BERNARD® CONTROLS

Invest in Confidence

BC PREMIUM

# FQ & FQ-R RANGES

*Start Up Guide*

NR_1043_EN - Ind. G
Art : 5100876

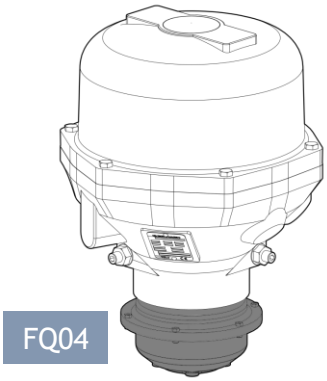
## TABLE OF CONTENTS

# 1 PRESENTATION OF THE ACTUATOR

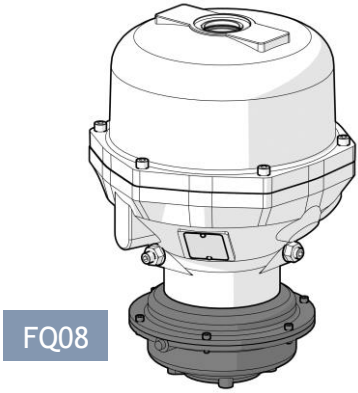
FQ range actuator is a quarter turn actuator featuring a spring-return (fail-safe) device. Its electrical operation can be manually overridden in case of power supply loss.

Six actuator models are described in this manual: FQ04, FQ08, FQ12, FQ18, FQ30 and FQ50.

