(●)

BERNARD®
CONTROLS

MOTORIZED VALVES FIELDBUS

SMARTCONTROL SC212

(●)
BERNARD
CONTROLS

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

New

Fieldbus Solution
SMART CONTROL

> Smart Control
Powerful control interface
for large quantities of motor operated valves

MS202e

SC2X2

Product overview

Compact
> Single enclosure for the redundant controllers

Built-in webserver
> Many functionalities directly available

MOTORIZED VALVES FIELDBUS CONTROL

SMARTCONTROL SC212

BERNARD CONTROLS

Stainless steel front door
> 1.5mm thick

User-friendly interface
> easy to operate (activate/deactivate MOV)

Extra-large display
> with touch screen
> vivid colours

Product benefits

• Compact & Efficient

> Our SmartControl is a compact and powerful device, i.e., the redundant controllers are housed in a single enclosure.

> Both SC2X2 and MS202e have faster data rate compared to conventional systems. It needs only one to five second(s) to scan the entire installation while being able to send simultaneously multiple orders.

> Hot Standby Redundant : in a dual-redundant configuration, both processors are running continuously with their program scans synchronized over the fiber optic link. If one processor fails, the other takes control with a bumpless transfer in which the outputs do not change state.

• Easy to use and to configurate

> Our SmartControl is a ready-to-work solution which eases the command and control of large quantities of motor operated valves by the mean of a fieldbus. It will help you saving time and resources. Because BERNARD CONTROLS Master Station is already set up, you will save precious time during the commissioning phase. Just cable it and the system is ready to work.

> Easy to use thanks to the extra-large panel-mounted display with touch screen and vivid colours.

> Build in webserver: no gateways or other webserver are required. All these functionalities are directly available in the SmartControl : operate the valve, retrieve data and alarms, log the data...

• The SmartControl makes the maintenance easier

> INTELLI+® advanced control solution provides users with a great deal of information to help with system diagnosis and aid in scheduling valves' preventative maintenance. Combined with the SmartControl you benefit then from a system which monitors easily and continuously every actuators of your installation.

> Remove actuator without line interruption, thanks to Bernard Controls BU box (see dedicated focus on p.3).

> The system is capable to display all diagnostic alarms including those for actuators, network Diagnostics shall also identify and display the exact location of network fault. It has its dedicated self-diagnostic features to find out faults like cable fault (for cable open and cable short or grounded), communication failure, faults, alarms, etc.) and it has real time clock to monitor alarm events/data/faults and it should be in sync with clock (if MODBUS TCP, else if MODBUS RTU link to DCS/PLC, clock is manually set).

> Maintenance is also made easier thanks to the archiving of alarms, 64MB data loging memory directly in the Master Station.

• For each application, our suitable innovation

> Different configuration of SmartControl to fully answer your needs and to fit at best your requirements.

> MS202e model : dual redundant configuration, supports Profibus DPV1 to connect BC actuators in the field, up to 120 actuators, 3s to scan 120 actuators (10km)...

> SC2X2 model :Modbus loop redundancy to allow a Modbus network, with all its slave MOVs, to be connected in a ring. This will create self-healing ring where a line break will not cause any slave MOV to lose communication with Modbus Master. Up to 240 actuators, between 16 and 20 msec to scan 120 actuators (10km).

• Our SmartControl supports Advanced Monitoring and Diagnostics for Predictive Maintenance

