

# 7SR242 Duobias

Multi-Function 2-Winding Transformer Protection Relay

## Document Release History

This document is issue **2010/06**. The list of revisions up to and including this issue is:

2010/06	Additional Comms modules option of (RS485 + IRIG-B) and (RS232 + IRIG-B) and typographical revisions
2010/02	Document reformat due to rebrand
2010/02	Third issue. Software revision 2662H80001 R4c-3
2008/07	Second issue. Software revision 2662H80001R3d-2c.
2008/05	First issue

## Software Revision History

2010/02	2662H80001 R4c-3	Revisions to: VT ratio settings, 87BD 1 <sup>st</sup> bias slope limit setting increments, CB fail function, LED CONFIG menu, DATA STORAGE menu.  Added: Open circuit detection (46BC), CONTROL MODE menu, Close circuit supervision (74CCS), Measured earth fault undercurrent (37G), Pulsed output contacts.
2008/07	2662H80001R3d-2c.	Demand metering. Optional DNP3.0 data comms.
2008/05	2662H80001R3-2b	First Release

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# Contents

<b>Document Release History</b> .....	<b>1</b>
<b>Software Revision History</b> .....	<b>1</b>
<b>Contents</b> .....	<b>2</b>
<b>List of Figures</b> .....	<b>3</b>
<b>Section 1: Installation</b> .....	<b>4</b>
1.1 Unpacking, Storage and Handling .....	4
1.2 Recommended Mounting Position.....	4
1.3 Wiring .....	4
1.4 Earthing.....	4
1.5 Ancillary Equipment .....	4
<b>Section 2: Equipment Operating Conditions</b> .....	<b>5</b>
2.1 Current Transformer Circuits .....	5
2.2 External Resistors .....	5
2.3 Fibre Optic Communication .....	5
2.4 Front Cover .....	5
<b>Section 3: Dimensions and Panel Fixings</b> .....	<b>6</b>
3.1 Relay Dimensions and Weight.....	6
3.2 Fixings.....	7
3.2.1 Crimps.....	7
3.2.2 Panel Fixings.....	7
<b>Section 4: Rear Terminal Drawings</b> .....	<b>8</b>
4.1 E8 CASE .....	8
E10 CASE .....	10
<b>Section 5: Connection/Wiring/Diagrams</b> .....	<b>12</b>
5.1 Wiring Diagram: 7SR242 Relay .....	12
<b>Section 6: Data Comms Connections</b> .....	<b>13</b>
6.1 RS485 Connection.....	13
6.2 IRIG-B Connections .....	13
6.3 Optional Fibre Optic Connections.....	13
6.4 Optional Additional RS485 Connections.....	15
6.5 Optional RS232 Connections.....	15
<b>Section 7: Connection Diagrams</b> .....	<b>16</b>
7.1 Typical Connection: 7SR242 .....	16

## List of Figures

Figure 5.1-1 7SR242 Wiring Diagram .....	12
Figure 6.1-1 RS485 Data Comms Connections .....	13
Figure 6.3-1 Data Comms to Multiple Devices Using Sigma 1 and F.O. Star Network .....	14
Figure 6.3-2 Data Comms to Multiple Devices Using Sigma 3 and F.O. Ring Network .....	14
Figure 6.5-1 RS232 Data Comms Pin Connections .....	15
Figure 7.1-1 7SR24 Typical Connections .....	16

## 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 be immediately be made against the carrier, also inform *Siemens Protection Devices Limited* and to the nearest *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 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  $\pm 30^\circ$  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™ s/w (Latest Version available 32 bit) using USB port situated on front of the relay.

## Section 2: Equipment Operating Conditions

### 2.1 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 and/or damage to equipment.



### 2.2 External Resistors

Where external resistors are fitted to relays there may be a risk of electric shock or burns if touched.



