MILTON ROY

ACC
Actuator Capacity Control Manual

m-ROY®, MAXROY®, MILROYAL®, PRIMEROYAL® and PRIMEROY® Product Family Pumps

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MILTON ROY

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DEFINITIONS

Tip or info.

Warning requiring a check and/or a compulsory action.

!

Warning requiring a check and/or a compulsory action on the device because of risks of damages for the device or danger for the staff working on the device.

! Ex

Warning requiring a check and/or a compulsory action on the device because ignoring it may cause an explosion.

➔ **Instruction to follow in order to comply with explosion-proof rules**

1 SAFETY INFORMATION

Please carefully read this whole document before proceeding to installation and commissioning.

The following documents should also be consulted:

a) IEC/EN60079-14 standard (electric installations in gaseous explosive atmosphere),

b) IEC/EN60079-17 standard (inspection and maintenance operations in dangerous areas),

c) National Electrical Code (NEC500) for the USA and Canadian Electrical Code (CEC500)

d) Decrees, ministerial orders, laws, directives, standards, procedures and any other document relative to the area where the actuator has to be installed.

Milton Roy, LLC cannot be judged responsible for the non-respect of these rules.

Our equipment complies with the CSA and FM Standard and are therefore CSA marked with indicators ‘’C” and ‘’US”.

Our equipment complies with IECEx and ATEX Standard and are therefore IECEx and ATEX marked.

They have been designed to be used in explosive atmospheres:

- **class I, group C, D in presence of vapor, fog or gas**
- **class II, group E, F, G and class III for dust**
- **group II - category 2 in presence of vapor, fog or gas (G). Use in zone 1 or 2 for gas**

➔ **Please check the compatibility between the indications written on the identification plate and the explosive atmosphere type, the ambient and the admissible surface temperature of the installation area.**

➔ **The actuator installation and maintenance must be carried out by qualified, trained and certified personnel.**

2 MARKING

2.1 Marking summary

	ATEX Explosionproof enclosure "d"	IECEx Explosionproof enclosure "d"	CSA C&US Explosionproof enclosure "C1, D1"
Name and address of manufacturer	Milton Roy, LLC 201 Ivyland Road, Ivyland, PA 18974, USA		
Actuator type	ACC		
Serial number	Serial n°XXXXXXXX.YYY		
Certificate number	**INERIS 19ATEX0019X**	**IECEx INE 19.0016X**	**CSA 600256**
Specific marking	WARNING – DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT	WARNING - TO PREVENT IGNITION OF FLAMMABLE GASES, VAPORS OR DUST, DO NOT REMOVE COVER WHILE CIRCUITS ARE LIVE	
	CABLE ENTRIES: SEE INSTRUCTIONS		
N° of notified audit body	CE 0891		
Gas marking	II 2 G Ex db IIB T6 Gb	Ex db IIB T6 Gb	Class I, Division 1 Group C D T6
Dust marking	Not available on ACC		Class II, Division 1 Group E, F, G T80°C
Ambient temperature	-40°C +60°C	-40°C +60°C	-40°C +60°C

2.2 Agency approvals

The nameplate documents all safety and/or hazardous location approvals that apply to the unit. See *Figures 1 and 2* for name plate configurations. All or some of the following approvals may apply:

Weatherproof IP68	EN 60529
	FM 3616
	CSA 213
	CSA 25
Exproof Atex	EN 60079-0
	EN 60079-1

Weatherproof Nema 4X	NEMA250
Exproof IECEx	IEC 60079-0
	IEC 60079-1
Exproof CSA	CSA22.2 No.30
	FM3615

Table 1: Approvals standards list

The declaration of conformity (*Figure 3*) lists the standards declared by Milton Roy.

