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## Auxiliary Relay (7PJ11) and Trip Relay (7PJ12)

Better protection and more efficiency for your power system

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# 7PJ11 and 7PJ12



## Description

Auxiliary relay and Trip Relay is an electro-mechanical relay that operates on attracted armature principal designed to IEC60255.

Auxiliary relay is available in 3 NO contacts and 2 CO contacts with self reset contacts type with or without flag.

Trip relay low burden is available in 3 NO and 3 NC contacts. Trip relay high burden is available in 3 NO and 2 NC contacts with hand reset contacts type.

Auxiliary Relay and Trip Relay is used in high speed operation which suits the requirements like transmission and industrial applications.

## Features

- Suitable for signalling in protection and control systems where immunity to capacitance discharge is required
- Robust design for a long, reliable, service life
- Heavy duty contacts ratings
- High voltage insulation
- Lower rated burden
- Higher operation stability
- Flag indication for the operated conditions
- Individual variant for Auxiliary voltages DC 110 V, DC 220 V

## Applications

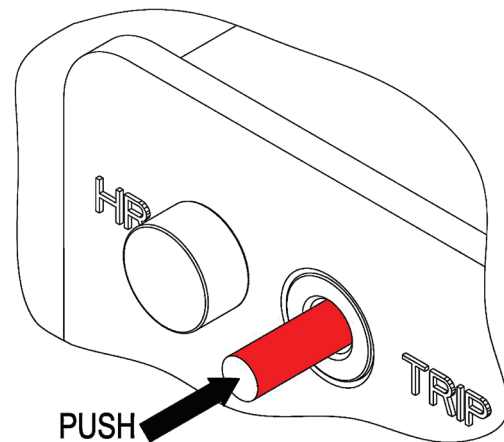
### Auxiliary Relay and Trip Relay

- The design, durability and quality of these relays guarantee their application in high responsibility controls such as power stations, substations, and process industries
- Applications are for general contact multiplication, interlocking, and customising of protection schemes
- To use in relay coordination and to provide control commands or signal commands to other devices in use
- To provide durability and quality of response

## Operation

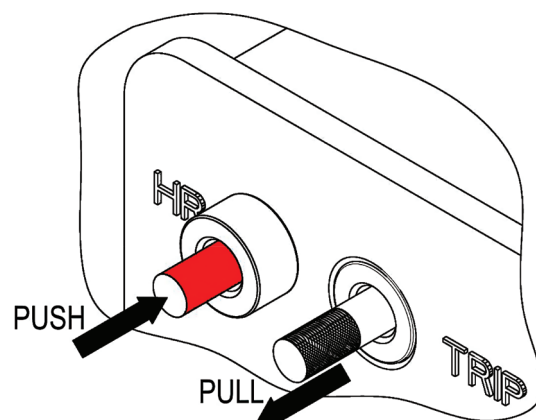
### Auxiliary Relay Operation

- When auxiliary voltage is supplied to the relay coil terminals, the auxiliary relay operates within the expected time and the Normal Open (NO) contacts and Change Over (CO) contacts will change their states. During the contacts change, the flag operates and indicates the relay has tripped
- Auxiliary relay resets when the coil terminal voltage is disconnected
- You can manually reset the auxiliary relay flag indication by pushing the flag plunger inside. Shown below,



### Trip Relay Operation

- When auxiliary voltage is supplied to the relay coil terminals, the trip relay operates within the expected time and the contacts will change from Normal Open (NO) to Normal Close (NC) state and vice-versa. During the contacts change, the flag operates and indicates the relay is tripped and the hand reset plunger operates to keep the contacts in latched mode
- Before resetting the trip relay, you should ensure that the auxiliary voltage is disconnected from the coil terminals or the trip command from any numerical relay should be disconnected
- For reset of trip relay manually, pull the hand reset plunger. The flag indication can be reset by pushing the flag plunger inside. Shown below,



