CMD420 / CMD421

Installation Bulletin / Reference Guide

This document is intended as a reference guide for installing and using BENDER CMD420 and CMD421 three-phase AC current relays. This document includes installation, setup, and usage instructions. For complete details, including installation, setup, settings, and troubleshooting, refer to the CMD420 / CMD421 user manual, document number TGH1459en. This document is intended as a supplement and not a replacement to the complete user manual.

Only qualified maintenance personnel shall operate or service this equipment. These instructions should not be viewed as sufficient for those who are not otherwise qualified to operate or service this equipment. This document is intended to provide accurate information only. No responsibility is assumed by BENDER for any consequences arising from use of this document.

Installation

Mounting
CMD420 / CMD421 series devices may be DIN rail mounted, or screw mounted using the black clips located on the top and bottom of the device. Screw mounting requires an extra black clip (article number B98060008, sold separately).

Wiring - General
Refer to figure 1 for wiring the CMD420 or CMD421. **When using the CMD420, a current transformer with 1 A secondary (x/1 type) is required. For CMD421 devices, a current transformer with a 5 A secondary (x/5 type) is required.** Use minimum AWG 24, maximum AWG 12 size wire. Refer to CMD420 / 421 series user manual for complete technical details.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Disconnect all power before servicing.
- Observe all local, state, and national codes, standards, and regulations.

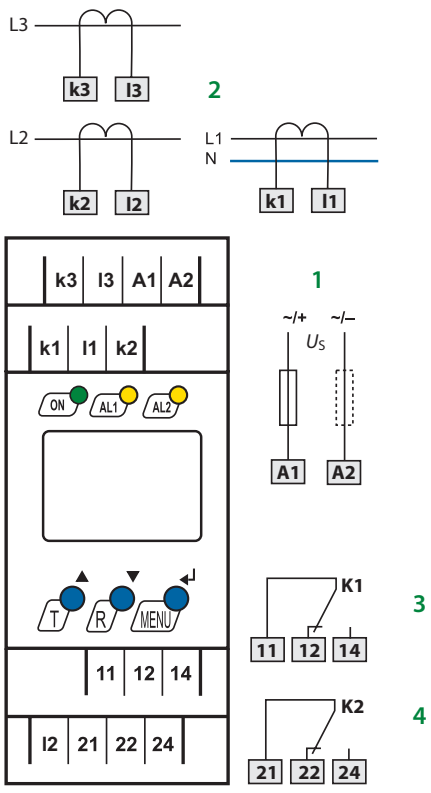


Figure 1 - Common wiring diagram for CMD420 and CMD421

1. External supply voltage; 5A fuse required for internal device protection
2. Connection to individual phase conductors via current transformers. Use x/1 type (1 A secondary) for CMD420 and x/5 type (5 A secondary) for CMD421.
3. Alarm relay K1: SPDT contact
4. Alarm relay K2: SPDT contact

Wiring - Contacts
Using a normally closed or normally open contact utilizes two factors: wiring out of the proper terminal, and setting the respective contact to normally energized or deenergized operation. Refer to the chart below for relay conditions. For changing the energized state of the contact, refer to "Figure 7 - Contact operation" on the reverse side of this document.

The factory default is normally deenergized operation for relays K1 and K2.

Device Relay Conditions

Relay Operation Setting	Device Alarm State	K1 STATE	K2 STATE
Normally deenergized mode (N/D) Non-failsafe mode "N/O" in device settings menu	Power ON, normal state (no alarms)	11-12 CLOSED 11-14 OPEN	21-22 CLOSED 21-24 OPEN
	Power OFF	11-12 CLOSED 11-14 OPEN	21-22 CLOSED 21-24 OPEN
	Power ON, alarm state	11-12 OPEN 11-14 CLOSED	21-22 OPEN 21-24 CLOSED
Normally energized mode (N/E) Failsafe mode "N/C" in device settings menu	Power ON, normal state (no alarms)	11-12 OPEN 11-14 CLOSED	21-22 OPEN 21-24 CLOSED
	Power OFF	11-12 CLOSED 11-14 OPEN	21-22 CLOSED 21-24 OPEN
	Power ON, alarm state	11-12 CLOSED 11-14 OPEN	21-22 CLOSED 21-24 OPEN

Front Panel Display

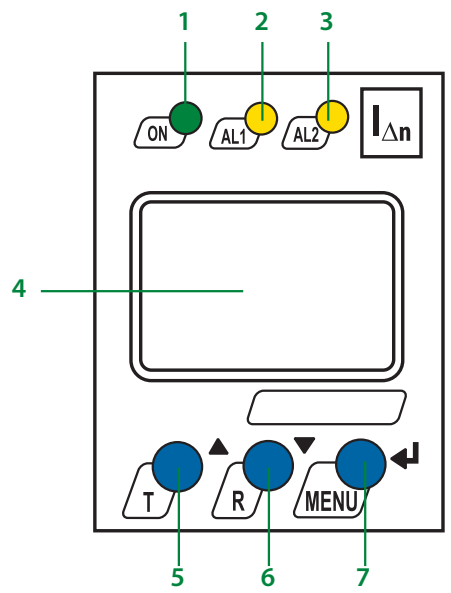
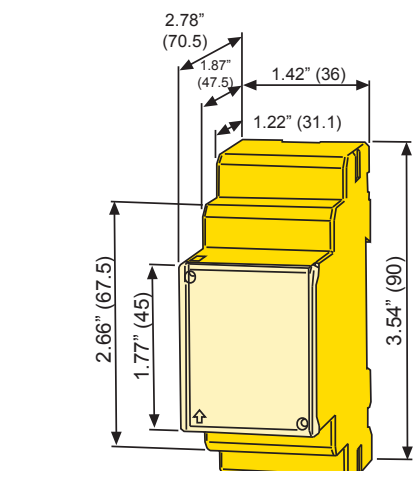