### 2.3 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.



### 2.4 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.



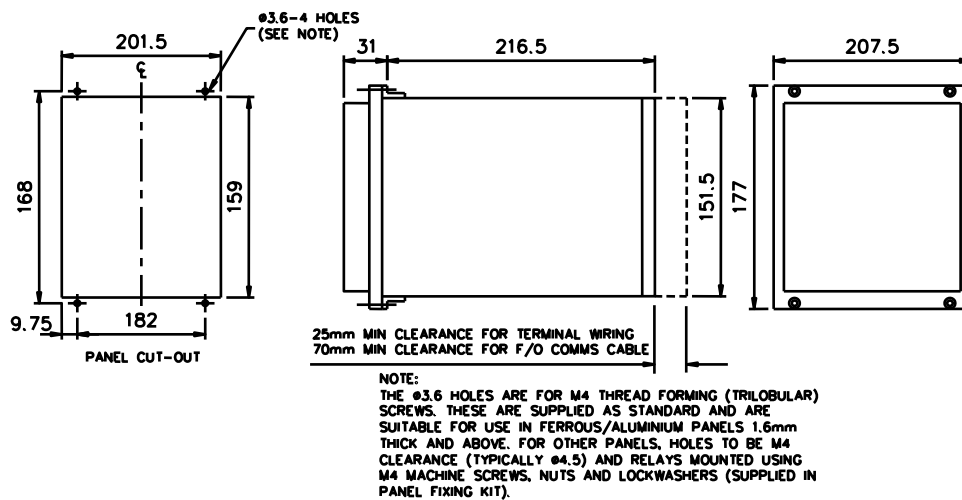
## Section 3: Dimensions and Panel Fixings

### 3.1 Relay Dimensions and Weight

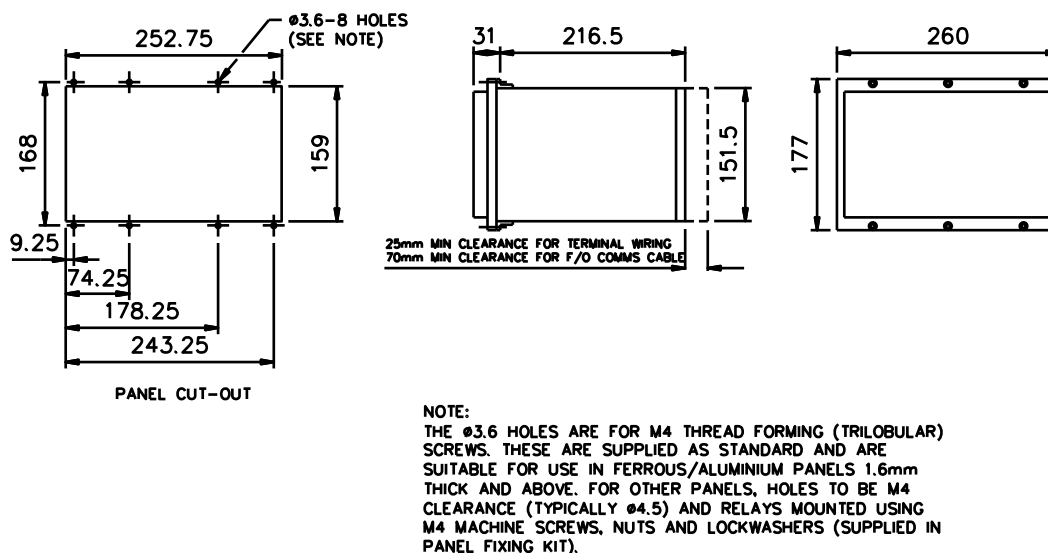
Relays are supplied in size E8 and E10 cases.

The drawing below provide panel cut-out and mounting details.

Overall Dimensions and panel Drilling for Size E8 Epsilon case (Typically 5.3 Kg)



Overall Dimensions and Panel Drilling for Size E10 Epsilon Case



## 3.2 Fixings

### 3.2.1 Crimps

Ring tongued crimps with 90° bend are recommended.

### 3.2.2 Panel Fixings

Typical mounting screw kit per Relay)

Consists of 4 off M4x10mm Screws

4 off M4 Nuts

4 off M4 Lock Washer

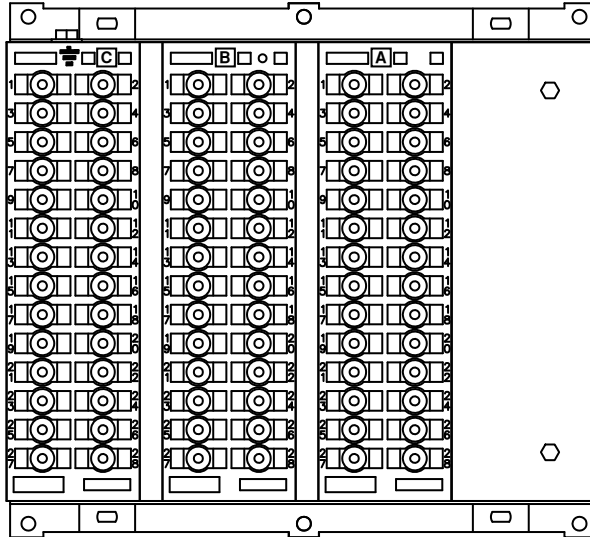
Typical rear terminal block fixing kit (1kit per terminal block fitted to relay) Consists of:

