BERNARD® CONTROLS

Invest in Confidence

FIRST BC

AQL Range

WP

Start Up Guide

SUG_17002 EN – Ind. E
Art : 5100723

TABLE OF CONTENTS

1 SAFETY

This device complies with current applicable safety standards.
The installation, use, and maintenance, of this unit require a skilled and trained staff.
Please carefully read this entire document before mounting and starting-up the actuator.

2 PACKAGING, STORAGE AND MAINTENANCE

2.1 Packaging & Storage

AQL actuators are delivered in a cardboard box equivalent to the size of the actuator and sit in a cardboard wedge.
Actuators should be stored under a shelter, in a clean and dry place, and protected from wide temperature variations.

- Avoid placing the actuator directly on the floor.
- Check that the plugs on cable entries are correctly tightened.
- Check that cover screws are correctly tightened to ensure weatherproof sealing of the cover.

What to check after storage

1. Visually check the electrical equipment.
2. Operate the actuator manually.

What to check on pre-installed actuators

If you expect a long period between the mounting of the actuator and the electrical wiring:

1. Visually check that cable entries and cover are tightly closed.
2. In case of outdoor installation, cover the unit with a plastic protective film.

2.2 Maintenance

This actuator features lifetime lubrication and does not require any specific maintenance.
If the actuator operates in a wet atmosphere, it is advised to check once a year that there is no condensation build-up inside the unit.

3 MECHANICAL SET-UP

After assembly on the valve or the damper, the actuator can operate in any position.

However:

- It is not recommended to install the actuator with its cover facing downwards.
- The cable glands must not be oriented upwards (loss of water tightness).

3.1 Opening the cover

You may need to open the cover to change the orientation of the position indicator, or to set the cams or the positioner board.

Before its 1st use, the actuator is submitted to an IP pressure test that tends to cause the cover seal to leave its groove.

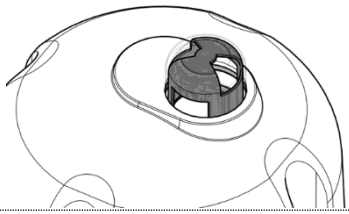
How to open the cover

1. Using an 8 mm angled socket wrench, unscrew the 4 screws fixing the cover. Do not remove them from the cover.
2. **Upon the 1st cover opening only:** Before removing the cover, slightly turn the cover while holding it on its housing to ensure its seal remains in place.
3. Remove the cover by pulling it out along its axis.

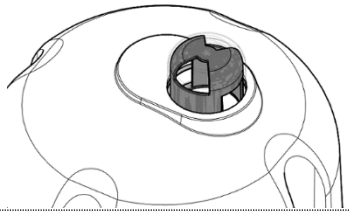
Actuators are fitted with mechanical stops and under no circumstances should the manual override be forced if a hard point is detected.

3.2 Configuring position indicator for counterclockwise closing

As a standard, AQL actuators are configured to close clockwise. If the actuator must close counterclockwise, you can change the orientation of the position indicator cap.



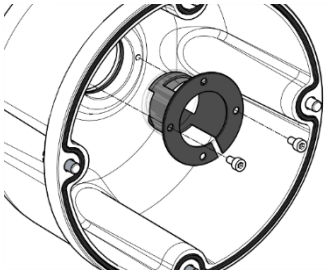
Standard indicator orientation for clockwise closing



Reverse indicator orientation for counterclockwise closing

How to change cap orientation

1. Disassemble the cover then the cap.
2. Turn the cap 90°.
3. Reassemble the cap then the cover.

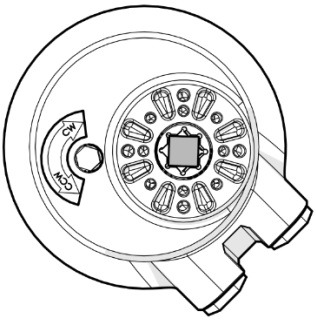


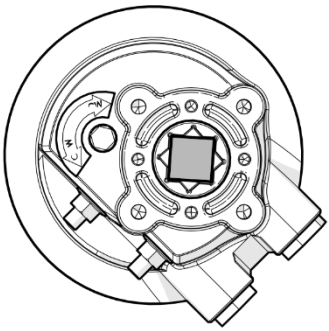
3.3 Adapting the actuator to your valve input

Both the actuator and the valve must be in the same position, either fully open or fully closed.

