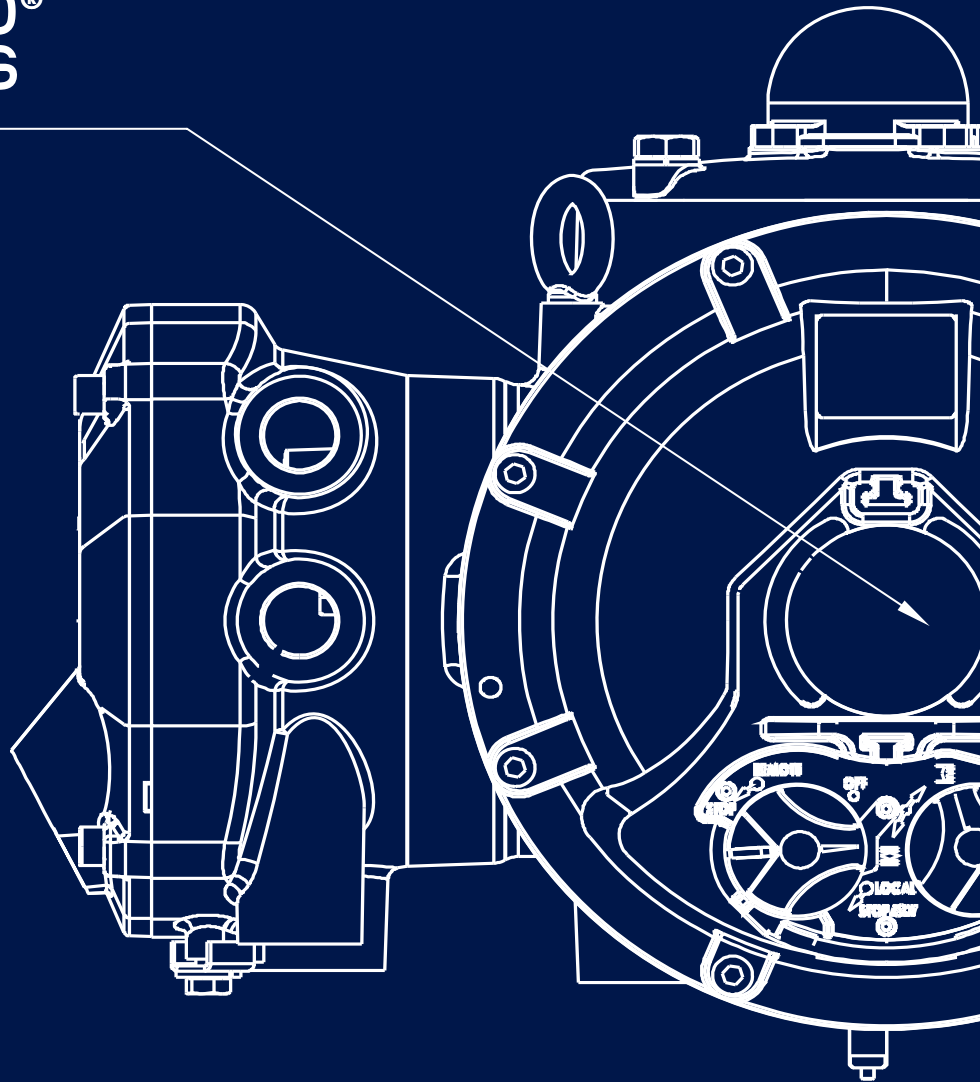


LABEL



**BERNARD[®]
CONTROLS**



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

New

Special Design & Expertise
Fail-safe Electric Actuators

FSE RANGE

> FSE range

The complete solution for fail-safe electric actuation



Product overview

Mechanical position indicator

- > As an option
- > Check the position of your valve at a glance



Cable entries

- > 7 cable entries as standard
- > Separate and segregated double sealed terminal enclosure

Spring

- > Together with the configurable ESD function, ensures fail close, fail open or fail freeze options

Removable lever for manual operation

- > As an option



Large LCD display

- > For user-friendly commissioning and local commands
- > Clear status, no abbreviations
- > Includes pressure indication

