BERNARD CONTROLS

INTERNATIONAL MID-SIZE BUSINESS

GLOBAL ELECTRIC ACTUATION SPECIALIST

ACTUATION

80 years of experience: Bernard Controls is a leader in the world electric actuation market, number one in the **Nuclear industry** and close partner of the most demanding sectors: **Power - Water - Industry - Oil & Gas.**

Technology: Bernard Controls designs and manufactures electric actuators and control systems for industrial valves' automation. More than mere products, BC offers innovative solutions that assess each type of movement, environment, operation and control requirements, in order to perfectly meet customers' needs. Two product labels guide your selection: **FIRST BC** "The Essentials, in case of moderate environmental and operational constraints". And **BC PREMIUM** "The complete solution, in case of severe environment, demanding operational constraints and critical applications".

Certified and recognized quality: Bernard Controls' products & organization have been **certified according to main international standards** (ISO 9001, ABS, ATEX, EAC CUSTOMS UNION, GERMANISCHER LLOYDS, IEEE, INMETRO, NEMA, RCC-E...) and **approved by the largest prime contractors & industrial players worldwide** (ADNOC, ALSTOM POWER, AREVA, BLUE CIRCLE, ENEL, EDF, ESKOM, GASPROM, GAZ DE FRANCE, KNPC, KOC, LAFARGE, NIOC, PETROBRAS, QATAR PETROLEUM, SAUDI ARAMCO, SHELL, SOFRESID, TRACTEBEL, TECHNIP, TOTAL, VEOLIA...).

DEDICATION

Global partner, always by your side: Bernard Controls is present all over the world and coordinates its activities within **4 Operating Areas** which gathers **17 Operating Units** in Americas, Asia, Europe, India - Middle East - Africa, and **3 Manufacturing Units** in China, France and in the United States. The Group also relies on **more than 50 agents and distributors** throughout the world.

Strong Customer Support: Fromthe design stage to installation, commissioning, maintenance and training, Bernard Controls teams are truly dedicated to your satisfaction and commits to delivering strong customer support everywhere around the globe.

STRONG CUSTOMER SUPPORT

INNOVATION

BC vision is that innovation arises from the ability to adapt. Ability to adapt to markets' needs, to new regulations and to customers' technological and financial requirements. But also ability of teams to adapt to new challenges, new market demands and new working environments in order to work everyday to provide **Service Excellence to clients and partners**.

More information on:
www.bernardcontrols.com

BERNARD® CONTROLS
Invest in Confidence

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BERNARD CONTROLS

COMPANY PROFILE

BERNARD CONTROLS, Industrial Technological Company

BERNARD CONTROLS designs and manufactures **electric actuators and associated control systems.**

World leader in the nuclear sector, BERNARD CONTROLS is one of the top 3 players in the world electric actuation business.

- → **+80** years of experience
- → **40 000** actuators produced per year
- → **1** Corporate Headquarters
- → **17** Operating Units in Asia, Europe, India - Middle East - Africa and Americas
- → **3** Manufacturing Units in France, China, United States
- → **50+** agents and distributors throughout the world
- → **+80 %** of turnover

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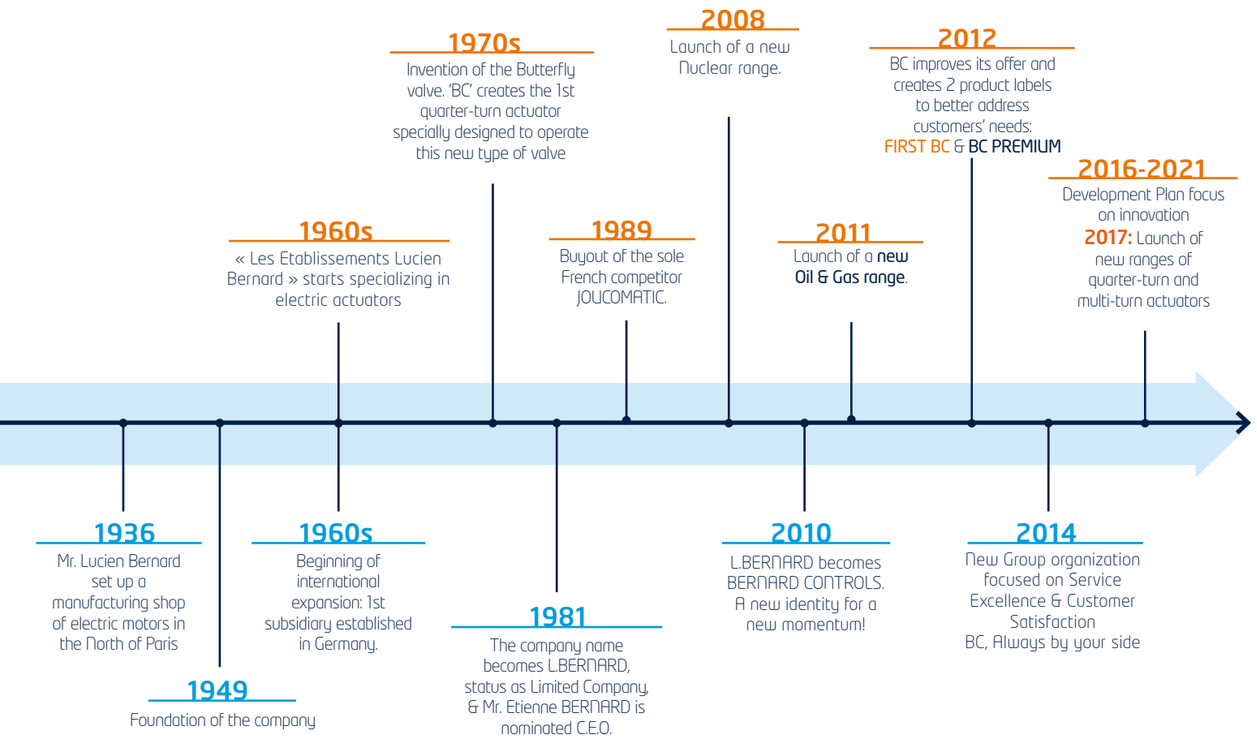
BERNARD CONTROLS

INVEST IN LONG TERM



In the site of La Plaine Saint Denis, North Paris Area, at the end of **1936**, Mr. Lucien BERNARD set up a manufacturing shop of electric motors. The activity, interrupted in 1939, resumed in 1946 after the Liberation. In **1949,** the company was founded and started specializing in the design and manufacturing of electric actuators. In the sixties, a first subsidiary is established in Germany. Quickly, others were created in Europe, then in the United States, in Asia and, more recently, in the Middle-East and Russia.

In the **1970s** a new type of valve called Butterfly emerged in the market but no existing actuator was perfectly adapted to automate it. "Les Etablissements Bernard" then asserted a customer-oriented innovation strategy and created the first compact quarter-turn actuator specially design for this type of valve.

The company name becomes L.BERNARD in **1981**, status as Limited Company, and Mr. Etienne BERNARD is nominated Chief Executive Officer at this date. Followed in **1989,** the building of a new plant in Gonesse - near ROISSY CDG Airport - and the purchase of the actuation activity of the only French competitor, Joucomatic. This buyout, combined with the design of a new product range qualified according to the latest nuclear safety standards in **2008**, allowed the Group to confirm its leading position in the nuclear industry. In **2010**, together with the launch of key technical innovations, the adoption of a new name –BERNARD CONTROLS– settled a strong Group identity. A new momentum confirmed in **2011** with the launch of new electric actuators designed for the Oil & Gas sector, where BC has been in steady growth since then.

In **2012**, we created two product labels FIRST BC and BC PREMIUM, in order to guide customers' choice. These are a new proof of BERNARD CONTROLS' commitment to offer tailor-made solutions to satisfy users' needs. This dedication and this will to place customer satisfaction at the heart of our activity are the roots for a new Group organization implemented in **2014**.