# Technical Specifications

## Technical Data for Auxiliary Relay

Rated voltage (U <sub>N</sub> )	DC 110 V, DC 220 V
Operating range	70% to 115%
Pickup voltage (%U <sub>N</sub> )	65% of rated value U <sub>N</sub>
Drop-off voltage (%U <sub>N</sub> )	Not less than 20% U <sub>N</sub>
Pickup time at U <sub>N</sub> (typical)	< 20 ms
Maximum power consumption	For U <sub>N</sub> DC 110 V, 16 W For U <sub>N</sub> DC 220 V, 16 W
Flag	Either Hand Reset (HR) or No flag
Contacts	Self Reset
Reset time*	< 20 ms
Mechanical life	10,000 operations
Switching rate	500 operations per hour at full breaking current (Rated breaking current 5 A with full resistive load)
Thermal withstand	Continuous = 1.15 U <sub>N</sub> For 10 s = 1.30 U <sub>N</sub>
No of contacts	3 NO + 2 CO

## Technical Data for Trip Relay

Rated voltage (U <sub>N</sub> )	DC 110 V, DC 220 V	
Operating range	70% to 115%	
Pickup voltage (%U <sub>N</sub> )	60% of rated value U <sub>N</sub>	
Pickup time at U <sub>N</sub> (typical)	≤10 ms	
Maximum power consumption	<b>Low Burden</b> For U <sub>N</sub> DC 110 V, 80 W For U <sub>N</sub> DC 220 V, 80 W	<b>High Burden</b> For U <sub>N</sub> DC 110 V, <150 W For U <sub>N</sub> DC 220 V, <150 W
Flag	HR - Hand Reset	
Contacts	Hand Reset	
Reset time*	< 20 ms	
Mechanical life	10,000 operations	
Switching rate	360 operations per hour at full breaking current (Rated breaking current 5 A with full resistive load)	
Thermal withstand	Continuous = 1.15 U <sub>N</sub> For 10 s = 1.30 U <sub>N</sub>	
No of contacts	<b>Low Burden</b> 3 NO + 3 NC	<b>High Burden</b> 3 NO + 2 NC

## Contacts Ratings

Rated voltage	AC 660 V, DC 660 V
Rated current	5 A
Max. making current	30 A for 3 s
Make and carry continuously	AC 1250 VA or DC 1250 W (limit of 660 V and 5 A)
Make and carry for 3 s	AC 7500 VA or DC 7500 W
Break	AC 1250 VA or DC 1250 W with maximum of 5 A and 660 V or 100 W resistive DC 50 W inductive DC (L/R = 0.04) (with limits of 660 V and 5 A)

\* Applicable to self reset variants only.

# Type Testing

## Insulation Test

Test	Reference	Test Levels
Insulation resistance test	IEC60255-1, IEC60255-27	Insulation resistance >100 M ohm at 500 V DC
Dielectric test	IEC60255-1, IEC60255-27 IEC60255-5	2 kV, 50 Hz, 1 min Between all terminals and with respect to earth terminal Between auxiliary terminals and contacts terminals 1.0 kV r.m.s AC, 1 min across NO contacts
Impulse voltage withstand test	IEC60255-1, IEC60255-27	5.0 kV, 1.2/50 µs, 0.5 J Between all terminals and with respect to earth terminal Between auxiliary terminals and contacts terminals

## Climatic Environmental Test

Test	Reference	Requirement
Dry cold, working test	IEC60068-2-1	-10°C working for 96 hours
Dry heat, working test	IEC60068-2-2	+55°C working for 96 hours
Damp heat cyclic	IEC60068-2-30	6 days at 95% RH and +40°C
Dry cold, Dry heat, storage test	IEC60068-2-1 IEC60068-2-2	-25°C to +70°C storage for 16 hours

## Electromagnetic Compatibility Test

Type test	Reference	Requirement
High frequency disturbance	IEC60255-22-1	Common-mode test voltage: 2.5 kV, Differential test voltage: 1.0 kV, Test duration: 2 s, Source impedance: 200 Ω
Fast transient disturbance	IEC60255-22-4, IEC61000-4-4	Test severity Amplitude: 4 kV, burst frequency 5 kHz
Electrostatic discharge	IEC60255-22-4, IEC61000-4-4	Class III, 8 kV discharge in air to front insulated surface
Surge immunity	IEC 61000-4-5 IEC60255-22-5	Time to half-value: 1.2/50 µs, Amplitude: 2 kV between all groups and case earth (CM) Auxiliary port R=10 Ω, C=9 µF, For output port R=40 Ω, C=0.5 µF Amplitude: 1 kV between terminals of each group (DM) Auxiliary port R=0, C=18 µF, For output port R=40, C=0.5 µF
Product safety	IEC60255-27	<ul style="list-style-type: none"> <li>Clearances and Creepage Distances Test</li> <li>IP Rating Test</li> <li>Impulse Voltage Test</li> <li>AC or DC Dielectric Voltage</li> <li>Insulation Resistance</li> <li>Protective Bonding Continuity</li> <li>Flammability of insulating materials, components and fire enclosures</li> <li>Single-fault Condition</li> </ul>