> Advanced monitoring and diagnostic functions thanks to INTELLI+® Integrated Control: Emergency Shut Down (ESD), Partial Stroke Test (PST), programmable timer, alarm customization, programmable signaling relays, operation monitoring...
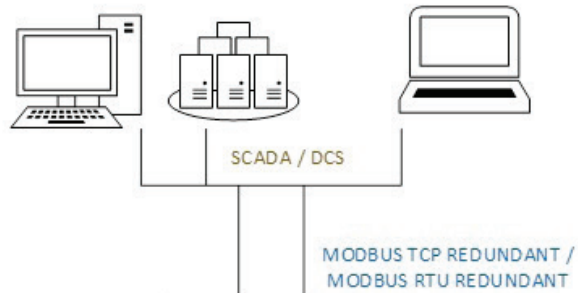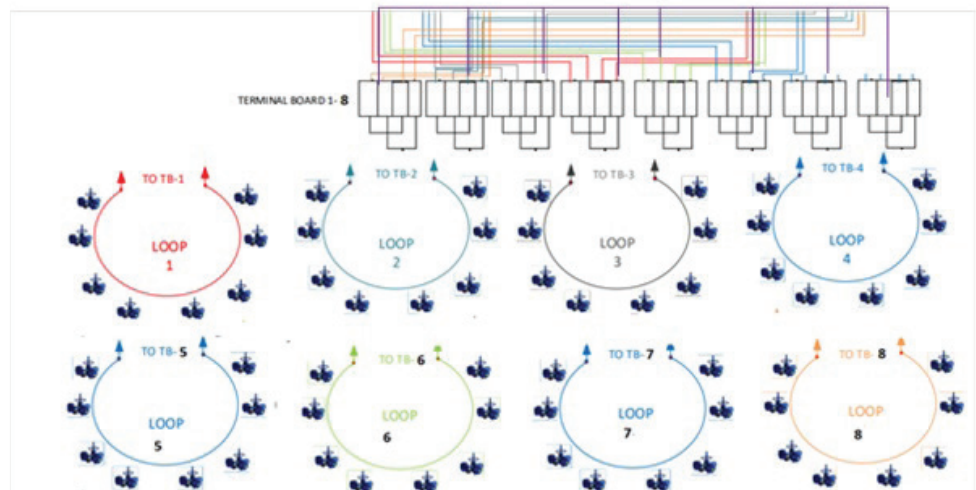
› SMARTCONTROL SC2X2

Multiple Independent networks mean easy identification of line fault, easy maintenance and troubleshooting.

Advanced Features

- > Hot Standby Redundancy
- > Less Components
- > Less Cabling / Single Channel
- > No external repeaters required
- > Compact / Single Enclosure
- > Bigger Display/ 10" Panel-mounted HMI
- > Built-in Webserver from HMI
- > Non-proprietary, open protocol
- > Faster data rate than conventional systems
- > Multiple independent redundant networks
- > Easy operation, fault finding and maintenance

SCADA / DCS

MODBUS TCP REDUNDANT /
MODBUS RTU REDUNDANT

MODBUS RTU (REDUNDANT SERIAL CONNECTIONS TO
CONTROLLER)

TERMINAL BOARD 1- 8

TO TB-1   LOOP 1
TO TB-2   LOOP 2
TO TB-3   LOOP 3
TO TB-4   LOOP 4
TO TB-5   LOOP 5
TO TB-6   LOOP 6
TO TB-7   LOOP 7
TO TB-8   LOOP 8

2 options available

Compact version

19" RACKMOUNTABLE
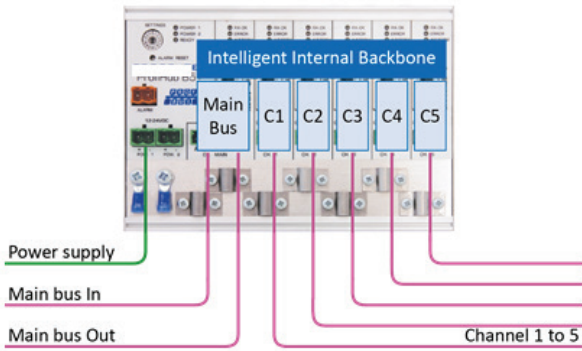1 loop of maximum 240 MOVs allowing for
max 1km between two actuators.

Standard version

Max of 8 loops with 240 MOVs allowing
for max 1km between two actuators.
Cabinet design can be customized.

