



Alpha TR User Guide

High Speed Tripping Relay

RMS Mors Smitt

Advanced Protection Devices



User Guide

Alpha TR User Guide

About This Manual

This User Guide covers all Alpha TR relays manufactured from January 2025. Earlier relays do not necessarily incorporate all the features described. Our policy of continuous development means that extra features & functionality may have been added.

The Alpha TR User Guide is designed as a generic document to describe the common operating parameters for all relays built on this platform.

The copyright and other intellectual property rights in this document, and in any model or article produced from it (and including any registered or unregistered design rights) are the property of RMS Mors Smitt. No part of this document shall be reproduced or modified or stored in another form, in any data retrieval system, without the permission of RMS Mors Smitt, nor shall any model or article be reproduced from this document without consent from RMS Mors Smitt.

While the information and guidance given in this document is believed to be correct, no liability shall be accepted for any loss or damage caused by any error or omission, whether such error or omission is the result of negligence or any other cause. Any and all such liability is disclaimed.

Contact Us

RMS Mors Smitt

19 Southern Court • Keysborough 3173 • AUSTRALIA

Phone +61 3 8544 1200

Email sales.rms@wabtec.com • Web <http://www.morssmitt.com/rms>

Contents

| | |
|--|-----------|
| Contents | 3 |
| Documentation..... | 4 |
| Technical Bulletin | 4 |
| User Guide | 4 |
| Introduction..... | 5 |
| Scheme Wiring and Installation..... | 6 |
| Alpha TR5 Connection diagram | 6 |
| Alpha TR12 Connection diagram | 7 |
| Example Schematic – Typical Trip Application | 8 |
| Terminal Layout and Relay Dimensions | 9 |
| IP2X Terminal Covers | 10 |
| Relay Configuration..... | 11 |
| Operating Burden Configuration..... | 11 |
| Electrical Reset Interlock Configuration | 12 |
| Alpha TR Indications | 14 |
| Front Layout | 14 |
| Optional Coil P/U LED..... | 14 |
| Optional Operation Counter | 14 |
| Armature Flag and Latched Contact Reset Push Button | 14 |
| Independent Hand Reset Flag and Flag Reset Push Button | 14 |
| Optional Electrical Reset Isolation Switch | 14 |
| Commissioning..... | 15 |
| Commissioning Preliminaries | 15 |
| Site Commissioning Verification Checklist | 16 |
| Preliminary Checks..... | 16 |
| Operate/Reset Operation | 18 |
| Protection Scheme Confirmation | 20 |

Documentation

Technical Bulletin

The detailed technical attributes, functional description & performance specifications for the Alpha TR are described in the product Technical Bulletin.

The order of precedence for product information is as follows:

- Technical Bulletin
- User Guide

User Guide

This User Guide covers all Alpha TR relay versions & describes the generic features & attributes common across all versions.

Different relay versions are required to cater for varying customer requirements such as auxiliary voltage range, I/O configuration, case style, relay functionality etc.

The product ordering code described in the Technical Bulletin is used to generate a unique version of the relay specification.

Introduction

The Alpha TR relay is a withdrawable High Speed Tripping relay with low contact bounce time and high contact rating.

The relay design incorporates a user settable high or low operate input burden.

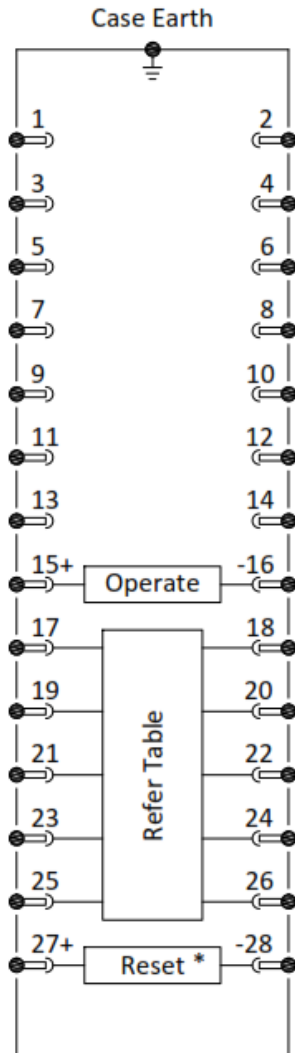
The high burden setting allows for applications that have specific Capacitor Discharge Immunity requirements to ESI 48-4 EB2.