## Mechanical Test

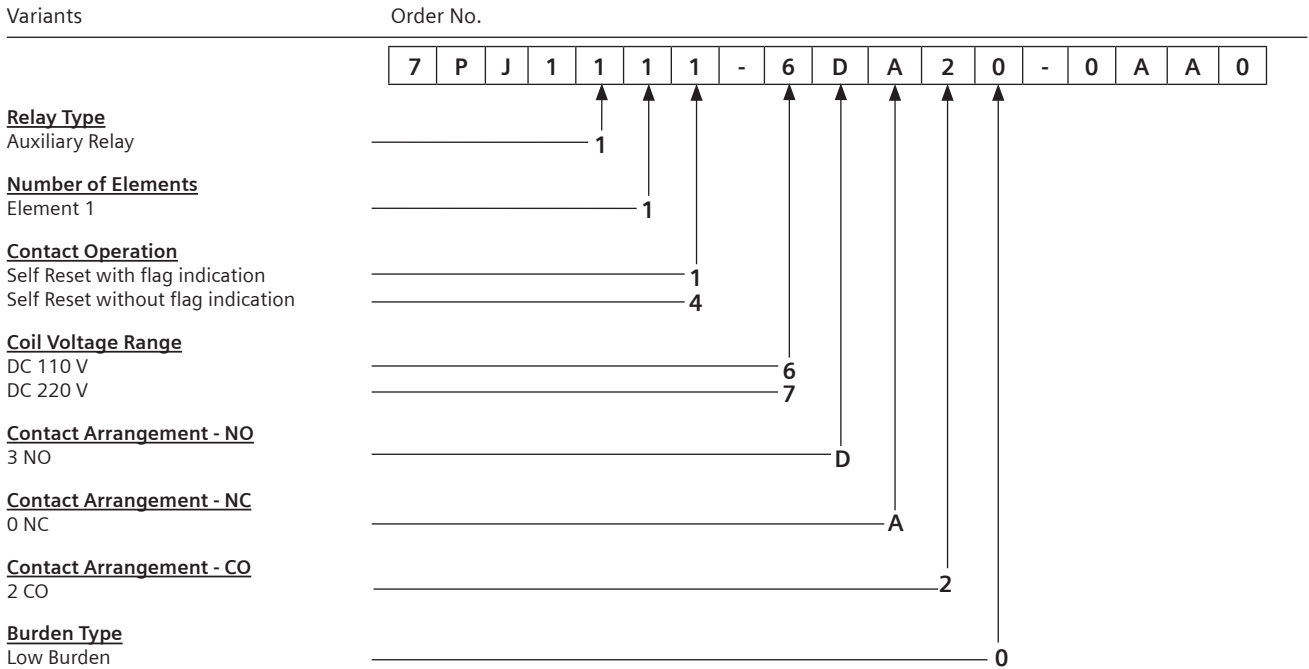
Type test	Reference	Requirement
Vibration test	IEC60255-21-1, IEC60255-21-2	Response Class I, 10 - 150 Hz, 0.5 g, 3 axis, Endurance Class I, 10 - 150 Hz, 1.0 g, 3 axis
Shock response test and Bump test	IEC60255-21-2	Shock response, Class I, 5 g, 11 ms Shock withstand, Class I, 15 g, 11 ms Bump Class I, 10 g, 16 ms
Seismic test	IEC60255-21-3: 1993	In single axis sine sweep in X-axis sweep (@ a sweep rate of 1 octave/minute) vibration in the frequency range (5 - 40 Hz) at amplitude of 3.5 mm or 1.0 g (whichever is less) In single axis sine sweep in Y-axis sweep (@ a sweep rate of 1 octave/minute) vibration in the frequency range (5 - 40 Hz) at amplitude of 1.5 mm or 0.5 g (whichever is less)
Degree of protection	IEC60255-27, IEC60529	IP50 – Front side IP20 – Rear terminal side

