FIMO-232

Installation Guide

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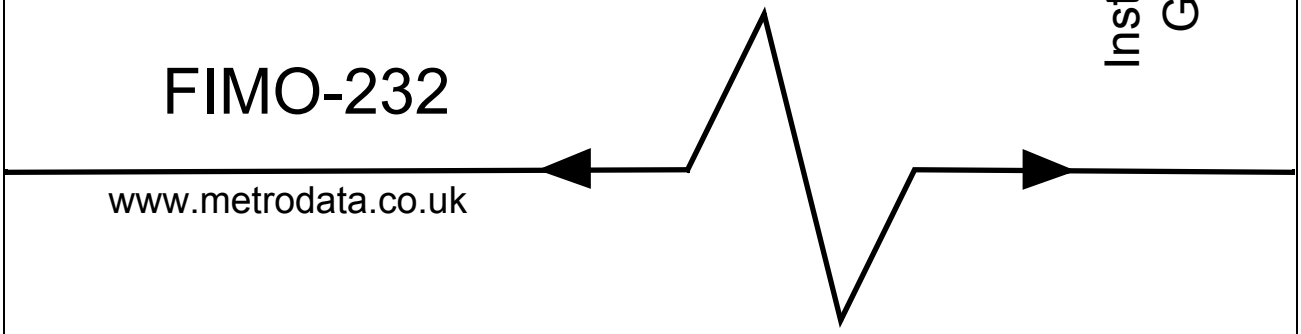

Metrodata FIMO-232 Installation Guide

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1 INTRODUCTION

1. 1 About The FIMO-232

The Metrodata FIMO-232 is a fibre modem supporting the transport of asynchronous RS-232 signals over an optical fibre. The fibre data is encoded using a proprietary transport protocol and as such the FIMO-232 must be used in pairs, with one unit at each end of the link.

The FIMO-232 is “data agile” in that it supports asynchronous data rates up to 256Kbps without the need for configuration. The FIMO-232 offers both DTE and DCE interfaces and automatically adjusts the internal signal mapping to support a variety of connection options:

DTE Port to DTE Port
DCE Port to DCE Port
DTE Port to DCE Port

To simplify fault diagnosis the FIMO-232 has a number of LEDs to show the status of the unit and various signal lines.

2 STATUTORY INFORMATION

2. 1 Safety

The following ports are designated SELV (Safety Extra Low Voltage) within the scope of EN41003:

RS-232 DCE Port
RS-232 DTE Port
Alarm extension port

These ports should only be connected to SELV ports on other equipment in accordance with EN60950 clause 2.3.

2. 2 Electromagnetic Compatibility

In order to ensure EMC compliance all signal and data cables and connectors must use a screened connector shell with a screened cable. The cable screen must be terminated to the screened connector shell and not connected to any pins of the connector. Failure to use the correct connector may compromise EMC compliance.

2. 3 FCC Declaration

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at its own expense.

2. 4 EN55022 Declaration

The FIMO-232 is a Class A product. In a domestic environment it may cause radio interference, in which case the user may be required to take adequate measures.

2. 5 RoHS Compliance

The FIMO-232 is compliant with the EU RoHS directive 2002/95/EC. The RoHS directive bans the use of six hazardous materials in products placed on the market after July 1st 2006. The six banned materials are Lead, Mercury, Hexavalent Chromium, Polybrominated Biphenyls, Polybrominated Diphenyl Ethers and Cadmium.

The FIMO-232 product is manufactured using a lead-free soldering process and as such is RoHS 6/6 compliant.

2. 6 Power Supply

The FIMO-232 is powered by an internal mains power supply with an input voltage range 100-250 VAC / 50-60 Hz. The maximum operating input current is 50mA rms at 100VAC.
An alternative -48V DC power supply is available with an input voltage range of minus 36VDC to minus 72 VDC, 200-100mA.

A schematic of the female -48V DC connector mounted on the rear panel in the place of the 240VAC IEC sockets is shown below.

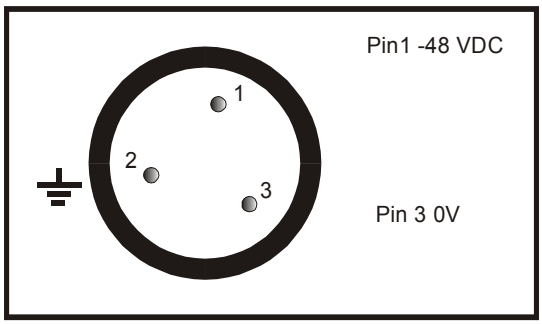


Figure 2. 1 Schematic -48VDC power connector

Safety Notes:
Excessive voltages are present inside the unit. There are no user serviceable parts inside the unit, and the cover should not be removed by unqualified personnel. The unit must not be exposed to damp or condensing conditions. The FIMO-232 must be connected to safety earth for correct operation.

