hubbell industrial controls, inc.

SPECIFICATIONS

5370

December 2010
Repl: October 1984

ELECTRONIC OVERLOAD RELAY
FOR DC APPLICATIONS

General Information

The Electronic Overload Relay receives line current signals from an ammeter shunt and performs both the *Inverse Time* as well as the *Instantaneous Trip* functions normally performed by two (2) separate electro-mechanical overload relays.

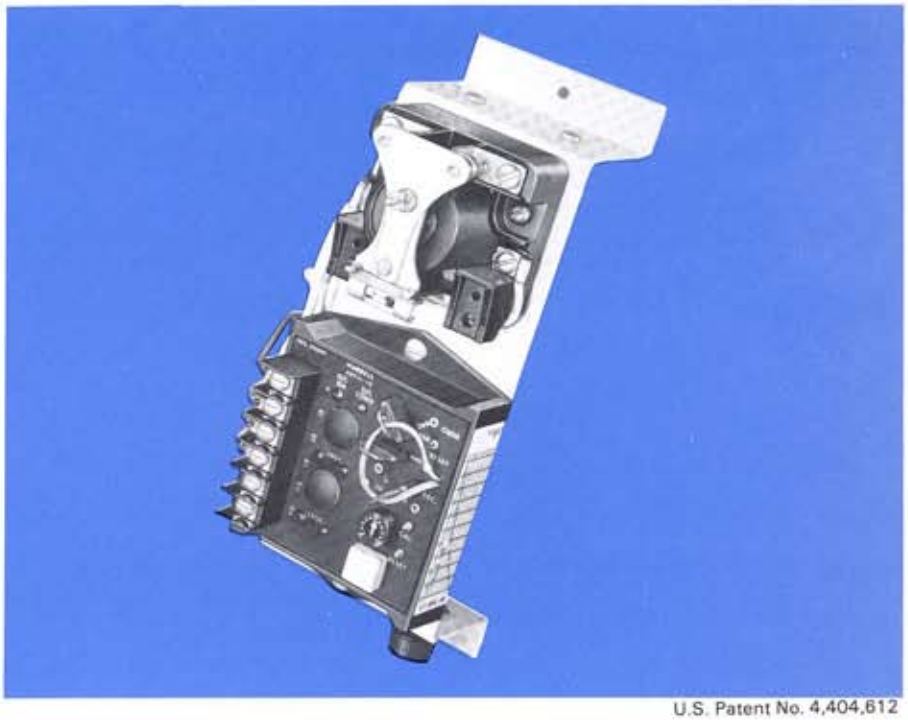
- Automatic Reset
- Instantaneous and Inverse Time in one (1) unit
- Green "Overload-on" indicator
- Yellow "Overload-Condition" indicator
- Negative or Positive Shunt applications
- Mill-Duty Design
- Double Break Contacts
- Selectable automatic or manual reset of the output relay.
- Latched red "Overload-Trip" indicators for Inverse Time and Instantaneous conditions.
- Manual reset of trip indicators.
- Optional 250 VDC isolation supply for adjustable voltage applications.
- Optional adapter for 100mv ammeter shunt applications.
- Optional ammeter shunt isolation module.

Application

Used with any dc motor that requires overload current protection. For applications such as crane control, mill auxiliary control, starters and adjustable speed drives.

Description

The Electronic Overload Relay consists of an Electronic Sensing Unit, and an output relay. The Electronic Sensing Unit receives line current signals from a 50 mv ammeter shunt and performs both the inverse time and instantaneous trip functions normally performed by two separate electromechanical overload relays.



