

## Frese ROL-L actuators

### Installation, Operation & Maintenance instruction

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#### Intro

This document describes installation, commissioning, operation, maintenance and troubleshooting aspects of the Frese ROL-L actuators for Frese OMEGA and Frese Butterfly valves.

For any questions or special request you can always find the relevant contact person on: [www.frese.eu](http://www.frese.eu)

#### Installation

FIG 1

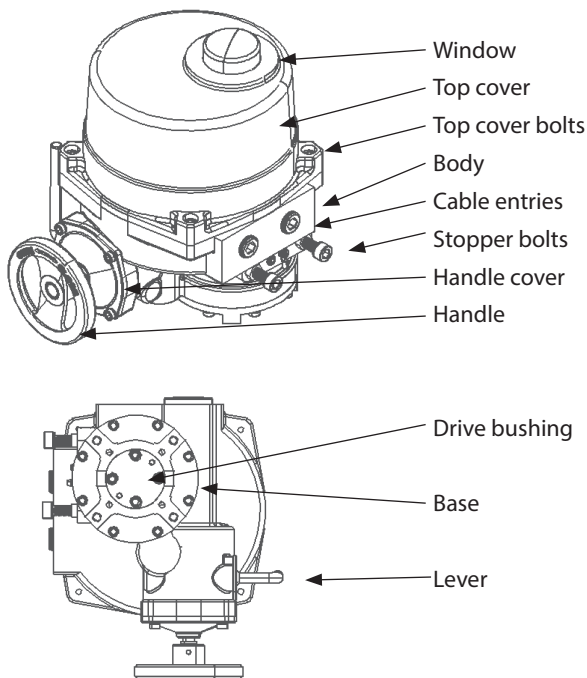


FIG 1 - Actuator parts:

FIG 2

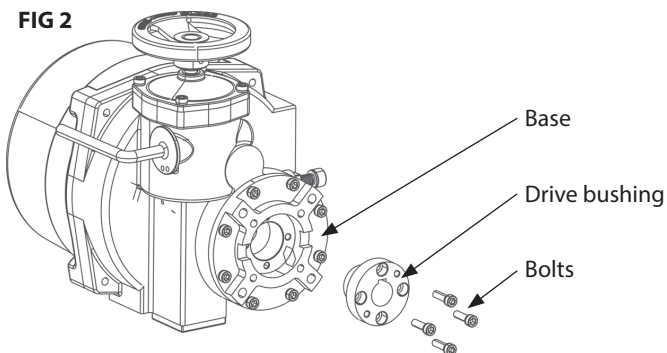


FIG 2 - Bushing separation:

Remove the 4 bolts by using and separate the drive bushing from the ACTUATOR.

FIG 3

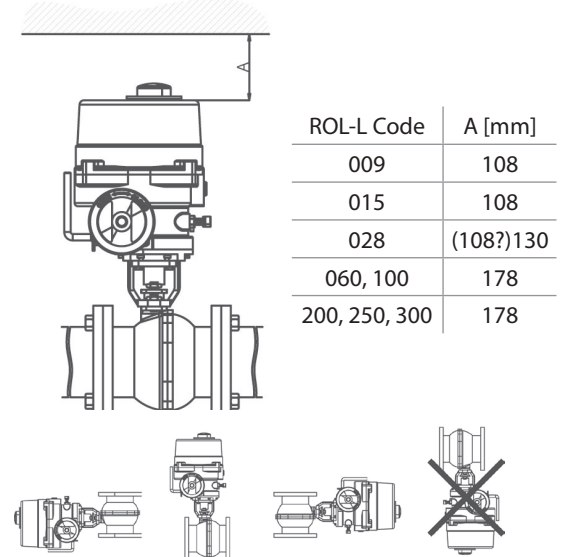


FIG 3 - Installation positions:

Please observe the free space over the top cover to ensure maintenance and follow the installation positions to maintain the protection class.

#### Operation

FIG 4

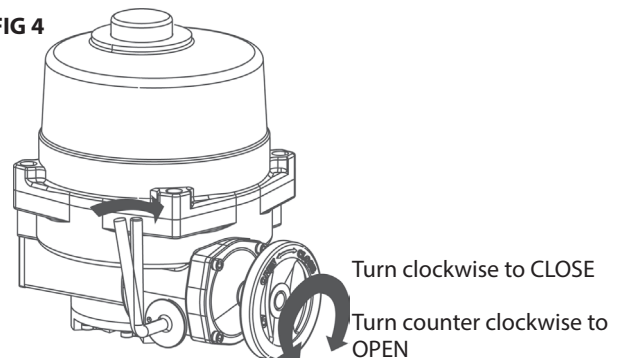


FIG 4 - Manual operation:

Pull the lever located on the side of the actuator towards the handwheel. The lever should "LOCK" in position.

Turn the handwheel and the actuator output will rotate.

If the lever does not "LOCK" in the upright position, then turn the handwheel halfway and pull the lever to the upright position.

After manual operation, leave the lever as is.