## Limits of Operations

Type test	Reference	Requirement
Thermal withstand Continuous	IEC60255-6	1.15 U <sub>N</sub>
Thermal withstand for 10 s	IEC60255-6	1.30 U <sub>N</sub>
AC ripple on DC supply	IEC60255-11	Withstand 12% AC ripple on DC supply
Burden Class	ENA TS 48-4 Issue 4 2010 Table 1	High Burden Relay <ul style="list-style-type: none"> <li>Power consumption &lt;150 W after operation &lt;20 W,</li> <li>Min Operating current should be greater than 50 mA ,</li> <li>Immunity to Capacitor Discharge.</li> </ul>

# MLFB (Ordering Code)

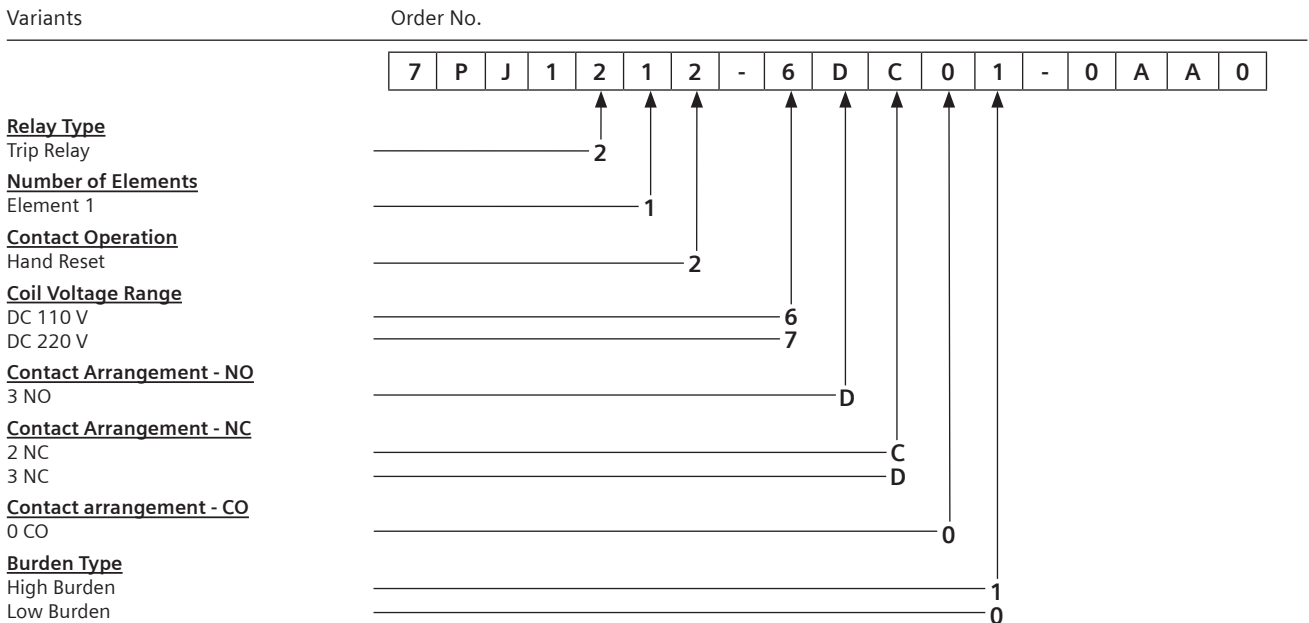
## Auxiliary Relay



The following table shows the variants and MLFB ordering code of Auxiliary relay.

Variants	MLFB Ordering Code
Auxiliary relay with self reset contacts without flag, DC 110 V, 3 NO + 2 CO, Low Burden	7PJ1114-6DA20-0AA0
Auxiliary relay with self reset contacts without flag, DC 220 V, 3 NO + 2 CO, Low Burden	7PJ1114-7DA20-0AA0
Auxiliary relay with self reset contacts with flag, DC 110 V, 3 NO + 2 CO, Low Burden	7PJ1111-6DA20-0AA0
Auxiliary relay with self reset contacts with flag, DC 220 V, 3 NO + 2 CO, Low Burden	7PJ1111-7DA20-0AA0