U.S. Patent No. 4,404,612

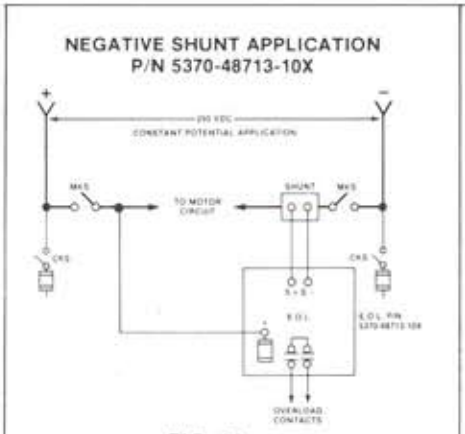


FIG. 1A

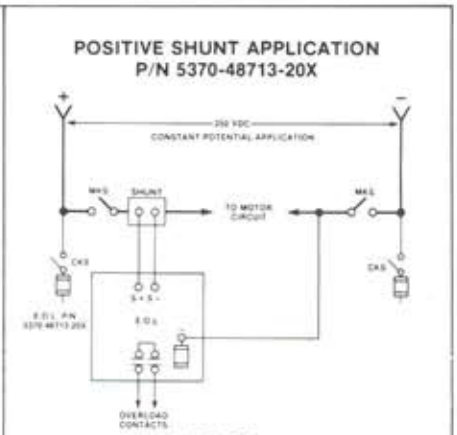


FIG. 2A

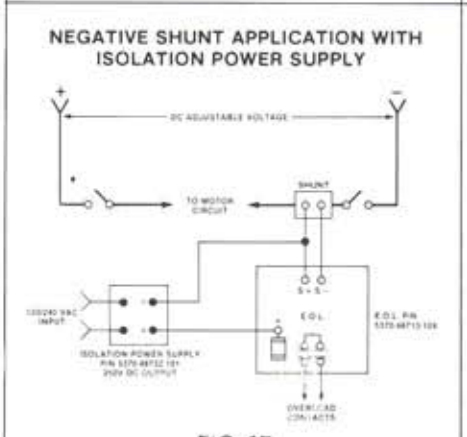


FIG. 1B

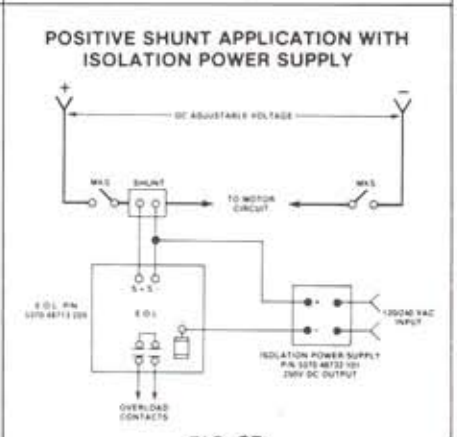


FIG. 2B

*EOL = Electronic OverLoad relay

There are two basic configurations:

1) **Negative Shunt** - The ammeter shunt is placed in the negative power line of the controller to monitor the motor line currents. See Fig. 1A
2) **Positive Shunt** - The ammeter shunt is placed in the positive power line of the controller to monitor the motor line currents. See Fig. 2A

The selection of "Negative Shunt" or "Positive Shunt" electronic overload relay is determined by the configuration that best fits the protection requirements. The negative shunt configuration will monitor currents in the negative line but will not monitor positive line to ground leakage or fault currents. Similarly, the positive shunt configuration will monitor positive line currents but will not monitor negative line to ground leakage or fault currents. For this reason, negative ground systems are best protected by the positive shunt configuration, and positive ground systems are best protected by the negative shunt configuration.

Floating or ungrounded systems can be protected by either configuration, however, full fault protection can only be provided for line to line faults.

P/N 48713-102 and -202 have latched trip indication and selectable automatic or manual reset for the output relay. These two versions contain the Green and Yellow indicators as well as two Red indicators which show the tripped condition (either instantaneous or inverse time). When the manual reset mode is selected, the output relay and the trip indicators are latched after an overload trip until the reset button is pressed. When the automatic reset mode is selected, the output relay will reset when the overload condition is removed, but the trip indicators will remain "On" until the reset button is pressed.