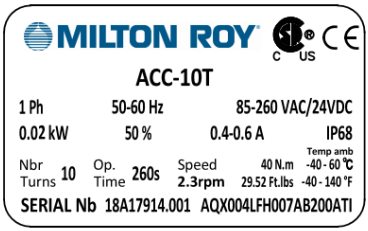

Figure 1. Weatherproof IP68 and NEMA 4X ACC nameplate (for illustration only)

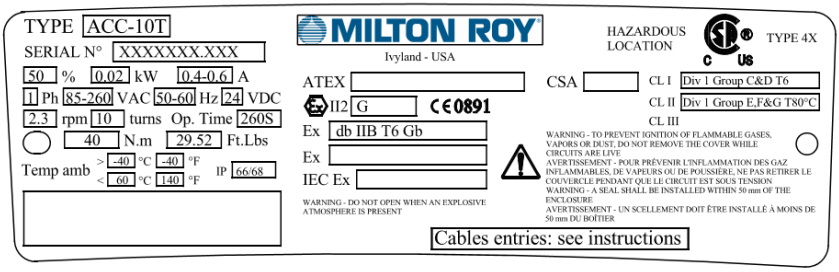

Figure 2. IECEX / ATEX / CSA ACC nameplate (for illustration only)

EC DECLARATION OF CONFORMITY

Declaration No. 002

We, the undersigned:

Name of Manufacturer	Milton Roy, LLC
Address:	201 Ivyland Road, Ivyland, PA 18974
Country:	USA

Declare under our sole responsibility that the following apparatus:

Product description:	Actuator Capacity Control (ACC) Actuators. Electronic Actuators for adjusting the capacity setting of metering pumps.
Model or Type No.:	**Type**, ACC-10T for **Models**, mROY® A or B MILROYAL® C, D, B PRIMEROYAL® K or L PRIMEROY K or L **Type**, ACC3/4T for **Models,** MAXROY® A, D or B
Brand name:	Milton Roy (ACC) Actuators

Are in conformity with the following relevant EC legislation:

IECEx 01 et IECEx 02 / IECEx 01 and IECEx 02
Directive 2014/34/UE / 2014/34/EU Directive

Based on the following harmonised standards:

IEC 60079-0: 2017
Edition 7.0
IEC 60079-1: 2014-06
Edition 7.0

And therefore complies with all of the relevant essential requirements of those directives.

The following Notified Body has been involved in the conformity assessment process:

Notified Body:	INERIS
Role:	Issue of IECEX EC Type Certificate
Certificate No.	IECEx INE 19.0005X
ATEX coding	II 2 G Ex db IIB T6 Gb
Technical File No.	INERIS 19ATEX0003X

Name and position of person binding the manufacturer or authorised representative:

Signature	5/9/19
Name	Mark Hessenius
Function	Engineering Manager
Location	Milton Roy, LLC Ivyland, PA 18974, USA
Date of issue	05/09/2019

Figure 3: Declaration of conformity

3 TECHNICAL DEFINITION

3.1 Technical specifications

ACC Capacity Controller			
Technical specifications		**ACC - ¾ turn**	**ACC - 10 turns**
GENERAL	Description	ACC actuators include a multi-voltage board to supply a 24VDC motor, Compact gear case, emergency manual command and standard output with a square of 22mm	
	Max Torque	70N.m	40N.m
	Max output speed	1 rpm	2 rpm
	Duty Classification	• Inching/Positioning: Class B actuators complying with EN15714-2	
ENCLOSURE - PROTECTION	Casing	• Aluminum gravity casting enclosure • Cover fastened by captive and stainless-steel screws	
	Weather proofness	• IP68 (comply with EN 60529, FM 3616, CSA 213, CSA 25) • NEMA 4X (comply with NEMA250)	
	Explosion proof	See §2.1 and §2.2	
	Ambient temperature range	See §2.1 and §2.2	
MOTOR	Motor technology	24VDC motors with 2-wire connection to the control boards	
	Motor duty rating	Inching/Positioning (complying with EN15714-2 Class B): S4-50% motor duty rating. Up to 120 starts per hour at peak of operation	
	Power supply tolerance level	(Voltage +/- 10%, frequency +/-2%)	
	Nominal Motor Power @ 50% actuator load	20W	13.5W