› SMARTCONTROL MS202e

Intelligent Internal Backbone

Main Bus | C1 | C2 | C3 | C4 | C5

Power supply
Main bus In
Main bus Out
Channel 1 to 5

Advanced Features

> Repeaters can also be used to get additional fieldbus lines if placed at PLC output. Each line is independent from the others and therefore a problem on a line does not affect the others.
> Each network / spur length can range up to 1200 m depending on transmission speed, i.e., 9.6kbps to 12 Mbps, 31 devices per channel.
> No limit in serial placement or cascading of Profihubs but limited by bus parameters e.g., in BC limited to 4 Profihubs to have max 20 networks.
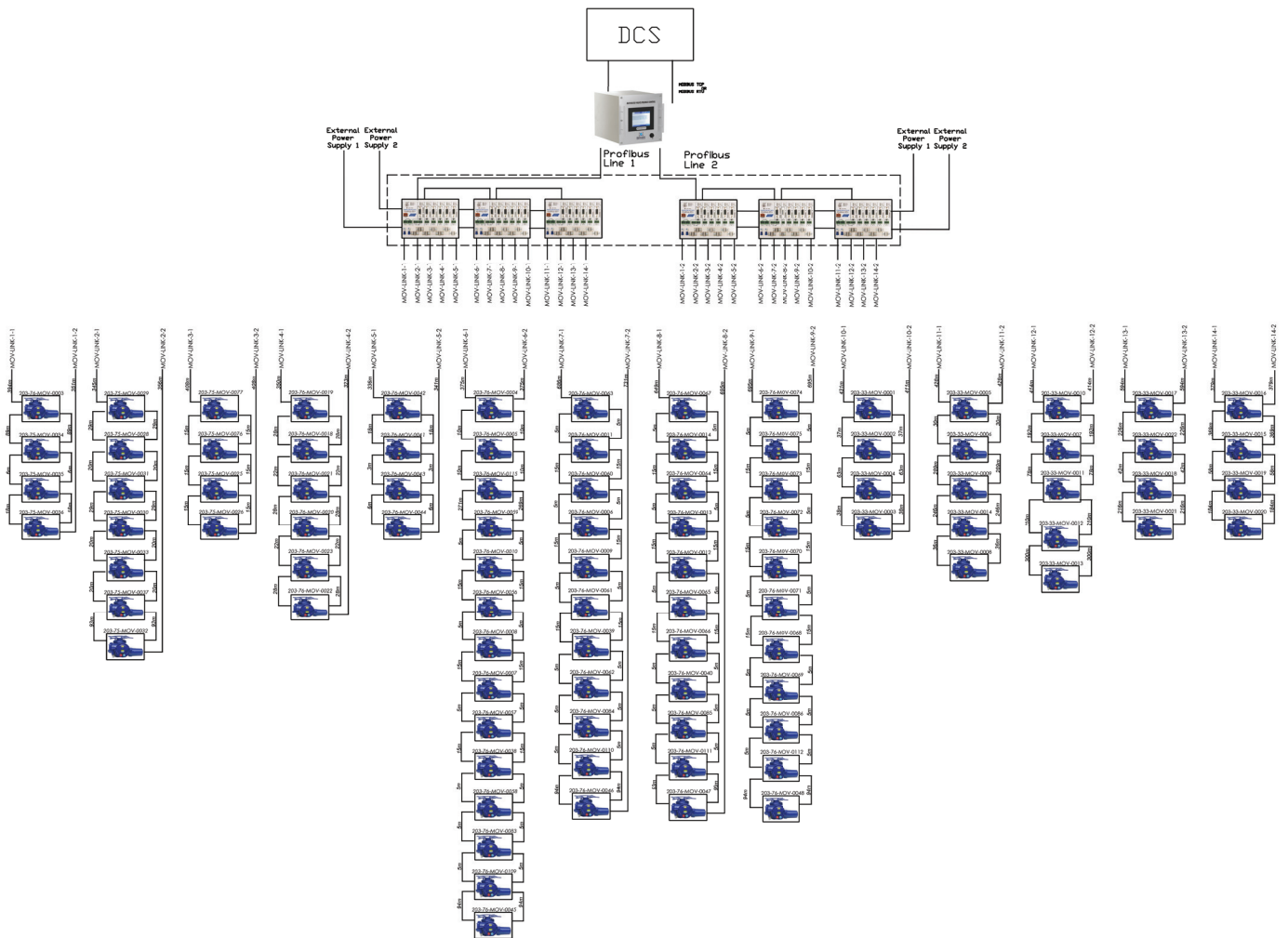
# › Removing an actuator without line interruption
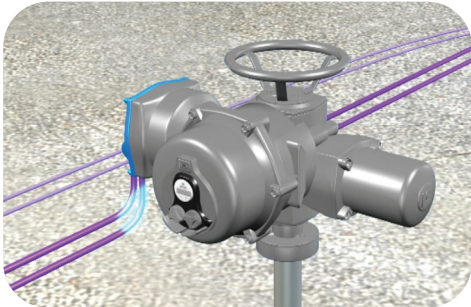
Fieldbus is advantageous because it allows getting more information while reducing the overall wiring on site. However, when you break up the continuity of the line, for instance because of one actuator being retrieved from the field for maintenance, your whole installation is affected since the signal cannot circulate anymore.

