7SR224 Recloser Controller
Overcurrent Relay

Document Release History

This document is issue **2010/05**. The list of revisions up to and including this issue is:

2008/03	First Issue
2008/11	Second Issue. Additional I/O connections added
2009/09	Third Issue. Core Balance CT arrangement & Comms options added.
2010/04	Fourth Issue. Check Synchronising added
2010/05	Fifth issue. Document reformat due to rebrand.

Software Revision History

2008/03	2435H80011R2d-1a	First Release
2008/06	2435H80011R3d-2b	Second Release. Loss Of Voltage
2008/10	2435H80011R4-3	Third Release. Single/Triple AutoReclose function
2009/09	2435H80011R4c-3b	Fourth Release. Additional RS485 & RS232 comms
2010/04	2435H80011R4d-4	Fifth Release. Check Synchronising

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Section 1: Installation

1.1   Unpacking, Storage and Handling

On receipt remove the relay from the container in which it was received and inspect it for obvious damage. It is recommended that the relay not be removed from its case.

If damage has been sustained a claim should immediately be made against the carrier, also inform *Siemens Protection Devices Limited*, and the local *Siemens* agent, using the Defect Report Form in the Maintenance section of this manual.

When not required for immediate use, the relay should be returned to its original carton and stored in a clean, dry place.

The relay contains static sensitive devices, which are susceptible to damage due to static discharge. The relay's electronic circuits are protected from damage by static discharge when the relay is housed in its case.

There can be no requirement to disassemble any relay, since there are no user serviceable parts in the relay. If any modules have been tampered with, then the guarantee will be invalidated. *Siemens Protection Devices Limited* reserves the right to charge for any subsequent repairs.

1.2   Recommended Mounting Position

The relay uses a liquid crystal display (LCD) which is used in the programming and for operation.   The LCD has a vertical viewing angle of ± 30˚ and is back–lit. However, the best viewing position is at eye level, and this is particularly important given its control features.

The relay should be mounted on the circuit breaker (or protection panel) to allow the operator the best access to the relay functions

1.3   Wiring

The product should be wired according to the scheme requirements, with reference to the appropriate wiring diagram. Refer to the appropriate Diagrams and Parameters document for a cross reference of wiring diagrams and models.

1.4   Earthing

Terminal 28 of the PSU (Power Supply Unit) should be solidly earthed by a direct connection to the panel earth. The Relay case earth stud connection should be connected to terminal 28 of the PSU.

It is normal practice to additionally 'daisy chain' together the case (safety) earths of all the Relays installed in a panel to prevent earth current loops posing a risk to personnel.

1.5   Ancillary Equipment

The relay can be interrogated locally or remotely. For local interrogation a portable PC with suitable version of MS Windows (2000 SP4 or XP SP2) and Reydisp Evolution™ software is required. The PC is connected to the front USB port of the relay.

1.6   Equipment Operating Conditions Current Transformer Circuits

The secondary circuit of a live CT must not be open circuited. Non-observance of this precaution can result in injury to personnel or damage to equipment

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1.7   Fibre Optic Communication

Where fibre optic communication devices are fitted, these should not be viewed directly. Optical power meters should be used to determine the operation or signal level of the device.

1.8   Front Cover

The front cover provides additional securing of the relay element within the case. The relay cover should be in place during normal operating conditions.
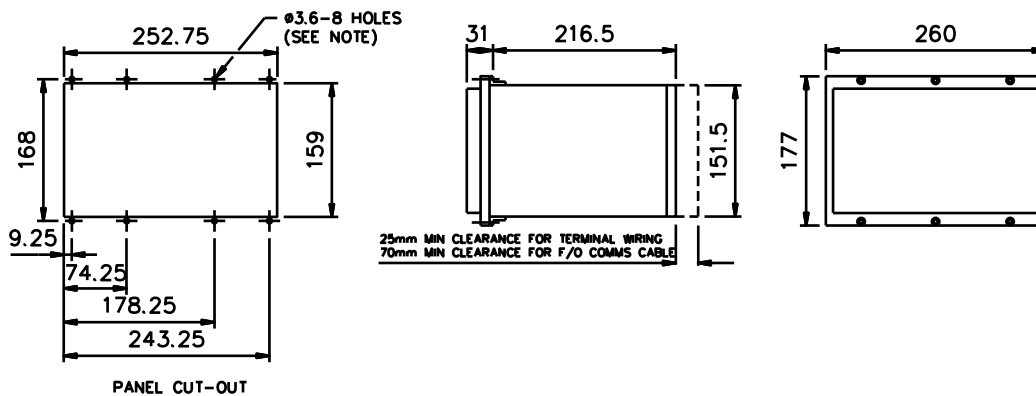
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Section 2: Dimensions and Panel Fixings

2.1 Relay Dimensions and Weight

Relays are supplied in size E10 and E12 cases.

The following drawing is available which gives panel cut-out and mounting details.

Overall Dimensions and panel Drilling for Size E10 Epsilon case (Typically 5.89Kg)

NOTE:
THE ⌀3.6 HOLES ARE FOR M4 THREAD FORMING (TRILOBULAR)
SCREWS. THESE ARE SUPPLIED AS STANDARD AND ARE
SUITABLE FOR USE IN FERROUS/ALUMINIUM PANELS 1.6mm
THICK AND ABOVE. FOR OTHER PANELS, HOLES TO BE M4
CLEARANCE (TYPICALLY ⌀4.5) AND RELAYS MOUNTED USING
M4 MACHINE SCREWS, NUTS AND LOCKWASHERS (SUPPLIED IN
PANEL FIXING KIT).

