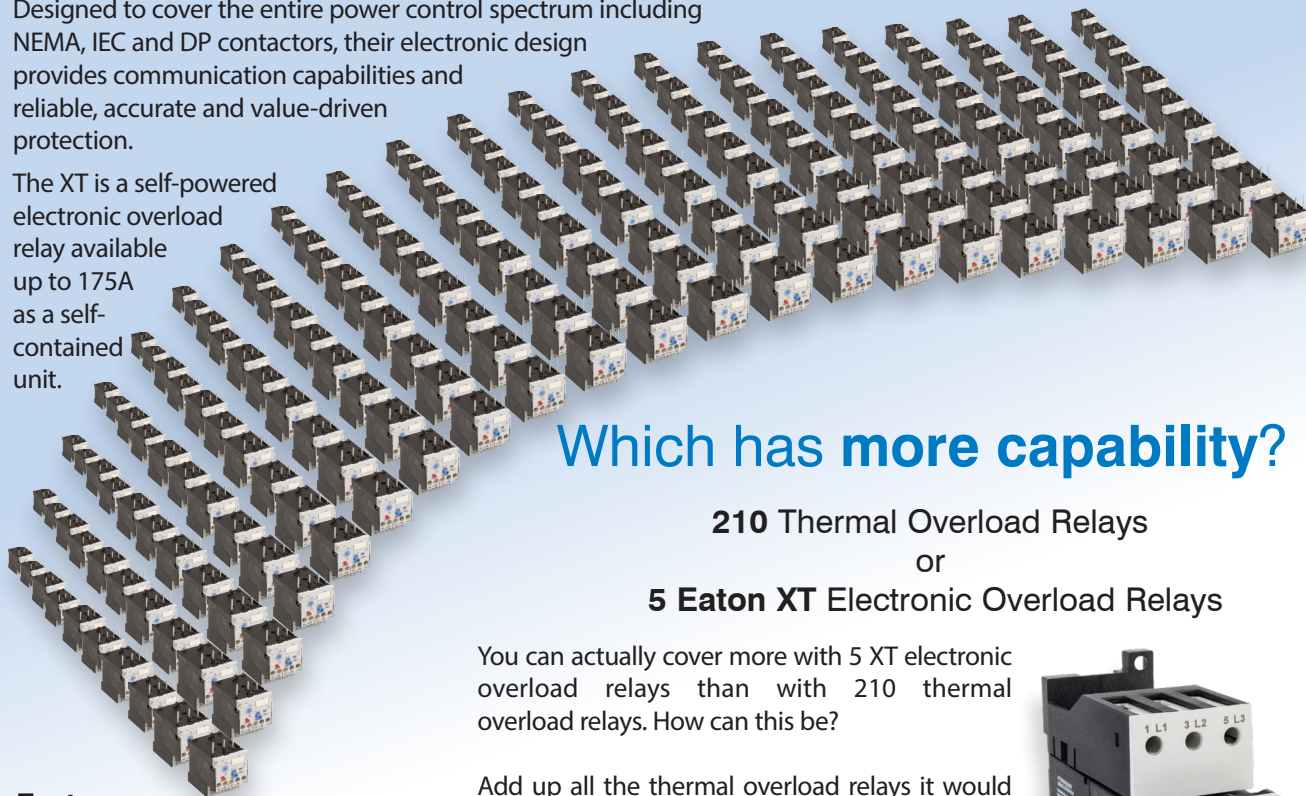


# Eaton XT Electronic Overload Relays

Our new Eaton XT electronic overload relays (EOL) are the most compact, high-featured, economical products in their class.

Designed to cover the entire power control spectrum including NEMA, IEC and DP contactors, their electronic design provides communication capabilities and reliable, accurate and value-driven protection.

The XT is a self-powered electronic overload relay available up to 175A as a self-contained unit.



## Which has more capability?

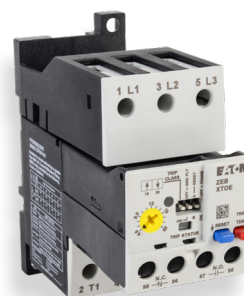
210 Thermal Overload Relays

or

5 Eaton XT Electronic Overload Relays

You can actually cover more with 5 XT electronic overload relays than with 210 thermal overload relays. How can this be?

Add up all the thermal overload relays it would take to cover 0.3 to 100 amps, class 10, class 20, class 30, and class 10A with automatic and manual reset. It would take 214 different thermal overload relays!



