

D85 Series—Alternating Relays



Product Description

Alternating relays are used in applications where the optimization of load usage is required by equalizing the run time of two loads. They are also used where additional capacity is required in case of excess load requirements. This alternating action is initiated by a control switch—such as a float switch, manual switch, timing relay, pressure switch or other isolated contact. Each time the initiating switch is opened, the output relay contacts will change state, thus alternating the two loads. Two LED indicators show the status of the output relay.

The D851 and D852 Series Relays are used with one control switch and are available in either SPDT or DPDT output configurations with or without a selector switch to lock in one sequence. The D852X Series Relays are available in DPDT cross-wired output configurations for use with one or two control switches (LEAD and LAG).

The D853 Series is designed for use with three-switch applications (LEAD, LAG and STOP). The D853 Series combines a standard DPDT Cross-Wired alternating relay, contactor auxiliary contacts, and a control relay into one compact and economical product. This saves space and labor, while reducing the number of components needed. The D853 Series uses Sequence On—Simultaneous Off (S.O.S.O.) operation, where the two loads are energized sequentially, but remain on together until the STOP switch is opened. This device also protects against failure of the STOP and LEAD switches. If both switches fail, the two pump motors will be energized simultaneously when the LAG switch is closed.

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Each of the D85 Series alternating relays is available with an optional three-position selector switch, which allows the unit to alternate the two loads as normal, or lock the relay to one load or the other. By locking the alternating relay to one load, the other load can be removed for service without rewiring the first load for continuous operation. The selector switch has a low profile to prevent any accidental actuation.

Features

- For duplex loads
- Works with one-, two-, or three-switch applications
- Compact plug-in design using industry standard sockets
- 10 A SPDT or DPDT output configurations
- Optional low profile selector switch to lock in one sequence
- Two LEDs indicate relay status
- D853 Series replaces separate components in duplex panel—saving space and reducing labor

Standards and Certifications

- CE
- cRUus
- UL listed ①
- RoHS compliant



Note

① When used with appropriate Eaton socket.

Product Selection

D85 Series—Alternating Relays ^①

Output Contacts	Control Voltage	Socket	Catalog Number
SPDT	12 Vac	8-pin	D851NR
SPDT	24 Vac	8-pin	D851NT
SPDT	120 Vac	8-pin	D851NA
SPDT	240 Vac	8-pin	D851NB
SPDT w/selector switch	12 Vac	8-pin	D851LR
SPDT w/selector switch	24 Vac	8-pin	D851LT
SPDT w/selector switch	120 Vac	8-pin	D851LA
SPDT w/selector switch	240 Vac	8-pin	D851LB
DPDT	12 Vac	11-pin	D852NR
DPDT	24 Vac	11-pin	D852NT
DPDT	120 Vac	11-pin	D852NA
DPDT	240 Vac	11-pin	D852NB
DPDT w/selector switch	12 Vac	11-pin	D852LR
DPDT w/selector switch	24 Vac	11-pin	D852LT
DPDT w/selector switch	120 Vac	11-pin	D852LA
DPDT w/selector switch	240 Vac	11-pin	D852LB
DPDT cross-wired	12 Vac	8-pin	D852XNR
DPDT cross-wired	24 Vac	8-pin	D852XNT
DPDT cross-wired	120 Vac	8-pin	D852XNA
DPDT cross-wired	240 Vac	8-pin	D852XNB
DPDT cross-wired w/selector switch	12 Vac	8-pin	D852XLR
DPDT cross-wired w/selector switch	24 Vac	8-pin	D852XLT
DPDT cross-wired w/selector switch	120 Vac	8-pin	D852XLA
DPDT cross-wired w/selector switch	240 Vac	8-pin	D852XLB

Accessories

D85 Series—Alternating Relays

Description	Standard Pack	Catalog Number
8-pin socket	10	D3PA2
11-pin socket	10	D3PA3-A2
Hold-down spring	10	D65CHDS

Note

^① Contact Eaton for relays for 3-switch applications (Lead-Lag-Stop).

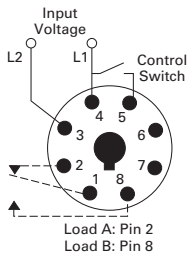
Technical Data and Specifications

D85 Series—Alternating Relays

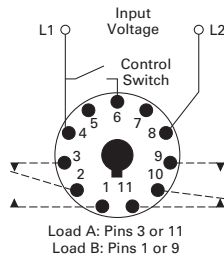
Description	Specification
Voltage tolerance	+10%/-15% of control voltage at 50/60 Hz
Load (burden)	Less than 3 VA
Output contacts	10 A resistive at 240 Vac / 30 Vdc, 1/2 hp at 120/240 Vac (NO), 1/3 hp at 120/240 Vac (NC)
Mechanical life	10,000,000 operations
Electrical life	100,000 operations
Temperature	-20 °F to +150 °F (-28 ° to 65 °C)
Transient protection	10,000 volts for 20 microseconds
Indicator LEDs	2 LEDs marked LOAD A and LOAD B
Optional selector switch settings	ALTERNATE, LOCK LOAD A, LOCK LOAD B

