25–60A, Single- and Three-Phase—A25, B25

Contents

25–60A, Single- and Three-Phase—A25, B25

Product Description

A25 and B25 Definite Purpose Starters from Eaton's Electrical Sector combine the features and flexibility of the C25 Definite Purpose Contactors and Freedom Series Bi-metallic Ambient Compensated Overload Relays mounted on a common mounting plate.

Features and Benefits

Overload Relay

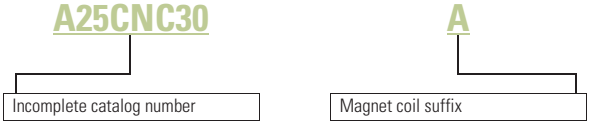
- Selectable manual or automatic reset operation
- Interchangeable heater packs adjustable ±24% to match motor FLA and calibrated for use with 1.0 and 1.15 service factor motors
- Class 10 or 20 heater packs
- Bimetallic, ambient compensated operated. Trip free mechanism
- Electrically isolated NO-NC contacts (pull RESET button to test)
- Overload trip indication
- Shrouded or fingerproof terminals to reduce possibility of electrical shock
- Single-phase sensitivity

Standards and Certifications

- UL Recognized Components UL File #E-1491, Guide NLDX2
- CSA Certified Components File #LR353, Guide 380W-1.14 Class 3211 04

Catalog Number Selection

25–60A, Single- and Three-Phase—A25, B25



When Ordering Specify

- Catalog number plus magnet coil suffix, see **Page V5-T4-24** Example, order catalog number A25CNC30**A**
- Heater packs for specific FLA of motor, see **Pages V5-T4-26** and **V5-T4-27**

Product Selection

A25 Starter

Single- and Three-Phase Starters—Open Type

Ampere Rating			Maximum Motor (hp)		Maximum Motor (kW)		Single-Phase ①②		Three-Phase ①	
							Common Control	Separate Control	Common Control	Separate Control
Inductive Full Load	Line Voltage	Locked Rotor	Single-Phase	Three-Phase	Single-Phase	Three-Phase	Catalog Number ③	Catalog Number ③	Catalog Number ③	Catalog Number ③
25	115	150	2	—	1.5	—	**B25CNC25_**	**B25SNC25_**	**A25CNC25_**	**A25SNC25_**
	230	150	3	7-1/2	2.2	5.5	**B25CNC25_**	**B25SNC25_**	**A25CNC25_**	**A25SNC25_**
	460	125	—	10	—	7.5	**B25CNC25_**	**B25SNC25_**	**A25CNC25_**	**A25SNC25_**
	575	100	—	10	—	7.5	**B25CNC25_**	**B25SNC25_**	**A25CNC25_**	**A25SNC25_**
30	115	180	2	—	1.5	—	**B25CNC30_**	**B25SNC30_**	**A25CNC30_**	**A25SNC30_**
	230	180	5	10	3.7	7.5	**B25CNC30_**	**B25SNC30_**	**A25CNC30_**	**A25SNC30_**
	460	150	—	15	—	11	**B25CNC30_**	**B25SNC30_**	**A25CNC30_**	**A25SNC30_**
	575	120	—	15	—	11	**B25CNC30_**	**B25SNC30_**	**A25CNC30_**	**A25SNC30_**
40	115	240	3	—	2.2	—	**B25CNE40_**	**B25SNE40_**	**A25CNE40_**	**A25SNE40_**
	230	240	7-1/2	10	5.5	7.5	**B25CNE40_**	**B25SNE40_**	**A25CNE40_**	**A25SNE40_**
	460	200	—	20	—	15	**B25CNE40_**	**B25SNE40_**	**A25CNE40_**	**A25SNE40_**
	575	160	—	20	—	15	**B25CNE40_**	**B25SNE40_**	**A25CNE40_**	**A25SNE40_**
50	115	300	—	—	—	—	**N/A**	**N/A**	**A25CNE50_**	**A25SNE50_**
	230	300	—	15	—	11	**N/A**	**N/A**	**A25CNE50_**	**A25SNE50_**
	460	250	—	30	—	22	**N/A**	**N/A**	**A25CNE50_**	**A25SNE50_**
	575	200	—	30	—	22	**N/A**	**N/A**	**A25CNE50_**	**A25SNE50_**
60	115	360	—	—	—	—	**N/A**	**N/A**	**A25CNE60_**	**A25SNE60_**
	230	360	—	20	—	15	**N/A**	**N/A**	**A25CNE60_**	**A25SNE60_**
	460	300	—	40	—	30	**N/A**	**N/A**	**A25CNE60_**	**A25SNE60_**
	575	240	—	40	—	30	**N/A**	**N/A**	**A25CNE60_**	**A25SNE60_**

Magnet Coil Suffix

Voltage 60 Hertz	50 Hertz	Coil Suffix
AC ④		
12	12	**R**
24	24	**T**
110–120 ⑤	110–120 ⑤	**A**
208–240	208–240	**B**
240 ⑥	220	**J**
277	—	**H**
—	380–415	**L**
440–480	440–480	**C**
550–600	550–600	**D**

Voltage 60 Hertz	Coil Suffix
DC ⑦	
12	**1R**
24	**1T**
48	**1W**
120	**1A**

Notes

① Starters do not include heater packs. Select heater pack from tables, see **Pages V5-T4-26** and **V5-T4-27**.
② Set of three heater packs required for single-phase applications.
③ Incomplete catalog number. Replace underscore (_) with magnet coil suffix from table above.
④ Class H AC coils available as option for 15A–50A contactor. Add **2** before AC coil suffix letter.
⑤ 104–120V 50/60 Hz for 60A contactor.
⑥ Available through 50A.
⑦ Starters with DC coils include an early breaking auxiliary contact, C320KGD1. See **Page V5-T4-62** for more detail.

Overload Relay

General

Overload relays are provided to protect motors, motor control apparatus and motor-branch circuit conductors against excessive heating due to motor overloads and failure to start. This definition does not include: 1) motor circuits over 600 volts, 2) short-circuits, 3) ground faults and 4) fire pump control. (NEC Art. 430-31)

Time Current Characteristics

The time-current characteristics of an overload relay is an expression of performance which defines its operating time at various multiples of its current setting. Tests are run at Underwriters Laboratory (UL) in accordance with NEMA Standards and the NEC.

UL requires—

- When tested at 100 percent of its current rating, the overload relay shall trip ultimately
- When tested at 200 percent of its current rating, the overload relay shall trip in not more than 8 minutes
- When tested at 600 percent of its current rating, the overload relay shall trip in not more than 10 or 20 seconds, depending on the Class of the relay or heater packs

"Current Rating" is defined as the minimum current at which the relay will trip. Per NEC, an overload must ultimately trip at 125% of FLA (Full Load Amperes) current (heater) setting for a 1.15 service factor motor and 115% FLA for a 1.0 service factor motor. "Current Setting" is defined as the FLA of the motor and thus the overload heater pack setting.