	Electrical equipment dissipated power (ACC-10T including motor @ 85 Vac 50Hz and 100% load)	33 VA	
	Starting currents	AC: Is= 2 A (starting current) DC: Is= 6 A (starting current)	
Technical specifications		**ACC - ¾ turn**	**ACC - 10 turns**
MECHANICAL SPECIFICATIONS	Gear design	The Actuator is mechanically self-locking and lubricated for product lifetime	
	Manual emergency operation	Manual emergency operation via a 10mm hexagonal manual shaft	
	Output flange	The Actuator's flanges comply with ISO 5211 F07	
	Lubrication	The actuators are lubricated for the product lifetime and do not require any special service	
ELECTRICAL SPECIFICATIONS	Power supply	The actuators can operate on a wide variety of single phase power supply From 85VAC to 260VAC 50/60Hz and 24VDC (12VDC single power supply available on request)	
	Terminal compartment	Push-in type terminals for controls and power supply Internal and external earth grounding post. Power Terminals wire section acceptance: - From 24 to 14 AWG / 0.25 to 2.5mm² Signal Terminals wire section acceptance: - From 24 to 16 AWG / 0.25 to 1.5mm²	
	Conduit entries	2 x ¾ NPT as standard (cable glands are not supplied)	

Technical specifications		ACC - ¾ turn	ACC - 10 turns
POSITION SENSORS	Inching/Positioning Control	• Command isolated from the feedback signals • 4-20mA analog input command given through 2 wires • 4-20mA analog output feedback received through 2 wires	
	Travel Limit systems	• Limit switches actuated by adjustable cam-block • 2 SPDT switches as standard (Open and Close) + 2 auxiliary switches (customer feedback) 250VAC-5A/ 48VDC-2.5A (resistive load)	Operated by the analog positioner only
EC DIRECTIVES AND STANDARD	Compliance with Directives and Standard	ACC actuators comply with: • Directive 2004/108/EC Electromagnetic compatibility • Directive 2006/95/EC Low voltage • The following harmonized standards: EN 61000-6-4: Generic emissions standard for industrial environments EN 61000-6-2: Generic immunity standard for industrial environments EN 60034-1: Rotating electrical machines • Directive ATEX2014/34/UE	

Table 2: Technical data

3.2 Product model coding

MAXROY®, mROY®, MILROYAL®, PRIMEROYAL® and PRIMEROY® product family pumps can be ordered with or without an ACC already attached. The pump model code can be found on the pump name plate, mounted on the pump.

There are four ACC's type supplied with a pump; these models are shown in the product model code tables (Table 3). There are several very similar ACC name plates and some of these are shown in *Figure 1 and Figure 2*. Please note that the *Figure* 2 data plate documents what safety and/or hazardous location approvals apply to the unit.

PUMP	Milton Roy Actuator Number	Type of Actuator	Technical definition
mROY® A or B MILROYAL® B, C or D PRIMEROYAL®K or L PRIMEROY K or L	0280087010N	ACC-10T	10 turns Ex-Proof IECEx, ATEX & CSA/FM
	0280088010N	ACC-10T	10 turns IP68
MAXROY® A, D or B	0280087110N	ACC-3/4T	¾ turn Ex-Proof IECEx, ATEX & CSA/FM
	0280088110N	ACC-3/4T	¾ turn IP68

Table 3: Pump Model codes

4 START-UP

4.1 Installation area

This actuator is an explosion-proof equipment and can be used in the following areas:

Actuator type	ACC (IECEx + ATEX)	AQX L (CSA)	
Protection class	Ex db	Class I Group C, D Class II Group E, F, G Class III	
Category	2 (EPL Gb)		
Division	Zone 1 or 2	Division 1 or 2	
Atmosphere	G Gas	Gas	Dust

EPL = Equipment's Protection Level. b= high level Gas (G) and Dust (D).

Zone 1 (gas): the explosive atmosphere is likely to occur occasionally in normal operation.

Zone 2 (gas): the explosive atmosphere is not likely to occur in normal operation but if it does occur, it will persist for a short period of time only.

Division 1: the explosive atmosphere is likely to occur during periodic maintenance or during normal operation.

Division 2: the explosive atmosphere is not likely to occur in normal operation but in case of accidental rupture or abnormal operation.

! Ex

This device has not been designed to be operated in an area where explosive atmosphere occurs frequently or during long periods (IEC 79-10-zone 0).

Groups

This actuator has been designed for the surface industries groups B, C or D.

Zone Group	Division Group	Typical gas
IIA	D	Propane
IIB	C	Ethylene
Not available on ACC	E	Combustible Metal Dusts
	F	Combustible Carbonaceous Dusts
	G	Other Combustible Dusts

Table 4: Zone group ACC design

For other gases, please consult a notified body (e.g. CSA or INERIS).