The Alpha TR relay may be ordered in 5 or 12 contact variants with either self resetting or latched contacts and flexible contact arrangements.

Relay models are available for hand reset and/or electrical reset contacts and self reset or hand reset flags.

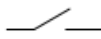
Scheme Wiring and Installation

Alpha TR5 Connection diagram



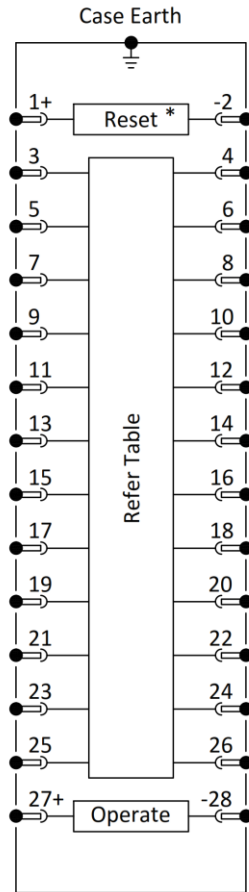
* Electrical reset where specified.
Refer Technical Bulletin

| TR5 Terminal Number Pairs | | | | | | |
|---------------------------|----------|-------|-------|-------|-------|-------|
| Code | Contacts | 17-18 | 19-20 | 21-22 | 23-24 | 25-26 |
| N | 5M 0B | M | M | M | M | M |
| P | 4M 1B | M | M | M | M | B |
| Q | 3M 2B | B | M | M | M | B |
| R | 2M 3B | B | M | M | B | B |
| S | 1M 4B | B | B | M | B | B |

M: Make 


B: Break 


Alpha TR12 Connection diagram



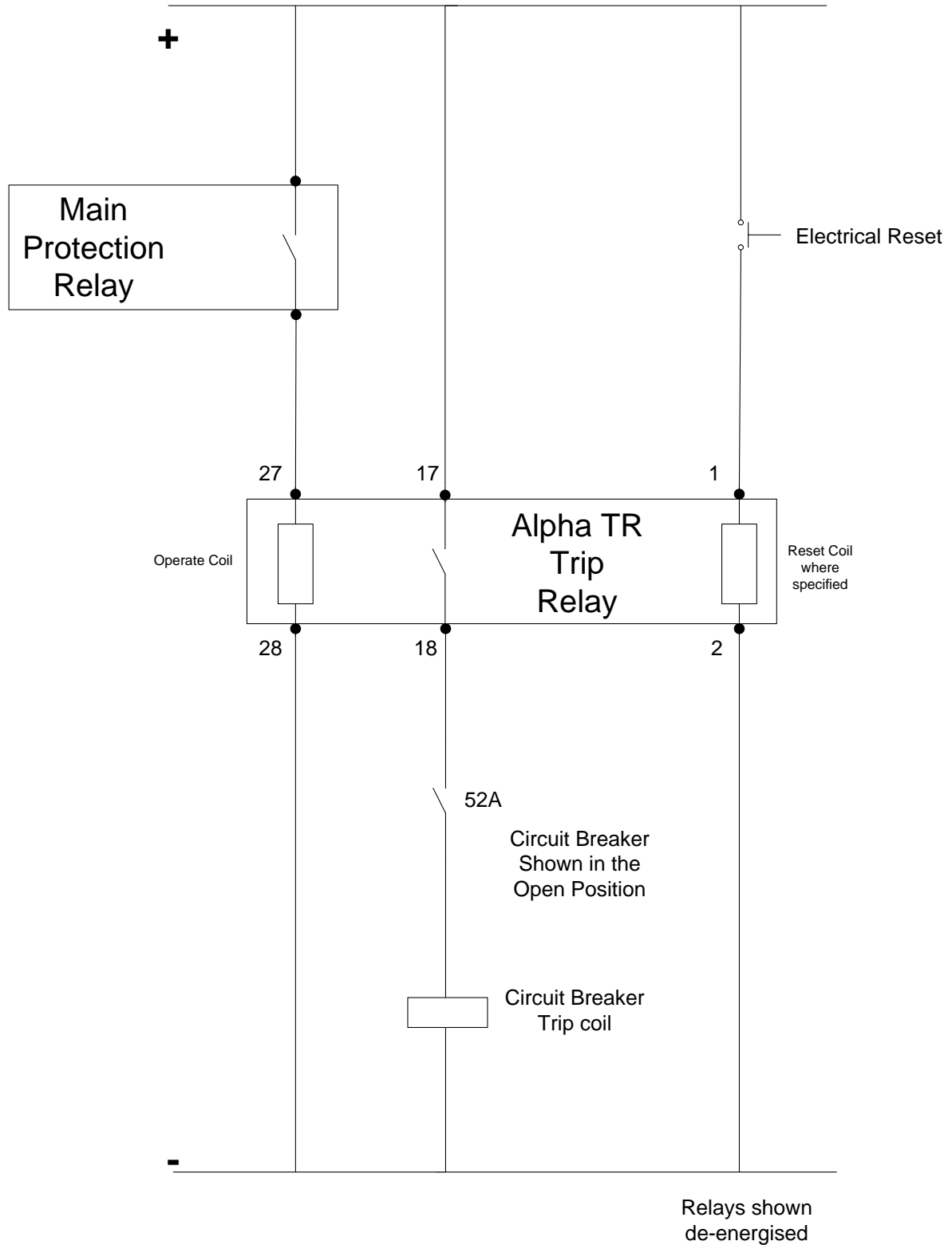
* Electrical reset where specified.
Refer Technical Bulletin

