Thermal Overload Relays Overview

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.

The C306 overload relay is designed for use with the Cutler-Hammer series non-reversing contactors.

Time-current characteristics

The time-current characteristics of an overload relay define its operating time at various multiples of its current setting. Underwriters Laboratory (UL) performs tests in accordance with NEMA Standards and the NEC as follows:

- 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 that eight minutes.
- When tested at 600 percent of its current rating, the overload relay shall trip in not more that 10 or 20 seconds, depending on the class of the relay.

Definitions

Current rating: the minimum current at which the relay will trip. Per NEC, an overload must ultimately trip at 125% of FLA current (heater) setting for a 1.15 service factor motor, and 115% FLA for a 1.0 service factor motor. **Current setting:** the FLA (Full Load Amperage) 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 10A heater setting must trip in 20 seconds or less at 75A motor current for a Class 20 relay.

Thermal overload relays feature:

- Selectable manual or automatic reset operations
- Interchangeable Class 20 heater packs ±24% to match motor FLA and calibrated for 1.0 and 1.15 service factors (ordered separately)
- Integral load lugs which allow field wiring prior to heater pack installation
- Single-phase protection
- Bimetallic, ambient compensated operation
- Trip-free mechanism
- Electrically-isolated N.O. or N.C. contacts
- Overload trip indication
- Fingerproof terminals to reduce possibility of shock
- UL-listed, CSA-certified, NEMA-compliant

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, or to meet IEC 947 requirements, rotate the FLA dial one-half of a position counter-clockwise (CCW).

Manual/automatic reset

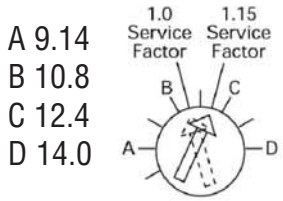
The overload relay is factory set at **M** for manual reset operation. For automatic reset operation, turn the reset adjustment dial to the **A** position, as shown in the illustration. Automatic reset is not intended for two-wire control devices.

Test for trip indication

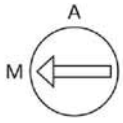
To test overload relay for trip indication when in manual reset, pull out the blue **RESET** button. An orange flag will appear indicating that the device has tripped. Push **RESET** button in to reset.

Thermal Overload Relays			
IEC	*Max. Amps*	*No. of Poles*	*Open Type*
A-F	32	3	C306DN3B

Price: <--->

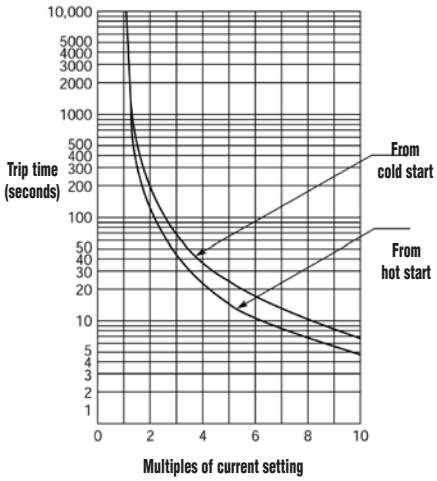


Example of 12.0 FLA setting for heater pack number H2011B showing position for 1.0 or 1.15 service factor motors.

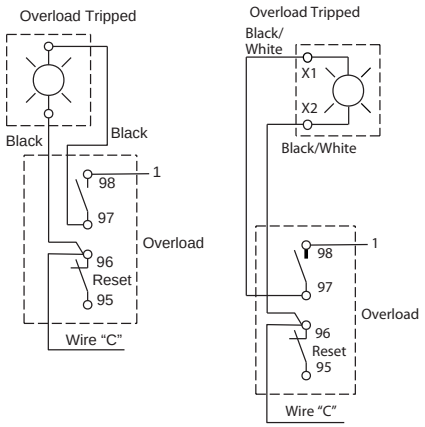


Example of setting of manual reset.

Class 20 overload relay 25ºC open rating



Overload terminals 95/96 and 98/97



Warning: To provide continued protection against fire or shock hazard, the complete relay must be replaced if burnout of the heater element occurs.

Motor Control Accessories

Heater packs

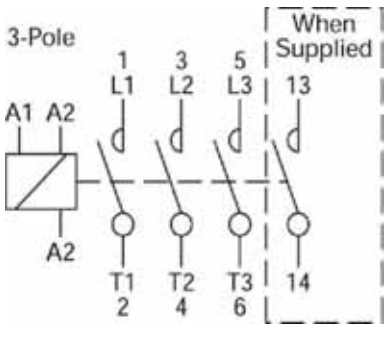
Heater packs are used with the C306DN3B overload relay. The load lugs are built into the overload base to allow load wiring prior to heater pack installation. Heater packs come in packs of three.

Standard Trip-Class 20 Heater Packs						
Part Number (Three heater packs)	Price	Max. Amps	Motor Full Load Ampere Rating Dial Position			
			A	B	C	D
H2001B-3	<--->	32	.254	.306	.359	.411
H2002B-3	<--->	32	.375	.452	.530	.607
H2003B-3	<--->	32	.560	.676	.791	.907
H2004B-3	<--->	32	.814	.983	1.15	1.32
H2005B-3	<--->	32	1.20	1.45	1.71	1.96
H2006B-3	<--->	32	1.79	2.16	2.53	2.90
H2007B-3	<--->	32	2.15	2.60	3.04	3.49
H2008B-3	<--->	32	3.23	3.90	4.56	5.23
H2009B-3	<--->	32	4.55	5.50	6.45	7.40
H2010B-3	<--->	32	6.75	8.17	9.58	11.0
H2011B-3	<--->	32	9.14	10.8	12.4	14.0
H2012B-3	<--->	32	14.0	16.9	19.9	22.8
H2013B-3	<--->	32	18.7	22.7	26.7	30.7
H2014B-3	<--->	32	23.5	28.5	33.5	38.5

Auxiliary contacts

Auxiliary contacts are designed for installation on the Cutler-Hammer Freedom series contactors and starters. The snap-on design makes them quick and easy to install.

The bifurcated (i.e. contact is split into two fingers for redundant contact) design of the contact blocks features silver cadmium alloy contacts.



Auxiliary Contacts

Contactor terminal markings

Contactor terminals are identified by a two-digit number in accordance with international standards approved by CENELEC (European Committee for Electrotechnical Standardization). This distinctive number is marked on the top nameplate and designates the type and quantity of built-in auxiliary contacts. The first digit indicates the quantity of N.O. contacts and the second digit indicates the quantity of N.C. contacts. *Example:* 10E indicates a contactor with one N.O. and no N.C. auxiliary contacts (factory supplied). In addition, all terminals conform to both CENELEC and NEMA requirements. Auxiliary contact terminals use the first digit to indicate location and the second digit to indicate status (1-2 means N.C. and 3-4 means N.O.) *Example*: 13-14 indicates the first auxiliary contact and it is a N.O. See the diagram to the left for the contact label.

Auxiliary Contacts		
Part Number	Price	Description
C320KGS3	<--->	1 N.O. and 1 N.C.
C320KGS1	<--->	1 N.O.

Mounting adapters

DIN-rail and panel mounting adapters are required when overload relays need to be separately mounted due to space requirements. The terminal base adapter includes line terminals and connects with the overload relays.

Mounting Adapters		
Part Number	Price	Description
C306TB1	<--->	Mounting Adapter for 32 Amp Overload Relay