### Features:

- Enhanced motor protection
- Flexible design
- Predictive indication
- Separate mounting for use with any contactor
- Self-powered, no control power needed
- Integral current sensing and electronics save money and valuable panel space
- Selectable trip classes for variable or high inertia loads

Eaton's XT electronic overload relays allow you to select these options right on the face of every overload relay. Imagine the amount of applications you can cover with just a handful of inventory.

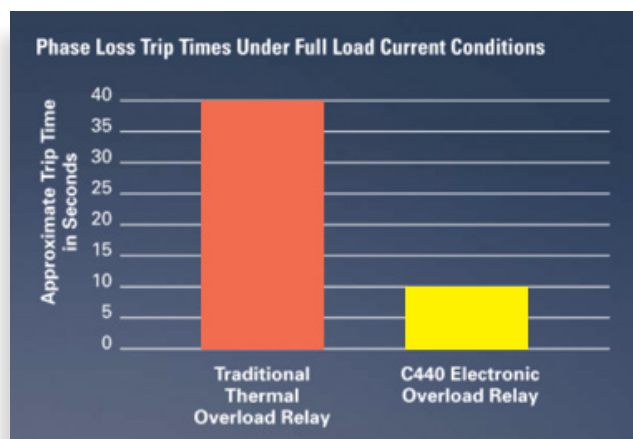
## Make life simple!

Choose **Eaton XT Electronic Overload Relays**

## Enhanced Protection

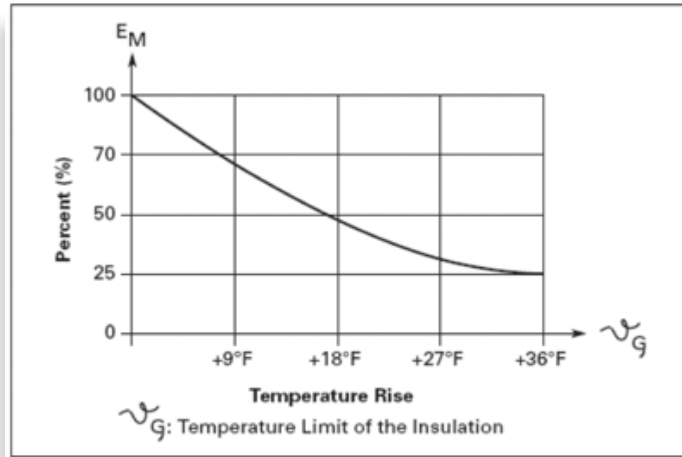
### The superiority of electronic overload relays versus traditional thermal overload relays:

- Faster response time under phase loss and phase unbalance conditions
- Increased motor life due to thermal modeling design
- Common design for single-phase and three-phase applications



# Eaton XT Electronic Overload Relays

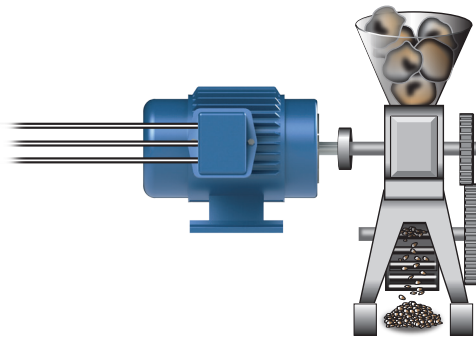
**Protect your valuable assets - Increase Motor Life through better thermal protection**



An increase of just 18 °F above the thermal limit will reduce motor life by 50%.

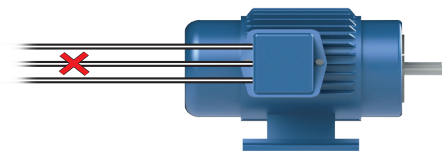
This graph shows the reduction in average life of a motor,  $E_M$ , when the winding is continuously overheated.

## Applications



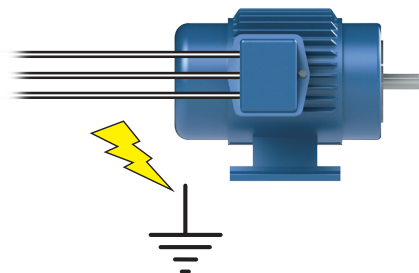
### Selectable trip classes for variable or high inertia loads

- Conveyors
- Crushers / Grinders
- Mixers



### Unbalance / Phase Lose Protection

- Blown fuses
- Single phasing
- Loose connections
- Stator turn to turn faults



### Ground Fault Protection

- Moisture in submersible pumps, wells, freezers
- Damaged insulation in mobile / flexing applications

### Integral Ground Fault Protection

- The C440 has built-in ground protection capabilities eliminating the need to purchase and install separate CTs and ground fault modules
- Integral design reduces inventory, speeds up installation time and delivers physical space savings

# Eaton XT Series Electronic Overload Relays



## Electronic Overload Relays up to 175A

**XT0E1P6CCSS****XT0E1P6CGSS****XT0E175GCSS**

### Description

Eaton's new electronic overload relays (EOL) are the most compact, high-featured, economical products in their class.