Overall Dimensions and Panel Drilling for Size E12 Epsilon Case
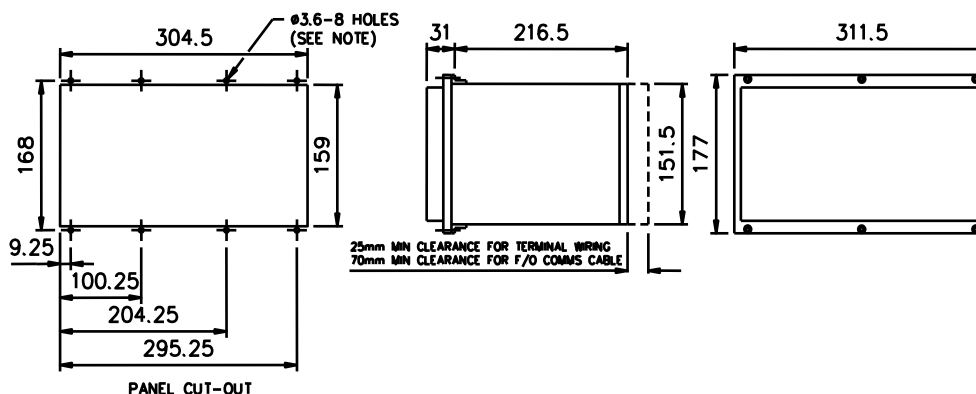
NOTE:
THE ⌀3.6 HOLES ARE FOR M4 THREAD FORMING (TRILOBULAR)
SCREWS. THESE ARE SUPPLIED AS STANDARD AND ARE
SUITABLE FOR USE IN FERROUS/ALUMINIUM PANELS 1.6mm
THICK AND ABOVE. FOR OTHER PANELS, HOLES TO BE M4
CLEARANCE (TYPICALLY ⌀4.5) AND RELAYS MOUNTED USING
M4 MACHINE SCREWS, NUTS AND LOCKWASHERS (SUPPLIED IN
PANEL FIXING KIT).

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2.2   Fixings

2.2.1   Crimps

Ring tongued crimps with 90˚ bend are recommended.

2.2.2   Panel Fixings

Typical mounting screw kit per Relay)

Consists of 4 off M4x10mm Screws

　　　4 off M4 Nuts

　　　4 off M4 Lock Washer

Typical rear terminal block fixing kit (1kit per terminal block fitted to relay) Consists of:
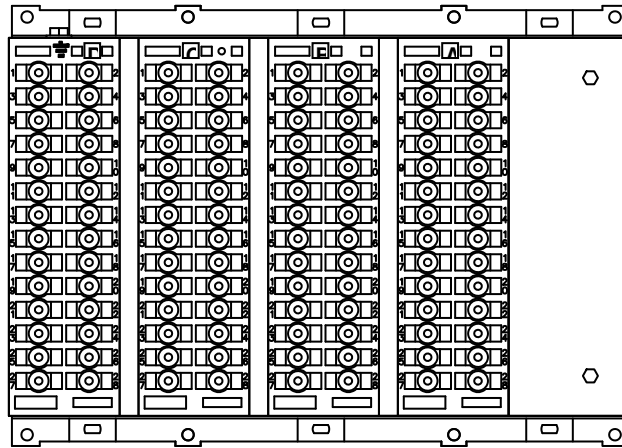
　　　28 x M4, 8mm Screws

　　　28 x M4 Lock Washer

2.2.3   Fibre Optic Connectors

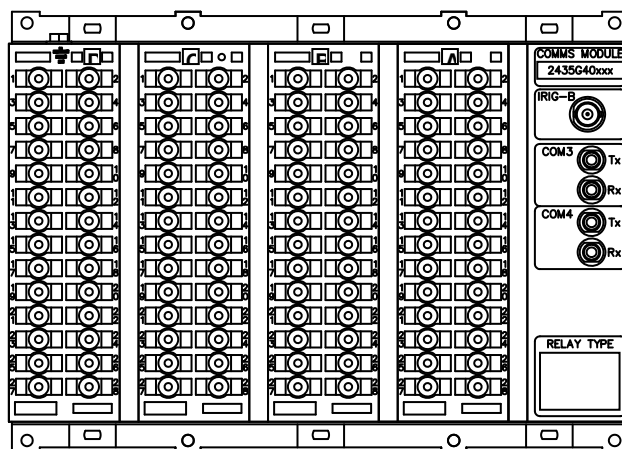The relay has Fibre-Optic ST^{TM} (BFOC/2.5) bayonet connectors fitted when specified.