Wiring Diagrams

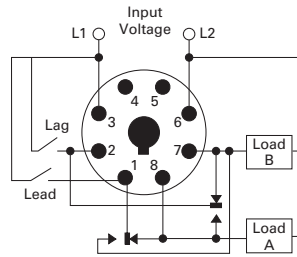
D851 Series Relays, SPDT



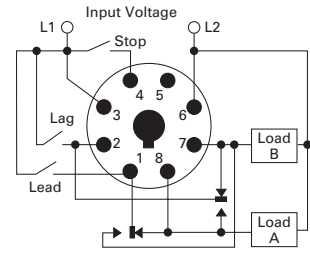
D852 Series Relays, DPDT



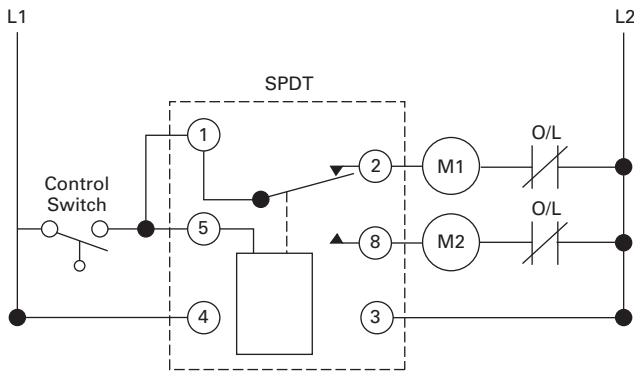
D852X Series Relays, DPDT Cross-Wired



D853 Series Relays, Three-Switch Applications



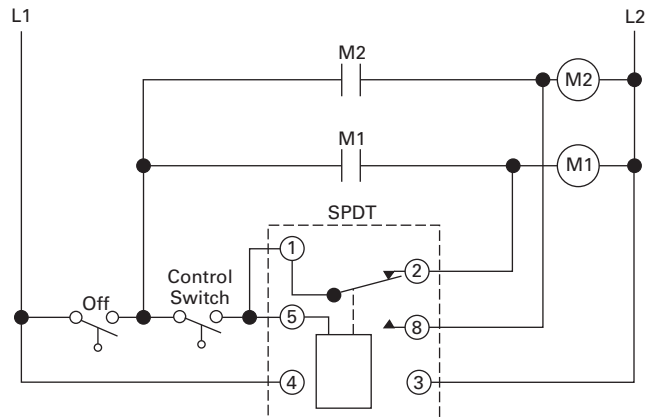
Typical Installations for SPDT and DPDT Alternating Relays, Standard Installation



In the OFF state (standard installation), the control switch is open, the alternating relay is in the LOAD A position, and both loads (M1 and M2) are off. When the control switch closes, it energizes the first load (M1). The red LED marked "LOAD A" glows. As long as the control switch remains closed, M1 remains energized.

When the control switch opens, the first load (M1) is turned off and the alternating relay toggles to the LOAD B position. When the control switch closes again, it energizes the second load (M2). The red LED marked "LOAD B" glows.

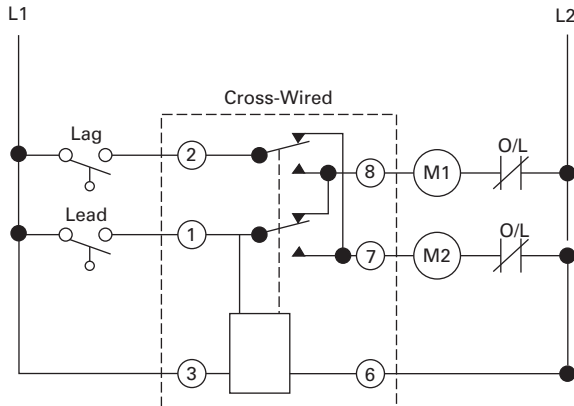
Typical Installations for SPDT and DPDT Alternating Relays, Anti-Bounce Installation



When the control switch opens, the second load (M2) is turned off, the alternating relay toggles back to the LOAD A position, and the process can be repeated again. On relays with DPDT contacts, two pilot lights can be used for remote indication of LOAD A or LOAD B status.

To eliminate any bounce condition of the control switch, the addition of a second switch (OFF) along with two auxiliary contacts is recommended as shown in the Anti-Bounce Installation.

