

7SR224 Recloser Controller

Overcurrent Relay

Document Release History

This document is issue **2010/09** The list of revisions up to and including this issue is:

2008/03	First issue
2008/06	Second issue
2009/02	Third issue. Single Triple Autoreclose added.
2009/09	Fourth Issue. Software version R4c-3b added & optional RS485/RS232 comms.
2010/04	Fifth Issue. Software version updated
2010/05	Sixth Issue. Document formatted due to rebrand
2010/09	Seventh issue. Addition of IEC60870-5-101 communication protocol.

Software Revision History

2008/03	2435H80011R2d-1a	First Release
2008/11	2435H80011R3d-2b	Loss of Voltage
2008/11	2435H80011R4-3	Single /Triple Autoreclose Function
2009/09	2435H80011R4c-3b	First Release. Maintenance Release
2010/04	2435H80011R4d-4	Check Synchronising, Phase allocation and sequence
2010/09	2435H80011R4f-4b	IEC60870-5-101 communication protocol

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 Siemens Protection Devices Limited. No part of this document shall be reproduced or modified or stored in another form, in any data retrieval system, without the permission of Siemens Protection Devices Limited, nor shall any model or article be reproduced from this document unless Siemens Protection Devices Limited consent.

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.

Contents

Section 1: Introduction	3
1.1 Relay Menus And Display	3
1.2 Operation Guide.....	5
1.2.1 User Interface Operation.....	5
1.3 Settings Display	7
1.4 Instruments Mode	8
1.5 Fault Data Mode	8
1.6 Control Mode	8
Section 2: Setting the Relay Using Reydisp Evolution	9
2.1 Physical Connection.....	9
2.1.1 Front USB connection.....	9
2.1.2 Rear RS485 connection.....	10
2.1.3 Optional rear fibre optic connection	10
2.1.4 Optional Rear RS232 connection.....	11
2.1.5 Configuring Relay Data Communication	11
2.1.6 Connecting to the Relay via Reydisp	13

List of Figures

Figure 1.1-1 Menu	3
Figure 1.1-2 Fascia Contrast symbol	3
Figure 1.1-3 Fascia of a 7SR224 relay (Please note your model may differ from illustration).....	4
Figure 1.2-4 Relay Identifier Screen	5
Figure 1.2-5 Typical Menu Structure (See Appendices for relevant software version).....	6
Figure 2.1.1-1 USB connection to PC	9
Figure 2.1.2-1 RS485 connection to PC	10
Figure 2.1.3-1 Fibre Optic Connection to PC	10
Figure 2.1.4-1 Direct RS232 Connection to PC	11
Figure 2.1.5-1 PC Comm Port Selection.....	13

APPENDIX 1	Relay Settings. Software version 2435H80011R2d-1a
APPENDIX 2	Relay Settings. Software version 2435H80011R4-3
APPENDIX 3	Relay Settings. Software version 2435H80011R3d-2b
APPENDIX 4	Relay Settings. Software version 2435H80011R4c-3b
APPENDIX 5	Relay Settings. Software version 2435H80011R4d-4
APPENDIX 6	Relay Settings. Software version 2435H80011R4f-4b

Section 1: Introduction

1.1 Relay Menus And Display

All relay fascias contain the same access keys although the fascias may differ in appearance from model to model. The basic menu structure is also the same in all products and consists of four main menus, these being,

Settings Mode - allows the user to view and (if allowed via the settings mode password) change settings in the relay.

Instruments Mode - allows the user to view the relay meters e.g. current, voltage etc.

Fault Data Mode - allows the user to view the type and data of any fault detected by the relay.