3.3.1 Adapters

The actuator is supplied with a set of adapters to ensure the output fits your valve shaft.
You only need to insert the suitable square adapter inside the socket.
The adapter can be oriented as a parallel square or as a diagonal square, depending on the need.



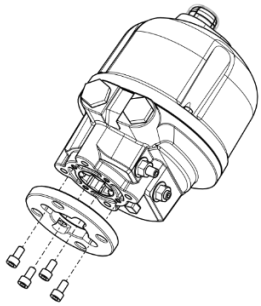


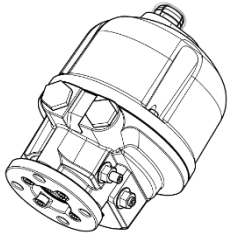
9 11 Standard	9 On request	11 14 17 Standard	12 14 On request
Internal size in mm Max. shaft length accepted 20 mm		Internal size in mm Max. shaft length accepted 25 mm	
AQ1L/AQ3L		AQ7L	

Adapters shapes (view from under the actuator)

3.3.2 Flange spacer (OPTION)

If the valve input rod is too long and does not allow you to mount the actuator on the valve flange, you can mount a spacer under the actuator.
This spacer is assembled on the flange of the AQL as shown below.





3.4 Fastening the actuator on the flange

Once the actuator is coupled with the valve, you need to fasten it on the valve flange.

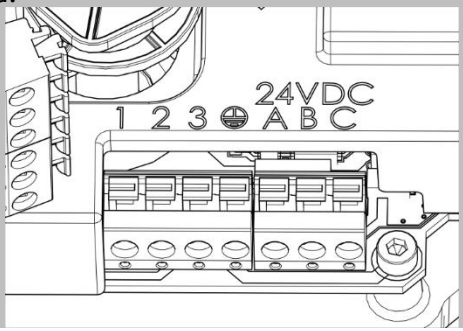
How to fasten the actuator on the valve

1. Screw the fasteners on the actuator through the valve flange without fully tightening the actuator.
2. Turn the actuator to the maximum in the counterclockwise direction.
3. Hold it in this position and tighten the actuator on the flange using the screws.

4 ELECTRICAL CONNECTION AND TESTS

To perform the electrical wiring, please refer to the wiring diagram stuck inside the actuator cover and follow the numbering of the terminals.

Make sure not to wire an AC supply on terminals A, B, C or a DC supply on terminals 1, 2, 3, this would damage the board.



4.1 Checking after wiring

Once the wiring of the actuator is completed, please check the following:

1. Make sure that the power supply voltage matches the information on the sticker located on the side of the actuator.
2. Check that all connectors or cable glands are correctly tightened.
3. Electrically operate the opening and closing travels and check that the actuator rotates in the right direction and stops at the desired position.

Never use a powered rotary equipment on the manual override to operate the actuator.

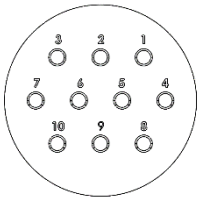
If any fault is detected at this stage, please check that your wiring is correct.

4.2 Installation of the Fast Connector (OPTION)

Bernard Controls provide a fast connector option for AQL actuators.

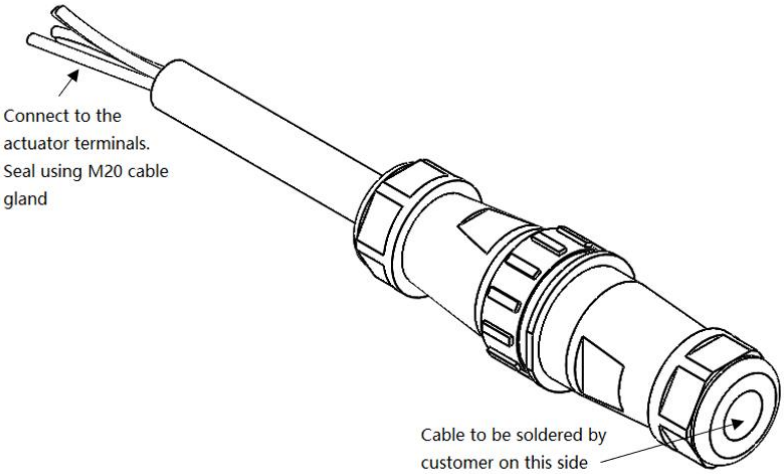
With this option, the male fast connection socket should be connected to the actuator terminals inside the actuator. Sealing must be done using the provided M20 cable gland.

