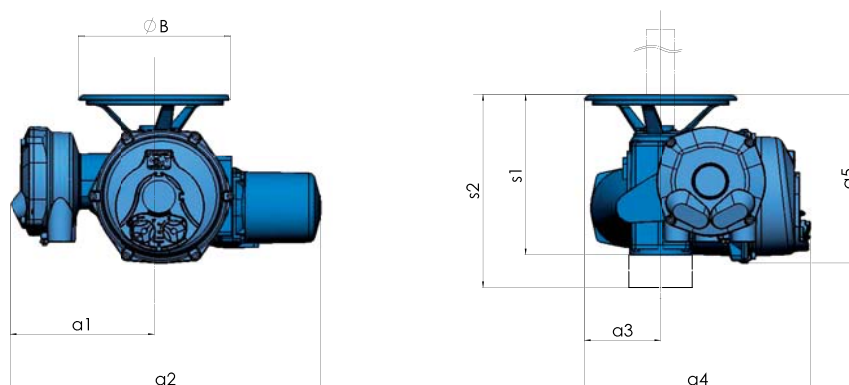
Dimensions - Multiturn ST Range

> Overall dimensions ST6 to ST70 INTELLI+



	Weight (kg)	Ø B	a1	a2 maxi	a3	a4	a5	s1 Form B3/C	s2 Form A	s2 Form B1
ST6 INTELLI+	32	300	315	636	150	472	313	283	341	341
ST14 INTELLI+	40	300	315	642	150	450	332	317	375	375
ST30 INTELLI+	61	450	309	743	225	570	364	364	441	450
ST70 INTELLI+	85	550	297	781	275	638	447	447	547	547

> Overall dimensions ST175 and ST220 INTELLI+



	Weight (kg)	Ø B	a1	a2 maxi	a3	a4	a5	s1 Form B3/C	s2 Form A	s2 Form B1
ST175 INTELLI+	294	1000	335	1056	500	882	\	523	661	661
ST220 INTELLI+	315	1000	335	1056	500	882	\	523	658	658



Technical data

Valve interface - Multiturn ST Range

> ST INTELLI+ range

	Flange	Max. stem diameter (mm)			
		Type A (max)	Type B1 (max)	Type B3	Type C (max)
ST6	F10	30	42	20	32
ST14	F10	38	42	20	40
ST30	F14	42	60	30	45
ST70	F16	54	80	40	56
ST175	F25	85	100	50	90
ST220	F30	90	120	60	90

Type A
STEM NUT



Thrust accepted



Type B1
LARGE DIA.



Thrust not accepted



Type B3
SMALL DIA.



Thrust not accepted



Type C
CLAW COUPLING

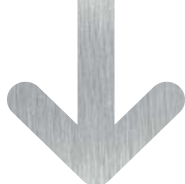


Thrust not accepted



> ISO 5210 requirements

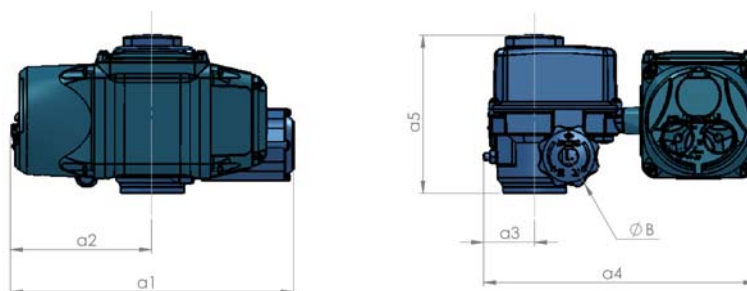
Flange	Max torque	Max. thrust with stem nut	Mounting bolts
F10	100 N.m	40 000 N	4 x M10 / d=102 mm
F14	400 N.m	100 000 N	4 x M16 / d=140 mm
F16	700 N.m	150 000 N	4 x M20 / d=165 mm
F25	1200 N.m	200 000 N	8 x M16 / d=254 mm
F30	2500 N.m	325 000 N	8 x M20 / d=298 mm