Description	Negative Shunt Configuration Part Number	Positive Shunt Configuration Part Number
Diagnostic Lights and Auto-Man Mode Selection Overload Relay	5370-48713-102	5370-48713-202
Shunt Isolation Module	5370-48764-101	5370-48764-102
250V D.C. Isolation Power Supply	5370-48732-101	
Adapter for 100MV Ammeter Shunt Applications	5370-48742-101	

50mv Shunt Selection Table: (Fig. 3)

HP	MOTOR FULL LOAD AMPS	SHUNTS FOR EOL* RELAY ONLY		SHUNTS FOR EOL* RELAY AND PANEL AMMETER	
		AMP RATING	mv @ † FULL LOAD	AMP RATING	mv @ † FULL LOAD
3	12	25	25	25	25
4	16	25	32	25	32
5	20	25	40	25	40
7½	30	60	25	60	25
10	40	60	33	60	33
15	60	60	50	100	30
20	80	100	40	150	27
25	100	100	50	150	33
30	120	150	40	200	30
35	140	150	47	200	35
40	160	150	53	250	32
45	180	200	45	250	36
50	200	200	50	300	33
60	240	250	48	400	30
75	300	300	50	500	30
100	400	400	50	600	33
125	500	500	50	750	33
150	600	600	50	1000	30
200	800	750	53	1200	33
250	1000	1000	50	1500	33
300	1200	1200	50	2000	30

* (Electronic OverLoad relay)
† Double these 50mv shunt ratings for 100mv shunt applications.
Adapter (P/N 5370-48742-101) is needed for 100mv shunt applications.

How To Select and Set Relay

Example:

1) The electronic overload relay is being used to protect a 20 HP 230v dc crane motor. The electrical system has the negative line grounded which calls for a positive shunt configuration.
2) From the Shunt Selection Table, Fig. 3, the motor's full load current will produce a shunt signal of 40mv from a 50mv shunt.
3) The 40mv shunt signal requires a Dial Setting of 65 (refer to Fig. 4).