Example: 600% of current rating is defined as 750% (600 x 1.25) of FLA current (heater) setting for a 1.15 service factor motor. A 10 ampere heater setting must trip in 20 seconds or less at 75 amperes motor current for a Class 20 relay.

Overload Relay Setting

FLA Dial Adjustment—

For motors having a 1.15 service factor, rotate the FLA adjustment dial to correspond to the motor's FLA rating. Estimate the dial position when the motor FLA falls between two letter values as shown in the example.

For motors having a 1.0 service factor, rotate the FLA dial single-half position counterclockwise (CCW).

Manual/Automatic Reset—

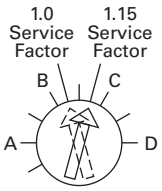
The overload relay is factory set at M for manual reset operation. For automatic reset operation, turn the reset adjustment dial to the A position as shown in the illustration.

Automatic reset is not intended for two-wire control devices.

Test for Trip Indication—

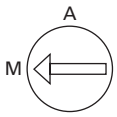
To test overload relay for trip indication when in manual reset, pull out the blue RESET button. An orange flag will appear indicating that the device has tripped. Push RESET button in to reset.

FLA Dial Adjustment



Example of 12.0 FLA setting for heater pack number H2011B showing position for 1.0 or 1.15 service factor motors.

Reset Adjustment Dial



Example of setting for manual reset.

Replacement Overload with Connectors

Starter Size	Overload Part Number
25 and 30A	**10-7125**
40 and 50A	**10-7132**
60A	**10-7131**

Accessories

Contactor Accessories, see **Pages V5-T4-11** and **V5-T4-12**.

Locking Cover for Overload Relay

Snap-on transparent or opaque plastic panel for covering access port to the overload relay trip setting dial—helps prevent accidental or unauthorized changes to trip and reset setting.

Locking Cover

Locking Cover for Overload Relay

Description	Minimum Order Quantity (Std. Pkg.)	Catalog Number
Clear cover, no accessibility	50	**C320PC3**
Gray cover, no accessibility, with auto only nib	50	**C320PC4**
Gray cover, no accessibility, with manual only nib	50	**C320PC5**
Gray cover with FLA dial accessibility, A, B, C, D positions and auto only nib	50	**C320PC6**
Gray cover with FLA dial accessibility, A, B, C, D positions and manual only nib	50	**C320PC7**

Separate Enclosures

Separate Enclosures—NEMA 1

Application	Catalog Number
25 and 30A	**C799B11**
40, 50 and 60A	**C799B13**

Heater Packs

Fast Trip—Class 10 Heater Packs

Manual or Automatic Reset

Heater packs are shipped three to a carton.
Catalog numbers listed below are for three heater packs.

Fast Trip Ratings

Motor Full Load Ampere Rating ① Dial Position A	B	C	D	Catalog Number ② (Includes Three Heater Packs)
0.26	0.313	0.367	0.42	**H2101B-3**
0.384	0.464	0.543	0.623	**H2102B-3**
0.57	0.688	0.806	0.924	**H2103B-3**
0.846	1.02	1.2	1.37	**H2104B-3**
1.28	1.55	1.83	2.1	**H2105B-3**
1.92	2.33	2.74	3.15	**H2106B-3**
2.3	2.79	3.28	3.77	**H2107B-3**
3.38	4.1	4.82	5.54	**H2108B-3**
4.96	6.03	7.09	8.16	**H2109B-3**
7.07	8.58	10.1	11.6	**H2110B-3**
9.6	11.2	12.8	14.4	**H2111B-3**
14.4	17.5	20.7	23.8	**H2112B-3**
18.7	21.8	25	28.1	**H2113B-3**
23.5	27.3	31	34.8	**H2114B-3**
28.3	32.6	37	41.3	**H2115B-3**
36.6	42.3	48.1	53.8	**H2116B-3**
53.8	60.8	67.9	74.9	**H2117B-3**

Trip Curves, see **Page V5-T4-28**.

Notes

① For motor full load amperes between listed values, adjust dial clockwise for higher or counter-clockwise for lower motor currents. The currents listed are for 1.5 service factor motors. A position adjustment is provided for 1.0 service factor motors.

② Set of three heater packs are required for both single- and three-phase applications.

Standard Trip—Class 20 Heater Packs

Manual or Automatic Reset

Heater packs are shipped three to a carton.
Catalog numbers listed below are for three heater packs.

Standard Trip Ratings

Motor Full Load Ampere Rating ① Dial Position A	B	C	D	Catalog Number ② (Includes Three Heater Packs)
0.254	0.306	0.359	0.411	**H2001B-3**
0.375	0.452	0.53	0.607	**H2002B-3**
0.56	0.676	0.791	0.907	**H2003B-3**
0.814	0.983	1.15	1.32	**H2004B-3**
1.2	1.45	1.71	1.96	**H2005B-3**
1.79	2.16	2.53	2.9	**H2006B-3**
2.15	2.6	3.04	3.49	**H2007B-3**
3.23	3.9	4.56	5.23	**H2008B-3**
4.55	5.5	6.45	7.4	**H2009B-3**
6.75	8.17	9.58	11	**H2010B-3**
9.14	10.8	12.4	14	**H2011B-3**
14	16.9	19.9	22.8	**H2012B-3**
18.7	22.7	26.7	30.7	**H2013B-3**
23.5	28.5	33.5	38.5	**H2014B-3**
29	34	39.1	44.1	**H2015B-3**
39.6	45.5	51.5	57.4	**H2016B-3**
53.9	60.9	67.9	74.9	**H2017B-3**

Trip Curves, see **Page V5-T4-28**.

Technical Data and Specifications

Terminal Wire Sizes

Line Side (Contactor) ③

Terminal Type	Wire Range—Solid or Stranded Power Terminals	Coil Terminals
Screw/pressure plate	8–14 AWG	12–16 AWG
Box lug: 25–50A	4–14 AWG	12–16 AWG
Box lug: 60A	3–14 AWG	12–16 AWG

Power Terminals—Load—Cu Only (Stranded or Solid)

Terminal	Range	Torque Rating
25 and 30A	14–6 AWG	20 lb-in (14–10 AWG)
40, 50 and 60A	14–2 AWG	35 lb-in (14–10 AWG) 40 lb-in (8 AWG) 45 lb-in (6–4 AWG) 50 lb-in (3–2 AWG)
Control Terminals—Cu Only		
12–16 AWG stranded, 12–14 AWG solid		

Notes

① For motor full load amperes between listed values, adjust dial clockwise for higher or counter-clockwise for lower motor currents. The currents listed are for 1.5 service factor motors. A position adjustment is provided for 1.0 service factor motors.

② Set of three heater packs are required for both single- and three-phase applications.

③ Line side (contactor) torque ratings can be found on **Page V5-T4-14**.