Technical data

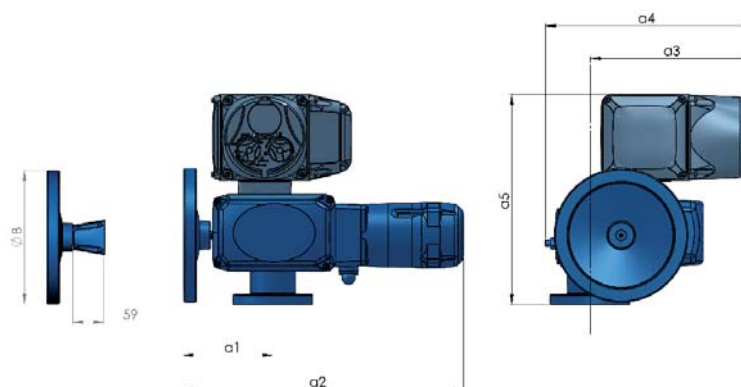
Dimensions - Quarter-turn SQ Range

> Overall dimensions SQ6 and SQ15 INTELLI+

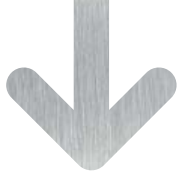


	Weight (kg)	Ø B	a1 maxi	a2	a3	a4	a5
SQ6 INTELLI+	14	90	405	202	73	389	225
SQ15 INTELLI+	14	90	448	202	73	389	225

> Overall dimensions SQ20 to SQ120 INTELLI+



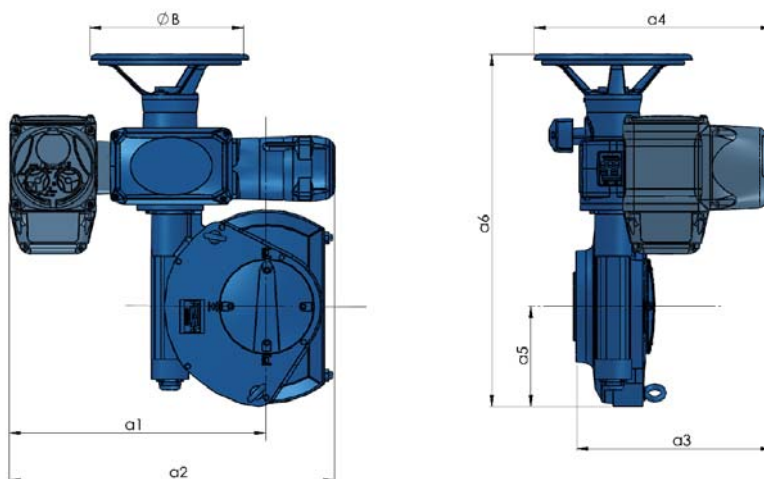
	Weight (kg)	Ø B	a1	a2 maxi	a3	a4	a5
SQ20 INTELLI+	25	160	167	479	305	389	366
SQ25 INTELLI+	22	160	167	459	305	389	366
SQ50 INTELLI+	27	250	168	528	305	389	366
SQ80 INTELLI+	28	250	168	528	305	389	366
SQ120 INTELLI+	37	250	171	583	385	525	356



Technical data

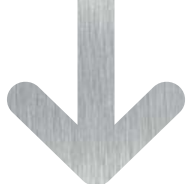
Dimensions - Quarter-turn SQ Range

➤ Overall dimensions SQ100 to SQ1000 INTELLI+



	Weight (kg)	Ø B	a1	a2	a3	a4	a5	a6
SQ100 INTELLI+	71	300	388	614	371	452	114	521
SQ250 INTELLI+	71	300	486	615	408	488	188	664
SQ400 INTELLI+	67	300	440	614	372	452	/	664
SQ600 INTELLI+	91	400	484	634	391	502	/	742
SQ1000 INTELLI+	99	300	485	635	427	488	/	780