Designed with a global platform in mind, the new EOL line covers the entire power control spectrum including NEMA, IEC and DP contactors. The NEMA and DP versions are offered with the IEC 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.

The XT is a self-powered electronic overload relay available up to 175A as a self-contained unit. Accessories include remote reset capability.

### Features

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

### Size/Range

- Broad FLA range (0.33 –175A)
- Selectable trip class (10A, 10, 20, 30)
- Separate mounting to NEMA, IEC and DP contactors
- Compact electronic overload

### Motor Protection

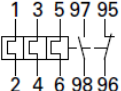
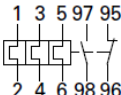
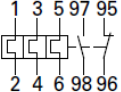
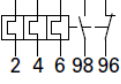
- Thermal overload
- Phase loss
- Selectable (ON/OFF) phase imbalance
- Selectable (ON/OFF) ground fault

### Standards and Certifications

- UL File E1230
- CSA File 156828 or 000353\_0\_000
- CE Directives, RoHS, LVD, EMC, ATEX



### Eaton XT Series Electronic Overload Relays for Separate Mount

| Part Number                 | Price    | Amperage Adjustment Range (A) | Power Pole (Wire) Connections | Mounting                | Ground Fault Protection | Contact Sequence                                                                      | Frame Size      |
|-----------------------------|----------|-------------------------------|-------------------------------|-------------------------|-------------------------|---------------------------------------------------------------------------------------|-----------------|
| <a href="#">XTOE1P6CCSS</a> | \$102.00 | 0.33-1.65                     | Stand-alone connections       | DIN rail or panel mount | No                      |  | 45mm [1.77 in]  |
| <a href="#">XTOE005CCSS</a> | \$131.00 | 1-5                           |                               |                         |                         |                                                                                       | 55mm [2.17 in]  |
| <a href="#">XTOE020CCSS</a> | \$131.00 | 4-20                          |                               |                         |                         |                                                                                       |                 |
| <a href="#">XTOE045CCSS</a> | \$147.00 | 9-45                          |                               |                         |                         |                                                                                       |                 |
| <a href="#">XTOE100GCSS</a> | \$166.00 | 20-100                        |                               |                         |                         |                                                                                       |                 |
| <a href="#">XTOE175GCSS</a> | \$218.00 | 35-175                        |                               |                         |                         |                                                                                       |                 |
| <a href="#">XTOE175GCSP</a> | \$226.00 | 35-175                        | Pass-through connections      | Panel mount             |                         |  | 110mm [4.33 in] |
| <a href="#">XTOE1P6CGSS</a> | \$129.00 | 0.33-1.65                     | Stand-alone connections       | DIN rail or panel mount | Yes                     |  | 45mm [1.77 in]  |
| <a href="#">XTOE005CGSS</a> | \$137.00 | 1-5                           |                               |                         |                         |                                                                                       |                 |
| <a href="#">XTOE020CGSS</a> | \$137.00 | 4-20                          |                               |                         |                         |                                                                                       |                 |
| <a href="#">XTOE045CGSS</a> | \$153.00 | 9-45                          |                               |                         |                         |                                                                                       |                 |
| <a href="#">XTOE100GGSS</a> | \$180.00 | 20-100                        |                               |                         |                         | 55mm [2.17 in]                                                                        |                 |
| <a href="#">XTOE175GGSP</a> | \$245.00 | 35-175                        | Pass-through connections      | Panel mount             |                         |  | 110mm [4.33 in] |