28 x M4, 8mm Screws

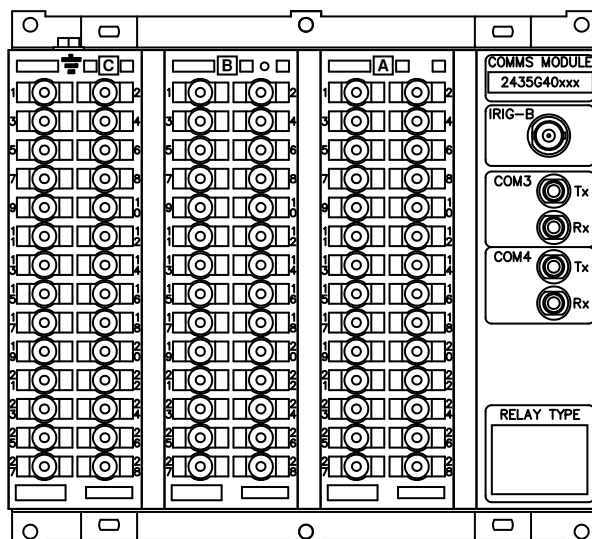
28 x M4 Lock Washer

## Section 4: Rear Terminal Drawings

### 4.1 E8 CASE



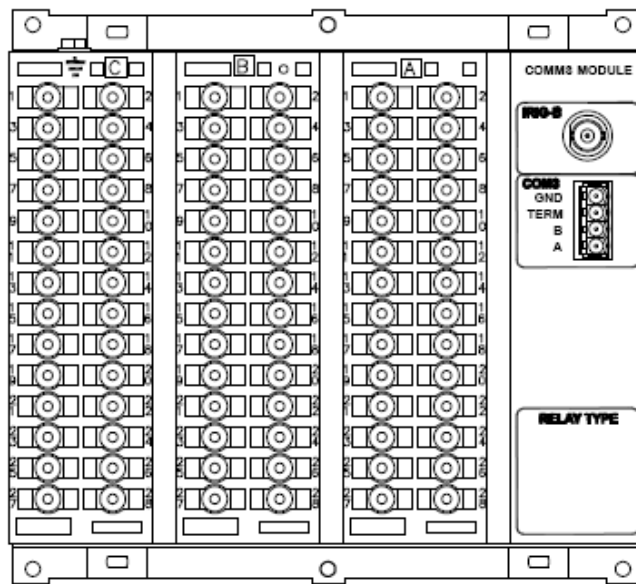
**E8 STANDARD COMMS**:- USB FRONT PORT,RS485 (SEE NOTE 2)