Control Mode - allows the user to control external plant under the relays control for example the CB (if allowed via the control mode password)

The menus can be viewed via the LCD by pressing the access keys as below,

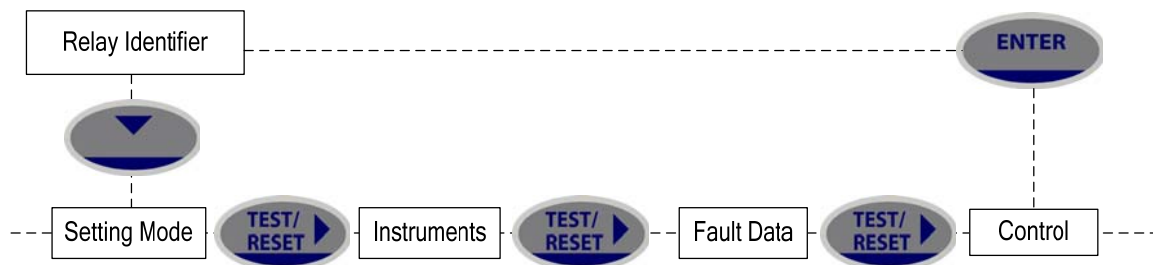


Figure 1.1-1 Menu

Pressing CANCEL returns to the Identifier screen

LCD Contrast

To change the contrast on the LCD insert a flat nosed screwdriver into the screwhead below the contrast symbol, turning the screwhead decreases or increases the contrast of the LCD.



Figure 1.1-2 Fascia Contrast symbol



Figure 1.1-3 Fascia of a 7SR224 relay (Please note your model may differ from illustration)

1.2 Operation Guide

1.2.1 User Interface Operation

The basic menu structure flow diagram is shown in Figure 1.2-5. This diagram shows the main modes of display: Settings Mode, Instrument Mode, Fault Data Mode and Control Mode.

When the relay leaves the factory all data storage areas are cleared and the settings set to default as specified in settings document.

When the relay is first energised the user is presented with the following message: -

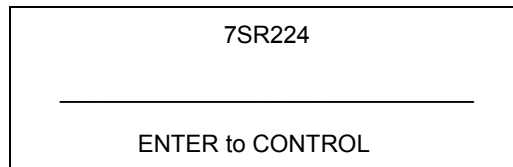


Figure 1.2-4 Relay Identifier Screen

On the factory default setup the relay LCD should display the relay identifier, on each subsequent power-on the screen that was showing before the last power-off will be displayed.

The push-buttons on the fascia are used to display and edit the relay settings via the LCD, to display and activate the control segment of the relay, to display the relays instrumentation and Fault data and to reset the output relays and LED's.

The five push-buttons have the following functions:



READ DOWN



READ UP

Used to navigate the menu structure.



ENTER

The ENTER push-button is used to initiate and accept setting changes.

When a setting is displayed pressing the ENTER key will enter the edit mode, the setting will flash and can now be changed using the READ UP ▲ or READ DOWN ▼ buttons. When the required value is displayed the ENTER button is pressed again to accept the change.

When an instrument is displayed pressing ENTER will toggle the instruments favourite screen status.



CANCEL

This push-button is used to return the relay display to its initial status or one level up in the menu structure. Pressed repeatedly will return to the Relay Identifier screen. It is also used to reject any alterations to a setting while in the edit mode.



TEST/RESET

This push-button is used to reset the fault indication on the fascia. When on the Relay Identifier screen it also acts as a lamp test button, when pressed all LEDs will momentarily light up to indicate their correct operation. It is also moves the cursor right when navigating through menus and settings.

