

C440/XT Electronic Overload Relay



C440/XT Electronic Overload Relay

Product Description

Eaton's new electronic overload relay (EOL) is the most compact, high-featured, economical product in its class. Designed on a global platform, the new EOL covers the entire power control spectrum including NEMA, IEC and DP contactors. The NEMA and DP versions are offered with the *C440* designation while the IEC offering has the *XT* designation. The electronic design provides reliable, accurate and value driven protection and communications capabilities in a single compact device. It is the flexible choice for any application requiring easy-to-use, reliable protection.

Eaton has a long history of innovations and product development in motor control and protection, including both traditional NEMA, as well as IEC control. It was from this experience that the C440 was developed, delivering new solutions to meet today's demands.

C440 is a self-powered electronic overload relay available up to 175 A as a self contained unit. With external CTs, C440 can protect motor up to 1500 FLA. Available add-on accessories include remote reset capability and communication modules for Modbus RTU, DeviceNet, PROFIBUS, Modbus TCP, EtherNet/IP and HTTP web services all with I/O options.

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Features and Benefits

Features

- Reliable, accurate, electronic motor protection
- Easy to select, install and maintain
- Compact size
- Flexible, intelligent design
- Global product offering—available with NEMA, IEC and DP power control

Size/Range

- Broad FLA range (0.33–1500 A)
- Selectable trip class (10A, 10, 20, 30)
- Direct mounting to NEMA, IEC and DP contactors
- Most compact electronic overload in its class

Motor Control

- Two B600 alarm (NO) and fault (NC) contacts
- Test/Trip button

Motor Protection

- Thermal overload
- Phase loss
- Selectable (ON/OFF) phase imbalance
- Selectable (ON/OFF) ground fault

User Interface

- Large FLA selection dial
- Trip status indicator
- Operating mode LED
- DIP switch selectable trip class, phase imbalance and ground fault
- Selectable Auto/Manual reset

Feature Options

- Remote reset
 - 120 Vac
 - 24 Vac
 - 24 Vdc
- Tamper-proof cover
- Communications modules
 - Modbus RTU RS-485
 - DeviceNet with I/O
 - PROFIBUS with I/O
 - Modbus RTU with I/O
 - Ethernet IP with I/O
 - Modbus TCP with I/O

Benefits

Reliability and Improved Uptime

- C440 provides the users with peace of mind knowing that their assets are protected with the highest level of motor protection and communication capability in its class
- Extends the life of plant assets with selectable motor protection features such as trip class, phase imbalance and ground fault
- Protects against unnecessary downtime by discovering changes in your system (line/load) with remote monitoring capabilities
- Status LED provides added assurance that valuable assets are protected by indicating the overload operational status

Flexibility

- Available with NEMA, IEC and DP contactors
- Improves return on investment by reducing inventory carrying costs with wide FLA adjustment (5:1) and selectable trip class
- Design incorporates built-in ground fault protection thus eliminating the need for separate CTs and modules
- Flexible communication with optional I/O enables easy integration into plant management systems for remote monitoring and control
- Available as an open component and in enclosed control and motor control center assemblies

Monitoring Capabilities

- Individual phase currents RMS
- Average three-phase current RMS
- Thermal memory
- Fault indication (overload, phase loss, phase imbalance, ground fault)

Safety

- IP 20 rated terminal blocks
- Available in Eaton's industry leading FlashGard MCCs
- Tested to the highest industry standards such as UL, CSA, CE and IEC
- RoHS compliant

Standards and Certifications

- UL
- CSA
- CE
- NEMA
- IEC/EN 60947 VDE 0660
- ISO® 13849-1 (EN954-1)
- RoHS
- ATEX directive 94/9/EC
- Equipment Group 2, Category 2