BERNARD CONTROLS actuators can host a special Modbus/Profibus connection board[1]. It is 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**.
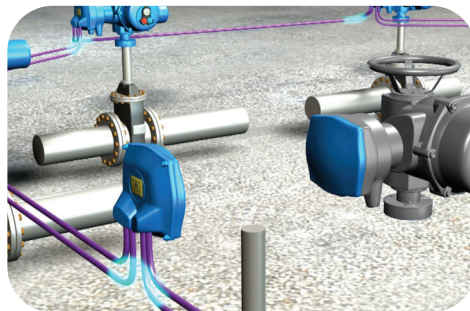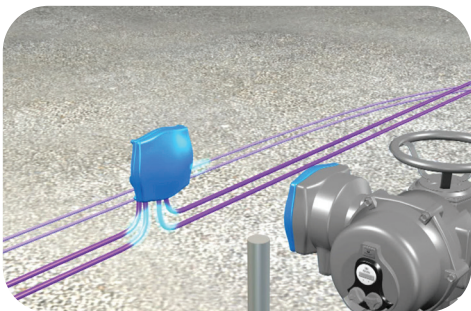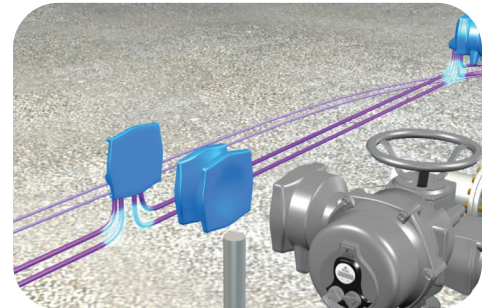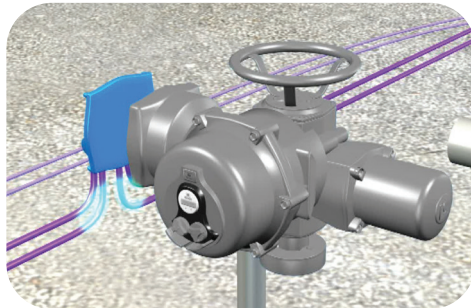
Maintenance is then **facilitated since you can disconnect an actuator for repair or replacement, while maintaining signal transmission.**
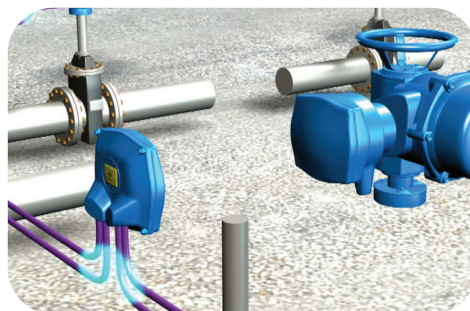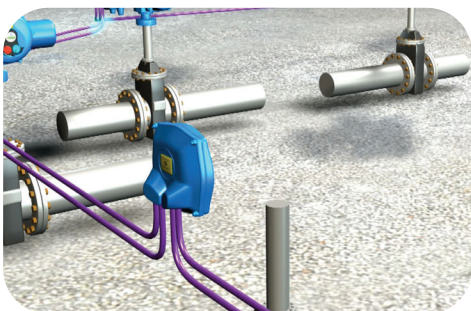
1 - Standard on Explosionproof actuators, on option for Waterproof actuators.