| TR12 Terminal Number Pairs | | | | | | | | | | | | | |
|----------------------------|----------|-----|-----|-----|------|-------|-------|-------|-------|-------|-------|-------|-------|
| Code | Contacts | 3-4 | 5-6 | 7-8 | 9-10 | 11-12 | 13-14 | 15-16 | 17-18 | 19-20 | 21-22 | 23-24 | 25-26 |
| C | 10M 02B | B | M | M | M | M | M | M | M | M | M | M | B |
| D | 09M 03B | B | M | M | M | M | M | M | M | M | M | B | B |
| E | 08M 04B | B | B | M | M | M | M | M | M | M | M | B | B |
| F | 07M 05B | B | B | M | M | M | M | M | M | M | B | B | B |
| G | 06M 06B | B | B | B | M | M | M | M | M | M | B | B | B |

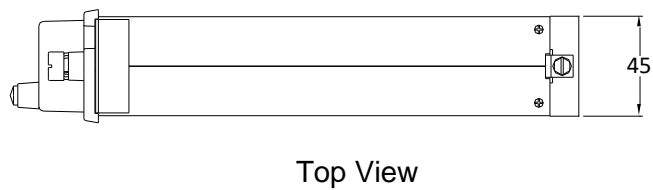
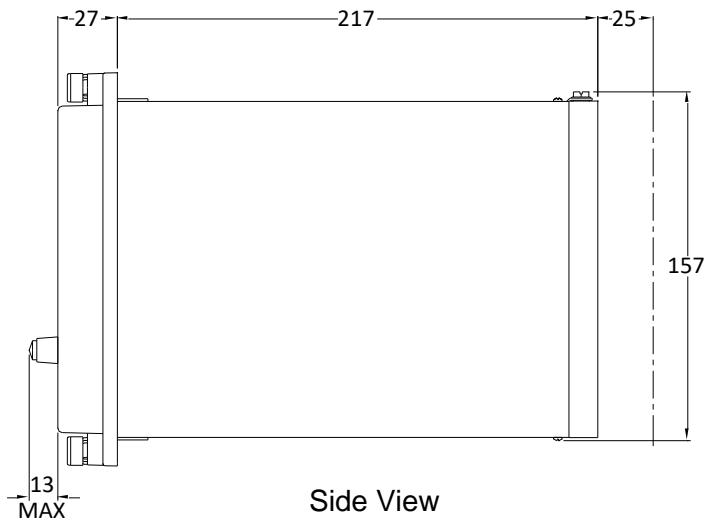
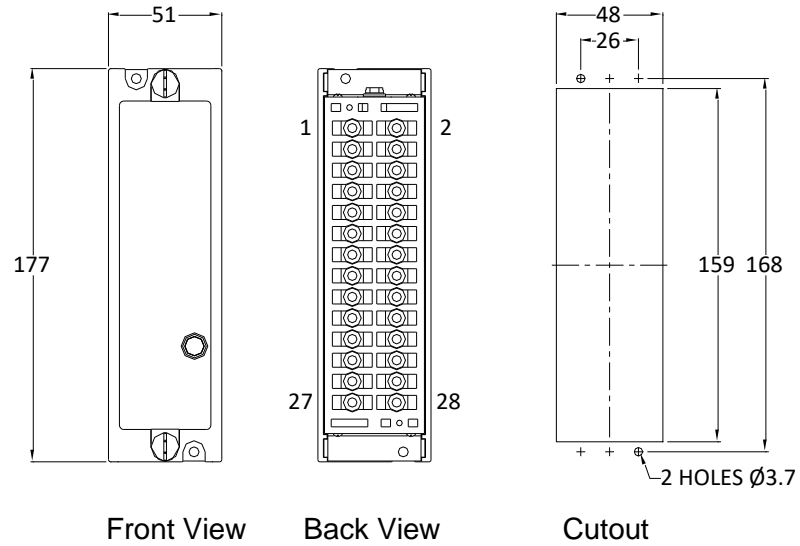
M: Make 