The female fast connection socket needs to be prepared by the customer by soldering the site cable to the connection as indicated in the figure below and in the wiring diagram. The pins on the female connection socket are shown on the adjacent figure.



! Soldering must be done according to the provided wiring diagram.

ⓘ The outer diameter of the side cable of the actuator is Ø13~Ø16 mm.

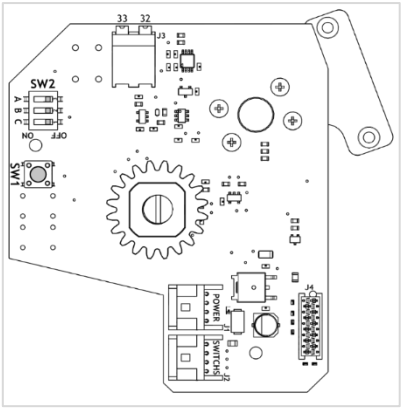


5 CALIBRATION OF POSITIONER OR TRANSMITTER

5.1 Calibration of position transmitter board (OPTION)

> **!** Make sure that the board is connected to the power supply during the calibration process.
> This operation must be carried out by a qualified electrician.

The proportional transmitter board allows you to get a feedback of the current position of the valve using a 4-20mA analog signal.
Perform the electrical wiring according to the wiring diagram of the actuator.



> ⓘ The actuator is delivered with its position transmitter already installed, and calibration has already been performed at our factory.

> ☝ Cams must be set before proceeding to this board calibration.

5.1.1 How to set the position transmitter

1. Supply the actuator for opening.
2. Press during 5 s on the **SW1** button.
   The yellow LED starts blinking.
3. When the actuator reaches the OPEN position, press on **SW1** to validate this position as the OPEN position.
4. Cut-off supply for opening.
   The yellow LED turns off.
5. Supply the actuator for closing.

The yellow LED starts blinking.

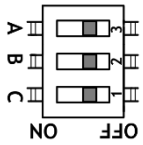
6. When the actuator reaches the CLOSED position, press on **SW1** to validate this position as the CLOSED position.
   The yellow LED remains ON.
7. Check that the position transmission operates correctly by measuring the current intensity between terminals 32 & 33.

> The current intensity should vary from 4 mA (CLOSED position) to 20 mA (OPEN position).

8. If it does not, return to step 1.

How to set closing direction

You can use the SW2 **C** dip switch to set the closing direction (A & B are not used).
This setting must be done with the power off.

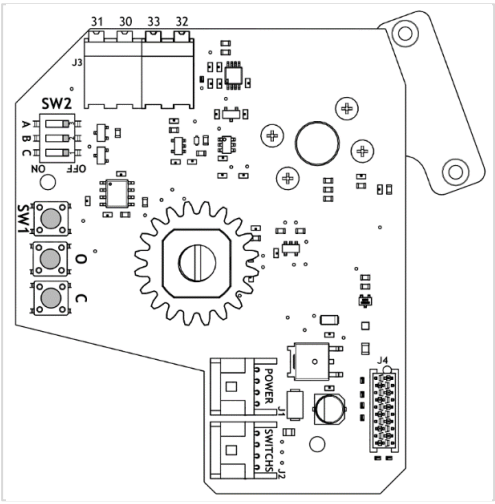


Closing direction	C
ON	Clockwise
OFF	Counterclockwise

5.2 Calibration of positioner board (OPTION)

> **!** Make sure that the board is connected to the power supply during the calibration process.
> This operation must be carried out by a qualified electrician.