BERNARD® CONTROLS

PRODUCT SPECIFICATIONS

	MS202e	SC2X2
REDUNDANCY	Hot standby redundancy, bumpless switchover in msec as standard	Hot standby redundancy, bumpless switchover in msec as standard
COMPACT & COMPETITIVE DESIGN	Redundant, total of 2 racks is housed in a single enclosure as standard	Redundant, total of 2 racks is housed in a single enclosure as standard
DATALOGGING MEMORY SIZE CAPABILITY	64MB built-in program memory	• 64MB built-in program memory • 5GB memory expansion
HOUSING	• Installation in 19" rackmount • Dimensions: 500Lx465Wx400H as standard (can be customized) • Integral 10" multitouch screen as user interface • Material : Mild Steel 1.5mm thick RAL7035 Finish, body and door rear • Stainless Steel SS316L 1.5mm thick front door • Mounting Plates: 2.0mm thick • 2 Nos of Grommet holes at bottom side Optional • Installation on control cabinet	• Installation in 19" rackmount • Dimensions: 500Lx465Wx400H as standard (can be customized) • Integral 10" multitouch screen as user interface • Material : Mild Steel 1.5mm thick RAL7035 Finish, body and door rear • Stainless Steel SS316L 1.5mm thick front door • Mounting Plates: 2.0mm thick • 2 Nos of Grommet holes at bottom side Optional • Installation on control cabinet • Customised panel dimension, wall mounted, floor standing (multiloops)
WEIGHT	<30 kg (2 controllers in single housing)	• Standard version: <30 kg (2 controllers in single loop) • Compact version: <60kg (multiloop, single housing)
CONTROL PANEL	• Check the Masterstation status • Configure Masterstation (IP address, gateway...) • Check actuators status (alarms, signalling...) • Configure actuator (Aux commands, Alarms...)	• Check the Masterstation status • Configure Masterstation (IP address, gateway...) • Check actuators status (alarms, signalling...) • Configure actuator (Aux commands, Alarms...)
DIAGNOSTICS	Diagnostics of Each module component as standard	Diagnostics of Each module component as standard
CONFIGURATION	• Easy to configure • Easy to maintain	• Easy to configure • Easy to maintain
OPERATION	Standalone operation (without host) as standard	Standalone operation (without host) as standard
WEB SERVER SUPPORT	Web Server Support as standard	Web Server Support as standard
INTEGRATION	Easy Integration, with no gateways required	Easy Integration, with no gateways required
NTP TIME SERVER CONNECTION	As an option	As an option
CYCLE TIME	• Cycle time for 5km and 60 actuators: 1.75s • Cycle time for 10km and 120 actuators: 3s	• Cycle time for 5km and 60 actuators: 3s • Cycle time for 10km and 120 actuators: 5s
ACCESSIBILITY	Customer can access all the functions in autonomy, as standard	Customer can access all the functions in autonomy, as standard