User-friendly local commands

- > through 2 buttons
- > Can be inhibited remotely

Hydraulic cylinder

- > High pressure device to provide a smaller, more compact solution

Oil circuitry

- > Considerably minimized
- > Reduced risks of leakage

Product benefits

THE COMPLETE COMBINATION OF MODERN ELECTRICS AND POWER OF HYDRAULICS

• Security at all levels & Easy maintenance

- > Protect your installation and maximize site protection, thanks to BERNARD CONTROLS actuators' smart functions
- > In case of power failure to the solenoid, the spring will drive the FSE and valve to the safety position. When the power supply is restored (no resetting of the spring is required), the actuator is immediately available for normal operation
- > Partial stroking : check the availability of the connected MOVs by executing of a very short return travel, and get a warning if problems occurs.
- > Easy to install : the FSE is self contained, it only requires electrical power
- > Reduced maintenance : actuators are lubricated for the product lifetime and do not require any periodic maintenance
- > Extending life time of the valve : no "Hard Closing", slamming the Valve into the seat
- > Fieldbus available as an option, including common market standard protocols : Profibus, Modbus, Foundation Fieldbus, Hart...

• Unique design & enhanced performances

- > IP67, double-sealing protection, coating C5-M as standard
- > Address all type of applications: wide torque range from 25Nm to 700 000Nm for rotary and from 1.2 up to 8 000 kN force for linear actuator.
- > Compact and optimized design, reduced complexity with increased

- flexibility & functionality: no need of air compressors, filtration and dryer, no multiple leak paths
- > Easy control system: all components are integrated in the manifold
- > A considerably minimized and enclosed oil circuitry to ensure zero leakages and no external contamination
- > Very precise hydraulic control
- > No mix of hazardous area equipment, EEx d, EEx ia components, with multiple cables & termination points

• User-friendly & intuitive controls

- > No complex control systems, with multiple products for the manifold system
- > Non intrusive settings thanks to the integrated control
- > LCD display gives a clear status of the actuator and of the control system, including pressure indication. Menu guided settings using clear messages, without abbreviations
- > 2 LEDs (red/green, freely assigned) indicate the position (close/open) at ends of travel, and direction of running (blinking)
- > Local commands with two selectors, which can be inhibited remotely if needed
- > Advanced monitoring and diagnostic functions of the integrated control: Emergency Shutdown (ESD), Partial Stroke Test (PST), timer, alarm customization, operation monitoring...

What is fail-safe ?

The activation of an emergency signal triggers the immediate opening, closing or freeze of the backup device, without the need of any external power source and using a full mechanical spring return.

PRODUCT SPECIFICATIONS - FSE RANGE

GENERAL	Description	<p>The FSE range has been specially designed for applications where the risks are such that, driving the device to its safety position must be possible at any time, even in the absence of power supply.</p> <p>With the combination of modern electrics and power of hydraulics, Bernard Controls FSE is specifically well adapted for ESD valves such as high-pressure ball-valve or triple-offset butterfly valves.</p>
	Torque range	From 25 to 600 000 Nm for rotary and from 1.2 to 8 000 kN force for linear actuator
	Duty Classification	<p>Adapted to process requirements:</p> <ul style="list-style-type: none"> • On-Off: Class A actuators complying with EN15714-2 • Inching/Positioning: Class B actuators complying with EN15714-2 • Modulating: Class III actuators complying with EN15714-2
ENCLOSURE - PROTECTION	Casing	Aluminium casting
	External Protection	<ul style="list-style-type: none"> • Type: Polyurethane coating • Protection: tested to C5-M environments acc. to ISO 12944 (Higher protection on request) • Option: highly corrosive conditions • All cover fasteners are captive and stainless <p>Other colors and finishes, please consult us</p>
	Weatherproofness	IP67
	Ambient temperature range	<ul style="list-style-type: none"> • -20...+60°C / -4 ... +140°F • High temperature option +70°C / +158°F • Low temperature option -50°C / -58°F
	Vibration resistance	1g (9.8 m/s ²) at 10-500 Hz. For higher vibration levels, please consult us
	Explosionproof ATEX	ATEX Directive 2014/34/EU - CENELEC EN60079-0, EN60079-1, EN80079-36, EN80079-37 As standard: Ex d II B T5
	Explosionproof IEC Ex	IEC Ex - standard IEC60079-0, IEC60079-1, IEC80079-36, IEC80079-37 As standard: Ex d II B T5
MOTOR	Motor technology	TEFV design (Totally-enclosed, not ventilated) 3-phase or single-phase asynchronous motor, Class F insulation and Class B temperature rise; integrated thermal overload protection.
	Motor duty rating	<ul style="list-style-type: none"> • On/Off operation (Class A): S4-30% - up to 360 starts per hour at peak of operation. • Inching/Positioning (Class B): S4-30% motor duty rating. Up to 360 starts per hour at peak of operation. • Modulating (Class III): S4-50% motor duty rating. Up to 1 200 starts per hour at peak of operation.
MECHANICAL SPECIFICATIONS	Manual operation	Hydraulic Hand-Pump As an option
	Lubrication	The actuators are lubricated for the product lifetime and do not require any periodic maintenance.
ELECTRICAL SPECIFICATIONS	Power supply	<p>The actuators can operate on a wide variety of power supplies (see detail on technical handbook):</p> <ul style="list-style-type: none"> • single-phase or 3-phase, DC • up to 690 V • 50 or 60 Hz
	SPECIFICATIONS	<ul style="list-style-type: none"> • Ring tongue terminals • Internal and external earth ground rod.