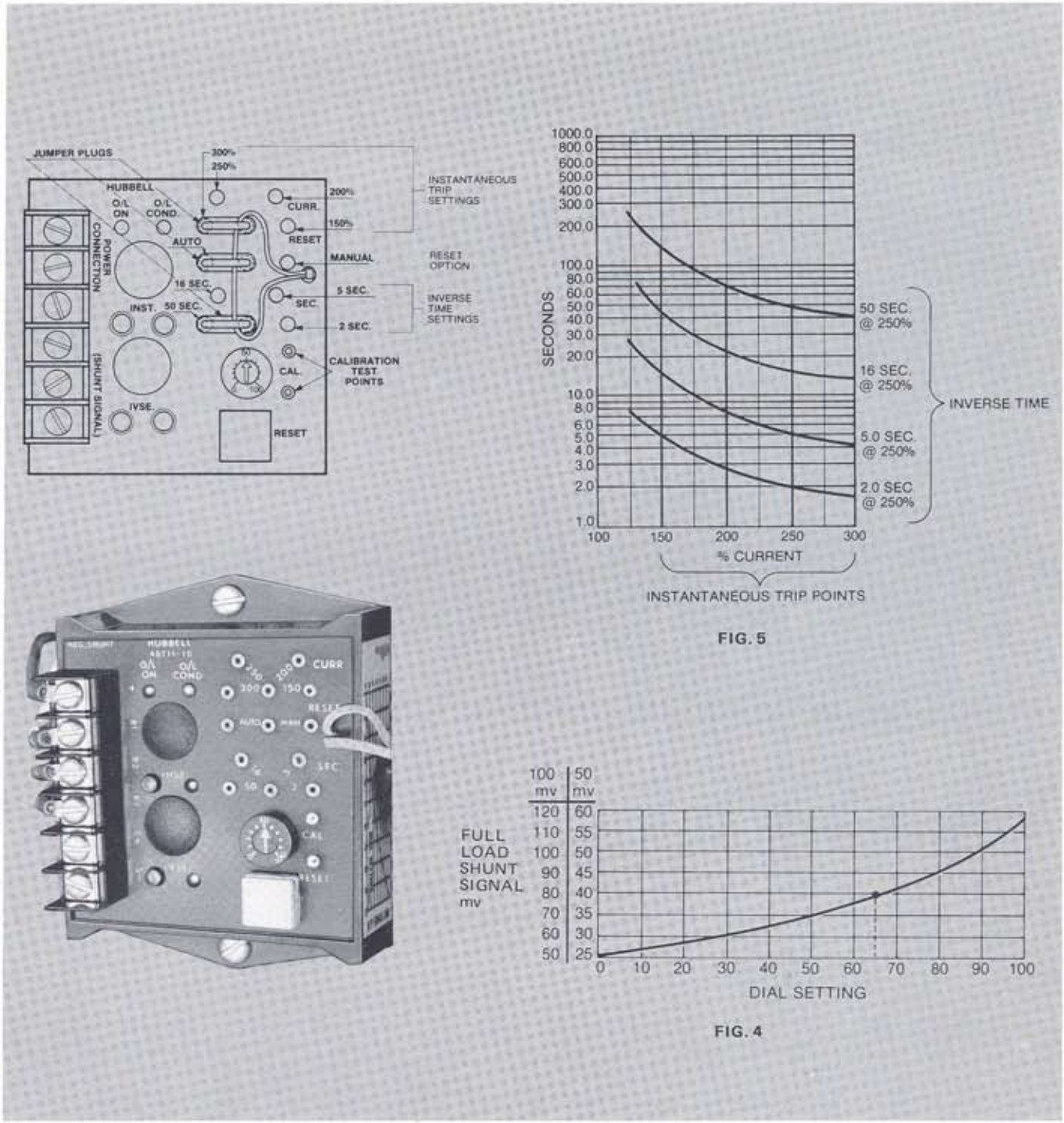


FIG. 5

FIG. 4

For precise settings, the two calibration (CAL) test points next to the potentiometer may be used. With the controller power "off" and using an ohmmeter set to read "0" to "100" ohms, connect the ohmmeter across the calibration test points. Adjust the calibration potentiometer until the ohmmeter reads 65 ohms.

Inverse Time & Instantaneous Trip Points (Fig. 5)

The curves are selected by moving the jumper plugs located on the front of the overload relay. For crane service, as indicated in the example, a typical setting for the instantaneous trip would be 250% of full load current and the inverse time would be set for 5 sec. These settings allow for normal acceleration current peaks and acceleration time.

In the event that the jumper plugs would be removed, the electronic overload will still function and provide protection. But it reverts to the 150% instantaneous trip and the 50 sec. inverse time curve.

Operation of the electronic overload relay can be verified by watching the green and yellow indicators on the front of the electronic module. The green indicator will be "On" when there is power connected to the overload. The yellow indicator will be "On" when the monitored current exceeds 120% - 125% of full load current. It is normal for the yellow light to wink on and off in response to the motor acceleration current peaks.