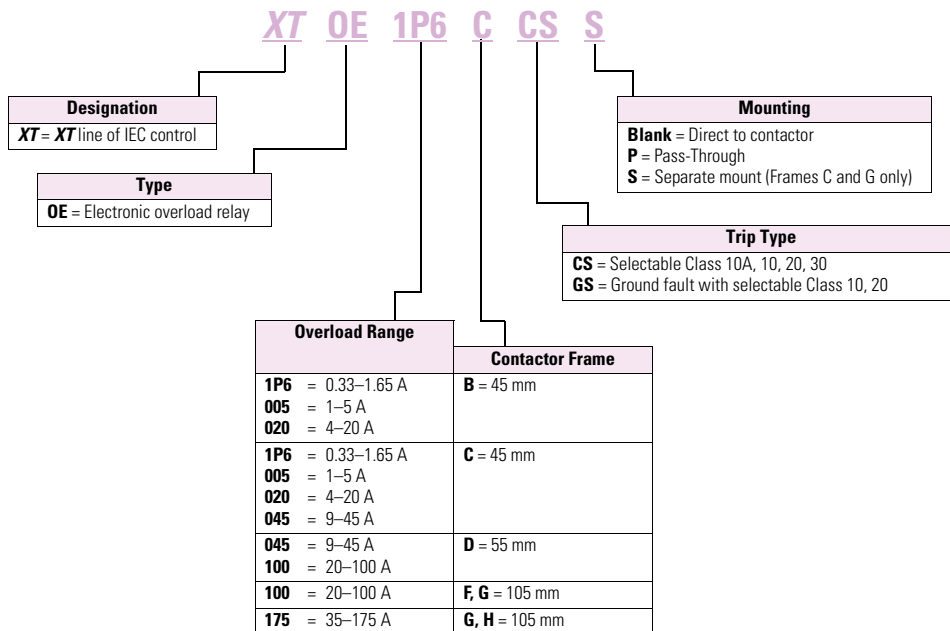


Electronic Overload Education

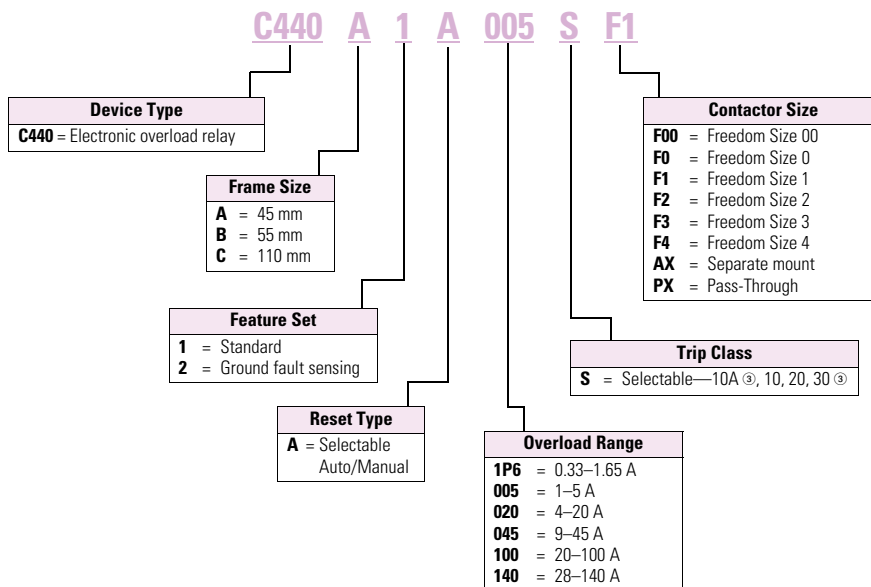
Description	Definition	Cause	Effect if not Protected	C440/XT Protection
Motor Protection				
Thermal overload	Overload is a condition in which current draw exceeds 115% of the full load amperage rating for an inductive motor.	<ul style="list-style-type: none"> • An increase in the load or torque that is being driven by the motor. • A low voltage supply to the motor causes the current to go high to maintain the power needed. • A poor power factor causing above normal current draw. 	<ul style="list-style-type: none"> • Increase in current draw leads to heat and insulation breakdown, which can cause system failure. • Increase in current can increase power consumption and waste valuable energy. 	<ul style="list-style-type: none"> • Thermal trip behavior is defined by UL, CSA and IEC standards. • Trip class is settable from 10A, 10, 20, 30
Ground fault	A line to ground fault.	A current leakage path to ground.	An undetected ground fault can burn through multiple insulation windings, ultimately leading to motor failure, not to mention risk to equipment or personnel	Fixed protective setting that takes the starter offline if ground fault current exceeds 50% of the FLA dial setting, that is, if the FLA dial is set to 12A, the overload relay will trip if the ground current exceeds 6A.
Imbalanced phases (voltage and current)	Uneven voltage or current between phases in a three-phase system.	When a three-phase load is powered with a poor quality line, the voltage per phase may be imbalanced.	Imbalanced voltage causes large imbalanced currents and as a result this can lead to motor stator windings being overloaded, causing excessive heating, reduced motor efficiency and reduced insulation life.	Fixed protective setting that takes the starter offline if a phase drops below 50% of the other two phases.
Phase loss—current (single-phasing)	One of the three-phase voltages is not present.	Multiple causes, loose wire, improper wiring, grounded phase, open fuse, and so on.	Single-phasing can lead to unwanted motor vibrations in addition to the results of imbalanced phases as listed above.	Fixed protective setting that takes the starter offline if a phase drops below 50% of the other two phases.