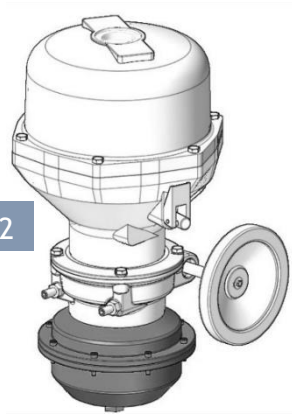
## 1.1 FQ RANGE DESIGN



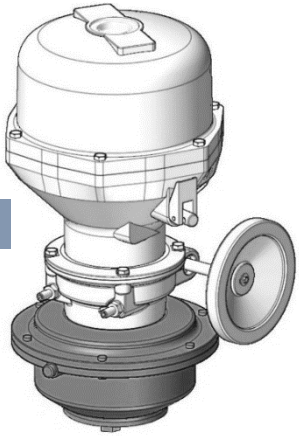
FQ04



FQ08

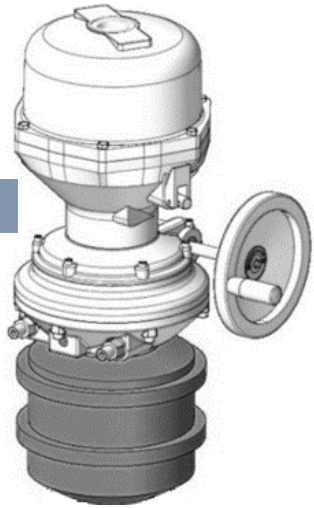


FQ12

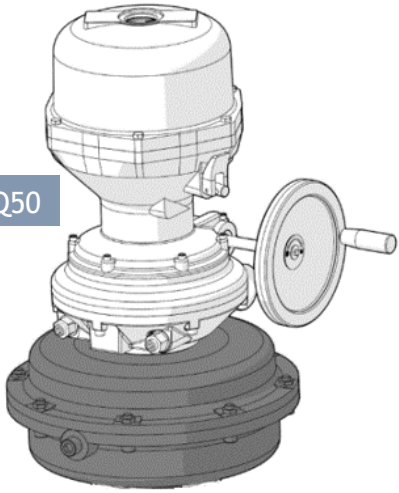


FQ18

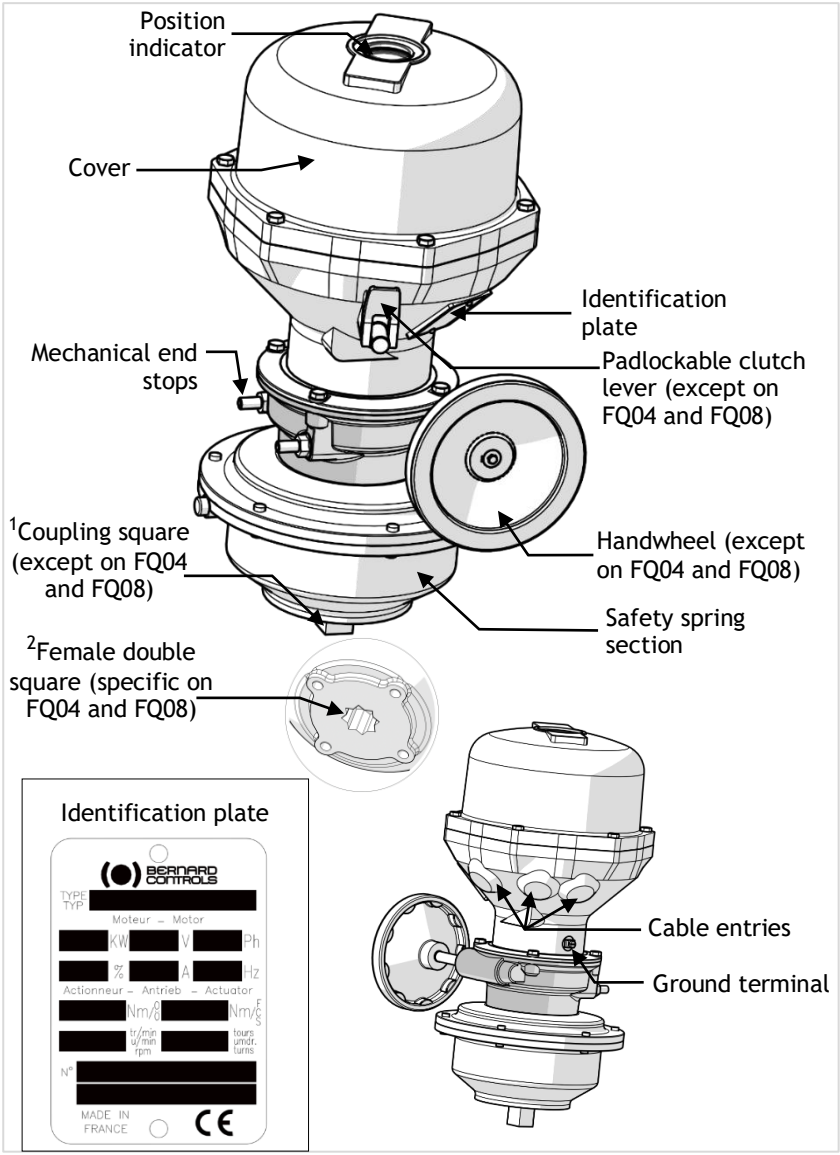
FQ30



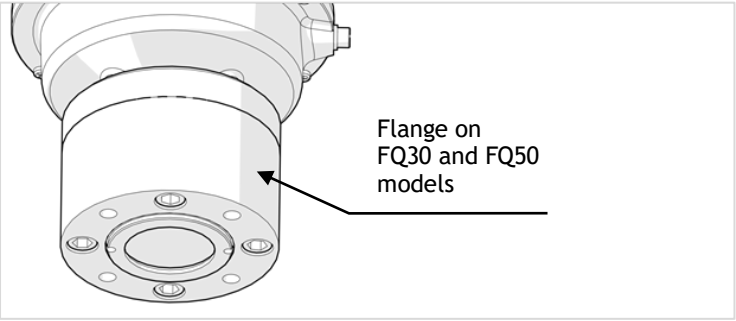
FQ50



## 1.2 FQ COMPONENTS

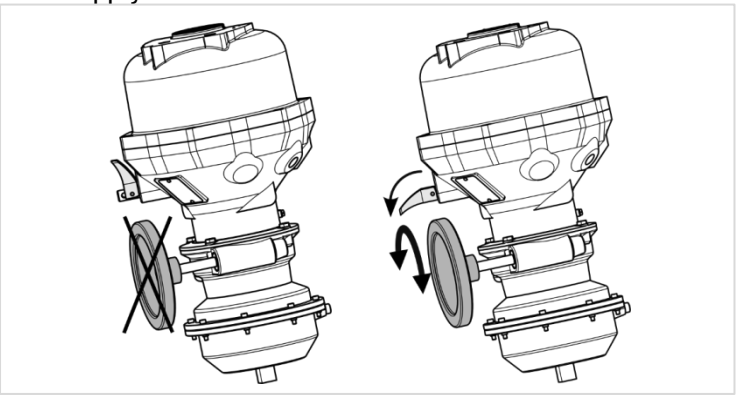


! This actuator includes a compressed spiral spring which can only be disassembled with special tools. Only the control compartment remains accessible without having to use special tools (see picture).



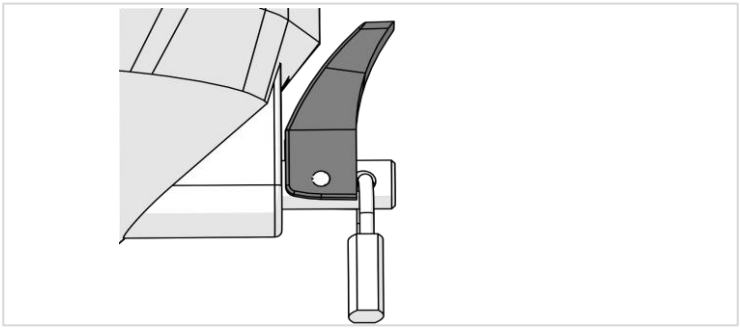

## 1.3 MANUAL OPERATING CLUTCHING (EXCEPT FOR FQ04 AND FQ08)

FQ-range actuators are fitted with a handwheel (except for the FQ04 and FQ08). It allows to manually operate the actuator in case of loss of power supply.

