ECON ELECTRIC ACTUATOR
Fig. 7907, type ELA80 - 3000

Scan for manual

Compact quarter turn actuator
Mechanical position indicator
High output torque
Multi mounting base
Manual override

Installation and Operation Manual for actuator type:
ELA80, 100, 150, 200, 300, 500, 600, 800, 1200, 2000, 2700 & 3000

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1 INTRODUCTION

1.1 Purpose

The purpose of this manual is to introduce and explain the installation, operation and maintenance of ELA-series electric actuators.

1.2 Safety Notices

This manual contains safety notices and precautions the user must take to reduce the risk of personal injury and damage to the equipment. The user(s) must read these instructions before the installation, operation or maintenance of the ELA-series electric actuators.

DANGER: ***Refers to personal safety and alerts the user for danger and/or injury.***

Hazardous or unsafe practice may result in severe injury or death.

WARNING: ***Refers to personal safety. Alerts the user for potential danger.***

Not following warning notices could result in personal injury or death.

CAUTION: ***Directs the user's attention to general precautions that, if not followed, could result in personal injury and/or equipment damage.***

Note: Information in this manual is critical to the user's understanding of the actuator's installation and operation.

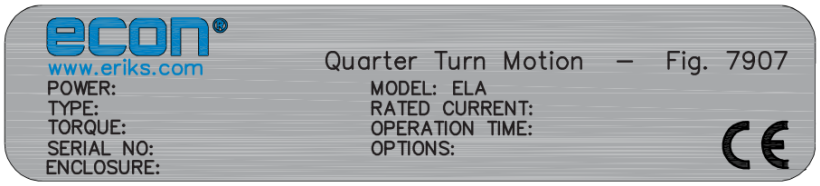
2 PRODUCT IDENTIFICATION

2.1 Product Identification

The actuator name plate is located on the opposite side of the conduit entry. The name plate contains the following:

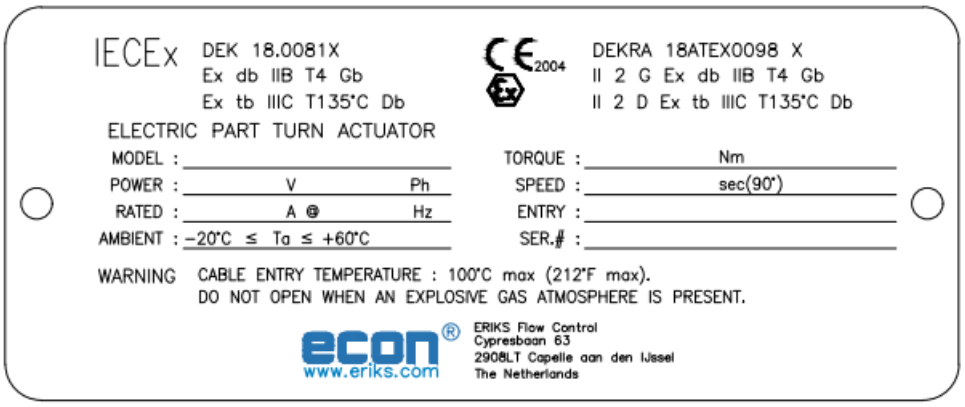
2.1.1 Marking

A) General



- ECON logo (trade mark)
- Electrical power supply
- Model
- Type
- Rated current
- Torque output
- Operation time (seconds)
- Serial number
- Options

B) Ex-version Actuators



- ECON logo (trade mark)
- CE ATEX and IECEx mark
- Model
- Electrical power supply
- Rated current
- Ambient temperature limitation
- Torque output
- Speed / operation time (seconds)
- Conduit entries
- Serial number and production date*
- Warning text
- Manufacturer's address

*The production date is incorporated in the serial number: For example: SER.#: EW**21 01**- 0001, in which 21 represents the production year 2021 and 01 represents the production month January.

2.1.2 Applied Standards

- IEC60079–0: 2011 (Ed.6 +ISO1), EN60079-0: 2012 +A11
- IEC60079-1: 2014 (Ed.7), EN60079-1: 2014
- IEC60079-31: 2013 9ED.2), EN60079-31: 2014

2.1.3 Certification

Series ELA80 ~ ELA3000

IECEx: IECEx DEK 16.0042X
- Ex db IIB T4 Gb, Ta -20°C to +60°C
- Ex tb IIIC T135°C Db

ATEX: DEKRA 18 ATEX 0098 X
- II 2 G Ex db IIB T4 Gb, Ta -20°C to +60°C
- II 2 D Ex tb IIIC T135°C Db

Notes :
- ***Sealing devices must be used and shall be fitted directly at the enclosure wall when using conduit.***
- ***Cable glands shall be suitable for the environment and shall be certified as flameproof if used in Zone 1 application.***
- ***Cable glands and conduit to be installed for minimum 6 full threads and the thread length must be 8mm minimal.***
- ***The temperature of the cable entry is maximum 100℃. A heat resistance cable is recommended.***
- ***Ex db and/or Ex tb certified cable glands suitable for 100℃ must be used.***
- ***Minimal requirements concerning the material and the allowance of LCU fasteners:***
  - ***Fasteners with yield strength ≥ 210MPa (stainless steel)***
  - ***Bolts type: M5x0.8, M6x1, M8x1.25, M10x1.5, M12x1.75 (Tolerance Fit 6g).***
- ***Cable connection: Refers to the Appendix I - (Wiring Diagram)***
- ***For cable entries or conduit entries that are not used, user or installer shall close them with certified blanking elements (stopping plugs) in order to maintain flameproof or dust ignition proof properties of the enclosure.***
- ***Always ground the enclosure in accordance with local electric codes. The most effective enclosure grounding method is a direct connection to earth ground with minimal impedance. Methods for grounding the enclosure include:***
  - ***Internal ground connection: The internal ground is located in the terminal block #1. Refer to the enclosed wiring diagram.***
  - ***External ground connection: The ground lug is located on the centre of cable entries. For more information, refer to the Appendix II – (Grounding).***
- ***Stainless steel name plates for the flame proof and dust ignition proof versions shall be permanently attached by rivets.***

2.2 Initial Inspection

Upon on the receipt of the actuator, the user should inspect the condition of the product and ensure that the product specification stated on the name plate matches with the order sheet.

- Remove the packing wrap or wooden box carefully. Inspect the product for any physical damage that may have occurred during shipment.
- Check the product specification of the received product. If a wrong product has been supplied, please immediately report this to the distributing company.

2.3 Storage

Actuators must be stored in a clean, cool and dry area. The unit should be stored with the cover installed and the conduit openings sealed. Storage must be off the floor, covered with a sealed dust protector.

3 GENERAL INFORMATION AND FEATURES

3.1 General Information

ECON ELA-series electric actuators are designed for the operation of industrial valves; e.g. butterfly valves and ball valves.

The actuator has a torque output range from 80 Nm to 3,000 Nm (708 in-lbs to 26,552 in-lbs).

3.1.1 Standard Technical Data

Enclosure Rated	Weatherproof IP67, NEMA 4, 4X & 6
Enclosure	High grade aluminium alloy, corrosion coated
Power Supply acc. To IEC 60034-1	115 / 230VAC ±5% 1Ph, 380 / 440 VAC 3Ph 50/60Hz 24VAC and 24VDC
Duty Type	See table in paragraph 3.1.2
Motor	Squirrel caged induction motor
Limit Switches	2 x open/close SPDT, 250V AC 16A rating
Auxiliary Limit Switches	2 x open/close SPDT, 250V AC 16A rating (except for ELA80 and ELA100 Ex-versions)
Torque Switches	Open/close SPDT, 250VAC 16A Rating (except for ELA80 and ELA100)
Stall Protection	Built–in thermal protection
Travel Angle	90 degree +/- 10%
Indicator	Continuous position indicator
Manual Override	Declutchable manual override
Self-Locking	By means of worm gear
Mechanical Travel Stops	2 x external adjustable mechanical travel stops
Space Heater	See table in paragraph 3.1.5
Conduit Entries	2x M25 or 2x NPT 3/4 (for “Ex db" versions) 2x M20, 2x M25 or 2x NPT 3/4" with M30 adapter (for ”Ex tb” versions)
Lubrication	Grease moly EP
Ambient Temperature	-20°C (-4°F) up to +80°C (176°F) Ex-versions: -20°C (-4°F) up to +60°C (140°F) (CPT and PCU boards excluded)
External Coating	Dry Polyester powder coating

3.1.2 ELA Actuator Versions and Additional Technical Data

Fig. 7907 type	Maximum torque	Operating time	Rated current						Duty cycle according to	Hand wheel turns	Weight
			12VDC	24VDC (24VAC) [2]	115VAC [3] 1 Phase	230VAC [3] 1 Phase	380VAC 3 Phase	440VAC 3 Phase			
	Nm (in-lb)	s/90° (50/60Hz)	A	A	A (50/60Hz)	A (50/60Hz)	A (50/60Hz)	A (50/60Hz)	IEC 60034-1 S4	Number	kg (lbs)
ELA80	80 (708)	16/13	6,4	3,7	1,2/1,2	0,7/0,6	0,3/,04	0,6/0,5	70% [4]	10,0	6 (13,2)
ELA100	100 (885)	20/17	9,5	4,0	1,2/1,2	0,7/0,6	0,3/0,3	0,6/0,5	70% [4]	10,0	6 (13,2)
ELA150	150 (1,328)	25/21	-	5,3	2,2/2,0	1,0/1,0	0,7/0,5	0,7/0,4	70%	11,0	15 (33.1)
ELA200	200 (1,770)	25/21	-	6,5	2,3/2,1	1,1/1,1	0,8/0,5	0,7/,04	70%	11,0	15 (33.1)
ELA300	300 (2,655)	31/26	-	8,6	2,2/2,4	1,0/1,3	0,7/0,6	0,4/,03	70%	13,5	19 (41.9)
ELA500	500 (4,425)	31/26	-	-	3,3/4,2	1,7/1,9	1,0/0,8	0,8/,05	70%	13,5	20 (44.1)
ELA600	600 (5,310)	31/26	-	-	3,5/4,4	1,9/2,1	1,1/,09	1,4/0,9	70%	13,5	20 (44.1)
ELA800	800 (7,080)	37/31	-	-	5,4/5,8	2,6/2,8	1,3/1,0	1,7/1,0	70%	16,5	29 (63.9)
ELA1200	1.200 (10,620)	37/31	-	-	6,5/6,9	2,9/3.0	1,6/1,2	1,8/1,0	70%	16,5	29 (63.9)
ELA2000	2.000 (17,701)	37/31 [1]	-	-	5,4/5,8	3,1/3,0	1,4/1,0	1,7/1,0	70%	49,5	75 (165.3)
ELA2700	2.700 (23,897)	56/47 [1]	-	-	6,4/6,7	3,2/3,1	1,6/1,2	1,8/1,0	70%	49,5	75 (165.3)
ELA3000	3.000 (26,552)	112/93	-	-	6,5/6,9	2,9/3,0	1,6,1,2	1,8/1,0	70%	49,5	75 (165.3)

Notes:1. Operation time of 115V 1Ph actuators is 112/93 s/90°.

2. 24VAC actuators have 24VDC motors.

3. 115VAC and 230VAC ±5% according to IEC 60034-1

4. Duty ratings: ELA80 and ELA100 in 380 VAC/3Ph – S4-70% and 440 VAC/3Ph - S4-40%.

3.1.3 ELA-Series Options

EXD	Flameproof enclosure
EXTB	Dust ignition proof
WTA	Watertight enclosure (IP68 (10m/72hr) Nema 6P
ATS	Additional torque switches (SPDT x 2ea, 230VAC – 16A)
EXT	Rotating extension - 120°, 180° or 270° (90° is standard)
ALS	Additional limit switches (SPDT x 2ea, 230VAC – 16A)
PIU	Potentiometer unit (0~1KΩ)
PCU	Proportional control unit (input, output 0~10 VDC, 4~20mA DC)
CPT	Current position transmitter (output 4~20mA DC)
ADCM	AC/DC Multi-board
SICU	Semi-Integral Control Unit (LCU-B + IMS + phase protect indicator) (5W max.)
ICU	Intelligent Digital Control Unit (LCU-C + IMS + auto phase discriminator) (5W max.)
PRB	ProfiBus (5VDC, 0.1A max., in redundant configuration, multiplied by 2)
MOB	ModBus (5VDC, 0.1A max., in redundant configuration, multiplied by 2)

3.1.4 Duty Cycle

Duty cycle rating according IEC60034-1 S4. See table in paragraph 3.1.2 for rating figures.

Exceeding the actuator's rated duty cycle may cause thermal overload.

Intermittent duty S4
The duty is a sequence of identical cycles which consist of starting time, operation time with constant load and rest period. The rest period allows the machine to cool down so that thermal equilibrium is not reached. The relative on-time at S4-25% or S4-50% is limited to 25% and 50% respectively.

3.1.5 Space Heater

Condensation in the actuator is possible due to wide fluctuation of the ambient temperature. The heater integrated in the control unit prevents this in general.
Ceramic housing with thermostat to prevent over heating with 60℃ set temperature.

Heating Element	**Self-regulating**	
Voltage Range (ELA80~100) (based on the power supply)	**115V**	5W 4.5KΩJ
	230V	5W 18KΩJ
	24V DC	5W 200ΩJ
	12V DC	5W 47ΩJ
Voltage Range (ELA150~3000) (based on the power supply)	**115V**	10W 2KΩJ
	230V	10W 8KΩJ
	24V DC	10W 100ΩJ
	12V DC	10W 27ΩJ

3.1.6 Hand Wheel and Declutching

ELA-series actuators are provided with a declutchable manual override system.

- In order to manually operate the actuator, pull the manual override lever towards the hand-wheel until. It will remain in position.
- Turn the hand-wheel until the valve reaches the required position.
- Turn clockwise to close and counter-clockwise to open.

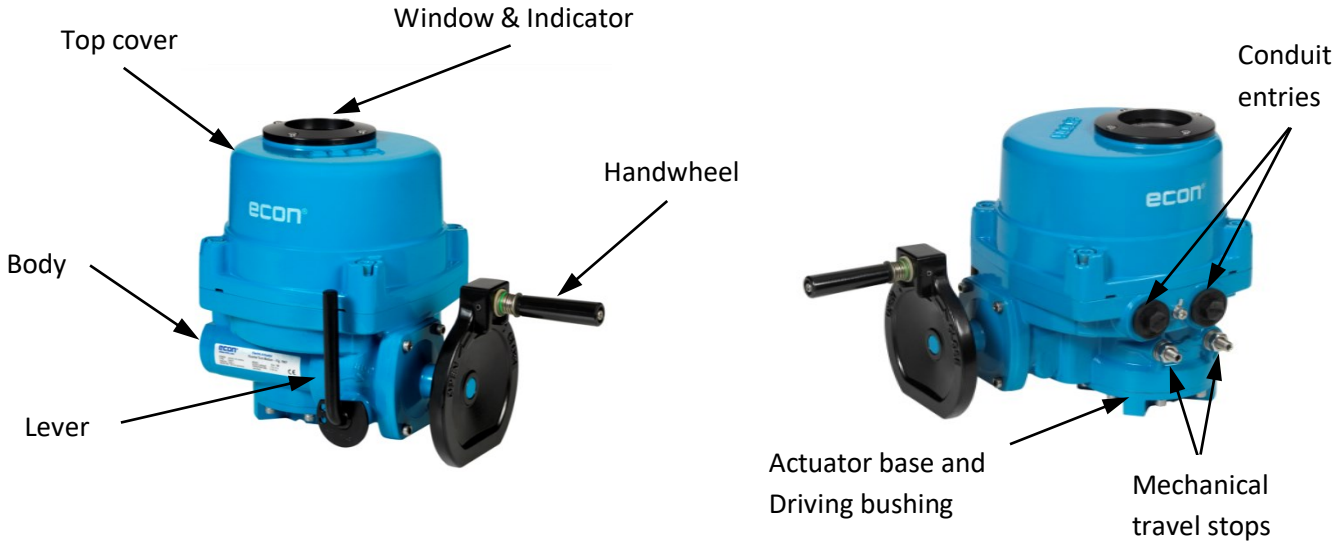
Note: ***The manual override lever returns automatically to auto-position when the actuator is operated electrically.***

3.1.7 Lubrication

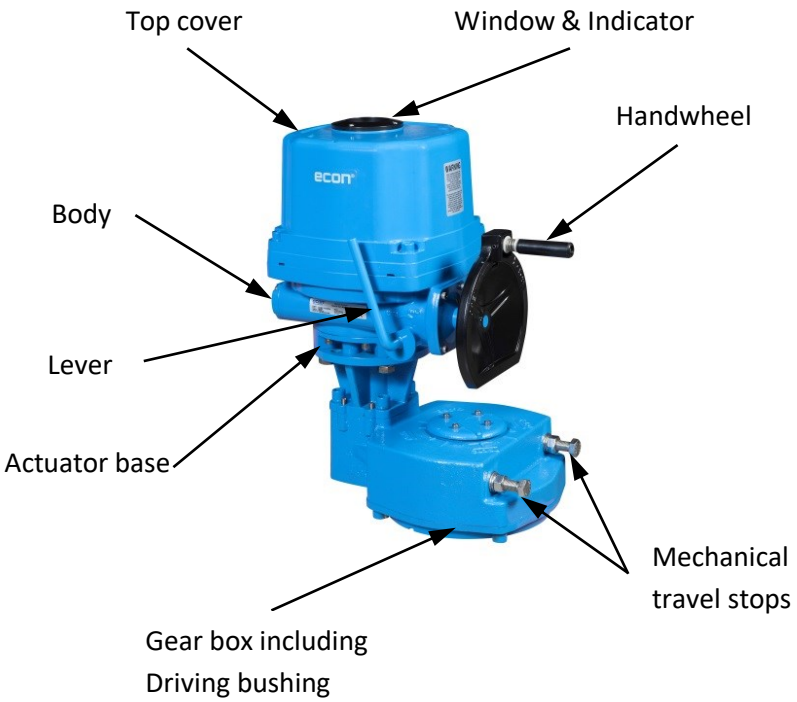
ELA-series are totally enclosed units with a permanent lubricated gear train (Moly EP Grease). Once installed, lubricating the actuator should not be required. However, periodic preventative maintenance will extend the operating life time of the actuator.

3.2 External Parts for Standard Models

3.2.1 ELA80 - 1200

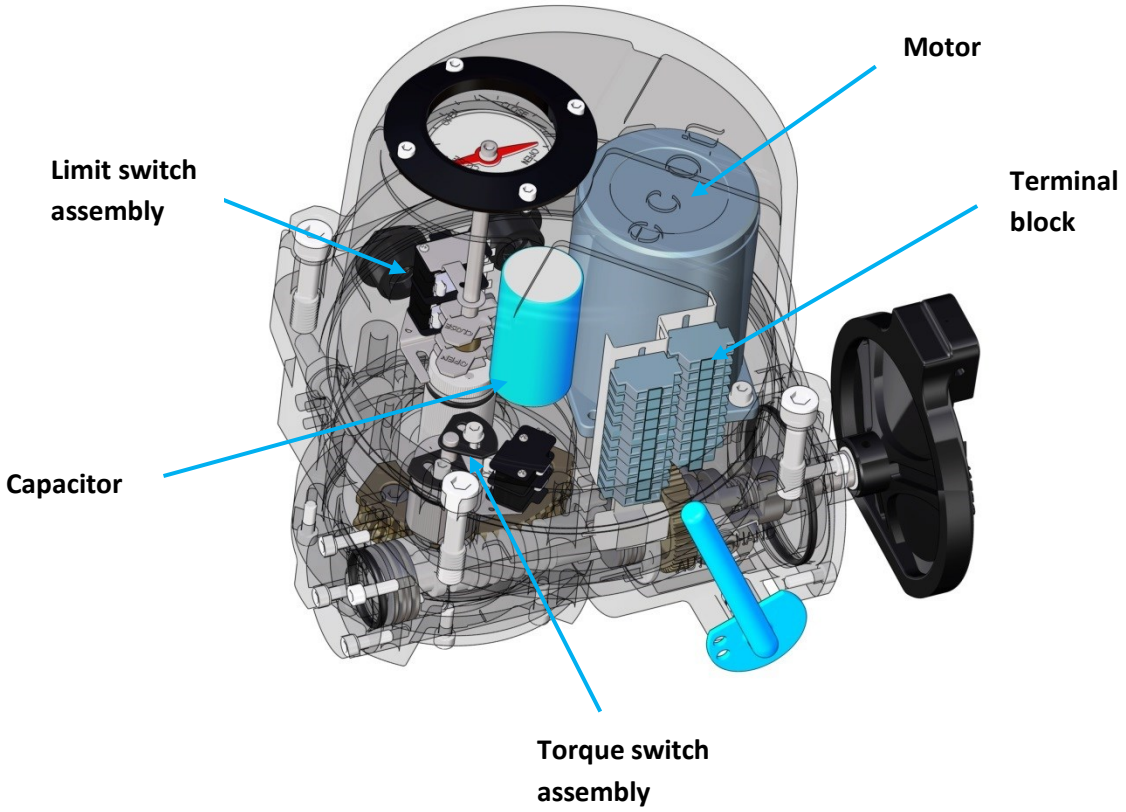


3.2.2 ELA2000 - 3000 (Actuator + Gear Box)



3.3 Internal Parts for Standard Models

3.3.1 ELA80 - 3000



Note: ELA80 and ELA100 do not have a torque switch provision!

4 INSTALLATION

4.1 Pre-installation

- Please check if the electric power supply corresponds with your specification and the information on the actuator type plate.
- Make sure the power supply has been switched off before you start wiring the actuator.

4.1.1 Use in General Service

Verify the actuator's nameplate to ensure that model number, torque output, operating speed, voltage and enclosure type are correct before installation or use.

It is important to verify that the torque output of the actuator is appropriate for the torque requirements of the valve and that the duty cycle of the actuator is appropriate for the intended application.

Make sure the power supply has been switched off before the actuator is being wired.

4.1.2 Use in Potentially Explosive Atmosphere

Model:	ELA80 ~ ELA3000
Type of Enclosure :	IECEx: Ex db IIB T4 Gb and Ex tb IIIC T135°C Db
	ATEX: II 2 G Ex db IIB T4 Gb and II 2 D Ex tb IIIC T135°C Db
Ambient Temperature:	-20°C (-4°F) up to +60°C (140°F)

WARNING:

Read this installation, operation and maintenance manual carefully and completely before attempting to install, operate, or troubleshoot the ELA actuator.

CAUTION:

Installation, commissioning, maintenance, repairs and modification work may only be performed by qualified personnel with extensive knowledge on how to work on explosion-proof electrical equipment.

4.2 Actuator Mounting

Note: ***Prior to mounting, the part-turn actuator must be checked for any damage. Damaged parts must be replaced by original spare parts***

Mounting is most easily done with the valve shaft pointing vertically upwards. But mounting is also possible in any other position.

The ELA-series electric actuators are supplied with a female double square drive output. The ISO5211 bolt patterns are provided for actuator mounting. The actuator drive bush can be replaced or removed for machining easily.

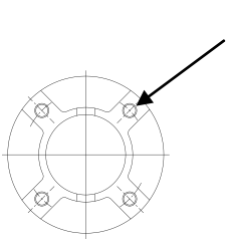
It is mandatory for the actuator to be firmly secured to a robust mounting bracket or to be mounted directly to the valves' ISO mounting pad. High tensile bolts or studs with spring locking washers must be used.

The valve stem must be in line with the actuator output drive to avoid side loads to the shaft. To avoid backlash play between the actuator, mounting bracket and valve is not allowed.

CAUTION:

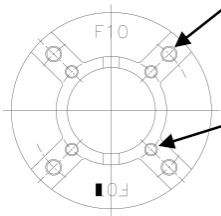
Do not attempt to work on your ECON actuator without first shutting off the power supply
Do not attach ropes or hooks to the hand wheel for lifting purposes

4.2.1 Actuator Mounting Base Details (ISO 5211)



4-M8TAP
D.P12
P.C.D Ø 70
(ISO 5211 F07)

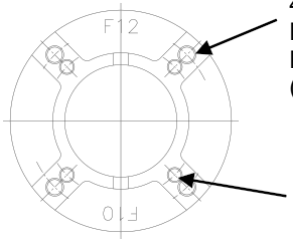
ELA80/100



4-M10TAP D.P15
P.C.D Ø 102
(ISO 5211 F10)

4-M8TAP
D.P12
P.C.D Ø 70
(ISO 5211 F07)

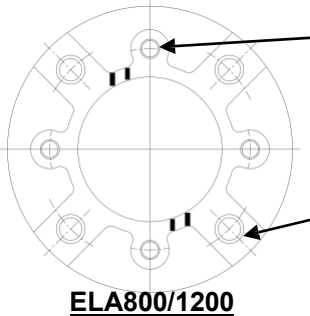
ELA150/200



4-M12TAP
D.P18
P.C.D Ø 125
(ISO 5211 F12)

4-M10TAP D.P15
P.C.D Ø 102
(ISO 5211 F10)

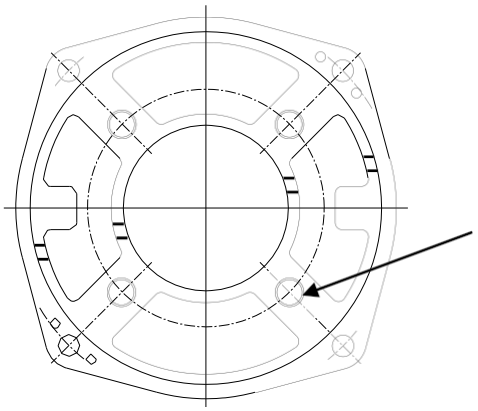
ELA300/500/600



4-M12TAP D.P18
P.C.D Ø 125
(ISO 5211 F12)

4-M16TAP D.P24
P.C.D Ø 140
(ISO 5211 F14)

ELA800/1200



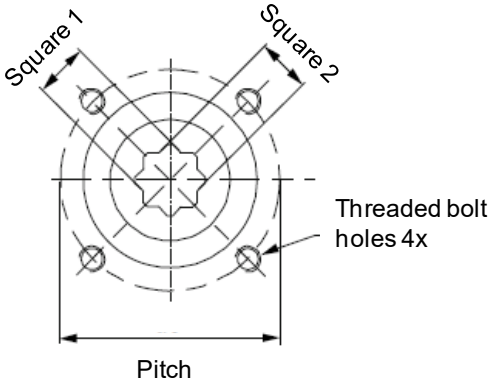
4-M20TAP D.P30
P.C.D Ø165
(ISO 5211 F16)

ELA2000/2700/3000

4.2.2 Actuator Drive Bushing

ELA actuators have a Double Square (star) driving bush, which can be replaced by another dimension to fit the valve stem. This means that the actuators are suitable for valves with a parallel or diagonal stem connection. Also drive bushings with a double-D shape or round shape with keyway are available as an option. Hereunder the ELA-versions with standard connection and possible double square options can be found:

	Standard	Optional
• ELA80	DS 17mm	DS 9-11-14-16mm
• ELA100	DS 17mm	DS 9-11-14-16mm
• ELA150	DS 17mm	DS 11-14-19-22mm
• ELA200	DS 17mm	DS 11-14-19-22mm
• ELA300	DS 22mm	DS 14-17-19-27mm
• ELA500	DS 27mm	DS 14-17-19-27mm
• ELA600	DS 27mm	DS 14-17-19-27mm
• ELA800	DS 27mm	DS 22mm
• ELA1200	DS 27mm	DS 22-30mm
• ELA2000	DS 36mm	DS 27-46-55mm
• ELA2000	DS 36mm	DS 27-46-55mm
• ELA3000	DS 46mm	DS 27-36-55mm



4.3 Limit Switch Setting

- Rotate the hand wheel of the actuator manually to the fully closed position of the valve.
- Use an Allen key, loosen the set screw of the CLOSE limit switch cam
- Rotate the CLOSE cam CW until the limit switch 'clicks' (see Figure 1)
- Tighten the set screw with the Allen key
- Manually rotate the hand wheel of the actuator to the fully opened position of the valve
- Use an Allen key to loosen the set screw of the OPEN limit switch cam
- Rotate the OPEN cam CCW until the limit switch 'clicks' (see Figure 2)
- Tighten the set screw with the Allen key.

DANGER:

HAZARDOUS VOLTAGE.
Make sure all incoming power is disconnected before setting the limit switches

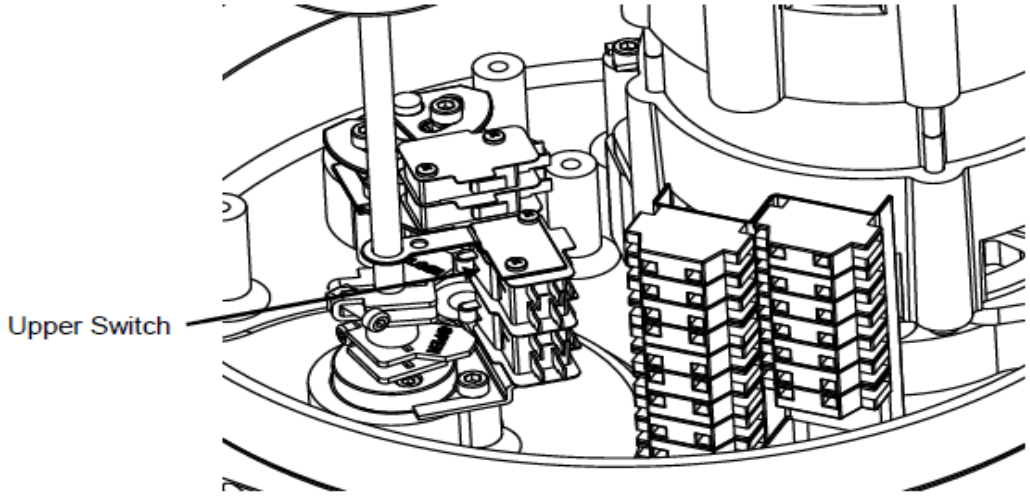


Figure 1: Close Cam Setting

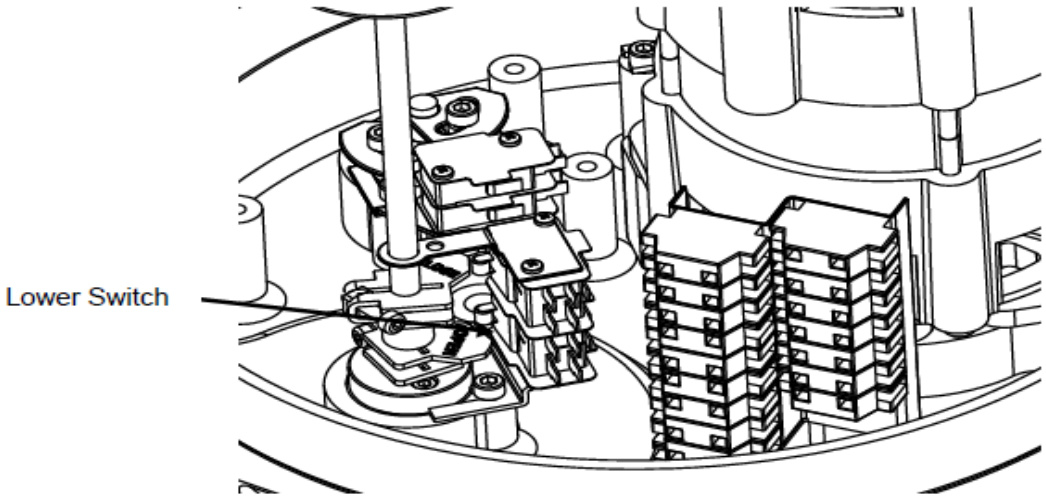


Figure 2: Open Cam Setting

4.4 Torque Switch Setting

The torque spring, which detects the variation of torque during the operation, is installed to prevent damaging the valve and actuator under overload conditions. If an overload of the actuator occurs, the torque switch will be activated and the actuator stops immediately.