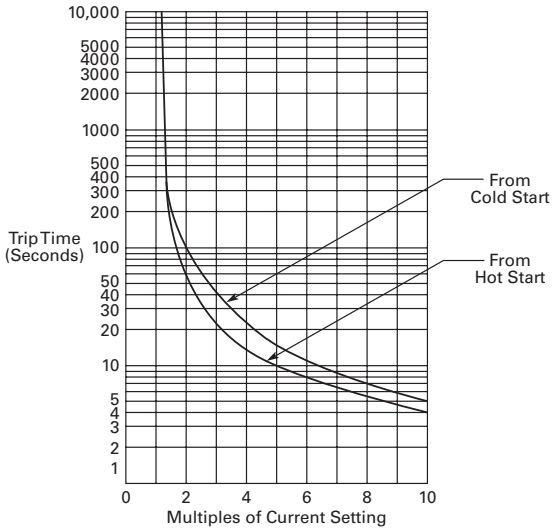
Overload Relay UL/CSA Contact Ratings Control Circuit

AC Volts	120V	240V	480V	600V
NC Contact B600				
Make and break	30A	15A	7.5A	6A
Break	3A	1.5A	0.75A	0.6A
Continuous	5A	5A	5A	5A
NO Contact C600				
Make and break	15A	7.5A	3.375A	3A
Break	1.5A	0.75A	0.375A	0.3A
Continuous	2.5A	2.5A	2.5A	2.5A

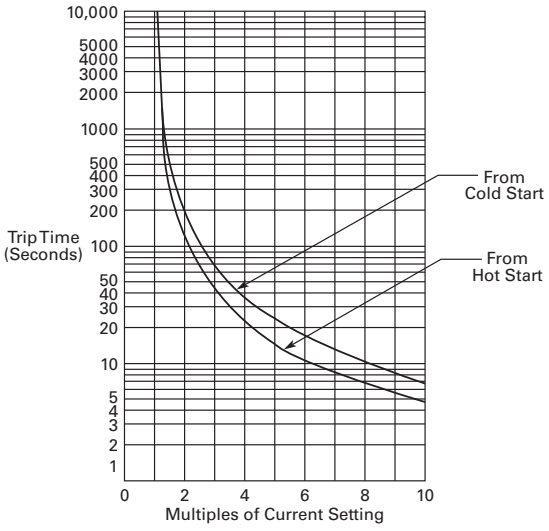
Trip Curves

Bimetallic Ambient Compensated Overload Relay—25°C Open Rating

Class 10 Overload Relay

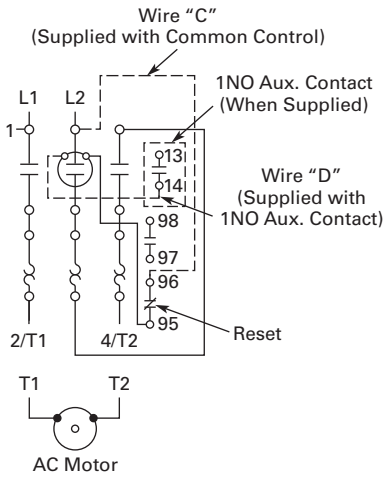


Class 20 Overload Relay

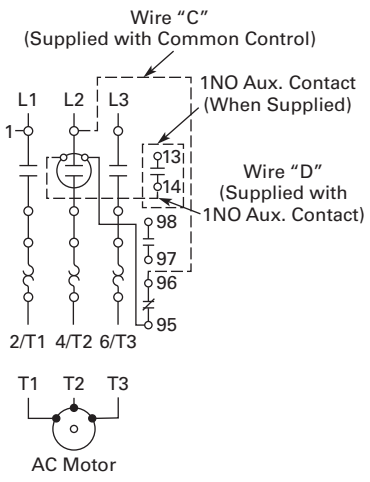


Wiring Diagrams

Single-Phase Connections



Three-Phase Connections

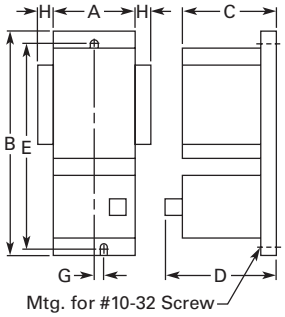


Dimensions

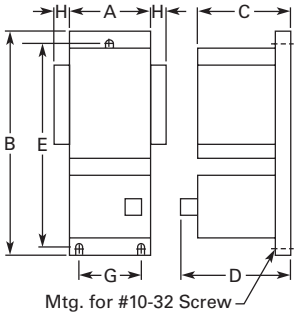
Approximate Dimensions in Inches (mm)

A25 and B25 Starers—Open Type

25 and 30 Ampere



40, 50 and 60 Ampere



Dimensions and Shipping Weights

Ampere Size	Wide A	High B	Deep C	Deep D	Mounting E	Mounting G	Auxiliary Contact Adder H	Shipping Weight Lbs (kg)
25 and 30	2.50 (64.0)	7.14 (181.0)	3.56 (90.4)	3.69 (93.7)	6.55 (166.0)	0.20 (5.1)	0.54 (13.7)	1.8 (0.8)
40	2.56 (65.0)	8.08 (205.0)	3.50 (89.0)	3.66 (93.0)	7.50 (190.5)	2.00 (51.0)	0.54 (13.7)	1.8 (0.8)
50 and 60	2.56 (65.0)	8.08 (205.0)	4.15 (105.0)	3.66 (93.0)	7.50 (190.5)	2.00 (51.0)	0.54 (13.7)	3.6 (1.6)

15–45A, Single- and Three-Phase—A27, B27

Contents

15–45A, Single- and Three-Phase—A27, B27

Product Description

A27 and B27 Definite Purpose Starters from Eaton's Electrical Sector combine the features and flexibility of the C25 Definite Purpose Contactors and ***XT*** Series Bi-metallic Ambient Compensated Overload Relays.

Features and Benefits

- Selectable manual or automatic reset operation
- Class 10 trip class
- Bimetallic, ambient compensated operated. Trip free mechanism
- Electrically isolated NO-NC contacts (pull TEST button to test)
- Shrouded or fingerproof terminals to reduce possibility of electrical shock
- Single-phase sensitivity

Standards and Certifications

- UL Recognized Components UL File #E-1491, Guide NLDX2
- CSA Certified Components File #LR353, Guide 3 80W-1.14 Class 3211 04
- IEC/EN 60947
- VDE 0660
- UL
- CSA
- CE

Catalog Number Selection

15–45A, Single- and Three-Phase—A27, B27

A27CNE30	A	040
Incomplete catalog number	Magnet coil suffix	Overload relay suffix

When Ordering Specify

- Catalog number plus magnet coil suffix plus overload relay suffix, see **Page V5-T4-32**
  Example, order catalog number A27CNE30**A040**