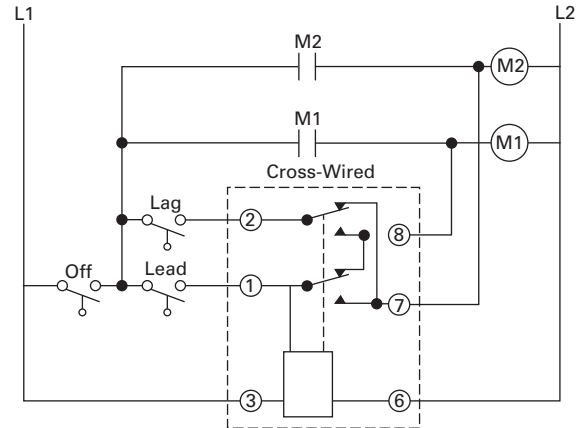
Typical Installations for DPDT Cross-Wired Alternating Relays, Standard Installation



In the OFF state, both the LEAD control switch and the LAG control switch are open, the alternating relay is in the LOAD A position, and both loads are off. When the LEAD control switch closes, it energizes the first load (M1). The red LED marked "LOAD A" glows. As long as the LEAD control switch remains closed, M1 remains energized. If the LAG control switch closes, it energizes the second load (M2).

When the LAG control switch opens, the second load (M2) is turned off. When the LEAD control switch opens, the first load (M1) is turned off and the alternating relay toggles to the LOAD B position.

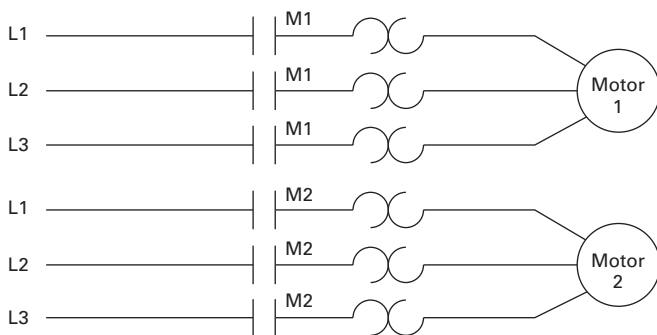
Typical Installations for DPDT Cross-Wired Alternating Relays, Anti-Bounce Installation



When the LEAD control switch closes, it turns on the second load (M2). The red LED marked "LOAD B" glows. If the LAG control switch closes, it will energize the first load (M1). When the LAG control switch opens, the first load (M1) is turned off. When the LEAD control switch opens, the second load (M2) is turned off, the alternating relay toggles back to the LOAD A position, and the process can be repeated again.

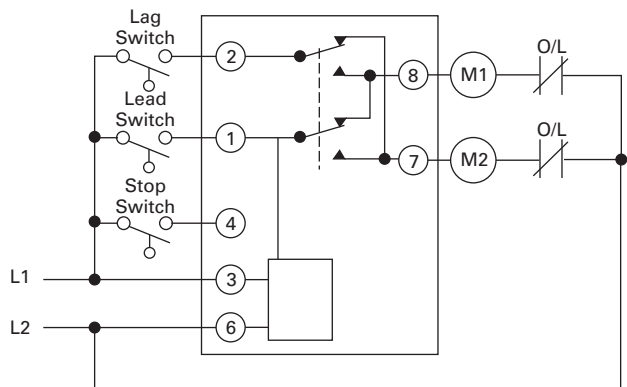
To eliminate any bounce condition of the control switch, the addition of a second switch (OFF) along with two auxiliary contacts is recommended as shown in the Anti-Bounce Installation.

Typical Installations for DPDT Cross-Wired Relays for Three-Switch Applications



In the OFF state, all three switches are open, the alternating relay is in the LOAD A position, and both loads are off. No action happens with the alternating relay or either load when the STOP switch closes. When the LEAD switch closes, Load #1 (M1) turns on. When the LAG switch closes, Load #2 (M2) turns on. Both loads remain on as long as all three switches are closed.

When the LAG switch opens, Load #2 (M2) remains on because the STOP switch is still closed. When the LEAD switch opens, Load #1 (M1) remains on because the STOP switch is still closed. When the STOP switch opens, both Load #1 (M1) and Load #2 (M2) are turned off simultaneously.



The alternating relay toggles to the LOAD B position. The entire cycle is then repeated, but with Load #2 (M2) energized first followed by Load #1 (M1). This type of operation is known as "Sequence On-Simultaneously Off (S.O.S.O.)"—the two loads are energized sequentially, but remain on together until the STOP switch is opened.

If both the STOP switch and LEAD switch fail to close and turn on the first load, both loads will be turned on simultaneously when the LAG switch is closed.

3.9

Control Relays and Timers

Alternating Relays

Dimensions

Approximate Dimensions in Inches (mm)

D85 Series—Alternating Relays

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