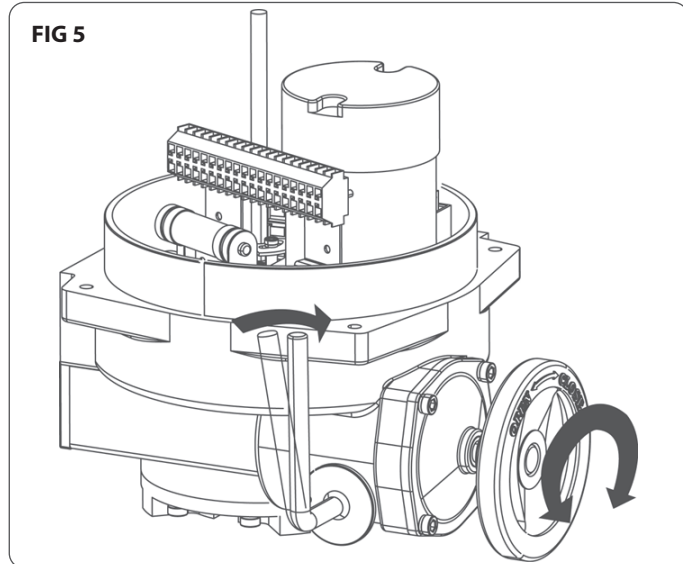
When power is reapplied to the actuator, the lever will disengage and declutch the manual override. The actuator will then rotate the valve to the powered position.

If the lever does not "LOCK" in the manual position while trying to manually operate the actuator, then the actuator gearing may be jammed and needs to be checked.

## Limit switch

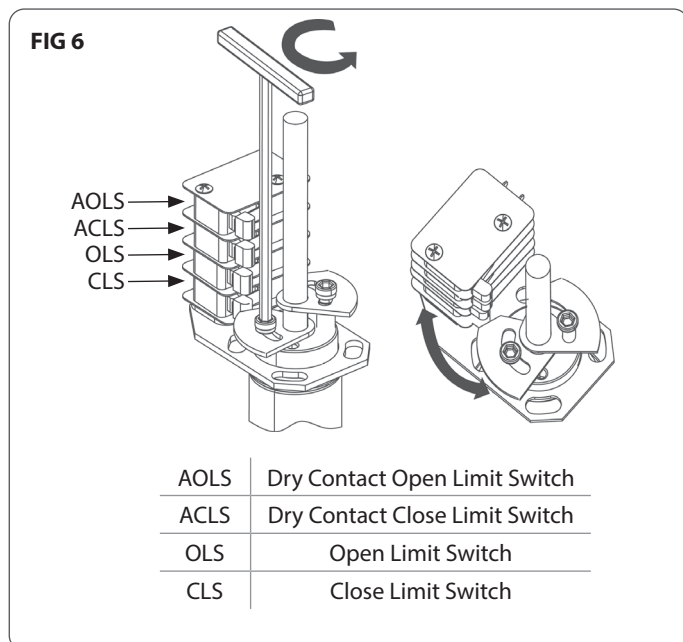


Whenever a new actuator is mounted on a valve, the limits switch must adjusted according to below:



**FIG 5 - Close/Open Limit Switch Cam Setting:**

Confirm that the power is off. Dismount cover  
Pull lever located on the side of the ACTUATOR to engage the manual override handwheel.  
Rotate the handwheel counter clockwise to fully close the actuator.  
Loosen the closed limit switch cam set screw, as shown in figure 6.  
Rotate cam in the clockwise/closing direction and engage the switch lever to actuate the switch  
If auxillary limit switches are included in the ACTUATOR, then set the corresponding auxillary switch at this time.

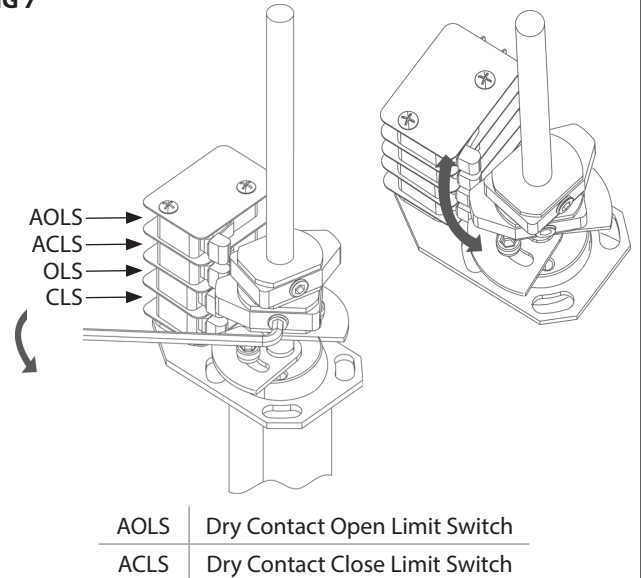


**FIG 6 - Set cam screws:**

Firmly re-tighten the cam set screw.

To set the open limit switch, follow the same procedure as above except that the rotation will be counter clockwise using the open limit switch cam.

**FIG 7**



**FIG 7 - Dry Contact Close/Open Limit Switch Setting:**

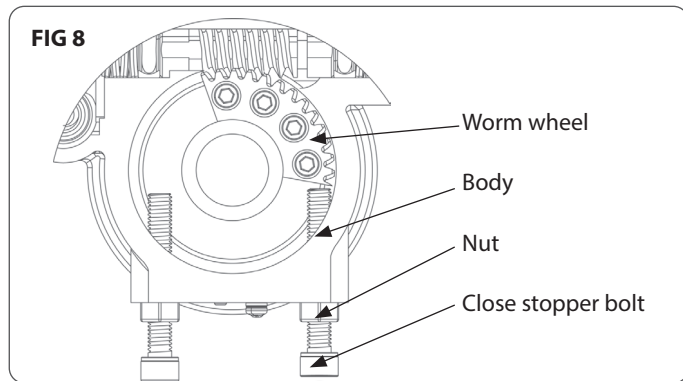
Using the manual override, rotate actuator to the desired position.  
Loosen the set screw in the ACLS cam and then rotate the cam in the clockwise rotation to engage the auxillary switch.  
Firmly re-tighten the cam set screw.  
To set the open auxillary limit switch, follow the same procedure as above.