Product Selection

A27 Starter

Three-Phase Starter—Open Type

Ampere Rating					Common Control		Separate Control	
					Metal Mounting Plate	DIN Rail Adapter	Metal Mounting Plate	DIN Rail Adapter
Inductive Full Load	Line Voltage	Locked Rotor	Maximum Motor (hp)	Maximum Motor (kW)	Catalog Number ①	Catalog Number ①	Catalog Number ①	Catalog Number ①
15	115	90	—	—	**A27CNC15_**	**A27CRC15_**	**A27SNC15_**	**A27SRC15_**
	230	90	3	2.2	**A27CNC15_**	**A27CRC15_**	**A27SNC15_**	**A27SRC15_**
	460	75	5	3.7	**A27CNC15_**	**A27CRC15_**	**A27SNC15_**	**A27SRC15_**
	575	60	5	3.7	**A27CNC15_**	**A27CRC15_**	**A27SNC15_**	**A27SRC15_**
25	115	150	—	—	**A27CNC25_**	**A27CRC25_**	**A27SNC25_**	**A27SRC25_**
	230	150	7-1/2	5.5	**A27CNC25_**	**A27CRC25_**	**A27SNC25_**	**A27SRC25_**
	460	125	10	7.5	**A27CNC25_**	**A27CRC25_**	**A27SNC25_**	**A27SRC25_**
	575	100	10	7.5	**A27CNC25_**	**A27CRC25_**	**A27SNC25_**	**A27SRC25_**
30	115	180	—	—	**A27CNE30_**	**A27CRE30_**	**A27SNE30_**	**A27SRE30_**
	230	180	10	7.5	**A27CNE30_**	**A27CRE30_**	**A27SNE30_**	**A27SRE30_**
	460	150	15	11	**A27CNE30_**	**A27CRE30_**	**A27SNE30_**	**A27SRE30_**
	575	120	15	11	**A27CNE30_**	**A27CRE30_**	**A27SNE30_**	**A27SRE30_**
40	115	240	—	—	**A27CNE40_**	**A27CRE40_**	**A27SNE40_**	**A27SRE40_**
	230	240	10	7.5	**A27CNE40_**	**A27CRE40_**	**A27SNE40_**	**A27SRE40_**
	460	200	20	15	**A27CNE40_**	**A27CRE40_**	**A27SNE40_**	**A27SRE40_**
	575	160	20	15	**A27CNE40_**	**A27CRE40_**	**A27SNE40_**	**A27SRE40_**
45	115	270	—	—	**A27CNE45_**	**A27CRE45_**	**A27SNE45_**	**A27SRE45_**
	230	270	15	11	**A27CNE45_**	**A27CRE45_**	**A27SNE45_**	**A27SRE45_**
	460	225	30	22	**A27CNE45_**	**A27CRE45_**	**A27SNE45_**	**A27SRE45_**
	575	180	30	22	**A27CNE45_**	**A27CRE45_**	**A27SNE45_**	**A27SRE45_**

Note

① Incomplete catalog number. Replace underscore (_) with magnet coil suffix and overload relay suffix from **Page V5-T4-32**.

Single-Phase Starter—Open Type, B27

Ampere Rating					Common Control		Separate Control	
					Metal Mounting Plate	DIN Rail Adapter	Metal Mounting Plate	DIN Rail Adapter
Inductive Full Load	Line Voltage	Locked Rotor	Maximum Motor (hp)	Maximum Motor (kW)	Catalog Number ①	Catalog Number ①	Catalog Number ①	Catalog Number ①
15	115	90	3/4	0.4	**B27CNC15_**	**B27CRC15_**	**B27SNC15_**	**B27SRC15_**
	230	90	2	1.5	**B27CNC15_**	**B27CRC15_**	**B27SNC15_**	**B27SRC15_**
	460	75	—	—	**B27CNC15_**	**B27CRC15_**	**B27SNC15_**	**B27SRC15_**
	575	60	—	—	**B27CNC15_**	**B27CRC15_**	**B27SNC15_**	**B27SRC15_**
25	115	150	2	1.5	**B27CNC25_**	**B27CRC25_**	**B27SNC25_**	**B27SRC25_**
	230	150	3	2.2	**B27CNC25_**	**B27CRC25_**	**B27SNC25_**	**B27SRC25_**
	460	125	—	—	**B27CNC25_**	**B27CRC25_**	**B27SNC25_**	**B27SRC25_**
	575	100	—	—	**B27CNC25_**	**B27CRC25_**	**B27SNC25_**	**B27SRC25_**
30	115	180	2	1.5	**B27CNE30_**	**B27CRE30_**	**B27SNE30_**	**B27SRE30_**
	230	180	5	3.7	**B27CNE30_**	**B27CRE30_**	**B27SNE30_**	**B27SRE30_**
	460	150	—	—	**B27CNE30_**	**B27CRE30_**	**B27SNE30_**	**B27SRE30_**
	575	120	—	—	**B27CNE30_**	**B27CRE30_**	**B27SNE30_**	**B27SRE30_**
40	115	240	3	2.2	**B27CNE40_**	**B27CRE40_**	**B27SNE40_**	**B27SRE40_**
	230	240	7-1/2	5.5	**B27CNE40_**	**B27CRE40_**	**B27SNE40_**	**B27SRE40_**
	460	200	—	—	**B27CNE40_**	**B27CRE40_**	**B27SNE40_**	**B27SRE40_**
	575	160	—	—	**B27CNE40_**	**B27CRE40_**	**B27SNE40_**	**B27SRE40_**
45	115	270	3	2.2	**B27CNE45_**	**B27CRE45_**	**B27SNE45_**	**B27SRE45_**
	230	270	7-1/2	7.5	**B27CNE45_**	**B27CRE45_**	**B27SNE45_**	**B27SRE45_**
	460	225	—	—	**B27CNE45_**	**B27CRE45_**	**B27SNE45_**	**B27SRE45_**
	575	180	—	—	**B27CNE45_**	**B27CRE45_**	**B27SNE45_**	**B27SRE45_**

Magnet Coil Suffix

Voltage 60 Hertz	50 Hertz	Coil Suffix
AC ②		
12	12	**R**
24	24	**T**
110–120	110–120	**A**
208–240	208–240	**B**
240 ③	220	**J**
277	—	**H**
—	380–415	**L**
440–480	440–480	**C**
550–600	550–600	**D**

Voltage 60 Hertz	Coil Suffix
DC ④	
12	**1R**
24	**1T**
48	**1W**
120	**1A**

Overload Relay Suffix

Motor Full Load Amperes	Suffix Code	For use with Contactor Ampere Range
Frame C		
0.1–0.16	**P16**	15–25A
0.16–0.24	**P24**	15–25A
0.24–0.4	**P40**	15–25A
0.4–0.6	**P60**	15–25A
0.6–1	**001**	15–25A
1–1.6	**1P6**	15–25A
1.6–2.4	**2P4**	15–25A
2.4–4	**004**	15–25A
4–6	**006**	15–25A
6–10	**010**	15–25A
10–16	**016**	15–25A
16–24	**024**	15–25A
24–32	**032**	15–25A
Frame D		
6–10	**010**	30–45A
10–16	**016**	30–45A
16–24	**024**	30–45A
24–40	**040**	30–45A
40–57	**057**	30–45A

Notes

① Incomplete catalog number. Replace underscore (_) with magnet coil suffix and overload relay suffix from tables above.

