

**BERNARD
CONTROLS**

Invest in Confidence



AQL Range



Start Up Guide

SUG_17002 - Ind.A
Art : 5100465

TABLE OF CONTENTS

1	SAFETY	4
2	STORAGE AND MAINTENANCE	4
	Packaging & Storage	
	Maintenance	
3	ASSEMBLY	5
	Adapting the actuator to your valve input	
	Configuring position indicator for counter-clockwise closing	
4	MANUAL OVERRIDE	6
5	ELECTRICAL CONNECTION AND TESTS	7
	Checking after wiring	
6	TRAVEL LIMIT SETTINGS	8
	Setting a single cam	
	Setting cams (AQ1L & AQ3L)	
	Setting cams and mechanical stops (AQ7L)	
7	PROPORTIONAL ANALOG COMMAND (OPTION)	11
	Setting up positioner board	
8	TORQUE LIMITING DEVICE	12

1 SAFETY

This device complies with current applicable safety standards. Installation, maintenance, and use of this unit require a skilled and trained staff.

Please carefully read this whole document before mounting and starting-up the actuator.

2 STORAGE AND MAINTENANCE

Packaging & Storage

The AQL actuator is delivered in a cardboard box equivalent to the size of the actuator and sits in a cardboard wedge.

It 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 cable entries' plugs are correctly tightened.
- Check that cover screws are correctly tightened.

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 actuator mounting and 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.

Maintenance

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

3 ASSEMBLY

After assembly, the actuator can operate in any position.



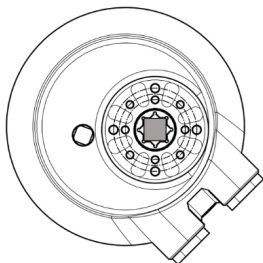
However:

- It is not recommended to install actuator with cover downwards
- Cable glands must not be oriented upwards (loss of water tightness)

Adapting the actuator to your valve input

Actuator is supplied with a set of adapters to ensure the output fits your valve shaft.

You only need to insert the accurate square adapter inside the socket. Adapter can be oriented as parallel square or as diagonal square, depending on your need.



Standard

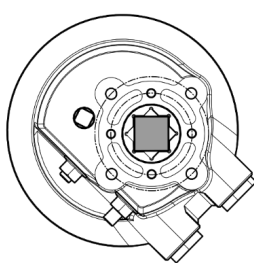


On request

Internal size in mm

Max. shaft length accepted 20mm

AQ1L/AQ3L



Standard



On request

Internal size in mm

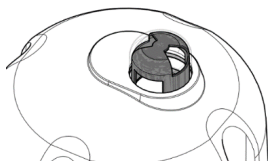
Max. shaft length accepted 25mm

AQ7L

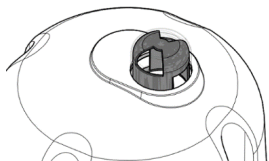
Adapters shapes (view from under the actuator)

Configuring position indicator for counter-clockwise closing

As a standard, AQL actuator is configured to close clockwise. If the actuator must close counter-clockwise, you can change orientation of the position indicator cap.



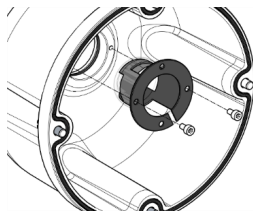
Standard indicator orientation
for clockwise closing



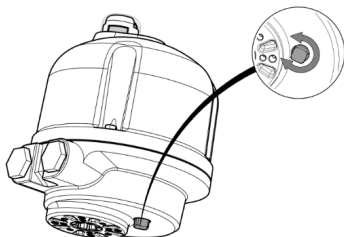
Reverse indicator orientation
for counter-clockwise closing

How to change cap orientation

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



4 MANUAL OVERRIDE



You can operate the actuator manually using the driving square under the actuator.

Output will turn in the direction opposite to the rotation applied.

Square size is 10mm.

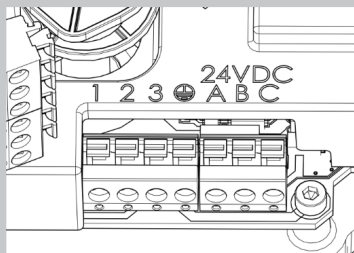


- Be careful not to damage actuator during manual operation. Do not apply a torque higher than 6N·m to the square.
- Check indicator when driving actuator with manual override to avoid reaching mechanical stops.

5 ELECTRICAL CONNECTION AND TESTS

To perform electrical wiring, please refer to the wiring diagram supplied and follow the terminals' numbering.

Make sure not to wire AC supply on A, B, C terminals or DC supply on 1, 2, 3 terminals, that will damage the board.



Checking after wiring

Once the actuator wiring is completed, the following points must be checked:

1. Make sure that power supply voltage matches information on the sticker on the side of the actuator.
2. Check that all connectors or cable glands are correctly tightened.
3. Move the valve using manual override to an intermediate position.
4. Electrically operate 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 manual override to operate the actuator.

If any fault is detected at this stage, please check all wiring.

6 TRAVEL LIMIT SETTINGS

The actuator is factory-set for a 90° travel.

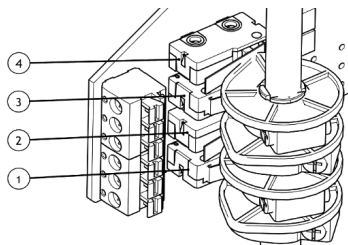
It features 2 devices to limit the travel:

- Cams trigger switches to switch off power at an end position or to signal a position.
- Mechanical stops mechanically block rotation to protect the valve in case of over-travel. They must not be used as travel limits.

Setting a single cam

The cam rotates as the output shaft and triggers a switch by pushing on its lever.