## Over Torque Switch Setting



The over torque switches are factory set.  
Tampering with the over torque switch settings may damage the actuator and VOID the warranty.  
For more information contact Frese.

## Mechanical stop



**FIG 8 - Mechanical Limit Stop Setting:**

In the event of a limit switch malfunction, the mechanical limit stops will prevent the actuator from over-traveling and causing damage to the valve.

The mechanical limit stops should be reset whenever an adjustment is made to the open and closed limit switches, this will protect the valve in the event of an electrical malfunction.

Turn the power off to the ACTUATOR. Engage the manual override and fully close the valve clockwise.

As shown above, turn the mechanical limit stop into the body until contact is made between the limit stop and worm wheel. After contact is made, then turn the limit stop back out two turns and lock it in place with the nut by tightening the nut against the body.

To set open limit stop, follow the above instructions except rotate the ACTUATOR in the counter clockwise rotation.

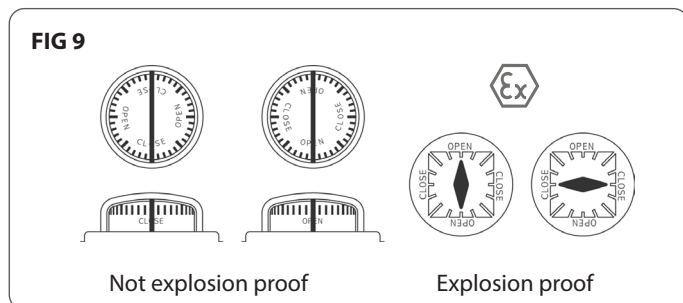


If the mechanical stops are improperly set, motor and gear damage may occur.

After setting the limit stops, check for proper function by operating the actuator both manually and electrically.

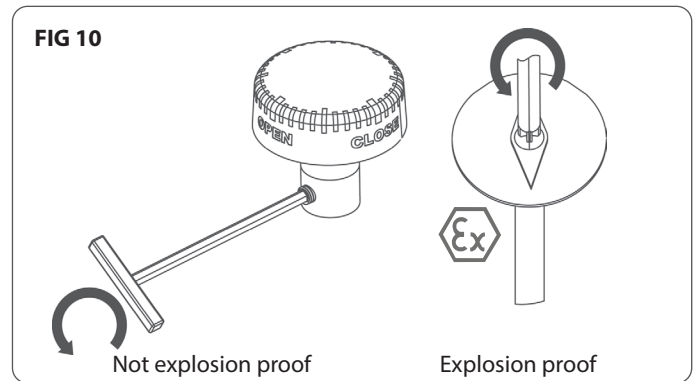
Confirm that the end of travel limit switches shut off power to the motor in both the open and closed positions, and that the motor is not stalled or in an over torque condition.

## Visual Indicator



**FIG 9 - Visual Indicator:**

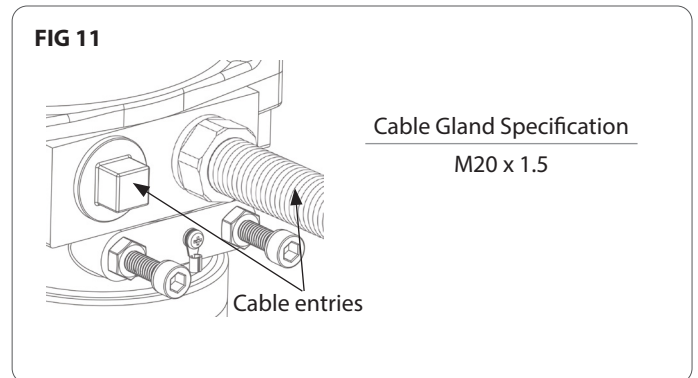
The valve position is easily confirmed from a distance by looking at the indicator dome located on the top of the actuator cover.



**FIG 10 - Visual Indicator Setting:**

If the position shown on the indicator is incorrect, simply loosen the set screw and rotate the indicator to the correct position and retighten the set screw.

## Wire Connection



**FIG 11 - Wire Connection Entries:**

Cable entries should remain plugged with the plugs fitted on the actuator from factory. When a cable is installed a cable gland of minimum same IP class as the actuator should be used to maintain the IP protection class of the actuator.



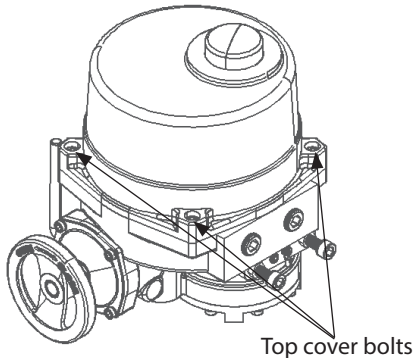
Cable Glands used on explosion proof applications must be certified for the proper explosion proof application class (Ex d IIB or d IIC) and properly sealed.

Failure to use the correct components may result in the failure of the actuator enclosure.

Frese is not responsible the improper installation of the actuators.