Bernard Controls, always by your side: a global partner supporting its clients in all their projects, everywhere on the world!

Since its beginnings more than 80 years ago, Bernard Controls has earned its leading position in electric actuator technology step by step.

This success is primarily due to our Group's commitments to productivity, innovation, quality and safety. We have respected these commitments without compromise in an increasingly demanding industrial environment. Over the last decade, Bernard Controls has increased the rhythm of its investments and innovations to make it an exemplary group, a group that has maintained and nurtured both the quality of its relationships and its eminent technological reputation.

Recent key dates:

In 2010 we changed our identity to highlight our prowess in controls and, in parallel, we optimised our production and manufacturing processes (Lean Manufacturing).

In 2011/2012 we grew from strength to strength on markets including oil and gas, buoyed by our international leadership on the nuclear market. New offices were also opened in Russia and in the Middle East.

In 2012 /2013, we segmented our offer through the First BC and BC Premium labels to provide technical and economical solutions perfectly adapted to the different sectors who wanted to remain loyal to our brand.

In 2014 we rethought the Group organisation as part of our customer promise of better and faster service. We have created the Strong Customer Support approach to federate Bernard Controls' increasingly asserted sense of service.

In 2015, we propose a Duty and Modulating Classification to guide customers in their product selection, and then get the electric actuator fitting perfectly to their need. With a strong presence in Europe and in Asia, we are also launching a new investment plant in order to establish a strong development in PWI – Power, Water, Industry. A capital increase offers us means to accelerate pace of studies and researches in order to design our new ranges of products by 2017. A new momentum for the Group which perpetuates in this way the transformation from exporting SME to international mid-size business by developing itself quickly on its markets .

In 2017, we take a new leaf and release three new ranges, the AQ, a quarter-turn actuator, and the AT and BT, two multi-turn actuators.

There can be no compromise between high technology and high customer satisfaction.
That is the philosophy behind our mission statement: «Always by your side».

Etienne Bernard
Bernard Controls C.E.O.

For more information about BERNARD CONTROLS, please consult our online brochure: http://www.bernardcontrols.com/fr/bernard-controls/

BERNARD CONTROLS

ELECTRIC ACTUATOR GUIDE

BERNARD® CONTROLS

Invest in Confidence

Solutions always by your side

2 labels: total solutions for your applications

The automation of industrial machinery and equipment addresses human and financial challenges of security and productivity.

Our leadership in the nuclear market with more than 120 reactors installed worldwide and our continuous experience from the 70's have shaped our expertise and our control of processes.

Our understanding of industrial processes drives the design and manufacturing of our electrical actuators. Our vision of controls furthers the appearance of solutions fully adapted to markets' evolutions and to our customers' budgetary and technological requirements.

That is why our electromechanical profile has developed into an expertise in the management of evermore complex systems.

BERNARD CONTROLS propose 2 labels which federate well different ranges of actuator solutions:

THE ESSENTIALS

In case of **moderate environmental and operational constraints**, BERNARD CONTROLS has created the FIRST BC label to identify **products and solutions which offer to users The Essentials**: the key functions to **operate your valve safely and efficiently in case of standard applications.**

THE COMPLETE SOLUTION

The BC PREMIUM label guarantees **"The complete solution", with many options and possible configurations to fit at best very specific needs.** It is the guarantee of quality and security for installations' actuation in the case of **severe environment, demanding operational constraints and critical applications.**

Contents

Innovation always by your side

GPS Actuator

The best way to find your electric actuation solution

GPS Actuator is the web application developed by BERNARD CONTROLS that helps you find your way to your electric actuation solution.

As suggested by its name, the GPS function of this application simply drives you to the best solution to your needs, following 5 key steps.

www.gpsactuator.com

Go

Flash this QR code and access BC GPS Actuator!

A dedicated Guide

to define your model of actuator

Using the GPS actuator, you will end up with a range of BERNARD CONTROLS' electric actuators.

This Guide continues the selection process and helps you to finalize your request taking into account all parameters and options.

Review each step of the GPS Actuator selection with comments on the right page. Then, read through data and additional explanations on next pages and fill in the detachable specification sheet at the end of the document.

You will be sure to consider all criteria to select the appropriate actuation solution.

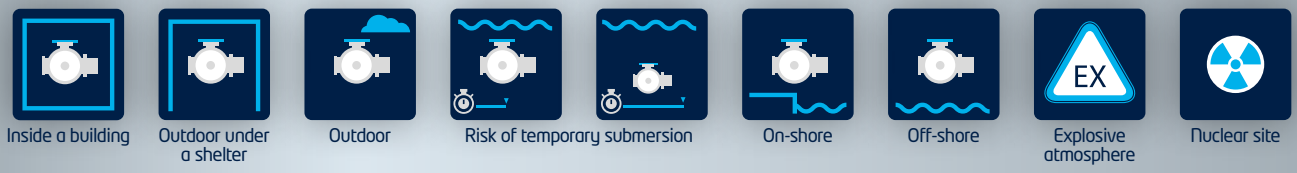
At any time, BERNARD CONTROLS teams are available for support.
From basic quotation to specific design or project design, do not hesitate to contact our sales teams. They can help you to fill in the form and inform about only options or technologies.

STRONG CUSTOMER SUPPORT

1 Movement to operate the valve

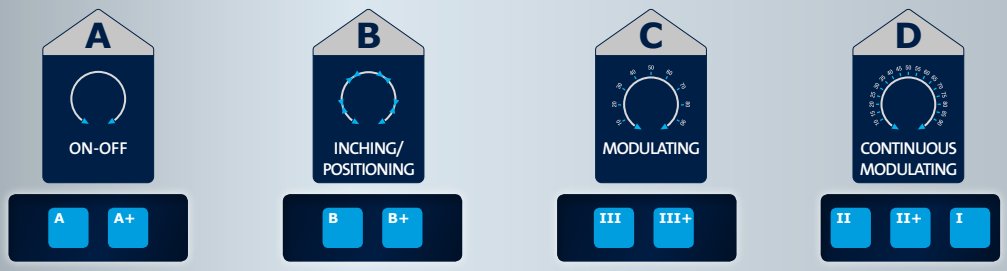
> Movement selection has to be completed with data about your valve to ensure good fitting of the actuator to your valve.

2 Environment



> Location and working environment impose to specify watertightness level, enclosure protection...

3 Operation



> BC GPS Actuator presents Duty and Modulating Classification. More information on pages 6 to 15.

4 Security

5 Control

> Choice of controls has to be completed with options, security requirement, electric connections, signaling information ...

Additional options and information to be selected on the specification sheet at the end.

Focus on Operation

Actuator Duty & Modulating Classification

Operation is a decisive step in your electric actuator selection.
Looking carefully at your process requirement will make the difference.

> Actuator Duty

The EN 15714-2 Standard defines 4 actuator duties with basic design requirements per movement to operate the valve: part-turn, multi-turn and linear.

Class A
On-Off

The actuator is required to drive the valve through its **entire travel from the fully open position to the fully closed position** or vice-versa.

Class B
Inching / Positioning

The actuator is required to **occasionally drive** the valve to any position.

Class C
Modulating

The actuator is required to **frequently drive** the valve to any position between fully open and fully closed.

Class D
Continuous modulating

The actuator is required to **continuously drive** the valve to any position between fully open and fully closed.

Relying on its experience and on years of customers' feedbacks, BERNARD CONTROLS considers that these 4 types of operation must be specified with key criteria in order to define the unique appropriate solution to the process requirement of each customer.

> On-Off & Positioning: Increase ENDURANCE

Considering **On-Off applications (Class A)** and **Inching/Positioning applications (Class B)**, process requirements imply to set ENDURANCE as the decisive criteria. Number of cycles, i.e. life time of the actuator, will make the difference for the customer and his application.