Section 3: Rear Terminal Drawings

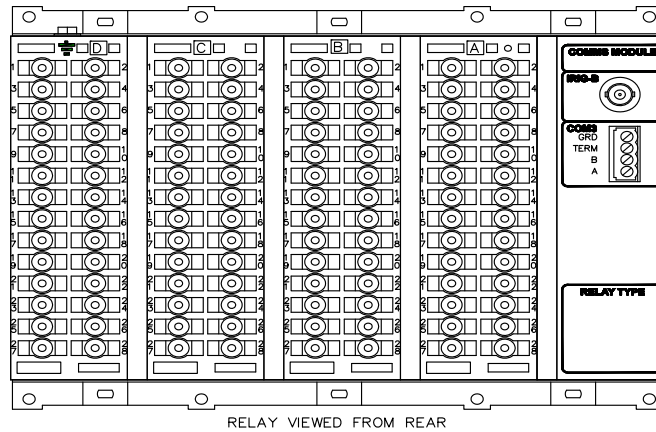## 3.1   E10 Case

RELAY VIEWED FROM REAR

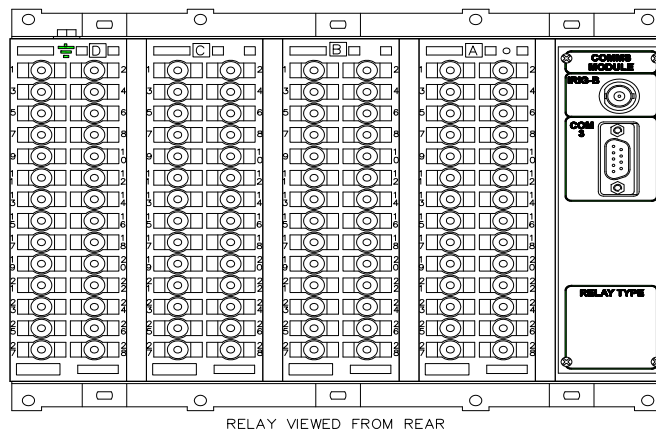**E10 STANDARD COMMS** i.e. USB FRONT PORT, RS485 (SEE NOTE 2)

RELAY VIEWED FROM REAR

E10 STANDARD COMMS + ADDITIONAL FIBRE OPTIC PORTS + IRIG-B

 i.e.:- USB FRONT PORT, RS485 (SEE NOTE 2) IRIG B, 2 X F.O. (S.T. CONNECTORS)

RELAY VIEWED FROM REAR

E10 STANDARD COMMS + ADDITIONAL RS485 PORT + IRIG-B

RELAY VIEWED FROM REAR

E10 STANDARD COMMS + ADDITIONAL RS232 PORT + IRIG-B

Notes

1) RECOMMENDED TERMINATIONS ARE PRE-INSULATED & MUST BE CRIMPED USING APPROVED TOOLING.

2) RS485 (BLOCK"B"TERMS 14, 16, 18, 20) CONNECTIONS TO THIS COMMUNICATION FACILITY IS BY SCREENED, TWISTED PAIR CABLE. ON SITE WHEN WIRING OTHER FACILITIES ENSURE THAT THESE TERMINALS AND OTHER COMMUNICATIONS INTERFACES ARE NOT OBSCURED BY OTHER WIRING RUNS. CABLE SHOULD BE RS485 COMPLIANT.