# Eaton XT Series Electronic Overload Relays



## Electronic Overload Relays up to 175A

| Electrical Ratings                              |                                                     |                |                      |
|-------------------------------------------------|-----------------------------------------------------|----------------|----------------------|
| Frame size                                      | 45mm (1.77 in)                                      | 55mm (2.17 in) | 110mm (4.33 in)      |
| Operating Voltage (3-phase)                     | 690VAC                                              |                |                      |
| Frequency                                       | 60/50 Hz                                            |                |                      |
| FLA Range                                       | 0.33-1.65 A<br>1-5 A<br>4-20 A<br>9-45 A            | 20-100 A       | 28-140 A<br>35-175 A |
| Trip Class                                      | 10A, 10, 20, 30 selectable (10, 20 ground fault)    |                |                      |
| Thermal Overload Setting                        | 1.05xFLA: does not trip<br>1.15xFLA: overload trip  |                |                      |
| Phase Loss                                      | Fixed threshold 50%                                 |                |                      |
| Phase Unbalance<br>(Selectable: enable/disable) | Fixed threshold 50%                                 |                |                      |
| Ground Fault<br>(Selectable: enable/disable)    | 50% of FLA dial setting<br>>150%=2sec<br>>250%=1sec |                |                      |
| Reset                                           | Manual/automatic                                    |                |                      |
| Insulation Voltage $U_i$ (three-phase)          | 690VAC                                              |                |                      |
| Insulation Voltage $U_i$ (control)              | 500VAC                                              |                |                      |
| Rated Impulse Withstand Voltage                 | 6000VAC                                             |                |                      |
| Overvoltage Category/Pollution Degree           | III/3                                               |                |                      |

| Indicators            |                                                                                                                  |                |                 |
|-----------------------|------------------------------------------------------------------------------------------------------------------|----------------|-----------------|
| Frame size            | 45mm (1.77 in)                                                                                                   | 55mm (2.17 in) | 110mm (4.33 in) |
| Trip status indicator | Orange flag                                                                                                      |                |                 |
| Mode LED              | Flashing (0.5 Hz): Overload operating properly<br>Flashing (1Hz): Current is above FLA dial setting—pending trip |                |                 |

| Options                               |                |                |                 |
|---------------------------------------|----------------|----------------|-----------------|
| Frame size                            | 45mm (1.77 in) | 55mm (2.17 in) | 110mm (4.33 in) |
| Remote Reset Option                   | Yes            |                |                 |
| Reset Bar Option                      | Yes            |                |                 |
| Communication Expansion Module Option | Yes            |                |                 |

| Terminal Capacity and Torque                                                                |                                                                     |                                  |                                    |
|---------------------------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------|------------------------------------|
| Frame size                                                                                  | 45mm (1.77 in)                                                      | 55mm (2.17 in)                   | 110mm (4.33 in)                    |
| Load Terminals Capacity                                                                     | 12-10 AWG (4-6 mm <sup>2</sup> )<br>8-6 AWG (6-16 mm <sup>2</sup> ) | 6-1 AWG (16-50 mm <sup>2</sup> ) | 8-4/0 AWG (10-95 mm <sup>2</sup> ) |
| Load Terminals Tightening Torque                                                            | 20-25 lb•in [2.3-2.8 N•m]<br>25-30 lb•in [28-3.4 N•m]               | 25-30 lb•in [28-3.4 N•m]         | 124 lb•in [14 N•m]                 |
| Input, Auxiliary Contact and Remote Reset Terminals Capacity<br>(C440-XCOM and ZEB-XRR-120) | 2x 18-12 AWG                                                        |                                  |                                    |
| Input Terminals Tightening Torque<br>(C440-XCOM and ZEB-XRR-120)                            | 7-11 lb•in [0.8-1.2 N•m]                                            |                                  |                                    |

# Eaton XT Series

## Electronic Overload Relays



Electronic Overload Relays up to 175A

| Auxiliary and Control Circuit Ratings                         |        |
|---------------------------------------------------------------|--------|
| Conventional Thermal Continuous Current                       | 5A     |
| Rated Operational Current (IEC AC-15) - Make Contact (1800VA) |        |
| 120V                                                          | 15A    |
| 240V                                                          | 15A    |
| 415V                                                          | 0.5 A  |
| 500V                                                          | 0.5A   |
| Rated Operational Current (IEC AC-15) - Break Contact (180VA) |        |
| 120V                                                          | 1.5 A  |
| 240V                                                          | 1.5 A  |
| 415V                                                          | 0.9 A  |
| 500V                                                          | 0.8 A  |
| Rated Operational Current (IEC DC-13) - L/R F 15ms            |        |
| 0-250 V                                                       | 1.0 A  |
| Rated Operational Current (UL B600) - Make Contact (3600VA)   |        |
| 120V                                                          | 30A    |
| 240V                                                          | 15A    |
| 480V                                                          | 7.5 A  |
| 600V                                                          | 6A     |
| Rated Operational Current (UL B600) - Break Contact (360VA)   |        |
| 120V                                                          | 3A     |
| 240V                                                          | 1.5 A  |
| 480V                                                          | 0.75 A |
| 600V                                                          | 0.6 A  |
| Rated Operational Current (UL R300) - VDC Ratings (28VA)      |        |
| 0-120 V                                                       | 0.22 A |
| 250V                                                          | 0.11 A |