> Modulating & Continuous Modulating: Improve PERFORMANCE

Modulating and Continuous Modulating applications require specific expertise to define the most appropriate solution. For many years BERNARD CONTROLS has been a leader in electric actuation and a forerunner in modulating technology. Our modulating classification (Class III which complies with EN15714-2 Modulating Class C and Classes II & I which comply with EN15714-2 Continuous modulating Class D) is now well-known from our customers and has, in fact, inspired the EN 15714-2 Standard.

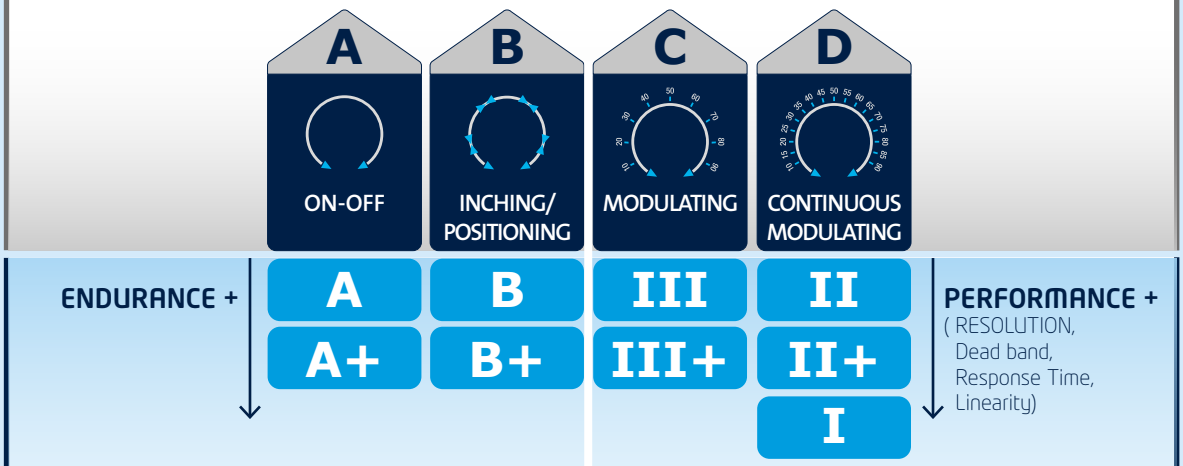
Duty PERFORMANCE is the main criterion to fully address modulating process requirements, but needs to be specified and completed with additional performance criteria.

BERNARD CONTROLS sets 4 additional performance criteria to EN15714-2 basic design requirements:

+ RESOLUTION* **+ Response Time*** **+ Dead Band*** **+ Linearity***

These criteria determine the efficiency of the modulating process.

STANDARD DUTY CLASSIFICATION



BC RESPONSE TO MARKETS NEEDS:

BC offers products for On-Off Class A & Inching/Positioning Class B.

BC also proposes products with **longer lifetime / increased ENDURANCE** : A + & B+.

BC RESPONSE TO MARKETS NEEDS:

BC completes its modulating classification and defines a new segmentation.

BC offers Class III & Class II products and also has a clear definition of solutions for more demanding modulating performances (Classes III+ / II+ / I)

BC DUTY & MODULATING CLASSIFICATION

Find detailed data per movement and classes on next pages and BERNARD CONTROLS product offer with available classes on pages 14 & 15.

DEFINITIONS*

- **RESOLUTION**: the smallest achievable step at the output shaft of the electric actuator.
- **DEAD BAND**: the range through which an input signal may vary, upon reversal of direction, without triggering any observable change in the position of the valve.
- **RESPONSE TIME**: the time needed by the actuator to reach position following an input signal change.
- **LINEARITY**: the percentage of change in input signal must approximate the percentage of the change at the output of the actuator.

Part - Turn Actuator

Design requirements per classes

Actuator duty
STANDARD CLASSIFICATION

Class A
On - Off

ON - OFF Standard Duty Class A		EN 15714 - 2
Torque Nm	Duty Performance cycles per hour	Endurance [1] number of cycles
<126	15	10 000
126 - 1 000	10	10 000
1 001 - 4 000	5	5 000
4 001 - 32 000	5	2 500
> 32 000	5	1 000

(1) *Endurance Test Requirement Standard EN 15714 - 2*

Class B
Inching / Positioning

INCHING / POSITIONING Standard Duty Class B		EN 15714 - 2
Torque Nm	Duty Performance starts per hour	Endurance [1] number of cycles
<126	120	10 000
126 - 1 000	60	10 000
1 001 - 4 000	30	5 000
4 001 - 32 000	15	2 500
> 32 000	5	1 000

(1) *Endurance Test Requirement Standard EN 15714 - 2*

Process Requirements
BC DUTY & MODULATING CLASSIFICATION

ENDURANCE CRITERIA

A

ON - OFF Endurance Class A		
Torque Nm	Duty Performance cycles per hour	Endurance [1] number of cycles
<126	15	10 000
126 - 1 000	10	10 000
1 001 - 4 000	5	5 000
4 001 - 32 000	5	2 500
> 32 000	5	1 000

(1) Endurance Test Requirement Standard EN 15714 - 2

A+

ON - OFF Endurance Class A+		
Torque Nm	Duty Performance cycles per hour	Endurance [2] number of cycles
<126	15	100 000
126 - 1 000	10	30 000
1 001 - 4 000	5	10 000
4 001 - 32 000	5	5 000
> 32 000	5	2 000

(2) Endurance Higher Level than Standard EN 15714 - 2

ENDURANCE CRITERIA

B

INCHING / POSITIONING Endurance Class B		
Torque Nm	Duty Performance starts per hour	Endurance [1] number of cycles
<126	120	10 000
126 - 1 000	60	10 000
1 001 - 4 000	30	5 000
4 001 - 32 000	15	2 500
> 32 000	5	1 000

(1) Endurance Test Requirement Standard EN 15714 - 2

B+

INCHING / POSITIONING Endurance Class B+		
Torque Nm	Duty Performance starts per hour	Endurance [2] number of cycles
<126	120	100 000
126 - 1 000	60	30 000
1 001 - 4 000	30	10 000
4 001 - 32 000	15	5 000
> 32 000	5	2 000

(2) Endurance Higher Level than Standard EN 15714 - 2

DEFINITIONS

- Torque is based on EN ISO 5211
- One cycle consists of nominal 90° angular travel in both directions (i.e. 90° to open + 90° to close), based on an average load of at least 30 % of the rated torque with the ability to transmit 100 % of the rated torque for at least 5 % at each end of travel. For angular travel other than 90°, the endurance shall be agreed between the purchaser and the manufacturer/supplier.
- One start consists of a movement of at least 1 % in either direction, with a load of at least 30 % of the rated torque.
- TBA: To be agreed between manufacturer / supplier and purchaser.

Class C
Modulating

MODULATING Standard Duty Class C		EN 15714 - 2
Torque Nm	Duty (1) Performance starts per hour	Endurance number of starts
<126	1 200	1 800 000
126 - 1 000	600	1 200 000
1 001 - 4 000	300	500 000
4 001 - 32 000	60	250 000
> 32 000	30	T. B. A.