The torque switches are set by manufacturer on the production site. If re-setting is necessary, please contact the ECON actuator distributer before setting the torque switch.

CAUTION:

Do not reset the torque switch to a setting higher than the maximum setting stated by the manufacturer.

4.5 Counter-Clockwise to Close Setting

Standard actuators are normally set to clockwise rotation to close. However, the rotation can be reversed to counter-clockwise to close by simply reconfiguring the wiring as follows:

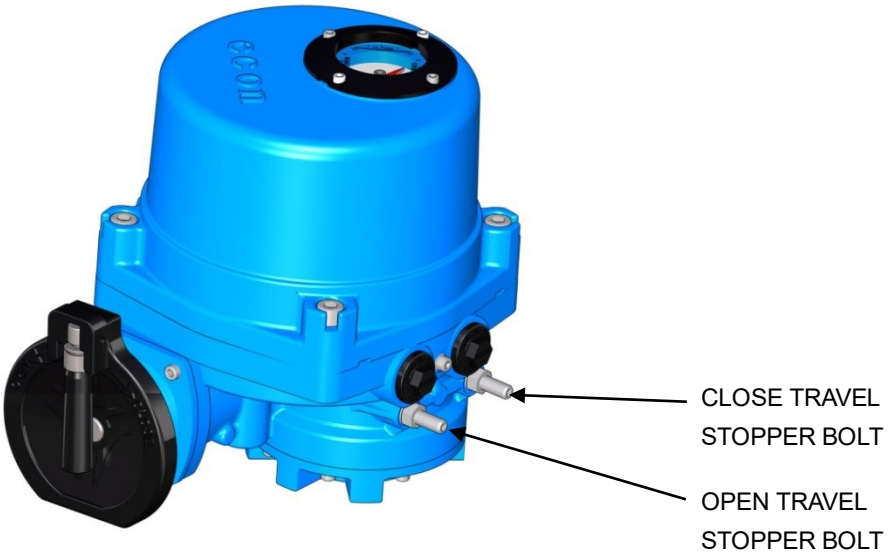
- Reverse wiring on the main terminal block: 9 & 10 as well as 11 & 12.
- Adjust the visual indicator to suit the counter-clockwise rotation.

If a PCU card is installed:

- Reverse P1 (orange) and P3 (grey) on the PCU board.
- Move the actuator manually to the half-open position and push the auto-reset button once.

4.6 Mechanical Travel Stop Adjustment

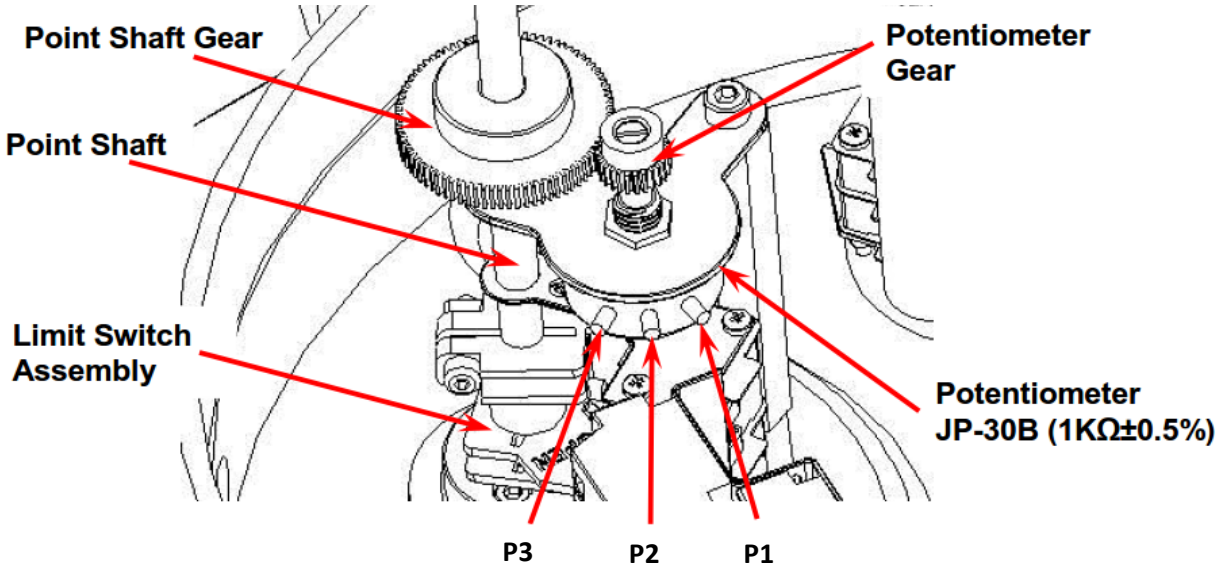
- Loosen both (open and close) travel stopper bolt nuts.
- Operate the actuator manually by turning the hand wheel (the clutch lever must be switched to “manual” first) to the closed position until the “close” open limit switch is being activated.
- Tighten the close travel stopper bolt until resistance is felt. (In this position the close travel stopper bolt should not be able to travel any further).
- Loosen back the close travel stopper bolt by only one turn and tighten the close travel stopper bolt nut.
- Repeat the same operation for setting of the open travel stopper bolt.



4.7 Setting Potentiometer (Optional)

The potentiometer has been calibrated at the factory. However, if re-calibration is required, proceed as follows:

- Manually rotate the hand wheel of the actuator to the fully closed position.
- While measuring the resistance between P1 (black) and P2 (blue), gently rotate the Potentiometer Gear until it reaches between 80 - 120 Ω (100 Ω preferred), by using a flat head screw driver.
- Engage the Potentiometer Gear into the Point Shaft Gear and use an Allen key to fasten the locking bolt of the Potentiometer Gear.



4.8 Current Position Transmitter – CPT (Optional)

The potentiometer is used for the actuator signal feedback. It reads a resistance value which corresponds with the current position of the actuator and transfers it to the CPT card. The CPT indicates the current position of the actuator throughout the complete stroke by a 4 – 20mA output signal.

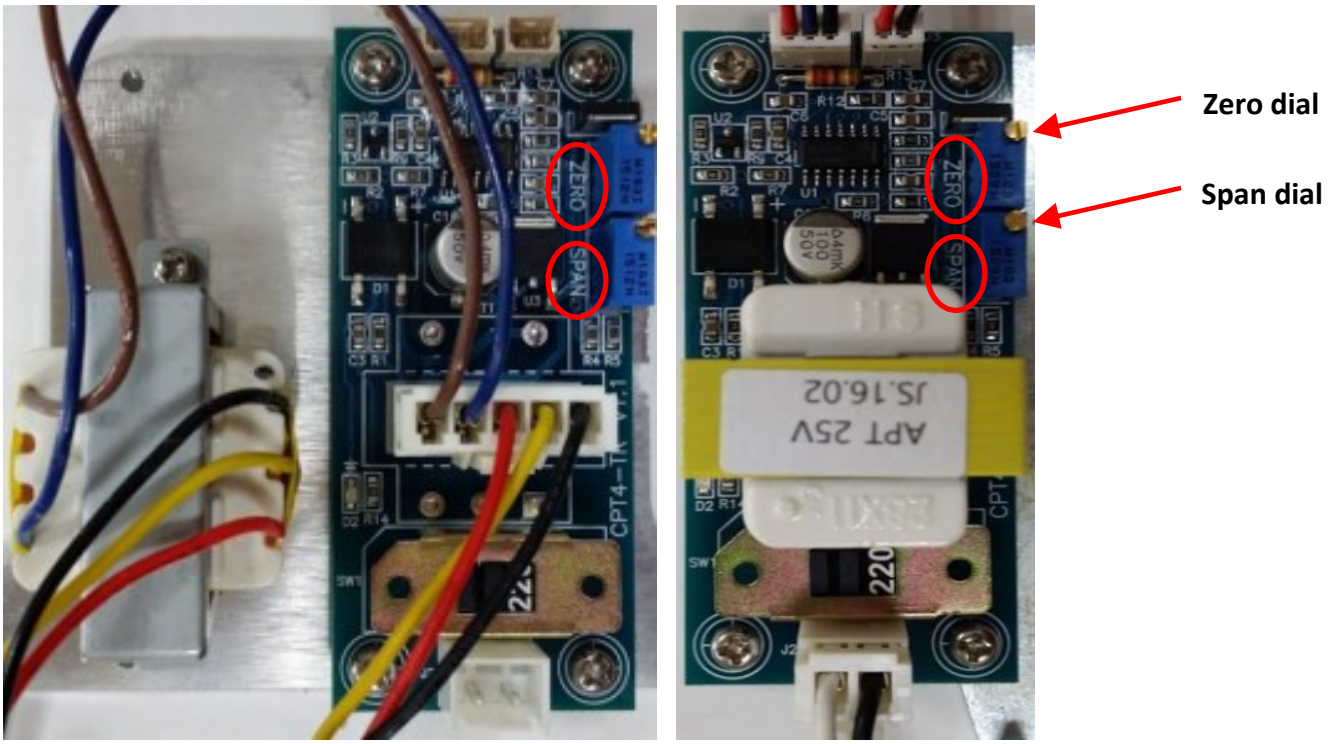
4.8.1 Standard Features

Model	CPT
Power	230(115) VAC ±5%, 50/60Hz 2VA Max
Output Signal	4~20mA DC
Output Impedance	750Ω Max
Resolution	Min 1/1000
Position Conversion Accuracy	±0.5 ~ ±1.5%
Ambient Temperature	-20°C (-4°F) up to +70C (158°F)
Ambient Humidity	90% RH Max (Non-condensing)
Dielectric Strength	1 s at (Rated VAC x 2 + 1000) x 1.2 (from Input to power ground)
Insulation Resistance	Above 500V DC 30MΩ
Vibration	10g, 0~34Hz

4.8.2 Calibration of Zero and Span - CPT

The settings of Zero and Span have been calibrated at the factory. However, if re-calibration is required, proceed as follows:

- Apply power (or use the manual override) to move the actuator to its fully closed position (clockwise rotation).
- When the actuator is in the fully closed position, adjust the ZERO close setting on the CPT board until an output value of 4mA is achieved.
- Apply power (or use the manual override) to move the actuator to its fully open position (counter- clockwise rotation).
- When the actuator is in the fully open position, adjust the SPAN open setting on the CPT board until an output value of 20mA is achieved.

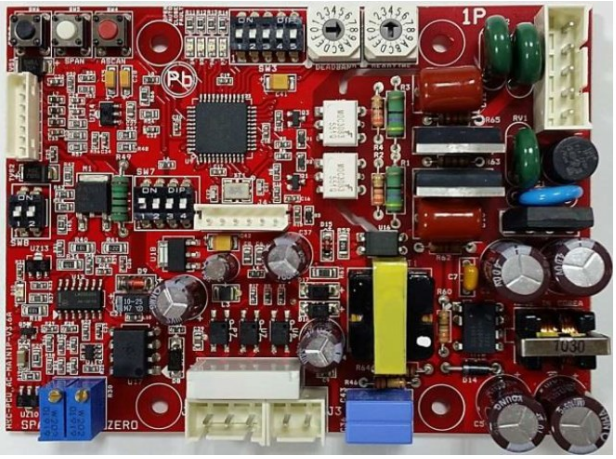


4.9 Proportional Control Unit – PCU (Optional)

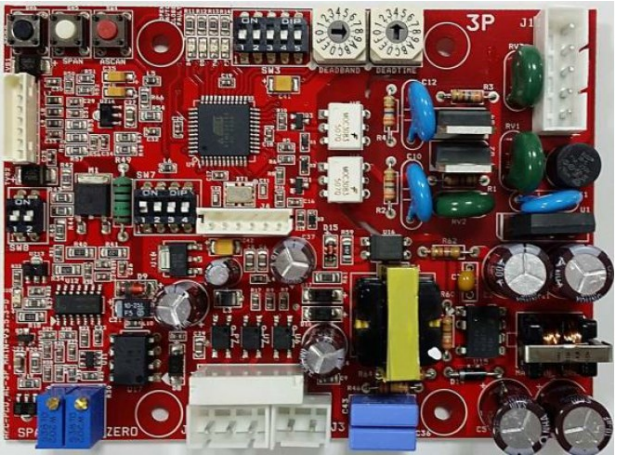
The actuators can be equipped with an additional PCU-PCB (Printed Circuit Board). This circuit board includes a mounting kit and can be installed in any standard open-close actuator. The PCU converts an open-close actuator into a modulating actuator.

Note: ***Please be aware that since the year 2020 a second version PCU (VAC) became available. This PCU can be recognized by the "PCU-EB" marking on the PCB. This PCB has a slightly different setting instruction, which can be found in paragraph 4.9.5..***

4.9.1 PCU-A – Proportional Control Unit Alternating Current



PCU-A 1P



PCU-A 3P

PCU-A (1P and 3P) High performance Controller, using a 10 bit A/D converter and 8 bit microprocessor technology.

PCU-A Features	
Model	PCU-A (1 Phase and 3 Phase)
Power	**85 ~ 260 VAC Free Voltage ± 10%, 50/60Hz, Max. 4 VA**
Input Signal	4~20mA DC, 1~5V DC, 2~10V DC, 0~5V DC, 0~10V DC
Input Impedance	250Ω
Output Signal	4~20mA DC, 1~5V DC, 2~10V DC, 0~5V DC, 0~10V DC
Output Impedance	250Ω Max
Output Contact	1 (Fault monitor)
Deadtime Adjustment	0.05~7.5 seconds
Deadband Adjustment	0.0625~1mA (0.0625mA + step no. x 0.0625mA, 15 steps total)
Ambient Temperature	-10°C (14°F) up to +70°C (158°F)
Ambient Humidity	90% RH Max (non-condensation)

The factory settings of the PCU card are normally set according to the customer requirements at the time of order. However, we strongly recommend that input power, signal input selection and DIP switches are to be verified prior to the actuator start up.

Settings the PCU functions are shown in paragraph 4.9.3 and 4.9.4.

4.9.2 PCU-D – Proportional Control Unit Direct Current

PCU-D High Performance Controller, using a 10 bit A/D converter and 8 bit microprocessor technology

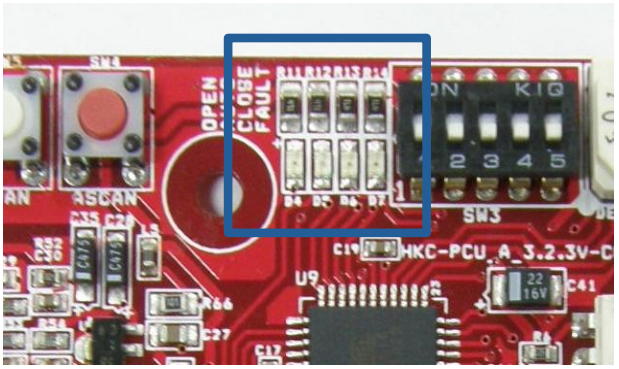
PCU-D Features	
Model	PCU-D
Power	**24V DC Voltage ± 15%, Max. 36V DC**
Input Signal	4~20mA DC, 1~5V DC, 2~10V DC, 0~5V DC, 0~10V DC
Input Impedance	250Ω
Output Signal	4~20mA DC, 1~5V DC, 2~10V DC, 0~5V DC, 0~10V DC
Output Impedance	250Ω Max
Deadtime Adjustment	0.05 ~ 7.5 seconds
Deadband Adjustment	0.0625~1mA (0.0625mA + step no. x 0.0625mA, 15 steps total)
Ambient Temperature	-25°C (-13°F) up to +80°C (176°F)
Ambient Humidity	90% RH Max (non-condensation)

The factory settings of the PCU card are normally set according to the customer requirements at the time of order. However, we strongly recommend that input power, signal input selection and DIP switches are to be verified prior to the actuator start up.

Settings the PCU functions are shown in paragraph 4.9.3 and 4.9.4.

4.9.3 LED Signal Indication

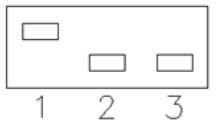
LED	State	Indication
Blue	On	Power on (auto)
	Flickering	Auto calibrating
Green	On	Fully closed
	Flickering	Closing
Red	On	Fully open
	Flickering	Opening
Yellow	On	Manual mode
	Flickering	Fault indication, either: - no input signal - wrong input wiring - wrong PIU setting



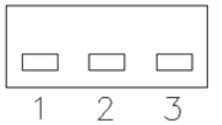
4.9.4 Setting PCU Functions

A) Selecting Input Signal (SW7 on PCU-A or SW2 on PCU-D)

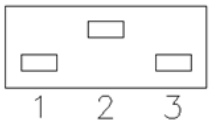
User can select different types of input signals by adjusting the DIP switches as follows:



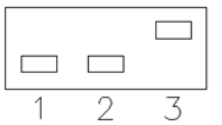
4 - 20mA DC



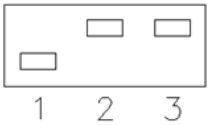
1 - 5V DC



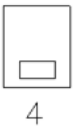
2 - 10V DC



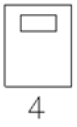
0 - 5V DC



0 - 10V DC

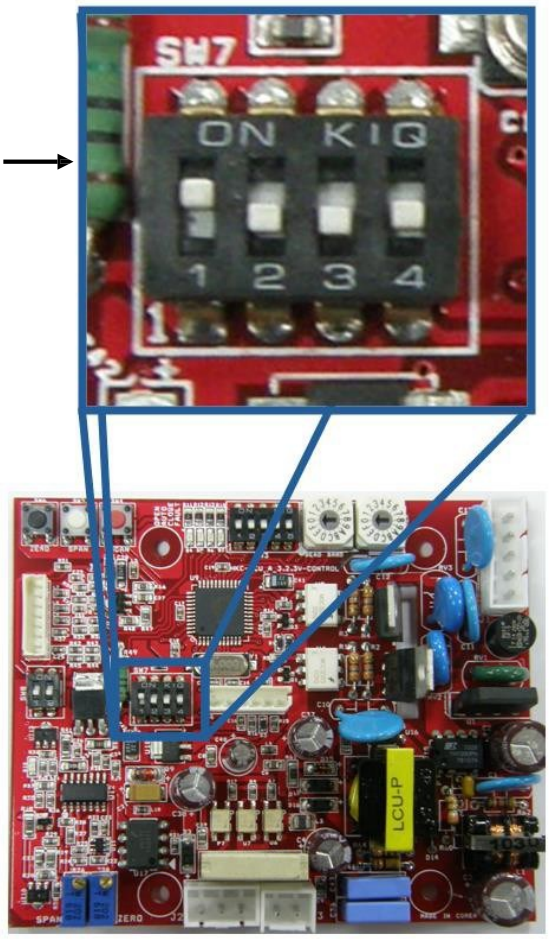


60 Hz (not applicable for PCU-D)



50 Hz (not applicable for PCU-D)

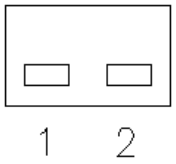
Input Signal Switch →



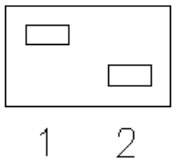
Note: If not specified, the factory setting of the input signal is 4 - 20mA.

B) Selecting Output Signal (SW8 on PCU-A or SW3 on PCU-D)

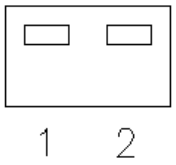
User can select different types of output signals by adjusting the DIP switch as follows:



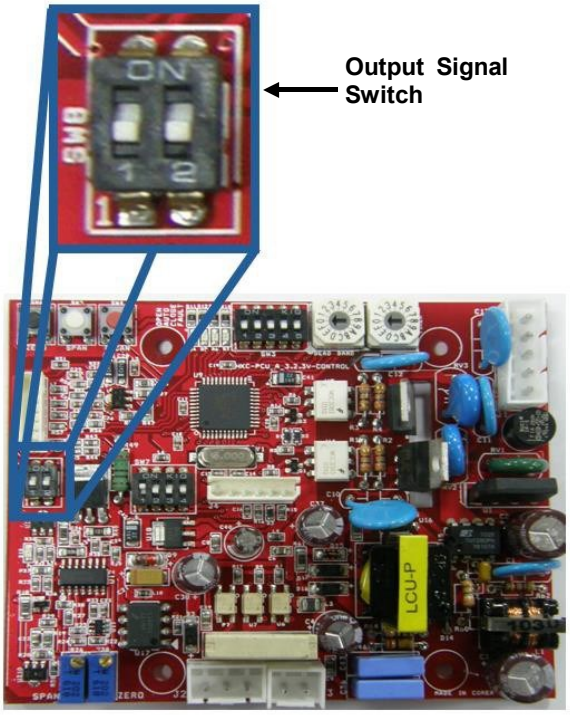
4 - 20mA DC



Input signal switch No. 3 (PCU-A SW7 or PCU-D SW2) "ON"	0 – 10V DC
Input signal switch No. 3 (PCU-A SW7 or PCU-D SW2) "OFF"	2 – 10V DC



Input signal switch No. 3 (PCU-A SW7 or PCU-D SW2) "ON"	0 – 5V DC
Input signal switch No. 3 (PCU-A SW7 or PCU-D SW2) "OFF"	1 – 5V DC



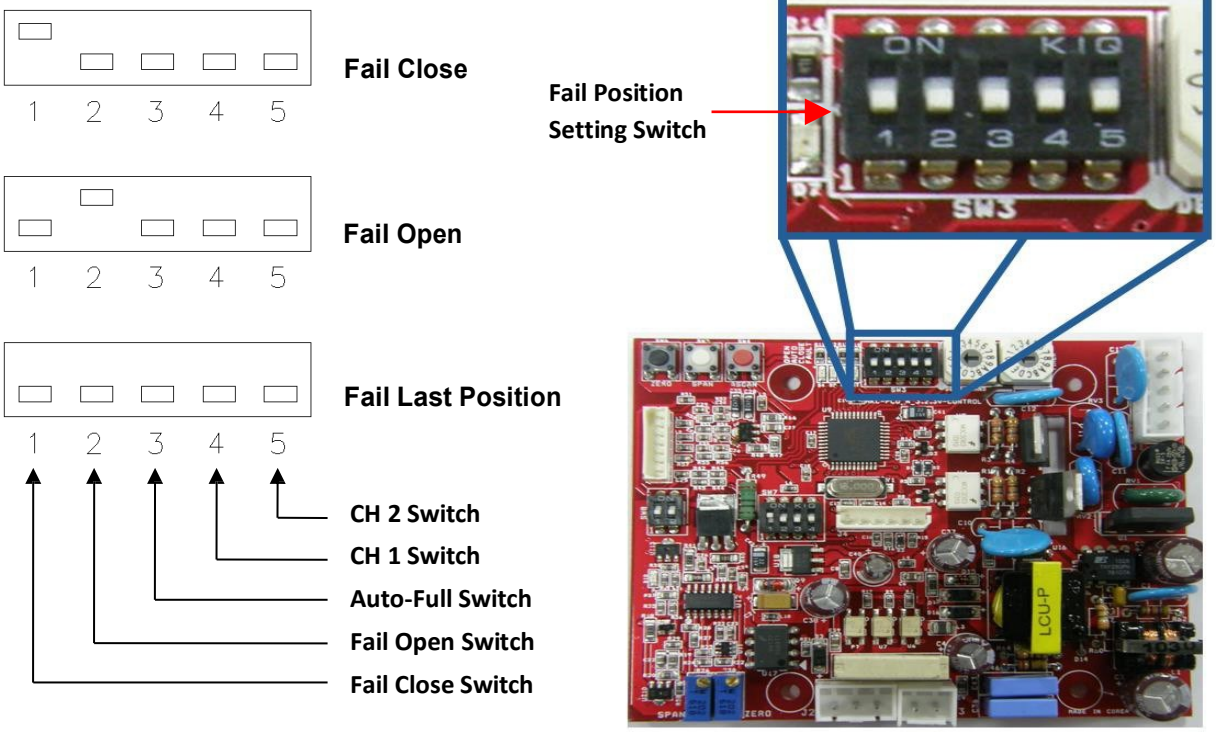
Note 1: If not specified, the factory setting of the output signal is 4 - 20mA.

Note 2: If the ELA150~3000, 115/230VAC actuators only will be operated by open and close commands on terminal 11 and 12, the following procedure must be followed in order to select the desired feedback signal:

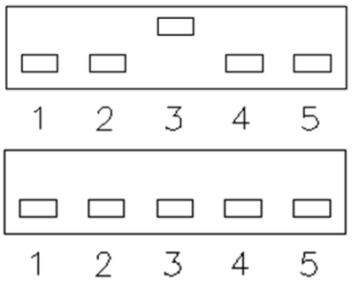
- ***Select the output signal by adjusting the DIP switches as mentioned in this paragraph.***
- ***Connect the power supply; Neutral on terminal 5 and Live on terminal 13.***
- ***Make a link between terminal 13 and 14 and connect a multi-meter to terminal 17 and 18.***
- ***Push "auto adjust" (red button on the circuit board) for 2 seconds.***
- ***The actuator will now "auto adjust" itself.***
- ***After the adjusting cycle has stopped, remove the link between 13 and 14.***
- ***Now the actuator van be operated by giving the open and close commands on terminal 11 and 12. The feedback signal will be given on terminal 17 and 18.***
- ***The feedback signal however still needs to be checked and if necessary adjusted. Therefor measure the voltage or current on terminal 17 and 18, while opening and closing the actuator. If necessary adjust the potentiometers "zero" and "span" on the bottom of the circuit board until the output values are correct.***

C) Fail Position Setting (SW3 on PCU-A or SW1 on PCU-D)

User can select the fail position of the actuator in case of control signal failure by adjusting the DIP switches as follows:



D) Special Signal Setting for Fully Open and Fully Closed



Auto-Full Switch (Switch 3) On (up)	Signal: 4.3~4mA	Fully Closed
	Signal: 19.7~20mA	Fully Open

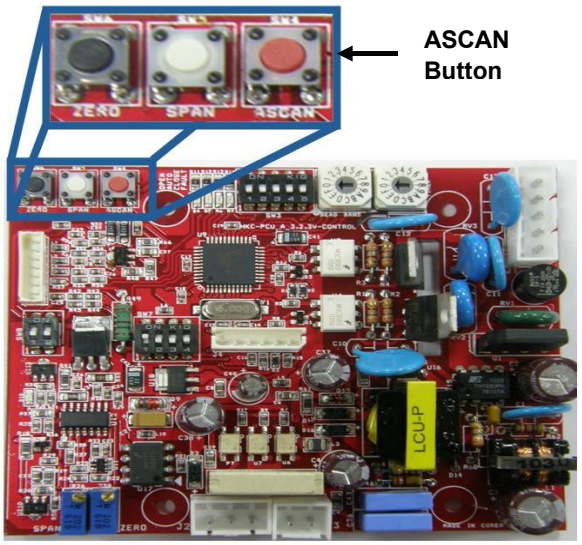
Auto-Full Switch (Switch 3) Off (down)	Signal: 4mA	Fully Closed
	Signal: 20mA	Fully Open

E) Auto Setting

This function is used for automatic setting of the PCU card to the predefined limits.

First make sure that the actuator has been mounted correctly on the valve. Secondly check the input power and also the input and output signals. Press the ASCAN button once. Regardless the position of the actuator, the actuator will now perform the Auto Setting motion:

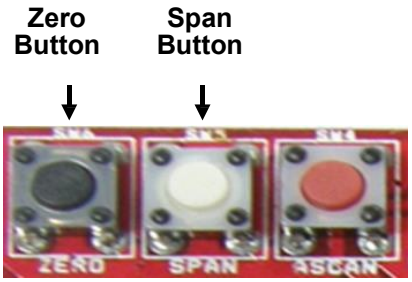
1) The blue LED starts flickering
2) The red LED starts flickering for 5 seconds indicating that the actuator is moving to the open position
3) Pause for 2 seconds
4) The green LED starts flickering, indicating that the actuator is moving to the fully closed position
5) Pause (the green LED on) for 3 seconds
6) The red LED starts flickering, indicating that the actuator is moving to the fully open position
7) Pause (the red LED on) for 3 seconds
8) Moving back to the command position



Note: ***Since the actuator is already set at the factory, no further settings are required unless the user has made adjustments to the Limit Switch or the Potentiometer settings.***

F) Manual Operation

- This function allows the user to manually operate the actuator.
- To access this function, press the ZERO (black) and SPAN (white) buttons simultaneously for 2 seconds and the yellow LED will be lit to indicate that the actuator is in Manual Operation mode.
- Pressing the ZERO button will move the actuator to the close position and pressing the SPAN button will move the actuator to the open position.
- If no operation occurs within 5 seconds, the PCU automatically terminates the Manual Operation mode or alternatively press the ZERO and SPAN buttons simultaneously for 2 seconds. In both cases, the yellow LED will be lit off to indicate the termination of the Manual Operation Mode.