**E8 STANDARD COMMS + ADDITIONAL PORTS**

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

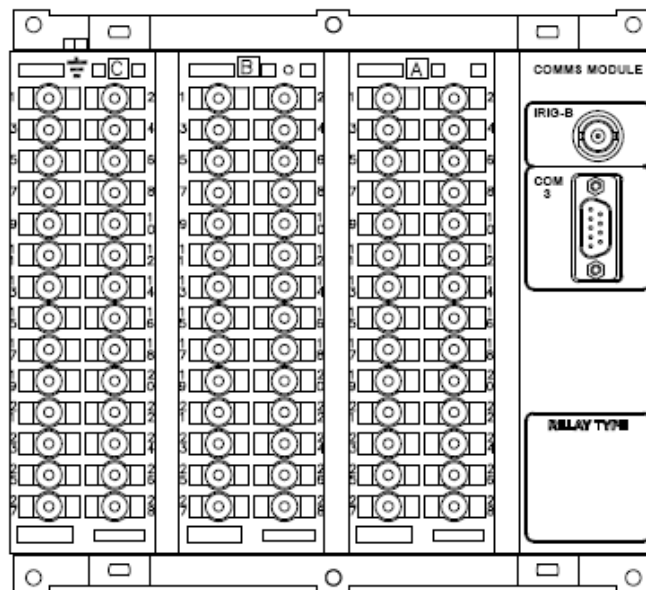




RELAY VIEWED FROM REAR

**E8 STANDARD COMMS + ADDITIONAL PORTS**

USB FRONT PORT, 2 x RS485 (SEE NOTE 2), IRIG B



RELAY VIEWED FROM REAR

**E8 STANDARD COMMS + ADDITIONAL PORTS**

USB FRONT PORT, RS485 (SEE NOTE 2), RS232, IRIG B

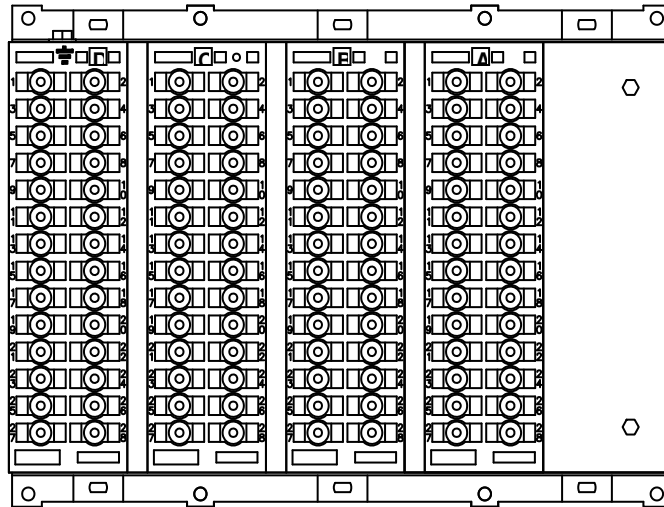
**Notes**

- 1) Recommended terminations are pre-insulated & must be crimped using approved tooling.
- 2) RS485 (block "B" terminals 14, 16, 18, 20 and optional COMMS MODULE) connections are by screened, twisted pair cable.

Ensure that these terminals are not obscured by other wiring runs.

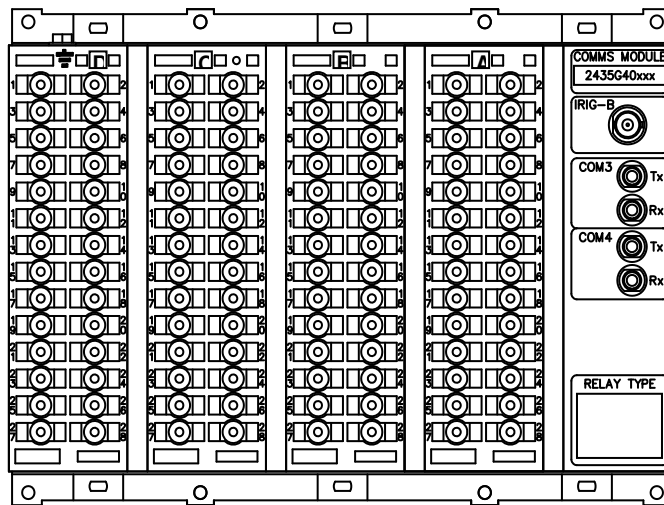
Cable should be RS485 compliant.

## E10 CASE



RELAY VIEWED FROM REAR

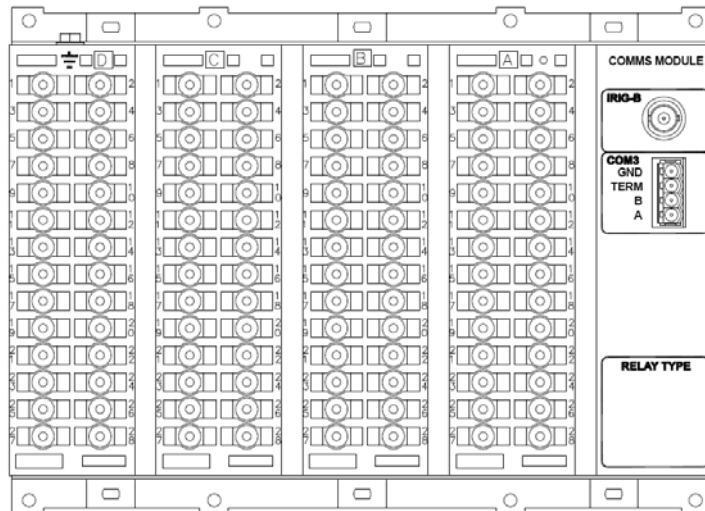
**E10 STANDARD COMMS:-** USB FRONT PORT,RS485 (SEE NOTE 2)