(1) *Duty Performance Standard EN 15714 - 2*

PERFORMANCE CRITERIA

III

MODULATING Performance Class III			Additional performance criteria				
Torque Nm	Duty (2) Performance starts per hour	Endurance number of starts	Resolution % and Number step mini		Dead band % Maxi	Reponse time sec	Linearity %
<126	1 200	1 800 000	<2%	50	±1%	<2s	2%
126 - 1 000	1 200	1 200 000	<2%	50	±1%	<2s	2%
1 001 - 4 000	1 200	500 000	<2%	50	±1%	<2s	2%
4 001 - 32 000	1 200	250 000	<2%	50	±1%	<2s	2%
> 32 000	1 200	T. B. A.	<2%	50	±1%	<2s	2%

(2) Duty Performance Higher Level than Standard EN 15714 - 2

III+

MODULATING Performance Class III+			Additional performance criteria				
Torque Nm	Duty (2) Performance starts per hour	Endurance (2) number of starts	Resolution % and Number step mini		Dead band % Maxi	Reponse time sec	Linearity %
<126	1 200	3 000 000	<1%	100	±0.5%	<2s	2%
126 - 1 000	1 200	2 000 000	<1%	100	±0.5%	<2s	2%
1 001 - 4 000	1 200	1 000 000	<1%	100	±0.5%	<2s	2%
4 001 - 32 000	1 200	500 000	<1%	100	±0.5%	<5s	2%
> 32 000	1 200	T. B. A.	<1%	100	±0.5%	<10s	2%

(2) Duty Performance and Endurance Higher Level than Standard EN 15714 - 2

Class D
Continuous Modulating

CONTINUOUS MODULATING Standard Duty Class D		EN 15714 - 2
Torque Nm	Duty (1) Performance starts per hour	Endurance number of starts
<126	3 600	10 000 000
126 - 1 000	1 800	10 000 000
1 001 - 4 000	600	5 000 000
4 001 - 32 000	N.A.	T. B. A.
> 32 000	N.A.	T. B. A.

(1) *Duty Performance Standard EN 15714 - 2*

PERFORMANCE CRITERIA

II

CONTINUOUS MODULATING Performance Class II			Additional performance criteria				
Torque Nm	Duty (2) Performance starts per hour	Endurance number of starts	Resolution % and Number step mini		Dead band % Maxi	Reponse time sec	Linearity %
<126	3 600	10 000 000	<1.5%	67	±0.75%	<2s	2%
126 - 1 000	1 800	10 000 000	<1.5%	67	±0.75%	<2s	2%
1 001 - 4 000	1 800	5 000 000	<1.5%	67	±0.75%	<2s	2%
4 001 - 32 000	N.A.	T. B. A.	<1.5%	67	±0.75%	<2s	2%
> 32 000	N.A.	T. B. A.	<1.5%	67	±0.75%	<2s	2%

(2) Duty Performance Higher Level than Standard EN 15714 - 2

II+

CONTINUOUS MODULATING Performance Class II+			Additional performance criteria				
Torque Nm	Duty (2) Performance starts per hour	Endurance (2) number of starts	Resolution % and Number step mini		Dead band % Maxi	Reponse time sec	Linearity %
<126	3 600	20 000 000	<1%	100	±0.5%	<2s	2%
126 - 1 000	1 800	20 000 000	<1%	100	±0.5%	<2s	2%
1 001 - 4 000	1 800	5 000 000	<1%	100	±0.5%	<2s	2%
4 001 - 32 000	1 200	T. B. A.	<1%	100	±0.5%	<5s	2%
> 32 000	1 200	T. B. A.	<1%	100	±0.5%	<10s	2%

(2) Duty Performance and Endurance Higher Level than Standard EN 15714 - 2

I

CONTINUOUS MODULATING Performance Class I			Additional performance criteria				
Torque Nm	Duty (2) Performance starts per hour	Endurance (2) number of starts	Resolution % and Number step mini		Dead band % Maxi	Reponse time sec	Linearity %
<126	3 600 ↗	50 000 000	<0.25%	400	±0.13%	<1s	2%
126 - 1 000	1 800 ↗	50 000 000	<0.25%	400	±0.13%	<1s	2%
1 001 - 4 000	1 800 ↗	20 000 000	<0.25%	400	±0.13%	<1s	2%
4 001 - 32 000	N.A.	T. B. A.	<0.25%	400	±0.13%	<2s	2%
> 32 000	N.A.	T. B. A.	<0.25%	400	±0.13%	<3s	2%

(2) Duty Performance and Endurance Higher Level than Standard EN 15714 - 2

Multi - Turn Actuator

Design requirements per classes

Actuator duty
STANDARD CLASSIFICATION

Class A
On - Off

ON - OFF Standard Duty Class A		EN 15714 - 2
Torque Nm	Duty Performance running time/hour	Endurance (1) number of cycles
<101	15	10 000
101 - 700	15	10 000
701 - 2 500	15	5 000
2 501 - 10 000	15	2 500
> 10 000	15	1 000

(1) *Endurance Test Requirement Standard EN 15714 - 2*

Class B
Inching / Positioning

INCHING / POSITIONING Standard Duty Class B		EN 15714 - 2
Torque Nm	Duty Performance starts per hour	Endurance (1) number of cycles
<101	30	10 000
101 - 700	20	10 000
701 - 2 500	15	5 000
2 501 - 10 000	10	2 500
> 10000	5	1 000

(1) *Endurance Test Requirement Standard EN 15714 - 2*

Process Requirements
BC DUTY & MODULATING CLASSIFICATION

ENDURANCE CRITERIA

A

ON - OFF Endurance Class A		
Torque Nm	Duty Performance running time/hour	Endurance (1) number of cycles
<101	15	10 000
101 - 700	15	10 000
701 - 2 500	15	5 000
2 501 - 10 000	15	2 500
> 10 000	15	1 000

(1) Endurance Test Requirement Standard EN 15714 - 2

A+

ON - OFF Endurance Class A+		
Torque Nm	Duty Performance running time/hour	Endurance (2) number of cycles
<101	15	20 000
101 - 700	15	20 000
701 - 2 500	15	10 000
2 501 - 10 000	15	5 000
> 10 000	15	2 000

(2) Endurance Higher Level than Standard EN 15714 - 2

ENDURANCE CRITERIA

B

INCHING / POSITIONING Endurance Class B		
Torque Nm	Duty Performance starts per hour	Endurance (1) number of cycles
<101	30	10 000
101 - 700	20	10 000
701 - 2 500	15	5 000
2 501 - 10 000	10	2 500
> 10000	5	1 000

(1) Endurance Test Requirement Standard EN 15714 - 2

B+

INCHING / POSITIONING Endurance Class B+		
Torque Nm	Duty Performance starts per hour	Endurance (2) number of cycles
<101	30	20 000
101 - 700	20	20 000
701 - 2 500	15	10 000
2 501 - 10 000	10	5 000
> 10000	5	2 000

(2) Endurance Higher Level than Standard EN 15714 - 2

DEFINITIONS

- Torque is based on EN ISO 5210
- One cycle consists of 25 turns in both directions (i.e. 25 turns to open + 25 turns to close), based on an average load of at least 30 % of the rated torque with the ability to transmit 100 % of the rated torque for at least 10 % of the travel.
- One start consists of a movement of at least 1 % of travel in either direction, with a load of at least 30 % of the rated torque.
- TBA: To be agreed between manufacturer / supplier and purchaser.

Class C
Modulating

MODULATING Standard Duty Class C		EN 15714 - 2
Torque Nm	Duty (1) Performance starts per hour	Endurance number of starts
<101	1 200	1 800 000
101 - 700	600	1 200 000
701 - 2 500	300	500 000
2 501 - 10 000	60	250 000
> 10 000	30	T. B. A.