Figure 2 - CMD420 / CMD421 front display

1. LED "ON" (green): Illuminates when power is applied to the device. Flashes when the CT connection alarm is active.
2. LED "AL1" (yellow): Illuminates when the prealarm is activated. Flashes when the CT connection alarm is active.
3. LED "AL2" (yellow): Illuminates when the main alarm is activated. Flashes when the CT connection alarm is active.
4. Backlit LCD display
5. TEST / UP button: Activates self-test / scrolls up inside main menu.
6. RESET / DOWN button: Resets device / scrolls down inside main menu.
7. MENU / ENTER button: Activates main menu / Confirms (momuntary push) or goes back a step (held > 1.5 s) inside main menu.

Dimensions

Dimensions listed in inches (mm).



Menu Flow Chart for Common Settings

Figure 4 through figure 8 on the reverse side of this document contain flow charts for modifying commonly used features and settings in the device's main menu. Not all available features are listed in this document. For more information, consult the CMD420 / CMD421 user manual.

Menu Legend

R	DOWN ARROW button	< 1.5 s	Momuntary button push
T	UP ARROW button	> 1.5 s	Hold button for at least 1.5 s, then release
↵	MENU / ENTER button		

Figure 4 - Setting alarm type and CT ratio

The recommended first step is to set the type of alarm that will be used. Set this option to "HI" for undercurrent, "LO" for undercurrent, or "In" for both (window function).
Regardless whether the CMD420 or CMD421 is being used, the ratio of the current transformer used must be entered into the device as an X/1 type. For example, if using a 50:1 ratio CT with the CMD420, enter a value of "50" for the CT ratio. If using a 250:5 ratio CT with the CMD421, enter a value of "50" for the CT ratio.
NOTE: See below for instructions on setting alarm values. Alarm values will still be entered into the device based on the secondary side (0 - 1 A for the CMD420, 0-5 A for the CMD421). However, since the CT ratio has been entered into the device, values on the primary side of the CT will be displayed in real-time on the device's screen during operation.

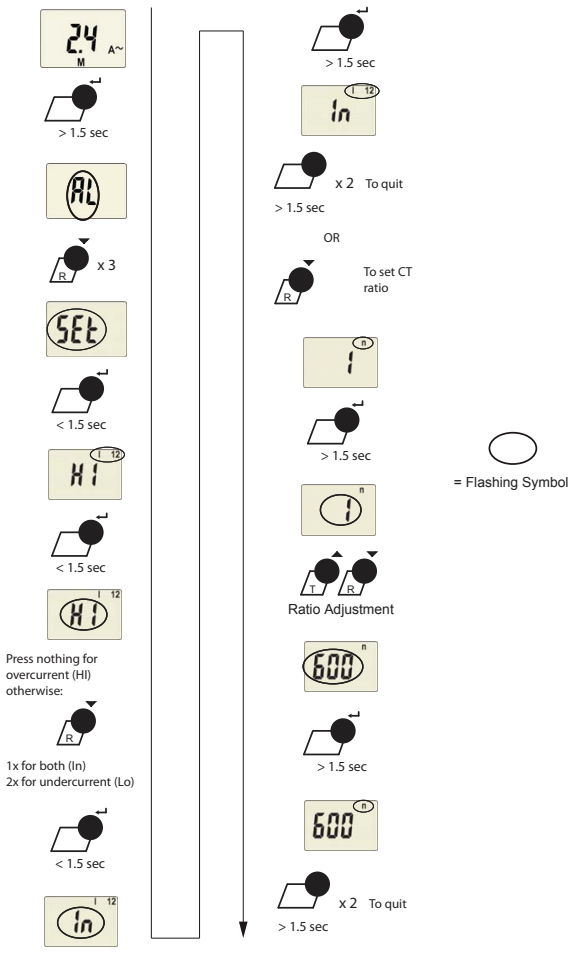


Figure 5 - Setting Alarm Values

The CMD420/CMD421 has two alarm values that may be set. Use the following guidelines for setting these numbers:

- **Using only overcurrent OR undercurrent:** Only one value is required. The value I_2 is the explicit alarm value that is set. The value I_1 is an optional prewarning that may be activated, which is a percentage value based on the previously set trip value.
- **Using both overcurrent AND undercurrent:** Both values are required. The value I_2 is the overcurrent value, entered as an explicit number. The value I_1 is the undercurrent value, entered as a percentage of the previously entered overcurrent value. EXAMPLE: For an overcurrent alarm of 2 A and an undercurrent alarm of 1 A, enter "2" for I_2, and enter "50%" for I_1.