② Class H AC coils available as option. Add **2** before AC coil suffix letter.

③ Available through 45A.

④ Starters with DC coils include an early breaking auxiliary contact, C320KGD1. See **Page V5-T4-62** for more detail.

Renewal Parts

Overload Relays

Motor Full Load Amperes	Suffix Code	For use with Contactor Ampere Range	Overload Relay Catalog Number
Frame C			
0.1–0.16	**P16**	15–25A	**XTOBP16CC1DP**
0.16–0.24	**P24**	15–25A	**XTOBP24CC1DP**
0.24–0.4	**P40**	15–25A	**XTOBP40CC1DP**
0.4–0.6	**P60**	15–25A	**XTOBP60CC1DP**
0.6–1	**001**	15–25A	**XTOB001CC1DP**
1–1.6	**1P6**	15–25A	**XTOB1P6CC1DP**
1.6–2.4	**2P4**	15–25A	**XTOB2P4CC1DP**
2.4–4	**004**	15–25A	**XTOB004CC1DP**
4–6	**006**	15–25A	**XTOB006CC1DP**
6–10	**010**	15–25A	**XTOB010CC1DP**
10–16	**016**	15–25A	**XTOB016CC1DP**
16–24	**024**	15–25A	**XTOB024CC1DP**
24–32	**032**	15–25A	**XTOB032CC1DP**
Frame D			
6–10	**010**	30–45A	**XTOB010DC1DP**
10–16	**016**	30–45A	**XTOB016DC1DP**
16–24	**024**	30–45A	**XTOB024DC1DP**
24–40	**040**	30–45A	**XTOB040DC1DP**
40–57	**057**	30–45A	**XTOB057DC1DP**

Technical Data and Specifications

Terminal Wire Sizes

Line Side (Contactor) ①	Wire Range—Solid or Stranded	
Terminal Type	**Power Terminals**	**Coil Terminals**
Screw/pressure plate	8–14 AWG	12–16 AWG
Box lug: 15–45A	4–14 AWG	12–16 AWG

Power Terminals—Load—Cu Only (Stranded or Solid)

Terminal	Range	Torque Rating
15 and 25A	14–8 AWG	16 lb-in (14–8 AWG)
30, 40 and 45A	14–2 AWG	31 lb-in (14–2 AWG)
Control Terminals—Cu Only		
12–16 AWG stranded, 12–14 AWG solid		

Note

① Line side (contactor) torque ratings can be found on **Page V5-T4-14**.

Overload Relays

These tripping characteristics are the mean values of the spread at 20°C ambient temperature in a cold state.

Tripping time depends on response current. With devices at operating temperature, the tripping time of the overload relay reduces to approximately 25% of the read off value. Specific characteristics for each individual setting range can be found in MN03402001E.

Overload Relays

Description	XTOB … CC1 Specification	XTOB … DC1 Specification
General		
Climatic proofing	Damp heat, constant, to IEC 60068-2-78; Damp heat, cyclic, to IEC 60 068-2-30	Damp heat, constant, to IEC 60068-2-78; Damp heat, cyclic, to IEC 60 068-2-30
Ambient temperature range ①	–25° to 50°C [–13° to 122°F]	–25° to 50°C [–13° to 122°F]
Temperature compensation	Continuous	Continuous
Mechanical shock resistance (IEC/EN 60068-2-27)		
Half-sinusoidal shock 10 ms	10g	10g
Degree of protection	IP20	IP20
Protection against direct contact when actuated from front (IEC 536)	Finger and back of hand proof	Finger and back of hand proof
Insulation voltage (U_i) Vac	690	690
Overvoltage category/pollution degree	III/3	III/3
Impulse withstand voltage (U_{imp}) Vac	6000	6000
Operational voltage (U_e) Vac	690	690
Safe isolation to VDE 0106 Part 101 and Part 101/A1		
Between auxiliary contacts and main contacts (Vac)	440	440
Between main contacts (Vac)	440	440
Overload relay setting range	0.1–32A	6–75A
Temperature compensation residual error >20°C (%/K)	≤0.25	≤0.25
Current heat loss (3 conductors)		
Lower value of setting range, W	2.5	3
Upper value of setting range, W	6	7.5
Terminal capacity	2 x (1–6)	2 x (1–6)
Solid, mm^2	2 x (1–4)	1 x 25
Flexible with ferrule, mm^2	2 x (1–6) ②	2 x (1–10) ③
Solid or stranded, AWG	14-8	14-2
Terminal screw	M4	M6
Tightening torque Nm (lb-in)	1.8 (16)	3.5 (31)
Tools		
Pozidrive screwdriver	Size 2	Size 2
Standard screwdriver	1 x 6	1 x 6

Notes

① Ambient temperature operating range to IEC/EN 60947, PTB: –5° to 50°C [23° to 122°F].
② 6 mm^2 flexible with ferrules to DIN 46228.
③ Main contact terminal capacity, solid and stranded conductors with ferrules: When using two conductors use identical cross-section.

Overload Relays, continued

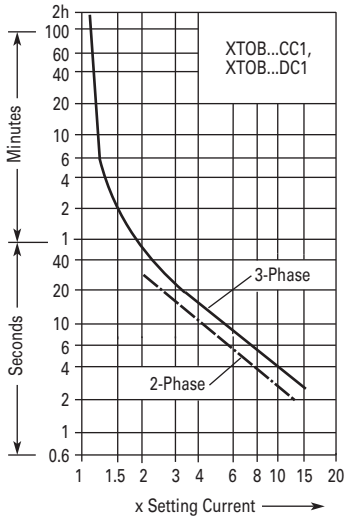
Description	XTOB … CC1 Specification	XTOB … DC1 Specification
Auxiliary and Control Circuit Connections		
Impulse withstand voltage (U_{imp}) Vac	6000	6000
Overvoltage category/pollution degree	III/3	III/3
Terminal capacity		
Solid, mm²	2 x (0.75–4)	2 x (0.75–4)
Flexible with ferrule, mm²	2 x (0.75–2.5)	2 x (0.75–2.5)
Solid or stranded, AWG	2 x (18–12)	2 x (18–12)
Terminal screw	M3.5	M3.5
Tightening torque Nm (lb-in)	0.8–1.3 (7–11.5)	0.8–1.3 (7–11.5)
Tools		
Pozidrive screwdriver	Size 2	Size 2
Standard screwdriver	1 x 6	1 x 6
Auxiliary circuit rated insulation voltage (U_i) Vac	500	500
Rated operational voltage (U_e) Vac	500	500
Safe isolation to VDE 0106 Part 101 and Part 101/A1		
Between the auxiliary contacts (Vac)	240	240
Conventional thermal current, I_{th}	6	6
Rated operational current—AC-15		
NO contact		
120V	1.5	1.5
240V	1.5	1.5
415V	0.5	0.5
500V	0.5	0.5
NC contact		
120V	1.5	1.5
240V	1.5	1.5
415V	0.9	0.9
500V	0.8	0.8
Rated operational current—DC-13 L/R ≤15 ms ①		
NO contact		
24V	0.9	0.9
60V	0.75	0.75
110V	0.4	0.4
220V	0.2	0.2
Short-circuit rating without welding maximum fuse, A gG/gL	6	6

Note

① Rated operational current: Making and breaking conditions to DC-13, L/R constant as stated.