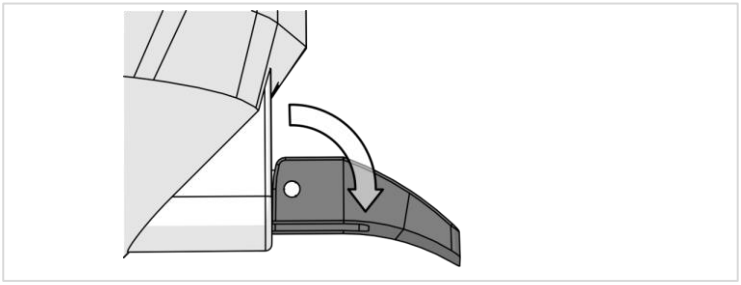


### 1.3.1 To clutch the manual control

1. If a padlock locks the clutch lever, remove it from the rod.



2. Tilt the clutch lever to operate the actuator with the handwheel, refer to the figure below.



**!** When the clutch lever is in its lowered position the manual control is engaged, therefore the safety spring return is not operational and fail-safe action is not available.

### 1.3.2 To retrieve the electrical control

1. Raise the clutch lever back to its initial position.
2. If a padlock locked the clutch lever, put it back on the rod.

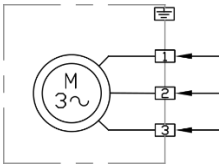
# 2 ELECTRICAL CONNECTIONS

## 2.1 GROUNDING THE ACTUATOR

1. Connect your actuator to the ground from the actuator external grounding plug, using a 4 $mm^2$ wire.
2. Check that internal and external groundings are connected together.