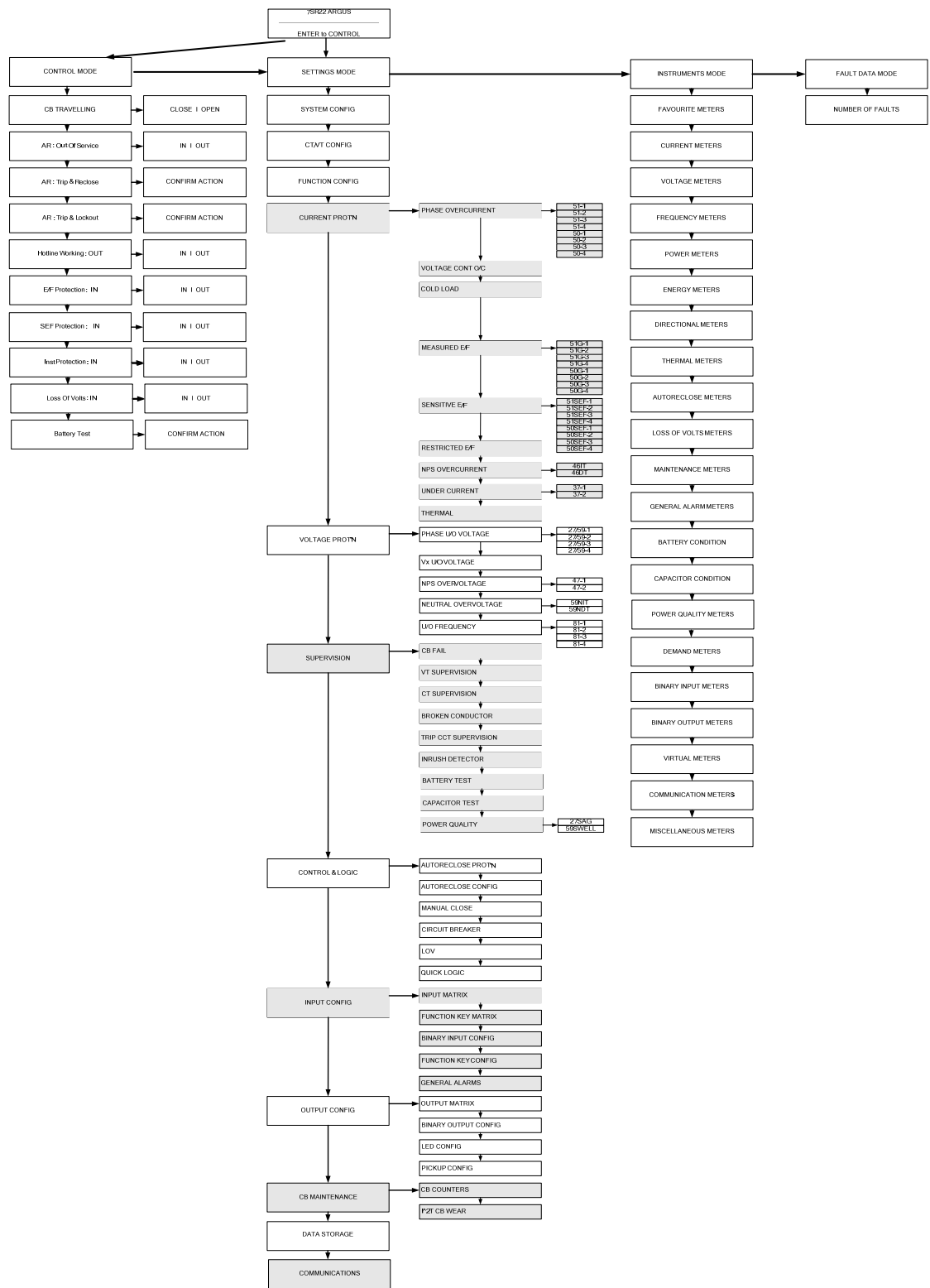


Figure 1.2-5 Typical Menu Structure (See Appendices for relevant software version)

1.3 Settings Display

The Settings Mode is reached by pressing the READ DOWN ▼ button from the relay identifier screen.

Once the Settings Mode title screen has been located pressing the READ DOWN ▼ button takes the user into the Settings mode sub-menus.

Each sub-menu contains the programmable settings of the relay in separate logical groups. The sub menus are accessed by pressing the TEST/RESET ► button. Pressing the READ DOWN ▼ button will scroll through the settings, after the last setting in each sub menu is reached the next sub menu will be displayed. If a particular sub menu is not required to be viewed then pressing READ DOWN ▼ will move directly to the next one in the list.