Note: ***During the Manual Operation mode, the input signal is ignored.***

G) Customizing Set-points (CH 1 Switch)

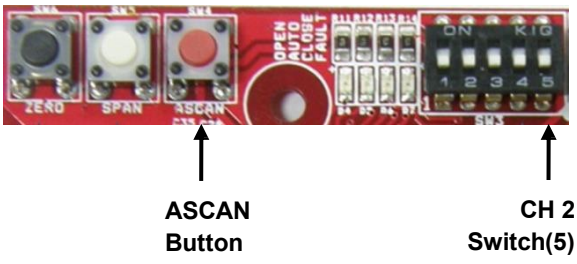
- This function is used when the user wants to set different set-points for fully open and fully closed positions.
- For example, if the user wants to assign 5mA as the set-point for the fully closed position, first of all switch- on (move up) the CH1 switch (switch 4). Supply a 5mA signal and push the ZERO button once. Hereafter, the actuator will acknowledge the 5mA signal as the set-point for the fully closed position and transmits a 4mA feedback signal. Similarly, for setting the set-point for the fully open position, supply the desired signal (for example, 19mA) and push the SPAN button once. Switch-off (move down) the CH1 switch to complete the setting. After this action, the actuator will operate according this new setting.

Set-points	Adjustable Range
Fully Closed	3 – 8mA DC
Fully Open	16 – 21mA DC

H) Reversal Acting (CH 2 Switch)

- This function allows the user to reverse the input and output signals for the operation of the actuator.
- For standard operation (CH 2 switch down), the input signal of 4mA operates the actuator to the fully closed position and the actuator transmits the output signal of 4mA. However, if the CH 2 switch is on (up) the input signal of 4mA operates the actuator to the fully open position and still transmits a 4mA output signal.
- Manually move the actuator to the half-open position and push the ASCAN button once to execute the Auto Setting (see 4.10.2 E). Supply signal and check the operation.

CH 2 Switch (Switch 5) On (up)	4mA DC	Fully Open
	20mA DC	Fully Closed
CH 2 Switch (Switch5) Off (down)	4mA DC	Fully Closed
	20mA DC	Fully Open

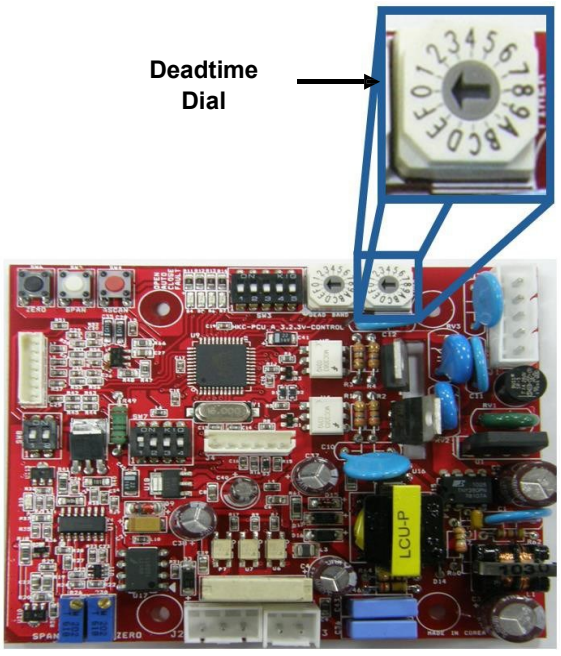


I) Deadtime

- The actuator will only start to move if the change of the input signal value is greater than the deadband set value (see 4.10.2 J) and when the signal value is maintained for the duration of the deadtime time.
- This prevents malfunction of the actuator caused by unwanted signals in the input signal such as noise and interferences.
- Turning the Delay Time Dial in clockwise direction will increase the deadtime time (Range 0.05 to 7.5 seconds).

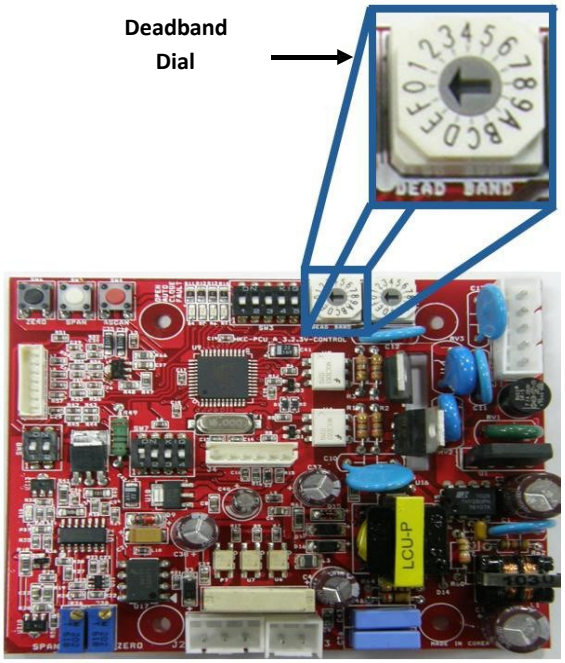
Dial	0	1	2	3	4	5	6	7
Sec.	0.05	0.2	0.4	0.6	0.8	2.5	3.0	3.5

Dial	8	9	A	B	C	D	E	F
Sec.	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5



J) Deadband Dial

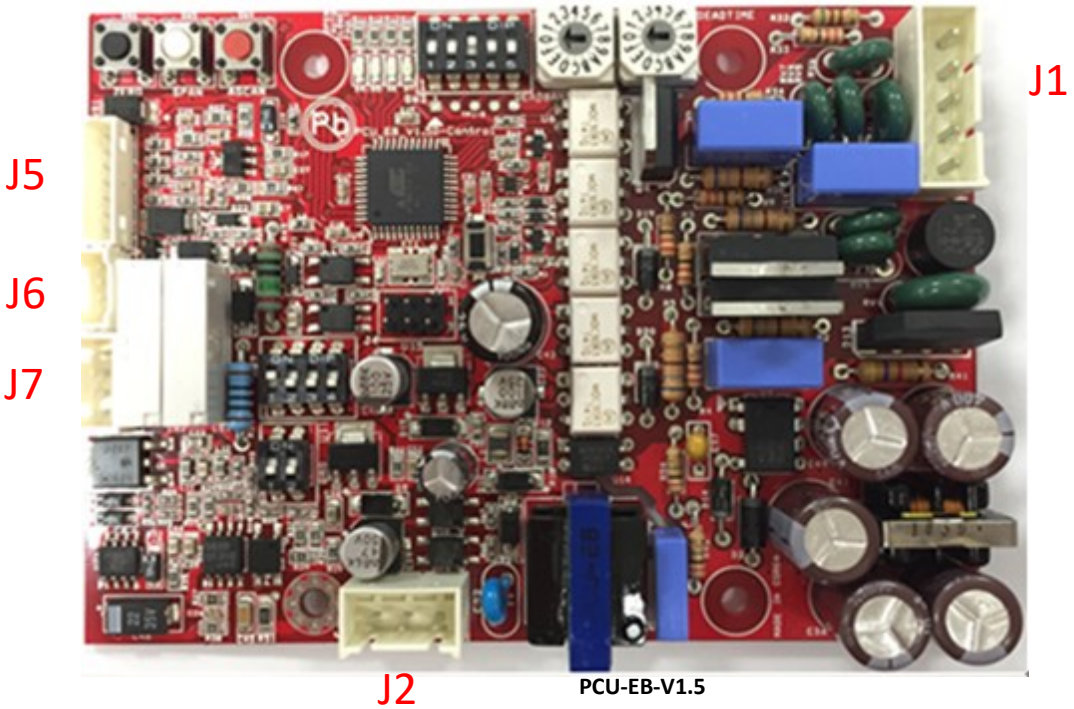
- The deadband adjusts the limits of the valve's deviation between an actual position and a target position. The dead band is set to 0.12mA DC max.
- Deadband indicates the extent of the reaction on the input signal.
- Low deadband setting may cause the actuator to hunt or to unnecessarily respond to a fluctuating input signal. If so, the deadband must be increased.
- Turning the Deadband Dial in clockwise direction will increase the resolution (Range 0.0625mA to 1mA).



Dial	0	1	2	3
mA DC	0.0625	0.125	0.1875	0.25
Dial	4	5	6	7
mA DC	0.3125	0.375	0.4375	0.5
Dial	8	9	A	B
mA DC	0.5625	0.625	0.6875	0.75
Dial	C	D	E	F
mA DC	0.8125	0.875	0.9375	1

4.9.5 PCU-EB – Proportional Control Unit Alternating Current (2020 *VERSION*)

Note: ***Please be noted that two PCU Alternating Current PCB's are available. Check the markings on the PCB before you start working on the settings. The instructions below are only applicable to the PCU-EB PCB.***



PCU-EB-V1.5

Connector	Purpose
J1 (5-Pin)	Power connection for PCU and motor
J2 (3-Pin)	LCU connection terminal
J5 (7-Pin)	Command and feedback signal, Potentiometer connector
J6 (4-Pin)	Closed (1, 2) & Open (3, 4) Limit Switch connection terminal
J7 (4-Pin)	Closed (1, 2) & Open (3, 4) Relay contact output terminal

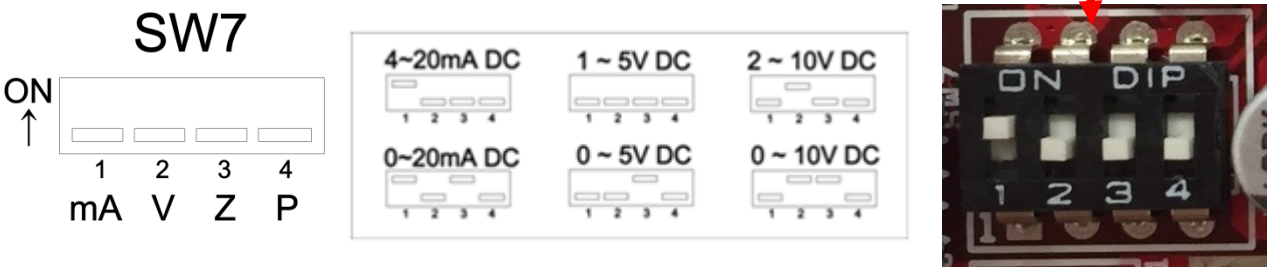
PCU-EB Features	
Model	PCU-EB-V1.5 (1 Phase)
Power	**115/230 VAC ± 10%, 50/60Hz, Max. 4 VA**
Input Signal	4~20mA DC, 1~5V DC, 2~10V DC, 0~20mA DC, 0~5V DC, 0~10V DC
Input Impedance	250Ω
Position Impedance	100~10kΩ
Output Signal	4~20mA DC, 1~5V DC, 2~10V DC, 0~20mA DC, 0~5V DC, 0~10V DC
Output Impedance (load)	500Ω Max
Deadtime Adjustment	0.2~7.5 seconds (to be set in 16 steps)
Deadband Adjustment	0.3~7.5% (to be set in 16 steps)
Ambient Temperature	-25°C (-13°F) up to +80°C (176°F)
Ambient Humidity	90% RH Max (non-condensation)
Fault Mode	Fail close, fail open and fail stop
Position Conversion Accuracy	±(0.2~5)% (depending on conditions)
Dielectric Strength	1500V AC 1 minute
Insulation Resistance	500V DC, 50MΩ
Vibration and Shock	X, Y & Z, 10g (6g based on RMF), Frequency: 0.2~34Hz, Time: 30 minutes

A) LED Signal Indication

LED	Signal
Red	Open
Blue	Power or Auto
Green	Close
Yellow	Manual or Fault

B) Selecting Input Signal

Depending on the system environment a suitable input signal can be selected by adjusting the SW7 DIP-switches as follows:

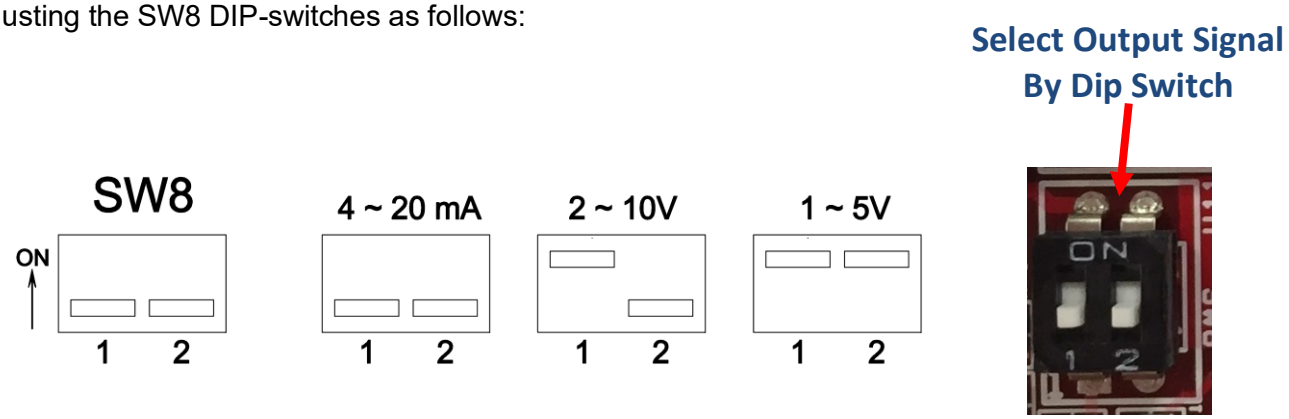


Notes:

- ***4-20mA is the standard factory setting for the input signal of this PCU.***
- ***ZERO SWITCH (SW7.3). Same application of input and output signals.***

C) Selecting Output Signal

Depending the system environment a suitable output (feedback) signal can be selected by adj usting the SW8 DIP-switches as follows:

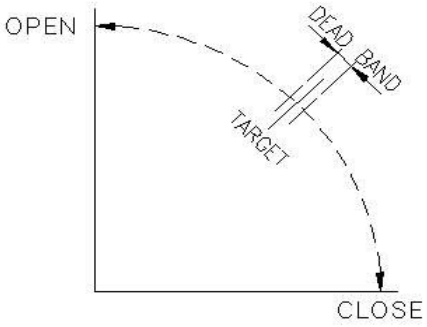


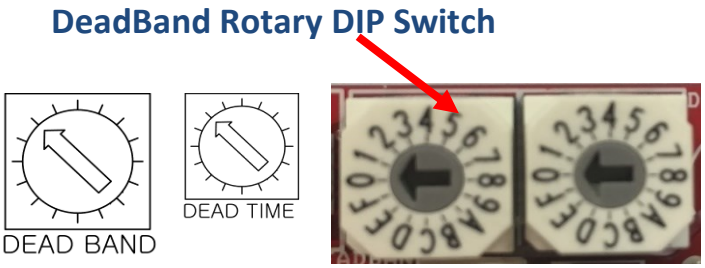
Note: ***4-20mA is the standard factory setting for the output signal of this PCU.***

CAUTION: "(1) Selection of input signal" ZERO SWITCH (SW7.3) Usage Notes

D) Deadband Setting

- Max. allowable value of actuator position error by input command signal.
- Min. variation range of the input command signal to start operating the actuator.

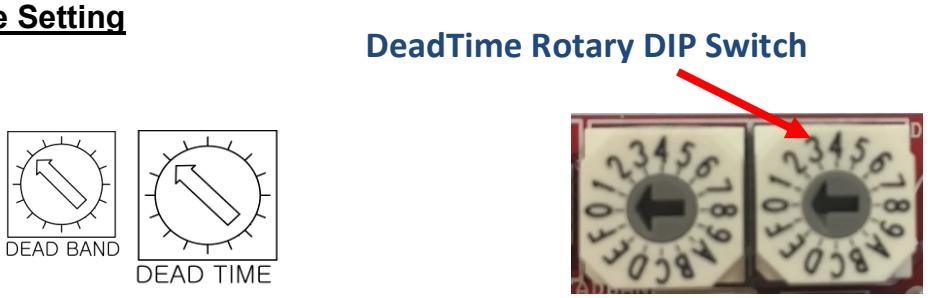




- Range of DEAD BAND setting: 0.3 ~ 7.5% (setting in 16 steps)
  - ① Step 0 : 0.1% increase per step (0.3% ~ 0.7%)
  - ② Step 1 ~ 4 : 0.2% increase per step (1.0% ~ 1.8%)
  - ③ Step 5 ~ 15 : 0.5% increase per step (5.0% ~ 7.5%)
  - ④ Factory setting : "2"
- In case the DEADBAND is set too narrow, the actuator may run back and forward repea tedly not finding the target position. This is called as HUNTING.
- DEADBAND should be properly adjusted in order to prevent HUNTING.

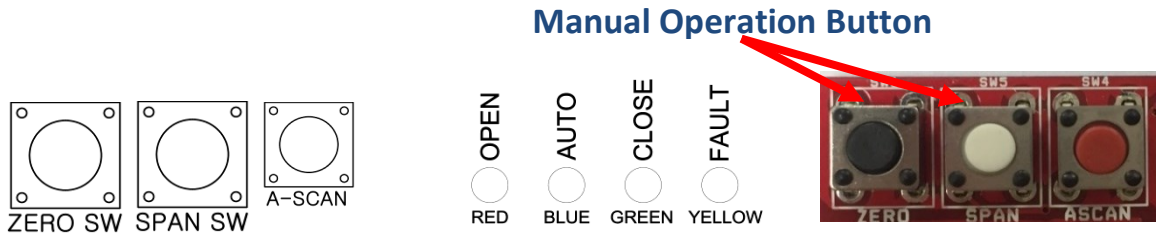
CAUTION: ***Continuous HUNTING will cause damage to the motor, PCU-card or potentiometer.***

E) Deadtime Setting



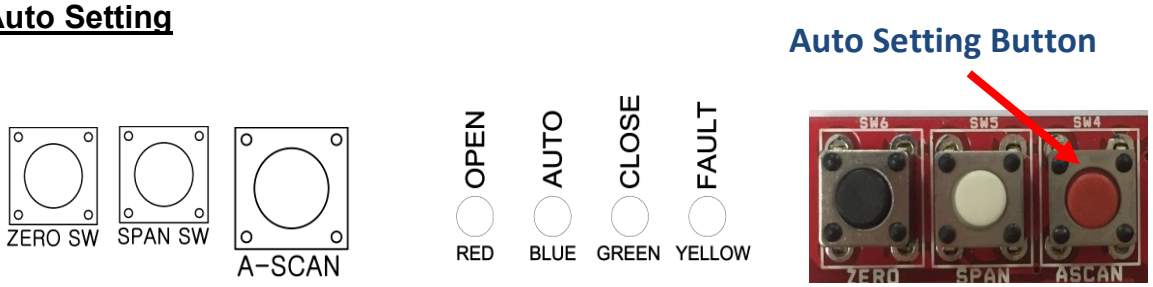
- DEAD TIME setting is to secure the reliability of the command signal.
- Minimum duration time of the input command signal satisfying DEAD BAND.
- Actuator is operated by recognizing input signals satisfying DEAD TIME as command si gnals.
- Range of DEAD TIME Setting : 0.2 ~ 7.5 seconds (setting in 16 steps)
  - ① Step 0 : 0.2s (the minimum value)
  - ② Step 1 ~ 4 : 0.25s increase per step (0.25 ~ 1 sec)
  - ③ Step 5 ~ 15 : 0.50s increase per step (2.5 ~ 7.5 sec)
  - ④ Factory setting : "2"

F) Manual Mode



- This is for operating the actuator manually.
- Press the “ZERO” button and “SPAN” button simultaneously for more than one second until the YELLOW LED turns on. The manual mode is now activated.
- ZERO BUTTON (black): For operating the actuator to the CLOSED direction.
- SPAN BUTTON(white) : For operating the actuator to the OPEN direction.
- The MANUAL MODE will be released automatically when there is no new command sig nal within 10 seconds by using the manual buttons. Or press the ZERO SW (black) and SPAN SW (white) button simultaneously for more than one second. The YELLOW LED will turn off, indicating that the MANUAL MODE is released.

G) Auto Setting



- Please check the actuator wiring connections and input and output signals, after the act uator has been mounted on the valve.
- If all wiring connections have been made correctly, press the “ASCAN” button one time.
- The PCU card will start the actuator SETTING automatically. During the AUTO SETING mode the blue LED is blinking.

Setting Procedure:

1) The BLUE LED blinks continuously.

2) The actuator is moving to the closed position (GREEN LED blinking) → The actuator is fully closed (GREEN LED turns ON). If the actuator is already in the closed position, the closing process will be skipped!

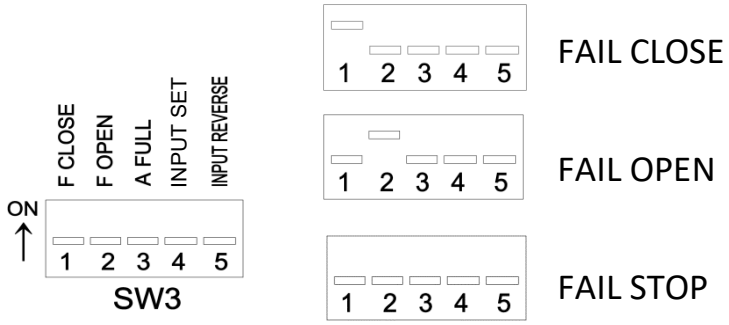
3) The actuator is moving to the open position (RED LED is blinking) → The actuator is fully open (RED LED light turns ON)

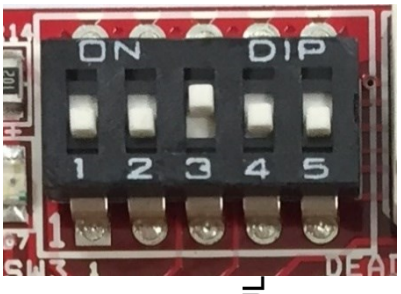
4) When the AUTO SETTING has been completed (BLUE LED turns ON) → The actuator will move to the new position given by the input signal.

Note: ***The Auto Setting command is cancelled automatically when any button (Zero, Span or A-scan) is pressed during the Auto Setting mode.***

H) Fail Close, Fail Open and Fail Stop Setting

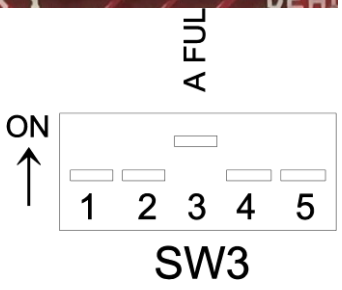
The PCU card will recognize input signals such as no signal or wrong signal as faults, it will m ake the actuator automatically move to fully OPEN or fully CLOSE position, or the actuator will STOP immediately in the current position.





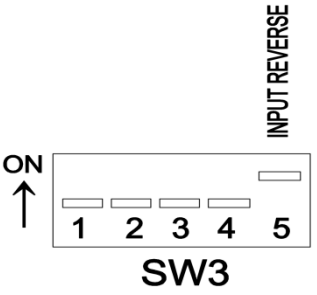
I) Auto Full Action (A FULL)

Dip switch No. 3 (A_FULL) is in the ON position as shown above. This setting will make the actuator run to the fully closed position if the input signal is lower than 4.3mA. It will run to the fully open position if the input signal is higher than 19.7MA

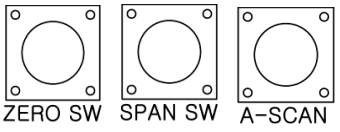


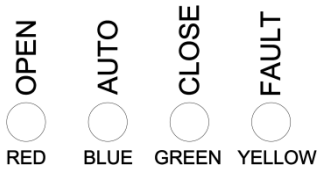
J) Reverse Mode

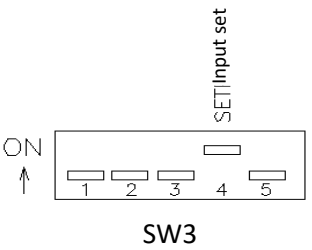
- When the Reverse Mode is set as shown on the picture on the right, the actuator is responding in reverse to the input signal. This means:
- When input (command) signal is 4mA, the actuator will run to the fully open position and will send out 4mA as output signal (feedback).
- When the input (command) signal is 20mA, the actuator will run to the fully closed position and will send out 20mA as output signal (feedback).



K) Setting the Optional Set Point







- ZERO (FULL CLOSE) Signal, SPAN (FULL OPEN) Signal for changing the Signal
- ZERO (FULL CLOSE) Signal SETTING Range: Generally 3 ~ 8 mA DC
- SPAN (FULL OPEN) Signal SETTING Range: Generally 16 ~ 21mA DC

Example

Please set full close (zero) to 5mA DC and set fully open (span) to 19mA DC

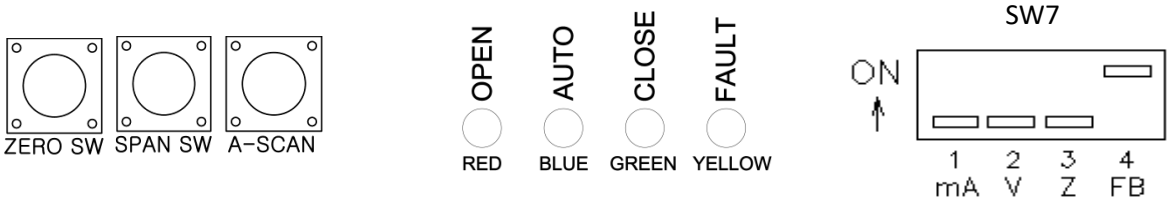
① Put dip switch No. 4 ON (SW3).
② RED & GREEN LED start blinking together.

③ After 1.5 Seconds, Only the GREEN LED blinks.
④ Put the 5mA input (command) signal on the input terminal, then push the black " ZERO" button.
⑤ If the setting has succeeded, the YELLOW LED will blink once.
⑥ Check if the GREEN LED is on and the RED LED is blinking.
⑦ Put the 19mA input (command) signal on the input terminal, then push the white " SPAN" button.
⑧ If the setting has succeeded, the YELLOW LED will blink once and the RED LED is on.
⑨ Check if the RED and GREEN LEDS are blinking together and wait until only the GREEN LED is blinking.
⑩ Put dip switch No. 4 back to OFF (SW3)

Notes:

- ***The above setting procedure will be cancelled if dip switch No. 4 is being put in the OFF position during the setting procedure.***
- ***If, during the above procedure, there is any input signal for longer than 2 minutes the setting procedure is being cancelled.***

L) Setting the feedback



- Setting the output signal as 4mA and 20mA.
- ZERO BUTTON (Black): To decrease the Output signal.
- SPAN BUTTON (white): To increase the output signal.

Example

ZERO: 4mA and SPAN: 20mA Setting

① Put dip switch No. 4t ON (SW7)
② The RED and GREEN LED will turn off. Wait until the GREEN LED starts blinking.
③ Push the "ZERO-SPAN" button in order to set the output signal to 4mA.
④ Check the 4mA output signal and push the "ASCAN" button.
⑤ Check if the YELLOW LED blinks once.
⑥ Check if the GREEN LED is on and the RED LED is blinking.
⑦ Push the "ZERO-SPAN" button in order to set the output signal to 20mA.
⑧ Check the 20mA output signal and push the "ASCAN" button.
⑨ Check if the YELLOW LED blinks once.
⑩ Check if the RED LED is on.
⑪ Check if the RED and GREEN LED are switched on together and wait until RED LED switches off.
⑫ Put dip switch No. 4 back to OFF (SW7).

Notes:

- ***The above setting procedure will be cancelled if dip switch No. 4 is being put in the OFF position during the setting procedure.***
- ***If, during the above procedure, there is any input signal for longer than 2 minutes the setting procedure is being cancelled.***

M) LED Display

LED	Color	Operation	Status
OPEN	RED	ON	FULLY OPEN
		OFF	OPENING
AUTO	BLUE	ON	POWER ON
		OFF	AUTO SETTING
CLOSE	GREEN	ON	FULLY CLOSED
		OFF	CLOSING
FAULT	YELLOW	ON	MANUAL MODE
		OF	MALFUNCTION

N) Error Display

PCU-card is in error condition (YELLOW LED is switched off)

By pushing the black “ZERO” button, the error condition can be checked with the LED status as shown in the below table.