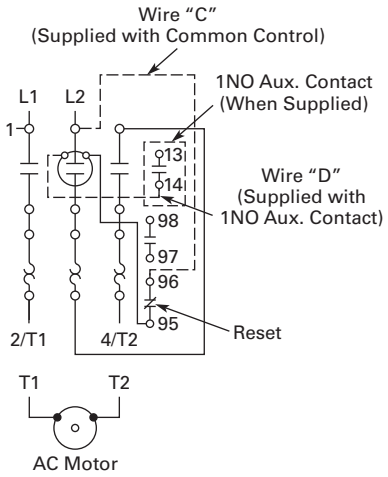
Trip Curve

Overload Relay

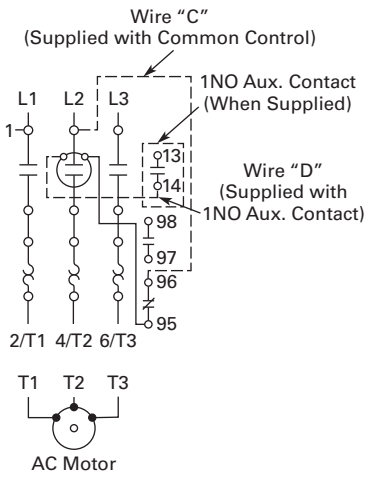


Wiring Diagrams

Single-Phase Connections



Three-Phase Connections

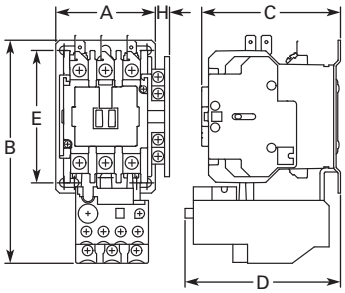


Dimensions

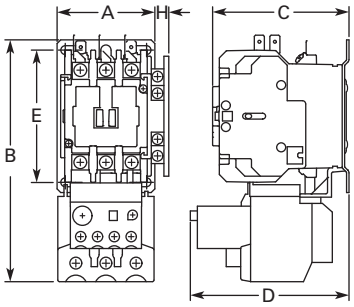
Approximate Dimensions in Inches (mm)

A27 and B27 Starters—Open Type

15 and 25 Ampere



30, 40 and 45 Ampere



Dimensions and Shipping Weights

Ampere Size	Wide A	High B	Deep C	Deep D	Mounting E	Mounting G	Auxiliary Contact Adder H	Shipping Weight Lbs (kg)
15 and 25 (metal plate)	2.40 (61.0)	5.50 (139.0)	3.35 (85.0)	3.70 (94.0)	3.13 (82.6)	—	0.54 (13.7)	1.6 (0.7)
15 and 25 (DIN rail mount)	2.23 (56.5)	5.20 (133.0)	3.35 (85.0)	3.70 (94.0)	—	—	0.54 (13.7)	1.6 (0.7)
30, 40 and 45 (metal plate)	2.40 (61.0)	6.00 (152.0)	3.35 (85.0)	3.90 (98.0)	3.13 (82.6)	—	0.54 (13.7)	1.11 (0.9)
30, 40 and 45 (DIN rail mount)	2.23 (56.5)	5.70 (145.0)	3.35 (85.0)	3.90 (98.0)	—	—	0.54 (13.7)	1.11 (0.9)

15–75A, Single- and Three-Phase—A30, B30 and C440/*XT* Electronic Overload Relay

Contents

15–75A, Single- and Three-Phase—A30, B30 and C440/*XT* Electronic Overload Relay

Product Description

A30 and B30 Starters

A30 and B30 Definite Purpose Starters from Eaton's Electrical Sector combine the features and flexibility of the C25 Definite Purpose Contactors and C440 Electronic Overload Relays.

C440 Overload

C440 is the most compact, high-featured, economical product in its class.

C440 is a self-powered electronic overload relay available up to 100A 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 with I/O for DeviceNet, PROFIBUS, and Modbus.

Features

A30 and B30 Starters

- Standard version: selectable trip class (10A, 10, 20, 30) with selectable manual or auto reset
- Current adjustment range: 5:1
- Self-powered design—will accept AC voltages from 12 to 690V 50/60 Hz
- Ambient temperature compensation
- Low heat generation
- Phase loss protection
- Phase unbalance protection
- Electrically isolated 1NO-1NC contacts (push-to-test)
- Trip status indicator

C440 Overload

- 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

Motor Control

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

Motor Protection

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

User Interface

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

Feature Options

- Remote reset
  - 120 Vac
  - 24 Vac
  - 24 Vdc
- Tamper-proof cover

Standards and Certifications

A30 and B30 Starters

- UL Listed Components
- CSA Certified Components
- IEC EN 60947-4-1, EN 60947-5-1
- CE Certified Components
- CCC Certified Components
- RoHS Certified Components

Catalog Number Selection

A30 and B30 Definite Purpose Starters

A 30 C N C 25 A X 5E 005

Designation
A = Three-phase starter
B = Single-phase starter

Type
30 = Non-reversing

Control
C = Common control
S = Separate control

Enclosure Type
N = Open with metal mounting plate
R = Open with DIN rail mounting adapter (two- and three-pole, 15–50A contactors only)
G = NEMA Type 1 enclosed

Power Terminals

15–40A Contactor
A = Binding head screws without quick connect terminals
B = Binding head screws with quick connect terminals
C = Pressure plate without quick connect terminals
D = Pressure plate with quick connect terminals
E = Lugs without quick connect terminals
F = Lugs with quick connect terminals

50–75A Contactor
E = Lugs without quick connect terminals
F = Lugs with quick connect terminals

Current Ratings

25 = 25A	**45** = 45A
30 = 30A	**60** = 60A
40 = 40A	**75** = 75A

AC Coil Codes

T = 24V	**D** = 550/600V
A = 110/120V	**H** = 277V
B = 208/240V	**L** = 380/415V
C = 440/480V	**J** = 240V/60 Hz; 220V/50 Hz (Available through 50A)