(1) *Duty Performance Standard EN 15714 - 2*

PERFORMANCE CRITERIA

III

MODULATING Performance Class III			Additional performance criteria				
Torque Nm	Duty (2) Performance starts per hour	Endurance number of starts	Resolution % and Number step mini		Dead band % Maxi	Reponse time sec	Linearity %
<101	1 200	1 800 000	<2%	50	±1%	<2s	2%
101 - 700	1 200	1 200 000	<2%	50	±1%	<2s	2%
701 - 2 500	300	500 000	<2%	50	±1%	<2s	2%
2 501 - 10 000	60	250 000	<2%	50	±1%	<2s	2%
> 10 000	30	T. B. A.	<2%	50	±1%	<2s	2%

(2) Duty Performance Higher Level than Standard EN 15714 - 2

III+

MODULATING Performance Class III+			Additional performance criteria				
Torque Nm	Duty (2) Performance starts per hour	Endurance (2) number of starts	Resolution % and Number step mini		Dead band % Maxi	Reponse time sec	Linearity %
<101	1 200	3 000 000	<1%	100	±0.5%	<2s	2%
101 - 700	1 200	2 000 000	<1%	100	±0.5%	<2s	2%
701 - 2 500	300	1 000 000	<1%	100	±0.5%	<2s	2%
2 501 - 10 000	60	500 000	<1%	100	±0.5%	<5s	2%
> 10 000	30	T. B. A.	<1%	100	±0.5%	<10s	2%

(2) Duty Performance and Endurance Higher Level than Standard EN 15714 - 2

Class D
Continuous Modulating

CONTINUOUS MODULATING Standard Duty Class D		EN 15714 - 2
Torque Nm	Duty Performance starts per hour	Endurance (1) number of starts
<101	3 600	10 000 000
101 - 700	1 800	10 000 000
701 - 2 500	600	5 000 000
2 501 - 10 000	N.A.	T. B. A.
> 10 000	N.A.	T. B. A.

(1) *Endurance Test Requirement Standard EN 15714 - 2*

PERFORMANCE CRITERIA

II

CONTINUOUS MODULATING Performance Class II			Additional performance criteria				
Torque Nm	Duty Performance starts per hour	Endurance (2) number of starts	Resolution % and Number step mini		Dead band % Maxi	Reponse time sec	Linearity %
<101	3 600	10 000 000	<1.5%	67	±0.75%	<2s	2%
101 - 700	1 800	10 000 000	<1.5%	67	±0.75%	<2s	2%
701 - 2 500	600	5 000 000	<1.5%	67	±0.75%	<2s	2%
2 501 - 10 000	N.A.	T. B. A.	<1.5%	67	±0.75%	<2s	2%
> 10 000	N.A.	T. B. A.	<1.5%	67	±0.75%	<2s	2%

(2) Endurance Test Requirement Standard EN 15714 - 2

II+

CONTINUOUS MODULATING Performance Class II+			Additional performance criteria				
Torque Nm	Duty Performance starts per hour	Endurance (2) number of starts	Resolution % and Number step mini		Dead band % Maxi	Reponse time sec	Linearity %
<101	3 600	20 000 000	<1%	100	±0.5%	<2s	2%
101 - 700	1 800	10 000 000	<1%	100	±0.5%	<2s	2%
701 - 2 500	600	5 000 000	<1%	100	±0.5%	<2s	2%
2 501 - 10 000	N.A.	T. B. A.	<1%	100	±0.5%	<5s	2%
> 10 000	N.A.	T. B. A.	<1%	100	±0.5%	<10s	2%

(2) Endurance Higher Level than Standard EN 15714 - 2

I

CONTINUOUS MODULATING Performance Class I			Additional performance criteria				
Torque Nm	Duty Performance starts per hour	Endurance (2) number of starts	Resolution % and Number step mini		Dead band % Maxi	Reponse time sec	Linearity %
<101	3 600	50 000 000	<0.25%	400	±0.13%	<1s	2%
101 - 700	1 800	20 000 000	<0.25%	400	±0.13%	<1s	2%
701 - 2 500	600	5 000 000	<0.25%	400	±0.13%	<1s	2%
2 501 - 10 000	N.A.	T. B. A.	<0.25%	400	±0.13%	<2s	2%
> 10 000	N.A.	T. B. A.	<0.25%	400	±0.13%	<3s	2%

(2) Endurance Higher Level than Standard EN 15714 - 2

Linear Actuator

Design requirements per classes

Actuator duty
STANDARD CLASSIFICATION

Class A
On - Off

ON - OFF Standard Duty Class A		EN 15714 - 2
Thrust kN	Duty Performance running time/hour	Endurance (1) number of cycles
<21	15	10 000
21 - 70	10	10 000
71 - 150	5	5 000
151 - 325	5	2 500
> 325	5	1 000

(1) *Endurance Test Requirement Standard EN 15714 - 2*

Class B
Inching / Positioning

INCHING / POSITIONING Standard Duty Class B		EN 15714 - 2
Thrust kN	Duty Performance starts per hour	Endurance (1) number of cycles
<21	30	10 000
21 - 70	15	10 000
71 - 150	10	5 000
151 - 325	10	2 500
> 325	10	1 000

(1) *Endurance Test Requirement Standard EN 15714 - 2*

Process Requirements
BC DUTY & MODULATING CLASSIFICATION

ENDURANCE CRITERIA

A

ON - OFF Endurance Class A		
Thrust kN	Duty Performance running time/hour	Endurance (1) number of cycles
<21	15	10 000
21 - 70	10	10 000
71 - 150	5	5 000
151 - 325	5	2 500
> 325	5	1 000

(1) Endurance Test Requirement Standard EN 15714 - 2

A+

ON - OFF Endurance Class A+		
Thrust kN	Duty Performance running time/hour	Endurance (2) number of cycles
<21	15	20 000
21 - 70	10	20 000
71 - 150	5	10 000
151 - 325	5	5 000
> 325	5	2 000

(2) Endurance Higher Level than Standard EN 15714 - 2

ENDURANCE CRITERIA

B

INCHING / POSITIONING Endurance Class B		
Thrust kN	Duty Performance starts per hour	Endurance (1) number of cycles
<21	30	10 000
21 - 70	15	10 000
71 - 150	10	5 000
151 - 325	10	2 500
> 325	10	1 000

(1) Endurance Test Requirement Standard EN 15714 - 2

B+

INCHING / POSITIONING Endurance Class B+		
Thrust kN	Duty Performance starts per hour	Endurance (2) number of cycles
<21	30	20 000
21 - 70	15	20 000
71 - 150	10	10 000
151 - 325	10	5 000
> 325	10	1 000

(2) Endurance Higher Level than Standard EN 15714 - 2

DEFINITIONS

- Thrust is based on EN ISO 5210
- One cycle consists in a stroke of 40 mm, or in a minimum stroke (H) given in Table 5, in both directions (i.e. 40 mm to open + 40 mm to close), based on an average load of at least 30 % of the rated thrust with the ability to transmit 100 % of the rated thrust for at least 10 % of the travel.
- One start consists of a movement of at least 1 % of the stroke in either direction, with a load of at least 30 % of the rated thrust.
- TBA: To be agreed between manufacturer / supplier and purchaser.

Class C
Modulating

MODULATING Standard Duty Class C		EN 15714 - 2
Thrust kN	Duty (1) Performance starts per hour	Endurance number of starts
<21	1 200	1 800 000
21 - 70	600	1 200 000
71 - 150	60	500 000
151 - 325	60	250 000
> 325	60	T. B. A.

(1) *Duty Performance Standard EN 15714 - 2*

Class D
Continuous Modulating

CONTINUOUS MODULATING Standard Duty Class D		EN 15714 - 2
Thrust kN	Duty Performance starts per hour	Endurance (1) number of starts
<21	3 600	10 000 000
21 - 70	1 800	10 000 000
71 - 150	T. B. A.	5 000 000
151 - 325	T. B. A.	T. B. A.
> 325	T. B. A.	T. B. A.