B: Break 

Example Schematic – Typical Trip Application



Terminal Layout and Relay Dimensions



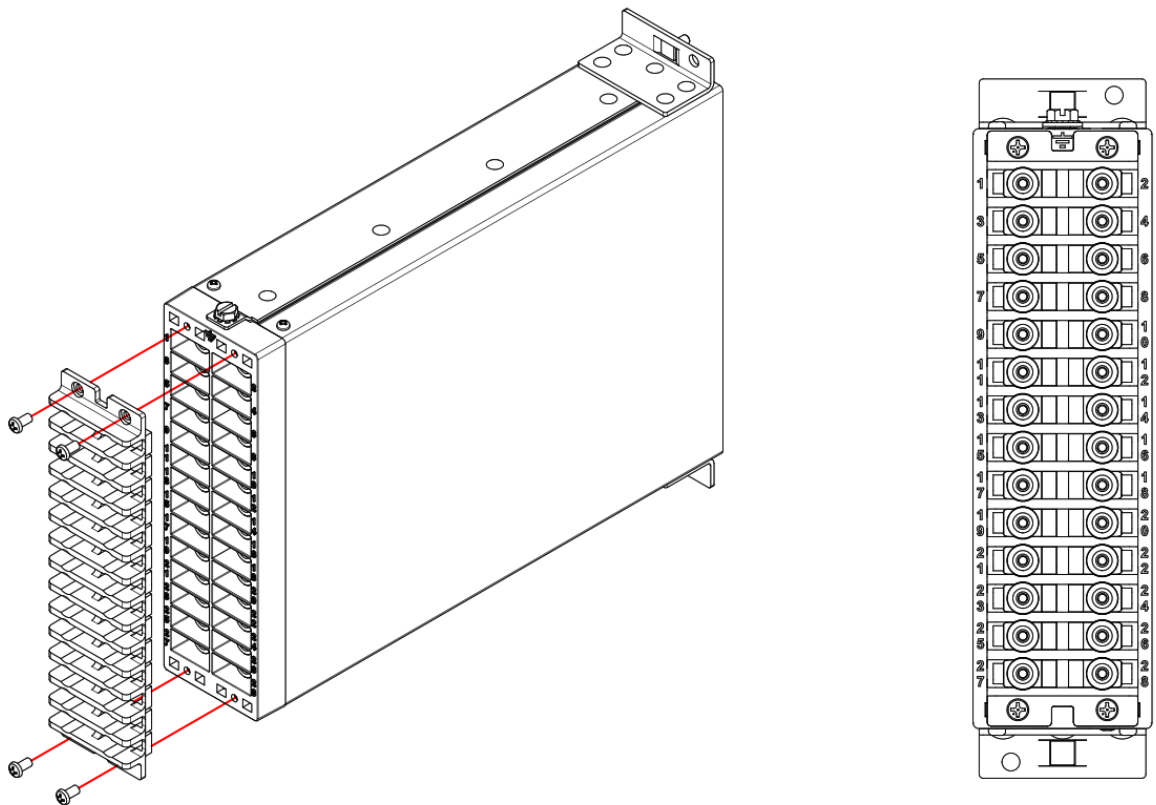
The relay module is designed for rack or panel mounting.

IP2X Terminal Covers

The relay may be ordered with IP2X terminal covers to provide IP2X protection of the case terminals.

Alternatively separate IP2X terminal cover kits are available to provide IP2X protection of the case terminals.

The covers are fitted to the terminal block prior to cable termination.