3 INTRODUCING THE FIMO-232

3. 1 Front Panel

The layout of the front and rear panels of the FIMO-232 are shown in schematic form below:

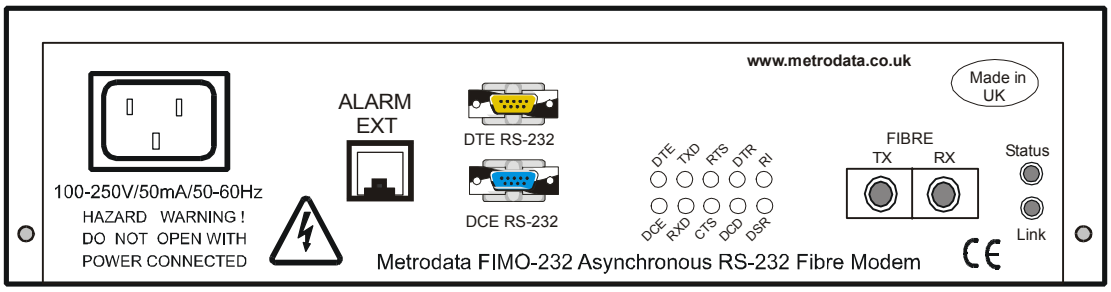


Figure 3.1 FIMO-232 rear panel

3. 2 LED Indicators

The FIMO-232 provides you with essential information through a series of LED's on the rear panel. The colour of some of these LED's will depend on the type of data that is being handled at the time, and these are described in Figures 3.2 and 3.3 below.

3 . 2. 1 Status & Link LEDs

Status LED	Meaning
Off	Power is not being received by the FIMO-232.
Green	Power is being received by the FIMO-232.
Green Flashing	Local RS-232 cable is not connected
Red/Green Flashing	Remote RS-232 cable is not connected
Red Flashing	Remote Alarm
Red	Fibre Fault
Link LED	**Meaning**
Off	Loss of Signal / Fibre disconnected
Green Flashing	Loss of Synchronisation
Green	Fibre Link up

Figure 3.2 Rear panel Status & Link LEDs

3 . 2. 2 RS-232 Port LEDs

There is an array of miniature LEDs on the rear panel of the unit. These give detailed indication of the RS-232 signal states.

DTE Port Select	**Off**	DTE Port Disabled. If a data cable is connected to the disabled port, the data will be ignored.
	Green	DTE Port Active
DCE Port Select	**Off**	DCE Port Disabled. If a data cable is connected to the disabled port, the data will be ignored.
	Green	DCE Port Active
TXD LED	**Red**	TXD in Mark State
	Green	TXD in Space State (Pulse stretched to 1/10 second to ensure that low level activity is indicated.)
RXD LED	**Red**	RXD in Mark State
	Green	RXD in Space State (Pulse stretched to 1/10 second to ensure that low level activity is indicated.)
RTS LED	**Red**	RTS in OFF State
	Green	RTS in ON State
CTS LED	**Red**	CTS in OFF State
	Green	CTS in ON State
DTR LED	**Red**	DTR in OFF State
	Green	DTR in ON State
DSR LED	**Red**	DSR in OFF State
	Green	DSR in ON State
DCD LED	**Red**	DCD in OFF State
	Green	DCD in ON State
RI LED	**Red**	RI in OFF State
	Green	RI in ON State

Figure 3.3 RS-232 port LED indicators

3 . 2. 3 FIMO-232 Bit-switch Configuration

The Bit-switches on the base of the unit must be configured before making any connections to the unit. There is an explanatory label on the base of the unit defining the switch options:

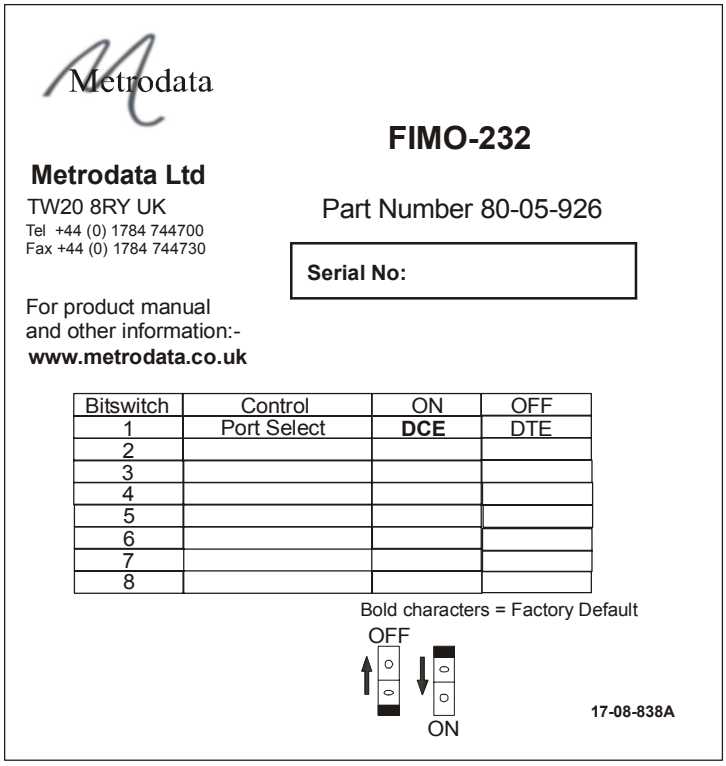


Figure 3.4 FIMO-232 Base label

The lower 9-way D-type outlet on the rear panel of the unit is the DCE port. The upper 9-way D-type outlet on the rear panel of the unit is the DTE port

3 . 2. 4 Power

The FIMO-232 is powered by a mains supply with an input voltage of 100-250VAC 50-60Hz and with a maximum input current of 50 mA at 100VAC. Mains power is connected via the IEC inlet on the rear of the unit. The FIMO-232 consumes approximately 5 Watts.

An alternative -48VDC powered unit is available. The input voltage and current ranges are minus 36 to minus 72 volts DC, 200 - 100mA. A Buccaneer type socket is fitted to the rear panel, and a plug is provided with the unit for the customer's own wiring. The connections are labelled on the rear panel of the FIMO-232.

Pin no	Connection
1	-48VDC
2	Ground
3	0VDC

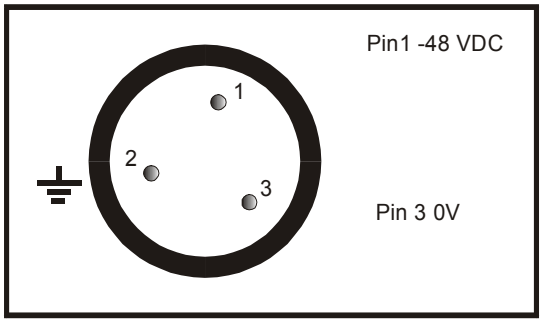


Figure 3.5 -48VDC connections

Note: The FIMO-232 must be connected to mains safety earth for correct operation.
On some units, an additional Ground stud may be located on the rear panel to permit a separate Ground connection to be made.

3 . 2. 5 RS-232 Interface

The RS-232 interface is presented on a dual 9-way D-type connector. The FIMO-232 presents a DCE interface on the lower (female) connector, and a DTE interface on the upper (male) connector. The pinout is shown below:

Pin	Signal	Symbol	Direction
1	Data Carrier Detect	DCD	To DTE
2	Receive Data	RXD	To DTE
3	Transmit Data	TXD	From DTE
4	Data Terminal Ready	DTR	From DTE
5	Signal Ground		
6	Data Set Ready	DSR	To DTE
7	Request to Send	RTS	From DTE
8	Clear to Send	CTS	To DTE
9	Ring Indicator	RI	To DTE

Figure 3.6 FIMO-232 RS-232 Interface

3 . 2. 6 RJ45 Connector layout

Figure 3.5 shows both the plug and socket head on so that any connecting wires are behind the connector. The connector numbering is shown.