No.	Type of Error	LED			
		RED	BLUE	GREEN	YELLOW
1	EEPROM Error	OFF	OFF	OFF	ON
2	Input signal initialization error	OFF	OFF	ON	OFF
3	Auto Setting initialization error	OFF	OFF	ON	ON
4	Input signal error	OFF	ON	OFF	OFF
5	Motor backlashing	OFF	ON	OFF	ON
6	Command signal select switch error	OFF	ON	ON	OFF
7	POTENTIOMETER	OFF	ON	ON	ON
8	Open position error	ON	OFF	OFF	OFF
9	Close position error	ON	OFF	OFF	ON
10	Limit switch error	ON	OFF	ON	OFF

4.10 AC/DC Multi-Board (Optional)

ATTENTION:

This Multi-board has been redesigned in 2023. The function has remained the same, but the dip-switch settings have changed. Therefore please check which Multi-board is in the actuator and select the applicable instruction below. (Page 31 and 32)

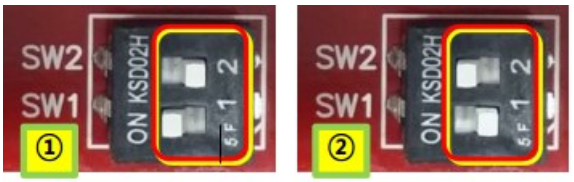
4.10.1 MULTI-BOARD UP TO 2023 – RED COLOUR PCB – V1.4

A) Power Open-Close Terminal block

1 Power 24V AC/DC (DC + signal block)
2 None
3 None
4 Open signal
5 Close signal
6 Power 24V AC/DC (DC – signal block)

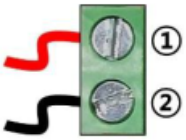
B) Power Input Switch

1. For DC Mode: #1 switch turn “ON” and #2 switch turn “OFF”
2. For AC Mode: #1 switch turn “OFF” and #2 switch turn “ON”



Note: Don’t operate both switches #1 and #2 at the same time. It may damage the board

C) Motor Terminal Block



- Red motor wire must be connected to terminal # 1
- Black motor wire must be connected to terminal # 2

4.10.2 MULTI-BOARD STARTING FROM 2024 – GREEN COLOUR PCB – V1.5

A) Power Open-Close Terminal block

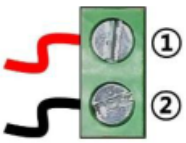
1 Power 24V AC/DC (DC + signal block)
2 None
3 None
4 Open signal
5 Close signal
6 Power 24V AC/DC (DC – signal block)

B) Power Input Switch

1. For AC Mode: #1 switch turn “ON” and #2 switch turn “ON”
2. For DC Mode: #1 switch turn “OFF” and #2 switch turn “OFF”

Note: Don’t operate both switches #1 and #2 at the same time. It may damage the board

C) Motor Terminal Block



- Red motor wire must be connected to terminal # 1
- Black motor wire must be connected to terminal # 2

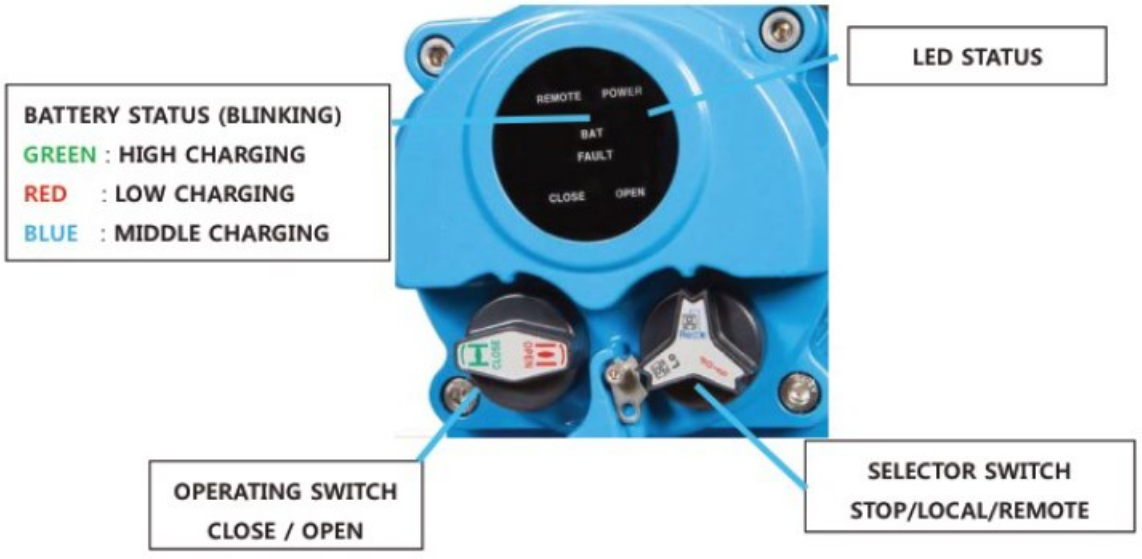
5 RECHARGEABLE BATTERY PACK – RBP (Optional)

Warning

- Please check if the electric power supply corresponds with your specification and the information on the actuator type plate.
- Make sure the power supply has been switched off before you start wiring the actuator.
- The life time of the battery is 2 years, subject to operating time and environment. It should be replaced after 2 years in order to guarantee a good working product.
- After electric power has been supplied on terminal strip number 2 and 3, please connect number 1 and 4 with a jumper as shown on the wiring diagram. Please make sure that number 1 and 4 are connected. This connection must be maintained as long as the electric power supply is connected.
- If the actuator will not be operated for a long period of time, please disconnect terminal strip number 1 and 4 in order to extend battery life.
- The battery must be discharged and charged regularly every 2 to 3 months.

5.1 General

The ECON actuator with Rechargeable Battery Pack (RBP) can be operated in Local or Remote mode by using two selector switches on the local control unit. During power failure the actuator can be operated 5 times by the battery pack. The actuator shows high reliability due to its self-checking c apability. The local control unit shows the position of the valve, status of the actuator and errors if occurring.



5.2 Features

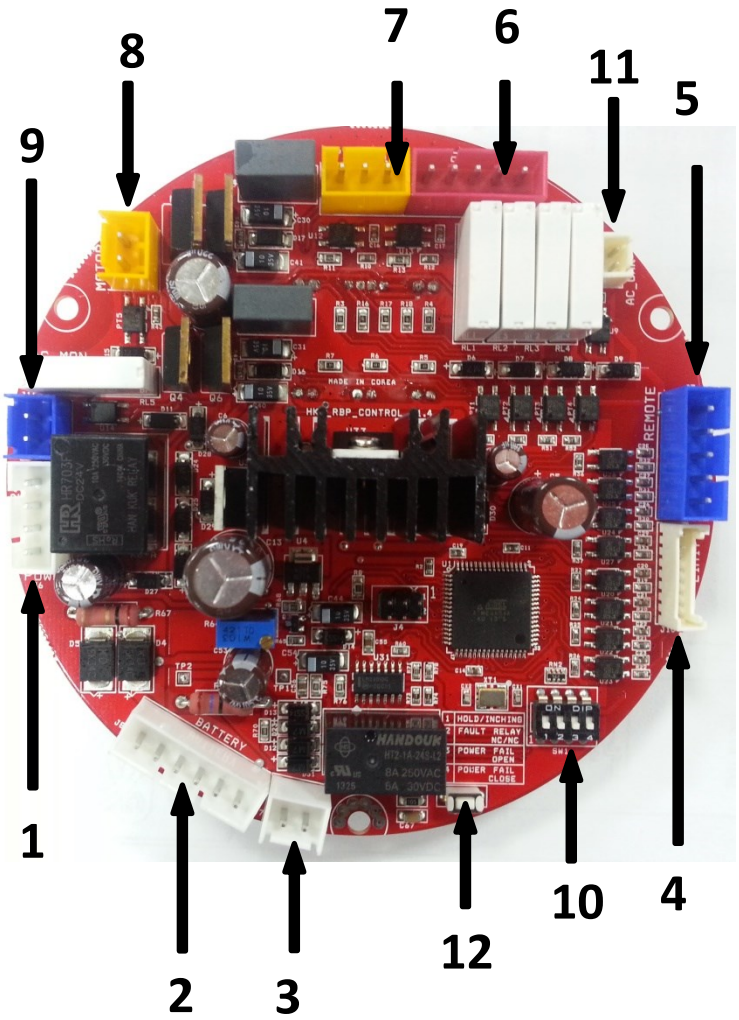
- The actuator unit can be operated in Local or Remote mode, also during power failure.
- The DIP switch settings and functions can be found in the table in paragraph 4.
- NORMAL MODE (on AC POWER): Battery LED blinks 1.5 seconds ON and 0.5 seconds OFF
- BATTERY MODE (on BATTERY POWER) : Battery LED blinks 0.25 seconds ON and 1.75 seconds OFF

5.3 Specification

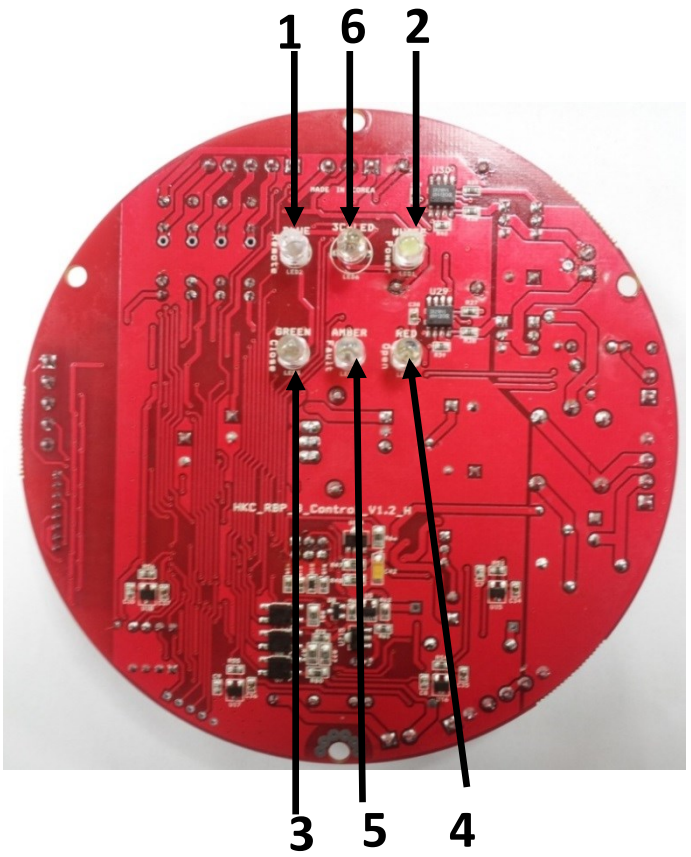
<table>
<tr><th>Items</th><th colspan="3">Condition</th></tr>
<tr><td>Electric Power Supply</td><td colspan="3">1 Phase – AC 115 V / 230 V 50/60Hz</td></tr>
<tr><td>Internal Voltage</td><td colspan="3">Control Voltage : DC 24 V / 30 V
Voltage for Space Heater : AC 115/230 V</td></tr>
<tr><td>Power Consumption</td><td colspan="3">40 VA</td></tr>
<tr><td>Temperature / Humidity</td><td colspan="3">-20 ~ 70°C / 60 % RX, MAX.</td></tr>
<tr><td rowspan="11">Actuator functions by DIP switch settings</td><td colspan="3">DIP Switch setting</td></tr>
<tr><td rowspan="2">DIP switch 1</td><td>OFF</td><td>INCHING</td></tr>
<tr><td>ON</td><td>HOLD</td></tr>
<tr><td rowspan="2">DIP switch 2</td><td>OFF</td><td>Fault Contact Normal Open</td></tr>
<tr><td>ON</td><td>Fault Contact Normal Close</td></tr>
<tr><td colspan="3">Power Fail action</td></tr>
<tr><td>DIP switch 3</td><td>DIP switch 4</td><td>FUNCTION</td></tr>
<tr><td>OFF</td><td>OFF</td><td>STOP</td></tr>
<tr><td>OFF</td><td>ON</td><td>CLOSE</td></tr>
<tr><td>ON</td><td>OFF</td><td>OPEN</td></tr>
<tr><td>ON</td><td>ON</td><td>NO POWER FAIL ACTION</td></tr>
</table>

5.4 PCB Layout

1. DC Power Connector
2. Battery Connector
3. Battery Switch Connector
4. Limits / Torque Signal Connector
5. Remote Control Signal
6. Status Contactor
7. PCU Signal
8. Motor Connector
9. AC Power Monitor (option)
10. DIP Switches
11. Power check
12. Battery active switch

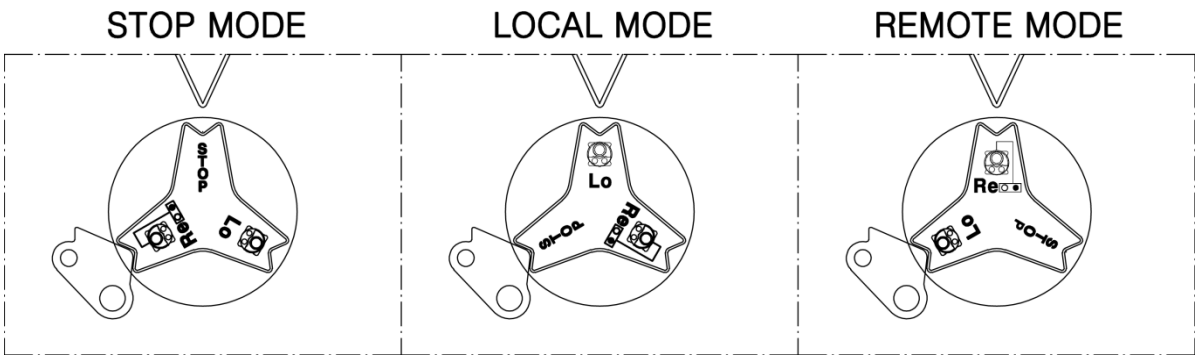


Note: ***If the actuator does not work on battery power, despite of a fully charged battery and a jumper has been placed on terminal strip connection number 1 and number 4, please press the battery active switch (12).***



LED status		
1. BLUE	BLINK	REMOTE MODULATING MODE
	ON	REMOTE MANUAL MODE
2.WHITE	OFF	AC POWER OFF
	ON	AC POWER ON
3.GREEN	BLINK	CLOSING
	ON	FULLY CLOSED
4.RED	BLINK	OPENING
	ON	FULLY OPEN
5. AMBER	OFF	NO ERROR/FAULT
	ON	ERROR message
6.BATTERY (BLINKING)	GREEN	HIGH CHARGING
	BLUE	MIDDLE CHARGING
	RED	LOW CHARGING
RED STEADY ON		NO BATTERY

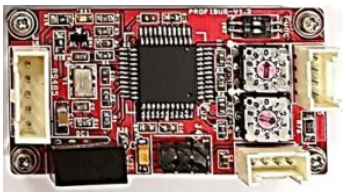
5.5 Operations



Local Operation
1. Put the selector switch into Local Mode. 2. Use the open/close switch to operate the actuator. 3. In Local Mode the LED indicators will show the below status: RED LED – ON : Fully Open GREEN LED – ON : Fully Close RED or Green LED – Blinking : Opening or closing
Remote (Manual mode) Operation
1. Put the selector switch into Remote Mode. 2. Manual Mode is functional if terminal strip number 5 and 9 are NOT wired. 3. In Manual Mode the LED indicators will show the below status: BLUE LED – Steady ON : Manual mode For wiring diagrams see drawings D7907-3 RBP and D7907-4 RBP on page 41-49
Remote (Modulating mode) Operation
1. Put the selector switch into Remote Mode. 2. Modulating Mode is functional if terminal strip number 5 and 9 are wired. 3. In Modulating Mode the LED indicators will show the below status: BLUE LED – Blinking: Modulating mode 4. For actuator operation please refer to the paragraph 4.10 (PCU settings). For wiring diagram see drawing D7907-4 RBP+PCU on page 50
Battery Mode Operation
1. If the power supply has been switches off, the actuator will be powered by the battery. 2. LOCAL MODE: Operate the Open/Close switch in order to put the actuator in the open or closed p osition. 3. REMOTE MODE: During power failure, the actuator will follow the power failure settings (DIP switch settings – see paragraph 4.12.4) 4. NO FAIL ACTION : The actuator will operate the same way as if there was not power failure.

6 FIELDBUS COMMUNICATION PROTOCOLS

6.1 ProfiBus Contoller



ProfiBus PCB

- The ProfiBus Controller is providing multiple communication functions by using a 8 bit microprocessor and ProfiBus controller.
- Providing the operator with actuator status information in order to confirm if the ProfiBus device and actuator is working correctly
- The maximum transmission speed is 12Mbit/s.
- Easily can be switched between PCU-version and ON-OFF-version.
- Providing System Redundancy by using dual ports and high reliability.
- LED lamps indicate the actuator status.

Termination PCB

6.1.1 Specification

Item	Description
Input power	87V ~ 270V ac ±10% , 50/60Hz ±2% 4VA max. Input power must match motor ratings
Communication	ProfiBus communication (RS-485 base)
Max. range	1000m @ 9.6 ~ 187.5 k Baud
Bit rate	Up to 12mega
Wiring terminals	SMW250-3P * 4 (ProfiBus signal) YW396-5P (Main power & Motor) SMW250-8P (CTS, OTS, CLS, OLS contact input) SMW250-6P (Firmware update connector) SMW250-4P (Debug connector)
Visual indicators	Power white, blue LED Fault yellow LED Motor open red LED Motor close green LED
Control configuration	PC software
Output contact	Triac 250V ac, 16A max. (Inductive load)
Ambient temperature	-10℃ ~ +60℃
Ambient humidity	90% RH max. (non-condensing)

6.2 ModBus Controller

ModBus PCB

- This clause explains the ModBus-RTU Slave Module (MBRSM). Positioned at level 7 of the OSI model, ModBus is an application layer messaging protocol that provides client/server communication between devices connected on different types of buses or networks.
- As a ModBus Serial Line protocol, ModBus-RTU (Remote Terminal Unit) is a Master-Slave protocol which takes place at level 2 (Data Link layer) of the OSI model. The master initiates the communication by transmitting the Function Code (a ‘request’) to the address of a slave and after receiving and processing the Function Code, the slave returns a message (a ‘response’).
- The slaves shall not communicate with each other without the request of the master. Since the

MBRSM is based on the 2 wire (half-duplex) RS-485 communication, the network length limit or the number of station should follow the standards of the RS-485 communication. To extend the network, such as adding another segment, repeaters can be used. To ensure stability of the network system, the network redundancy can be configured to slave redundancy.

- ModBus manages the access of data simply and flexibly. ModBus supports two data types: A Boolean value and an unsigned 16-bit integer. Generally, it is common for field devices to have certain values defined as inputs while other values are outputs, such as current temperature or valve position.

6.2.1 Specification

- Communication Protocol: ModBus-RTU according to IEC 61158 and IEC 61784
- Topology: Line topology with termination
- Number of nodes: 32 nodes in each segment without repeater, with repeaters expandable to 247
- Number of repeaters: Max. 9 with signal refreshing
- Cable length: Max. 1.2 Km with Repeater 10 Km
- Transfer Mode: RS-485
- Transmission Medium: Twisted, shielded 2-Wire cable according to IEC 61158
- Bus Access: Polling between master and slaves (query response)
- Supported Baud Rates: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
- Supported Parity Bit: Odd, Even, None
- Supported Stop Bit: 1, 2

For more detail information, please refer to separate ModBus operation manual.

7 OPERATION

7.1 Electrical Connections and Preliminary Test

WARNING:

If working in potentially explosive areas, observe the European Standards EN 60079-14 "Electrical Installation in Hazardous Areas" and EN 60079-17 "Inspection and Maintenance of Electrical Installations in Hazardous Areas". Work on the electrical system or equipment must only be carried out by a skilled electrician himself or by specially instructed personnel under the control and supervision of such an electrician and in accordance with the applicable electrical engineering rules.

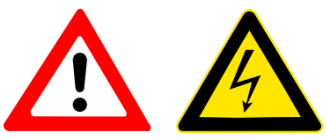
For cable gland or conduit entries that are not used, user or installer shall close those entries by certified blanking elements in order to maintain the enclosure protection. Extra attention is required for selecting the correct "Ex db IIC" or "Ex tb IIC" blanking elements.

For cleaning a dust ignition proof closure, a damp cloth shall be used.

An explosion proof enclosure must be treated with care. Seals and sealing surfaces may not be damaged in any way. Do not jam during assembly.

Dust ignition proof enclosures may not be charged with an electrostatic load. It therefor shall be installed in such a way, that the risk from electrostatic discharge and propagation brush discharge, caused by rapid flow of dust, is avoided.

- For testing purposes, loosen the bolts of the actuator cover and remove the cover.
- Make sure that the power supply voltage is in accordance with the information on the nameplate of the actuator.
- Cables shall be passed through the cable glands: M25 or NPT ¾" for "Ex db" versions. M25, M20 and NPT ¾" with M30 adapter shall only be applied for "Ex tb" versions.
- Connect wires according to the enclosed wiring diagram (See Appendix I)
- Manually move the valve to the half-open position. Then electrically operate the actuator to the fully open position and check if the motor rotates in the correct direction. According to the applicable standards, the actuator must be closing in counter-clockwise direction.
- Test the actuator and check whether the limit switches work correctly
- After testing, check if all cable glands are correctly tightened. Applicable cable glands must be selected to meet the application's condition. It is recommended to use at least IP67 cable glands.
- Put the cover back on the actuator and tighten the bolts.
-



DANGER:

HAZARDOUS VOLTAGE. Electrical power must not be connected until all wiring and limit switch adjustments have been completed. Once the power is supplied to the actuator, precautions must be taken if the cover is not mounted.

Note: For more information, refer to Appendix II

8 MAINTENANCE

8.1 Maintenance

WARNING:

Turn off all power before performing maintenance on the actuator.

POTENTIALLY HIGH PRESSURE VESSEL. Before removing or disassembling your actuator, ensure that the valve or other actuated device is isolated and not under pressure.

Under normal conditions, maintenance should be carried out at six month intervals. But when the conditions are more severe, more frequent inspections may be advisable.

- Ensure that the actuator is properly aligned with the valve (stem) or other actuated device
- Ensure that all wires are insulated and connected properly
- Ensure that all screws are present and tightened
- Ensure that all internal electrical devices are clean (dry and free of dust)
- Ensure that conduit connections are properly installed and are dry
- Check the internal devices for any condensation
- Check the power supply of the internal heater
- Check the enclosure O-ring seals and verify that the O-rings are not pinched
- Check the declutch mechanism
- Visually inspect the open/close cycle
- For Ex-actuators the cover seal O-ring needs to be inspected and replaced if damaged.
- Inspect the identification labels for wear and replace it if necessary
- Damaged or broken parts may only be replaced by genuine parts

WARNING:

Flameproof Enclosure! Before opening, ensure the absence of any gas and voltage

Treat cover with care. Seals and sealing surfaces may not be damaged or dirty in any. Do not jam the cover during mounting.

EMI - Do not use walky-talkies and cell phones or other devices which might cause electromagnetic interference (EMI) with the actuator. Keep these devices away from the actuator and control unit for at least one meter. EMI can cause damage to the actuator influence the operation.

8.2 Tools

- *Metric Allen Key (Hex Wrench)*
- *Screw Driver*
- *Metric Spanner*
- *Wrench 200mm*
- *Wrench 300mm*
- *Wire Stripper Long Nose*
- *Digital Multi-meter (AC, DC, Resistance)*
- *PCU Board Option: DC Signal Generator (4~20mA DC, 0~10V DC)*
- *In case a PCU-A or –D board has been mounted: DC signal generator (4-20mA DC)*
- *In case a PCU and CPT board has been mounted: mA Meter (0~25mA)*

9 TROUBLE SHOOTING

The following instructions are listed in the order of the most common difficulties encountered during the installation and start-up.

► The actuator does not respond

- Visually inspect the actuator and check if no damage has occurred during shipping and handling of the actuator.
- Verify the line voltage supplied to the actuator; it must match with the rating on the actuator's nameplate
- Compare and check the internal wiring with the supplied wiring diagram of the actuator
- Check the limit switch cams

► The actuator is supplied with power but does not operate

- Verify the line voltage supplied to the actuator; it must match with the rating on the actuator's nameplate.
- Make sure that the actuator output torque is greater than the required valve torque
- Check the limit switch cams
- Check if the torque switches have not been tripped
- Check the mechanical travel stop adjustment
- Check if the rotating direction matches (According to the applicable standards, valves and actuators must open in counter-clockwise direction)
- Check the internal wiring
- Check for any corrosion and condensation. Electrical or mechanical devices may have been affected
- Verify if coupler/bracket is correctly installed and may not block the actuator rotation

► Actuator runs erratically

- Check the ambient temperature
- Verify that the duty cycle has not been exceeded
- Check the position of the manual override lever

► Optional Equipment(s)

1) Potentiometer

- Check the resistance value
- Check the potentiometer gear for jamming
- Check the ZERO and SPAN calibration and confirm input/output signal
- Check the board for any damage

2) Current Position Transmitter

- Verify the input signal
- Check the configuration of the dip switches
- Check the board for any damage

10 INSTALLATION AND MAINTENANCE TIPS

WARNING:

If working in potentially explosive areas, be sure to comply with the standard EN 60079-14 "Electrical Installation in Hazardous Areas"

Work on an actuator with an open cover and which is under voltage, may only be performed if there is no explosion danger for the duration of the work.

In case of an explosion proof enclosure, the actuator may only be opened in the absence of flammable gas, dust and voltage.

During operation, installation and maintenance, treat cover with care. Seals and sealing surfaces may not be pinched, damaged or dirty in any way. Damaged seals (O-rings) must be replaced.

Dust ignition proof enclosures may not be charged with an electrostatic load. It therefor shall be installed in such a way, that the risk from electrostatic discharge and propagation brush discharge, caused by rapid flow of dust, is avoided.

CAUTION:

Regular inspection and maintenance should be performed by qualified and trained personnel

If working in potentially explosive areas, be sure to comply with the standard EN 60079-14 "Electrical Installations in Hazardous Areas".

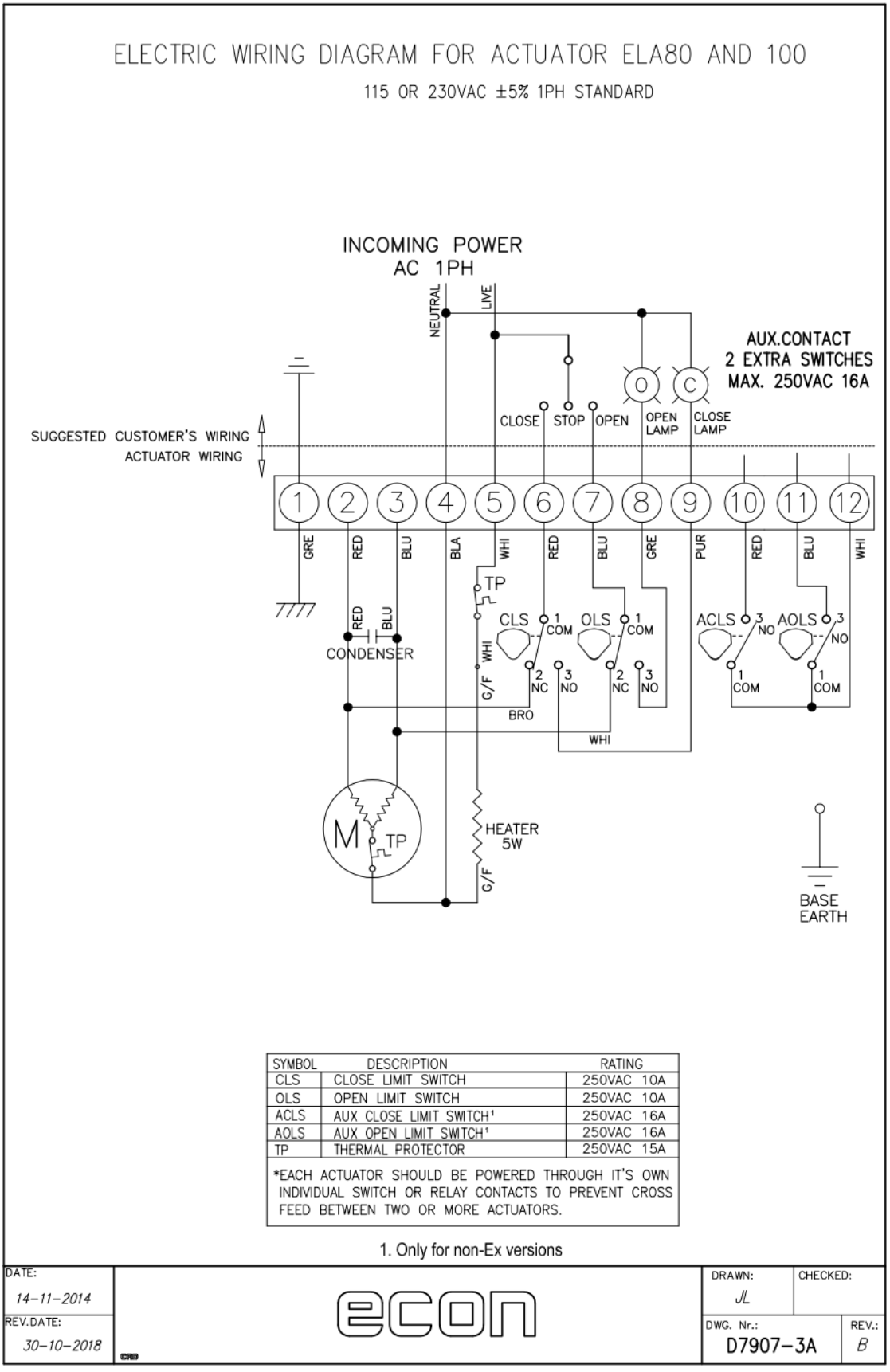
Working on the actuator that is in open position and under voltage must only be performed if it is assured that there is no danger of explosion for the duration of the work.

Pay attention to national regulations

For any installation and maintenance work, the followings should be noted:

- Check the actuator visually. Ensure that no external damage or changes are visible. The electrical cables must not be damaged and wired correctly.
- Cable entries, cable glands, plugs, etc. have to be checked whether they are correctly tightened and sealed.
- Check if the Ex-connections are correctly fastened.
- Check for possible discoloration of the terminal strip and wires as this may indicate an increased temperature.
- Check the flame path seals of the explosion proof enclosures for any dirt and corrosion. Since the dimensions of all Ex seals are strictly defined and inspected, no mechanical work shall be performed on them.
- All cables and motor protection elements have to be checked.
- If any defects are detected during maintenance that may affect the safety, repair measures have to be taken immediately.
- Any kind of coating for sealing surfaces is not permitted.
- When replacing parts, seals, etc., only original spare ones must be used.

