EMPX operators

Installation & maintenance information

EATON CROUSE-HINDS SERIES

IF 1857

SAVE THESE INSTRUCTIONS FOR FUTURE REFERENCE

APPLICATION

EMPX barrel assemblies include pilot lights, pushbutton switches, illuminated pushbutton switches, selector switches and combinations. They are used in control stations, panels and enclosures used in areas made hazardous due to the presence of flammable vapors, gases or combustible dusts.

UL application details:

Identification:	Class I, Division 1, Groups B, C, D Class II, Division 1, Groups E, F, G Class III
Certificate:	E10593
Ambient temperature range:	-50°C to +60°C
Thread:	3/4" x 14 NPSM
Required threads (Class I):	Eight (8) full threads engaged
Required threads (Class II and III): T	Three (3) full threads engaged
Ingress protection:	Type 4X
Storage temperature in original packaging:	-20°C to +50°C

IMPORTANT NOTE

When EMPX devices are to be installed in Crouse-Hinds equipment, refer to Installation Instruction Sheet that came with that equipment for proper installation.

IECEx and ATEX application details:

Identification:	Ex II 2G Ex db IIC Gb Ex II 2D Ex tb IIIC Db
Certificates:	Sira 18ATEX1236U IECEx CSA 18.0027U
Ambient temperature range:	-50°C to +60°C
Thread:	3/4" x 14 NPSM
Required threads (EN 60079 1):	Five (5) threads engaged (3/4" NPSM)
Required threads (EN 60079 31):	3.7mm (3/4" NPSM)
Ingress Protection:	IP66W (salt spray)
Storage temperature in original packaging:	-20°C to +50°C

APPLICABLE STANDARDS

- UL1203 Standard for Explosionproof and Dust-ignitionproof Electrical Equipment for use in Hazardous (Classified) Locations
- UL50 Enclosures for Electrical Equipment
- UL508 Standard for Industrial Control Equipment
- CSA C22.2 No. 25-1966 Enclosures for use in Class II, Groups E, F, G Hazardous Locations
- CSA C22.2 No. 30-M1986 Explosionproof Enclosures for use in Class I Hazardous Locations
- CSA C22.2 No. 94-M91 Special Purpose Enclosures Industrial Products
- CSA C22.2 No. 14-13 Industrial Control Equipment
- EN 60079-1 / IEC 60079-1
- EN 60079-31 / IEC 60079-31

TECHNICAL DATA

This product is not intended to be used alone. The electrical apparatus or systems to which it is being incorporated require certification as a whole when intended for use in explosive atmospheres. The 3/4" NPSM thread joint of this product, and the thread of the equipment to which it is being incorporated, must have a female 3/4" NPSM thread attending the requirements for threaded joints.

ELECTRICAL SPECIFICATIONS

PUSHBUTTONS:

Rated voltage	U_i 500V	
Rated current	I_{th} 10A	
Breaking capacity for AC 15	**Voltage** 220V 380V 500V	**Current** 10A 7.5A 5A
Breaking capacity for DC 13	**Voltage** 24V 60V 110V 220V	**Current** 2.75A 1.10A 0.55A 0.27A

ILLUMINATED PUSHBUTTONS:

CONTACT BLOCK INFORMATION

Rated voltage	U_i 500V	
Rated current	I_{th} 6A	
Contacts for AC 15	**Voltage** 250V	**Current** 6A
Contacts for DC 13	**Voltage** 24 VDC	**Current** 3A

PILOT LIGHTS:

LED SOCKET

12V / 24V / 120V	**240 VAC**	**480 VAC**
Rated voltage: 250 VAC/VDC	Rated voltage: 240 VAC	Rated voltage: 480 VAC
Maximum power: 2.6W	Maximum power: 2.6W	Maximum power: 2.6W

NOTE: Verify that LED marked rating matches the socket before replacement.

ROTARY SWITCHES:

Breaking capacity for AC		**Rated current 20A**
AC-3	220-240V	3.0 kW
	380-440V	5.5 kW
AC-15	220-240V	5A
	380-440V	4A
AC-22A	220-240V	20A
	380-440V	20A
AC-23A	220-240V	3.7 kW
	380-440V	7.5 kW

Breaking capacity for DC	**Rated current 20A**			
	24V	**48V**	**60V**	**110V**
Resistive loads T<1ms	20A	12A	4.5A	1A
Inductive loads T=50ms	12A	2A	1A	0.4A

Rated voltage	690V
Rated current	20A
Max. no. contact chambers	6

MOUNTING INSTRUCTIONS

⚠ WARNING

To avoid fire or explosion, operators must be used within their ratings, and installed by a qualified technician.

This product may not be used alone and should be installed in equipment with the appropriate type of protection, and using the procedures described below to ensure its degree of ingress protection.