Temperature

The temperature class corresponds to the actuator maximum surface temperature.

Class	Max surface temperature
T6	185°F (85°C)

Table 5 : Temperature class

! Ex

Check group and temperature class on the actuator tag.

4.2 Electrical and temperature parameters

The power supply voltage and frequency are indicated on the name plates and (or) on the electric wiring diagram.

The minimum ambient temperature is -40°F (-40°C) and the maximum +140°F (60°C) unless another information is mentioned on the name plates.

4.3 Recommendation

To avoid any risk of explosion, the actuator electric control and power supply must be switched off before opening the cover.

! Ex Do not open the cover when the actuator is under power.

! Ex Be careful not to damage the flameproof joint surfaces of the cover either at the opening and closing of the cover. Check its cleanliness when repositioning the cover onto the actuator body. Tighten each cover screw. The torque range of tightening cover screw is 6~10N.m.

When closing the cover, check the joints cleanliness. Be careful not to damage the joints when repositioning the cover onto the actuator body. Tighten each cover screw.

The torque range of tightening cover screw is 6~10Nm.

Screws of explosion-proof actuator body must be made of stainless steel of class A2 or A4 of 70 daN/mm² minimum tensile strength.

➔ **In case of use in explosive dust atmosphere, check that cover tightness gaskets are intact and make sure not to degrade the gaskets while closing the cover.**

The maximum temperatures of entry point or branching point are 68.2℃ and 71.6℃, please select proper cable or conductors for installation.

! Ex Cable entries shall provide a level of protection equal or higher than the one indicated on the actuator name plate.

Ensure that the cable glands or conduit entries comply with the explosion-proof equipment standards and with the explosion-proof classification. If one of them is not used, seal it with a certified and suitable metal plug for the type of protection specified.

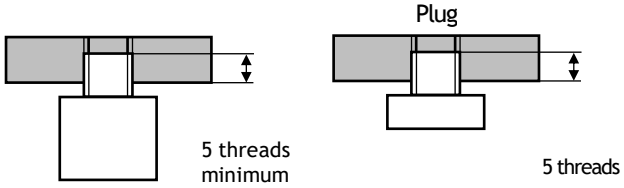

Figure 4. Cable glands or Conduit entries

A connection to the earth must be wired using the actuator external grounding plug. Internal and external groundings must be connected.

!

Ex

Remove all plastic plugs of unused conduit entries and replace them by an explosion proof certified metal plug. The plastic plug is not explosion-proof and is used only for shipping and storage

The cable glands are not included on the standard product. You could order the IECEX / ATEX cable glands kit number 3051570301F

Water-proofness: Because the NPT cable gland thread is not IP68, it's necessary to mount it with a thread sealant, for ex: Loctite 577 (Henkel).