11 WIRING DIAGRAMS

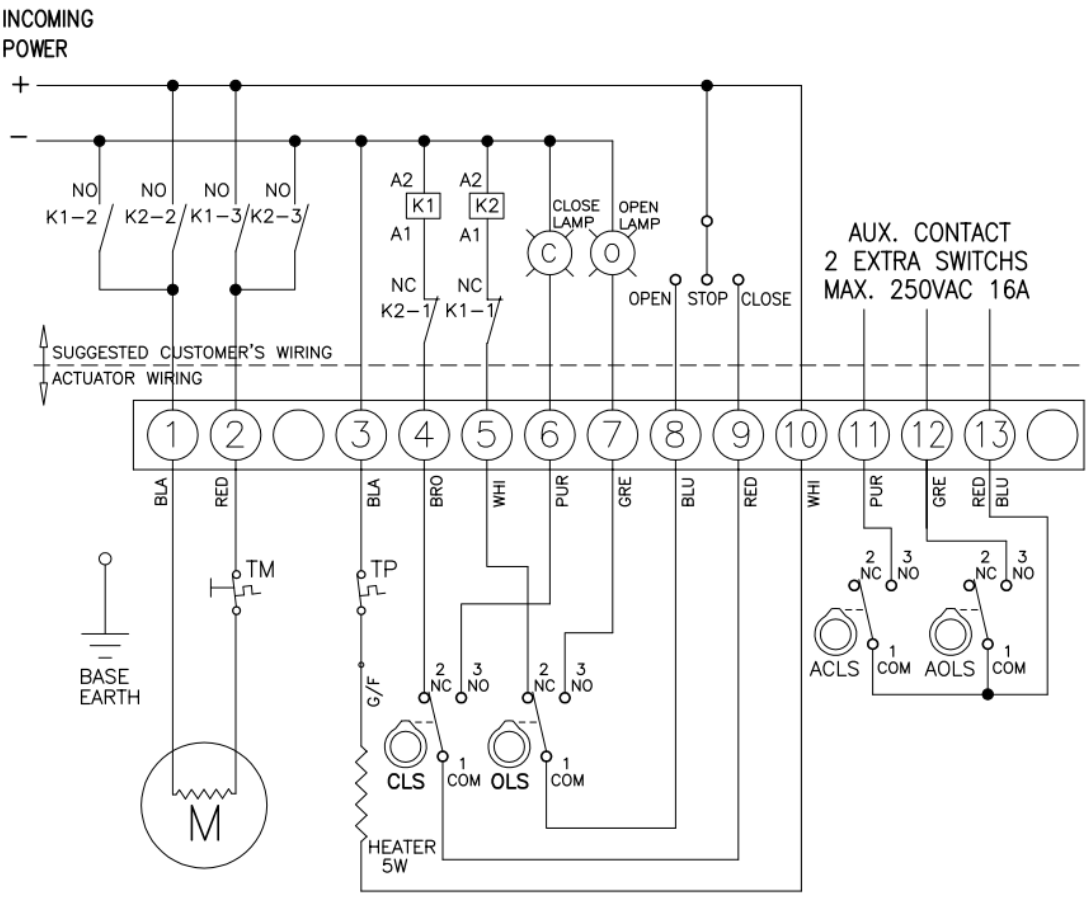


DANGER: ***HAZARDOUS VOLTAGE. Electrical power must not be connected until all wiring and limit switch adjustments have been completed.***

ELECTRIC WIRING DIAGRAM FOR ACTUATOR ELA80 AND 100

24VDC STANDARD

WITH THERMAL MAGNETIC CIRCUIT BREAKER (TM)



SYMBOL	DESCRIPTION	RATING
CLS	CLOSE LIMIT SWITCH	250VAC 10A
OLS	OPEN LIMIT SWITCH	250VAC 10A
ACLS	AUX CLOSE LIMIT SWITCH[1]	250VAC 16A
AOLS	AUX OPEN LIMIT SWITCH[1]	250VAC 16A
TP	THERMAL PROTECTOR	250VAC 15A
TM	THERMAL MAGNETIC CIRCUIT BREAKER[1]	25A/14s

*EACH ACTUATOR SHOULD BE POWERED THROUGH IT'S OWN INDIVIDUAL SWITCH OR RELAY CONTACTS TO PREVENT CROSS FEED BETWEEN TWO OR MORE ACTUATORS.

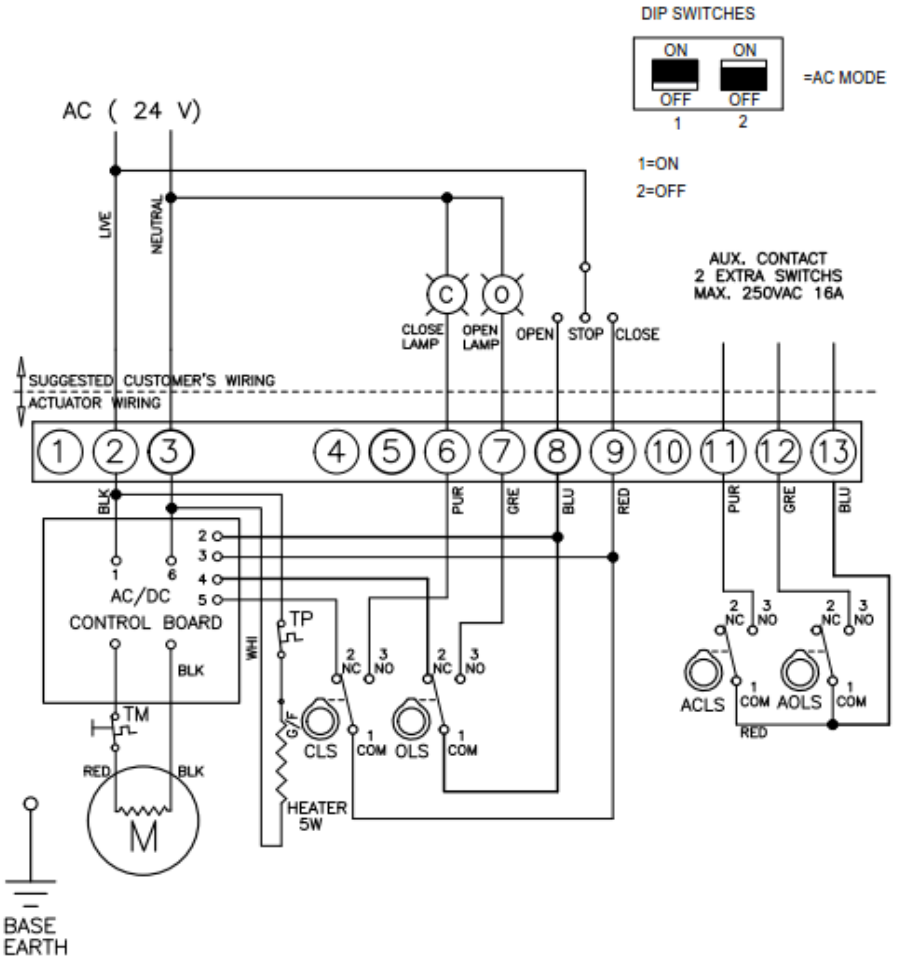
1. Only for non-Ex versions

DATE:		DRAWN:	CHECKED:
22–03–2017	econ	JL	JBM
REV.DATE: 30–10–2018		DWG. Nr.: D7907–3B+TM	REV.: C

DANGER: ***HAZARDOUS VOLTAGE. Electrical power must not be connected until all wiring and limit switch adjustments have been completed.***

ELECTRIC WIRING DIAGRAM FOR ACTUATOR ELA80 AND ELA100

24VDC AC-DC CONTROL BOARD
WITH THERMAL MAGNETIC CIRCUIT BREAKER (TM)



SYMBOL	DESCRIPTION	RATING
CLS	CLOSE LIMIT SWITCH	250VAC 16A
OLS	OPEN LIMIT SWITCH	250VAC 16A
ACLS	AUX CLOSE LIMIT SWITCH	250VAC 16A
AOLS	AUX OPEN LIMIT SWITCH	250VAC 16A
TM	THERMAL MAGNETIC CIRCUIT BREAKER [1]	25A/14s

*EACH ACTUATOR SHOULD BE POWERED THROUGH IT'S OWN INDIVIDUAL SWITCH OR RELAY CONTACTS TO PREVENT CROSS FEED BETWEEN TWO OR MORE ACTUATORS.

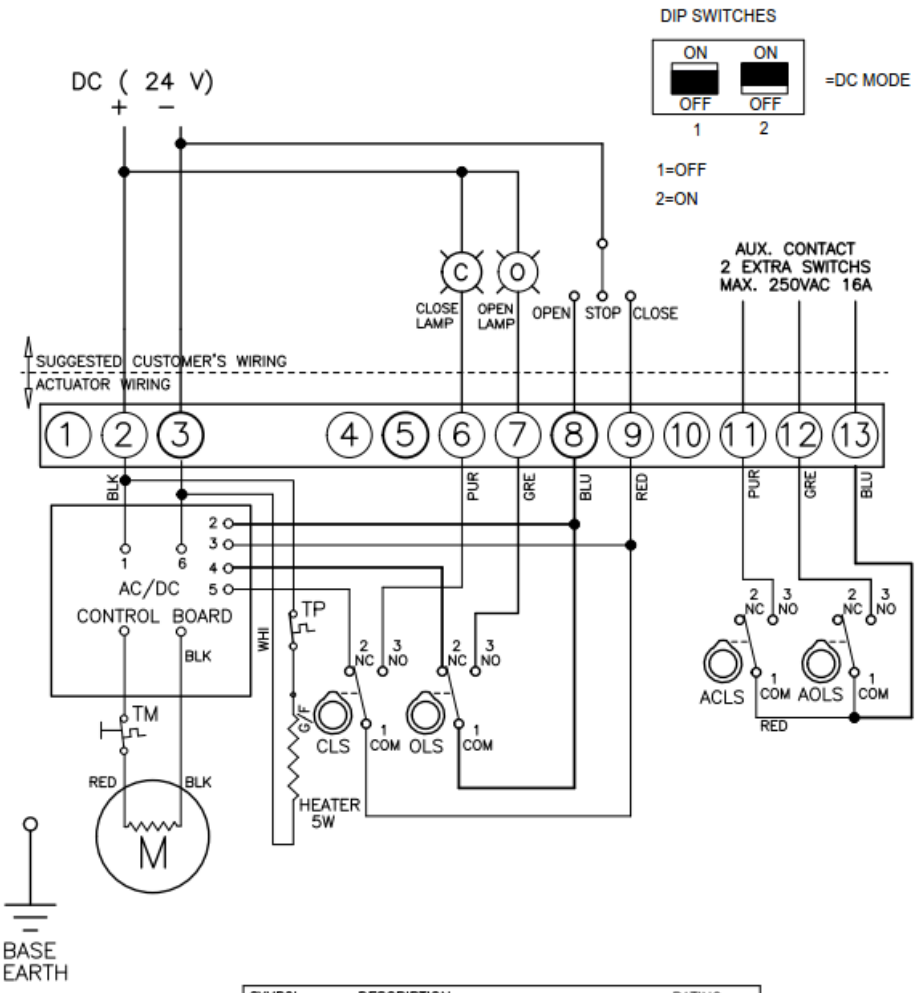
1. Only for non-Ex-Versions!

DATE:	REMARK:		DWG. Nr.:	
10-05-2017		econ®	D7907-3C AC + TM	
DRAWN BY:	CHECKED BY:		REV BY: / DATE REV:	REV.:
JL	JBM	WWW.ERIKS.COM	JL / 17-05-2023	B

DANGER: ***HAZARDOUS VOLTAGE. Electrical power must not be connected until all wiring and limit switch adjustments have been completed.***

ELECTRIC WIRING DIAGRAM FOR ACTUATOR ELA80 AND ELA100

24VDC AC-DC CONTROL BOARD
WITH THERMAL MAGNETIC CIRCUIT BREAKER (TM)

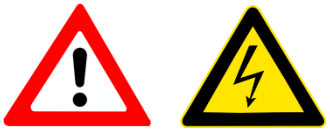


SYMBOL	DESCRIPTION	RATING
CLS	CLOSE LIMIT SWITCH	250VAC 16A
OLS	OPEN LIMIT SWITCH	250VAC 16A
ACLS	AUX CLOSE LIMIT SWITCH	250VAC 16A
AOLS	AUX OPEN LIMIT SWITCH	250VAC 16A
TP	THERMAL MAGNETIC CIRCUIT BREAKER [1]	25A/14s

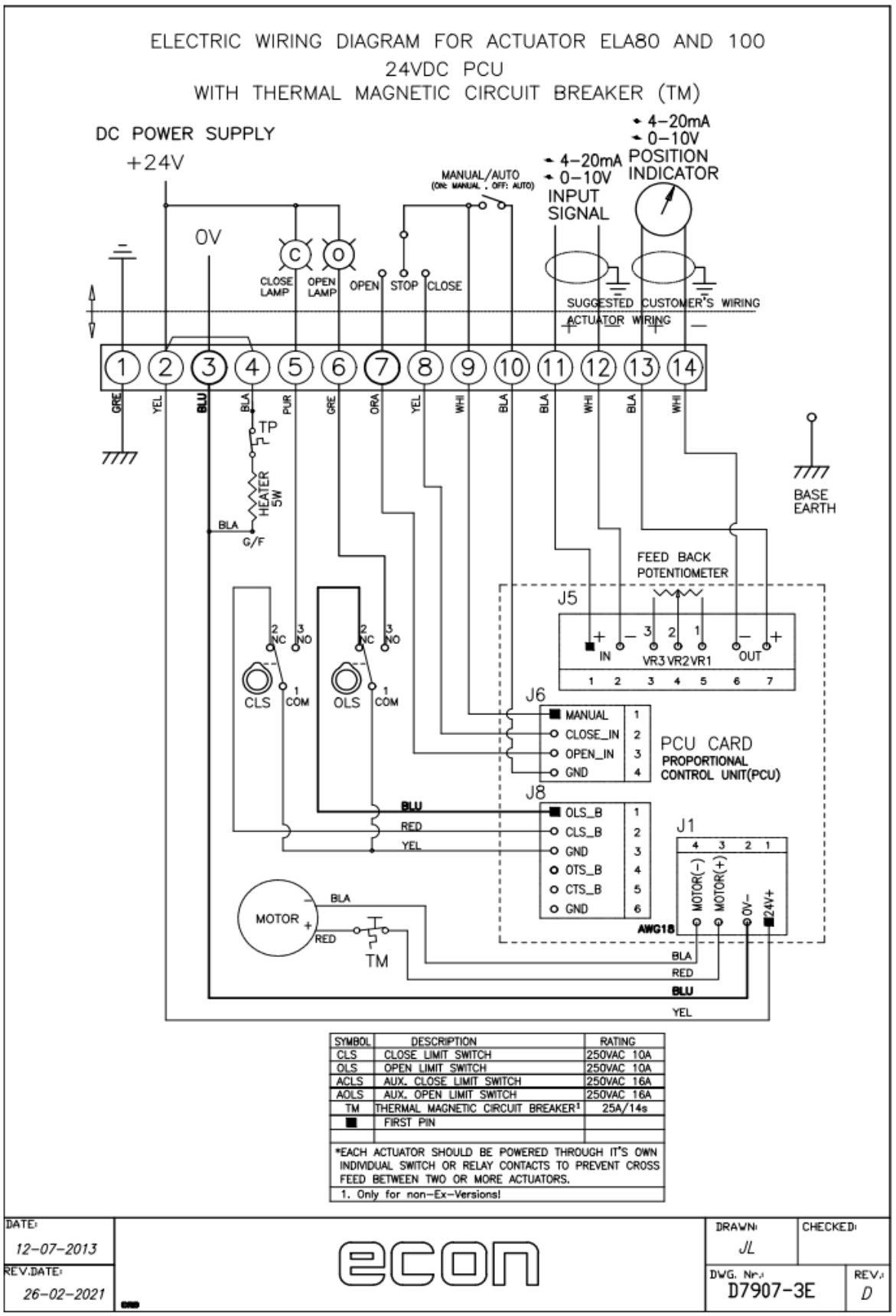
*EACH ACTUATOR SHOULD BE POWERED THROUGH IT'S OWN INDIVIDUAL SWITCH OR RELAY CONTACTS TO PREVENT CROSS FEED BETWEEN TWO OR MORE ACTUATORS.

1. Only for non-Ex-Versions!

DATE:	REMARK:		DWG. Nr.:		
10-05-2017		WWW.ERIKS.COM	D7907-3C DC + TM		
DRAWN BY:	CHECKED BY:		REV BY:	DATE REV:	REV.:
JL	JBM		JL	16-08-2023	B



DANGER: ***HAZARDOUS VOLTAGE. Electrical power must not be connected until all wiring and limit switch adjustments have been completed.***



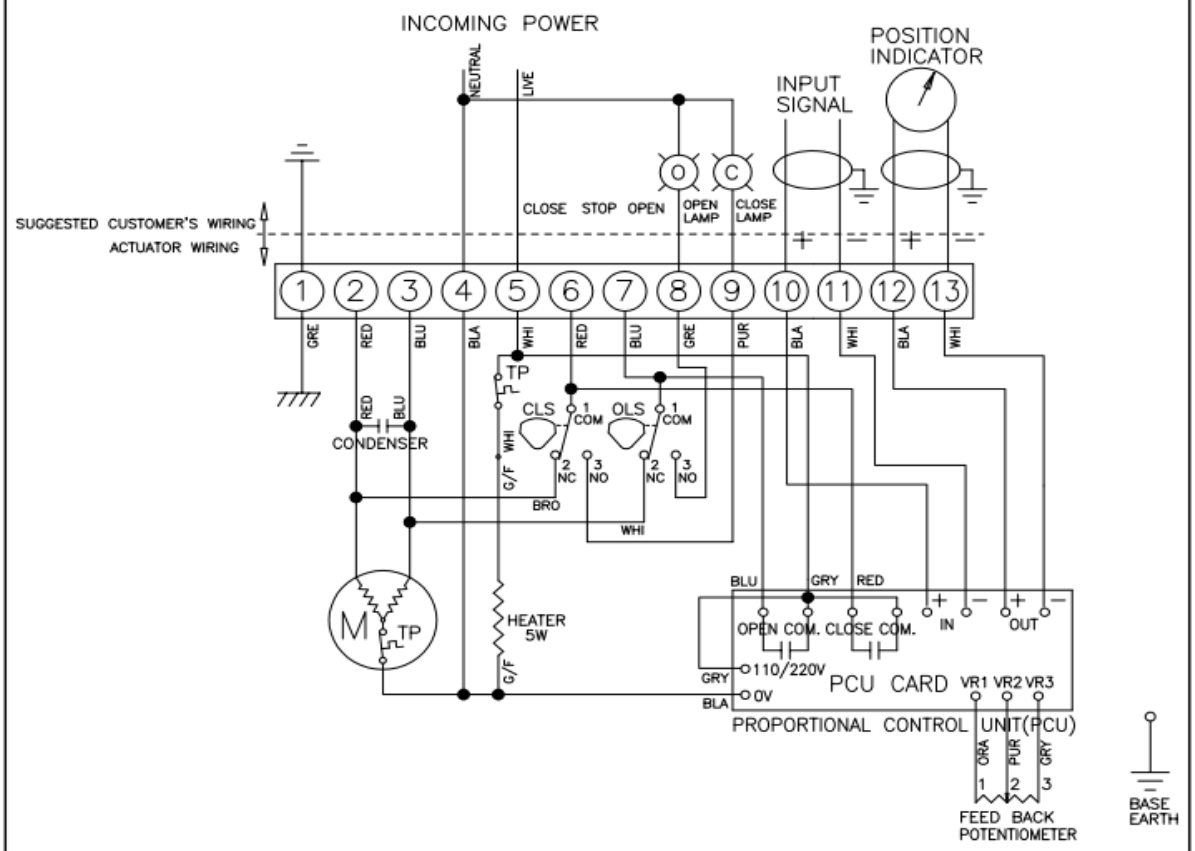
SYMBOL	DESCRIPTION	RATING
CLS	CLOSE LIMIT SWITCH	250VAC 10A
OLS	OPEN LIMIT SWITCH	250VAC 10A
ACLS	AUX. CLOSE LIMIT SWITCH	250VAC 16A
AOLS	AUX. OPEN LIMIT SWITCH	250VAC 16A
TM	THERMAL MAGNETIC CIRCUIT BREAKER[1]	25A/14s
■	FIRST PIN	

*EACH ACTUATOR SHOULD BE POWERED THROUGH IT'S OWN INDIVIDUAL SWITCH OR RELAY CONTACTS TO PREVENT CROSS FEED BETWEEN TWO OR MORE ACTUATORS.
1. Only for non-Ex-Versions!

DATE:		DRAWN:	CHECKED:
12-07-2013	econ	JL	
REV.DATE: 26-02-2021		DWG. Nr.: D7907-3E	REV.: D

DANGER: ***HAZARDOUS VOLTAGE. Electrical power must not be connected until all wiring and limit switch adjustments have been completed.***

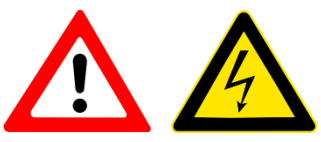
ELECTRIC WIRING DIAGRAM FOR ACTUATOR ELA80 AND 100
115 OR 230VAC ±5% 1PH PCU



SYMBOL	DESCRIPTION	RATING
CLS	CLOSE LIMIT SWITCH	250VAC 10A
OLS	OPEN LIMIT SWITCH	250VAC 10A
TP	THERMAL PROTECTOR	250VAC 15A

*EACH ACTUATOR SHOULD BE POWERED THROUGH IT'S OWN INDIVIDUAL SWITCH OR RELAY CONTACTS TO PREVENT CROSS FEED BETWEEN TWO OR MORE ACTUATORS.

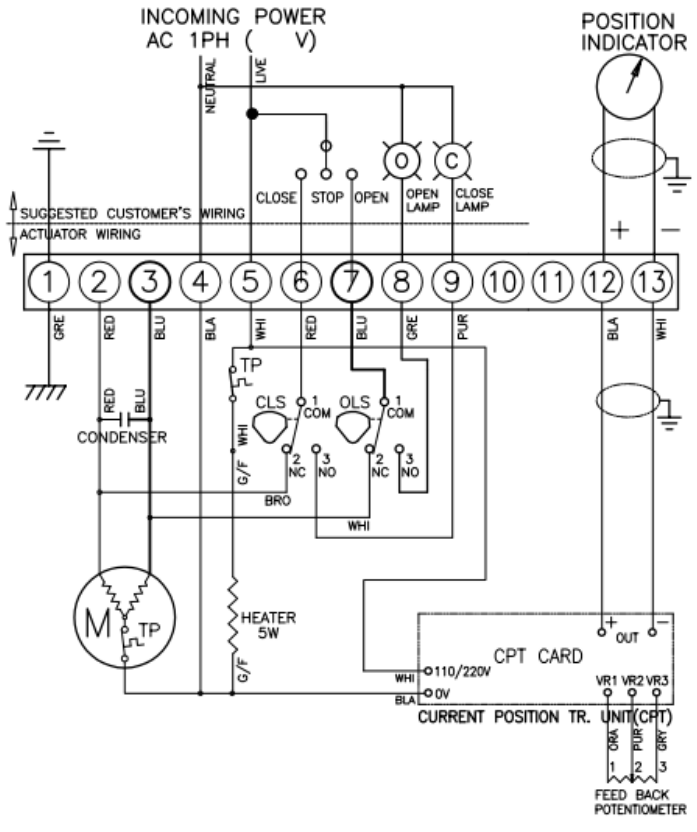
DATE: 12-07-2013		DRAWN: JL	CHECKED:
REV.DATE: 30-10-2018	econ	DWG. No.: D7907-3F	REV.: B



DANGER: ***HAZARDOUS VOLTAGE. Electrical power must not be connected until all wiring and limit switch adjustments have been completed.***

ELECTRIC WIRING DIAGRAM FOR ACTUATOR ELA80 AND 100

115 OR 230VAC ±5% 1PH CPT



SYMBOL	DESCRIPTION	RATING
CLS	CLOSE LIMIT SWITCH	250VAC 10A
OLS	OPEN LIMIT SWITCH	250VAC 10A
TP	THERMAL PROTECTOR	250VAC 15A

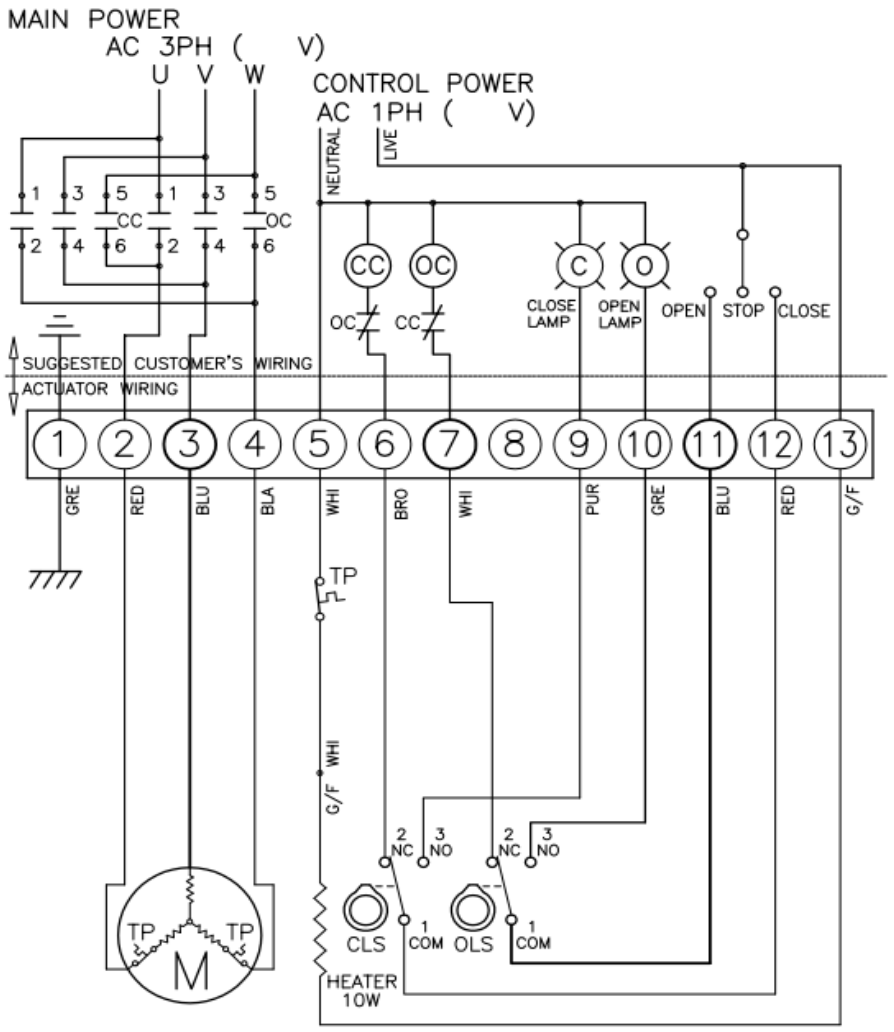
*EACH ACTUATOR SHOULD BE POWERED THROUGH IT'S OWN INDIVIDUAL SWITCH OR RELAY CONTACTS TO PREVENT CROSS FEED BETWEEN TWO OR MORE ACTUATORS.

DATE: 12-07-2013	econ	DRAWN: JL	CHECKED:
REV.DATE: 30-10-2018		DWG. Nr.: D7907-3G	REV.: C

DANGER: ***HAZARDOUS VOLTAGE. Electrical power must not be connected until all wiring and limit switch adjustments have been completed.***

ELECTRIC WIRING DIAGRAM FOR ACTUATOR ELA80 AND 100

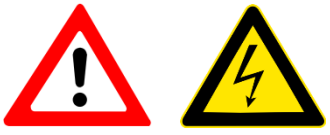
380V 3PH



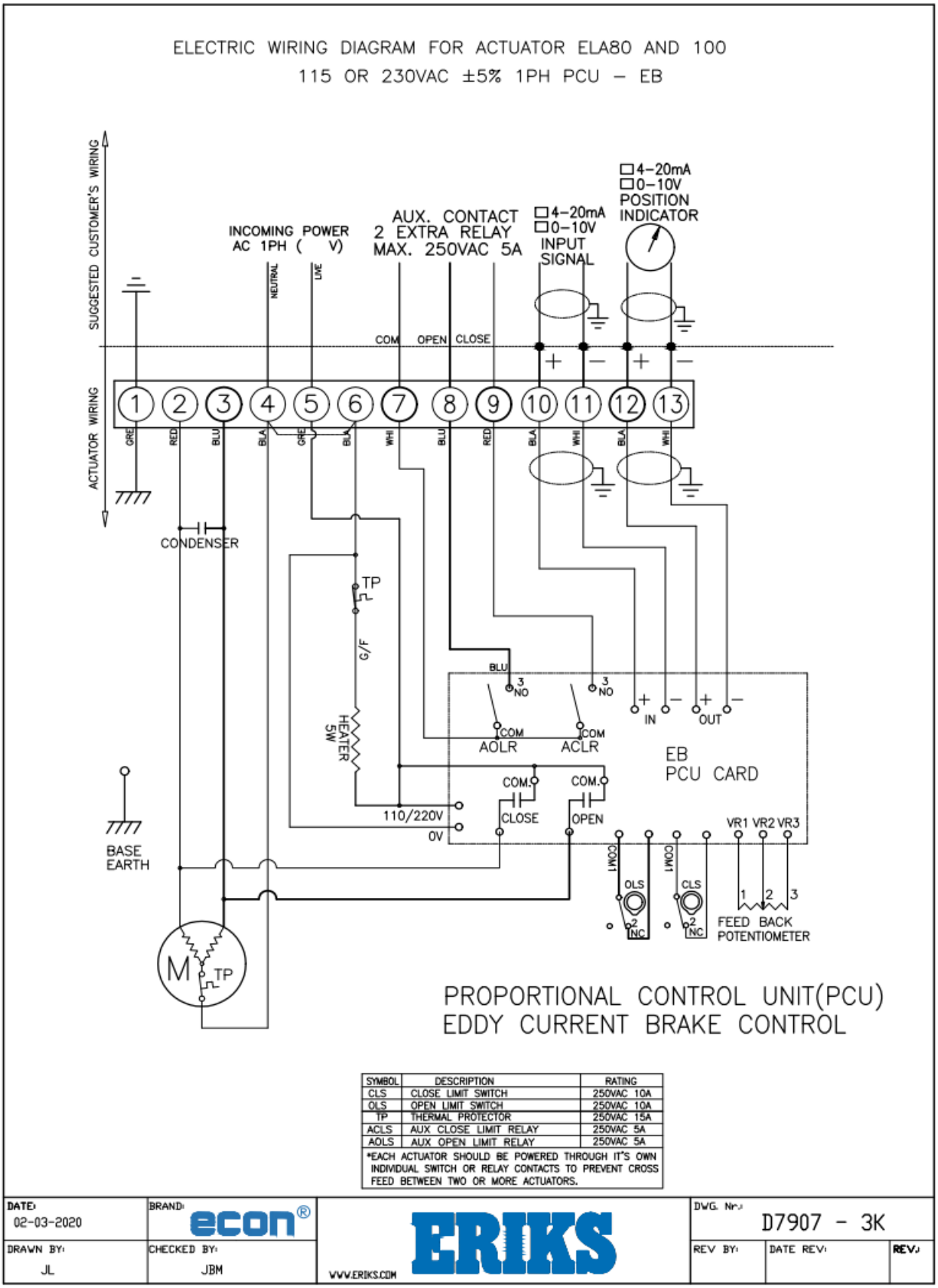
SYMBOL	DESCRIPTION	RATING
CLS	CLOSE LIMIT SWITCH	250VAC 10A
OLS	OPEN LIMIT SWITCH	250VAC 10A
CC	CLOSE MAGNETIC COIL	
OC	OPEN MAGNETIC COIL	
TP	THERMAL PROTECTOR	250VAC 15A

*EACH ACTUATOR SHOULD BE POWERED THROUGH IT'S OWN INDIVIDUAL SWITCH OR RELAY CONTACTS TO PREVENT CROSS FEED BETWEEN TWO OR MORE ACTUATORS.