| Short-Circuit Rating Without Welding |                |
|--------------------------------------|----------------|
| Maximum Fuse                         | 6A Class CC, J |

| Environmental Ratings                                                |                                       |
|----------------------------------------------------------------------|---------------------------------------|
| Ambient Temperature (operating)                                      | -13 to 149°F (-25 to 65°C)            |
| Ambient Temperature (storage)                                        | -40 to 185°F (-40 to 85°C)            |
| Operating Humidity UL 991 (H3)                                       | 5% to 95% non-condensing              |
| Altitude (No Derating) NEMA ICS1                                     | 2000m [6561.6 ft]                     |
| Shock (IEC 60068-2-27)                                               | 15g any direction                     |
| Vibration (IEC 60068-2-6)                                            | 3g any direction                      |
| Pollution Degree Per IEC 60947-4-1                                   | 3 for product (2 for PCB)             |
| Ingress Protection                                                   | IP20                                  |
| Protection Against Direct Contact When Actuated From Front (IEC 536) | Finger and back-of-hand proof         |
| Mounting Position                                                    | Any                                   |
| Climatic Proofing                                                    | Damp heat, constant to IEC 60068-2-30 |



# Eaton XT Series Electronic Overload Relays



## Electronic Overload Relays up to 175A

| Electrical / EMC                                                                                 |                                                                                                                                                                                                                              |
|--------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Radiated Emissions</b><br>IEC 60947-4-1-Table 15<br>EN 55011 (CISPR 11) Group 1, Class A, ISM | 30-1000 MHz                                                                                                                                                                                                                  |
| <b>Conducted Emissions</b><br>IEC 60947-4-1-Table 14<br>EN 55011 (CISPR 11) Group 1; Class ISM   | 0.15-30 MHz                                                                                                                                                                                                                  |
| <b>ESD Immunity</b><br>IEC 60947-4-1 (Table 13)                                                  | ±8kV air, ±6kV contact                                                                                                                                                                                                       |
| <b>Radiated Immunity</b><br>IEC 60947-4-1<br>IEC 61000-4-3                                       | 10 V/m 80-1000 MHz<br>3 V/m from 1.4-2.7 GHz<br>80% amplitude modulated<br>1 kHz sine wave                                                                                                                                   |
| <b>Conducted Immunity</b><br>IEC 60947-4-1, IEC 61000-4-6                                        | 140 dB (10 V rms)<br>150 kHz – 100 MHz                                                                                                                                                                                       |
| <b>Fast Transient Immunity</b><br>IEC 60947-4-1 (Table 13)<br>IEC 61000-4-4                      | ±4kV using direct method with accessory installed in expansion bay<br>±2kV using direct method                                                                                                                               |
| <b>Surge Immunity</b><br>IEC 60947-4-1 (Table 13)<br>IEC 61000-4-5 a Class 4                     | Three-phase power inputs: ±4kV line-to-line (DM); ±4kV line-to-ground (CM)<br>With accessory installed in expansion bay: ±2kV line-to-line (DM) → 1.2/50µs;<br>2kV line-to-earth, 1kV line-to-line; ±4kV line-to-ground (CM) |
| <b>Power Freq. Magnetic Field Immunity</b><br>IEC 60947-4-1, IEC 61000-4-8                       | 30A/m, 50Hz                                                                                                                                                                                                                  |
| <b>Electromagnetic Field</b><br>IEC 60947-4-1 Table 13, IEC 61000-4-3                            | 10V/m                                                                                                                                                                                                                        |
| <b>Distortion IEEE 519</b>                                                                       | 5% THD max., 5th harmonic 3% max.                                                                                                                                                                                            |
| <b>Electrostatic Discharge (ESD)</b><br>IEC 61000-4-2, EN 61131-2                                | 4kV contact<br>8kV air discharge                                                                                                                                                                                             |
| <b>Electrical Fast Transient (EFT)</b><br>IEC 61000-4-4, EN 61131-2                              | ±2kV using direct method                                                                                                                                                                                                     |
| <b>Surge Immunity</b><br>IEC 61000-4-5, EN 61131-2                                               | ±2kV line-to-ground (CM)                                                                                                                                                                                                     |

| Agency Approvals |                                                                  |
|------------------|------------------------------------------------------------------|
| <b>UL</b>        | E1230                                                            |
| <b>CSA</b>       | 156828 or 000353_0_000 (Class 3211-03)                           |
| <b>CE</b>        | 2014/35/EU LVD, 2014/30/EU EMC, 2014/34/EU ATEX, 2011/65/EU RoHS |