While a setting is being displayed on the screen the ENTER button can be pressed to edit the setting value. If the relay is setting password protected the user will be asked to enter the password. If an incorrect password is entered editing will not be permitted. All screens can be viewed even if the password is not known.

While a setting is being edited flashing characters indicate the edit field. Pressing the READ UP ▲ or READ DOWN ▼ buttons will display the valid field values. If these buttons are pressed and held, the rate of scrolling will increase.

Once editing is complete pressing the ENTER button stores the new setting into the non-volatile memory. The setting change is effective immediately unless any protection element is operating, in which case the change becomes effective when no elements are operating.

NB: The Settings Display may vary between software versions. Please see the appendices to this section of the manual for relevant software version.

1.4 Instruments Mode

The Instrument Mode sub-menu displays key quantities and information to aid with commissioning. The following meters are available and are navigated around by using the READ UP ▲, READ DOWN ▼ and TEST/REST buttons.

NB: The Instruments Mode may vary between software versions. Please see the appendices to this section of the manual for relevant software version.

1.5 Fault Data Mode

The Fault Data Mode sub menu lists the time and date of the previous ten protection operations. The stored data about each fault can be viewed by pressing the TEST/RESET► button. Each record contains data on the operated elements, analogue values and LED flag states at the time of the fault. The data is viewed by scrolling down using the READ DOWN ▼ button.

1.6 Control Mode

This mode provides convenient access to commonly used relay control and test functions. When any of the items listed below are selected control is initiated by pressing the ENTER key. The TEST/RESET► button is used to toggle between the available options. The user is prompted to confirm the action, again by pressing the ENTER key, before the command is executed. If the action is not confirmed within a short time the action is automatically cancelled.

Control Mode commands can be password protected by using the Control Password function

Commands available in the Control Mode are:

- CB: Open or CB: Close
- AR: In Service or AR: Out of Service
- AR: Trip and Reclose
- AR: Trip & Lockout
- Hotline Working: In or Hotline Working: Out
- E/F Protection: In or E/F Protection: Out
- SEF Protection: In or SEF Protection: Out
- Inst Protection: In or Inst Protection: Out
- Battery Test
- Set Local Mode
- Set Local or Remote Mode
- Set Remote Mode
- Set Service Mode

Section 2: Setting the Relay Using Reydisp Evolution

To set the relay using the communication port the user will need the following:-

PC with Reydisp Evolution Installed. (This can be download from our website www.siemens.com/energy and found under the submenu 'Software') This software requires windows 2000-service pack 4 or above, or windows XP with service pack 2 or above.

2.1 Physical Connection

The relay can be connected to Reydisp via any of the communication ports on the relay. Suitable communication Interface cable and converters are required depending which port is being used.

2.1.1 Front USB connection

To connect your pc locally via the front USB port.