Section 4: Connection/Wiring/Diagrams

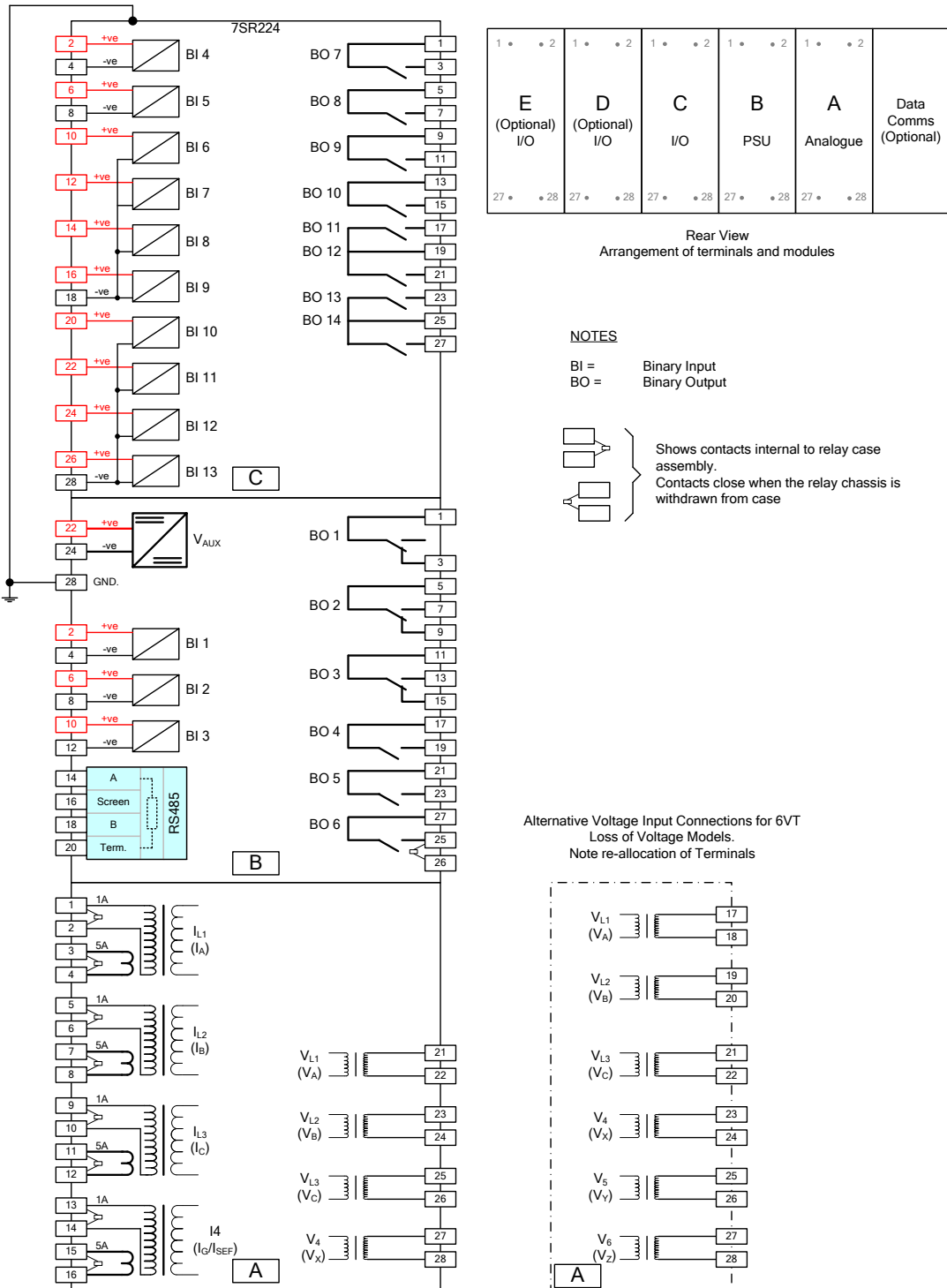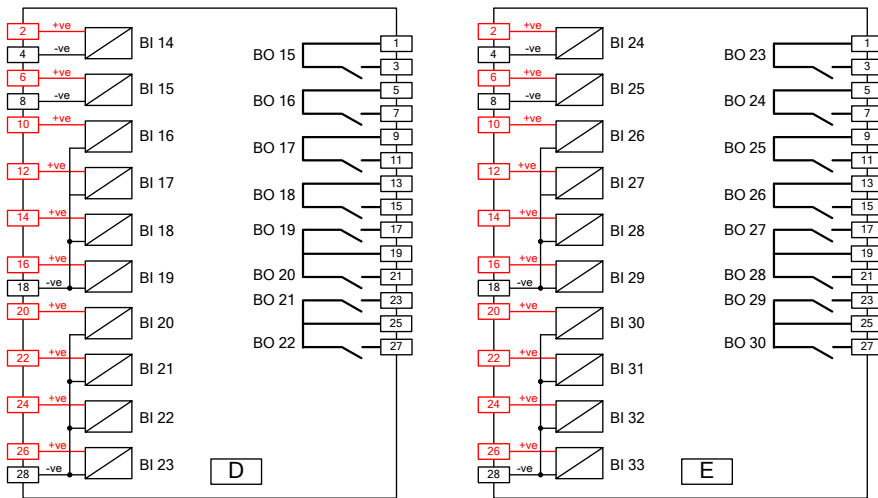## 4.1 Wiring Diagram: 7SR224 Recloser Controller Relay

Figure 4.1-1 Wiring Diagram: 7SR224

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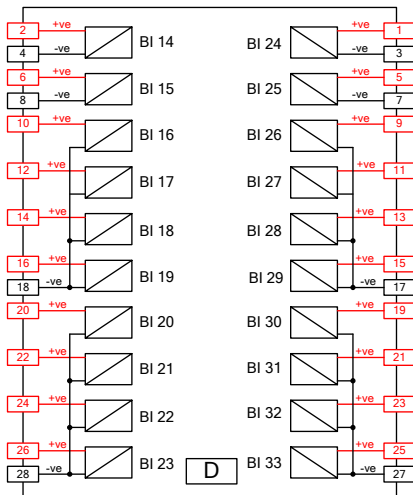
Optional Additional I/O for (23 Inputs 22 Outputs) and (33 Inputs 30 Outputs) Models

Optional Additional I/O for (33 Inputs 14 Outputs) Models

Optional Additional I/O for (43 Inputs 22 Outputs) Models
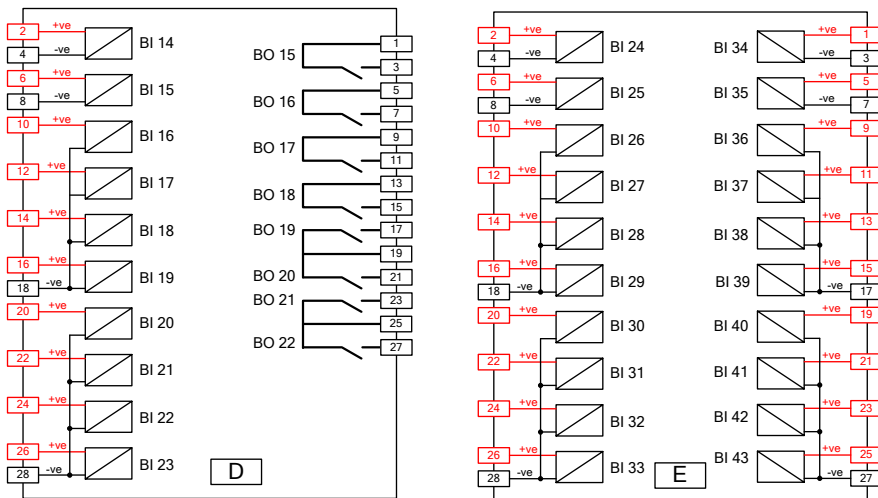
Figure 4.1-2 Additional Inputs & Outputs Wiring Diagram: 7SR224