# Eaton XT Series Electronic Overload Relays



## Electronic Overload Relays up to 175A

### Short Circuit Ratings (North America CSA, cUL)

Changes to UL 508A and NEC in recent years have brought a focus on control panel safety with regard to short-circuit current ratings (SCCR). The SCCR data in this document reflects the latest information as of April 2010.

| Short-Circuit Rating Without Welding |                           |                                   |                                   |                              |                               |           |                                      |                                   |           |                      |
|--------------------------------------|---------------------------|-----------------------------------|-----------------------------------|------------------------------|-------------------------------|-----------|--------------------------------------|-----------------------------------|-----------|----------------------|
| Overload FLA Range                   | Maximum Operating Voltage | Standard-Fault Short Circuit Data |                                   |                              | High-Fault Short Circuit Data |           |                                      | Thermal-Magnetic Circuit Breakers |           |                      |
|                                      |                           | 600V (kA)                         | Maximum Fuse Size (A) (Class RK5) | Maximum Breaker Size (A)     | 480V (kA)                     | 600V (kA) | Maximum Fuse Size (Class J, CC, RK5) | 480V (kA)                         | 600V (kA) | Maximum Breaker Size |
| 0.33–1.65 A                          | 600VAC                    | 1                                 | 6                                 | 15                           | —                             | —         | —                                    | —                                 | —         | —                    |
| 1–5 A                                |                           | 5                                 | 20                                | 20                           | 100                           | 100       | 30                                   | 100                               | 35        | 20                   |
| 4–20 A                               |                           | 5                                 | 80                                | 80                           | 100                           | 100       | 100                                  | 100                               | 35        | 80                   |
| 9–45 A                               |                           | 5                                 | 175                               | 175                          | 100                           | 100       | 100                                  | 100                               | 35        | 100/175 (480/600)    |
| 20–100 A                             |                           | 10                                | 400                               | 400                          | 100                           | 100       | 200                                  | 150                               | 35        | 250/400 (480/600)    |
| 35–175 A                             |                           | 10                                | 400                               | 350 (690VAC)<br>320 (415VAC) | 100                           | 100       | 400                                  | 100 (415VAC)                      | —         | 350<br>320           |

| Electronic Overload Education                  |                                                                                                                     |                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                 |                                                                                                                                                                                                                             |
|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                                    | Definition                                                                                                          | Cause                                                                                                                                                                                                                                                                                         | Effect if not Protected                                                                                                                                                                                         | XT Protection                                                                                                                                                                                                               |
| <b>Motor Protection</b>                        |                                                                                                                     |                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                 |                                                                                                                                                                                                                             |
| <b>Thermal Overload</b>                        | 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"> <li>An increase in the load or torque that is being driven by the motor.</li> <li>A low voltage supply to the motor causes the current to go high to maintain the power needed.</li> <li>A poor power factor causing above normal current draw.</li> </ul> | <ul style="list-style-type: none"> <li>Increase in current draw leads to heat and insulation breakdown, which can cause system failure.</li> <li>Increase in current can increase power consumption.</li> </ul> | <ul style="list-style-type: none"> <li>Thermal trip behavior is defined by UL, CSA and IEC standards.</li> <li>Trip class is settable from 10A, 10, 20, 30.</li> </ul>                                                      |
| <b>Ground Fault</b>                            | 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. |
| <b>Unbalanced Phases (Voltage and Current)</b> | 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 unbalanced.                                                                                                                                                                                         | Unbalanced voltage causes large unbalanced 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.                                                                                                                 |
| <b>Phase Loss – Current (Single-Phasing)</b>   | One of the three-phase voltages is not present.                                                                     | Multiple causes, loose wire, improper wiring, grounded phase, open fuse, etc.                                                                                                                                                                                                                 | Single-phasing can lead to unwanted motor vibrations in addition to the results of unbalanced phases as listed above.                                                                                           | Fixed protective setting that takes the starter offline if a phase is lost.                                                                                                                                                 |