RELAY VIEWED FROM REAR

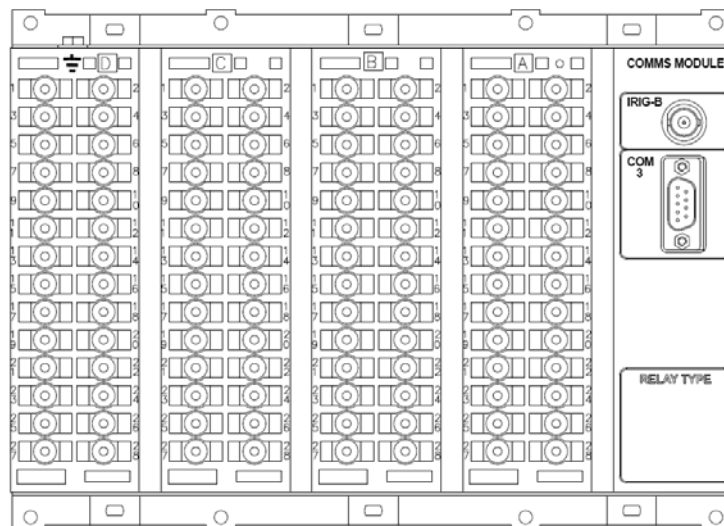
### **E10 STANDARD COMMS + ADDITIONAL PORTS**

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



### **E10 STANDARD COMMS + ADDITIONAL PORTS**

USB FRONT PORT, 2 x RS485 (SEE NOTE 2), IRIG B



### **E10 STANDARD COMMS + ADDITIONAL PORTS**

USB FRONT PORT, RS485 (SEE NOTE 2), RS232, IRIG B

#### **Notes**

- 1) Recommended terminations are pre-insulated & must be crimped using approved tooling.
  - 2) RS485 (block "B" terminals 14, 16, 18, 20 and optional COMMS MODULE) connections are by screened, twisted pair cable.
- Ensure that these terminals are not obscured by other wiring runs.
- Cable should be RS485 compliant.