Technical data

Valve interface - Quarter-turn SQ Range

> SQ INTELLI+ range

	Flange	Fixing screws	Bore (mm)	Square (mm)	Flat head (mm)
Direct	SQ6 INTELLI+ (60 N.m)	F05 F07	14 - 18 20 - 22	9 - 11 14 - 16 17-19	14
	SQ15 INTELLI+ (150 N.m)				14 - 19
	SQ20 INTELLI+ (200 N.m)	F07 F10	20	14 17 19 22 27	14 17 19 22
	SQ25 INTELLI+ (300 N.m)		22		
	SQ50 INTELLI+ (600 N.m)		25		
			28		
Combi			30		
	SQ80 INTELLI+ (800 N.m)	F12	25 - 28 30 - 32	22 27 36	14 17 19 22
	SQ120 INTELLI+ (1000 N.m)		25		
			28		
			30		
			35		
			40		
	SQ100 INTELLI+ (1000 N.m)	F12 (F14)	4 x M12 (4 x M16)	25 - 28 - 30 35 - 40	22 - 27 36
	SQ250 Intelli+ (2500 N.m)	F14 (F16)	4 x M16 (4 x M20)	35-40-45- 48-50-55- 60-72-80	22-27-36-46
	SQ 400 Intelli+ (4000 N.m)	F16	4 x M20	50-55-60- 72-80	36-46
	SQ 600 Intelli+ (5800 N.m)	F25	8 x M16	50-55-60- 72-80-100	46-50-55
	SQ 1000 Intelli+ (10000 N.m)				

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.

[illegible]



	INFORMATION	STANDARD	CONFIGURABLE
SIGNALLING RELAYS	Information reported on signalling relays	<ul style="list-style-type: none"> Valve open (for R1 and R3) Valve closed (for R2 and R4) 	<ul style="list-style-type: none"> 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
	Each contact can be:	<ul style="list-style-type: none"> Normally open (when something occurs, contact is closed) 	
FIELD BUS (option)	In case of communication loss	<ul style="list-style-type: none"> Remain in position 	<ul style="list-style-type: none"> Go to closed position Go to open position
ANALOG POSITION FEEDBACK BOARD (option)	Position remote indication	<ul style="list-style-type: none"> 4-20mA 	<ul style="list-style-type: none"> 0-20mA and 0-10V* 4-12 mA 12-20 mA
	Torque remote indication	<ul style="list-style-type: none"> 4-20mA 	
	Signal variation direction	<ul style="list-style-type: none"> Signal increases in the open direction 	<ul style="list-style-type: none"> Signal decreases in the open direction
ANALOGUE CONTROL: POSITIONER (option)	Auxillary command 1	<ul style="list-style-type: none"> Switch: automatic control (proportional command) / On-Off (standard Open / Close command) 	
	Type of signal	<ul style="list-style-type: none"> 4-20mA 	<ul style="list-style-type: none"> 0-20mA and 0-10V 4-12mA 12-20mA
	Signal direction	<ul style="list-style-type: none"> Signal increases in the open direction 	<ul style="list-style-type: none"> Signal decreases in the open direction
	Dead band setting	<ul style="list-style-type: none"> 1% 	<ul style="list-style-type: none"> Other value between 0.2 and 5%
	In case of 4-20mA signal loss	<ul style="list-style-type: none"> Remain in position 	<ul style="list-style-type: none"> Go to fully closed position Go to fully open position