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4.2   Interface Diagram: 7SR224 Recloser Controller Relay
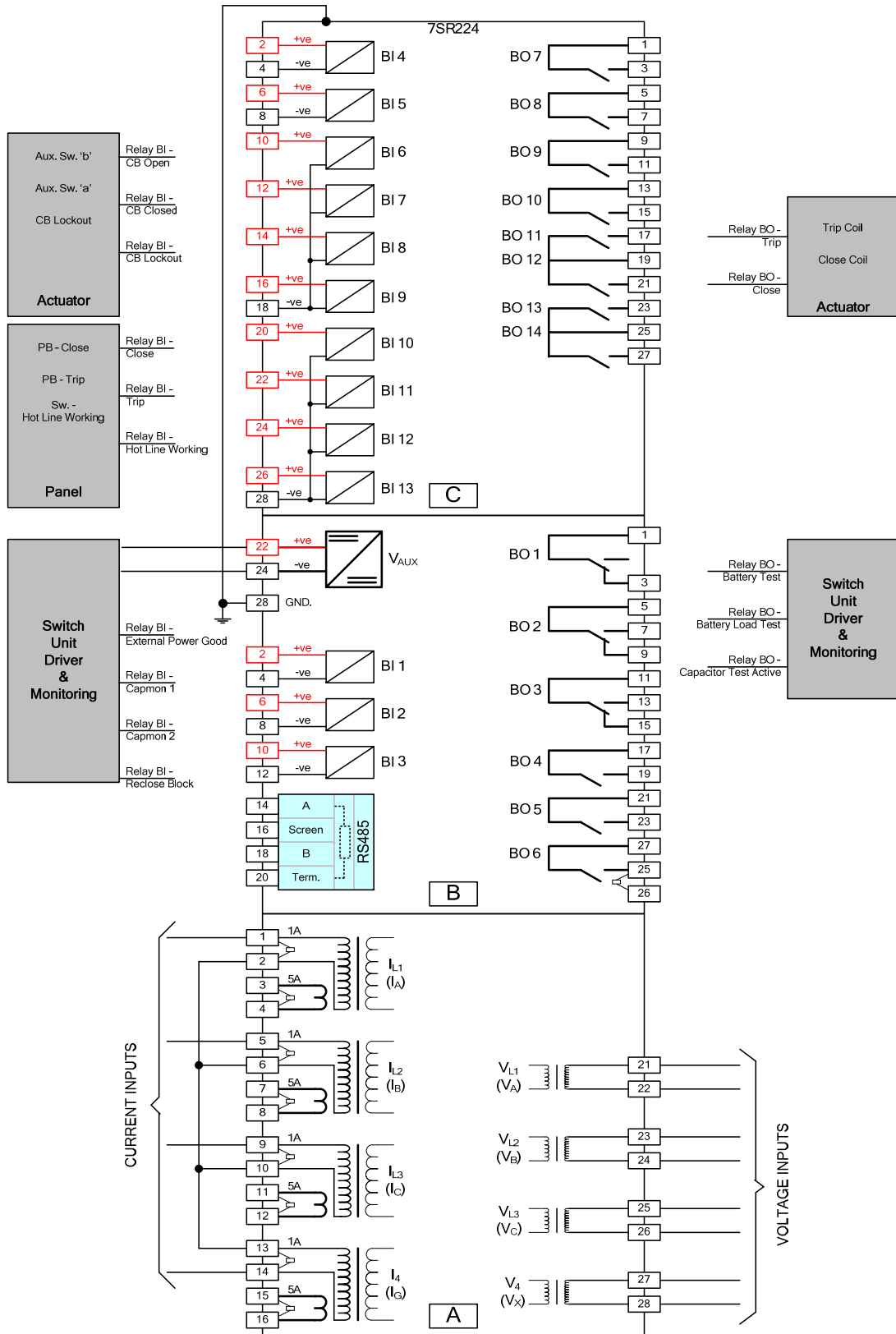

Figure 4.2-1 Interface Diagram: 7SR224

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Section 5: Data Comms Connections

5.1 RS485 Connection

The RS485 communication port is located on the rear of the relay and can be connected using a suitable RS485 120Ω screened twisted pair cable.

The RS485 electrical connection can be used in a single or multi-drop configuration. The RS485 master must support and use the Auto Device Enable (ADE) feature.

The last device in the connection must be terminated correctly in accordance with the master driving the connection. A terminating resistor is fitted in each relay, when required this is connected in circuit using an external wire loop between terminals 18 and 20 of the power supply module.

Up to 64 relays can be connected to the RS485 bus.

The RS485 data comms link will be broken if the relay element is withdrawn from the case.