## Section 5: Connection/Wiring/Diagrams

### 5.1 Wiring Diagram: 7SR242 Relay

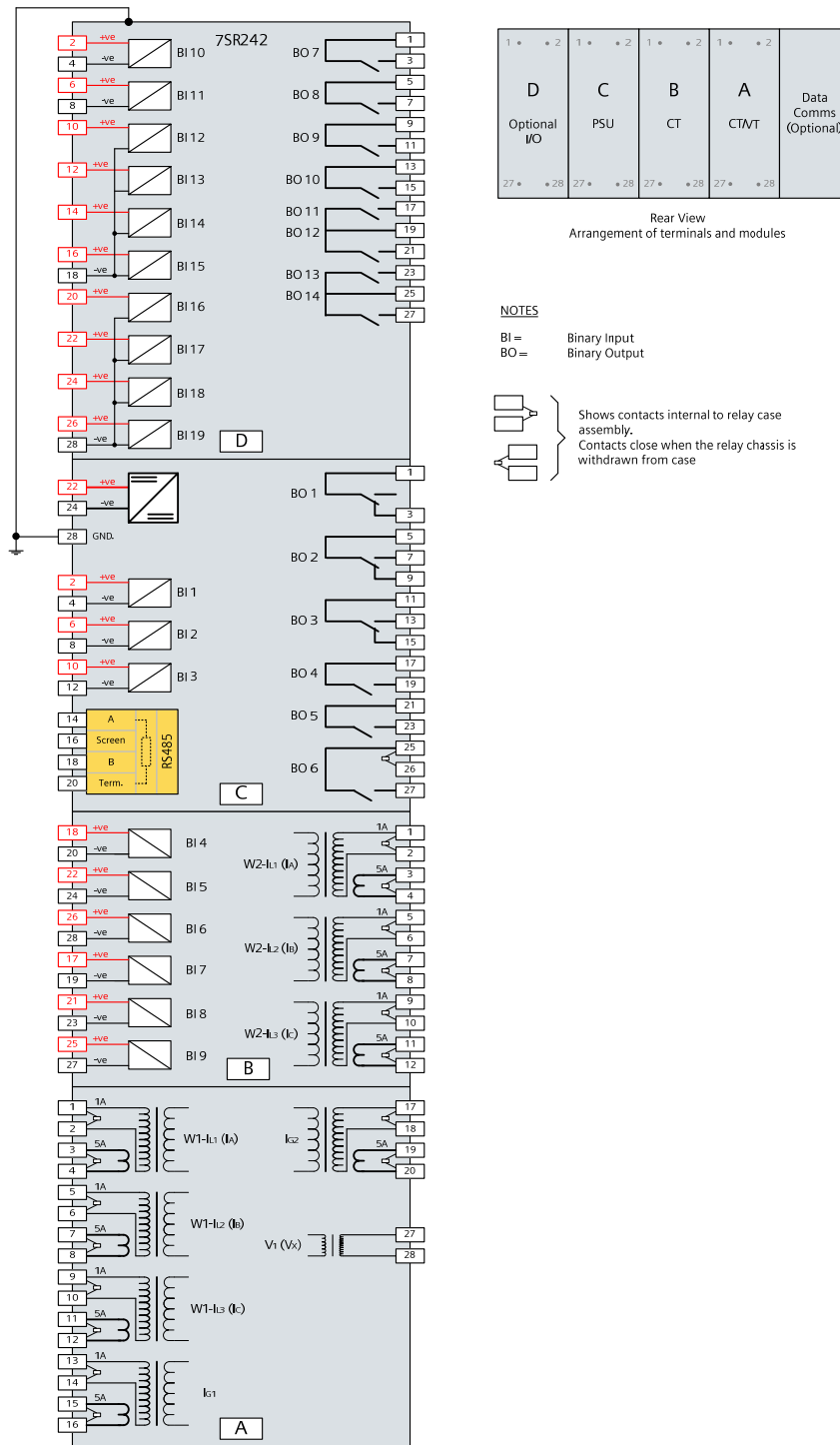


Figure 5.1-1 7SR242 Wiring Diagram

## Section 6: Data Comms Connections

### 6.1 RS485 Connection

The RS485 communication port terminals are 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. When used with Reydisp 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.

Each relay has an internal terminating resistor – this can be connected in circuit where necessary.