PRODUCT SPECIFICATIONS - FSE RANGE

ELECTRICAL SPECIFICATIONS	Cable entries	<ul style="list-style-type: none"> • 6xM20 + 1xM25 For other configurations, please consult us
POSITION AND PRESSURE SENSORS	Position sensors	Potentiometer
	Pressure sensors	Piezoresistive pressure transducers based on ceramic
CONTROLS	Visual position indication	<ul style="list-style-type: none"> • A LCD screen to display the position, the pressure and alarms. • Mechanical position indicator (option)
	Local command description	<ul style="list-style-type: none"> • 2 buttons (padlockable selector) • A large LCD screen to display the position, the pressure and alarms and to perform the settings • Green/Red: Configurable LED for CLOSED/OPEN • Blue: LED for Alarm
	Controls location	As standard, the control is integrated into the actuator.
	Analogue Control: Positionner (option)	Input (setpoint) and output (feedback) signals are fully isolated from each other Signal configurations : <ul style="list-style-type: none"> • Input signal: 4-20 mA - output signal: 4-20 mA
	Emergency Shutdown (ESD)	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.
CONTROLS	Partial Stroke Test	Enables 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. A warning is generated in event of problems occurring during this test.
	Remote command	<ul style="list-style-type: none"> • ESD : 230V AC 50/60Hz - 22 watts et 24VDC • PST : 20-60V AC/DC or 60-120V AC • OPEN/CLOSE : 20-60V AC/DC or 60-120V AC
	Double sealing protection	The control compartment of the actuator is fully isolated from the wiring compartment
	Transmitter (option)	Position & Pressure transmitter Position output signal: 4-20mA
	Signal relay	7 relays + fault : each information can be freely selected <ul style="list-style-type: none"> • Contact configuration: normally open or normally closed • Minimum current 10mA at 5V • Maximum current 5A at 160VAC or 5A at 30VDC (resistive load) Additional 3 relay boards on option.
	Fault relay	<ul style="list-style-type: none"> • SPDT monostable relay, in fault position when not supplied. • Minimum current 10mA at 5V • Maximum current 5A at 160VAC or 5A at 30VDC (resistive load)
	Limit switches	<ul style="list-style-type: none"> • Easily adjustable cams • Minimum current 10mA at 5V
	SIL Assessment (SIL 2 or SIL 3 capability)	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, according to IEC61508 & 61511 standards.
SETTINGS	Settings	Non-Intrusive settings. <ul style="list-style-type: none"> • All actuator settings and parameters are stored in a non-volatile EEPROM memory. Protection by password. • Adjustable via Local control
	Local settings	Can be fully set via its local display and selectors Does not require any specific setting tool

PRODUCT SPECIFICATIONS - FSE RANGE

FIELDBUS	Fieldbus	<ul style="list-style-type: none"> • MODBUS • Foundation Fieldbus • Hart • Profibus
OPTIONS	Options	<ul style="list-style-type: none"> • Highly corrosive conditions • High temperature : +70°C • Low temperature : -50°C • Mechanical position indicator • Hydraulic Hand-Pump • Positionner • Position & Pressure transmitter • Oil temperature • Safety Integrity Level (SIL 3) • Fieldbus communication

> Product selection

FSE00050AAHY0050E0 S0 RO 0 100 A EPC 0 000,2 004

**OperatingTime
Opening**
4 - 300 s.

Fail-Safe Condition
0,2 - 300 s.