DATE: 12-06-2017		DRAWN: JL	CHECKED:
REV.DATE: 30-10-2018	econ	DWG. Nr.: D7907-3H	REV.: A



DANGER: ***HAZARDOUS VOLTAGE. Electrical power must not be connected until all wiring and limit switch adjustments have been completed.***



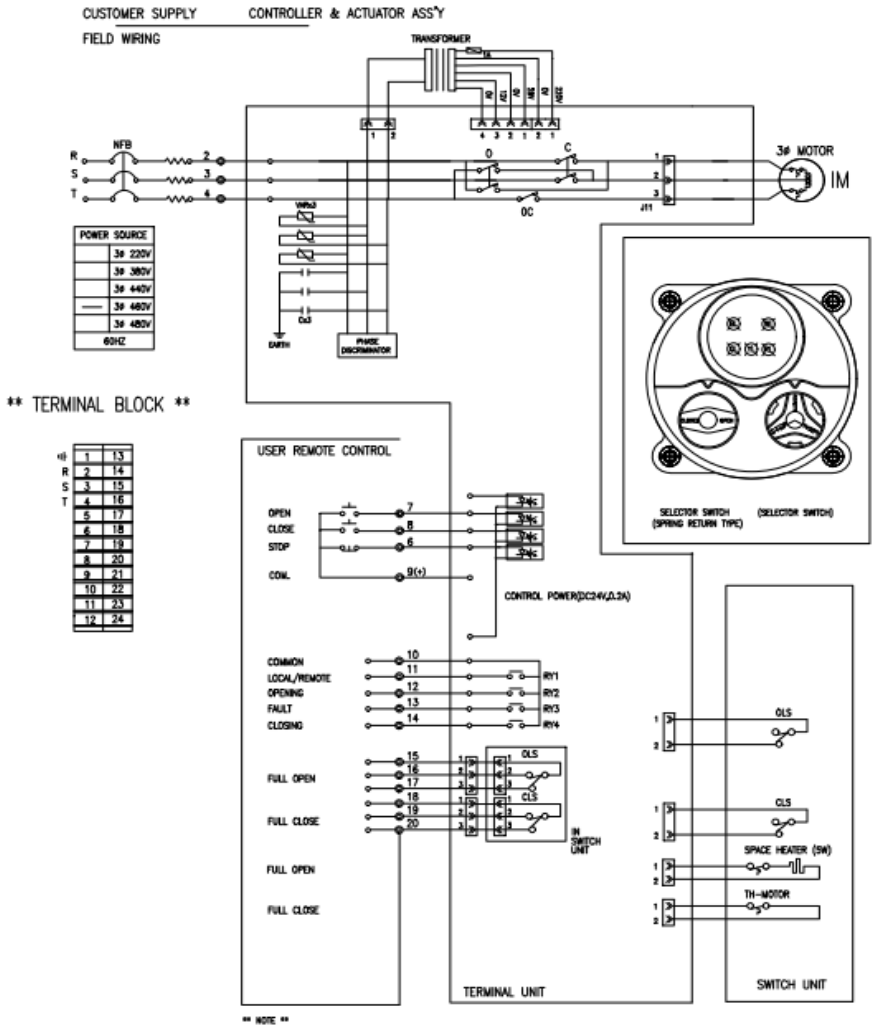
SYMBOL	DESCRIPTION	RATING
CLS	CLOSE LIMIT SWITCH	250VAC 10A
OLS	OPEN LIMIT SWITCH	250VAC 10A
TP	THERMAL PROTECTOR	250VAC 15A
ACLS	AUX CLOSE LIMIT RELAY	250VAC 5A
AOLS	AUX OPEN LIMIT RELAY	250VAC 5A

*EACH ACTUATOR SHOULD BE POWERED THROUGH IT'S OWN INDIVIDUAL SWITCH OR RELAY CONTACTS TO PREVENT CROSS FEED BETWEEN TWO OR MORE ACTUATORS.

DATE: 02-03-2020	BRAND: econ®	ERIKS WWW.ERIKS.COM	DWG. No.: D7907 - 3K	
DRAWN BY: JL	CHECKED BY: JBM		REV BY:	DATE REV: REV.:

DANGER: ***HAZARDOUS VOLTAGE. Electrical power must not be connected until all wiring and limit switch adjustments have been completed.***

ELECTRIC WIRING DIAGRAM FOR ACTUATOR ELA80 AND ELA100
400VAC 3Ph + LCU



OLS : OPEN LIMIT SWITCH
CLS : CLOSE LIMIT SWITCH
O/C : OPEN/CLOSE POWER RELAY(DC 24V)
RL : RED LAMP FOR OPEN WL : WHITE LAMP FOR POWER
GL : GREEN LAMP FOR CLOSE BL : BLUE LAMP FOR REMOTE
YL : YELLOW LAMP FOR FAULT
RY1 : REMOTE MONITOR RELAY
RY3 : FAULT RELAY
RY2/RY4 : RUNNING RELAY
◎ : MARKS FOR TERMINAL

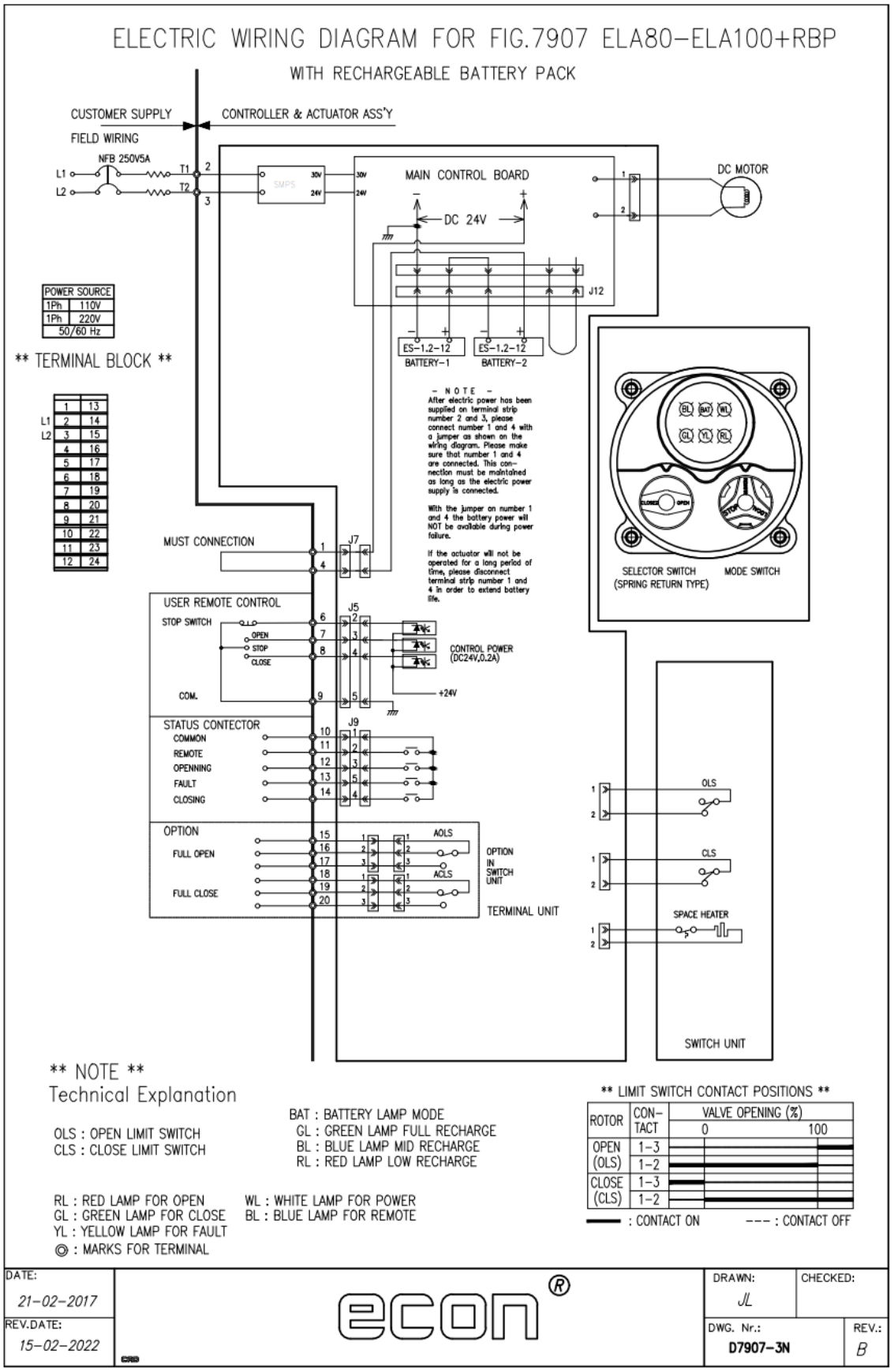
** LIMIT SWITCH CONTACT POSITIONS **

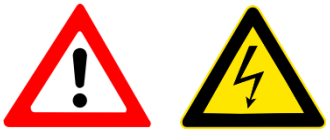
ROTOR	CON-TACT	VALVE OPENING (%) 0	100
OPEN (OLS)	1-2		
	1-3		
CLOSE (CLS)	1-2		
	1-3		

: CONTACT ON —— : CONTACT OFF

DATE: 06-07-2021	BRAND: econ®		DWG. Nr.: D7907 - 3M	
DRAWN BY: JL	CHECKED BY: JBM	WWW.ERIKS.COM ERIKS	REV BY:	DATE REV: REV.:

DANGER: ***HAZARDOUS VOLTAGE. Electrical power must not be connected until all wiring and limit switch adjustments have been completed.***

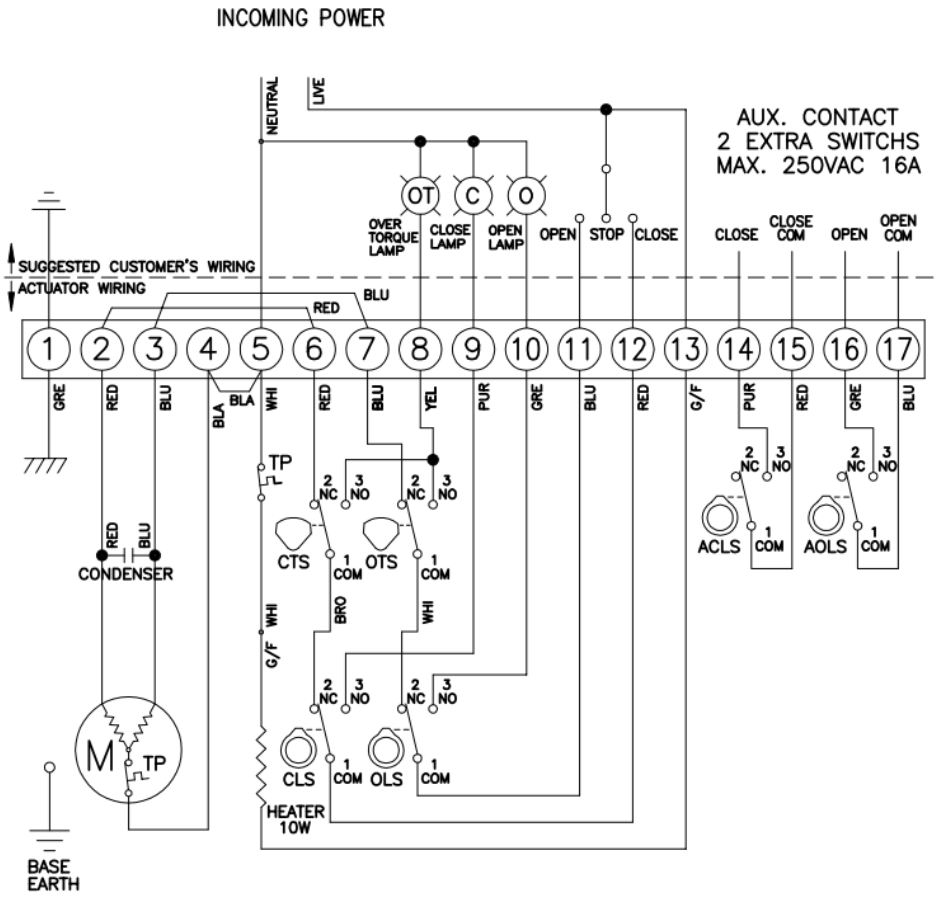




DANGER: ***HAZARDOUS VOLTAGE. Electrical power must not be connected until all wiring and limit switch adjustments have been completed.***

ELECTRIC WIRING DIAGRAM FOR ACTUATOR

ELA150 TILL ELA3000, 115VAC OR 230VAC ±5% 1 PH STANDARD



TORQUE AND LIMIT SWITCH OPERATION		
CTS 1-3	*CLOSING TORQUE SWITCH INTERRUPTS CONTROL IF MECHANICAL OVERLOAD OCCURS CLOSING CYCLE	
OTS 1-3	*OPENING TORQUE SWITCH INTERRUPTS CONTROL IF MECHANICAL OVERLOAD OCCURS OPENING CYCLE	
SYMBOL	DESCRIPTION	RATING
CLS	CLOSE LIMIT SWITCH	250VAC 10A
OLS	OPEN LIMIT SWITCH	250VAC 10A
CTS	CLOSE TORQUE SWITCH	250VAC 10A
OTS	OPEN TORQUE SWITCH	250VAC 10A
ACLS	AUX. CLOSE LIMIT SWITCH	250VAC 16A
AOLS	AUX. OPEN LIMIT SWITCH	250VAC 16A
TP	TERMAL PROTECTOR	250VAC 15A

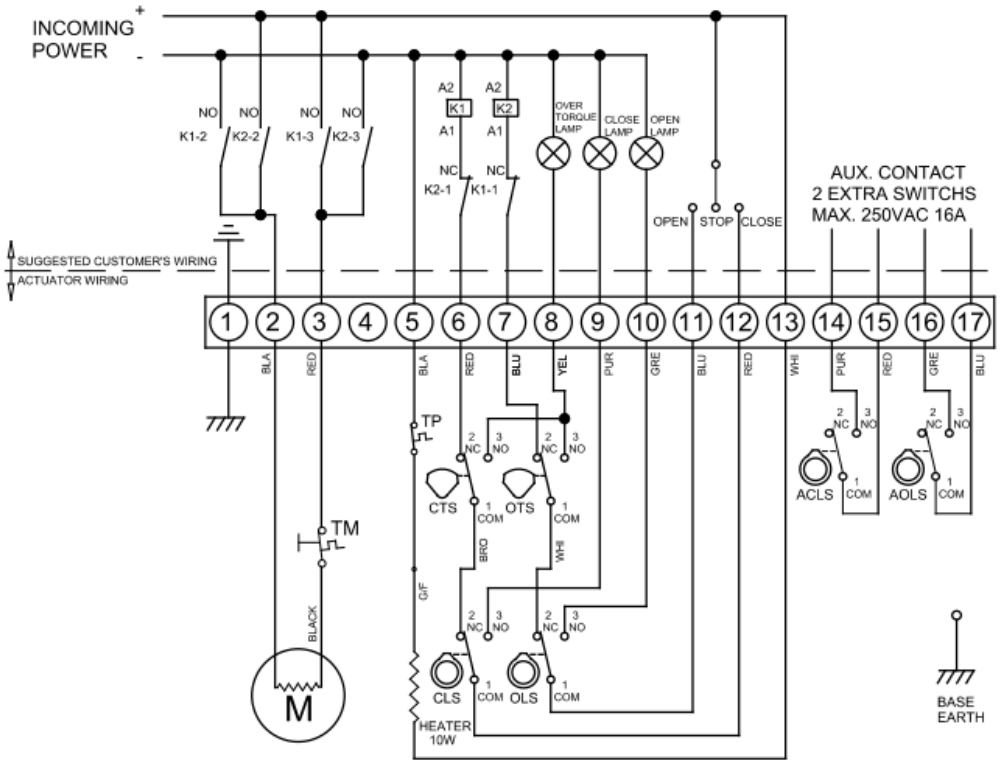
*EACH ACTUATOR SHOULD BE POWERD TROUGH IT'S OWN INDIVIDUAL SWITCH OR RELAY CONTACTS TO PREVENT CROSS FEED BETWEEN TWO OR MORE ACTUATORS

DATE:		DRAWN:	CHECKED:
14-11-2012	econ	FWP	
REV.DATE: 30-10-2018		DWG. Nr.: D7907-4A	REV.: B

DANGER: ***HAZARDOUS VOLTAGE. Electrical power must not be connected until all wiring and limit switch adjustments have been completed.***

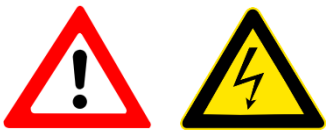
ELECTRIC WIRING DIAGRAM FOR ACTUATOR

ELA150 TILL ELA3000 24VDC STANDARD
WITH THERMAL MAGNETIC CIRCUIT BREAKER (TM)

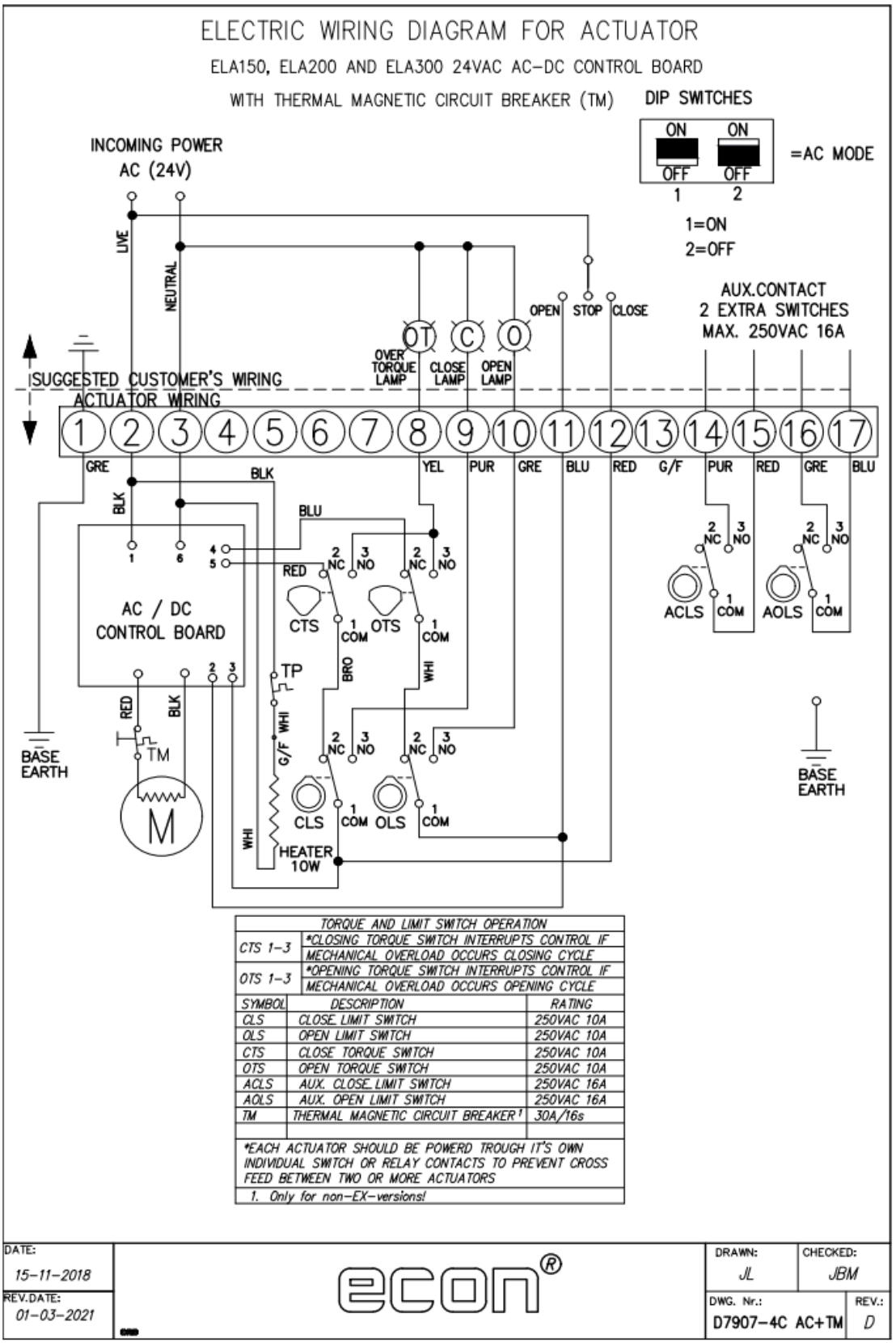


TORQUE AND LIMIT SWITCH OPERATION		
CTS 1-3	*CLOSING TORQUE SWITCH INTERRUPTS CONTROL IF	
	MECHANICAL OVERLOAD OCCURS CLOSING CYCLE	
OTS 1-3	*OPENING TORQUE SWITCH INTERRUPTS CONTROL IF	
	MECHANICAL OVERLOAD OCCURS CLOSING CYCLE	
SYMBOL	DESCRITION	RATING
CLS	CLOSE LIMIT SWITCH	250VAC 10A
OLS	OPEN LIMIT SWITCH	250VAC 10A
CTS	CLOSE TORQUE SWITCH	250VAC 10A
OTS	OPEN TORQUE SWITCH	250VAC 10A
ACLS	AUX. CLOSE LIMIT SWITCH	250VAC 16A
AOLS	AUX. OPEN LIMIT SWITCH	250VAC 16A
TM	THERMAL MAGNETIC CIRCUIT BREAKER[1]	30A/16s
*EACH ACTUATOR SHOULD BE POWERED TROUGH IT'S OWN INDIVIDUAL SWITCH OR RELAY CONTACTS TO PREVENT CROSS FEED BETWEEN TWO OR MORE ACTUATORS		
1. Only for non-Ex-versions !		

DATE:	REMARK:		DWG. Nr.:		
06-07-2017		WWW.ERIKS.COM	D7907-4B+TM		
DRAWN BY:	CHECKED BY:		REV BY:	DATE REV:	REV.:
JL	JBM		RFK	14-08-2023	E



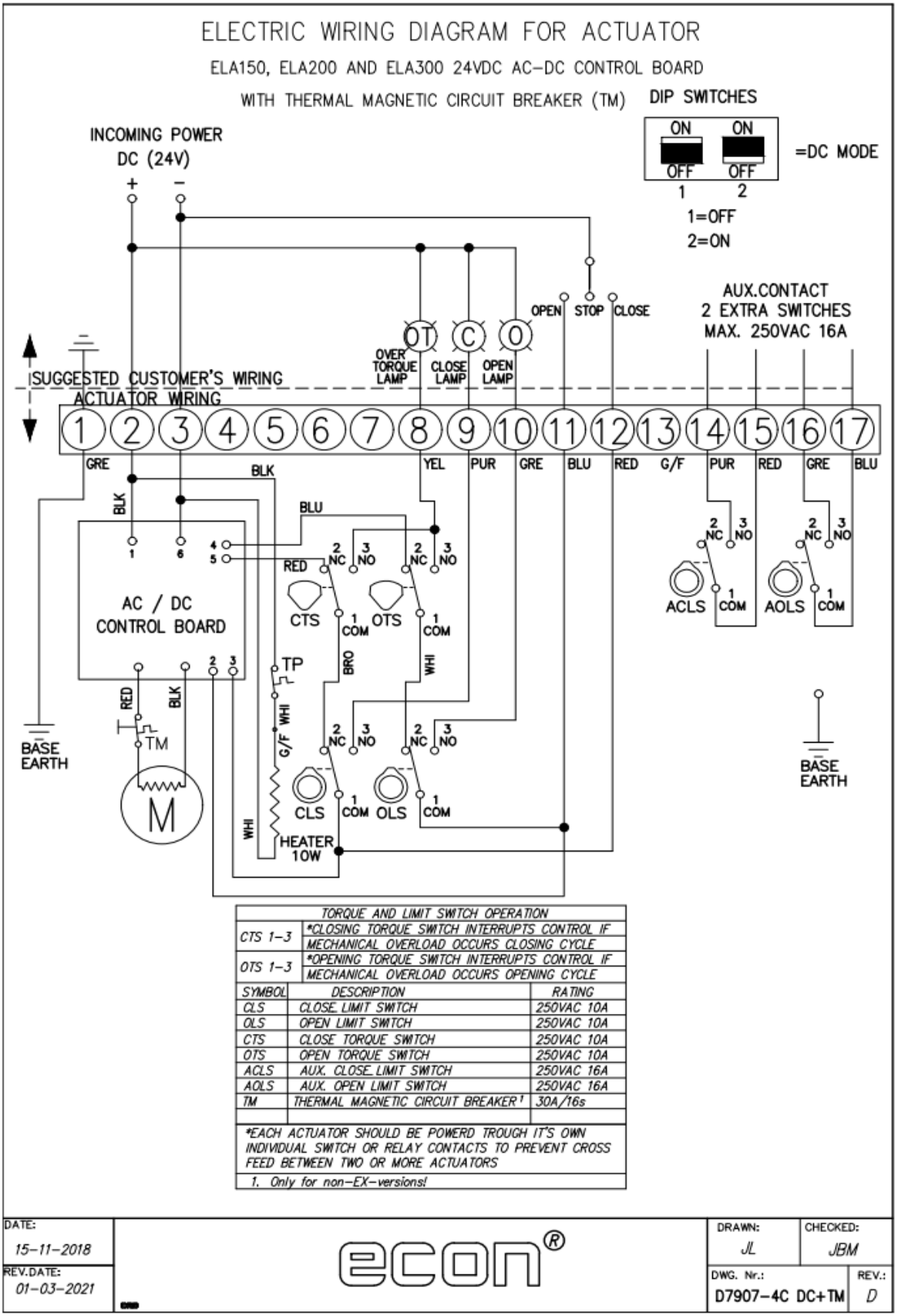
DANGER: ***HAZARDOUS VOLTAGE. Electrical power must not be connected until all wiring and limit switch adjustments have been completed.***



TORQUE AND LIMIT SWITCH OPERATION		
CTS 1-3	*CLOSING TORQUE SWITCH INTERRUPTS CONTROL IF MECHANICAL OVERLOAD OCCURS CLOSING CYCLE	
OTS 1-3	*OPENING TORQUE SWITCH INTERRUPTS CONTROL IF MECHANICAL OVERLOAD OCCURS OPENING CYCLE	
SYMBOL	DESCRIPTION	RATING
CLS	CLOSE LIMIT SWITCH	250VAC 10A
OLS	OPEN LIMIT SWITCH	250VAC 10A
CTS	CLOSE TORQUE SWITCH	250VAC 10A
OTS	OPEN TORQUE SWITCH	250VAC 10A
ACLS	AUX. CLOSE LIMIT SWITCH	250VAC 16A
AOLS	AUX. OPEN LIMIT SWITCH	250VAC 16A
TM	THERMAL MAGNETIC CIRCUIT BREAKER[1]	30A/16s
*EACH ACTUATOR SHOULD BE POWERD TROUGH IT'S OWN INDIVIDUAL SWITCH OR RELAY CONTACTS TO PREVENT CROSS FEED BETWEEN TWO OR MORE ACTUATORS		
1. Only for non-EX-versions!		