## 2.2 CONNECTING POWER SUPPLY TO THE ACTUATOR

1. Check the power supply type.
2. When the power supply is OFF, check that the actuator is staying on one of its mechanical stops.
3. Check the direction of electrical rotation, as an incorrect rotation of the motor could damage the actuator:
   a. Do not energize the brake.
   b. When the actuator has a handwheel, pull down the clutch lever.
   c. Power **ON** the motor.
   d. Compare the rotation direction of the motor and the rotation direction as indicated by the arrow on the label. Make sure they rotate in the same direction.
   e. Power **OFF** the motor.
   f. If the rotation direction is incorrect, re-wire the motor to obtain a rotation in the opposite direction, according to the following wiring diagram extract.




   g. Check again the rotation direction of the motor to ensure the motor rotates in the correct direction.

# 3 COMMISSIONING

## 3.1 TRAVEL LIMITS SETTING

When the power supply is OFF and the clutch lever is up, the actuator and valve sit on their fail-safe position, which is the resting position of the returning spring.

The mechanical stops limit the end of travel in fail-safe operation.

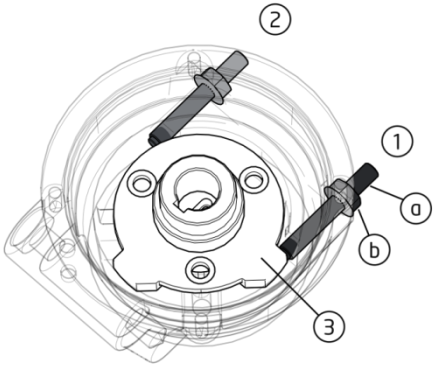
The cams limit the end of travel in normal operation.

### 3.1.1 Setting fail-safe position

Required tools: Flat-blade screwdriver, Open-end wrench, Hexagonal key.

**To set fail-safe position:**

1. Cut the power supply off to get the actuator to fail-safe position if it is not already the case.
2. If the valve does not reach desired fail-safe position, set corresponding mechanical stop **(1 or 2)** until it is the case.
3. Hold stop screw **(a)** with hex. key and unlock counter-nut **(b)** with the open-end wrench.
4. Screw stop screw **(a)** until the desired valve position is reached, so that it touches the plate **(3)**.
5. Hold stop screw **(a)** in position while tightening the counter nut **(b)** with the open-end wrench.

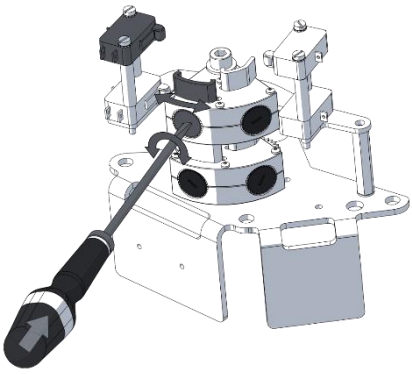


### 3.1.2 Setting travel limits for normal operation

! Do not electrically stop the actuator on mechanical stop, it may cause damage.

Required tools: Flat-blade screwdriver, Hexagonal key.

**To set a cam:**



1. Insert screwdriver in the slit of the setting head of the cam.
2. Slightly push along screwdriver axis to free rotation.
3. Turn screwdriver in one direction or the other to get the cam at the desired position.
4. Release screwdriver push while ensuring setting head got back to its original position and locks the cam movement.

**To set cams for fail safe position:**

1. Lower the clutch lever to engage manual control (except for the FQ04 and FQ08).
2. Slightly turn the handwheel (or manoeuver electrically for the FQ04 and FQ08) in the direction opposite to the fail-safe position direction until the valve starts to open or close.
3. Turn the handwheel in the other direction (or manoeuver electrically for the FQ04 and FQ08) towards the fail-safe position until the valve is fully open or closed.
4. Set the end-of-travel cam to trigger the switch at this position.
5. If the actuator has a signaling cam, turn the handwheel 1/8th of a turn (or manoeuver electrically for the FQ04 and FQ08) in the opposite direction of the fail-safe position.
6. Set the signaling cam so that it triggers the signaling switch at this position.
7. Raise the clutch lever (except for the FQ04 and FQ08).