The relay is available with an additional RS485 port as an ordering option. The terminal arrangement for this port are shown in Section 3: of this document. Connections shown below are duplicated on these ports to provide a separate, parallel, interface.
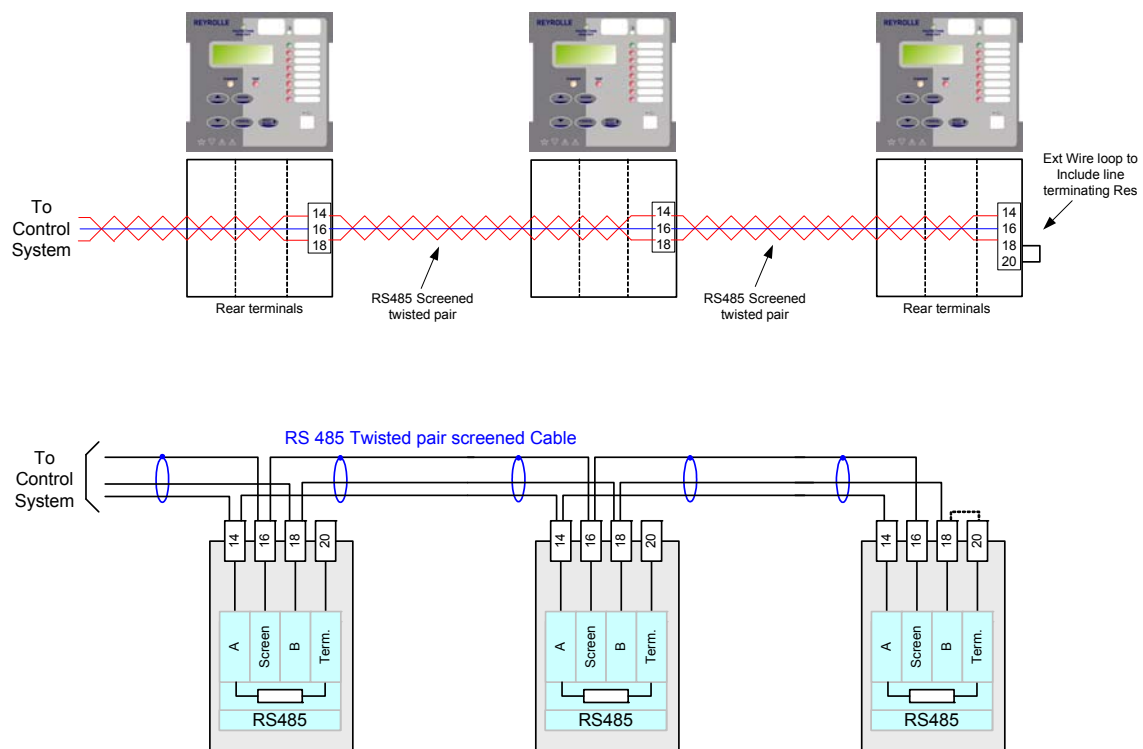

Figure 5.1-1 RS485 Data Comms Connections Between Relays

5.2 RS232 Connections

The Optional RS232 port is provided by a 9-way male 'D' connector at the relay rear as shown in Section 3: of this document for connection to a compatible device. Connections should be made using RS232 compatible cable.

5.3 IRIG-B Connections

A BNC plug is provided to connect a co-axial cable carrying IRIG-B time synchronisation signals. Ensure that the stub length is minimised by connecting the tee-connector directly to the rear of the relay. A suitable co-axial cable would be type RG 58 50ohms.

5.4 Fibre Optic Connections

Rear Com ports 3 and 4 comprise Fibre–Optic ST™ (BFOC/2.5) bayonet connectors-4 per product. 62.5 / 125µm glass fibre is recommended for all distances.

When installing fibre, ensure that the fibres' bend radii comply with the recommended minimum for the fibre used-typically 50mm is acceptable.
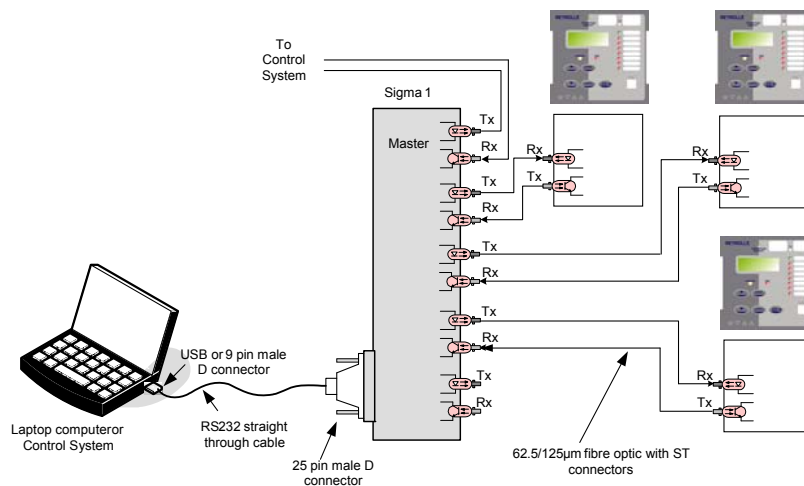