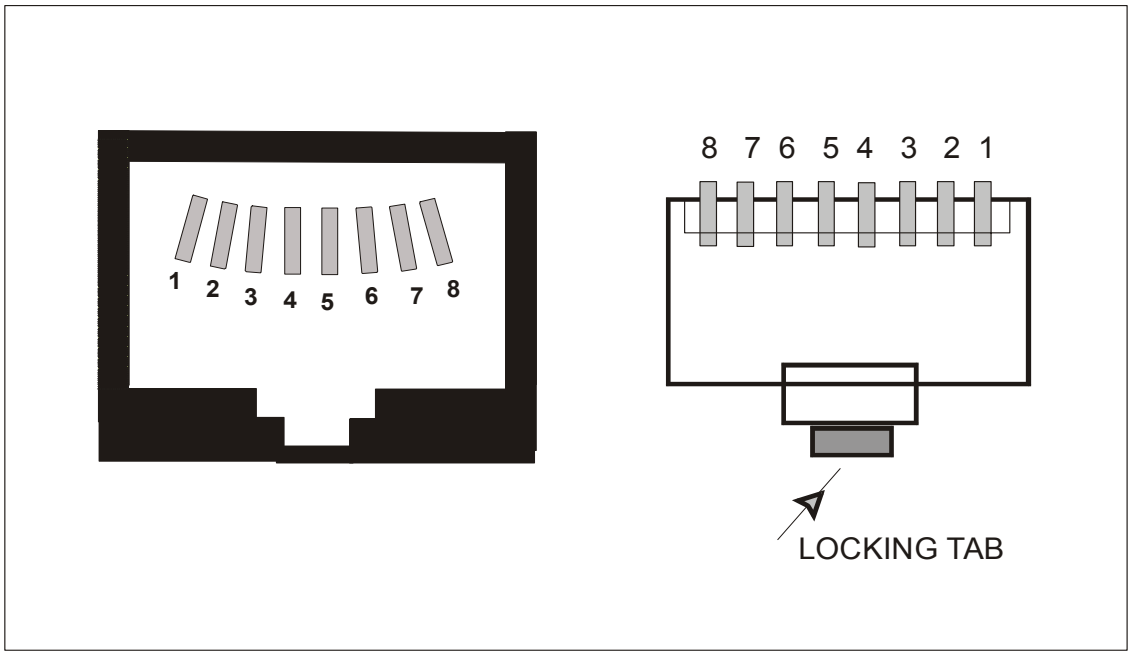


Figure 3.7 RJ45 connector layout

3 . 2. 7 Alarm Extension Relay

The FIMO-232 offers an Alarm relay to provide an external warning of problems which may arise. The interface is presented on an RJ45 connector, and offers both normally open and normally closed contacts. Maximum contact rating is 1.5 Amp at 125 VDC. Normal is the powered up, non-alarmed state. The connections are shown in the table below:

Pin	Contact
1	Normally closed
2	Normally open
3	Common
4	Not connected
5	Not connected
6	Not connected
7	Not connected
8	Not connected

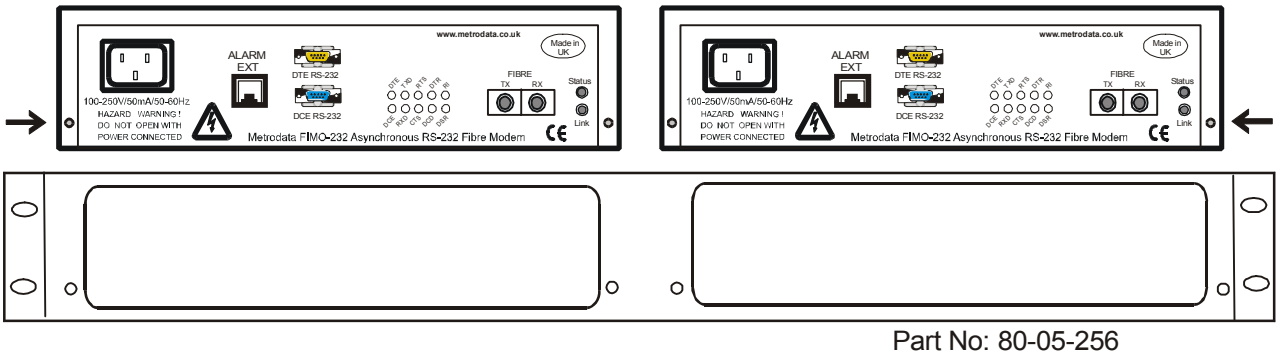
Figure 3.8 Alarm extension RJ45 connections

3. 3 Rack mounting

Rack-mounting kits may be used to mount two FIMO-232 units side by side in a 19” rack. The kit, part number 80-05-256, has a recessed plate to permit cable or fibre bends to be made within the envelope of the 19” cabinet or rack. It has a cutout to provide access to all the connectors on the rear panel of the FIMO-232.