DATE:		DRAWN:	CHECKED:
15-11-2018	econ®	JL	JBM
REV.DATE: 01-03-2021		DWG. Nr.: D7907-4C AC+TM	REV.: D

DANGER: ***HAZARDOUS VOLTAGE. Electrical power must not be connected until all wiring and limit switch adjustments have been completed.***



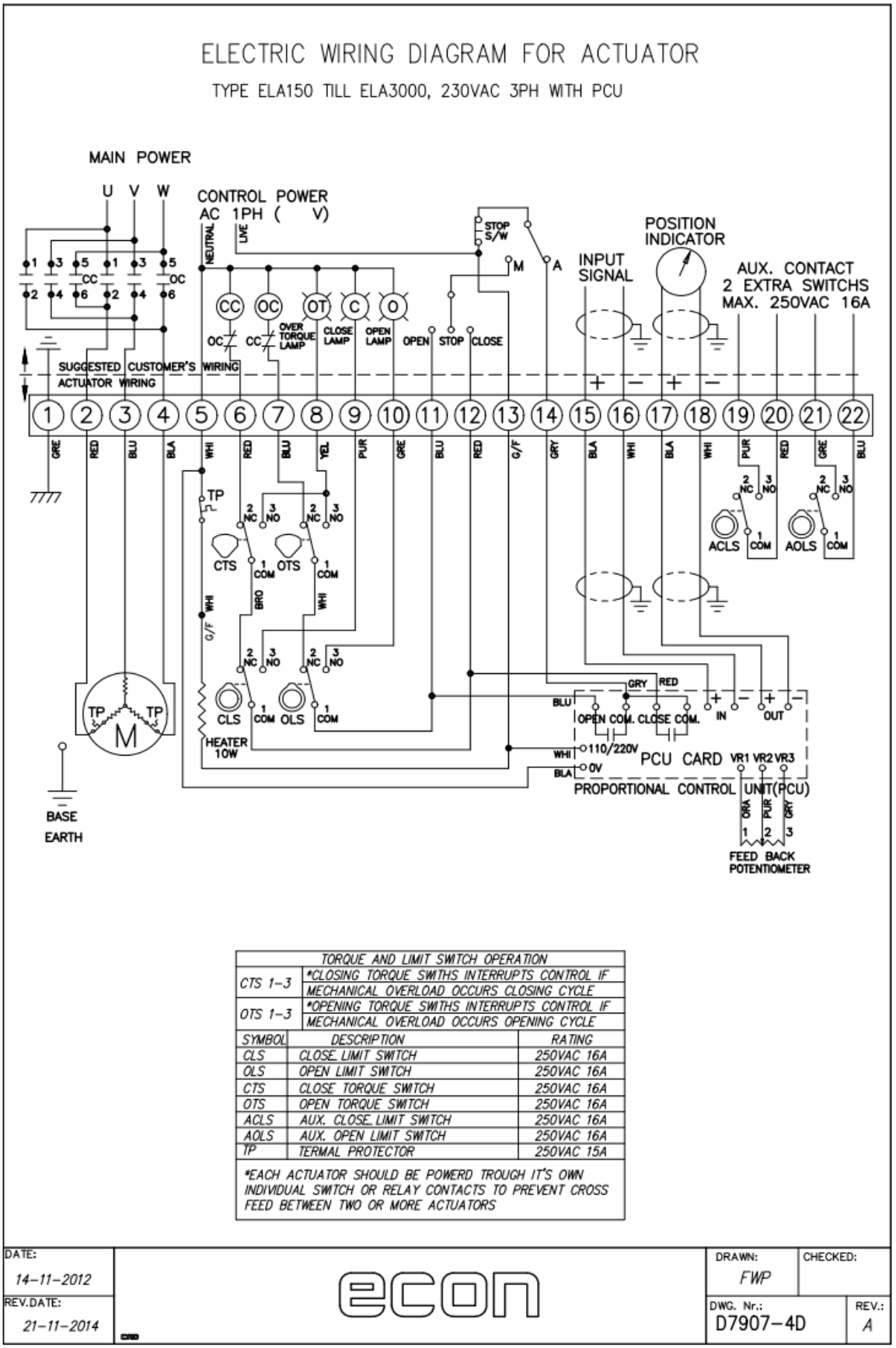
TORQUE AND LIMIT SWITCH OPERATION		
CTS 1–3	*CLOSING TORQUE SWITCH INTERRUPTS CONTROL IF MECHANICAL OVERLOAD OCCURS CLOSING CYCLE	
OTS 1–3	*OPENING TORQUE SWITCH INTERRUPTS CONTROL IF MECHANICAL OVERLOAD OCCURS OPENING CYCLE	
SYMBOL	DESCRIPTION	RATING
CLS	CLOSE LIMIT SWITCH	250VAC 10A
OLS	OPEN LIMIT SWITCH	250VAC 10A
CTS	CLOSE TORQUE SWITCH	250VAC 10A
OTS	OPEN TORQUE SWITCH	250VAC 10A
ACLS	AUX. CLOSE LIMIT SWITCH	250VAC 16A
AOLS	AUX. OPEN LIMIT SWITCH	250VAC 16A
TM	THERMAL MAGNETIC CIRCUIT BREAKER[1]	30A/16s

*EACH ACTUATOR SHOULD BE POWERD TROUGH IT'S OWN INDIVIDUAL SWITCH OR RELAY CONTACTS TO PREVENT CROSS FEED BETWEEN TWO OR MORE ACTUATORS

1. Only for non–EX–versions!

DATE:		DRAWN:	CHECKED:
15–11–2018	econ®	JL	JBM
REV.DATE: 01–03–2021		DWG. Nr.: D7907–4C DC+TM	REV.: D

DANGER: ***HAZARDOUS VOLTAGE. Electrical power must not be connected until all wiring and limit switch adjustments have been completed.***

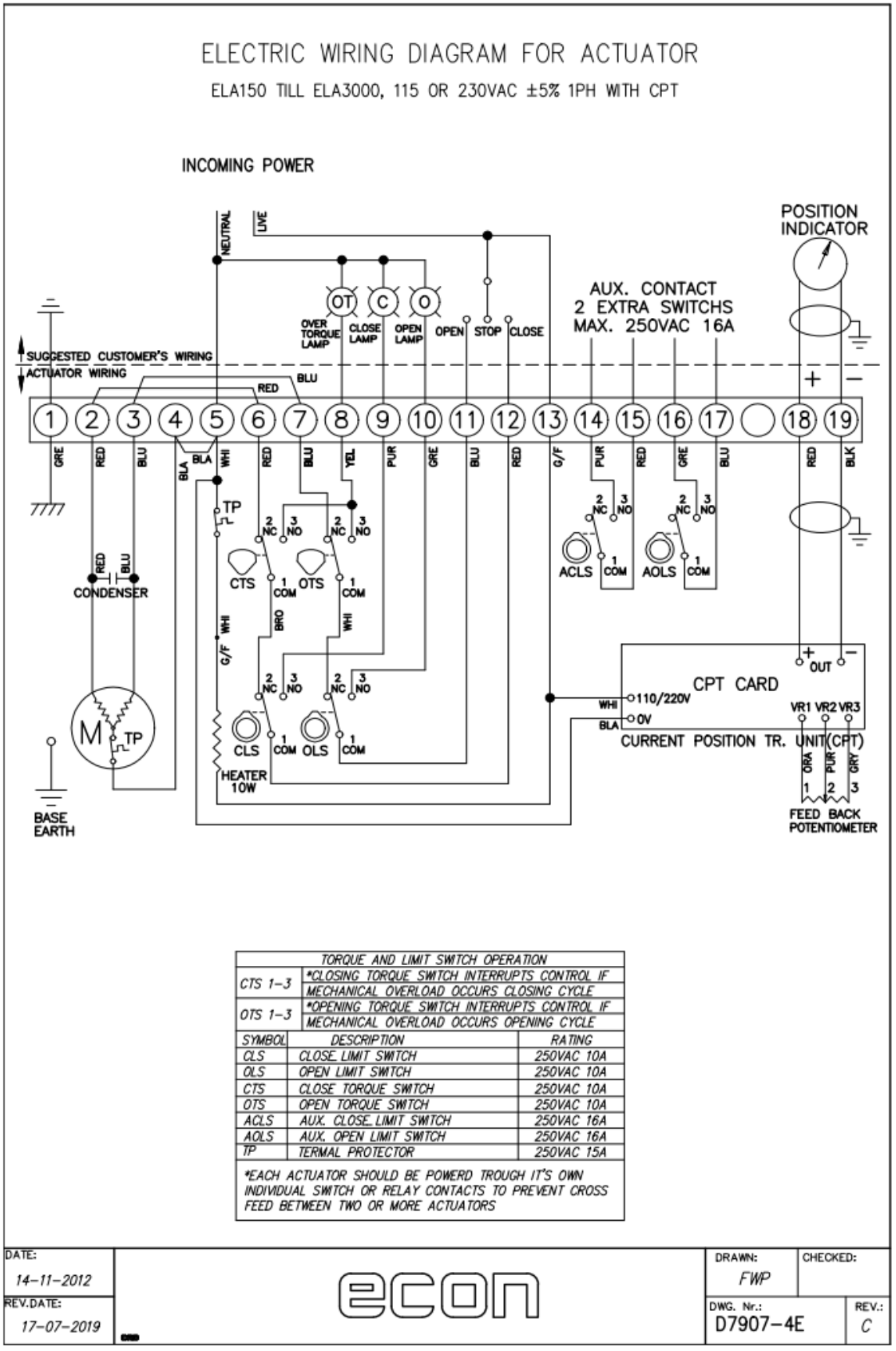


TORQUE AND LIMIT SWITCH OPERATION		
CTS 1-3	*CLOSING TORQUE SWITHS INTERRUPTS CONTROL IF MECHANICAL OVERLOAD OCCURS CLOSING CYCLE	
OTS 1-3	*OPENING TORQUE SWITHS INTERRUPTS CONTROL IF MECHANICAL OVERLOAD OCCURS OPENING CYCLE	
SYMBOL	DESCRIPTION	RATING
CLS	CLOSE LIMIT SWITCH	250VAC 16A
OLS	OPEN LIMIT SWITCH	250VAC 16A
CTS	CLOSE TORQUE SWITCH	250VAC 16A
OTS	OPEN TORQUE SWITCH	250VAC 16A
ACLS	AUX. CLOSE LIMIT SWITCH	250VAC 16A
AOLS	AUX. OPEN LIMIT SWITCH	250VAC 16A
TP	TERMAL PROTECTOR	250VAC 15A

*EACH ACTUATOR SHOULD BE POWERD TROUGH IT'S OWN INDIVIDUAL SWITCH OR RELAY CONTACTS TO PREVENT CROSS FEED BETWEEN TWO OR MORE ACTUATORS

DATE: 14-11-2012		DRAWN: FWP	CHECKED:
REV.DATE: 21-11-2014	econ	DWG. Nr.: D7907-4D	REV.: A

DANGER: ***HAZARDOUS VOLTAGE. Electrical power must not be connected until all wiring and limit switch adjustments have been completed.***

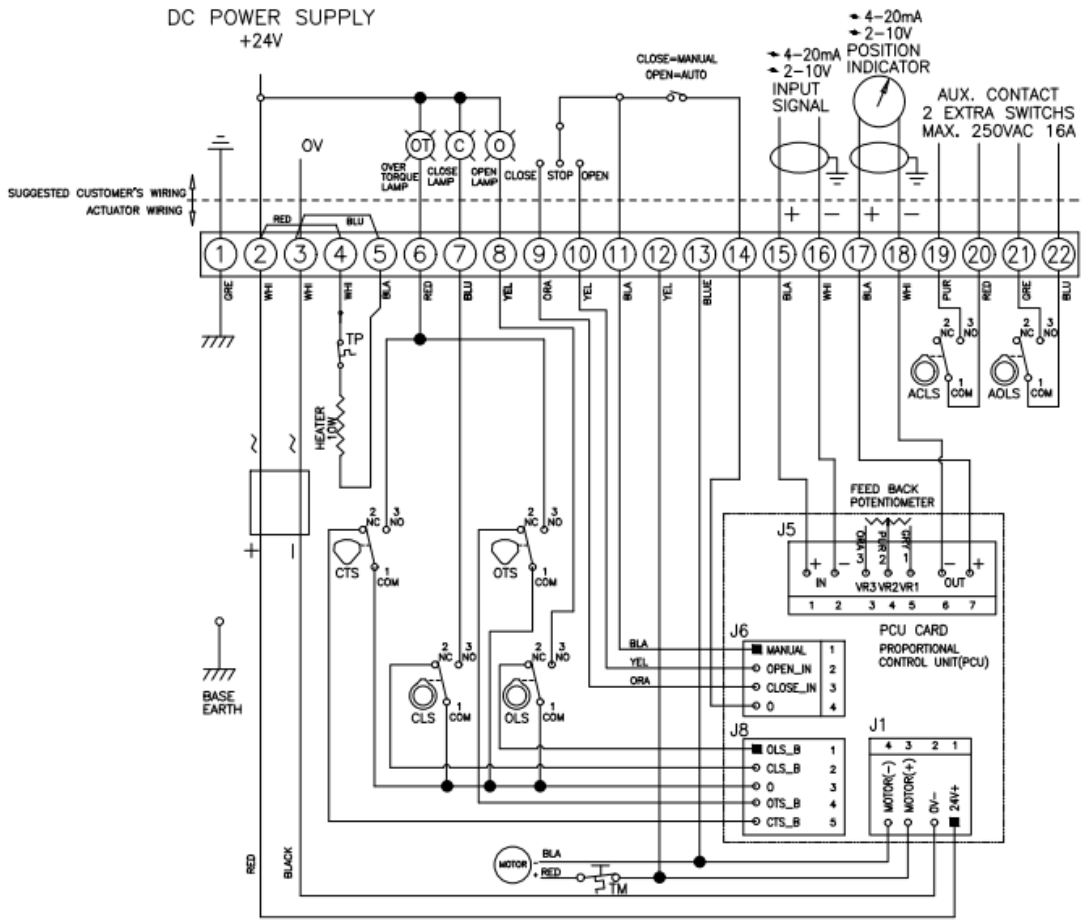


TORQUE AND LIMIT SWITCH OPERATION		
CTS 1–3	*CLOSING TORQUE SWITCH INTERRUPTS CONTROL IF MECHANICAL OVERLOAD OCCURS CLOSING CYCLE	
OTS 1–3	*OPENING TORQUE SWITCH INTERRUPTS CONTROL IF MECHANICAL OVERLOAD OCCURS OPENING CYCLE	
SYMBOL	DESCRIPTION	RATING
CLS	CLOSE LIMIT SWITCH	250VAC 10A
OLS	OPEN LIMIT SWITCH	250VAC 10A
CTS	CLOSE TORQUE SWITCH	250VAC 10A
OTS	OPEN TORQUE SWITCH	250VAC 10A
ACLS	AUX. CLOSE LIMIT SWITCH	250VAC 16A
AOLS	AUX. OPEN LIMIT SWITCH	250VAC 16A
TP	TERMAL PROTECTOR	250VAC 15A
*EACH ACTUATOR SHOULD BE POWERD TROUGH IT'S OWN INDIVIDUAL SWITCH OR RELAY CONTACTS TO PREVENT CROSS FEED BETWEEN TWO OR MORE ACTUATORS		

DATE:		DRAWN:	CHECKED:
14-11-2012	econ	FWP	
REV.DATE: 17-07-2019		DWG. Nr.: D7907-4E	REV.: C

DANGER: ***HAZARDOUS VOLTAGE. Electrical power must not be connected until all wiring and limit switch adjustments have been completed.***

ELECTRIC WIRING DIAGRAM FOR ACTUATOR ELA150 TILL ELA300, 24VDC PCU WITH THERMAL MAGNETIC CIRCUIT BREAKER (TM)



TORQUE AND LIMIT SWITCH OPERATION		
CTS 1-3	*CLOSING TORQUE SWITCH INTERRUPTS CONTROL IF MECHANICAL OVERLOAD OCCURS CLOSING CYCLE	
OTS 1-3	*OPENING TORQUE SWITCH INTERRUPTS CONTROL IF MECHANICAL OVERLOAD OCCURS OPENING CYCLE	
SYMBOL	DESCRIPTION	RATING
CLS	CLOSE LIMIT SWITCH	250VAC 10A
OLS	OPEN LIMIT SWITCH	250VAC 10A
CTS	CLOSE TORQUE SWITCH	250VAC 10A
OTS	OPEN TORQUE SWITCH	250VAC 10A
ACLS	AUX. CLOSE LIMIT SWITCH	250VAC 16A
AOLS	AUX. OPEN LIMIT SWITCH	250VAC 16A
TM	THERMAL MAGNETIC CIRCUIT BREAKER[1]	30A/16s

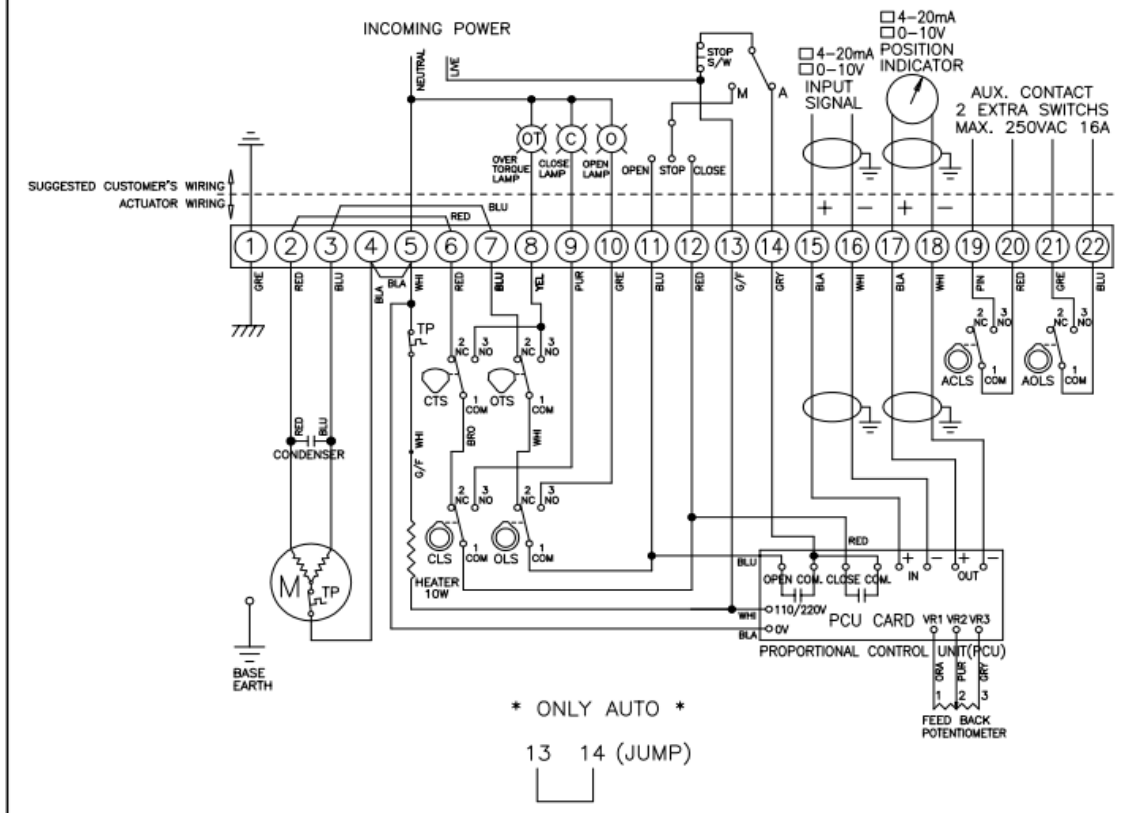
*EACH ACTUATOR SHOULD BE POWERD TROUGH IT'S OWN INDIVIDUAL SWITCH OR RELAY CONTACTS TO PREVENT CROSS FEED BETWEEN TWO OR MORE ACTUATORS

1. Only for non-Ex-versions!

DATE: 12-07-2013		DRAWN: JL	CHECKED: JBM
REV.DATE: 02-11-2023	econ	DWG. Nr.: D7907-4F	REV.: F

DANGER: ***HAZARDOUS VOLTAGE. Electrical power must not be connected until all wiring and limit switch adjustments have been completed.***

ELECTRIC WIRING DIAGRAM FOR ACTUATOR
ELA150 TILL ELA3000, 115 OR 230VAC ±5% 1PH PCU



* ONLY AUTO *

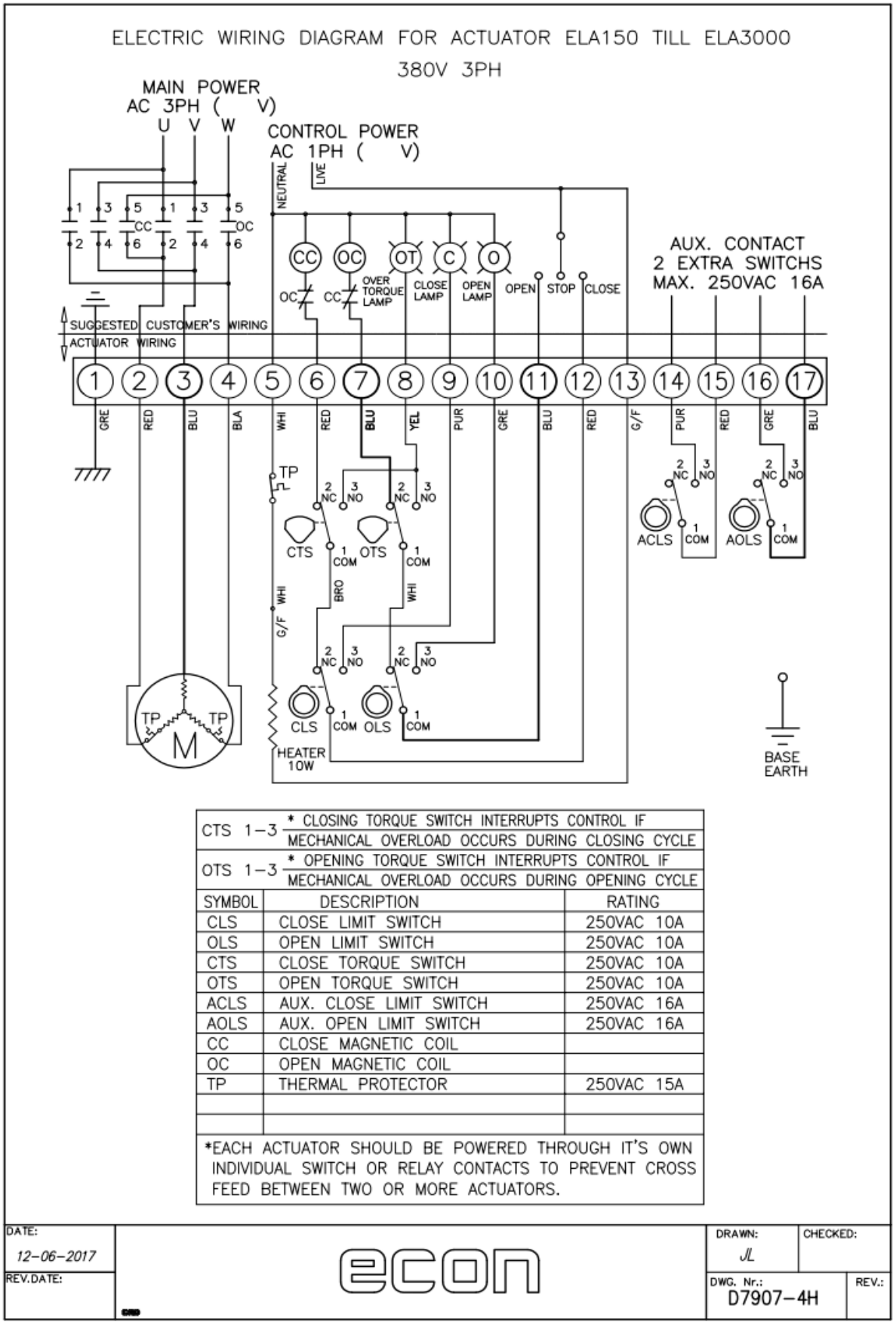
13 14 (JUMP)

TORQUE AND LIMIT SWITCH OPERATION		
CTS 1–3	*CLOSING TORQUE SWITCH INTERRUPTS CONTROL IF MECHANICAL OVERLOAD OCCURS CLOSING CYCLE	
OTS 1–3	*OPENING TORQUE SWITCH INTERRUPTS CONTROL IF MECHANICAL OVERLOAD OCCURS OPENING CYCLE	
SYMBOL	DESCRIPTION	RATING
CLS	CLOSE LIMIT SWITCH	250VAC 10A
OLS	OPEN LIMIT SWITCH	250VAC 10A
CTS	CLOSE TORQUE SWITCH	250VAC 10A
OTS	OPEN TORQUE SWITCH	250VAC 10A
ACLS	AUX. CLOSE LIMIT SWITCH	250VAC 16A
AOLS	AUX. OPEN LIMIT SWITCH	250VAC 16A
TP	TERMAL PROTECTOR	250VAC 15A

*EACH ACTUATOR SHOULD BE POWERD TROUGH IT'S OWN INDIVIDUAL SWITCH OR RELAY CONTACTS TO PREVENT CROSS FEED BETWEEN TWO OR MORE ACTUATORS

DATE: 12-07-2013		DRAWN: JL	CHECKED:
REV.DATE: 30-10-2018	econ	DWG. Nr: D7907-4G	REV: B

DANGER: ***HAZARDOUS VOLTAGE. Electrical power must not be connected until all wiring and limit switch adjustments have been completed.***



CTS 1–3	* CLOSING TORQUE SWITCH INTERRUPTS CONTROL IF MECHANICAL OVERLOAD OCCURS DURING CLOSING CYCLE
OTS 1–3	* OPENING TORQUE SWITCH INTERRUPTS CONTROL IF MECHANICAL OVERLOAD OCCURS DURING OPENING CYCLE

SYMBOL	DESCRIPTION	RATING
CLS	CLOSE LIMIT SWITCH	250VAC 10A
OLS	OPEN LIMIT SWITCH	250VAC 10A
CTS	CLOSE TORQUE SWITCH	250VAC 10A
OTS	OPEN TORQUE SWITCH	250VAC 10A
ACLS	AUX. CLOSE LIMIT SWITCH	250VAC 16A
AOLS	AUX. OPEN LIMIT SWITCH	250VAC 16A
CC	CLOSE MAGNETIC COIL	
OC	OPEN MAGNETIC COIL	
TP	THERMAL PROTECTOR	250VAC 15A

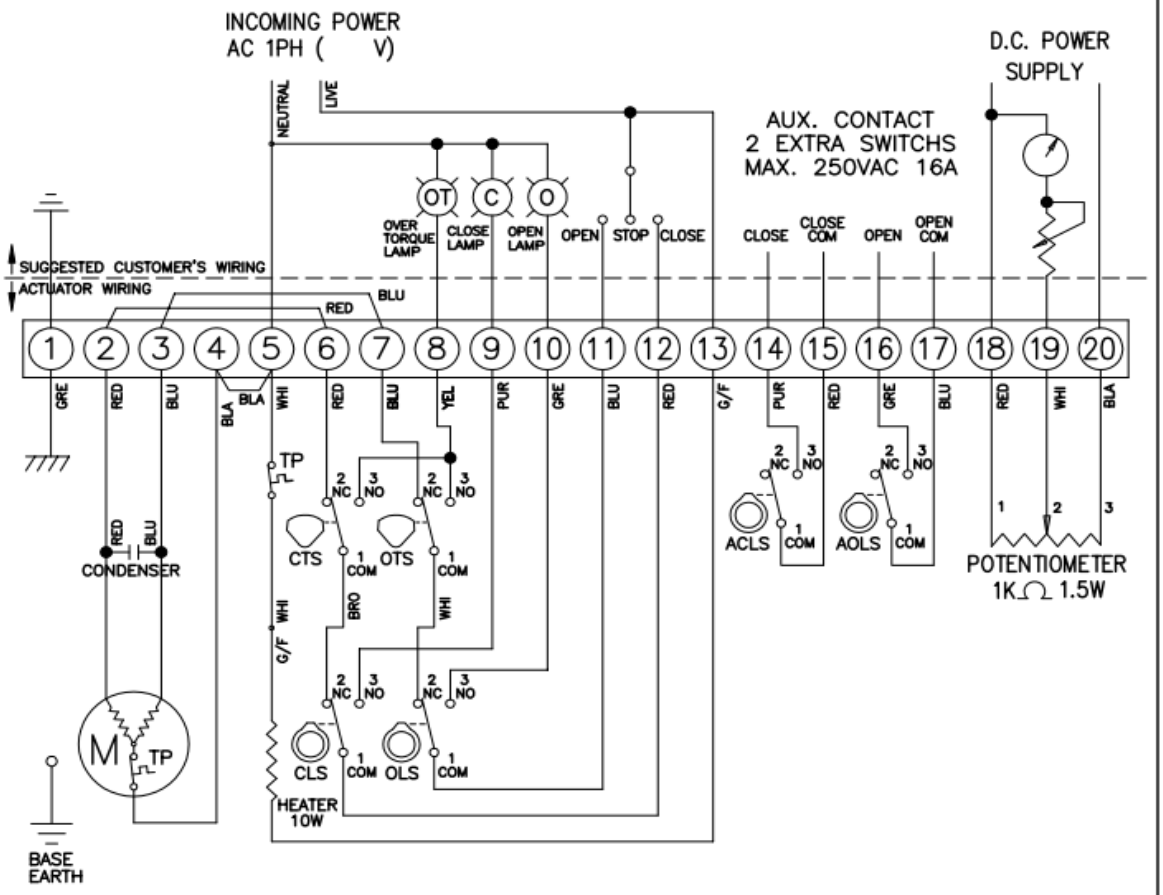
*EACH ACTUATOR SHOULD BE POWERED THROUGH IT'S OWN INDIVIDUAL SWITCH OR RELAY CONTACTS TO PREVENT CROSS FEED BETWEEN TWO OR MORE ACTUATORS.