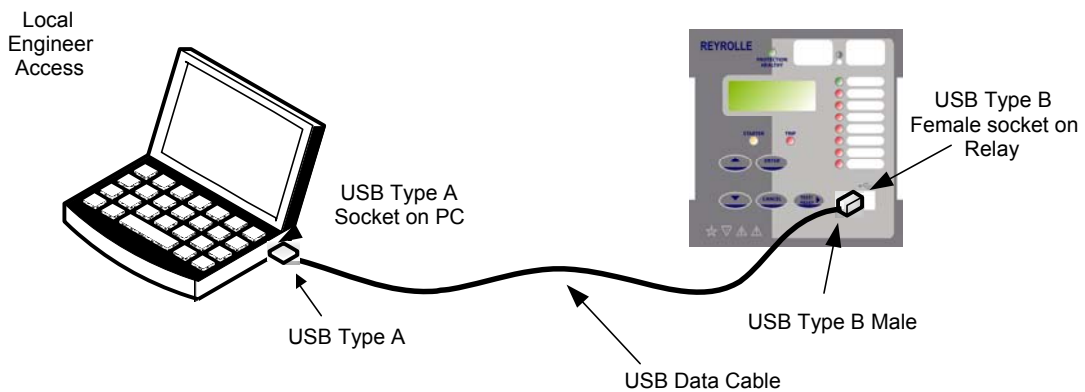


Figure 2.1.1-1 USB connection to PC

2.1.2 Rear RS485 connection

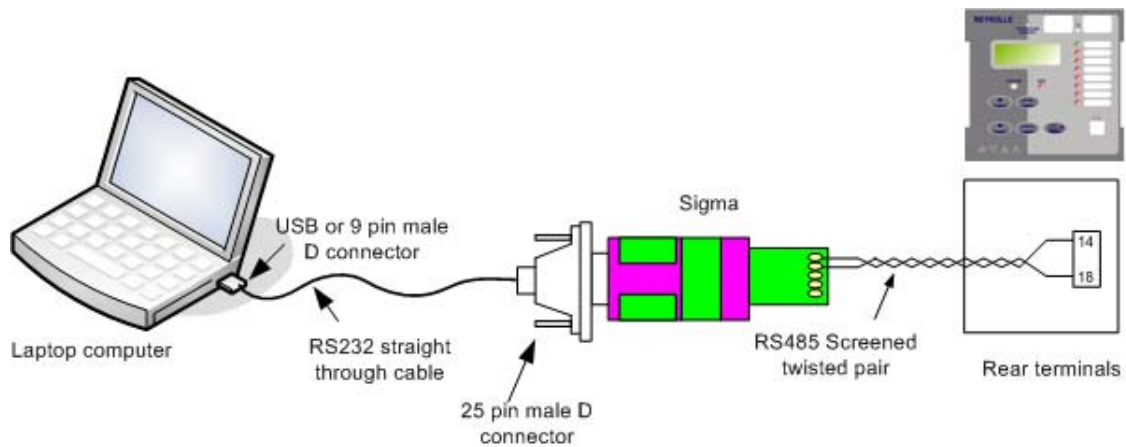


Figure 2.1.2-1 RS485 connection to PC

2.1.3 Optional rear fibre optic connection

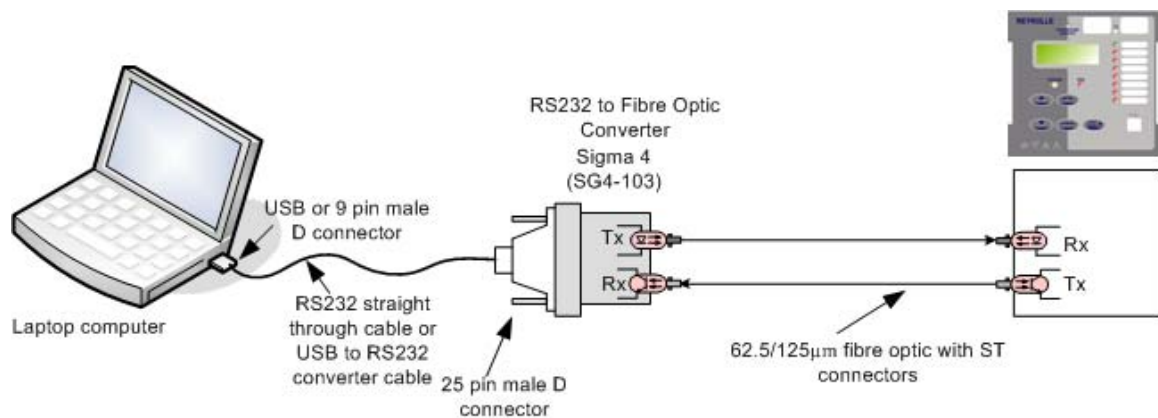


Figure 2.1.3-1 Fibre Optic Connection to PC

Sigma devices have a 25 pin female D connector with the following pin out.