Auxiliary Contacts (Side Mount)
A = 1NO pressure plate
B = 1NC pressure plate
C = 1NO-1NC pressure plate
D = 2NO pressure plate
E = 2NC pressure plate
F = 1NO pressure plate and QC
G = 1NC pressure plate and QC
H = 1NO-1NC pressure plate and QC
J = 2NO pressure plate and QC
K = 2NC pressure plate and QC
L = 1NO-1NC snap switch QC only
M = 2NO-2NC snap switch QC only
X = None

OLR Model Designation
5C = C440 with ground fault
5E = Standard C440 OLR SEL Reset, SEL Class

Overload Range

DP Starters with C440 Electronic Overload

15A–75A Contactor

005 = 1–5A	**045** = 9–45A
020 = 4–20A	**100** = 20–100A

Product Selection

When Ordering Specify

- Catalog number plus AC coil code, auxiliary contact code, OLR model designation and overload range code, see below

A30 Starter

Three-Phase Starters—Open Type A30 with C440 Electronic Overload

Ampere Rating					Common Control		Separate Control	
Inductive Full Load	Line Voltage	Locked Rotor	Maximum Motor (hp)	Maximum Motor (kW)	Metal Mounting Plate Catalog Number ①	DIN Rail Adapter Catalog Number ①	Metal Mounting Plate Catalog Number ①	DIN Rail Adapter Catalog Number ①
25	115	150	—	—	**A30CNC25_**	**A30CRC25_**	**A30SNC25_**	**A30SRC25_**
	230	150	7-1/2	5-1/2				
	460	125	10	7-1/2				
	575	100	10	7-1/2				
30	115	180	—	—	**A30CNE30_**	**A30CRE30_**	**A30SNE30_**	**A30SRE30_**
	230	180	10	7-1/2				
	460	150	15	11				
	575	120	15	11				
40	115	240	—	—	**A30CNE40_**	**A30CRE40_**	**A30SNE40_**	**A30SRE40_**
	230	240	10	7-1/2				
	460	200	20	15				
	575	160	20	15				
45	115	300	—	—	**A30CNE45_**	**A30CRE45_**	**A30SNE45_**	**A30SRE45_**
	230	300	15	11				
	460	250	30	22				
	575	200	30	22				
60	115	360	—	—	**A30CNE60_**	—	**A30SNE60_**	—
	230	360	20	15				
	460	300	40	30				
	575	340	40	30				
75	115	450	—	—	**A30CNE75_**	—	**A30SNE75_**	—
	230	450	20	18-1/2				
	460	375	50	37				
	575	300	50	37				

Note

① Incomplete catalog number. Replace underscore (_) with suffix, see **Page V5-T4-41**.

When Ordering Specify

- Catalog number plus AC coil code, auxiliary contact code, OLR model designation and overload range code, see below

Single-Phase Starters—Open Type, B30 with C440 Electronic Overload

Ampere Rating					Common Control		Separate Control	
Inductive Full Load	Line Voltage	Locked Rotor	Maximum Motor (hp)	Maximum Motor (kW)	Metal Mounting Plate Catalog Number ①	DIN Rail Adapter Catalog Number ①	Metal Mounting Plate Catalog Number ①	DIN Rail Adapter Catalog Number ①
25	115	150	2	1.5	**B30CNC25_**	**B30CRC25_**	**B30SNC25_**	**B30SRC25_**
	230	150	3	2.2				
	460	125	—	—				
	575	100	—	—				
30	115	180	2	1.5	**B30CNE30_**	**B30CRE30_**	**B30SNE30_**	**B30SRE30_**
	230	180	5	3.7				
	460	150	—	—				
	575	120	—	—				
40	115	240	3	2.2	**B30CNE40_**	**B30CRE40_**	**B30SNE40_**	**B30SRE40_**
	230	240	7-1/2	5.5				
	460	200	—	—				
	575	160	—	—				
45	115	300	3	2.2	**B30CNE45_**	**B30CRE45_**	**B30SNE45_**	**B30SRE45_**
	230	300	10	7.5				
	460	250	—	—				
	575	200	—	—				

C440/*XT* Electronic Overload Relay

C440 Electronic Overload Relay for Integrated Use with DP Contactors

C440 Overload Relay for Integrated Use with DP Contactors by Feature Set

FLA Range (Amps)	DP Contactor Rating	Suffix Code	Overload Relay Catalog Number (Standard)	Overload Relay Catalog Number (Ground Fault)
Frame D				
1–5	25–50A	**005**	**C440A1A005SDD**	**C440A2A005SDD**
4–20	25–50A	**020**	**C440A1A020SDD**	**C440A2A020SDD**
9–45	25–50A	**045**	**C440A1A045SDD**	**C440A2A045SDD**
Frame F				
20–100	60–75A	**100**	**C440B1A100SDF**	**C440B2A100SDF**

Note

① Incomplete catalog number. Replace underscore (_) with suffix, see table above.

Accessories

CT Kits

Accessories

Description	Catalog Number
Safety Cover	
Clear Lexan cover that mounts on top of the FLA dial and DIP switches when closed.	**ZEB-XSC**
Reset Bar	
Assembles to the top of the overload to provide a larger target area for door mounted reset operators.	**ZEB-XRB**
Remote Reset	
Remote reset module (24 Vdc) ①	**C440-XCOM**
Remote reset module (120 Vac) ①	**ZEB-XRR-120**
Remote reset module (24 Vac) ①	**ZEB-XRR-24**

Safety Cover

Reset Bar

Remote Reset

Note

① Customer can wire remote mounted button to reset module (that is, 22 mm pushbutton, catalog number M22-D-B-GB14-K10).

Technical Data and Specifications

Electronic Overload Relays up to 1500A

Description	Specification 45 mm	 55 mm
Electrical Ratings	**Range**	**Range**
Operating voltage (three-phase) and frequency	690 Vac (60/50 Hz)	690 Vac (60/50 Hz)
FLA Range		
	0.33–1.65A 1–5A 4–20A 9–45A	20–100A
Use with Contactors		
XT IEC frames	B, C, D	F, G
Freedom NEMA sizes	00, 0, 1, 2	3
DP contactors	25–50A	60, 75A
Trip Class		
	10A, 10, 20, 30 Selectable	10A, 10, 20, 30 Selectable
Motor Protection		
Thermal overload setting	1.05 x FLA: does not trip 1.15 x FLA: overload trip	1.05 x FLA: does not trip 1.15 x FLA: overload trip
Feature	**Range**	**Range**
Phase loss	Fixed threshold 50%	Fixed threshold 50%
Phase unbalance (selectable: enable/disable)	Fixed threshold 50%	Fixed threshold 50%
Ground fault (selectable: enable/disable)	50% of FLA dial setting >150% = 2 sec >250% = 1 sec	50% of FLA dial setting >150% = 2 sec >250% = 1 sec
Reset	Manual/automatic	Manual/automatic
Indicators		
Trip status	Orange flag	Orange flag
Mode LED	One flash: Overload operating properly Two flashes: Current is above FLA dial setting—pending trip	One flash: Overload operating properly Two flashes: Current is above FLA dial setting—pending trip
Options		
Remote reset	Yes	Yes
Reset bar	Yes	Yes
Communication expansion module	Yes	Yes
Communication adapter	Yes	Yes
Capacity		
Load terminals		
Terminal capacity	12–10 AWG (4–6 mm^2) 8–6 AWG (6–16 mm^2)	6–1 AWG (16–50 mm^2)
Tightening torque	20–25 lb-in (2.3–2.8 Nm) 25–30 lb-in (2.8–3.4 Nm)	25–30 lb-in (2.8–3.4 Nm)
Input, auxiliary contact and remote reset terminals		
Terminal capacity	2 x (18–12) AWG	2 x (18–12) AWG
Tightening torque	5.3 lb-in (0.8–1.2 Nm)	5.3 lb-in (0.8–1.2 Nm)
Voltages		
Insulation voltage U_i (three-phase)	690 Vac	690 Vac
Insulation voltage U_i (control)	500 Vac	500 Vac
Rated impulse withstand voltage	6000 Vac	6000 Vac
Overvoltage category/pollution degree	III/3	III/3