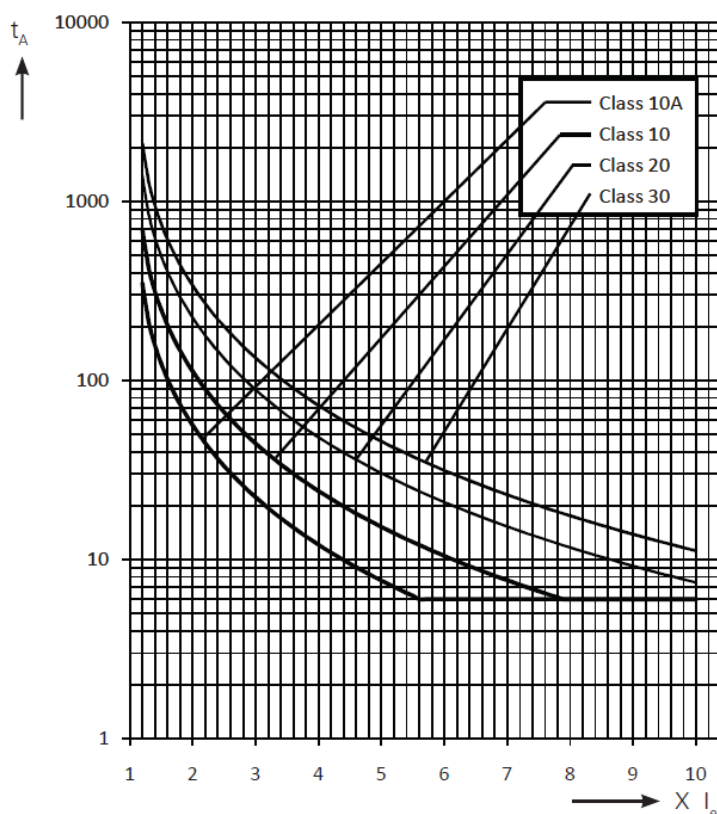
# Eaton XT Series Electronic Overload Relays



Electronic Overload Relays up to 175A

Tripping characteristics, 1- and 3-phase XTOE

10A, 10, 20, 30



| Class      | $t_A$ (s) |      |      |      |      |      |      | $=X I_e$ |
|------------|-----------|------|------|------|------|------|------|----------|
|            | 3         | 4    | 5    | 6    | 7.2  | 8    | 10   |          |
| <b>30</b>  | 133.5     | 72.5 | 45.7 | 31.4 | 21.7 | 17.5 | 11.2 |          |
| <b>20</b>  | 89.0      | 48.3 | 30.4 | 21.0 | 14.5 | 11.7 | 7.5  |          |
| <b>10</b>  | 44.5      | 24.2 | 15.2 | 10.5 | 7.2  | 6.0  | 6.0  |          |
| <b>10A</b> | 22.3      | 12.1 | 7.6  | 6.0  | 6.0  | 6.0  | 6.0  |          |

$t_{A(s)}$  = time (seconds)

$X_{I_e}$  = multiple of FIA

Please see our website [www.AutomationDirect.com](http://www.AutomationDirect.com) for complete engineering drawings.