PRODUCT SPECIFICATIONS

	MS202e	SC2X2
COMMUNICATION PROTOCOL	• Between SmartControl and Host /Control System : Modbus RS-485 or MODBUS TCP, Redundant • Between SmartControl and actuators : PROFIBUS DPV1, Line Redundant	• Between SmartControl and Host /Control System : Modbus RS-485 or MODBUS TCP, Redundant • Between SmartControl and actuators : MODBUS RTU, Loop Redundant
SUPPORT	• For Bernard Controls Intelli+® v2 & v3: as standard • For third party actuators : optional	• For Bernard Controls Intelli+® v2 & v3: as standard • For third party actuators : optional
MAXIMUM NUMBER OF ACTUATORS	120 actuators	247 actuators
DATA RATE / LENGTH	/	9,600 baud/10km & 19200 baud /1km
MAX LENGTH	10 kms	10 kms
AMBIENT TEMPERATURE RANGE	0...+50°C / 32 ... +122°F	0...+50°C / 32 ... +122°F
POWER SUPPLY	• 110-240 VAC (±10%) • 50 / 60 Hz	• 110-240 VAC (±10%) • 50 / 60 Hz
POWER CONSUMPTION	40 Watt max. for each controller	40 Watt max. for each controller
MULTIPLE START OF LINE (WITHOUT THE REPEATER)	20 independent redundant networks	8 independent redundant networks
EXTERNAL REPEATER	As an optional	As standard
LIGHTNING PROTECTION (OUTSIDE THE RACK)	As an optional	As an optional
FUTURE PROOF SUPPORT FOR INDUSTRIAL ETHERNET	As standard	As standard
WIRELESS CAPABILITY	As standard	As standard

ADVANTAGES OF BC SMARTCONTROL OVER CONVENTIONAL, PROPRIETARY MOV CONTROL SYSTEM

PROPRIETARY PROTOCOL	MS202e	SC2X2
Redundancy	Hot standby system redundancy	Hot standby system redundancy
Supports field network Pakscan™ Classic current loop	Support field network Profibus DP v1	Support field network Modbus RTU
Single network per unit	Maximum 20 independent networks per unit	Maximum 8 independent networks per unit
Maximum 240 field devices possible	Maximum 120 field devices per field network in Profibus DP v1	Maximum 247 field devices per field network in Modbus RTU (max of 247 MOVs x 8 Loops)
Two separate subsystems for redundancy i.e., each with small screen	Single enclosure with 10" multi function HMI that operates redundant system	Single enclosure with 10" multi function HMI that operates redundant system
SUPPORTED BAUD RATES: 110- 2400 BIT/S @ MAX 20KM *NOTE: Refer next page showing that 240 MOVs with 2400 bps is NOT APPLICABLE. Also that scan time degrades proportionally with the loop length and no. of MOVs with Full Status Update.*	Supported baud rates: 9.6kbps – 12Mbps @ 10km	Supported baud rates: 9.6 – 115.2 kbit/s @ 10km without any external repeater & max allowable 1km distance between two actuators *NOTE: Refer next page showing that 247 MOVs with 9.6 kbps is ATTAINABLE. Also that REPORT BY EXCEPTION scan times are shown i.e., when no changes in MOV status have occured.*
Dimensions (W x H x D): 482 x 177 x 230 mm	Dimensions (W x H x D): 485x400x500 mm	Dimensions (W x H x D): 485x400x500 mm
Redundant HYBRID CURRENT loop topology	Redundant line topology (PROFIBUS communication)	Redundant loop topology (MODBUS communication)
Proprietary protocol	Profibus is open protocol, non proprietary	Modbus is open protocol, non proprietary
Communication to the host is established via RJ45 Ethernet with MODBUS TCP	Communication to the host is established via RS-485 with Modbus RTU or RJ45 Ethernet with Modbus TCP	Communication to the host is established via RS-485 with Modbus RTU or RJ45 Ethernet with Modbus TCP

COMPARISON ON SCAN TIME VS LOOP LENGTH OF SC2X2 & PROPRIETARY SYSTEM

BC SMARTCONTROL (MODBUS RTU)

		Number of MOVs in Loop					
		60		**120**		**240**	
Baud Rate *Bits/sec*	**Time to Issue Command** *(mSec)*	**Loop Length** *(km)*	**Scan Time** *(Sec)*	**Loop Length** *(km)*	**Scan Time** *(Sec)*	**Loop Length** *(km)*	**Scan Time** *(Sec)*
Report-by-Exception Polling							
9600 Fixed	<30	>100	1.4	>100	2.8	>100	4.8
Full Status Update - All Units							
9600 Fixed	<30	>100	1.9	>100	3.5	>100	6.9

NOTE: 240 MOVs with 9.6 kbps is FIXED with loop length >100km. Also that REPORT BY EXCEPTION scan times are shown i.e., when no changes in MOV status have occured.