Electronic Overload Relays up to 1500A, continued

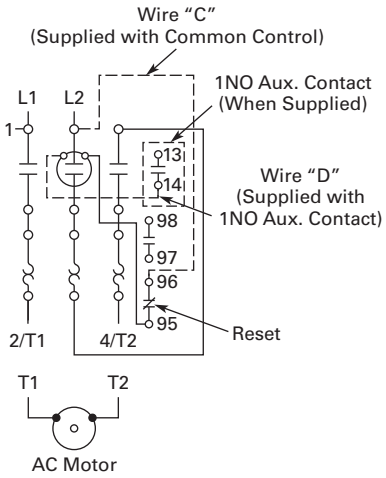
Description	Specification 45 mm	55 mm
Auxiliary and Control Circuit Ratings		
Conventional thermal continuous current	5A	5A
Rated operational current—IEC AC-15		
Make contact (1800 VA)		
120V	15A	15A
240V	15A	15A
415V	0.5A	0.5A
500V	0.5A	0.5A
Break contact (180 VA)		
120V	1.5A	1.5A
240V	1.5A	1.5A
415V	0.9A	0.9A
500V	0.8A	0.8A
IEC DC-13 (L/R F 15 ms1)		
0–250V	1.0A	1.0A
Rated operational current—UL B600		
Make contact (3600 VA)		
120V	30A	30A
240V	15A	15A
480V	7.5A	7.5A
600V	6A	6A
Break contact (360 VA)		
120V	3A	3A
240V	1.5A	1.5A
480V	0.75A	0.75A
600V	0.6A	0.6A
R300—Vdc ratings (28 VA)		
0–120V	0.22A	0.22A
250V	0.11A	0.11A
Short-Circuit Rating without Welding		
Maximum fuse	6A gG/gL	6A gG/gL
Environmental Ratings		
Ambient temperature (operating)	–13° to 149°F (–25° to 65°C)	–13° to 149°F (–25° to 65°C)
Ambient temperature (storage)	–40° to 185°F (–40° to 85°C)	–40° to 185°F (–40° to 85°C)
Operating humidity UL 991 (H3)	5% to 95% non-condensing	5% to 95% non-condensing
Altitude (no derating) NEMA ICS1	2000m	2000m
Shock (IEC 600068-2-27)	15g any direction	15g any direction
Vibration (IEC 60068-2-6)	3g any direction	3g any direction
Pollution degree per IEC 60947-4-1	3 for product (2 for pcb)	3 for product (2 for pcb)
Ingress protection	IP20	IP20
Protection against direct contact when actuated from front (IEC 536)	Finger- and back-of-hand proof	Finger- and back-of-hand proof
Mounting position	Any	Any
Climatic proofing	Damp heat, constant to IEC 60068-2-30	Damp heat, constant to IEC 60068-2-30

Electronic Overload Relays up to 1500A, continued

Description	Specification 45 mm	55 mm
Electrical/EMC		
Radiated emissions IEC 60947-4-1-Table 15 EN 55011 (CISPIR 11) Group 1, Class A, ISM	30 MHz to 1000 MHz	30 MHz to 1000 MHz
Conducted emissions IEC 60947-4-1-Table 14 EN 55011 (CISPIR 11) Group 1; Class ISM	0.15 MHz to 30 MHz	0.15 MHz to 30 MHz
ESD immunity IEC 60947-4-1 (Table 13)	±8 kV air, ±6 kV contact	±8 kV air, ±6 kV contact
Radiated immunity IEC 60947-4-1 IEC 61000-4-3	10V/m 80 MHz–1000 MHz 3V/m from 1.4 to 2.7 GHz 80% amplitude modulated 1 kHz sine wave	10V/m 80 MHz–1000 MHz 3V/m from 1.4 to 2.7 GHz 80% amplitude modulated 1 kHz sine wave
Conducted immunity IEC 60947-4-1, IEC 61000-4-6	140 dub (10V rms) 150 kHz–100 MHz	140 dub (10V rms) 150 kHz–100 MHz
Fast transient immunity IEC 60947-4-1 (Table 13) IEC 61000-4-4	±4 kV using direct method with accessory installed in expansion bay ±2 kV using direct method	±4 kV using direct method with accessory installed in expansion bay ±2 kV using direct method
Surge immunity IEC 60947-4-1 (Table 13) IEC 61000-4-5 a Class 4	Three-phase power inputs: ±4 kV line-to-line (DM) ±4 kV line-to-ground (CM)	Three-phase power inputs: ±4 kV line-to-line (DM) ±4 kV line-to-ground (CM)
	With accessory installed in expansion bay: ±2 kV line-to-line (DM) –>1.2/50 us; 2 kV line-to-earth, 1 kV line-to-line ±4 kV line-to-ground (CM)	With accessory installed in expansion bay: ±2 kV line-to-line (DM) –>1.2/50 us; 2 kV line-to-earth, 1 kV line-to-line ±4 kV line-to-ground (CM)
Power freq. magnetic field immunity IEC 60947-4-1, IEC 61000-4-8	30A/m, 50 Hz	30A/m, 50 Hz
Electromagnetic field IEC 60947-4-1 Table 13, IEC 61000-4-3	10 V/m	10 V/m
Distortion IEEE 519	5% THD max., 5th harmonic 3% max.	5% THD max., 5th harmonic 3% max.
Electrostatic discharge (ESD) IEC 61000-4-2, EN 61131-2	4 kV contact 8 kV air discharge	4 kV contact 8 kV air discharge
Electrical fast transient (EFT) IEC 61000-4-4, EN 61131-2	±2 kV using direct method	±2 kV using direct method
Surge immunity IEC 61000-4-5, EN 61131-2	±2 kV line-to-ground (CM)	±2 kV line-to-ground (CM)

Wiring Diagrams

Single-Phase Connections



Three-Phase Connections