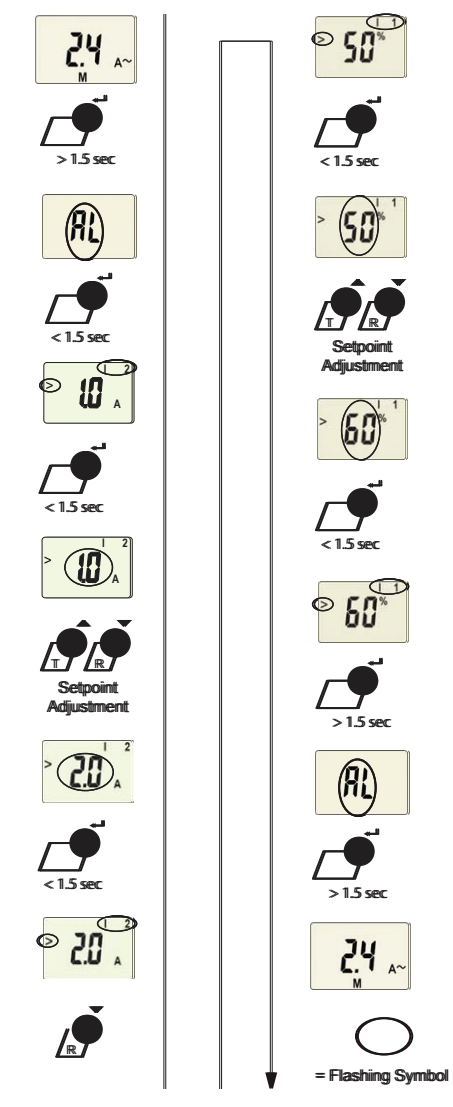


Figure 5 - Changing Time Delays

Four separate time delays are available:

- t_{on1} - Response delay, prewarning
- t_{on2} - Response delay, main alarm
- t - Startup delay
- t_{off} - Delay on release

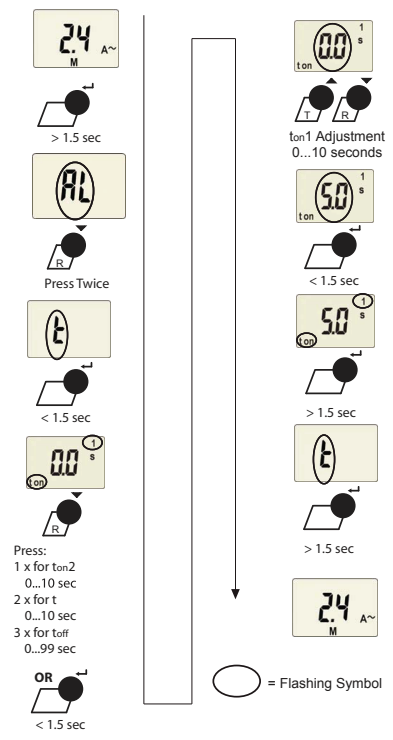


Figure 6 - Latching behavior (fault memory)

Changing this setting affects the latching behavior of the device:

- "OFF" will cause the device to automatically reset if the alarm condition clears.
- "ON" will cause the device to latch in the event of an alarm and require a manual reset. If power is cycled to the device and the alarm condition has cleared, the device will reset.
- "CON" will cause the device to latch in the event of an alarm and require a manual reset. The device will remain latched even if power is cycled to the device.

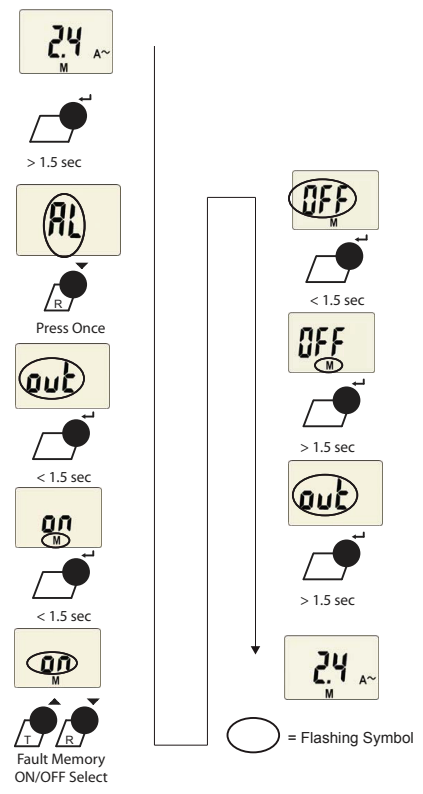


Figure 7 - Contact operation

Use this option to change the behavior of the contacts between normally deenergized (non-failsafe) mode and normally energized (failsafe) mode. The two SPDT contacts may be changed individually. Note that the CMD420/CMD421 labels normally deenergized operation as "N/O" and normally energized operation as "N/C"; utilzing a normally open or normally closed contact only depends on which contact output is wired.