## Trip Relay



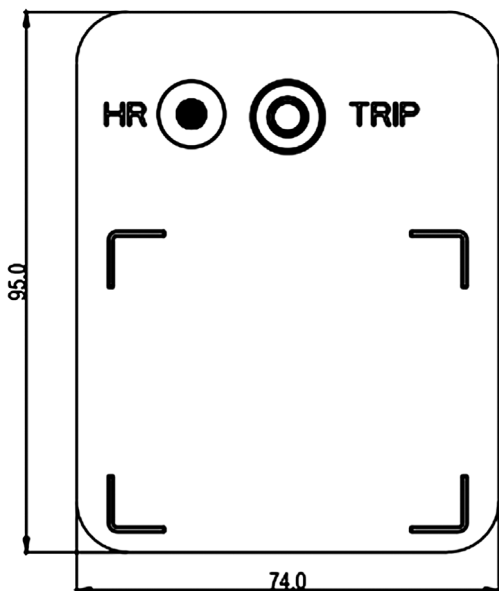
The following table shows the variants and MLFB ordering code of Trip relay.

Variants	MLFB Ordering Code
Trip relay with hand reset contacts with flag, DC 110 V, 3 NO + 2 NC, High Burden	7PJ1212-6DC01-0AA0
Trip relay with hand reset contacts with flag, DC 220 V, 3 NO + 2 NC, High Burden	7PJ1212-7DC01-0AA0
Trip relay with hand reset contacts with flag, DC 110 V, 3 NO + 3 NC, Low Burden	7PJ1212-6DD00-0AA0
Trip relay with hand reset contacts with flag, DC 220 V, 3 NO + 3 NC, Low Burden	7PJ1212-7DD00-0AA0

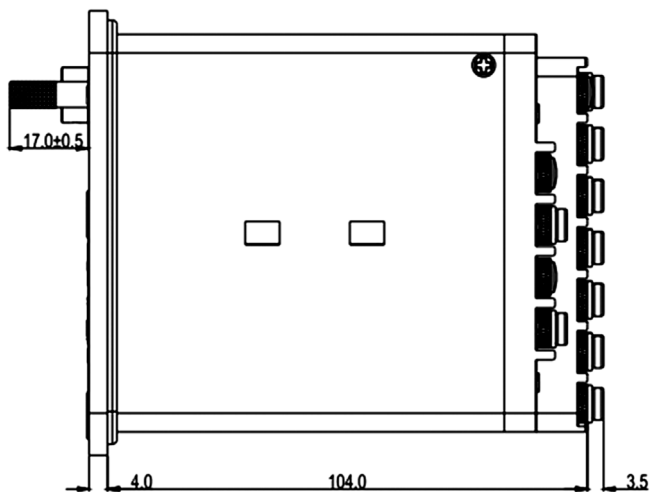
# Dimensional Drawings

The dimensional drawings display the different views of Auxiliary relay and Trip relay.