To install the FIMO-232 first remove the two rear panel screws securing the lid as arrowed below. Fasten the FIMO-232 into the rack-mounting adaptor plate using the screws just removed. Then secure the rack-mounting plate complete with one or two FIMO-232 units into the 19” rack using the locator holes at the ends of the adaptor plate.

Ensure that the bit-switches are correctly set before installing the rack-mount option.



Part No: 80-05-256

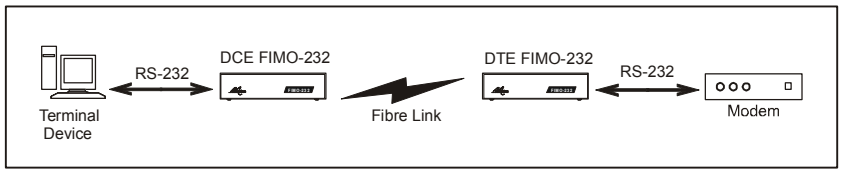
4 FIMO-232 OPERATION

The FIMO-232 operates as a fibre modem, transporting asynchronous RS-232 signals over an optical fibre. The FIMO-232 uses an encoding scheme that automatically adapts to the data rate used on the RS-232 port and as such is “data agile”, supporting any data rate up to 256 Kbps.

The FIMO-232 offers a selectable DCE or DTE port and automatically supports any combination of interface connections as shown below.

4. 1 DTE to DCE

In the normal operating configuration, one FIMO-232 is configured as DTE for connection to a DCE device such as a modem, whilst the other is configured as DCE for connection to a DTE device such as a Terminal as shown:

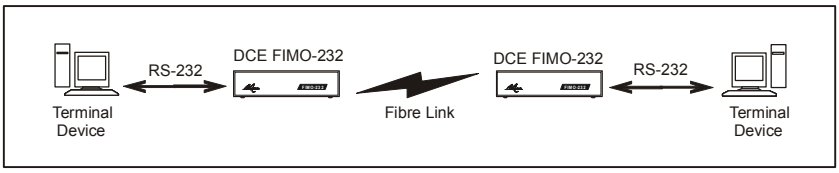


TXD	→	TXD
RXD	←	RXD
RTS	→	RTS
CTS	←	CTS
DCD	←	DCD
DTR	→	DTR
DSR	←	DSR
RI	←	RI

Figure 4.1 DTE to DCE Operation

4. 2 DCE to DCE

In this configuration both FIMO_232 units are configured for DCE mode. Both FIMO-232 units are connected to DTE devices such as a Terminal as shown:



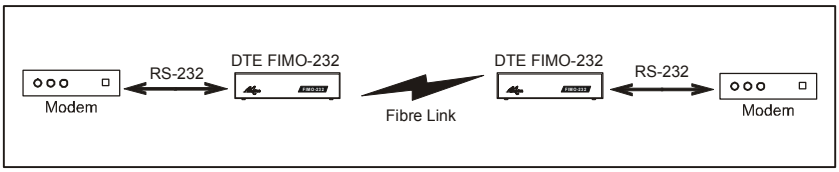
TXD	→	RXD
RXD	←	TXD
RTS	→	CTS
CTS	←	RTS
DTR	→	DSR
DSR	←	DTR
DCD = ON		DCD = ON
RI = OFF		RI = OFF

Figure 4.2 DCE to DCE Operation

In this configuration, the signals are automatically crossed over as shown. The FIMO-232 will force DCD into the ON State when a valid fibre connection is detected, whilst RI will be driven to the OFF State.

4. 3 DTE to DTE

In this configuration both FIMO-232 units are configured for DTE mode and are used to extend a connection between a pair of DCE devices such as modems.



TXD	←	RXD
RXD	→	TXD
RTS	←	CTS
CTS	→	RTS
DCD		DCD
DTR	←	DSR
DSR	→	DTR
RI		RI

Figure 4.3 DTE to DTE Operation

The signals are automatically crossed over as shown, and the incoming DCD and RI signals are ignored by the FIMO-232.

5 INSTALLING & SETTING-UP

This chapter describes how to set up the FIMO-232 ready for use. It covers the initial connections, powering on the unit, and how to access the software that controls the operating parameters.
Safety Notice: Ports that are identified as SELV in this manual should only be connected to SELV ports on other equipment in accordance with EN 60950 clause 2.3.

5. 1 Connecting up

Step 1: Mounting
The FIMO-232 is housed in a convenient 1U table top enclosure. 19" rack-mounting options are available as are rack nests for 2 to 18 units.