# Eaton XT Series

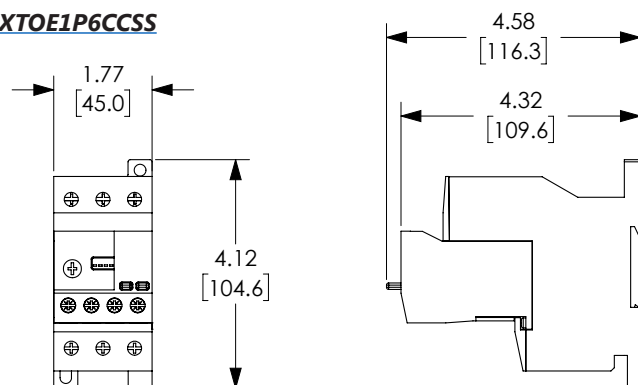
## Electronic Overload Relays



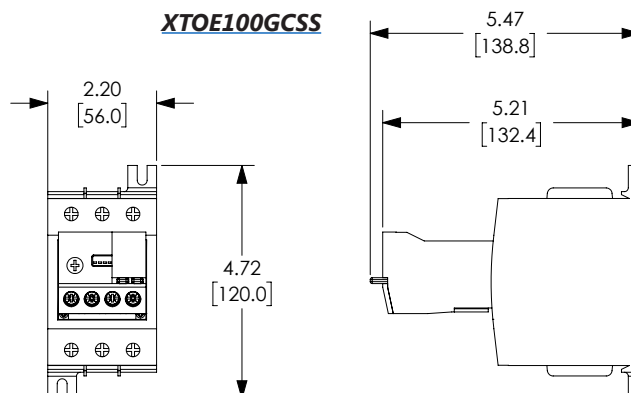
Electronic Overload Relays up to 175A

### Dimensions (inches [mm])

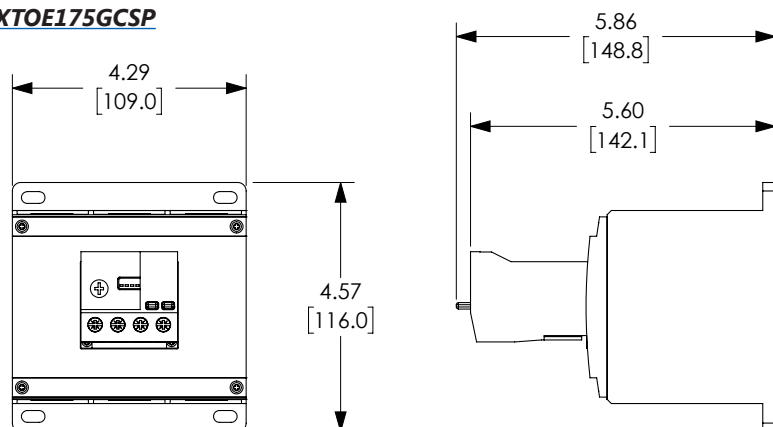
#### **XTOE1P6CCSS**



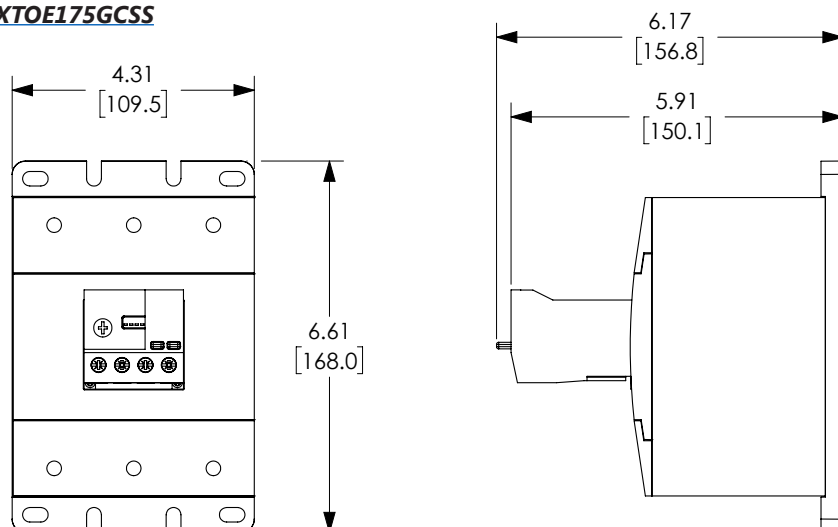
#### **XTOE100GCSS**



#### **XTOE175GCSP**



#### **XTOE175GCSS**



Please see our website [www.AutomationDirect.com](http://www.AutomationDirect.com) for complete engineering drawings.

# Eaton XT Series Electronic Overload Relays



## Electronic Overload Relays up to 175A

### Optional Modules



**C440-XCOM**



**ZEB-XRR-120**

Electronic Remote Reset is accomplished with 24VDC (C440-XCOM) or 120VAC (ZEB-XRR-120) accessory options. These expansion modules plug into the expansion bay on the XT overload relays, enabling remote reset. The C440-XCOM module can also accomplish basic communication with accessories purchased from Eaton, not sold by [AutomationDirect.com](http://AutomationDirect.com).

Users can add a remote mounted reset button to reset the module.

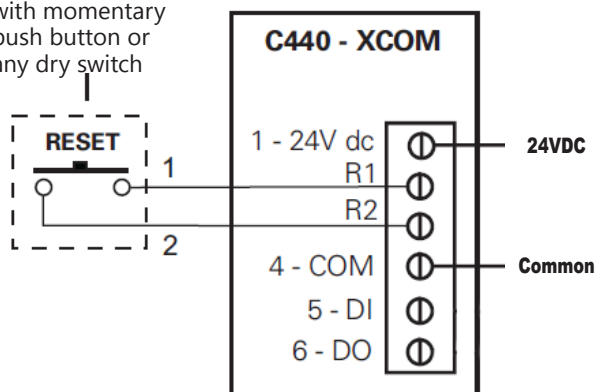
### Optional Modules

| Part Number        | Price   | Description                                                                                                   |
|--------------------|---------|---------------------------------------------------------------------------------------------------------------|
| <b>C440-XCOM</b>   | \$55.00 | Eaton communication expansion module, adds remote reset ability for the Eaton XT series electronic overloads. |
| <b>ZEB-XRR-120</b> | \$70.00 | Eaton remote reset module for use with XT series electronic overloads.                                        |

### Wiring Diagrams

#### C440-XCOM

Remote Reset with momentary push button or any dry switch



#### ZEB-XRR-120