(1) *Endurance Test Requirement Standard EN 15714 - 2*

PERFORMANCE CRITERIA

III

MODULATING Performance Class III			Additional performance criteria				
Thrust kN	Duty (2) Performance starts per hour	Endurance number of starts	Resolution % and Number step mini		Dead band % Maxi	Reponse time sec	Linearity %
<21	1 200	1 800 000	<2%	50	±1%	<2s	2%
21 - 70	1 200	1 200 000	<2%	50	±1%	<2s	2%
71 - 150	300	500 000	<2%	50	±1%	<2s	2%
151 - 325	60	250 000	<2%	50	±1%	<2s	2%
> 325	60	T. B. A.	<2%	50	±1%	<2s	2%

(2) Duty Performance Higher Level than Standard EN 15714 - 2

III+

MODULATING Performance Class III+			Additional performance criteria				
Thrust kN	Duty (2) Performance starts per hour	Endurance (2) number of starts	Resolution % and Number step mini		Dead band % Maxi	Reponse time sec	Linearity %
<21	1 200	3 000 000	<1%	100	±0.5%	<2s	2%
21 - 70	1 200	2 000 000	<1%	100	±0.5%	<2s	2%
71 - 150	300	1 000 000	<1%	100	±0.5%	<2s	2%
151 - 325	60	500 000	<1%	100	±0.5%	<5s	2%
> 325	60	T. B. A.	<1%	100	±0.5%	<10s	2%

(2) Duty Performance and Endurance Higher Level than Standard EN 15714 - 2

PERFORMANCE CRITERIA

II

CONTINUOUS MODULATING Performance Class II			Additional performance criteria				
Thrust kN	Duty Performance starts per hour	Endurance number of starts	Resolution % and Number step mini		Dead band % Maxi	Reponse time sec	Linearity %
<21	3 600	10 000 000	<1.5%	67	±0.75%	<2s	2%
21 - 70	1 800	10 000 000	<1.5%	67	±0.75%	<2s	2%
71 - 150	T. B. A.	5 000 000	<1.5%	67	±0.75%	<2s	2%
151 - 325	T. B. A.	T. B. A.	<1.5%	67	±0.75%	<2s	2%
> 325	T. B. A.	T. B. A.	<1.5%	67	±0.75%	<2s	2%

(2) Endurance Test Requirement Standard EN 15714 - 2

II+

CONTINUOUS MODULATING Performance Class II+			Additional performance criteria				
Thrust kN	Duty Performance starts per hour	Endurance (2) number of starts	Resolution % and Number step mini		Dead band % Maxi	Reponse time sec	Linearity %
<21	3 600	20 000 000	<1%	100	±0.5%	<2s	2%
21 - 70	1 800	10 000 000	<1%	100	±0.5%	<2s	2%
71 - 150	T. B. A.	5 000 000	<1%	100	±0.5%	<2s	2%
151 - 325	T. B. A.	T. B. A.	<1%	100	±0.5%	<5s	2%
> 325	T. B. A.	T. B. A.	<1%	100	±0.5%	<10s	2%

(2) Endurance Higher Level than Standard EN 15714 - 2

I

CONTINUOUS MODULATING Performance Class I			Additional performance criteria				
Thrust kN	Duty Performance starts per hour	Endurance (2) number of starts	Resolution % and Number step mini		Dead band % Maxi	Reponse time sec	Linearity %
<21	3 600	50 000 000	<0.25%	400	±0.13%	<1s	2%
21 - 70	1 800	20 000 000	<0.25%	400	±0.13%	<1s	2%
71 - 150	T. B. A.	5 000 000	<0.25%	400	±0.13%	<1s	2%
151 - 325	T. B. A.	T. B. A.	<0.25%	400	±0.13%	<2s	2%
> 325	T. B. A.	T. B. A.	<0.25%	400	±0.13%	<3s	2%

(2) Endurance Higher Level than Standard EN 15714 - 2

BC Ranges Overview

The essentials FIRST BC

For **moderate** environment,
moderate operational constraints,
standard applications.

WEATHERPROOF RANGES

Quarter-turn AQ RANGE

A	B	C
ON-OFF	INCHING/ POSITIONING	MODULATING
A	B	III

Multi-turn AT RANGE

A	B	C
ON-OFF	INCHING/ POSITIONING	MODULATING
A	B	III

BC PREMIUM The complete

For **severe** environment,
demanding operational constraints,
critical applications.

WEATHERPROOF RANGES

Quarter-turn SQ RANGE

A	B	C
ON-OFF	INCHING/ POSITIONING	MODULATING
A	B(1)	III(1)
A+	B+(1)	

(1) Long operating time (min 25s)

Multi-turn BT RANGE

A	B	C
ON-OFF	INCHING/ POSITIONING	MODULATING
A	B	III
A+	B+	III+

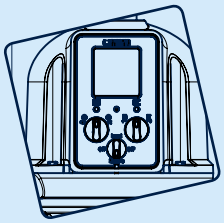
Multi-turn ST RANGE

A	B	C
ON-OFF	INCHING/ POSITIONING	MODULATING
A	B(1)	III(1)
A+	B+(1)	

(1) Low speed motor (max 1 500 rpm)

FOCUS ON CONTROLS AND APPLICATIONS

New LOGIC V2
The main functions you expect from modern integrated controls



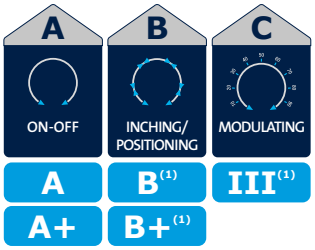
New INTELLI+® V3
Advanced control solution for your critical applications!

solution

STRONG CUSTOMER SUPPORT

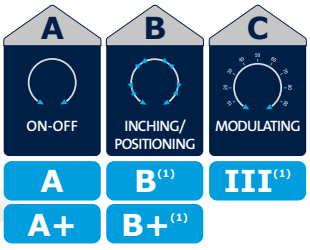
EXPLOSIONPROOF RANGES

→ Quarter-turn SQX RANGE



(1) Long operating time (min 25s)

→ Multi-turn STX RANGE



(1) Low speed motor (max 1 500 rpm)

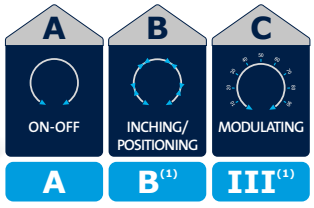
BC App:
The only application that allows not only to set up your actuator in a few clicks, but also to improve the reliability of your process thanks to key features and data for preventive maintenance

SPECIAL DESIGN & EXPERTISE

→ Nuclear Actuators: NUCLEAR QUALIFIED RANGES

Please consult our Nuclear Actuators calatogue for detailed information about SN and other qualified ranges.

→ Failsafe Actuators: FQ RANGE



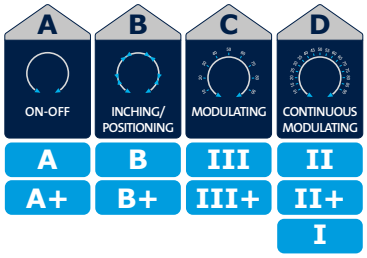
(1) Low speed motor (max 1 500 rpm)

→ Continuous Modulating Actuators: BC MODULATING RANGE

OAP, MA, MB, MAS, MBS, SQXM & STXM MODELS

→ Special Actuator & Customisation

- Special Actuators for severe environments
- Hydraulic Multi-turn Actuators for LNG carriers & Offshore applications
- Customized Design & Projects



All Classes available on demand

FOCUS ON

BC Technologies & Services

BERNARD CONTROLS technologies are the result of years of return on experience and customer feedbacks. These have led to actuators with heavy-duty mechanical design and increased security through performing electronics.

Gear transmission system

High transmission efficiency & self-locking capacity

Electric actuators generally use a worm drive because of its advantages of high drive ratio and self-locking. The mechanical design of BC actuators combines worm drive and high transmission efficiency planetary, in order to **reduce the motor's power consumption, optimize handwheel transmission** and to be **self-locking at all speed**.