Figure 5.4-1 Data Comms to Multiple Devices Using Sigma 1 and F.O. Star Network
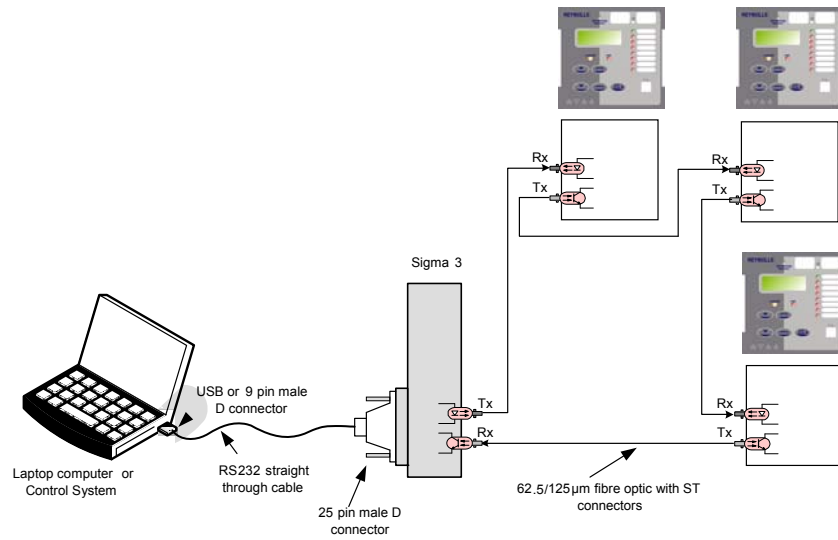

Figure 5.4-2 Data Comms to Multiple Devices Using Sigma 3 and F.O. Ring Network

The fibre optic data comms link will be broken if the relay element is withdrawn from the case.