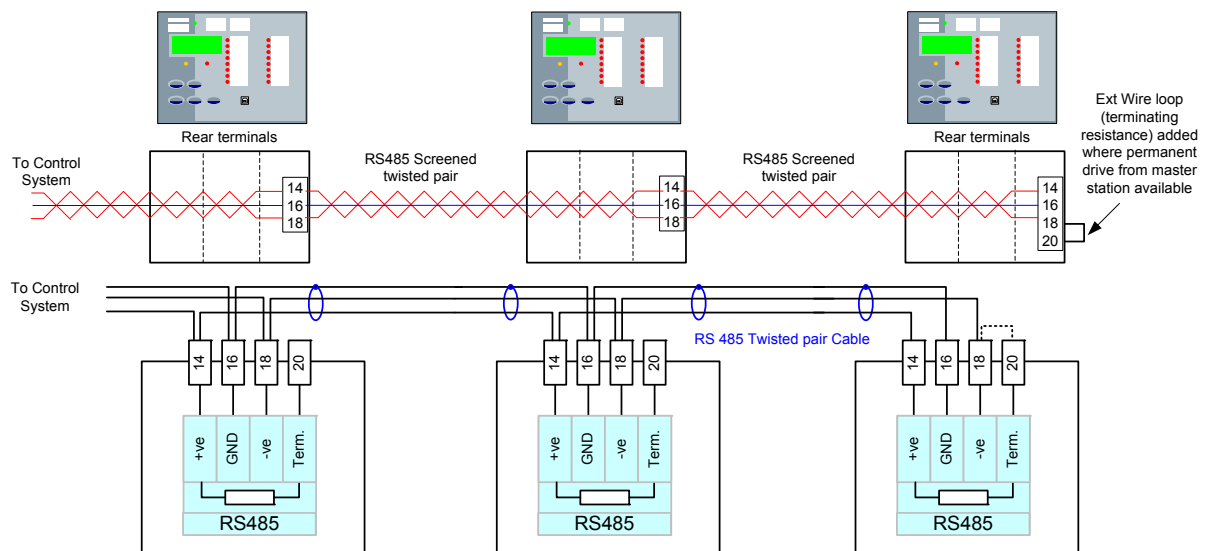


Figure 6.1-1 RS485 Data Comms Connections

### 6.2 IRIG-B Connections

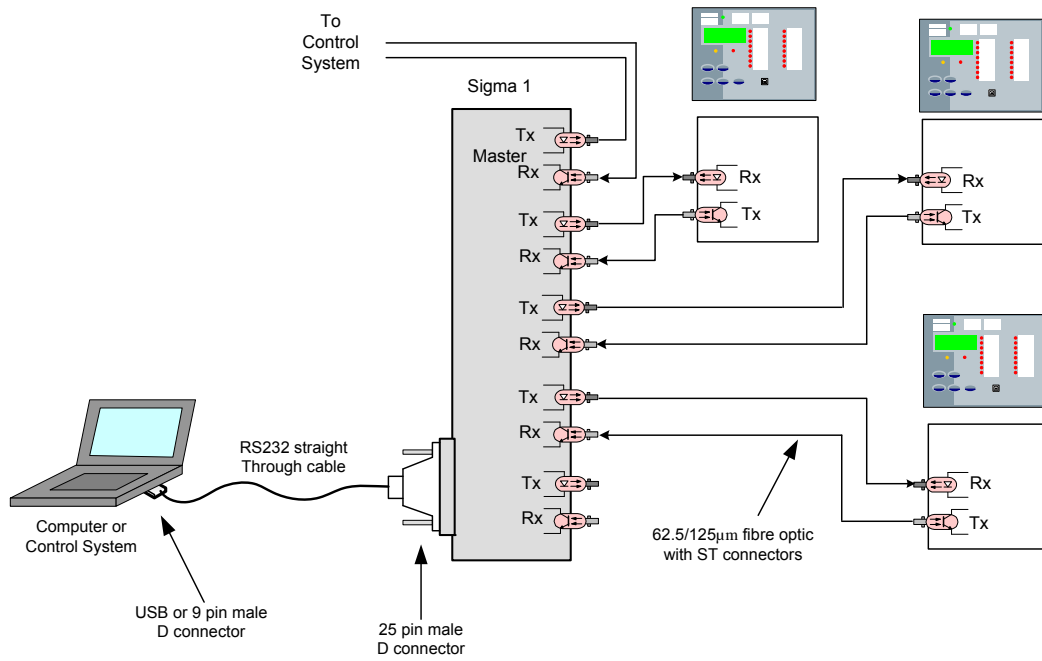
A BNC plug is provided to connect a co-axial cable carrying IRIG-B time synchronisation signals. Ensure that the stub length is minimised by connecting the tee-connector directly to the rear of the relay. A suitable co-axial cable would be type RG 58 50ohms.

### 6.3 Optional Fibre Optic Connections

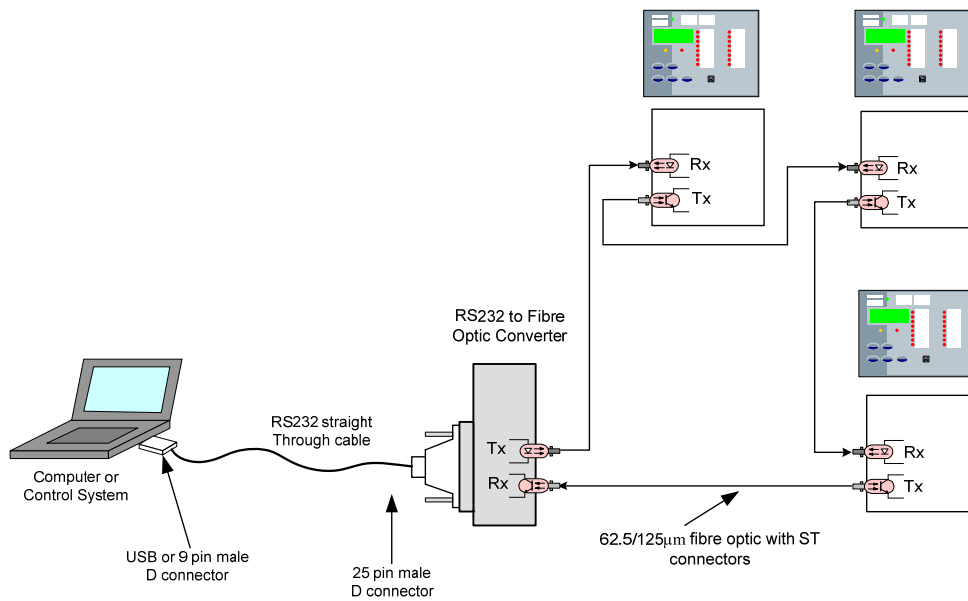
Where fitted rear Data Comms ports 3 and 4 comprise Fibre–Optic ST™ (BFOC/2.5) bayonet connectors-4 per product. 62.5 / 125µm glass fibre is recommended for all lead lengths.

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

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



**Figure 6.3-1 Data Comms to Multiple Devices Using Sigma 1 and F.O. Star Network**



**Figure 6.3-2 Data Comms to Multiple Devices Using Sigma 3 and F.O. Ring Network**

## 6.4 Optional Additional RS485 Connections

The additional (optional) RS485 communication port is located at the rear of the relay and can be connected using a suitable RS485 120 ohm screened twisted pair cable.

The RS485 electrical connection can be used in a single or multi-drop configuration. When used with Reydisp 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 device driving the connection. The relays are fitted with an internal terminating resistor which can be connected between the A and B by fitting an external wire loop between terminals 18 and 20 on the power supply module.

## 6.5 Optional RS232 Connections

The additional (optional) RS232 (9 pin plug) (DTE) communication port is located at the rear of the relay and can be connected using a suitable RS232 cable.