Travel limitation systems

User-friendly & reliable travel limitation system

Bernard Controls proposes a patented cam block system, which offers the following advantages:

- Fast & easy setting
- Vibration proof
- Precise indication

Torque limiters

User-friendly & reliable torque limitation system

Bernard Controls design of torque limiters is using proven technology offering:

- Full reliability
- Ease of adjustment
- High precision & repeatability

Manual override

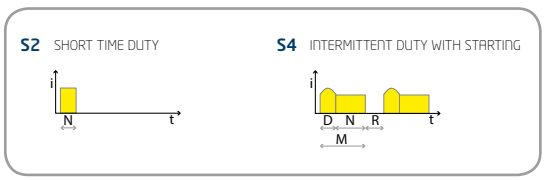
Easy maintenance with BC manual override technology

Depending on the markets and types of facilities, the features of emergency manual control - key functions of the actuator - can be very different. However, several features have a prime significance: it must be possible to operate the handwheel at any time & the number of turns on the handwheel must not be too high.

S4 Motor Duty cycle

The only representative duty cycle for electric actuator operation

The IEC 34 standard defines the electric motors' standard duty cycles. S2 duty rating is short time duty: motors adapt to constant load. Temperature rises fast during the operation and quickly reaches its limit. Motor needs long stop for total cooling between each start.
S4 duty cycle is intermittent duty with starting. Motors start with a large output torque. Temperature slowly decreases once operating torque has been reached. Therefore, the motor can be restarted shortly after shutdown.
BC has chosen the S4 duty rating because it is the most representative duty cycle for actuators operations.



IEC 34 S2 & S4 Motor Duty Cycles

INTELLI+ ® control

INTELLI+® is an intuitive and intelligent integrated control which offers key benefits to end users:

- **Non-intrusive settings**
- **Intuitive interface** with local LCD display and easy-to-use menu
- **Accurate information** with absolute sensors, which constantly measure the position and torque of the valve
- **Increased security** with constant self-monitoring, ESD, Partial Stroke Test (PST), Alarms indication, signaling continuity...
- **Preventive maintenance**: INTELLI+® continuously monitors its components as well as the actuator status and measures some important valve parameters. It provides users with a great deal of information to help with system diagnosis, aid in scheduling their valves preventative maintenance and maximize process availability by reducing maintenance downtime. INTELLI+® permanently monitors the required torque necessary to operate the valve, memorizing these torque values generated during the last open and close operations.
- **Infra-red/Bluetooth communication** with PC and tablet via INTELLISOFT software to collect data, implement settings/configuration...)

NEW *A new version of* INTELLI+® *V3 will be lauched with a new AT & BT range!*

Open fieldbus systems

Easy site management

BC chooses the «open» fieldbus system for all its fieldbus solutions.
Our actuators can be connected to most of the standard fieldbus available on the market: PROFIBUS DP, FOUNDATION FIELDBUS, MODBUS RTU, HART and other fieldbus on demand.
For more security, redundant fieldbus ensures continuous operation, even in case of a bus line disruption.

ESD

Increased security on site

ESD (Emergency Shut Down) is a remote emergency control signal with priority over all other commands in order to protect the pipeline and equipment from damage. Depending upon the valve operation, **ESD can be configured as an Open, Close or Stop command.**

SIL Design

SIL
SAFETY INTEGRITY LEVEL

More than safety commands, SIL certified signaling functions

The SIL - Safety Integrity Level - is a measure of the level of security provided by a technical measurement of a risk control system (cf. IEC 61508 & 61511 standards). BC offers weatherproof & explosionproof quarter-turn and multi-turn actuators specially designed (fully dedicated control board and absolute position encoder with built-in self-test) and SIL certified according to the latest & more demanding revision of the standard (Ed 2).

Recognised expertise

Our company has been **approved by major end users and engineering companies:**

- ADNOC, ALSTOM POWER, AREVA, BLUE CIRCLE, ENEL, EDF, ESKOM, GAZ DE FRANCE, KNPC, KOC, LAFARGE, NIOC, PETROBRAS, QATAR PETROLEUM, SAUDI ARAMCO, SHELL, SOFRESID, TRACTEBEL, TECHNIP, TOTAL, GAZPROM (...)

Our products and organization have been **certified by major international bodies and according to main standards**:

- ISO 9001, ISO 14001, OHSAS 18001
- ATEX, NEMA, IEEE, RCC-E, SIL (...)
- ABS, CSA, BUREAU VERITAS, GERMANISCHER LLOYDS, EAC Customs Union, INERIS, TÜV (...)

Strong Customer Support

STRONG CUSTOMER SUPPORT

From the design stage to installation, commissioning, maintenance and training, BERNARD CONTROLS teams are truly dedicated to your satisfaction and commits to delivering **strong customer support everywhere around the globe.**

General specifications

		AQ	SQ
TORQUE	**Type of rotation (max. torque)**		
	Quarter turn	10 000 Nm	40 000 Nm
	Multi turn	-	-
ENVIRONMENT	**Location**		
	Indoors	IP68	IP67
	Outdoors	IP68	IP67
	Risk of submersion IP68	2 metres, 24 hours	5 metres, 72 hours [3]
	In an explosive atmosphere	-	-
	Operating temperature		
	Standard	-20...+60° C	-20...+70° C
	High temperature version	-	0...+90° C
	Low temperature version	-	-40...+50° C
	Anti-condensation system	Standard	Standard
	Enclosure corrosion protection		
	Indoor	●	●
	Outdoors highly corrosive industrial	-	●
	Very highly corrosive industrial or off-shore	-	●
	Conditions of vibration 10-500 Hz	≤1g	≤1g
OPERATION	**Duty & Modulating Classification**		
	Comply with EN15714-2 Class A: On-Off	A	A/A+
	Comply with EN15714-2 Class B: Inching/Positioning	B	B/B+
	Comply with EN15714-2 Class C: Modulating	III (except AQL)	III
	Comply with EN15714-2 Class D: Continuous Modulating	-	-
MOTOR & TECHNOLOGY	**Motor technology**		
	Insulation class	F (except AQL)	F
	Operating motor duty cycle		
	BC Classes A & A+ complying with EN15714-2 Class A	S4-30%	S4-30%
	BC Classes B & B+ complying with EN15714-2 Class B	S4-30%	S4-30%
	BC Classes III & III+ complying with EN15714-2 Class C	S4-50% (except AQL)	S4-50%
	BC Classes II, II+ & I complying with EN15714-2 Class D	-	-
	Actuator technology/material		
	Self-locking drive gears	●	●
	Housing	Alloy/Aluminium	Alloy/Aluminium
	Manual override with priority to electric drive	●	●
	Declutch-free manual override	● [3]	● [3]
	Adjustable mechanical end stops (90°+/-2°)	●	●
INTERFACES	**Power supply**		
	3PH 400VAC-50Hz / 460VAC-60Hz	●	●
	1PH 230VAC-50Hz / 115 VAC-60Hz	●	●
	24VDC	●	●
	Other supply voltage	-	On request
	Valve-actuator standard interface	ISO 5211	ISO 5211
	Standard cable entries (other on request)	2 x ISO M20 or 2 x NPT 3/4"	2 x ISO M20
CONTROLS	**Type of controls**		
	Electromechanical SWITCH (option position transmitter, positioner, local command)	●	●
	Integrated controls	LOGIC V2	INTEGRAL+/POSIGAM+
	Intelligent controls	-	INTELLI+®
	Fieldbus communication / Integrated controls INTEGRAL+ (Profibus DP)	-	●
	Fieldbus communication / Intelligent controls INTELLI+® (Modbus RTU, Devicenet, Profibus DPV1, Fieldbus Foundation, Hart...)	-	●

For specifications of AT & BT ranges, please contact us.