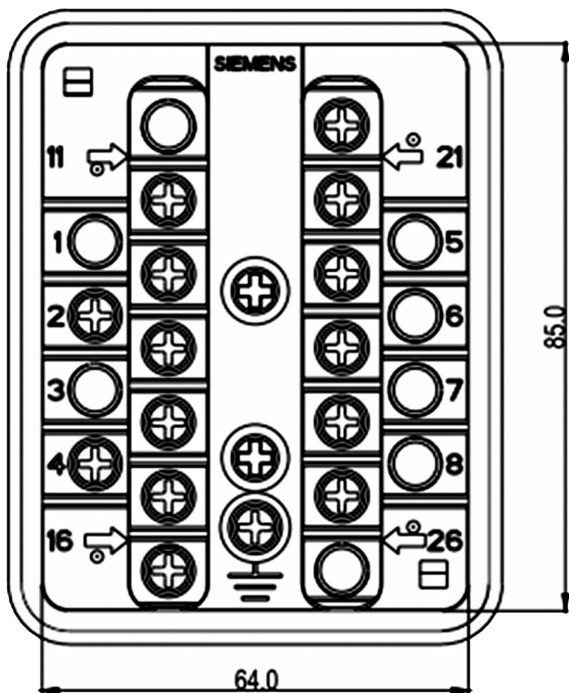
Front View



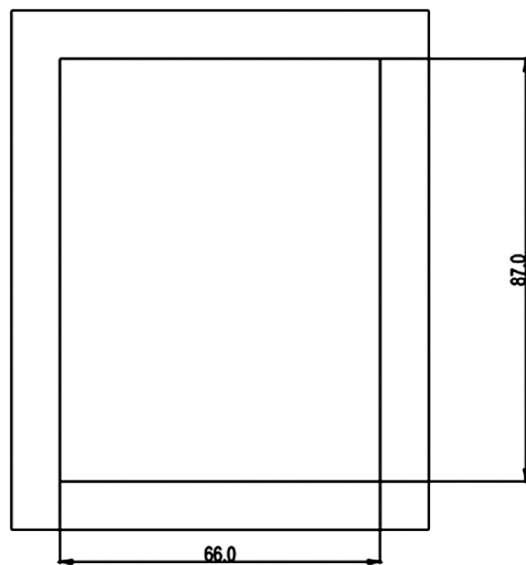
Side View



Rear View



Panel cut-out view

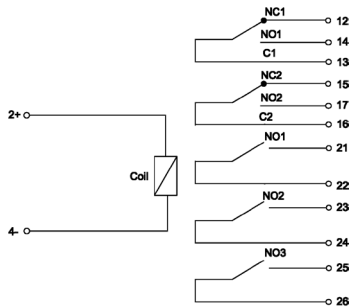


**NOTE**

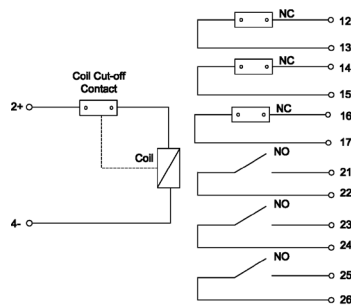
In the above drawings, all dimensions are in millimeter (mm).

# Terminal Diagrams

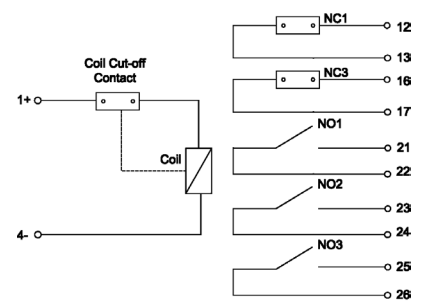
The terminal diagram shows the terminal numbers of Auxiliary relay and Trip relay and the physical arrangements of Normal Close(NC), Normal Open(NO), and Change Over contacts(CO).



Auxiliary Relay



Trip Relay Low Burden



Trip Relay High Burden

## Application Note:

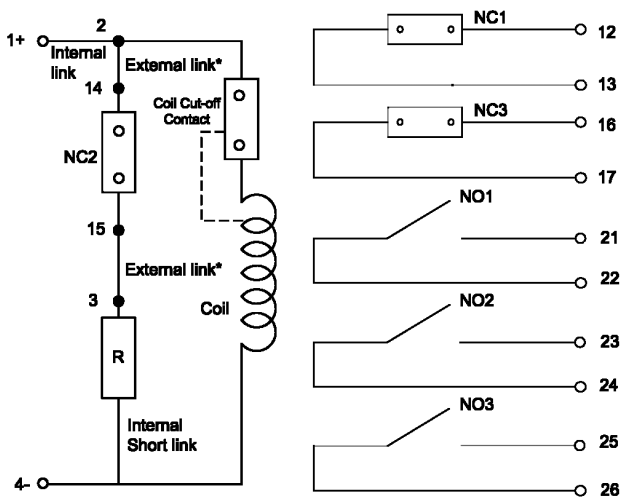
Trip Relay 7PJ1212-xDD00-0AA0, Low Burden are suitable for application for tripping and auxiliary duties where immunity to capacitance discharge is not required.

In general low-burden relay are for application where the trip wiring remains in the same panel or same breaker LV compartment.

High burden relays are designed for application where the trip relay is remotely located from the protective relay or where the trip wiring is routed through a long length cable from a far end control and relay panel. For immunity to capacitance discharges due to frequent station battery earth-faults, High Burden 7PJ1212-xDD01-0AA0 relay to be used.

These High Burden Trip Relays are qualified according to the international standard ENA TS 48-4 Issue 4 2010, for immunity to capacitive discharge due to frequent station battery earth-faults and immunity to AC interference due to inductive and capacitive coupling.

The below diagram shows the configuration followed for the high burden Trip Relay,



\* Do not remove external link as it will affect the high burden performance. In the high burden trip relay, an external link is connected between the terminal 2 and 14 terminal 3 and 15.



Rear Terminal view of High Burden Trip Relay with attached external link.

## NOTE

Do not remove external wire link

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**C53000-X7076-001-3**  
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