## Electrical Wiring

FIG 12

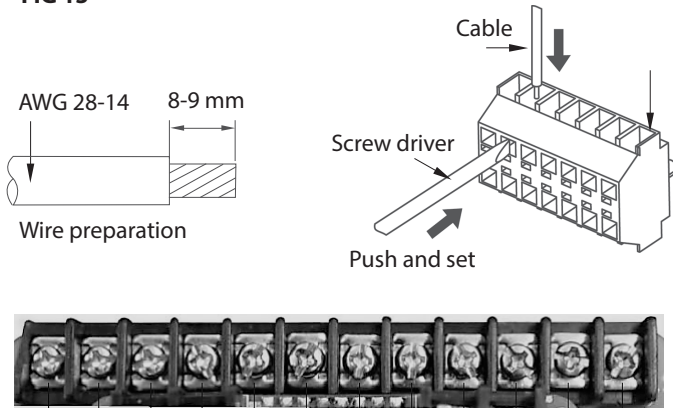


**FIG 12 - Top Cover Removal:**

Separate the cover of the actuator by loosening the four cover bolts. Confirm that the wiring diagram located in the actuator and Wiring No. on the name plate match with each other.

Confirm that the main power and power supply described on the name plate of actuator match each other.

FIG 13



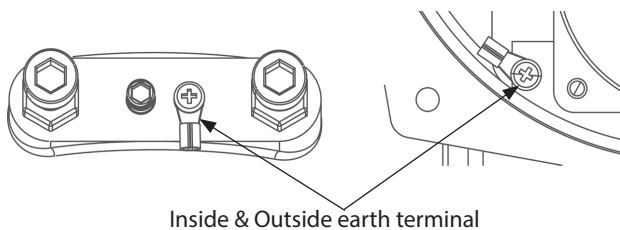
**FIG 13 - Wiring Terminal:**

Frese ROL-L Series uses either WAGO brand terminal or onboard screw terminals to allow easy wiring and to protect against vibration.

Be sure to wire and energize the heater that is provided.

Each actuator must be powered by their own individual relays to prevent voltage feedback and actuator damage.

FIG 14



**FIG 14 - Earth Terminal:**

Be sure to properly ground the actuator wiring to the grounding terminals provided on the inside and outside of the actuator body.

The internal grounding wire size shall be at least the same with the conductor used. The earth terminal is prepared for wire size 4.5~5.0 mm<sup>2</sup>.

## PCU switches setup

FIG 15

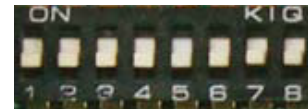


Input	1	2	3
4-20 mA	ON ↑	OFF ↓	OFF ↓
2-10 V	OFF ↓	ON ↑	OFF ↓
0-5 V	OFF ↓	OFF ↓	ON ↑
0-10 V	OFF ↓	ON ↑	ON ↑
1-5 V	OFF ↓	OFF ↓	OFF ↓

**FIG 15 - DIP-switch - Input setting.**

Set DIP-switches for the required input signal according to the table above.

FIG 16



DIP switch	Name	OFF ↓ function	ON ↑ function
1	F-C	Disabled	If no input signal is detected, actuator closes fully
2	F-O	Disabled	If no input signal is detected, actuator opens fully
3	A-F	Disabled	Fully open/closes actuator if input signal is close to limit
4*	CH1	Disabled	Set <b>ON</b> to change control signal range. Input control signal for "closed/ CW rotation" ~4 mA and press <b>ZERO</b> . Input control signal for "open/ CCW rotation" ~20 mA and press <b>SPAN</b>  Default DIP-switch setting <b>OFF</b>
5*	CH2	Disabled	Set <b>ON</b> to change feedback signal range. Rotate the actuator by means of the handwheel to fully closed and press <b>ZERO</b> Rotate the actuator by means of the handwheel to fully open and press <b>SPAN</b>  Default DIP-switch setting <b>OFF</b>
6	REV	Disabled	Low input signal: Fully open, High input signal: Fully closed
7*	Z ADJ	Disabled	Fully closed output signal adjust, using <b>ZERO</b> and <b>SPAN</b>
8*	S ADJ	Disabled	Fully open output signal adjust, using <b>ZERO</b> and <b>SPAN</b>

**FIG 16 - DIP-switch - General setting.**

Set DIP-switches for the general settings.

\*) Must be performed with power on.

FIG 17



Name	Function
ZERO	Close actuator (Manual control via PCU)
SPAN	Open actuator (Manual control via PCU)
ASCN	Auto scan between limit switches (CLS and OLS)

FIG 17 - Push buttons.

Use Push buttons for manual control and limit switches calibration.

FIG 18



A=10, B=11, C=12 etc.....

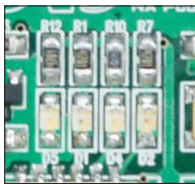
FIG 18 - Dead band.

**Deadband** is set to 0.2 mA from factory, to eliminate hunting (rapid moves back and forth). Deadband can be adjusted in 0.05 mA steps. 0.2 mA is default and should not be changed.

**Example: Set Dead band to 0.2 mA:**

Preset 4 => 4 x 0.05 = 0.2 mA

FIG 19



LED lamp	Color	Status
D5	Blue	Main Power Input
D1	Yellow	Fault
D4	Red	Fully open
D2	Green	Fully closed

FIG 19 - Control/ Warning LED.