DATE: 12–06–2017		DRAWN: JL	CHECKED:
REV.DATE:		DWG. Nr.: D7907–4H	REV.:

DANGER: ***HAZARDOUS VOLTAGE. Electrical power must not be connected until all wiring and limit switch adjustments have been completed.***

ELECTRIC WIRING DIAGRAM FOR ACTUATOR

ELA150 TILL ELA2000, 115VAC OR 230VAC 1 PH PIU + ALS



TORQUE AND LIMIT SWITCH OPERATION		
CTS 1-3	*CLOSING TORQUE SWITHS INTERRUPTS CONTROL IF MECHANICAL OVERLOAD OCCURS CLOSING CYCLE	
OTS 1-3	*OPENING TORQUE SWITHS INTERRUPTS CONTROL IF MECHANICAL OVERLOAD OCCURS OPENING CYCLE	
SYMBOL	DESCRIPTION	RATING
CLS	CLOSE LIMIT SWITCH	250VAC 10A
OLS	OPEN LIMIT SWITCH	250VAC 10A
CTS	CLOSE TORQUE SWITCH	250VAC 10A
OTS	OPEN TORQUE SWITCH	250VAC 10A
ACLS	AUX. CLOSE LIMIT SWITCH	250VAC 16A
AOLS	AUX. OPEN LIMIT SWITCH	250VAC 16A
TP	TERMAL PROTECTOR	250VAC 15A

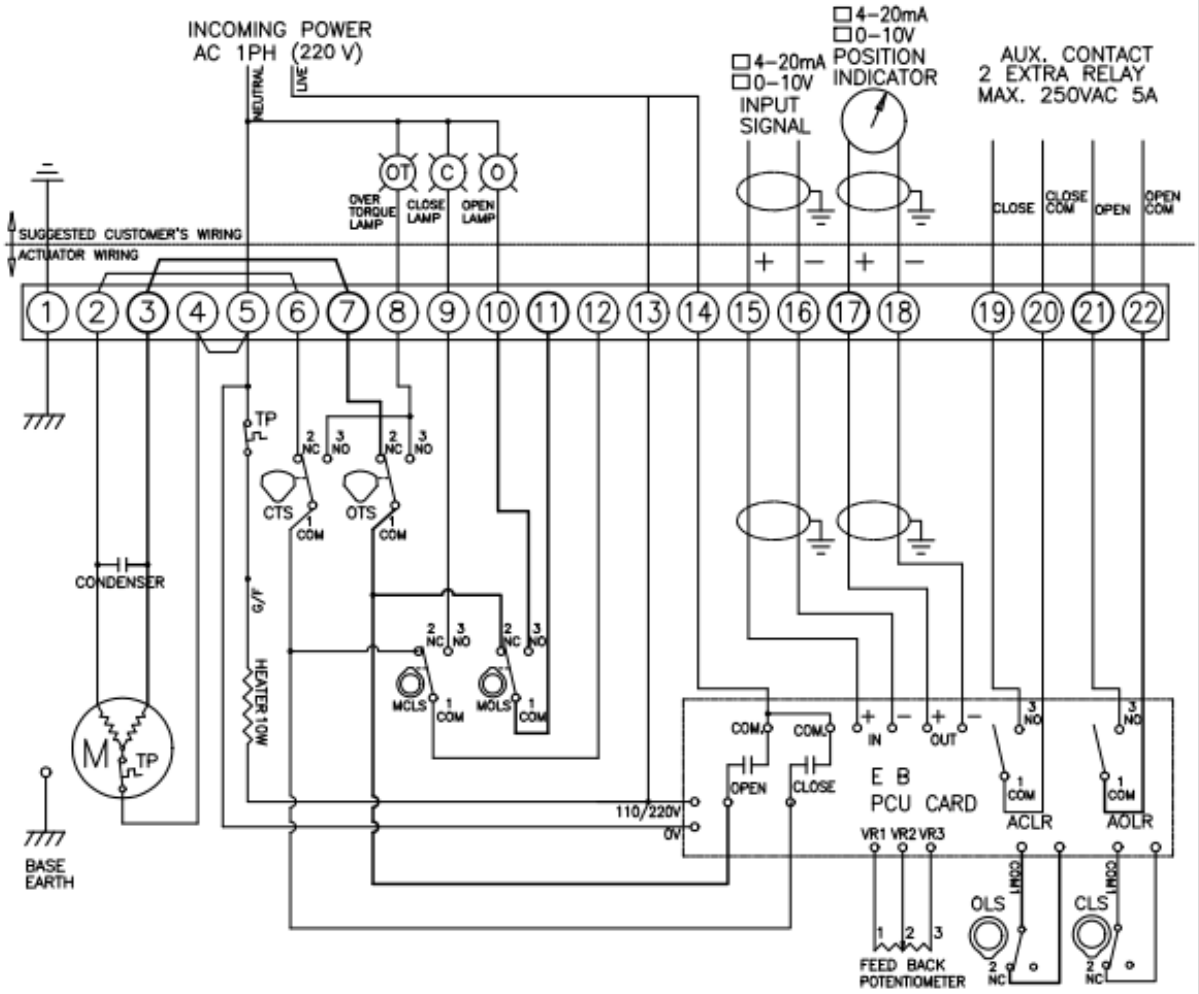
*EACH ACTUATOR SHOULD BE POWERD TROUGH IT'S OWN INDIVIDUAL SWITCH OR RELAY CONTACTS TO PREVENT CROSS FEED BETWEEN TWO OR MORE ACTUATORS

DATE: 07-11-2017	econ	DRAWN: JL	CHECKED:
REV.DATE:		DWG. Nr.: D7907-4L	REV.:

DANGER: ***HAZARDOUS VOLTAGE. Electrical power must not be connected until all wiring and limit switch adjustments have been completed.***

ELECTRIC WIRING DIAGRAM FOR ACTUATOR ELA150 TILL ELA3000

115 OR 230VAC 1PH PCU – EB



PROPORTIONAL CONTROL UNIT(PCU)
EDDY CURRENT BRAKE CONTROL

TORQUE AND LIMIT SWITCH OPERATION		
CTS 1-3	*CLOSING TORQUE SWITCH INTERRUPTS CONTROL IF MECHANICAL OVERLOAD OCCURS CLOSING CYCLE	
OTS 1-3	*OPENING TORQUE SWITCH INTERRUPTS CONTROL IF MECHANICAL OVERLOAD OCCURS OPENING CYCLE	
SYMBOL	DESCRIPTION	RATING
CLS	CLOSE LIMIT SWITCH	250VAC 10A
OLS	OPEN LIMIT SWITCH	250VAC 10A
CTS	CLOSE TORQUE SWITCH	250VAC 10A
OTS	OPEN TORQUE SWITCH	250VAC 10A
ACLR	AUX. CLOSE LIMIT RELAY	250VAC 5A
AOLR	AUX. OPEN LIMIT RELAY	250VAC 5A
TP	TERMAL PROTECTOR	250VAC 15A
MCLS	MANUAL CLOSE LIMIT SWITCH	250VAC 10A
MOLS	MANUAL OPEN LIMIT SWITCH	250VAC 10A

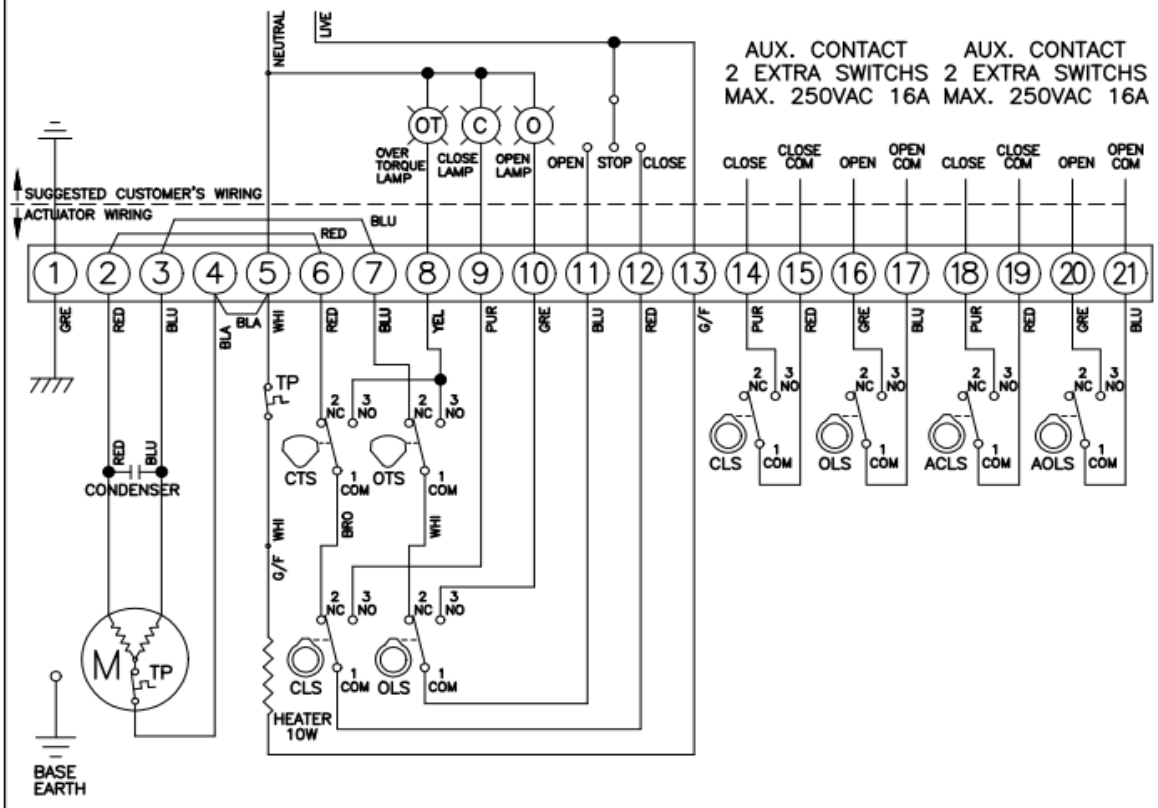
*EACH ACTUATOR SHOULD BE POWERD TROUGH IT'S OWN INDIVIDUAL SWITCH OR RELAY CONTACTS TO PREVENT CROSS FEED BETWEEN TWO OR MORE ACTUATORS

DATE: 02-03-20120	BRAND: econ®	ERIKS WWW.ERIKS.COM	DWG. NR.: D7907 - 4N	
DRAWN BY: JL	CHECKED BY: JBM		REV BY: JL	DATE REV: 15-02-2022	REV: A

DANGER: ***HAZARDOUS VOLTAGE. Electrical power must not be connected until all wiring and limit switch adjustments have been completed.***

ELECTRIC WIRING DIAGRAM FOR ACTUATOR

ELA150 TILL ELA3000, 115VAC OR 230VAC ±5% 1 PH + 2 EXTRA LIMIT SWITCHES

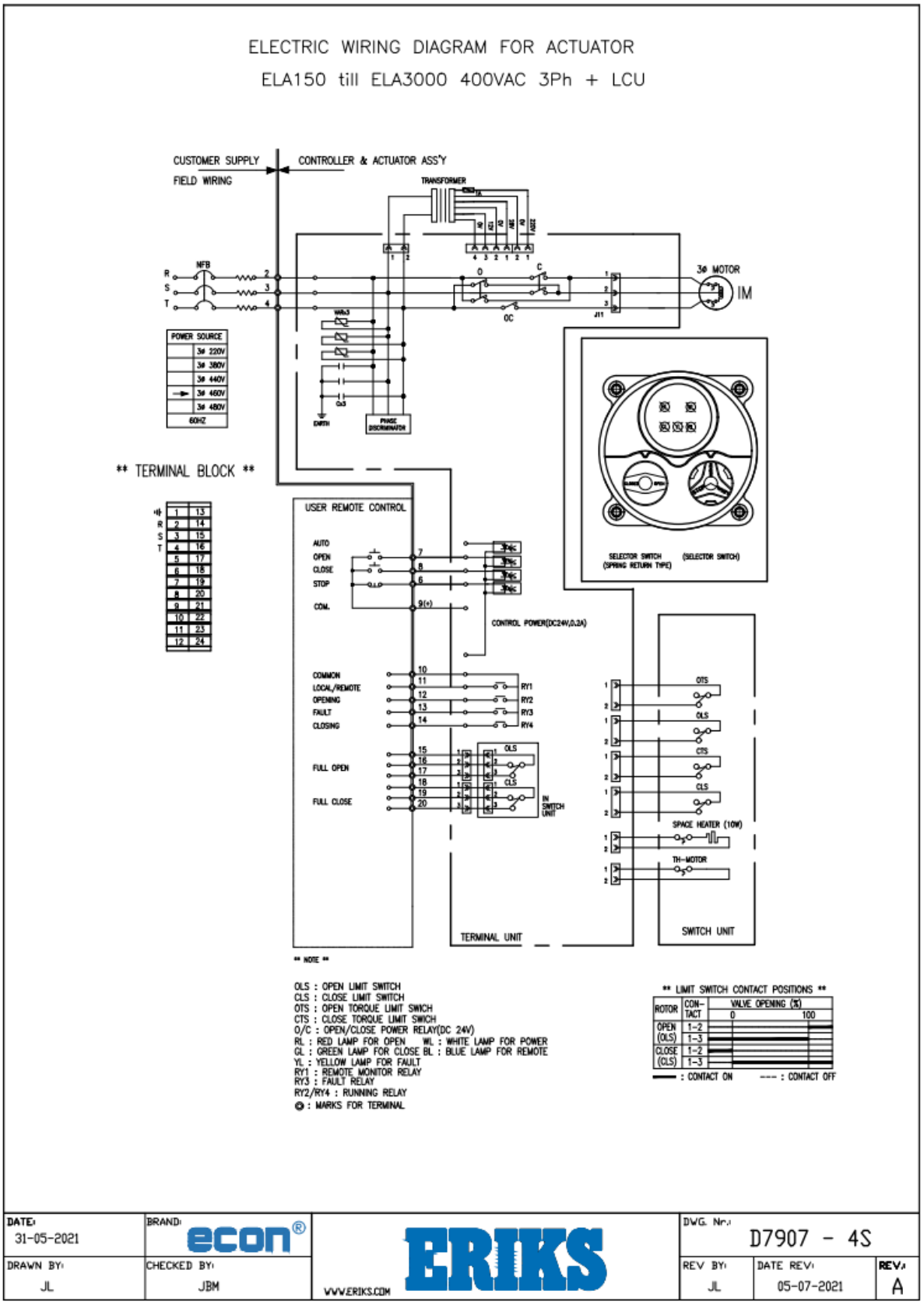


TORQUE AND LIMIT SWITCH OPERATION		
CTS 1–3	*CLOSING TORQUE SWITCH INTERRUPTS CONTROL IF MECHANICAL OVERLOAD OCCURS CLOSING CYCLE	
OTS 1–3	*OPENING TORQUE SWITCH INTERRUPTS CONTROL IF MECHANICAL OVERLOAD OCCURS OPENING CYCLE	
SYMBOL	DESCRIPTION	RATING
CLS	CLOSE LIMIT SWITCH	250VAC 10A
OLS	OPEN LIMIT SWITCH	250VAC 10A
CTS	CLOSE TORQUE SWITCH	250VAC 10A
OTS	OPEN TORQUE SWITCH	250VAC 10A
ACLS	AUX. CLOSE LIMIT SWITCH	250VAC 16A
AOLS	AUX. OPEN LIMIT SWITCH	250VAC 16A
TP	TERMAL PROTECTOR	250VAC 15A

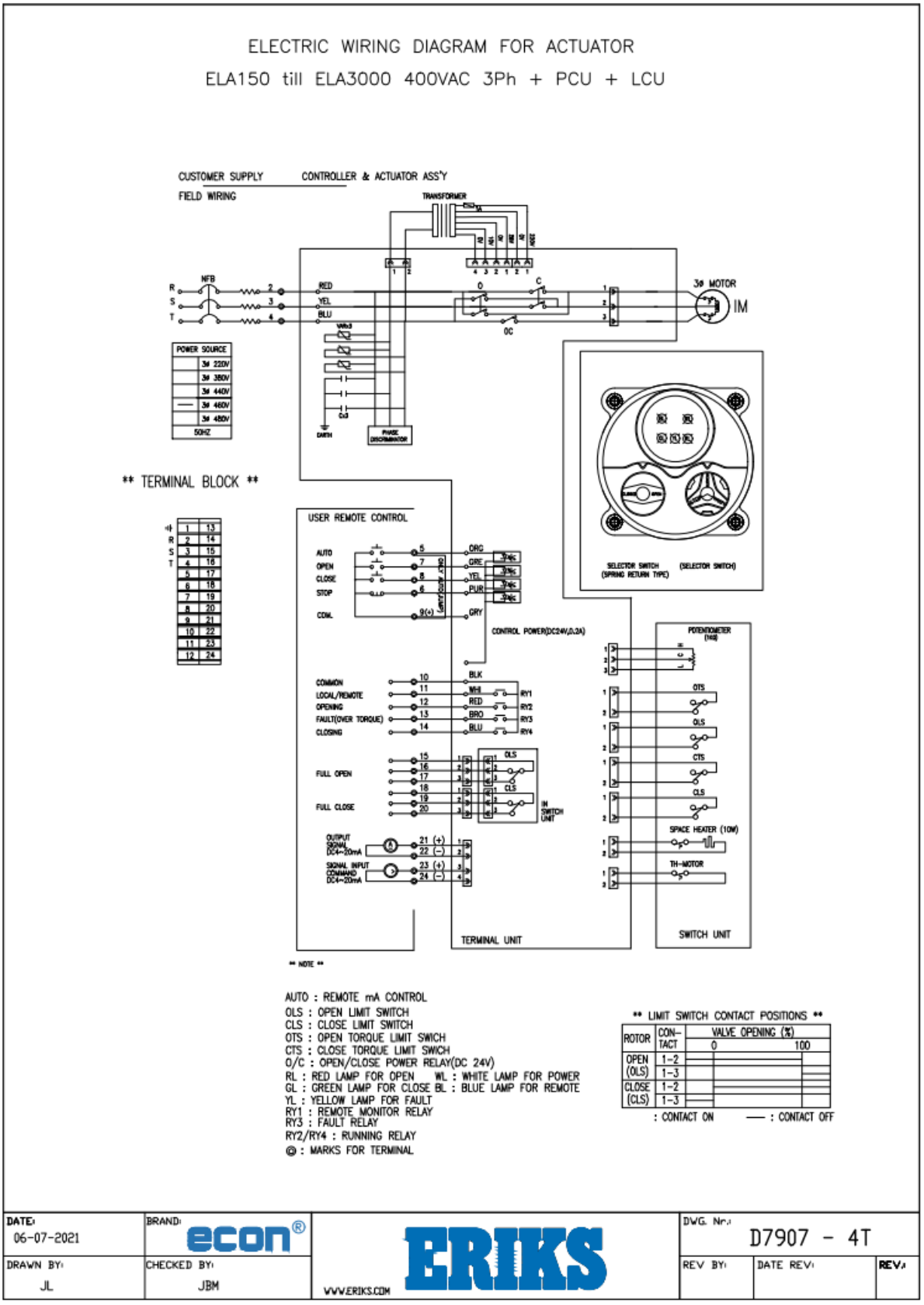
*EACH ACTUATOR SHOULD BE POWERD TROUGH IT'S OWN INDIVIDUAL SWITCH OR RELAY CONTACTS TO PREVENT CROSS FEED BETWEEN TWO OR MORE ACTUATORS

DATE: 05–02–2021		DRAWN: JL	CHECKED: JBM
REV.DATE:		DWG. Nr.: D7907–4R	REV.:

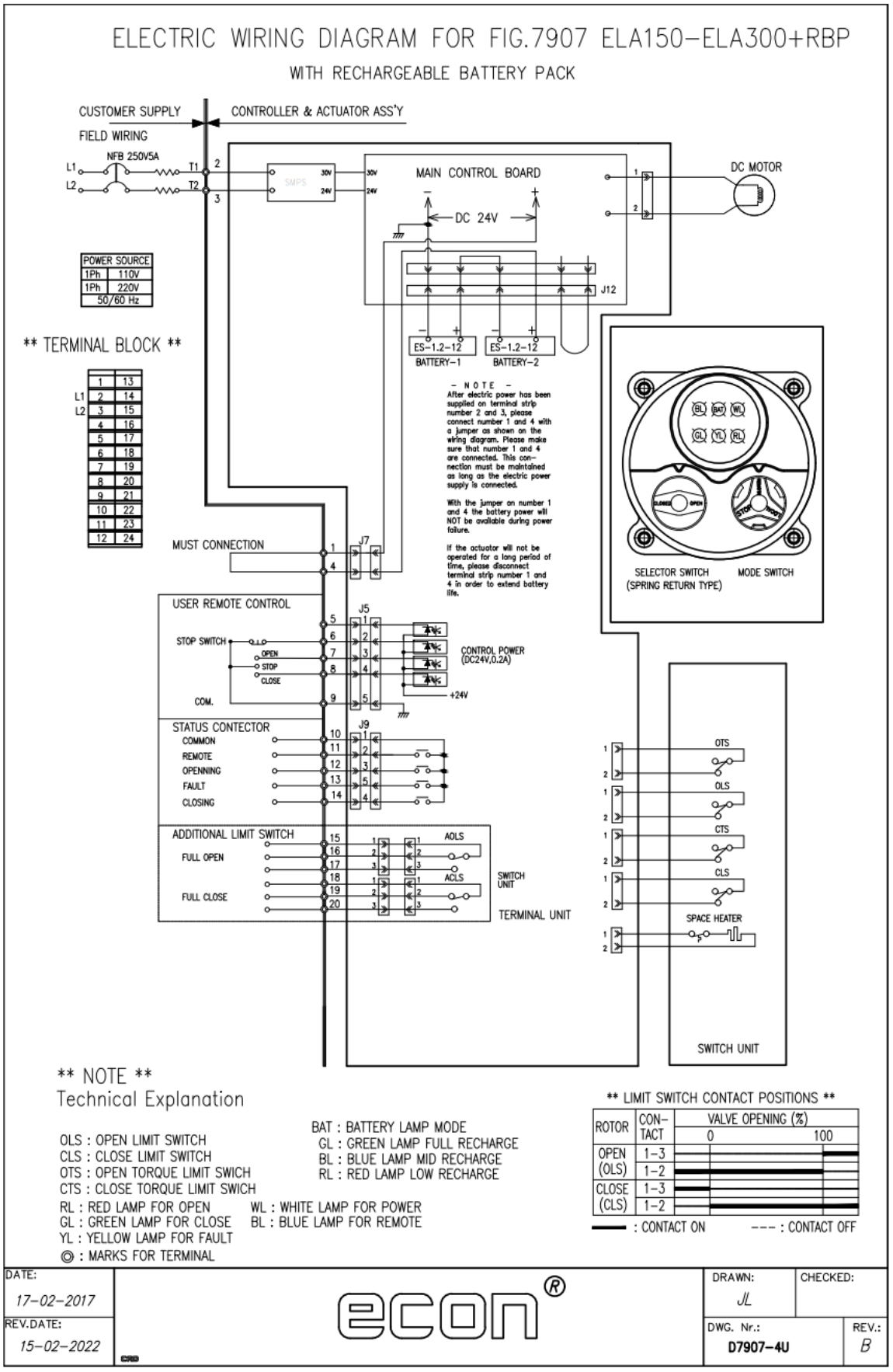
DANGER: ***HAZARDOUS VOLTAGE. Electrical power must not be connected until all wiring and limit switch adjustments have been completed.***



DANGER: ***HAZARDOUS VOLTAGE. Electrical power must not be connected until all wiring and limit switch adjustments have been completed.***



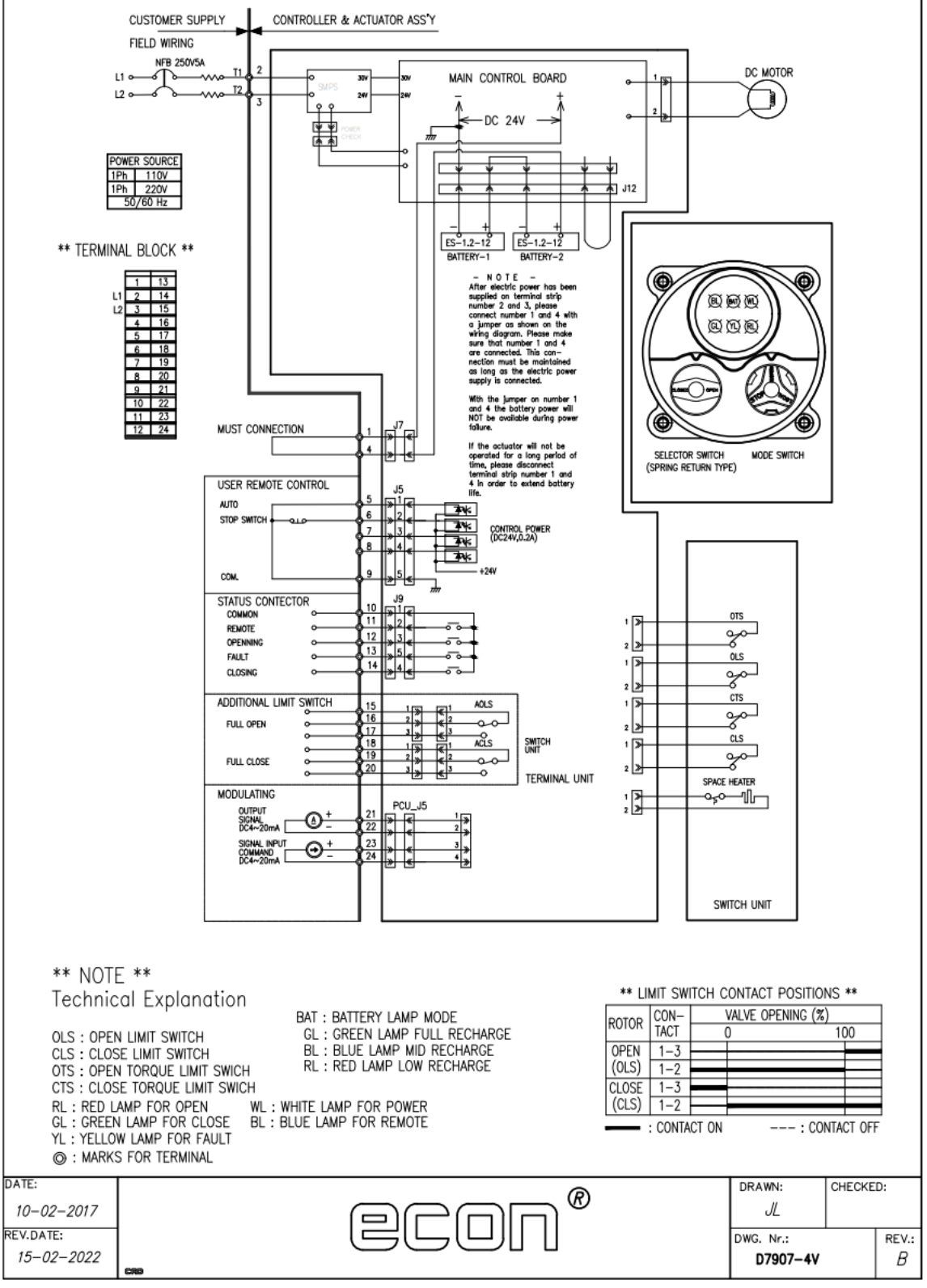
DANGER: ***HAZARDOUS VOLTAGE. Electrical power must not be connected until all wiring and limit switch adjustments have been completed.***



DANGER: ***HAZARDOUS VOLTAGE. Electrical power must not be connected until all wiring and limit switch adjustments have been completed.***

ELECTRIC WIRING DIAGRAM FOR FIG.7907 ELA150–ELA300 RBP+PCU

WITH RECHARGEABLE BATTERY PACK + PCU



** NOTE **
Technical Explanation

OLS : OPEN LIMIT SWITCH
CLS : CLOSE LIMIT SWITCH
OTS : OPEN TORQUE LIMIT SWICH
CTS : CLOSE TORQUE LIMIT SWICH
RL : RED LAMP FOR OPEN
GL : GREEN LAMP FOR CLOSE
YL : YELLOW LAMP FOR FAULT
◎ : MARKS FOR TERMINAL

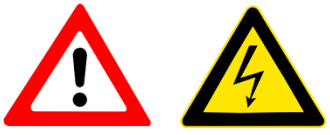
BAT : BATTERY LAMP MODE
GL : GREEN LAMP FULL RECHARGE
BL : BLUE LAMP MID RECHARGE
RL : RED LAMP LOW RECHARGE
WL : WHITE LAMP FOR POWER
BL : BLUE LAMP FOR REMOTE

** LIMIT SWITCH CONTACT POSITIONS **

ROTOR	CON-TACT	VALVE OPENING (%) 0	100
OPEN (OLS)	1–3		
	1–2		
CLOSE (CLS)	1–3		
	1–2		

▬▬ : CONTACT ON --- : CONTACT OFF

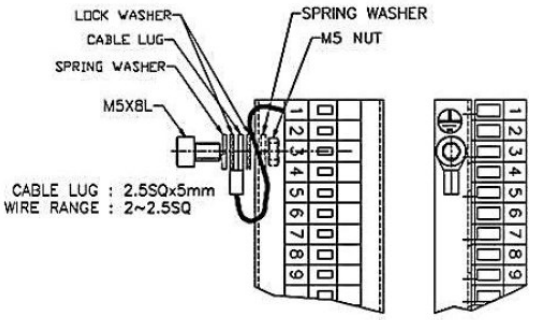
DATE: 10–02–2017		DRAWN: JL	CHECKED:
REV.DATE: 15–02–2022		DWG. Nr.: D7907–4V	REV.: B

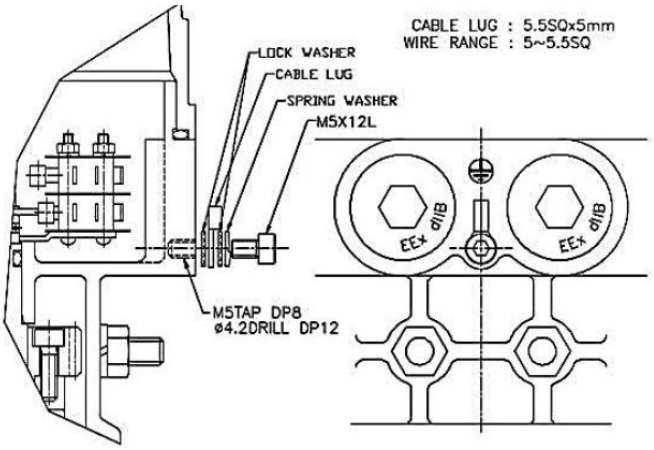


DANGER: ***HAZARDOUS VOLTAGE. Electrical power must not be connected until all wiring and limit switch adjustments have been completed.***

12 GROUNDING

ELA80 - 100 Grounding

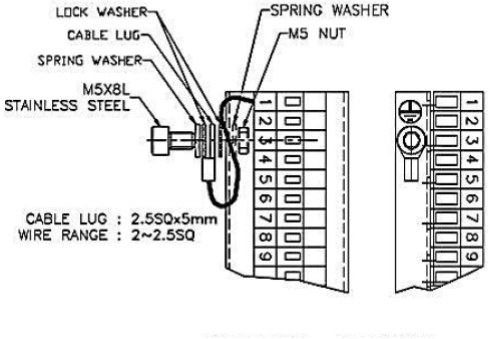


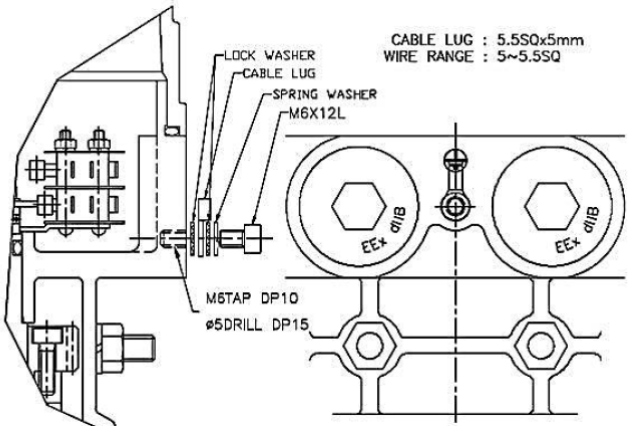


Internal Ground **External Ground**

Terminal Block #1 should be used for internal ground

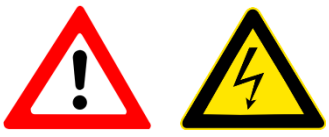
ELA150 - 3000 Grounding





Internal Ground **External Ground**

Terminal Block #1 should be used for internal ground



DANGER:

Flameproof Enclosure! Before opening, ensure that there is no explosive gas or voltage

If you have questions about this product,
Please contact the nearest ECON distributor.
You can find them on www.eriks.com

ERIKS Flow Control

Cypresbaan 63,
2908 LT Capelle aan den IJssel,
The Netherlands

Phone: +31 88 855 81 00