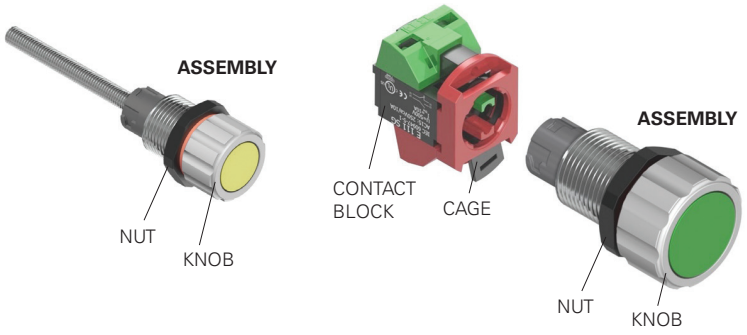
⚠ CAUTION

To maintain environmental ratings, operators shall be installed in the horizontal position; vertical position (facing up) is not permitted. Additionally, extra precaution shall be taken if operators are stored outdoors in the vertical position.

To install the product correctly, follow the steps below:

PUSHBUTTONS (for reset pushbuttons, omit Steps 1 and 6):

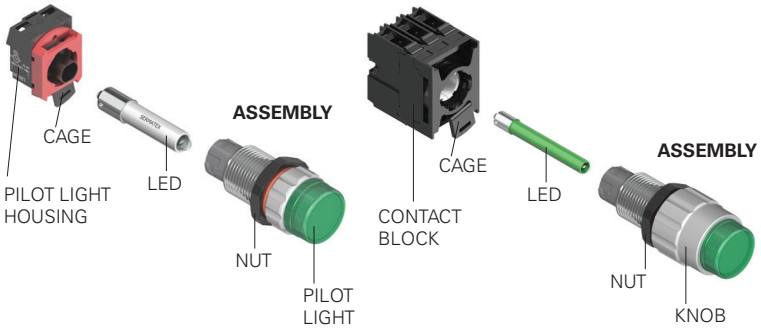
1. Disconnect the contact block from the assembly by sliding the cage locking tab clockwise.
2. Remove the nut and protective sleeve from the threaded body.
3. Place the legend plate under the knob, or attach to the enclosure.
4. Make sure the operator threads and surface being attached to are clean and free of debris. Apply STL thread lubricant and screw the pushbutton assembly into the enclosures 3/4" NPSM threaded entry and torque 27 in.-lbs. to 53 in.-lbs. (3 N-m to 6 N-m). Ensure legend plate is held in place to prevent rotation.
5. Install the nut onto the assembly threaded body and torque to 18 in.-lbs. (2 N-m) with an appropriate tool.
6. Installing the contact block to the assembly:
   a. With the cage locking tab held in the clockwise position, align the assembly channel with the locking cage ID tabs on the contact block and slide the block onto the assembly.
   b. Finally move the cage tab counterclockwise to lock switch in place.
   c. Verify orientation of block is such that control wires won't be directed into flame path of cover/body.



After performing the connections described above, the product can be safely used, and the ingress of protection is assured.

PILOT LIGHTS AND ILLUMINATED PUSHBUTTONS:

1. Disconnect the contact/terminal block from the assembly by sliding the cage locking tab clockwise.
2. Install LED into terminal block.
3. Remove the nut and protective sleeve from the threaded body.
4. Place the legend plate under the knob, or attach to the enclosure.
5. Make sure the operator threads and surface being attached to are clean and free of debris. Apply STL thread lubricant and screw the pushbutton assembly into the enclosures 3/4" NPSM threaded entry and torque to 27 in.-lbs. to 53 in.-lbs. (3 N-m to 6 N-m).
6. Install the nut onto the assembly threaded body and torque to 18 in.-lbs. (2 N-m) with an appropriate tool.
7. Installing the contact block to the assembly:
   a. With the cage locking tab oriented in the bottom, ensure it is slid to the left position.
   b. Align the assembly channel with the locking cage ID tabs on the contact block and slide the block onto the assembly.
   c. Finally move the cage tab counterclockwise to lock switch in place.
   d. Verify orientation of block is such that control wires won't be directed into flame path of cover/body.

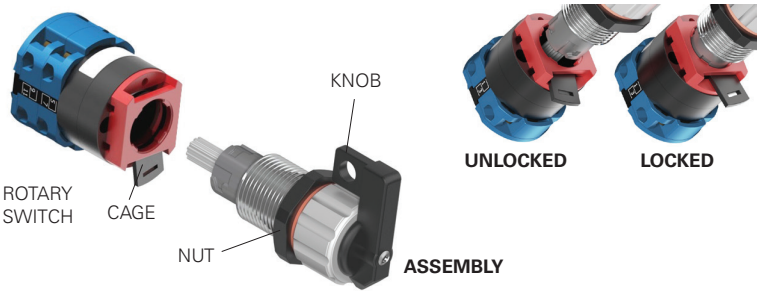


After performing the connections described above, the product can be safely used, and the ingress protection is assured.