The proportional analog command allows you to drive the valve to intermediate positions.
The board is factory pre-set.
Perform the electrical wiring according to the wiring diagram of the actuator.



5.2.1 Setting up positioner board

> **ⓘ** The actuator is delivered with the proportional analog command already installed, and calibration has already been performed at our factory.

Only go through the setup procedure below if you previously had to adjust the mechanical end stops positions.

5.2.2 How to set the positioner board

The potentiometer has mechanical stops, be careful not to turn the actuator too much on one side.
Check that the screw of the pinion on the potentiometer is not too loose.

1. Press for 5 seconds on the **SW1** push button located on the board. The yellow LED starts blinking.
2. Use the **O** button to operate the actuator and go to the open position.
3. Once the actuator is in the right position, press the SW1 button to save the value.
   The LED should be blinking rapidly.
4. Use the **C** buttons to operate the actuator and go to the closed position.
5. Once the actuator is in the right position, press the SW1 button to save the value.
   The LED should be blinking slowly.
6. The actuator now performs several operations to configure the controller.

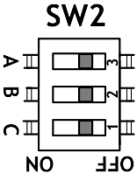
The actuator then goes back to run mode and the LED remains ON.

If the LED continues to blink after the automatic process, it is indicating one or several of the following errors:

Times blinking (blips)	2	3	4	5
	Configuration was not correctly loaded	4/20 mA signal is lost	Actuator is blocked during travel	• Direction of rotation is wrong • Actuator got to a position out of travel limits • Actuator is pumping

How to set closing direction and fail position

You can use the SW2 dip switches to set the closing direction (dip switch C) and the fail position (dip switches A & B) in case of signal loss.
This setting must be done with the power off.



Closing direction	C
ON	Clockwise
OFF	Countercl ockwise

Fail position		A ON	A OFF
B	ON	Fail last	Fail closed
	OFF	Fail open	Fail last

6 RESUMING FACTORY CALIBRATION

As a standard, AQL actuators close in the clockwise direction.

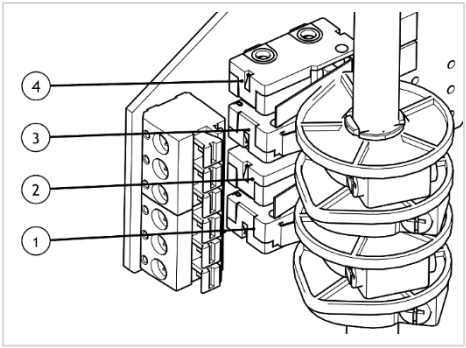
6.1 Resuming calibration of mechanical stops

Mechanical stops are set for an electrical travel of 90±3°.

Mechanical stops are factory set. You do not need to calibrate them.
They must not be used as electrical travel limits.

6.2 Resuming calibration of cams

The cam is attached on the output shaft, then rotates in the same direction and triggers a switch by pushing on its lever.
The orientation of the cams is factory pre-set, but you can re-adjust them upon installation if necessary.

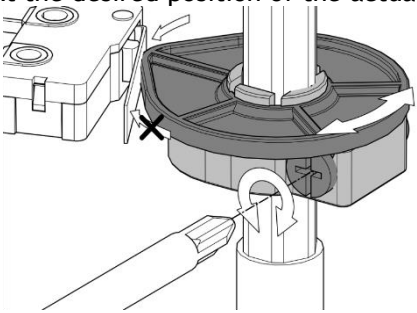


Rep.	Function	Status before installation
1	Clockwise travel limit	Pre-wired, cam pre-set
2	Counterclockwise travel limit	Pre-wired, cam pre-set
3	Clockwise signaling	To wire, to set
4	Counterclockwise signaling	To wire, to set

How to adjust a single cam

Make sure that the cam operates the lever in the right direction (as shown by the arrow in the figure below), otherwise the switch could be damaged.

At the desired position of the actuator output:



1) Turn the setting screw of the corresponding cam with a screwdriver.

The cam disk is then turning.