**To set cams and mechanical stop at the opposite end**

1. On the opposite mechanical stop, block screw **(a)** with hex. key and unblock counter nut **(b)** with open-end wrench.
2. Unscrew the screw **(a)** of a few milimeters with hex. key.
3. With electrical control, go close to the opposite position of the fail-safe position of the valve.
4. Lower the clutch lever to engage manual control and turn the handwheel until you reach this opposite position (or manoeuver electrically for the FQ04 and FQ08).
5. Set end-of-travel cam at the activation point of the end-of-travel micro-switch.
6. With hex key, screw stop screw **(a)** to get it in contact with planet carrier.
7. Unscrew the stop screw **(a)** of a turn and a half to keep a clearance between planet carrier and screw.
8. Hold the stop screw **(a)** in position with the Hex. key and tighten the counter nut **(b)** with the open-end key.
9. Turn the handwheel of a turn and a 1/8th towards the fail-safe position (or manoeuver electrically for the FQ04 and FQ08).
10. Set signaling cam at the activation point of the signaling micro-switch.
11. Raise the clutch lever (except for the FQ04 and FQ08).

**To check opposite position settings**

1. With electrical control, operate the actuator towards fail-safe position until you reach an intermediate position.
2. Operate the actuator to the opposite position.
3. Check:
    a. the correct activation of signaling micro-switch
    b. the correct activation of end-of-travel micro-switch and the stop of the operation
    c. the actuator does not lay on mechanical stop when stopped

4. If the actuator lays on mechanical stop, re-set it by slightly increasing the clearance between mechanical end and planet carrier until you validate 3.a., 3.b. and 3.c. conditions.

## 3.2 POSITION INDICATOR SETTING

The dial indicator is fixed on a shaft that also drives the cams.

1. Unlock the screw.
2. Position the arrow in front of the corresponding position shown on the cover.
3. Lock the screw.

## 3.3 SETTINGS CHECK

### 3.3.1 Normal operation check

1. When completed, switch on the electro-brake supply.
2. Raise the clutch lever (except for the FQ04 and FQ08).
3. Operate the actuator electrically in the opposite direction of fail-safe position.
4. Check the activations of the signal and end-of-travel limit switches.
5. Operate the actuator towards fail-safe position.
6. Check again the activation of the signal and end-of-travel limit switches.

### 3.3.2 Safety operation check

**Return duration measurement**

The stored energy in the spring powers the automatic return to the fail-safe position.

1. Check that the clutch lever is raised (except on the FQ04 and FQ08).
2. Operate the actuator to reach the end-of-travel switch opposite to fail-safe position.
3. Prepare to measure the actuator travelling time.
4. Cut electro-brake supply to free the valve shaft. At the same time, write down the starting time.

5. Check that the valve returns to its fail-safe position.
   When the actuator has returned to its fail-safe position.
6. Check that the safety return duration conforms to the expected duration.
7. Power the electro-brake back into operation.

# 4 MAINTENANCE AND STORAGE INSTRUCTIONS

## 4.1 MAINTENANCE

If the actuator is correctly mounted and sealed, no special maintenance is required. Check the function of the motor once a year and make sure that the switch compartment is condensation-free. If the environment is humid, in order to avoid condensation, BC electric actuators have installed an anti-condensation heating resistance inside the enclosure.

### 4.1.1 Prolonged non-use fail-safe operation

If the fail-safe is not operated within six months, it is recommended to schedule periodic operation.