* Voltage signal with an external resistance

SUBSIDIARIES

BELGIUM **BERNARD CONTROLS BENELUX** BRUXELLES

info.benelux@bernardcontrols.com
Tel +32 (0)2 343 41 22

CHINA **BERNARD CONTROLS CHINA** PEKIN

bcc.info@bernardcontrols.com
Tel +86 (0) 10 6789 2861

GERMANY **BERNARD CONTROLS DEUFRA** TROISDORF

bcd.mail@bernardcontrols.com
Tel +49 22 41 98 340

ITALIA **BERNARD CONTROLS ITALIA** MILAN

info.it@bernardcontrols.com
Tel +39 02 931 85 233

KOREA (REPUBLIC OF) **BERNARD CONTROLS KOREA** SEOUL

bck.info@bernardcontrols.com
Tel +82 02-2270-3880

SINGAPORE **BERNARD CONTROLS SINGAPORE** SINGAPORE

bcsq.info@bernardcontrols.com
Tel +65 65654227

SPAIN **BERNARD CONTROLS SPAIN** MADRID

info.spain@bernardcontrols.com
Tel +34 91 30 41 139

UNITED STATES **BERNARD CONTROLS Inc** HOUSTON

bsales@bernardcontrols.com
Tel +1 281 578 66 66

OFFICES

BANGKOK **BERNARD CONTROLS** **SOUTH-EAST ASIA**

j.chounramany@bernardcontrols.com
Tel +66 2 640 82 64

DUBAI **BERNARD CONTROLS** **MIDDLE-EAST**

bernact@emirates.net.ae
Tel +971 4 344 2010

MOSCOW **BERNARD CONTROLS** **RUSSIA**

youri.otradine@bernardcontrols.com
Tel +7 (499) 251 06 54
or +7 (916) 911 28 42

AGENTS AND DISTRIBUTORS

→ AMERICAS

Information on our network
www.bernardcontrols.com

or

Back Office
BERNARD CONTROLS Inc.
bsales@bernardcontrols.com
Tel +1 281 578 66 66

BRAZIL **JCN** SAO PAULO

jcn@jcn.com.br
Tel +55 11 39 02 26 00

→ ASIA

Information on our network
www.bernardcontrols.com

or

To contact our distributors
Back Office
BERNARD CONTROLS ASIA
bcc.info@bernardcontrols.com
Tel +86 10 6789 2861

→ EUROPE - MIDDLE EAST - AFRICA

Information on our network
www.bernardcontrols.com

or

Back Office
BERNARD CONTROLS
mail@bernardcontrols.com
Tel +33 (0)1 34 07 71 00

or

Contact directly agents/distributors

AUSTRIA **IPU ING PAUL UNGER** WIEN

hammermueller@IPU.co.at
Tel +43 1 602 41 49

CZECH REPUBLIC **FLUIDTECHNIK BOHEMIA s.r.o.** BRNO

brno@fluidbohemia.cz
Tel +420 548 213 233-5

DENMARK **ARMATEC A/S** COPENHAGEN

jo@armatec.dk
Tel + 45 46 96 00 00

EGYPT **ATEB** ALEXANDRIA

gm@atebco.com
Tel +203 582 76 47

FINLAND **TALLBERG TECH OY AB** ESPOO

info@tallberg.fr
Tel +358 0 207 420 740

GREECE **PIMES Entreprises Ltd** ATHENS

ioannis.pappas@pims.gr
Tel +30 210 608 61 52

HUNGARY **APAGYI TRADEIMPEX KFT** BUDAPEST

bela.apagyij@mail.tvnet.hu
Tel +36 1 223 1958

MOROCCO **AQUATEL sari** CASABLANCA

aquatel@wanadoo.net.ma
Tel +212 22 66 55 71

POLAND **ARNAP** BIELSKO-BALA

Sales@arnap.pl
Tel +48 33 81 84004

POLAND **MARCO** VARSOVIE

matzanke@pol.pl
Tel +48 22 864 55 43

SOUTH AFRICA **A-Q-RATE AUTOMATION CC** BERTSHAM

aqr@wol.co.za
Tel +27 11 432 58 31

SWITZERLAND **MATOKEM AG** ALLSCHWIL

info@matokem.ag
Tel +41 61 483 15 40

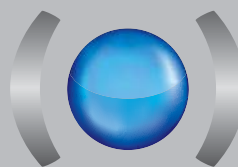
TURKEY **OTKONSAS** ISTANBUL

sales@otkonsas.com
Tel +90 216 326 39 39

UNITED KINGDOM **ZOEADALE Pic** BEDFORD

enquiries@zoedale.co.uk
Tel +44 12 34 83 28 28

Exhaustive list of agents
and distributors on
www.bernardcontrols.com



BERNARD CONTROLS

//////////////////// Invest in Confidence //////////////////////

BERNARD CONTROLS SA
4 rue d'Arsonval - B.P. 70091
95505 Gonesse CEDEX France
Tel.: +33 (0)1 34 07 71 00
Fax: +33 (0)1 34 07 71 01
mail@bernardcontrols.com
www.bernardcontrols.com