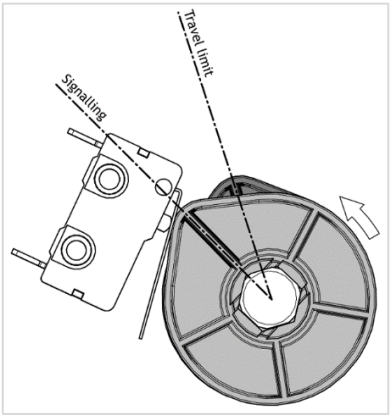
2) Adjust the cam disk until you hear a click from the switch. It indicates that the switch has been triggered.

Travel limit cams and signaling cams

AQL actuators have 4 cams with 2 different functions:

- **Travel limit cams** cut the power supply of the motor when they trigger the switch corresponding to an end position.
- **Signaling cams** are not wired by default. You can use them to indicate when the actuator gets close to an end position.

Signaling cams must be set to reach their corresponding switch before the travel limit cams do.



If the actuator is supplied mounted on a valve, the following settings should have been performed by the valve supplier.

6.3 Resuming calibration of travel limits

Travel limit settings are done with cams only. The actuator stops on the open or closed position when the travel limit switch is tripped. Remove the cover and, after the power supply is connected, proceed to the following test.

How to test factory settings (without positioner)

1. Run a clockwise operation until the actuator stops with the closing end position switch.
   If the setting is correct (i.e. the valve is closed), **the test procedure is finished**.
   If the setting is not correct, resume the settings according to the following steps:
2. Reset the clockwise end position cam to allow a slight extension of the travel of the actuator and get your valve closed.
   If the clockwise signaling switch is wired:
3. Drive the output slightly in the counterclockwise direction using the manual override.
4. Set the cam corresponding to the clockwise signaling switch.
5. Once the clockwise cams are set, resume steps 1 to 4 for the counterclockwise direction.

How to test factory settings (with positioner)

1. Using the manual override, drive the actuator in the clockwise direction to the end position.
2. According to the situation:
    - If the end position cam trips the switch at the same time as the valve is closed, **you do not need to resume the settings**.
    - If the end position cam trips the switch before the valve is closed, **set the cam slightly counterclockwise** to get the switch tripped and the valve closed at the same time
    - If the valve is closed before the cam is tripped, **set the cam slightly clockwise** to get the switch tripped and the valve closed at the same time
3. If it is wired and if necessary, set the clockwise signaling cam accordingly.
4. Using the manual override, drive the actuator counterclockwise to the end position.
5. Proceed to the same checks as in step 2 with the opposite directions.
6. If it is wired and if necessary, set the counterclockwise signaling cam accordingly.

7 RE-STARTING TORQUE LIMITING DEVICE

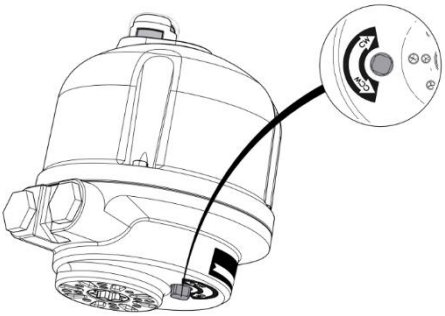
In case of excessive torque on the actuator, a torque limitation system shuts down the actuator.
A LED behind the switch board is lighting up when this protection is ON.

How to re-start the actuator after an over-torque detection

1. Switch off the power supply.
2. Check if the issue comes from the valve (stiff point or jamming) or the mechanical stops (over-travel).
3. Fix the issue.
4. Switch back on the power supply and electrically operate the actuator in both directions.

The LED remains lit for a few seconds after the power supply is switched off.
Wait those few seconds before switching back on the power supply and operating the actuator.

8 MANUAL OVERRIDE



In case of loss of power supply, you can operate the actuator manually using the driving square under the actuator.
This 10 mm driving square can be driven using a suitable wrench.
To operate the actuator using the manual override, follow the direction of rotation indicated by the stickers located on the side and below the actuator.

AQ1L / AQ3L side sticker

AQ7L side sticker

!

Be careful not to damage the actuator during manual operation.
Do not apply a torque higher than 3 N·m (AQ1L and AQ3L) or 6 N·m (AQ7L) to the square.

Check the indicator when using the manual override to avoid reaching the mechanical stops.

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