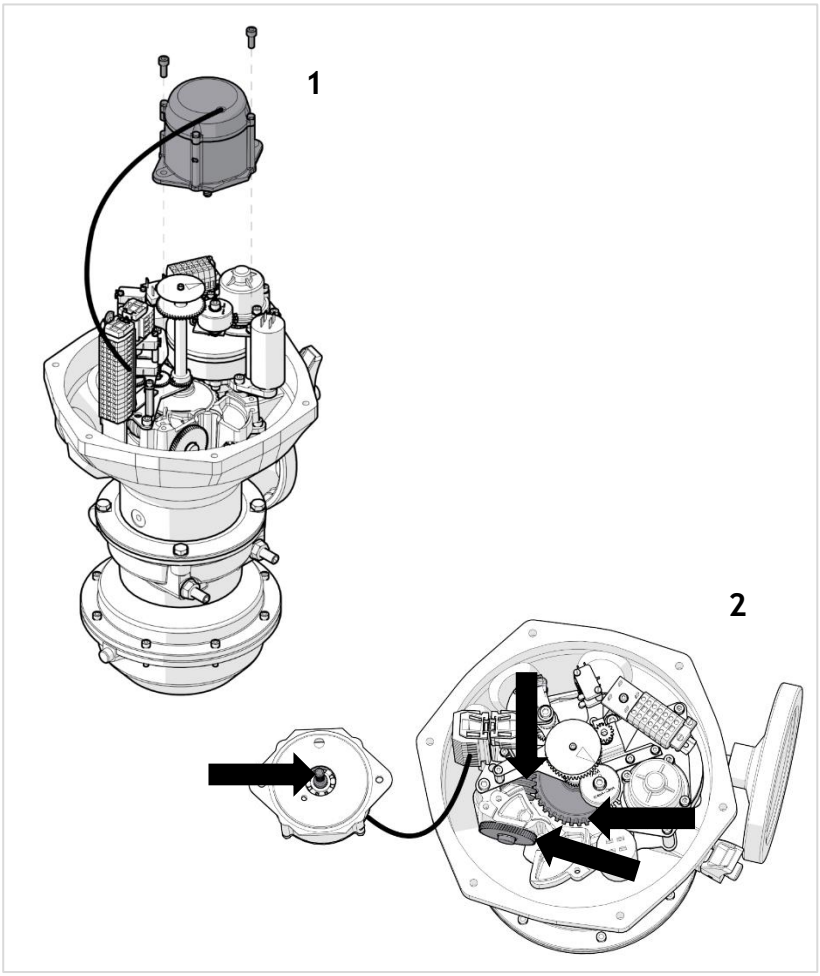
In addition, measure the actuator travelling time to make sure that the measured duration still matches the required characteristic, refer to the procedure in §3.3.2.

### 4.1.2 Grease (FQ-R only)

For FQ-R models, grease must be added at least twice during the actuator's lifetime (120.000 cycles), every 40.000 cycles at the latest (cf. procedure on the following page).

**Procedure:**

1. Unscrew the screws of the cover, and remove the cover.
2. Unscrew the screws fixing the motor to the plate, and lift the motor while making sure not to rip out the cable (see image **1**).
3. With a brush, apply some Total N31272 grease to the motor's worm screw and to the screw/wheels indicated in image **2.**
4. Place back the motor and the cover.



## 4.2 STORAGE

The actuator includes electrical equipment as well as grease-lubricated gear stages. Despite the weatherproof enclosure, oxidizing, jamming, and other alterations are possible if the actuator is not correctly stored.

### 4.2.1 Actuators stored in a stockroom

1. The actuators should be stored under a shelter, in a clean and dry place, and be protected from wide temperature variations. Avoid placing the actuators directly on the floor.
2. For actuators equipped with a heating resistance, it is recommended to connect it and to supply power, especially if the storage area is humid (standard 230 VAC, unless other specification).
3. Check that the temporary sealing plugs of the cable entries are well in place. Make sure that the covers and the boxes are well closed to ensure weatherproof sealing.