2M28-S Case with IP2X cover

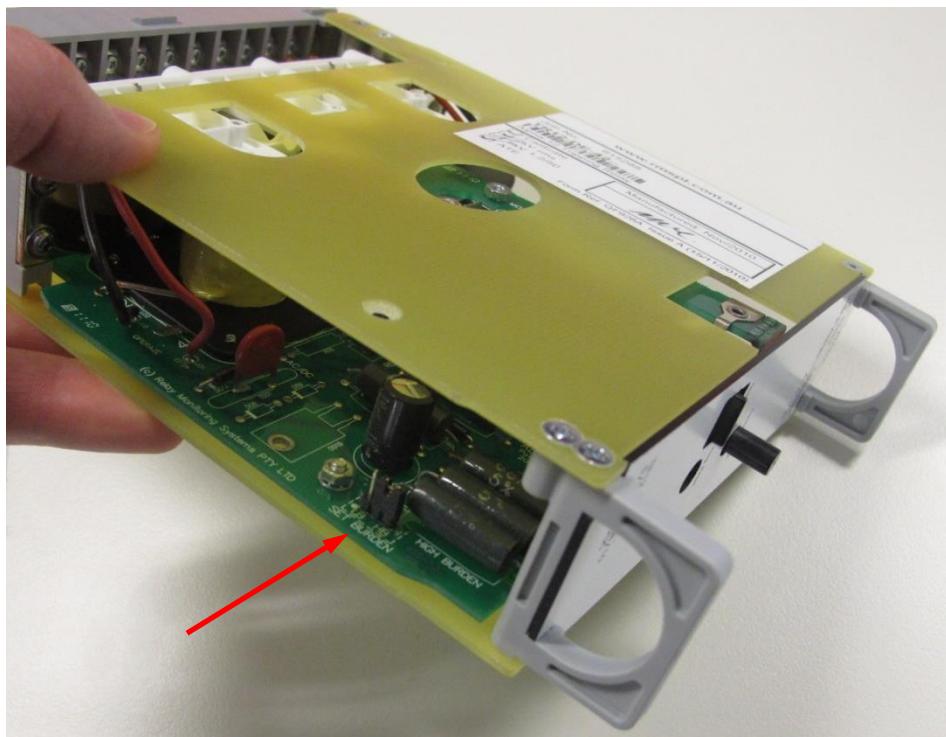
Relay Configuration

Prior to application of the Alpha TR the following configuration settings must be set to ensure correct relay application.

Operating Burden Configuration

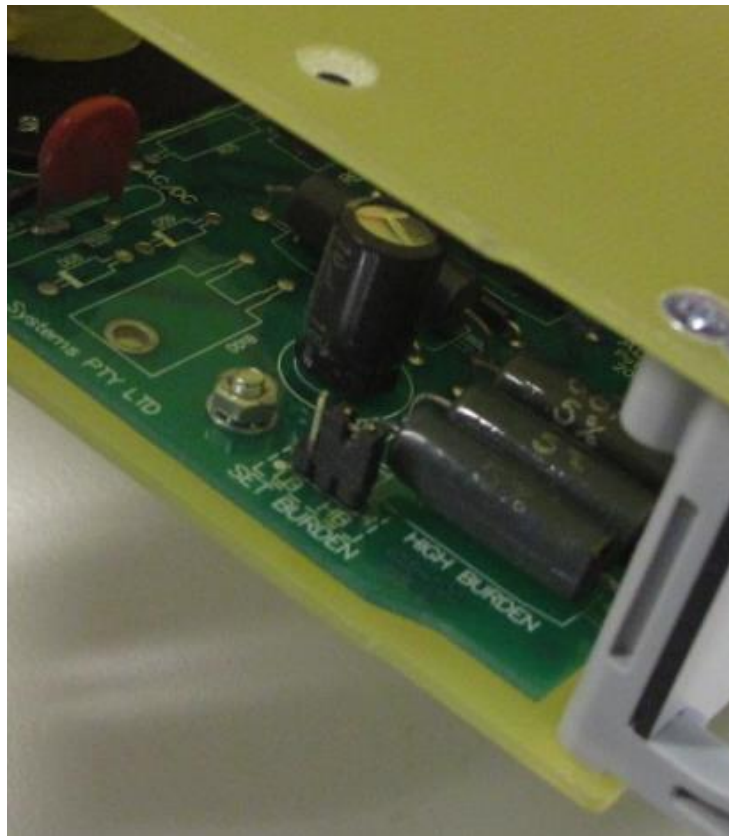
The Alpha TR high speed tripping relays may be set by the user for low burden or high burden operation.