Catalog Number Selection

XT Electronic Overload Relay—IEC ①



C440 Electronic Overload Relay—NEMA ②



Notes

- ① See Page V5-T5-59 for Product Selection.
- ② See Page V5-T5-61 for Product Selection.
- ③ On non-GF version only.

C440 Electronic Overload Relays

45 mm C440 for Direct Mount



C440 Electronic Overload Relays for Direct Mount to Freedom Series Contactors

For Use with Freedom NEMA Contactor Size	For Use with Contactor ①	Overload Range (Amps)	Standard Feature Set Catalog Number	Standard Feature Set with Ground Fault Catalog Number
00	CN15AN3_B	0.33–1.65	C440A1A1P6SF00	C440A2A1P6SF00
		1–5	C440A1A005SF00	C440A2A005SF00
		4–20	C440A1A020SF00	C440A2A020SF00
0	CN15BN3_B	0.33–1.65	C440A1A1P6SF0	C440A2A1P6SF0
		1–5	C440A1A005SF0	C440A2A005SF0
		4–20	C440A1A020SF0	C440A2A020SF0
1	CN15DN3_B	0.33–1.65	C440A1A1P6SF1	C440A2A1P6SF1
		1–5	C440A1A005SF1	C440A2A005SF1
		4–20	C440A1A020SF1	C440A2A020SF1
		9–45	C440A1A045SF1	C440A2A045SF1
2	CN15GN3_B	1–5	C440A1A005SF2	C440A2A005SF2
		4–20	C440A1A020SF2	C440A2A020SF2
		9–45	C440A1A045SF2	C440A2A045SF2
3	CN15KN3_	20–100	C440B1A100SF3	C440B2A100SF3
4	CN15NN3_	28–140	C440C1A140SF4	C440C2A140SF4

1–5 A OL with CTs



C440 Electronic Overload Relays for use with NEMA Contactors Sizes 5–8

Use CTs and 1–5 A C440 overload relay. CT kit does not include overload relay (order separately).

For Use with NEMA Contactor Size	CT Range (Amps)	Description	CT Kit Catalog Number ②	Terminal Size	Overload Relay Catalog Number
5	60–300	300: 5 panel-mount CT kit with integrated, pass through holes	ZEB-XCT300	750 kcmil (2) 250 kcmil 3/0 Cu/Al	C440A1A005SAX
6	120–600	600: 5 panel-mount CT kit with integrated, pass through holes	ZEB-XCT600	(2) 750 kcmil 3/0 Cu/Al	C440A1A005SAX
7	200–1000	1000: 5 panel-mount CT kit with integrated, pass through holes	ZEB-XCT1000	(3) 750 kcmil 3/0 Cu/Al	C440A1A005SAX
8	300–1500	1500: 5 panel-mount CT kit with integrated, pass through holes	ZEB-XCT1500	(4) 750 kcmil 1/0 Cu/Al	C440A1A005SAX

45 mm C440 for Separate Mount



C440 Electronic Overload Relays for Separate Mount

Overload Range	Frame Size	Overload Relay Catalog Number	Overload Relay with Ground Fault Catalog Number
0.33–1.65	45 mm	C440A1A1P6SAX	C440A2A1P6SAX
1–5		C440A1A005SAX	C440A2A005SAX
4–20		C440A1A020SAX	C440A2A020SAX
9–45		C440A1A045SAX	C440A2A045SAX
20–100	55 mm	C440B1A100SAX	C440B2A100SAX
28–140	110 mm	C440C1A140SAX	C440C2A140SAX

C440 Electronic Overload Relays for Pass-Through Design

Overload Range	Frame Size	Overload Relay Catalog Number	Overload Relay with Ground Fault Catalog Number
28–140	110 mm	C440C1A140SPX	C440C2A140SPX
35–175		XTOE175GCSP	XTOE175GGSP

Notes

- ① CN15 contactor listed is non-reversing with a 120 Vac coil. For more options, see Tab 2 in this volume, section 2.1.
- ② ZEB kits are not recommended for use with C440 overload relays with ground fault option.