4.4 Electrical Wiring

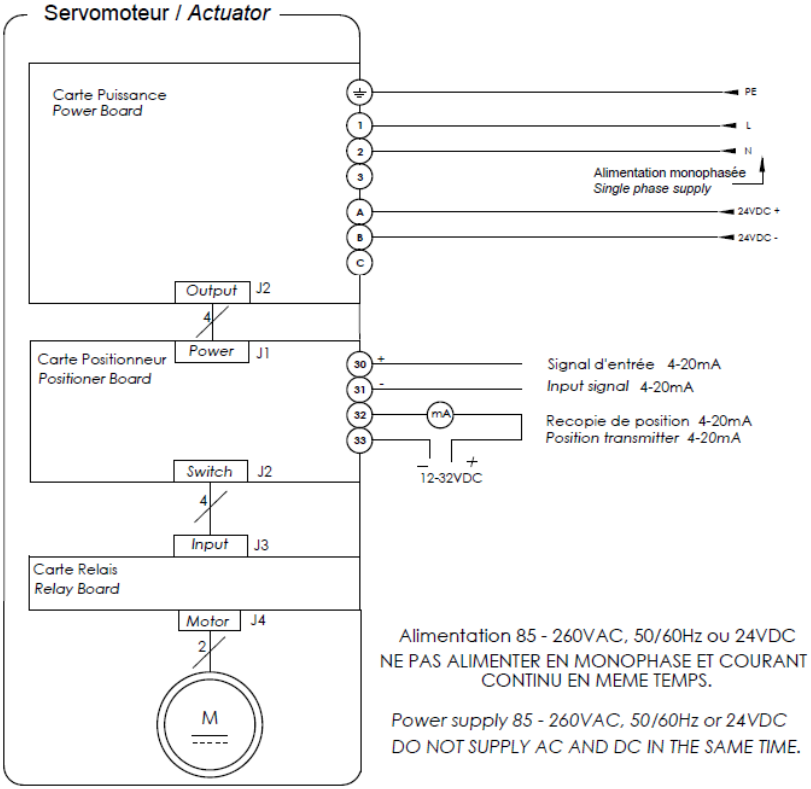

Figure 5. Electrical principle diagram

5 OPERATION

Never leave the cover open in order to avoid any risk of water inlet.

➔ **In case of use in explosive dust atmosphere, check that the cover tightness O-rings are intact and make sure not to damage the seals while closing the cover (see maintenance kit table 6)**

6 MAINTENANCE

! Ex

Ensure a regular cleaning of the product housing to avoid dust build-up.

➔ **Regularly check that the actuator explosion-proof enclosure has not been degraded by a mechanical shock or any other type of aggression.**

➔ **If it is operating in a very wet atmosphere, you are advised to check once a year there is not condensation inside.**

Covers opening

! Ex

Do not open the cover when the actuator is under power or if an explosive atmosphere is present.

! Ex

Explosionproof joint surfaces cannot be serviced. In case a joint is damaged, the corresponding part must be replaced.

It is important not to degrade the explosion-proof protections (surfaces, cable entries, joints ...).

➔ **Use the notches or bosses in order to keep sealing and cover integrity.**

! Ex

Any repair operation requires a manufacturer agreement. Do not bring any modification of any kind to the actuator.

The actuator mechanical parts are greased for product lifetime and do not need any specific maintenance.

! Ex

In case of a disassembly/re-assembly operation, make sure that all moving parts are correctly greased in order to prevent any electric spark.

6.1 Special operation conditions including incorrect practices

Duty cycle: Motors are designed for an intermittent operation; it means that they should be stopped for a sufficient period of time after each operation in order to enable it to cool down (**see table 2**).

! Ex

If the operating time is too high, the motor temperature will raise and there will be a risk to damage the motor.

➔ Please refer to the duty cycle written on the actuator tag.

6.2 Spare parts

Parts orders must include the following information:

Pump serial number (on pump nameplate)

Model number (on ACC nameplate)

Part description

Quantity required

Always include the serial and model numbers in all correspondence regarding the unit.

Designation	Kit Number	Work instruction number
Seal kit	3051570001F	1602101011
Cover kit	3051570003F	1602101021
Indicator Disc kit	3051570004F	1602101031
Power Board kit	3051570100F	1602101041
Relay Board kit	3051570300F	1602101061
Positioner Board kit	3051570201F	1602101051

Table 6: Maintenance Kits

6.3 Returning units to the factory

The Actuator Capacity Control (ACC) units will not be accepted for repair without a Return Material Authorization, available from the Factory Repair Department. If the ACC is being returned attached to a pump, process liquid should be flushed from the pump liquid end and oil should be drained from the pump housing before the pump is shipped. Label the unit clearly to indicate the liquid being pumped.

NOTE

Federal law prohibits handling of equipment that is not accompanied by an OSHA Safety Data Sheet (SDS). A completed SDS must be packed in the shipping crate if the ACC is returned attached to a pump. These safety precautions will aid the troubleshooting and repair procedure and preclude serious injury to repair personnel from hazardous residue in pump liquid end.