This is achieved by withdrawing the relay module from the case and changing the position of a PCB link, as depicted in figure below.



The burden setting link is located at the bottom front of the draw out module and is readily accessible to the user for checking and changing to meet specific system requirements.

Unless otherwise specified all TR model relays are factory set and shipped in high burden configuration.



The link is shown fitted in the high burden (HB), position.

LB = Low burden operation.

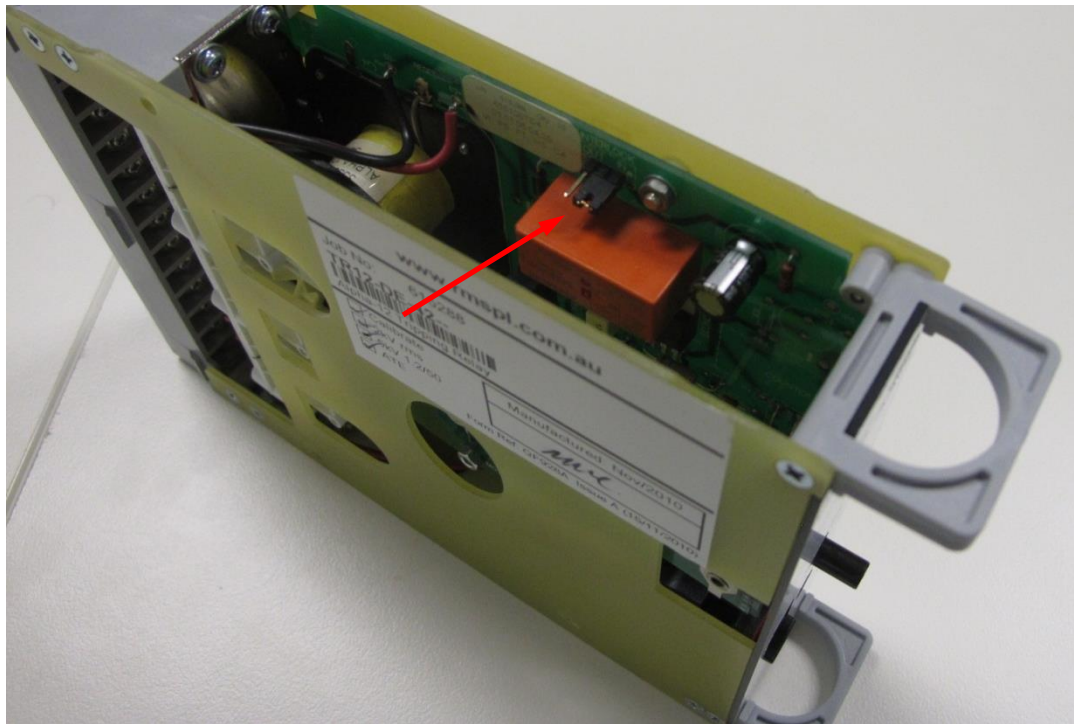
HB = High burden operation – default factory position.

Electrical Reset Interlock Configuration

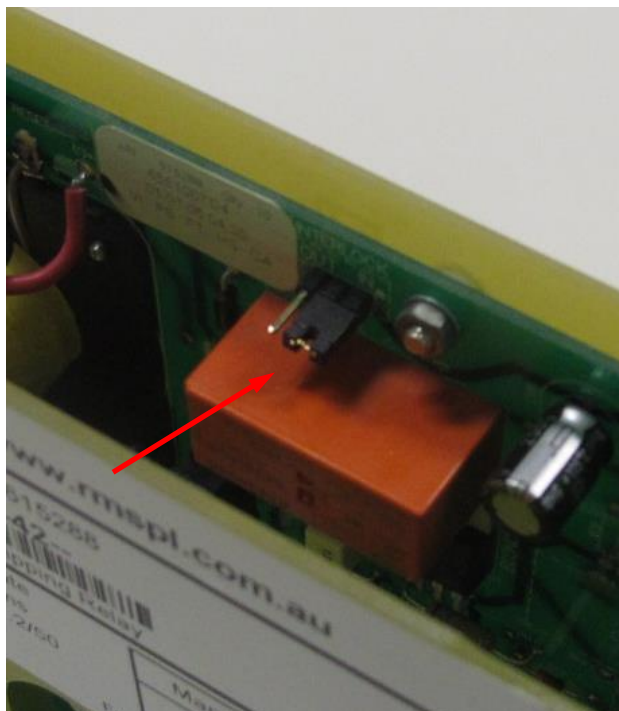
On Alpha TR relays fitted with an electrical reset, a selectable Electrical Reset Interlock feature is provided. If selected this feature locks out the reset command while voltage is applied to the operate coil and prevents damage to the relay.