ESD Configuration
0=None
A=24 VDC
Single SOV;
B=24 VDC
Dual SOV,
Redundant ¹

Fail-Safe Condition
EPC=ESD & Power Fail - Close;
EPO=ESD & Power Fail - Open

Main Power Supply
A=24VDC; C=1P 110/120 VAC 60Hz;
D=1P 220/240 VAC 50Hz;
F=3P 220/240 VAC 50Hz;
H=3P 380 VAC 50Hz; J=3P 400 VAC 50Hz;
L=3P 415 VAC 50Hz; N=3P 440 VAC 50Hz;
Q=3P 480 VAC 60Hz; S=3P 575 VAC 60Hz;
L=3P 690 VAC 50Hz

Maximum Operating Pressure
100 - 160 bar

Actuator Size

Operation Type
RO=Rotary On/Off

Special version
S0=None; S1= Remote Mount 50m - Rm50

Actuator Type

² Also available for linear applications

001 0 0 8R 0 000 0 0 STO 0 C5M C0 M0

Operating Time Closing
1 - 060 s.

Accumulator

Manual Override
0=None;
H=Handpump

Cable Entries
8R=1"NPT (F)

Indicator
0=None ; M=Mechanical

Internal Limit Switch
000=None ; 1A2=2 SPDT Micro switches

Transmitter (4-20 Feedback)
0=None ; P=Position Transmitter;

Oil Transmitter (4-20 Feedback)
0=None

Temperature
ST0= -20°C to +50°C ; HT1= -20°C to +70°C;

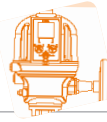
Fildbus Communication
0=None

Painting System
CSM

Certification
C0=None ; C6= ATEX IEC 60079-1;
C10=SIL3 Capability; C11=SIL3 Capability + ATEX IEC 60079-1

Mounting

M0=Vertical stem, Horizontal Pipeline, Actuator Parallel to pipeline ;
M1=Vertical stem, Horizontal Pipeline, Actuator Perpendicular to pipeline² ;
M2=Horizontal stem, Horizontal Pipeline, Actuator Parallel to pipeline ;
M3=Horizontal stem, Horizontal Pipeline, Actuator Perpendicular to pipeline² ;
M4=Horizontal stem, Vertical Pipeline, Actuator Parallel to pipeline ;
M5=Horizontal stem, Vertical Pipeline, Actuator Perpendicular to pipeline²



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)**



WEATHERPROOF RANGES



The essentials



Quarter-turn AQL RANGE

- 15 to 70 Nm (direct mount)
- Type of Controls: > **Electromechanical SWITCH**
- BC Duty & Modulating Classification

On-Off **A** Inching Positioning **B**

- Environment: > IP68 / C4 (High paint protection option C5)
- > T: -20°C ...+60°C

Quarter-turn AQ RANGE

- 50 to 10,000 Nm (up to 1000 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: > IP68 / C4 (High paint protection option C5)
- > T: -20°C ...+60°C (Low T° option -40°C)

Multi-turn AT RANGE

- 30 to 500 Nm (direct mount) | Up to 32,000 Nm on request
- 10 to 127 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: > IP68 / C4 (High paint protection option C5)
- > T: -20°C ...+60°C (Low T° option -40°C)
- Linear applications



WEATHERPROOF RANGES



The dedicated solutions



Multi-turn BT RANGE

- 30 to 500 Nm (direct mount) | Up to 32,000 Nm on request
- 10 to 127 rpm (direct mount) & **high speed: up to 180 rpm (direct)**
- 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: > IP68 / C4 (High paint protection option C5)
- > T: -20°C ...+60°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



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: IP68 / 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: IP67 / 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: IP67 / 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



EXPLOSIONPROOF RANGES



Quarter-turn AQXL RANGE

- 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: IP68 / C4 (C5 on request) / T: -20°C ...+60°C
- Linear applications



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.



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!

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