PROPRIETARY SYSTEM

		Number of MOVs in Loop					
		60		**120**		**240**	
Baud Rate *Bits/sec*	**Time to Issue Command** *(mSec)*	**Loop Length** *(km)*	**Scan Time** *(Sec)*	**Loop Length** *(km)*	**Scan Time** *(Sec)*	**Loop Length** *(km)*	**Scan Time** *(Sec)*
Report-by-Exception Polling							
110	432	20.3	9.8	20.3	24.8	20.3	54.9
300	218	17.1	3.8	15.9	9.2	13.7	20.4
600	108	12.2	1.8	11.1	4.51	8.8	10.2
1200	54	4.4	0.9	2.9	2.3	0.8	5.1
2400	27	1.5	0.5	0.3	1.25	N/A	N/A

NOTE: Max 240 MOVs with 2400 bps is NOT ATTAINABLE at all. Scan time degrades proportionally with the loop length and no. of MOVs that requires Full Status Update.

Solutions Overview

NEW RANGES OF ACTUATORS
AQ, AQL, AQXL, AT & BT

NEW MOBILE APPLICATION BC APP
The only application that allows not only to set up your actuator in a few clicks, but also to improve the reliability of your process thanks to key features and data for preventive maintenance. Compatible with our new controls: **LOGIC (v2)** & **INTELLI+® (v3)**

SCANN THE QR CODE & WATCH
BCAPP VIDEO HERE

WEATHERPROOF RANGES

FIRST BC — LABEL

The essentials

Quarter-turn AQL RANGE
ULTRA COMPACT
- 15 to 70 Nm (direct mount)
- Type of Controls: **> Electromechanical SWITCH**
- BC Duty & Modulating Classification

| On-Off | A | Inching Positioning | B |

- Environment:
  - > IP 68 / C4 (High paint protection option C5)
  - > T: -20°C ...+60°C

Quarter-turn AQ RANGE
COMPACT & SMART
- 50 to 10,000 Nm (up to 800 Nm direct mount)
  Up to 1,000,000 Nm on request
- Type of Controls: **> Electromechanical SWITCH**
  > Smart LOGIC (v2)
- BC Duty & Modulating Classification

| On-Off | A | Inching Positioning | B | Modulating | III |

- Environment:
  - > IP 68 / C4 (High paint protection option C5)
  - > T: -20°C ...+70°C (Low T° option -40°C)

Multi-turn AT RANGE
COMPACT & SMART
- 30 to 500 Nm (direct mount) | *Up to 32,000 Nm on request*
- 10 to 180 rpm (direct mount)
- Type of Controls: **> Electromechanical SWITCH**
  > Smart LOGIC (v2)
- Wiring: **> Screw Type Terminal**
- BC Duty & Modulating Classification

| On-Off | A | Inching Positioning | B | Modulating | III |

- Environment: > IP 68 / C4 (High paint protection option C5)
  - > T: -20°C ...+70°C (Low T° option -40°C)
- Linear applications

EXPLOSIONPROOF RANGES

Quarter-turn AQXL RANGE
ULTRA COMPACT
- 40 Nm and 70 Nm
- Compliance with international explosionproof standards: ATEX, IEC-Ex, NEMA 7...
- Type of Controls: **> Electromechanical SWITCH**
- BC Duty & Modulating Classification

| On-Off | A | Inching Positioning | B |

- Environment: IP 68 / C4 (C5 on request) / T: -20°C ...+60°C
- Linear applications

WEATHERPROOF RANGES

BC PREMIUM — LABEL

FLEXIBLE & MODULAR

The dedicated solutions

Multi-turn BT RANGE
COMPACT & COMPLETE
- 30 to 500 Nm (direct mount) | *Up to 32,000 Nm on request*
- 10 to 180 rpm (direct mount)
- Type of Controls: **> Smart INTELLI+®(v3)**
- Wiring: **Double-sealing as standard**
  - > New terminal plate with pins for easy wiring
  - > Quick Connector
- **Advanced BC Duty & Modulating Classification**

| On-Off | A+ | Inching Positioning | B+ | Modulating | III+ |

- Environment: > IP 68 / C4 (High paint protection option C5)
  - > T: -20°C ...+70°C Low T° (Low T° option -40°C)
- Linear applications