Section 6: Connection Diagrams

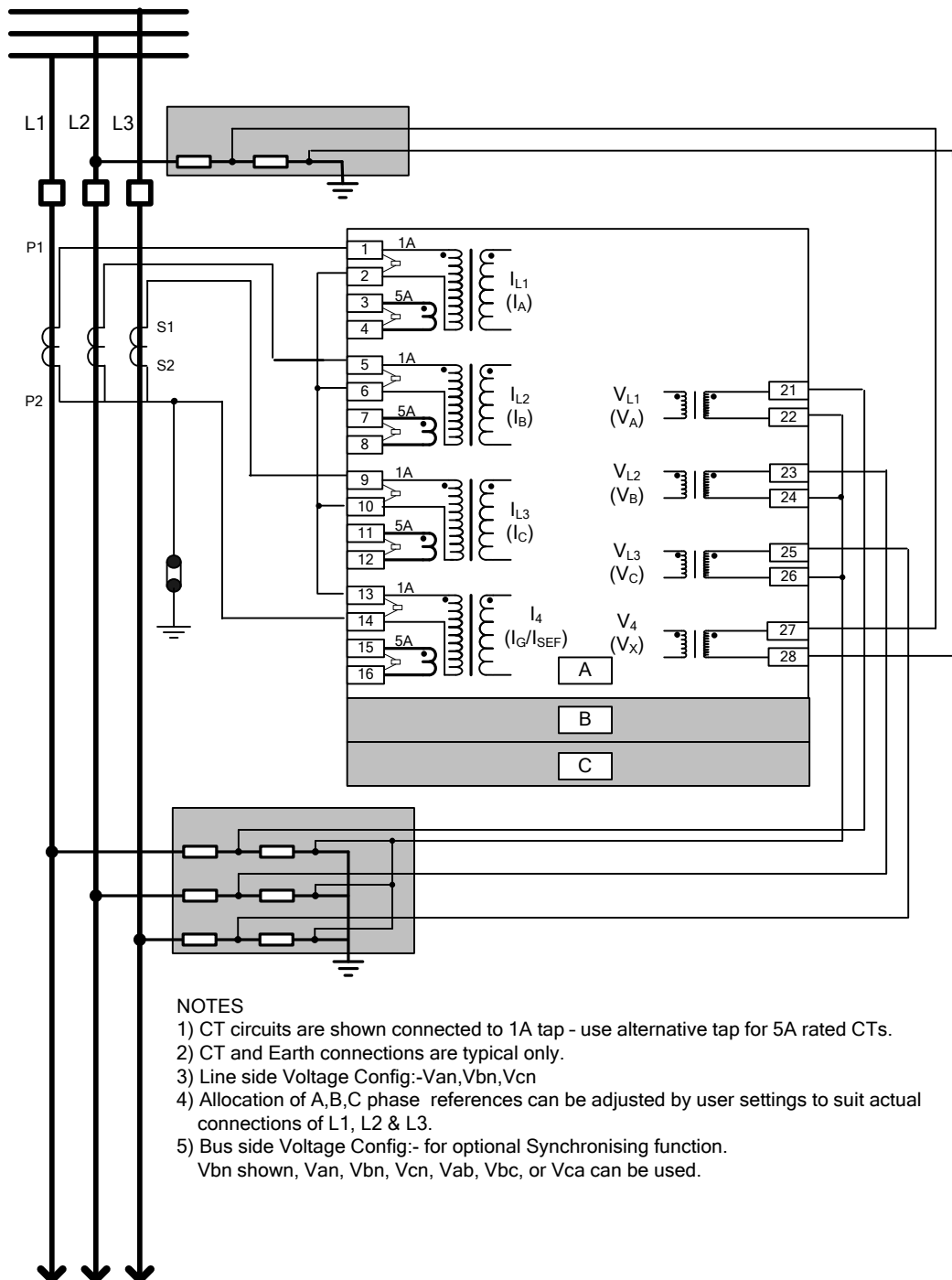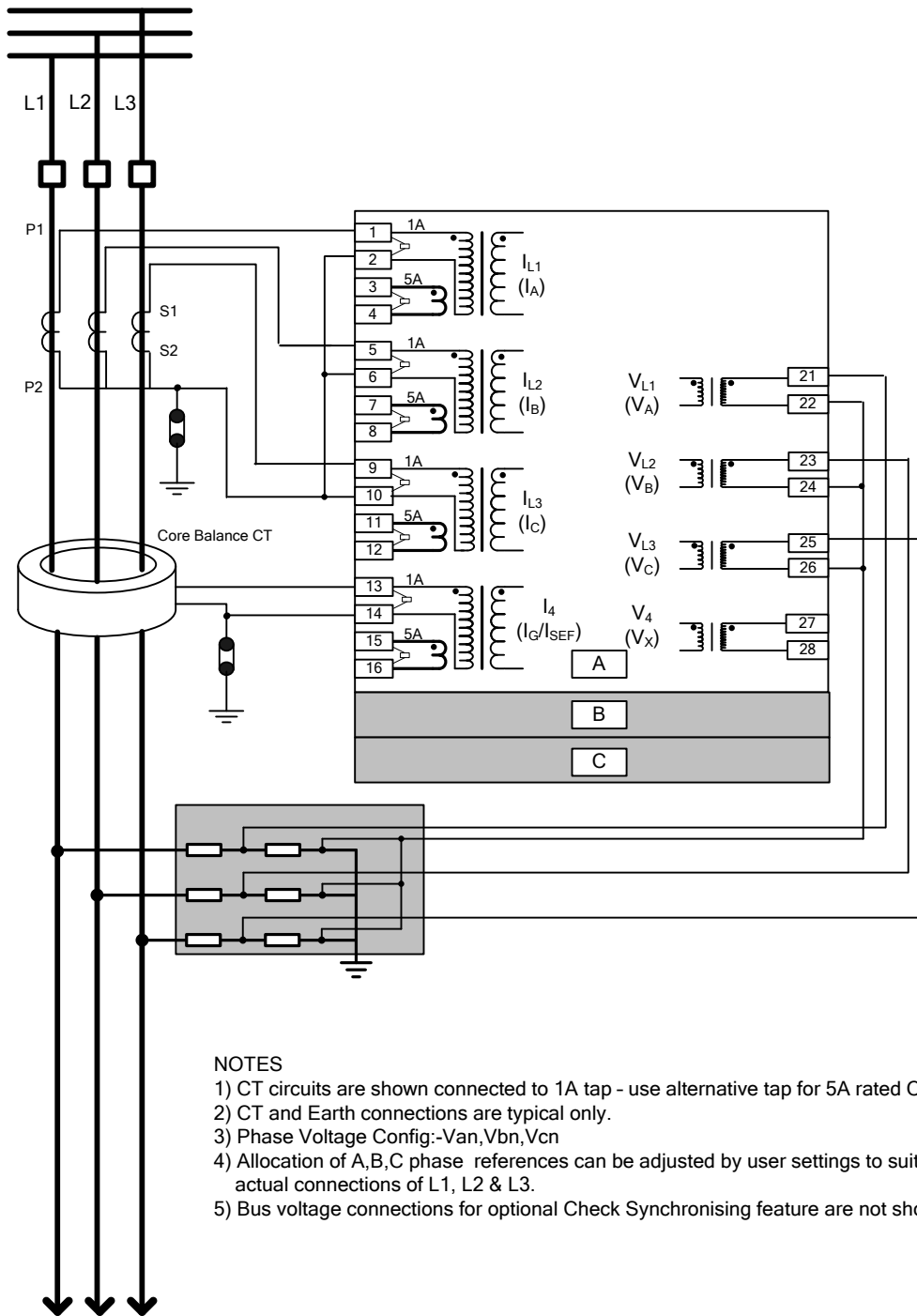## 6.1 Typical A.C. Connections: 7SR224 DOC/DEF Recloser Control Relay

Figure 6.1-1 7SR224 Connections to OHL Circuit

NOTES
1) CT circuits are shown connected to 1A tap - use alternative tap for 5A rated CTs.
2) CT and Earth connections are typical only.
3) Line side Voltage Config:-Van,Vbn,Vcn
4) Allocation of A,B,C phase references can be adjusted by user settings to suit actual connections of L1, L2 & L3.
5) Bus side Voltage Config:- for optional Synchronising function.
   Vbn shown, Van, Vbn, Vcn, Vab, Vbc, or Vca can be used.

Figure 6.1-2 7SR224 Connections to OHL Circuit with Core Balance CT

NOTES
1) CT circuits are shown connected to 1A tap - use alternative tap for 5A rated CTs.
2) CT and Earth connections are typical only.
3) Phase Voltage Config:-Van,Vbn,Vcn
4) Allocation of A,B,C phase references can be adjusted by user settings to suit actual connections of L1, L2 & L3.
5) Bus voltage connections for optional Check Synchronising feature are not shown.

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