All inquiries or parts orders should be addressed to your local Milton Roy representative. Representatives can be found on our website **(www.miltonroy.com).**

6.4 Troubleshooting

SYMPTOMS	REMEDIES
ACC moves to same position regardless of signal applied	● Improper command signal applied to ACC. Connect mA meter into signal line. Read signal. If necessary, correct signal source, possible broken wire, loose connection, etc. ● Mode setup incorrect. Review initial start-up procedure.
ACC does not respond to 4-20 mA command signal	● No power to ACC. Correct by applying AC / DC power to ACC. ● Polarity of 4-20 mA signal wires connected to terminals may be backwards. Check polarity and correct if improper. ●Incorrect Mode setup. Review initial start-up procedure. ● Bad printed circuit board. Replace PC board.
ACC will only travel in one direction	●Incorrect Mode setup. Review initial start-up procedure. ● Bad printed circuit board. Replace PC board.
ACC chatters or vibrates	● The ACC is driving the pump adjustment against the pump's mechanical stop. Reset the ACC and pump high and low limits per calibration procedure. ● Incorrect Mode setup. Review initial start-up procedure. ● If the limits are okay, then circuit board and/or feedback potentiometer should be replaced.
A red LED turns ON on the ACC Relay board	● Too high torque applied at the actuator's output. Check if anything could block the rotation.

Table 7: Trouble shooting

7 STORAGE

7.1 Packaging & Storage

The ACC 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.

7.2 What to check after storage?

1. Visually check the electrical equipment.
2. Controlled, no external enclosure damage.

7.3 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.

An actuator consists of electrical components plus mechanical parts which have life-long lubrication. Although the assembly is contained in a waterproof housing, the actuators may suffer from oxidation, become clogged or seize during commissioning if it has not been stored correctly.

8 MECHANICAL SET-UP

The actuator must be assembled according with the position defined in the general arrangement drawing of the pumps.

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

8.1 Adapting the actuator to your pump input

The Actuator assembly kit is supplied with your pump to ensure the output fits on your pump shaft.

All information regarding the adaptation of the Actuator on your pump are available in the pump IOM.

9 ELECTRICAL CONNECTION AND TESTS

Before performing the electrical wiring, please refer to the supplied wiring diagram **(figure 3)** 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.

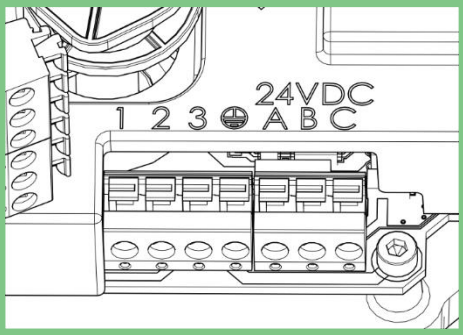

Figure 5. Power terminal block

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 inside of the cover.

2. Check that all connectors or cable glands are correctly tightened.
3. 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.

10 ACTUATOR SETTINGS

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

The Board is factory pre-set.

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

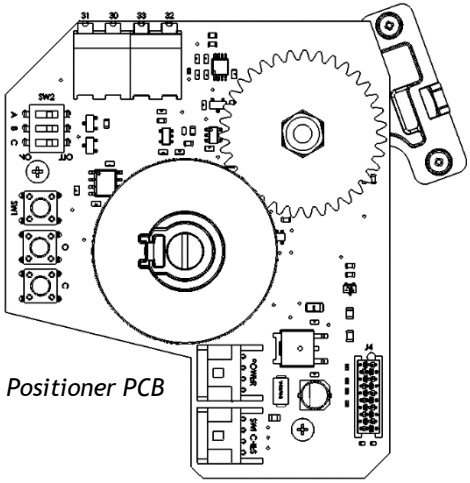

Figure 6. Positioner PCB

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

The ACC is shipped assembled on the pump, ready to be used in direct acting mode.
In this mode, 4mA corresponds to 0% of pump stroke and 20mA corresponds to 100% of pump stroke.
Do the following operations described in paragraphs 10.1 only if the actuator has been disassembled from the pump.

! The potentiometer has mechanical stop, be careful do not turn the actuator too much on one side. Check the screw of the pinion on potentiometer, make sure it is not loose.

10.1 Setting up positioner board in direct setting mode

! Ex

This operation must take place outside of the explosive atmosphere.

Nota: When the ACC-3/4T is shipped as spare part, it is already fully set up with its opening position (20mA) already in front of the 100% stroke position of the MAXROY pump knob. Do the following operation only if its setting was changed.

Put SW2 dip switches A, B and C on position “OFF”.