SQX	ST/ASM	STX	Continuous Modulating	FQ
40 000 Nm -	500 000 Nm 20 000 Nm	800 000 Nm 20 000 Nm	30 000 Nm 2 000 Nm	500 Nm -
IP68 IP68 10 metres, 96 hours ATEX, NEMA...	IP68 [1] IP68 [1] 5 metres, 72 hours[1] -	IP68 IP68 10 metres, 96 hours ATEX, NEMA...	IP67 IP67 5 metres, 72 hours [4] ATEX, NEMA...	IP67 IP67 5 metres, 72 hours [7] ATEX, NEMA...
-20...+70° C - -60...+70° C Standard	-20...+70° C 0...+90° C -40...+50° C Standard	-20...+70° C - -60...+70° C Standard	-20...+70° C - -40...+50° C [4] Standard[5]	-20...+70° C 0...+90° C -40...+50° C Standard
● ● ●	● ● ●	● ● ●	● ● ●	● ● ●
≤1g	≤1g	≤1g	≤1g	≤1g
A/A+ B/B+ III -	A/A+ B/B+ III -	A/A+ B/B+ III -	- - - II	A B III -
F	F	F	F	F
S4-30% S4-30% S4-50% -	S4-30% S4-30% S4-50% -	S4-30% S4-30% S4-50% -	- - - S4-100%	S4-30% S4-30% S4-50% -
● Alloy/Aluminium ● ● ●	●[2] Alloy/Aluminium ● ●[3] -	● Alloy/Aluminium ● ● -	● Alloy/Aluminium ● ● ●	● Alloy/Aluminium ● ● ●
● ● ● On request	● ● On request On request	● ● ● On request	● ● ● On request	● ● ● On request
ISO 5211	ISO 5210	ISO 5210	ISO 5210/5211	ISO 5211
2 x NPT 1" + 1 x NPT 1"1/2	2 x ISO M20	2 x NPT 1" + 1 x NPT 1"1/2	3 x ISO M20[6]	2 x ISO M20
● - INTELLI+®	● INTEGRAL+/POSIGAM+ INTELLI+®	● - INTELLI+®	● - INTELLI+®	● INTEGRAL+/POSIGAM+ -
-	●	-	-	●
●	●	●	●	-

[1] : As an option for ASM

[2] : Except ASM

[3] : Except AQL, SQ4-SQ15, ST6 & ASM

[4] : - 60 ... + 70° C for SQXM / STXM models

[5] : Self - heating for SQXM / STXM models

[6] : 2 x ISO M20 + 1 x ISO M25 for MA / MAS SWITCH models. And 2 x NPT 1" + 1 x NPT 1"1/2 for SQXM / STXM models

[7] : optional

> Control specifications

Legend
- : Not Available
● adapted or available (standard or optional)

		SWITCH	HARDWIRED	INTEGRAL+ POSIGAM+ Integrated	LOGIC V2 Integrated	INTELLI+® V2(1) Intelligent
MAIN FEATURES	**Integrated motor reversing starters**	-	●	●	●	●
	Padlockable local controls	-	●	●	● (3)	●
	Integrated or separated control box	-	●	●	Integrated Only	●
	Operating mode					
	On-Off: open or close full stroke on average 20-30 times/day	●	●	INTEGRAL+	●	INTELLI+®
	Inching/Positioning: change position on average 20-30 times/day	●	Inching only	POSIGAM+	●	INTELLI+®
	Modulating Class III: change position 360 times/day	●	-	POSIGAM+	●	INTELLI+®
	Intensive Modulating Class II: every 2 or 3 seconds positioning	-	-	-	-	INTELLI+®
	Timer (extended travel time)	-	-	●	-	●
	Power sypply					
	3 phase	●	●	●	●	●
	1 phase	●	-	●	●	●
	DC	●	-	●	●	●
REMOTE CONTROL	**On-off command mode (contacts)**					
	Maintained contact	●	●	●	●	●
	Pulse command	-	●	●	●	●
	Analogue signal (4-20 mA or 0-10 V)	-	-	●	●	●
	ESD - Emergency shutdown command	-	●	●	-	●
	Command by fieldbus	-	-	●	-	●
SIGNALS	**Open / close contacts**	●	●	●	●	●
	Proportional feedback signal (4-20 mA i.e)	Potentiometer or TAM transmitter	TAM or POT	●	●	●
	Information relay	-	●	●	●	●
	Fault monitoring relay	-	●	●	●	●
	Signaling via fieldbus	-	-	●	-	●
PROTECTION	**Fuses**	-	●	●	●	●
	Automatic phase detection (3 phases)	-	●	●	●	●
	Motor thermal protection	●	●	●	●	●
	Adjustable torque limiter	● (2)	● (2)	● (2)	● (4)	●
ADDITIONAL FEATURES	**Parameter setting**	-	-	Intrusive with jumpers	Non intrusive display + some intrusive settings	Non intrusive display+selectors or PDA+infrared
	Position and torque setting mode	Mechanical	Mechanical	Mechanical	Mechanical	Non intrusive display+selectors or PDA+infrared
	Self-diagnosis	-	-	-	●	●
	Torque curve	-	-	-	-	●
	Actuator activity data	-	-	●	-	

(1) : New version V3 to be released soon
(2) : Except SQ4-SQ15
(3) : Electrical non Mechanical
(4) : Except AQ5-10-15

Specification sheet

Valve and Actuator Technical Data

VALVE DATA

Operating Mouvement: [] quarter-turn [] multi-turn - number of turns to close valve [.....] [] linear [.....] mm
DN [.....] **Type** [.....] **Pressure class** [.....]
Max. required torque : [.....] Nm **or thrust:** [.....] kN [] **Safety fact. to be added** [.....] %
Closing: [] counter clockwise [] clockwise
Flange: [] ISO5210 or ISO5211 standard size F [.....] [] special [.....]
Quarter-turn output shaft: [] bore + keyway [] double D [] inside square [] special (to be defined)
Dimensions: [.....] [.....] [.....] [.....]
Multi-turn output shaft: [] A form [] B1 form [] B3 form [] C form [] special (to be defined)
Dimensions: [.....] [.....] [.....] [.....] [.....]
Valve rising stem lift: [.....] mm **Pitch:** [.....] mm **Lead:** [] single [] double

ACTUATOR SPECIFICATIONS

> Protection
Installation [] inside [] outside
Protection [] IP67 [] IP68
[] Corrosive atmosphere Specify [.....]
[] Explosive atmosphere Specify [.....]
[] Humidity (anti-condensation heater) [] Ambient temperature (in °C) [.....] MIN. [.....] MAX.
Paint Color: .....

> Operation
On-Off: [] Class A [] Class A+
Inching/positioning: [] Class B [] Class B+
Modulating: [] Class III [] Class III+
Continuous Modulating: [] Class II [] Class II+ [] Class I
[] Operating time [.....] seconds

> Motor
Type [] DC [] 1 phase [] 3 phase Voltage [.....] VOLTS Frequency [.....] Hz
[] Incorporated thermal protection [] Tropicalization [] Insulation Class F

> Security
[] Failsafe spring return by loss of power supply
[] Manual handwheel [] Taper square drive shaft instead of handwheel for manual key operation (Multi-turn)

> Control
[] Switch (reversing starters and control logic in customer cabinet)
[] Integrated version with built-in control logic reversing starters and local control
[] INTELLI+® version with built-in control logic reversing starters, local control, display
[] Proportional control (eg 4-20mA for example)
[] Command by fieldbus: [] Profibus DP [] Profibus DP Red. [] Foundation Fieldbus [] Modbus RTU
[] HART [] Other .....
[] ESD - Emergency shutdown command + [] SIL Certified

> Electric connection
[] Cable gland x M20 Number [.....] Other to specify [.....]

> Signaling Open Closed
[] Auxiliary travel limit switches contact Number [.....] Number [.....]
[] Position feedback signal 4-20 mA + [] SIL Certified
[] Position feedback signal, potentiometer 1000 Ohms
[] Fault monitoring relay

VARIOUS

[] Commissioning support [] Training

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