Pin	Function
2	Transmit Data
3	Received Data
4	Request to Send
5	Clear to Send
6	Data set ready
7	Signal Ground
8	Received Line Signal Detector
20	Data Terminal Ready

2.1.4 Optional Rear RS232 connection

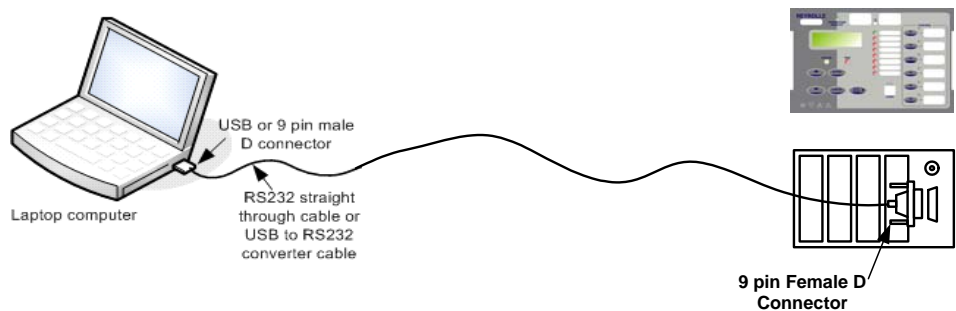


Figure 2.1.4-1 Direct RS232 Connection to PC

The optional RS232 port is a 9 pin male D connector with the following pin out.

Pin	Function
1	Received Line Signal Detector
2	Received Data
3	Transmit Data
4	Data Terminal Ready
5	Signal Ground
6	Data set ready
7	Request to Send
8	Clear to Send

2.1.5 Configuring Relay Data Communication

Using the keys on the relay fascia scroll down the settings menu's into the 'communications' menu and change the settings for the communication port used on the relay. All of the below settings may not be available in all relay types. Reydisp software uses IEC60870-5-103 protocol to communicate.

COM1-RS485 Port

COM2-USB Port

COM3 – Optional Fibre Optic, RS485 or RS232

COM4 – Optional Fibre Optic

Setting name	Range	Default	Units	Notes
Station Address	1 – 254 for IEC60870-5-103 or IEC60870-5-101 0 – 247 for Modbus RTU 0 – 65534 for DNP3.0	0		Address given to relay to identify that relay from others which may be using the same path for communication as other relays for example in a fibre optic hub
COM1-RS485 Protocol	OFF, IEC60870-5-103, MODBUS-RTU, DNP3.0 or IEC60870-5-101	IEC60870-5-103		COM1 is the rear mounted RS485 port
COM1-RS485 Baud Rate	75 110 150 300 600 1200 2400 4800 9600 19200 38400	19200		
COM1-RS485 Parity	NONE, ODD, EVEN	EVEN		
COM2-USB Protocol	OFF, IEC60870-5-103, MODBUS-RTU, ASCII, DNP3.0 or IEC60870-5-101	IEC60870-5-103		COM2 is the front USB port.
COM2-USB Baud Rate	75 110 150 300 600 1200 2400 4800 9600 19200 38400 57600 115200 230400 460800 921600	57600		
COM2-USB Parity	NONE, ODD, EVEN	EVEN		
COM3 Protocol	OFF, IEC60870-5-103, MODBUS-RTU, DNP3.0 or IEC60870-5-101	IEC6-0870-5-103		COM3 This is an optional rear mounted optional connection
COM3 Baud Rate	75 110 150 300 600 1200 2400 4800 9600 19200 38400 57600 115200	57600		
COM3 Parity	NONE, ODD, EVEN	EVEN		
COM3 Line Idle	LIGHT ON, LIGHT OFF	LIGHT OFF		
COM3 Data echo	ON, OFF	OFF		
COM4 Protocol	OFF, IEC60870-5-103, MODBUS-RTU, DNP3.0 or IEC60870-5-101	OFF		COM4 This is an optional rear mounted optional connection
COM4 Baud Rate	75 110 150 300 600 1200 2400 4800 9600 19200 38400	19200		
COM4 Parity	NONE, OFF, EVEN	EVEN		
COM4 Line Idle	LIGHT ON, LIGHT OFF	LIGHT OFF		
COM4 Data echo	ON, OFF	OFF		

NB: The Data Communication Configuration may vary between software versions. Please see the appendices to this section of the manual for relevant software version.