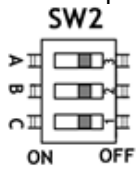

Figure 7. Switch 2

!

Be careful, this setting must be done while powered off.

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

Take care that the board is supplied during setting process.

2. Apply 20mA input signal until the rotation stop. Output shaft could not run, depending on its previous position.
3. Remove the 4-20mA input signal
4. Press for 5 seconds on the SW1 push button located on the board. The yellow LED is blinking 500ms ON-OFF.
5. Use the “O” or “C” buttons to run the output shaft until its position matches with the position of the stroke adjustment of the pump.

=> Position of the stroke adjustment of the pumps has to be:

=> 0% for mRoy, Milroyal, Primeroy & Primeroyal

=> 100% for Maxroy

ACC-3/4T has travel limit cams. If ACC stops running before reaching its position, it could be due to travel limit cams, see paragraph 12.

6. Once the actuator is in the right position, press the SW1 button to save the value, then the LED should be blinking 100ms ON-OFF.
7. Use the “C” button to operate the actuator. The output shaft must do 10 turns for ACC-10T and 270° for ACC-3/4T

ACC-3/4T has travel limit cams. If ACC stops running before reaching its position, it could be due to travel limit cams, see paragraph 11.

8. Once the requested number of turns is done, press the SW1 button to save the value, then the LED should be blinking 1s ON-OFF
9. After above steps the actuator will proceed to several operations to configure the controller. Then the actuator will go back to run mode and the LED should remain ON

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	4/20mA signal is lost	Actuator is blocked during travel	• Rotation direction is wrong • Actuator got to a position out of travel limits • Actuator is pumping

Table 8: LED blink error

! Only for MILROYAL, PRIMEROYAL and PRIMEROY pumps

If the ACC is used on MILROYAL, PRIMEROYAL and PRIMEROY pumps, put SW2 dip Switches A, B and C on position “ON”.

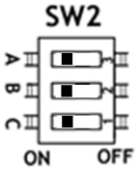

Figure 8. Switch 2

! Be careful, this setting must be done with power off.

Let these switches on position “OFF” if the ACC is used on mRoy and MAXROY pumps.

10. Before assembling the actuator on the pump do the following operations:

    On ACC -10T: Apply 4mA to run up to closing position (0% of stroke) and adjust the position of the stroke indicator accordingly

    On ACC -3/4T: Apply 20mA to run up to opening position (100% of stroke) and adjust the position of the stroke indicator accordingly.

11 How to change the acting mode and the fallback position?

The actuator is factory setting up in Direct Acting mode
You can change the position of SW2 dip switch C to run the actuator in Indirect Action mode (20mA = 0% stroke)
You can use SW2 dip switches A & B to change fallback position in case signal is lost.

This setting must be done with power off.

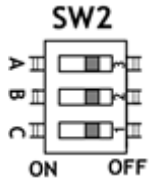

Figure 9. Switch 2

Opening direction	C
ON	Counter-Clockwise
OFF	Clockwise

Fallback position	A	
	ON	OFF
B ON	Stayput	Closed
B OFF	Open	Stayput

Table 9: Switch 2 position

11.1 How to adjust the actuator versus flow curve?

To offset the position of the 4mA, as below, follow the operations described in paragraph 10.1. The number of turns while pushing the "C" button has to be reduce following the flow curve. It is not necessary to remove the actuator from the pump.

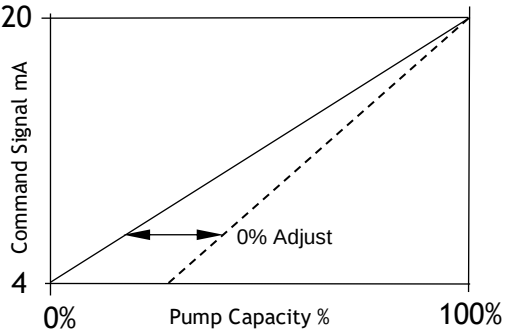

Figure 10. Adjustment to 0% flow

12 MECHANICAL STOPS SETTINGS (ACC-3/4T ONLY)

Only for ACC-3/4T

Mechanical stops are set for an electrical travel of 270±3°.