ROTARY SWITCHES:

1. Disconnect the rotary switch from the switch assembly by sliding the cage locking tab clockwise.
2. Remove the nut and protective sleeve from the threaded body.
3. Place the legend plate under the rotary knob, or attach to the enclosure.
4. Make sure the operator threads and surface being attached to are clean and free of debris. Apply STL thread lubricant and screw the rotary knob into the enclosures 3/4" NPSM threaded entry and torque to 27 in.-lbs. to 53 in.-lbs. (3 N-m to 6 N-m).
5. Align the rotary knob pointer to the legend plate.
6. Install the nut onto the switch assembly threaded body, but do not tighten yet.
7. Installing the rotary switch to the switch assembly:
   a. With the cage locking tab held in the clockwise position, align the assembly channel with the locking cage ID tabs on the rotary switch and slide onto the assembly.
   b. Apply pressure to the rotary switch while rotating the knob handle until the splined shaft aligns and drops into place.
   c. Move the cage tab counterclockwise to lock switch in place.
   d. If the knob pointer is misaligned from the legend plate markings, the switch assembly may need to be rotated by threading the assembly in or out while maintaining the 27 in.-lbs. to 53 in.-lbs. (3 N-m to 6 N-m) torque requirement.
   e. Torque nut to 18 in.-lbs. (2 N-m) with an appropriate tool.

NOTE: During the cables/wires installation, make sure that no mechanical tension is applied to the rotary switch to avoid any damage.

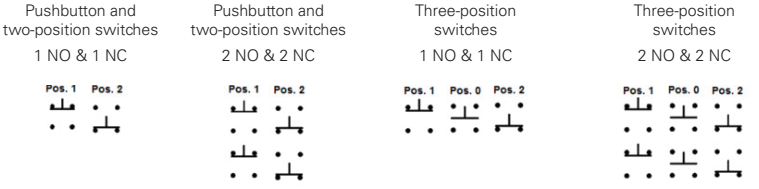


After performing the connections described above, the product can be safely used, and ingress protection is assured.

⚠ CAUTION

To avoid ingress, use of non-Crouse-Hinds legend plates must be verified by user.

TYPICAL CONTACT POSITIONS



WIRE SIZE CHART

The chart below shows the wire size for each type of EMPX devices.

	UL		IECEx and ATEX		
Device type	**Hard wire (up to 2 wires)**	**Flexible cable (up to 2 wires)**	**Hard wire (up to 2 wires)**	**Flexible cable (up to 2 wires)**	**Torque**
Pushbuttons and lights	18 - 13 AWG	20 - 15 AWG	2.5mm^2	1.5mm^2	9 in.-lbs. (1 N-m)
Selector switches	12 AWG	14 AWG	2.5mm^2	2.5mm^2	9 in.-lbs. (1 N-m)

IECEx AND ATEX SPECIAL CONDITIONS FOR SAFE USE

- For flameproof applications, the actuators and signaling elements shall only be installed in Ex db enclosures with maximum internal volume of 35 liters and approved for Group IIC or Ex db enclosures with maximum internal volume of 160 liters and approved for Group IIB + H_2, according to EN60079-1/IEC 60079-1.
- For flameproof applications, the actuators and signaling elements shall only be installed in Ex db enclosures with maximum internal explosion pressure of 20 bar for Group IIC according to EN60079-1/IEC 60079-1.
- The actuators and signaling elements shall only be used for a service temperature range of -50°C to +60°C.
- For flameproof applications, the actuators and signaling elements shall only be threaded in enclosure walls having a minimum length of at least five (5) threads engaged for 3/4" NPSM, according to Table 4 from EN 60079-1/IEC 60079-1. The maximum thickness of the enclosure wall is limited by size (length) of the actuating and signal elements.
- For dustproof applications, the actuators and signaling elements shall only be threaded in enclosure wall having a minimum length of 3.7mm for 3/4" NPSM, and at least two (2) threads engaged according to EN 60079-31. The maximum thickness of the enclosure wall is limited by size (length) of the actuating and signal elements. The elements have to be fixed in the electrical equipment in such a way that rotation and accidental loosening will be prevented.
- For the pilot light and illuminated buttons, the maximum load for LED is 2W.
- The outer molding of the elements has to be tightened according manufacturer's instructions.
- When a locknut is used, care must be taken to ensure that an engagement of two (2) threads is still available for fixing the locknut.
- The manufacturer's instructions for operation must be followed.

STORAGE

Upon receiving the product, the parts must stored in a covered, clean and dry place so that there is no contact between threads of the products.

INSPECTION AND MAINTENANCE

Inspection and maintenance must be performed in accordance with the applicable codes of practice by an appropriately trained person.

REPAIR

A properly trained person shall perform the repair of equipment in accordance with the manufacturer's instructions and applicable codes of practice. Repair/modification must be performed only with manufacturer original parts and should be limited to the replacement of the following parts:

- Gasket
- Contact blocks
- Adapter for circuit breaker
- Power supply module for pilot light
- Color calotte for signaling