FIG 20

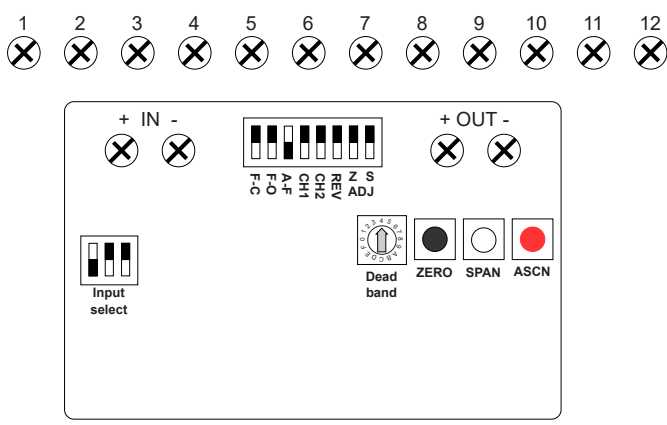


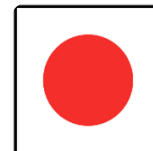
FIG 20 - Main Board and PCU

Connections Main board

Terminal 1	Line 230 V	230 V line $\pm 10\%$
Terminal 2	Neutral 230 V	Neutral for 230 V line
Terminal 3	3-point OPEN	3-point control: Connect to terminal 6 for CCW rotation
Terminal 4	3-point CLOSE	3-point control: Connect to terminal 6 for CW rotation
Terminal 5	Analog signal control select	Analog signal control: Connect to terminal 6
Terminal 6	3-point COM / Analog control	Common for 3-point control or analog control
Terminal 7	AOLS OPEN	Optional: Contactor for fully OPEN position
Terminal 8	AUX COM	Optional: Common for AOLS/ACLS contacts
Terminal 9	ACLS CLOSED	Optional: Contactor for fully CLOSED position
Terminal 10	Motor connection	Internal motor control
Terminal 11	Motor connection	Internal motor control
Terminal 12	Motor connection	Internal motor control

Connections PCU board

IN: +	Control signal +	Passive positive input for 4-20 mA
IN: -	Control signal -	Passive reference input for 4-20 mA
Galvanic isolation between Input & Output Output is active i.e., 24 VDC is generated by the PCU		
OUT: +	Feedback signal +	Active positive output 4-20 mA
OUT: -	Feedback signal -	Active reference output 4-20 mA



**ASCN**

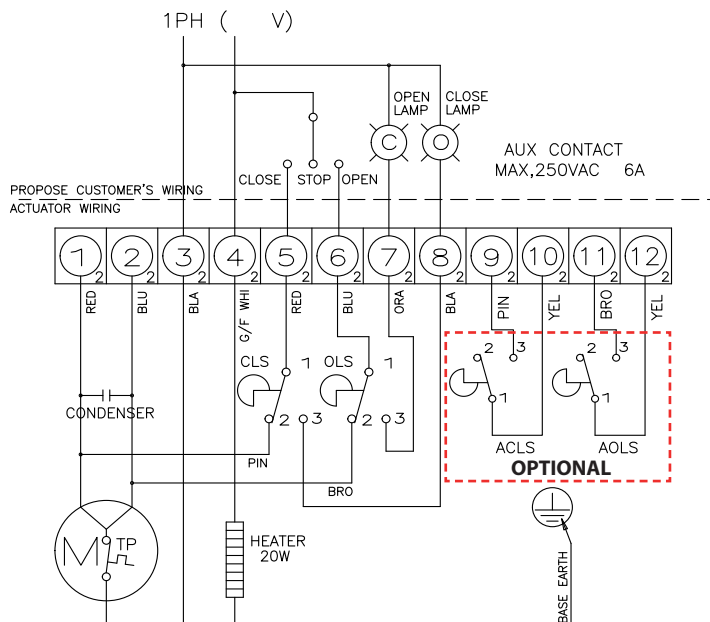
Auto Scan

Press and hold for 2 seconds for the actuator to recognize endpoints on the potentiometer. In this process the actuator will rotate from fully closed to fully open positions.

## Electric wiring ROL-L 60-90 Nm (Actuator Code 006-009)

CLS : CLOSE LIMIT SWITCH (250VAC 6A)  
 OLS : OPEN LIMIT SWITCH (250VAC 6A)  
 ACLS : AUX. CLOSE LIMIT SWITCH (250VAC 6A)  
 AOLS : AUX. OPEN LIMIT SWITCH (250VAC 6A)  
 TP : THERMAL PROTECTOR (250VAC 15A)