Unless otherwise specified all electrical reset Alpha TR model relays are factory set and shipped with the interlock set to the 'IN' position.

The selection of the Electrical Reset Interlock is achieved by withdrawing the relay module from the case and changing the position of a PCB link, as depicted in figure below.



The Electrical Reset Interlock link is located at the top front of the draw out module and is readily accessible to the user for checking and changing to meet specific system requirements.



Alpha TR Indications

Front Layout

The figure below depicts the indications, controls and the reset push buttons on the front of the relay of a fully optioned model.



Optional Coil P/U LED



The P/U Led illuminates when a pickup voltage is applied to the relay coil.

Optional Operation Counter



The operation counter increments each time the relay contacts operate.

Armature Flag and Latched Contact Reset Push Button



The Armature flag follows the position of the contacts. Latched contacts and associated Armature flag are reset using the contact reset push button.

Independent Hand Reset Flag and Flag Reset Push Button



The Independent hand reset flag operates when the contacts first operate and remains visible until it is hand reset using the Flag Reset Push Button.

Optional Electrical Reset Isolation Switch



An optional front panel switch that allows a local operator to isolate the electrical reset coil and disable the remote reset function.

Commissioning

Commissioning Preliminaries

Carefully examine the module to ensure that no damage has occurred during transit. Check that the model number and rating information are correct.

Insulation

The relay, and its associated wiring, may be insulation tested between:

- all electrically isolated circuits
- all circuits and earth

An electronic or brushless insulation tester should be used, having a dc voltage not exceeding 1000V. Accessible terminals of the same circuit should first be strapped together. Deliberate circuit earthing links, removed for the tests, subsequently must be replaced.

Injection Testing

Testing of relay function may be undertaken using a secondary test set injecting directly into the relay operate coil or alternatively as part of a complete protection scheme tested in conjunction with the main protection relays.

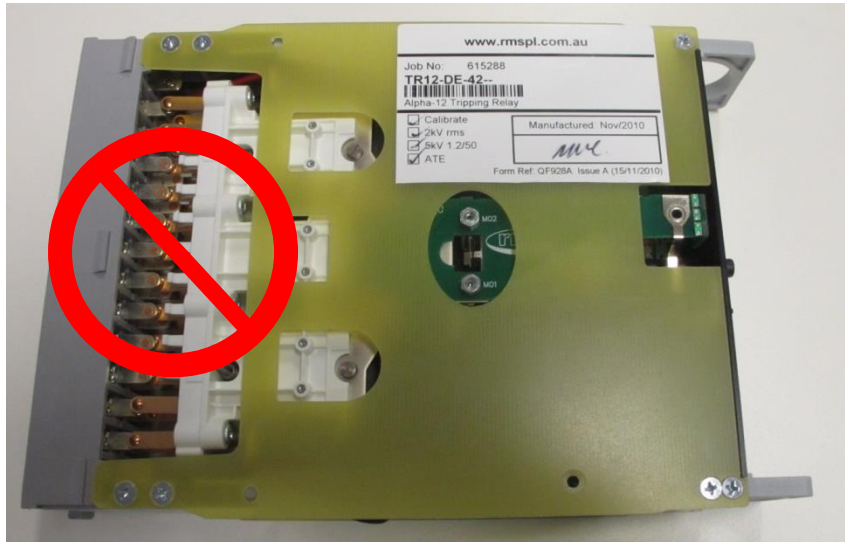
Site Commissioning Verification Checklist

Observe all site specific standard safety procedures.

The following tests are undertaken following the completion of all Alpha TR relay wiring.