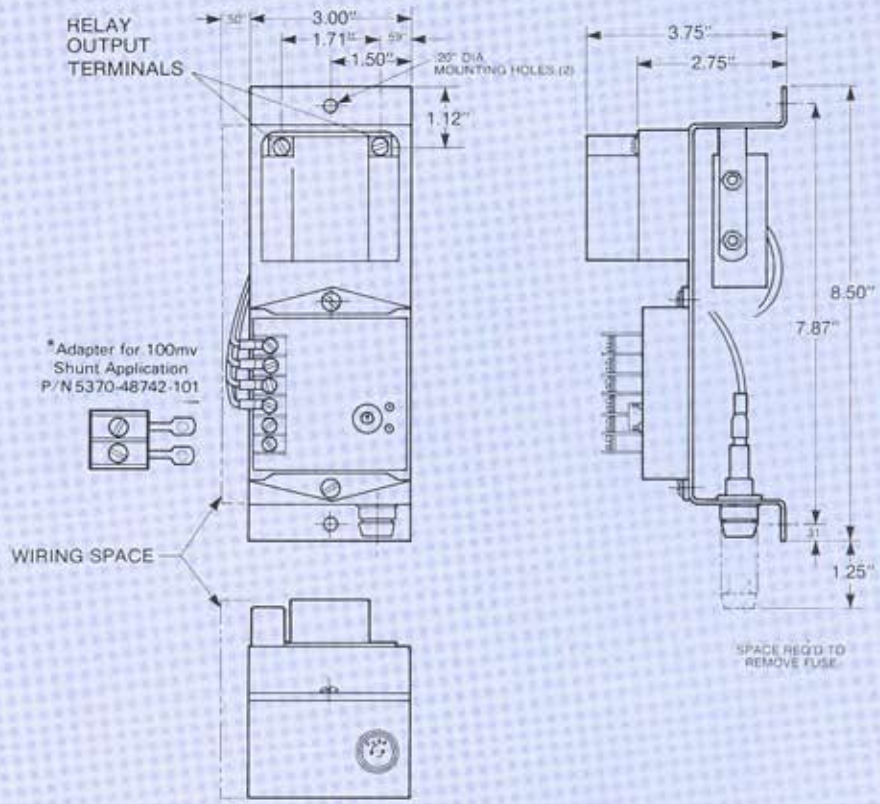
ELECTRONIC OVERLOAD RELAY

Specifications

Input Voltage	250V DC + 10% —20%
Fuse Rating	1 Amp 250V
Signal Input	50* mv shunt Scaling permits full load signals to range from 25mv to 58mv. See "dial setting" graph Fig. 4.
Instantaneous Trip Settings	150%, 200%, 250%, and 300% of Rated Motor Current Jumper Selectable ± 15%. See Overload Curves Fig. 5.
Inverse Time Settings	2 sec., 5 sec., 16 sec., and 50 sec. at 250% current. Jumper selectable ± 20%. See Overload Curves Fig. 5.
Temperature Stability	
Instantaneous Trip Setting	+3% —0% over full temp. range.
Inverse Time Setting	+3% —5% over full temp. range.
Relay Contacts Material	Silver
Interrupting Rating	0.5A Inductive @ 250V DC.
Temperature Range	—40°C to + 75°C

*Optional Adapter Available for 100mv Shunt Signal

Dimensions (Do Not Use for Construction Purposes)

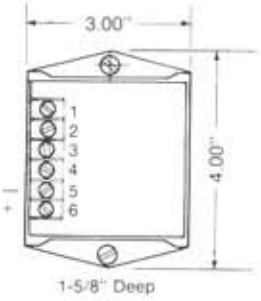


ISOLATION POWER SUPPLY

(FOR ADJUSTABLE VOLTAGE APPLICATIONS)
P/N 5370-48732-101

Specifications

Input Voltage	Terminals 1 to 4
120V 50/60 HZ	Jumper 1 to 2 & 3 to 4
240V 50/60 HZ	Jumper 2 to 3
Output Voltage	250V DC Terminal 5 is Negative Terminal 6 is Positive
Temperature Range	—40°C to +75°C
Isolation	1000 Volts



SHUNT ISOLATION MODULE

P/N 5370-48764-101, -102

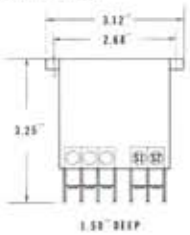
Application

The Shunt Isolation Module is required if electrical isolation is needed between the EOL power supply and the motor power supply, or if the ammeter shunt must be located at a point other than the motor positive or negative line.

Specifications

Temperature Range
-40° C to +75° C

Isolation 1500 Volts



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