Step 2: Configuration
The bit-switches on the underside of the FIMO-232 unit must be configured for the desired operation.

Step 3: Power Supply
Connect the mains power lead (or DC power cable) and re-check all connections for security. When power has been switched on, the Status LED should be GREEN, RED or Flashing to indicate that the FIMO-232 is operational.

Step 4: Fibre Port
Connect the Fibre Optic to the FIMO-232.
When both ends of the Fibre Link are connected, the LINK LED will be ON with a GREEN colour to indicate that the incoming fibre link is operational

If the LINK LED is not Green this indicates that either the remote FIMO-232 is not connected or powered up. Alternatively the remote unit is not a FIMO-232 or there is a high bit error rate on the fibre.

Step 5: RS-232 Port
The bit-switch should have been set to select the required port - DCE or DTE. Connect the RS-232 data cable to the selected port on the rear panel of the unit.

When the cable is connected, the Status LED should be steady GREEN, indicating that the unit is operating normally.

If the fibre link is OK, then a RED/GREEN Flashing LED indicates that there is no RS-232 cable connected to the remote unit. A GREEN Flashing LED indicates that there is no cable at the local end, or that the cable is attached to a disabled port.

6 TROUBLESHOOTING

If the link is not functioning correctly, the following troubleshooting hints may be helpful.

6. 1 Status LED Off

If the Status LED is unlit, the unit has no power. Check the power connection to the unit. If you are certain that the power connection is good, it is likely that the FIMO-232 has developed a fault causing the internal fuse to fail. This is not a field replaceable item, and the unit should be returned to Metrodata for repair.

6. 2 Link LED Off

If the Fibre LINK LED is OFF, this indicates that the fibre receiver cannot detect a signal. Check that the fibre is connected correctly and is of the correct type (e.g. Multi-mode, Single-mode). If the local fibre is correctly connected, it is likely that the remote end is powered down or not connected.

6. 3 Link LED Flashing Green

If the Fibre LINK LED is Flashing GREEN, this indicates that a signal can be detected but the FIMO-232 cannot synchronise to the signal. This may be for two reasons.

Firstly, if the Fibre link is faulty and has a very high error rate. This may be caused by having installed the wrong type of fibre e.g. Multi-mode instead of Single-mode; or that the loss budget has been exceeded owing to distance or couplings.

Secondly, if the Fibre link is not a transparent connection to the remote FIMO-232 unit.

6. 4 Status LED Flashing Red

With the Fibre Link LED in the Steady GREEN state, the Flashing Red Status LED indicates that the remote FIMO-232 has a fibre fault, either LOS (Loss of signal) or Loss of Synch.

Check that the local fibre transmitter is correctly connected. If it is, the fault exists at the other end of the link with the remote unit.

6. 5 Status LED Flashing Red/Green

A Flashing Red/Green Status LED indicates that the remote cable is not connected.
This may be because no cable has been fitted to the local unit or that the cable is fitted to a port that is in the DISABLED State; or it may be that the end equipment is not connected or is powered down.

6. 6 Status LED Flashing Green

A Flashing GREEN Status LED indicates that the local cable is not connected. This may be because no cable is fitted to the local unit, or because the cable is fitted to a port in the DISABLED State. Or it may be that the end equipment is not connected or is powered down.

6. 7 Status OK, but no traffic passing

Verify the State of the port LEDs. Check the State of the control signals. If hardware based flow control is enabled, then the control signals must be in the ON State for traffic to pass. Check for transitions on the data line. If the TXD/RXD LEDs are RED then the line is in a MARK state. If it does not pulse GREEN then there is no activity on the line.

7 SPECIFICATIONS

RS-232 Interface	Definition
DCE Mode	9-way D-type Female connector on rear panel
DTE Mode	9-way D-type Male connector on rear panel
Fibre Interface	**Definition**
Single mode short haul	Dual SC single mode 8/125 um
Single mode long haul	Dual SC single mode 8/125 um
Multi-mode	Dual SC multi-mode 62.5/125 um
General	**Definition**
Power supply	100-250 VAC, 50-60 Hz, 60-24 mA or -36 to -72VDC, 200-100mA
Dimensions	202 x 132 x 44 mm (w x d x h) Enclosure only 202 x 132 x 47 mm (w x d x h) Overall including feet
Environmental	**Range**
Ambient Temperature	0degC to +50degC
Storage Temperature	-20degC to +70degC
Relative Humidity	0% - 95% non condensing
Barometric Pressure	86 KPa - 106 KPa