Cams orientation are factory pre-set, yet you can still re-adjust them upon the installation if necessary.



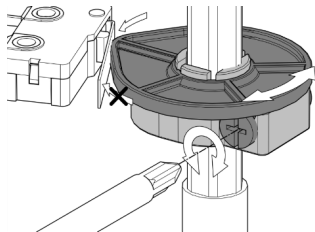
Rep.	Function	Status before installation
1	Clockwise travel limit	Pre-wired, cam pre-set
2	Counter-clockwise travel limit	Pre-wired, cam pre-set
3	Clockwise signalling	To wire, to set
4	Counter-clockwise signalling	To wire, to set

How to adjust a single cam



Make sure the cams contact the switch according to their proper direction of travel, otherwise you could damage the switch.

At the desired position of the actuator output:



- 1) Turn the setting screw of the corresponding cam with a flat-head or a Phillips-head screwdriver.

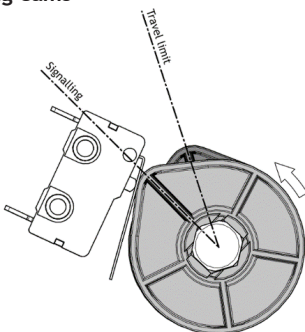
The cam disk is then turning.

- 2) Set the cam disk until you hear a click from the switch. It indicates the triggering of the switch.

Travel limit cams and signalling cams

On AQL actuator, you have 4 cams with 2 different functions:

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



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



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

Setting cams (AQ1L & AQ3L)

AQ1L & AQ3L have fixed mechanical stops. Travel limit settings are done by cams only.

How to adjust cams for both directions

1. Drive the actuator to clockwise travel limit position.
2. Set the cam corresponding to clockwise travel limit switch.

If the clockwise signalling switch is wired:

3. Drive the output slightly in the counter-clockwise direction using manual override.
4. Set the cam corresponding to clockwise signalling switch.
5. Drive the actuator to the counter-clockwise travel limit position.
6. Redo settings steps 2 to 4 for counter-clockwise direction.

Setting cams and mechanical stops (AQ7L)

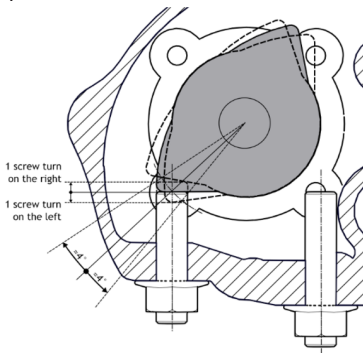
AQ7L has both mechanical stops and cams that can be set.

Setting travel limits

The mechanical stops limit the actuator travel.

Fine adjustment of the stop screws position is possible within a limit of $\pm 2^\circ$ maximum. These screws are located in the lower section of the actuator.

The actuator stops on open or closed position when the travel limit switch is tripped.



How to adjust cams and mechanical stops for both directions



One turn of the adjustment screw = 4° angle variation at the actuator output.

1. Untighten the nut corresponding to clockwise mechanical stop and turn stop screw 2 turns back.
2. Drive the actuator to clockwise travel limit position.
3. Get the clockwise stop screw in contact with output sleeve then turn it back of 1.5 turns.
4. Retighten nut to keep position of mechanical stop.
5. Set the cam corresponding to clockwise travel limit switch.

If the clockwise signalling switch is wired:

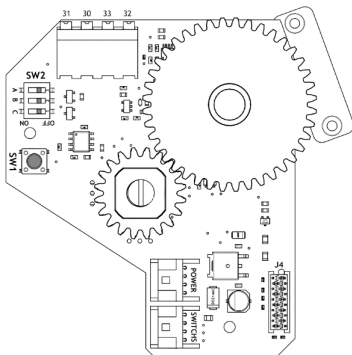
6. Drive the output slightly in the counter-clockwise direction using manual override.
7. Set the cam corresponding to clockwise signalling switch.
8. Untighten the nut corresponding to counter-clockwise mechanical stop and turn stop screw 2 turns back.
9. Drive the actuator to the counter-clockwise travel limit position.
10. Redo settings steps 3 to 7 for counter-clockwise direction.

7 PROPORTIONAL ANALOG COMMAND (OPTION)

The proportional analog command allows to drive the valve to intermediate positions.

Board is factory pre-set.

Perform the electrical wiring according to the wiring diagram of the actuator.



Setting up positioner board



Take care that the board is supplied during setting process.



The actuator is delivered with the proportional analog command already installed, and the settings have already been done at our factory.

Only go through the setup procedure below if you had to adjust the mechanical end stops positions. Board setup is fully automatic.

How to run the board setup

1. Press for 5 seconds on the **SW1** push button located on the board.
The yellow LED is blinking while the setup is in progress and is remaining lit when the setting is completed.
2. Control the setup by performing some clockwise and counter-clockwise operations.

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

Times blinking	2	3	4	5
	Configuration was not correctly loaded	4/20 mA signal is lost	Actuator is blocked during travel	<ul style="list-style-type: none"> • Rotation direction is wrong • Actuator got to a position out of travel limits • Actuator is pumping

How to set closing direction and fallback position

You can use SW2 dip switches to set closing direction (dip switch 1) and fallback position (dip switches 2 & 3) in case signal is lost. This setting must be done with power off.



Closing direction		1
ON		Clockwise
OFF		Counter-clockwise

Fallback position		3	
		ON	OFF
2	ON	Stayput	Closed
	OFF	Open	Stayput

8 TORQUE LIMITING DEVICE

In case of excessive torque on the actuator, a torque limitation system shuts down actuator.

A LED behind switch board is lighting up when this protection is ON.

How to re-start the actuator if torque limiter went off

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



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

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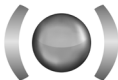
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