2.1.6 Connecting to the Relay via Reydisp

When Reydisp software is running all available communication ports of the PC will automatically be detected. On the start page tool bar open up the sub-menu File > Connect.

The 'Communication Manager' window will display all available communication ports. With the preferred port highlighted, select the 'Properties' option and ensure the baud rate and parity match that selected in the relay Data Comms settings. Select 'Connect' to initiate the relay-PC connection.

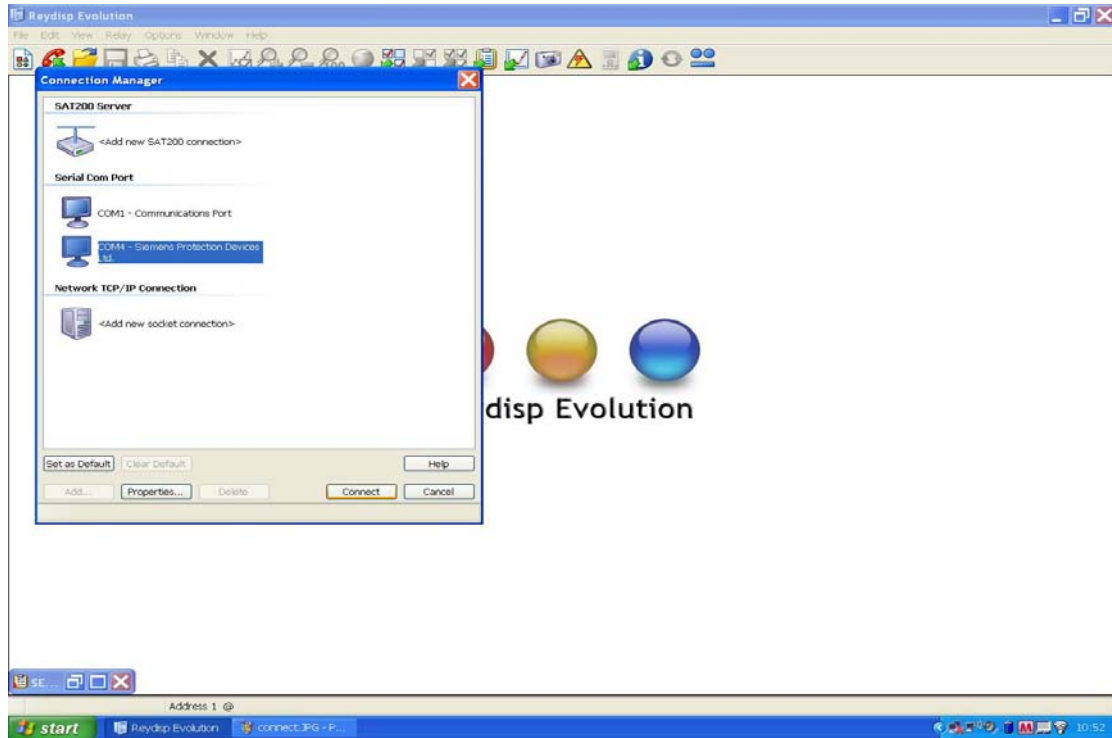


Figure 2.1.5-1 PC Comm Port Selection

Via the Relay > Set Address > Address set the relay address (1-254) or alternatively search for connected devices using the Relay > Set Address > Device Map. The relay can now be configured using the Reydisp software. Please refer to the Reydisp Evolution Manual for further guidance.