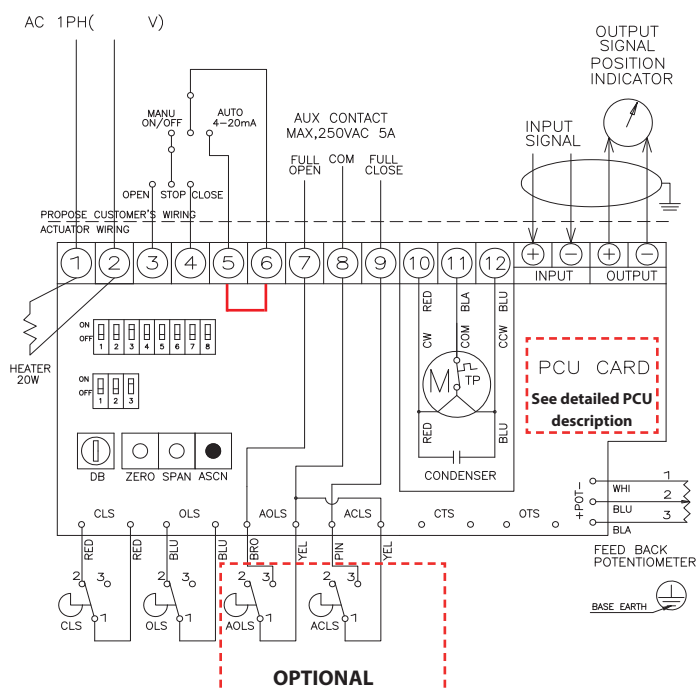
	CLOSE	OPEN
CLS 1-2		
CLS 1-3		
OLS 1-2		
OLS 1-3		
ACLS 1-2		
ACLS 1-3		
AOLS 1-2		
AOLS 1-3		



## Electric wiring ROL-L with PCU 60-90 Nm (Actuator Code 006-009)

CLS : CLOSE LIMIT SWITCH (250VAC 15A)  
 OLS : OPEN LIMIT SWITCH (250VAC 15A)  
 ACLS : AUX. CLOSE LIMIT SWITCH (250VAC 5A)  
 AOLS : AUX. OPEN LIMIT SWITCH (250VAC 5A)  
 TP : THERMAL PROTECTOR (250VAC 15A)

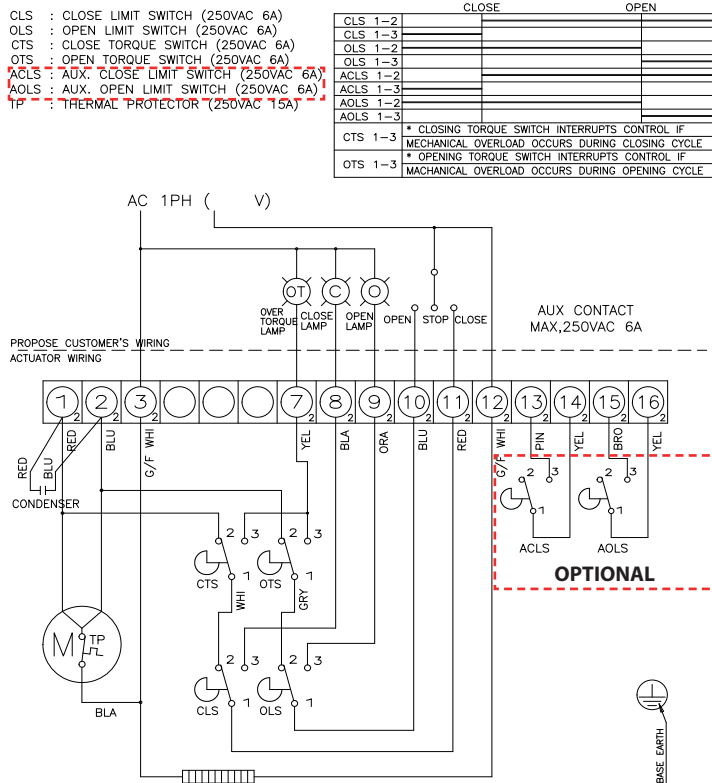
	CLOSE	OPEN
CLS 1-2		
CLS 1-3		
OLS 1-2		
OLS 1-3		
ACLS		
AOLS		



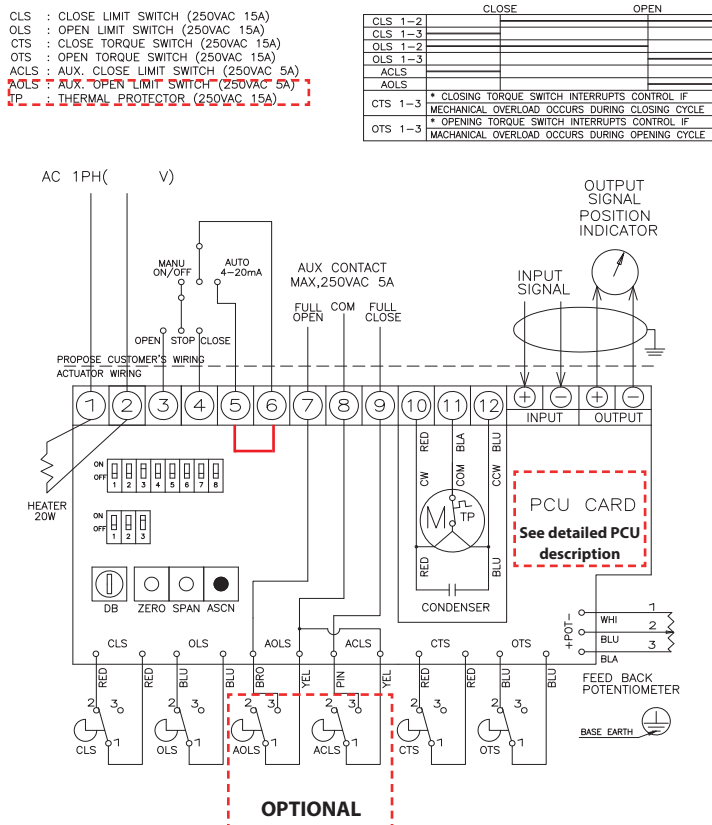
**To enable 4-20mA control signal on INPUT terminals:**  
**Connect terminal 5 to 6 using a jumper.**