Preliminary Checks

| Item | Description | Complete |
|------|---|----------|
| 1 | Confirm all necessary primary equipment isolations | |
| 2 | Confirm all necessary secondary equipment isolations (including trip outputs) | |
| 3 | Check panel installation of the Alpha TR relay | |
| 4 | Check the Alpha TR is wired to the protection design schematic | |
| 5 | With the relay element withdrawn from the case check for any evidence of transit damage and confirm free and easy movement of the armature assembly. Note care should be taken to avoid touching the adjusted contacts. | |



The image shows an Alpha TR relay unit with a red prohibition sign (a red circle with a diagonal slash) overlaid on the contact assembly. The relay is green and has a white label with the following text: www.rmspl.com.au, Job No: 615288, TR12-DE-42, Alpha 12 Tripping Relay, Manufactured Nov2010, and Form Ref: QF92SA Issue A (15/11/2010). There are also checkboxes for Calibrate, 2kV rms, 5kV 1.2/50, and ATE, with the ATE checkbox checked.

| Item | Description | Complete |
|------|--|----------|
| 6 | <p>The armature assembly may be manually operated using the grub screw adjustment window as depicted.</p>  <p>Confirm that fitted mechanical flags drop when the armature assembly is manually operated.</p> <p>On latched contact models confirm that the armature mechanism latches when manually operated.</p> | |

| Item | Description | Complete |
|------|--|----------|
| 7 | On latched contact models confirm that the latched contacts are able to be reset using the contact reset push button. Confirm that the fitted mechanical flags are able to be reset. | |
| 8 | In the non operate state confirm the normally open and normally closed contact states against the relevant relay connection diagram using a suitable continuity tester | |
| 9 | Manually operate the relay contacts and confirm the contact state change against the relevant relay connection diagram using a suitable continuity tester | |

Operate/Reset Operation

| Item | Description | Complete |
|------|---|----------|
| 1 | Insert the relay module into the case and ensure contacts are reset and the mechanical flags are in the reset position | |
| 2 | The operate circuit is terminated to case terminals 27(+) and 28(-) | |
| 3 | Where fitted the electrical reset circuit is terminated to case terminals 15(+) and 16(-) on TR5 models or 1(+) and 2(-) on TR12 models | |
| 4 | Disconnect external wiring from these terminals to allow application of the test supply | |
| 5 | <p>Check for operation of the operate circuit by energising the relay with 100% of the nominal supply voltage</p> <p>The test voltage is to be applied as a step</p> <p>The relays should switch cleanly with one movement</p> <p>On relays fitted with a mechanical flag, confirm that the flag drops to provide a visual indication of relay operation</p> <p>Confirm the operate time of the contacts is in accordance with the individual relay test report supplied with the relay</p> | |
| 6 | With the relay in the operate state check the continuity of the closed contacts. The contact continuity test should be undertaken by applying 5A current & measuring the voltage across the closed output contact terminals and confirming the contact impedance per the individual relay test report supplied with the relay | |

| Item | Description | Complete |
|------|---|----------|
| 7 | Remove the operate circuit test supply | |
| 8 | <p>On latching relays perform a manual contact reset and confirm the contact state change with a suitable continuity tester</p> <p>On relays fitted with a mechanical flag reset the flag</p> | |
| 9 | <p>On relays fitted with an electrical reset circuit, repeat step 5 through to 7</p> <p>Ensure that the operate circuit test supply is removed</p> <p>Check for operation of the reset circuit by energising the reset input with 100% of the nominal supply voltage</p> <p>The test voltage is to be applied as a step and the relays should reset cleanly with one movement</p> <p>Confirm the contact state change with a suitable continuity tester</p> <p>On relays fitted with a mechanical flag reset the flag</p> | |
| 10 | Restore any external wiring connections that may have been disturbed during the above tests | |

Protection Scheme Confirmation

| Item | Description | Complete |
|------|--|----------|
| 1 | With the tripping relay connected in the tripping scheme perform a trip check of the main protection relay | |
| 2 | Confirm intended operation of the tripping relay upon operation of the main protection relay | |
| 3 | On latching relays perform a manual contact reset and confirm the contact state change with a suitable continuity tester On relays fitted with a mechanical flag reset the flag | |
| 4 | On relays fitted with an electrical reset circuit, repeat steps 1 through to 2 Ensure that the operate circuit test supply is removed Check operation of the reset circuit by performing an electrical reset Confirm the contact state change with a suitable continuity tester On relays fitted with a mechanical flag reset the flag | |