Mechanical stops are factory set. Their setting does not require to be resumed.
They must not be used as travel limits.

12.1 Cams settings

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.

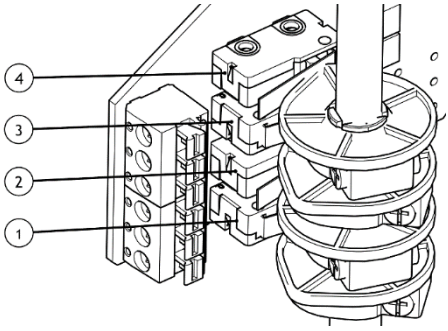

Figure 11. Adjustment to 0% flow (ACC 3/4 Only)

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 signaling	To wire, to set
4	Counter-clockwise signaling	To wire, to set

Table 10 : Cam function

12.2 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:

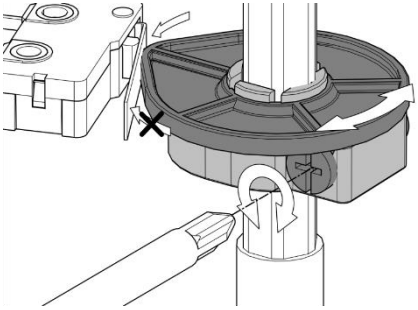

Figure 12. Setting Cam

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.

12.3 Travel limit cams and signaling cams

On ACC 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.
- **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.

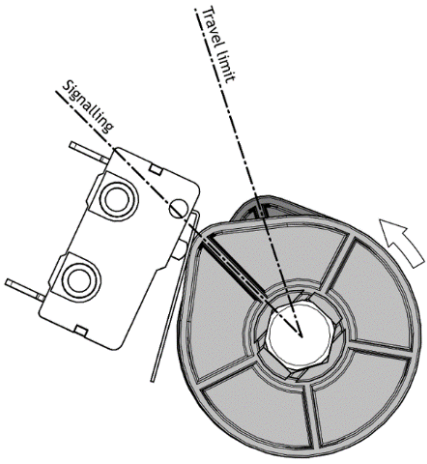

Figure 13. Setting Cam

ⓘ If the actuator is supplied mounted on a pump, following settings should have been performed by Milton Roy.

12.4 How to test factory settings (with positioner)?

1. Using 4-20mA input to drive clockwise the actuator to the end position.
2. According to the situation:
   - If end position cam trips the switch at the same time as pump flow is stop, **you do not need to resume settings**.
   - If end position cam trips the switch before the pump flow is stopped, **set the cam slightly counter-clockwise** to get the switch tripped and the valve closed at the same time
   - If the pump flow is stopped before cam is tripped, **set the cam slightly clockwise** to get switch tripped and pump flow stopped at the same time
3. If wired and if necessary, set the clockwise signaling cam accordingly.
4. Using 4-20mA input to drive the actuator counter-clockwise to the end position.
5. Proceed to the same checks as in pt.2 with the opposite directions.
6. If wired and if necessary, set the counter-clockwise signaling cam accordingly.

13 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 after an over-torque detection?

1. Switch power supply off.
2. Check if the issue comes from pump (stiff point or jamming) or mechanical stops (over-travel).
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.

14 MANUAL OVERRIDE

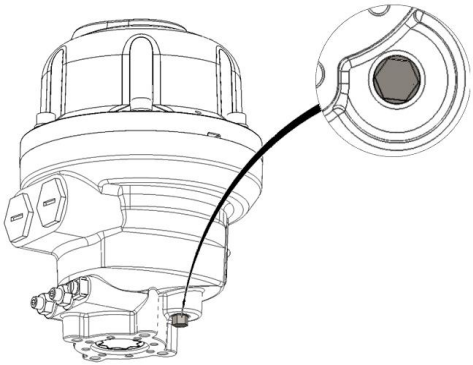

Figure 14. Manual command

In case of loss of power supply, you can operate the actuator manually using the driving hexagonal shaft under the actuator.

This 10 mm driving hexagonal shaft can be driven using a suitable wrench.

!

Be careful not to damage actuator during manual operation.

Do not apply to the hexagonal shaft a torque higher than 6N·m.

Check indicator when driving actuator with manual override to avoid reaching mechanical stops.

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