## Electric wiring ROL-L 150-3000 Nm (Actuator Code 015-300)



## Electric wiring ROL-L with PCU 150-3000 Nm (Actuator Code 015-300)

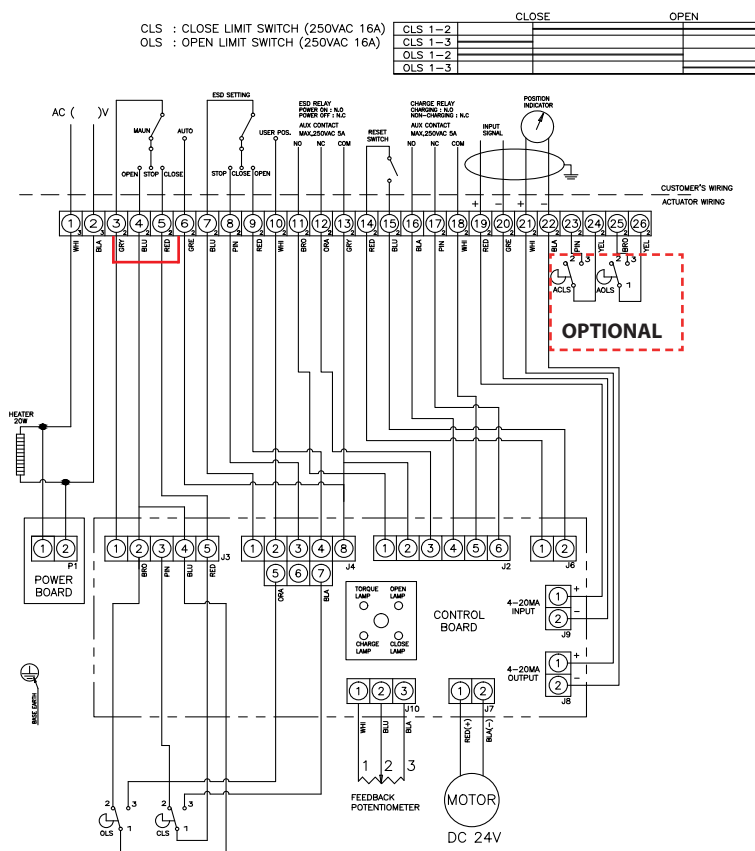


**To enable 4-20mA control signal on INPUT terminals:  
 Connect terminal 5 to 6 using a jumper.**

## Electric wiring ROL-L with Super Capacitor 90 Nm (Actuator Code 009)



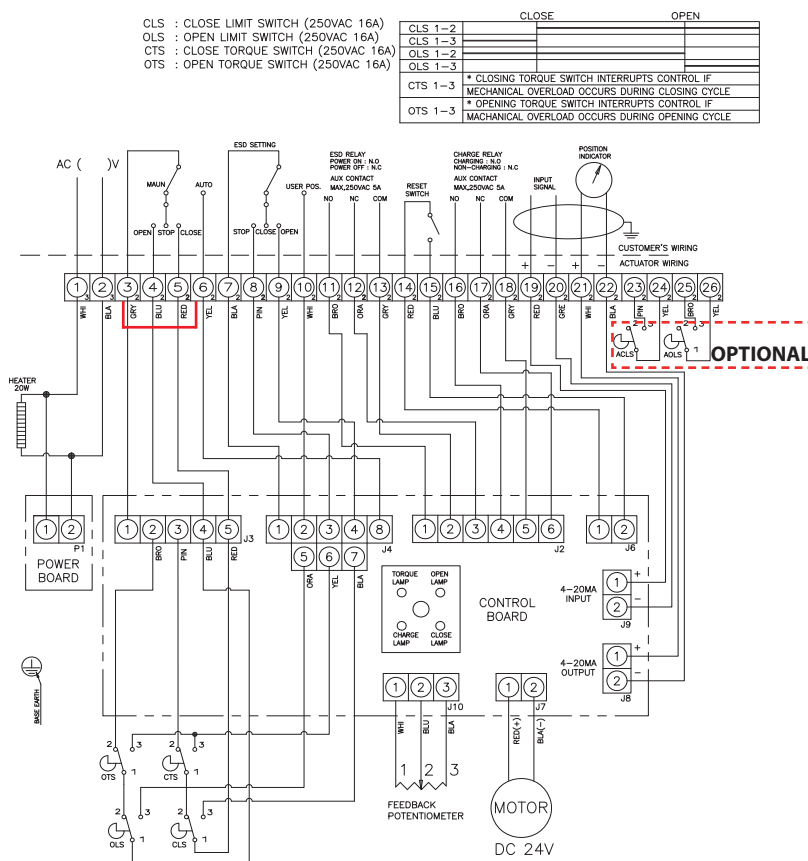
To enable 4-20mA control signal on INPUT terminals:  
Connect terminal 3 to 6 using a jumper.



## Electric wiring ROL-L with Super Capacitor 150 Nm (Actuator Code 015)



To enable 4-20mA control signal on INPUT terminals:  
Connect terminal 3 to 6 using a jumper.