SPECIAL REQUESTS

Quarter-turn SQ RANGE
- 45 to 10,000 Nm (up to 800 Nm direct mount) | *Up to 1,000,000 Nm on request*
- With type of Controls: > Smart INTELLI+®(v2) With Fieldbus Redundant ...
  - > SIL2
- Wiring: Double-sealing with INTELLI+

Multi-turn ST RANGE
- 60 to 2,200 Nm (direct mount) | *up to 20,000 Nm on request*
- 10 to 120 rpm (direct mount) | High speed: up to 190 rpm (direct & <300Nm)
- With type of Controls: > Smart INTELLI+®(v2) With Fieldbus Redundant ...
  - > SIL2

CUSTOMIZED DESIGN & PROJECTS:
At any time and anywhere on the globe, BERNARD CONTROLS teams are available for dedicated support. From the design stage to installation, commissioning, maintenance and training, our experts help you to define and implement the most appropriate solution to your specific needs thanks to our local R&D centers, test labs, calculation tools and training center.

STRONG CUSTOMER SUPPORT

EXPLOSIONPROOF RANGES

Quarter-turn & Multi-turn SQX & STX RANGES
- **SQX**: 80 to 800 Nm (direct) & up to 1,000,000 Nm on request
- **STX**: 25 to 2,200 Nm (direct) & up to 20,000 Nm on request
- Compliance with international explosionproof standards: ATEX, INMETRO, IEC-Ex, EAC-Ex, NEMA 7 & 9...
- Type of Controls: **> Electromechanical SWITCH**
  > Hardwired
  > Smart INTELLI+® (v2)
  > SIL2
- BC Duty & Modulating Classification

| On-Off | A+ | Inching Positioning | B+ | Modulating | III |

- Environment: IP 68 / C3 up to C5-M / T: -20°C ...+70°C (low T° option: -60°C)
- Special configurations: Corrosion protection, Fire proofing, Extreme temperatures

FAILSAFE RANGES

Quarter-turn Failsafe Actuators FQ RANGE
Fast and shock-free reliable spring-return technology during emergency operation
- BC Duty & Modulating Classification

| On-Off | A | Inching Positioning | B | Modulating | III |

- Environment: IP 67 / C3 / T: -20°C ...+70°C (low T° option -40°C)

Failsafe Actuators FQX RANGE
- Explosionproof versions ATEX-NEMA

Quarter-turn & Linear Failsafe FSeX RANGE
The complete combination of modern electrics and power of hydraulics
- BC Duty & Modulating Classification

| On-Off | A | Inching Positioning | B | Modulating | III |

- Environment: IP 67 / C4 / T: -20°C ...+60°C
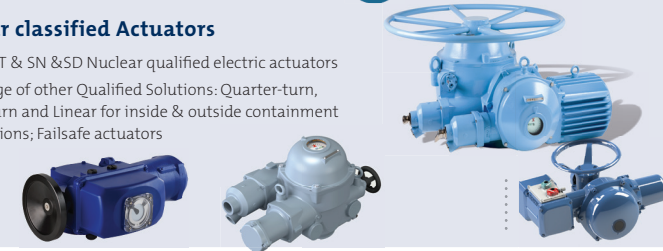- ATEX-NEMA, SIL3

NUCLEAR RANGES

Nuclear classified Actuators
- SQN & ST & SN & SD Nuclear qualified electric actuators
- **+** Full range of other Qualified Solutions: Quarter-turn, Multi-turn and Linear for inside & outside containment applications; Failsafe actuators

NEW GENERATION OF SMART CONTROLS

LOGIC (v2)
The main functions you expect from modern integrated controls

INTELLI+® (v3)
Advanced control solution for your critical applications!

BERNARD CONTROLS GROUP

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