Where there is a requirement for multi-drop RS232 connection, a suitable device to facilitate this should be obtained.

Pin	Relay Function
1	Not Connected
2	Receive Data (RXD)
3	Transmit Data (TXD)
4	Output Supply +5V 50mA
5	Signal Ground (GND)
6	Output Supply +5V 50mA
7	Linked to 8 (volts free)
8	Linked to 7 (volts free)
9	Output Supply +5V 50mA

**Figure 6.5-1 RS232 Data Comms Pin Connections**

## Section 7: Connection Diagrams

### 7.1 Typical Connection: 7SR242

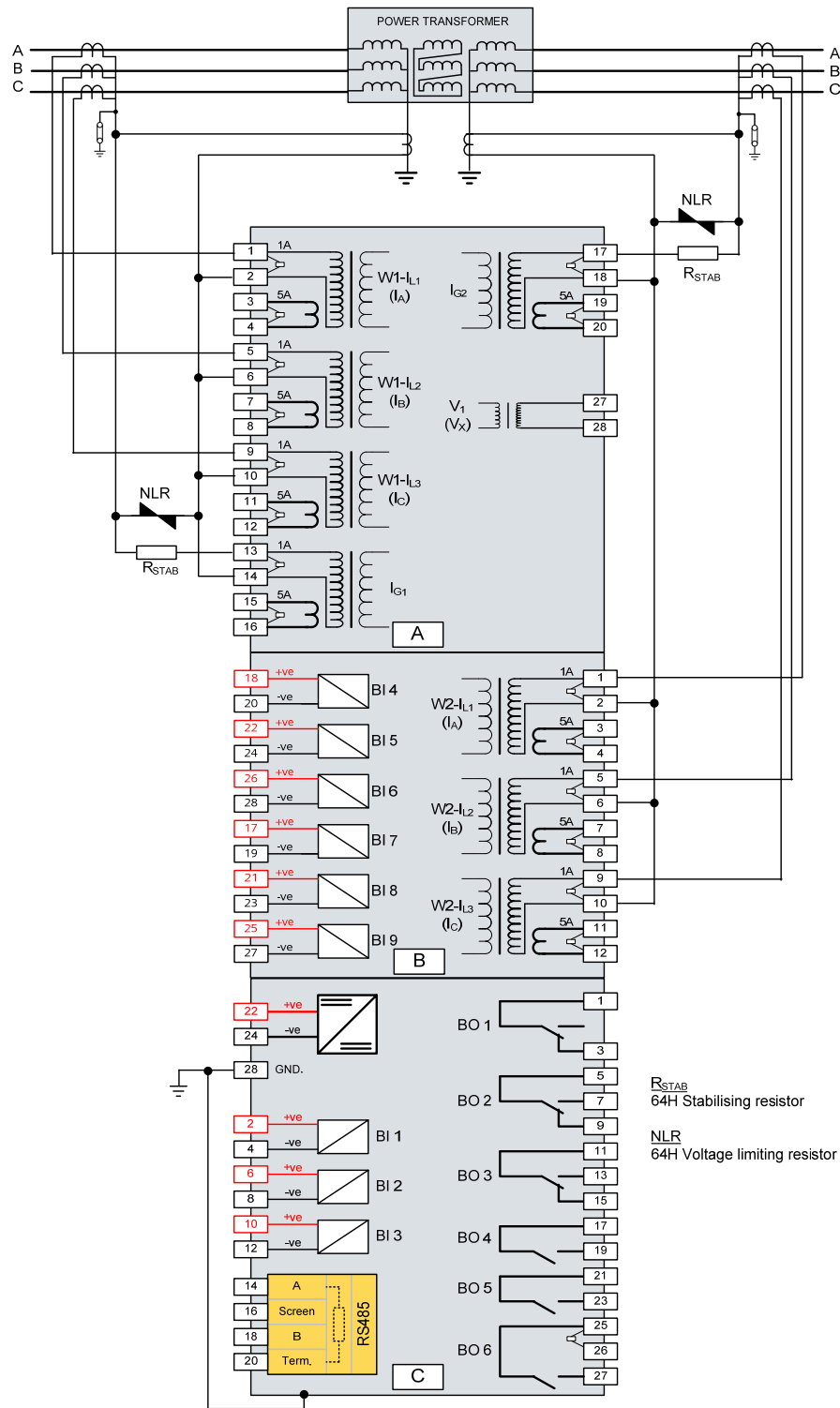


Figure 7.1-1 7SR24 Typical Connections