### 4.2.2 Actuators installed but waiting for electrical connection

If a long period of time is expected between the actuator mounting and the electrical wiring works:

1. Visually check the tightness of the electrical box cover and cable glands.
2. Cover the device with a plastic protective film.
3. For actuators equipped with a heating resistance, it is recommended to connect it and to supply power, especially if the storage area is humid (standard 230 VAC, unless other specification).

### 4.2.3 Storage of actuators equipped with electronic components

Long term storage of electronic components which are not in service increases the risk of malfunction. This practice is therefore highly unadvisable.

If long-term storage is necessary, we strongly recommend a revision of the electronic boards in our factory before using the actuators.

### 4.2.4 Control after storage

1. Visually check the electrical equipment.
2. Manually operate the microswitches, buttons, selectors, etc., to insure correct mechanical function.
3. Operate the apparatus manually.
4. Verify that grease consistency is correct.
5. For actuators equipped with grease nipple, remember to complete with some fresh grease.

# NOTES

# BERNARD CONTROLS GROUP

## CORPORATE HEADQUARTERS

4 rue d'Arsonval - CS 70091 / 95505 Gonesse CEDEX France
Tel. : +33 (0)1 34 7 71 00 / Fax : +33 (0)1 34 07 71 01 / mail@bernardcontrols.com

## CONTACT BY OPERATING AREAS

### > AMERICA

**NORTH AMERICA**
BERNARD CONTROLS UNITED STATES
HOUSTON
inquiry.usa@bernardcontrols.com
Tel. +1 281 578 66 66

**SOUTH AMERICA**
BERNARD CONTROLS LATIN AMERICA
inquiry.southamerica@bernardcontrols.com
Tel. +1 281 578 66 66

### >ASIA

**CHINA**
BERNARD CONTROLS CHINA &
BERNARD CONTROLS CHINA NUCLEAR
BEIJING
inquiry.china@bernardcontrols.com
Tel. +86 (0) 10 6789 2861

**KOREA**
BERNARD CONTROLS KOREA
SEOUL
inquiry.korea@bernardcontrols.com
Tel. +82 2 553 6957

**SINGAPORE**
BERNARD CONTROLS SINGAPORE
SINGAPORE
inquiry.singapore@bernardcontrols.com
Tel. +65 65 654 227

### > EUROPE

**BELGIUM**
BERNARD CONTROLS BENELUX
NIVELLES (BRUSSELS)
inquiry.belgium@bernardcontrols.com
inquiry.holland@bernardcontrols.com
Tel. +32 (0)2 343 41 22

**FRANCE**
BERNARD CONTROLS FRANCE &
BERNARD CONTROLS NUCLEAR FRANCE
GONESSE (PARIS)
inquiry.france@bernardcontrols.com
Tel. +33 (0)1 34 07 71 00

**GERMANY**
BERNARD CONTROLS DEUFRA
TROISDORF (KÖLN)
inquiry.germany@bernardcontrols.com
Tel. +49 2241 9834 0

**ITALY**
BERNARD CONTROLS ITALIA
RHO (MILANO)
inquiry.italy@bernardcontrols.com
Tel. +39 02 931 85 233

**RUSSIA**
BERNARD CONTROLS RUSSIA
inquiry.russia@bernardcontrols.com
Tel. +33 (0)1 34 07 71 00

**SPAIN**
BERNARD CONTROLS SPAIN
MADRID
inquiry.spain@bernardcontrols.com
Tel. +34 91 30 41 139

### > INDIA, MIDDLE EAST & AFRICA

**AFRICA**
BERNARD CONTROLS AFRICA
ABIDJAN - IVORY COAST
inquiry.africa@bernardcontrols.com
Tel. + 225 21 34 07 82

**INDIA**
BERNARD CONTROLS INDIA
inquiry.india@bernardcontrols.com
Tel. +971 4 880 0660

**MIDDLE-EAST**
BERNARD CONTROLS MIDDLE-EAST
DUBAI - U.A.E.
inquiry.middleeast@bernardcontrols.com

BERNARD® CONTROLS

www.bernardcontrols.com