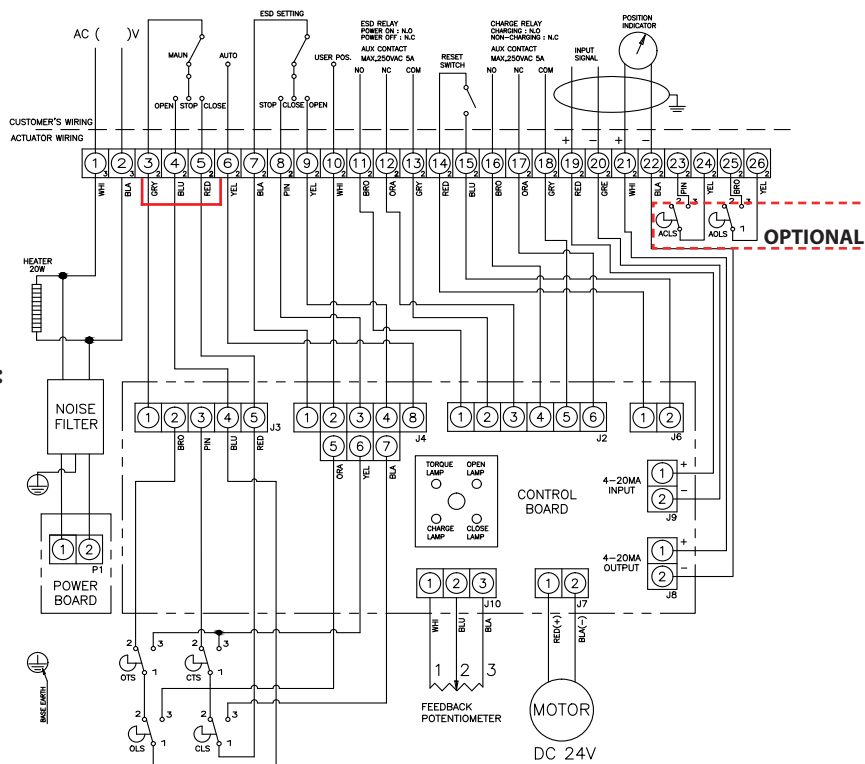
## Electric wiring ROL-L with Super Capacitor 280 Nm (Actuator Code 028)

CLS : CLOSE LIMIT SWITCH (250VAC 16A)  
 OLS : OPEN LIMIT SWITCH (250VAC 16A)  
 CTS : CLOSE TORQUE SWITCH (250VAC 16A)  
 OTS : OPEN TORQUE SWITCH (250VAC 16A)

CLOSE		OPEN	
CLS 1-2			
CLS 1-3			
OLS 1-2			
OLS 1-3			
* CLOSING TORQUE SWITCH INTERRUPTS CONTROL IF MECHANICAL OVERLOAD OCCURS DURING CLOSING CYCLE			
* OPENING TORQUE SWITCH INTERRUPTS CONTROL IF MECHANICAL OVERLOAD OCCURS DURING OPENING CYCLE			



**To enable 4-20mA control signal on INPUT terminals:  
 Connect terminal 3 to 6 using a jumper.**



## CAUTION - PLEASE PAY ATTENTION TO:



### ELECTRICAL SHOCK HAZARD

To avoid serious personal injury, property damage or death, turn off all power to the actuator before removing the cover.

### CHECK NAMEPLATE

Before installation or use, verify the nameplate information to insure the correct model number, torque, voltage and enclosure type.

### READ MANUAL

Be sure to completely review the actuator manual prior to operation.

### LIMIT SWITCH ADJUSTMENT

Final limit switch adjustment must be done after mounting the ACTUATOR to the valve. Incorrect adjustment may cause ACTUATOR failure.

### OVER TORQUE SWITCHES

Over torque switches are factory set. Tampering with the over torque switch settings may damage the actuator and VOID the warranty.

### GROUNDING

Actuator MUST be properly grounded. Use the grounding lugs provided on the inside or outside of the ACTUATOR body.

### AVOID CONDENSATION

To minimize the possible damage caused by condensation, be sure to energize the heater.

### ENSURE CORRECT WIRING

Care should be taken when wiring 3-phase actuators. Confirm proper rotation and limit switch shutoff function during the initial operation. If the actuator rotates in the reverse direction, then the phasing needs to be corrected by switching two of the 3-phase wires on the terminal block.



### EXPLOSION PROOF PRODUCTS

Explosion-proof products must be used under the temperature and environment appropriate for the product spec.

#### Flameproof Enclosure Level and Environment of actuator Ex d IIB T4 -20 °C ~ +55 °C

Explosion proof actuators and wiring must be properly sealed prior to operation. Improper installation may cause a hazardous condition and failure of the explosion proof enclosure. The manufacture is not responsible for any losses or damages caused by incorrect installation.

1. Certified cable entries rated for at least 90°C must be used when installed.
2. If conduit is used for cable entry, a seal fitting with setting compound must be installed as close as possible within 450mm to the actuator.

## Storage

The ACTUATOR must be stored in a clean, dry, temperature controlled area. The unit shall be stored with the cover installed and with the conduit openings sealed. Storage must be off the floor.

Care must be taken to guard the ACTUATOR from condensation in extreme temperature variations.

Heaters should be energized as soon as ACTUATORS are installed.

**Storage location : Indoor**  
**Storage temperature: 18C +/-5°C**



**Improper storage of the actuator will VOID WARRANTY.**

## Maintenance

### Regular Check up:

It is recommended that the actuator is cycled every two weeks after purchase.

To minimize the effects of condensation in the actuator it is recommended that the conduit entries are sealed at the actuator and that the heater is energized.