

**RS232 1Channel Data Line Powered / RPopto-clamp DCE**

**1 General**

This device is a modem for asynchronous data transmission in full-duplex mode. Drawing all necessary operating power from the RS232 Interface, the system supports data rates up to 120kBit/s and link length up to 100m using low cost 1mm polymer optical fibre (POF) (650nm version). Due to the RPopto-clamp system fiber termination needs no connectors.

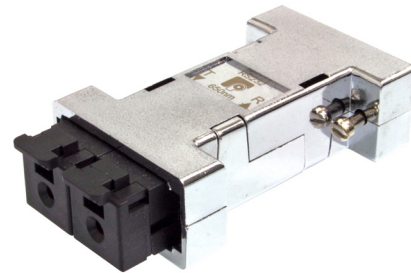


Fig. 1 RS232 interface

**2 Application**

Due to the max. data rate of 120 kBit/s, the max. link length of 100m between 2 stations and the protocol free operation the modem can be used in many applications:

- Existing electrical RS232 Systems can be extended up to 100m link lengths
- Interference-free data transmission in EMI-loaded area
- Electrical isolation between RS232 interfaces

**4 Features**

- 1Channel RS232 - FO Transceiver
- Full-Duplex Data Transmission
- 120 kBit/s Data rate
- Protocol-transparent
- 9-way Sub-D Connector Male
- Optical clamp system `RPopto clamp`
- FO termination without connectors
- Metalized plastic case
- Data line powered

**3 Block Diagram**

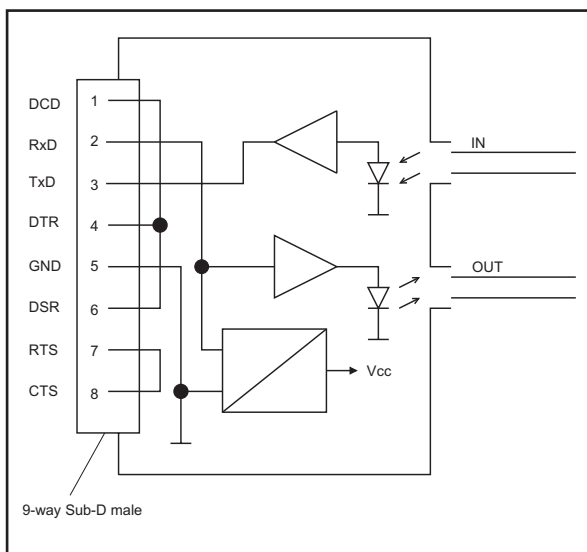


Fig. 2 Drawing

**5 Ordering Information**

<b>Model</b>	<b>Order number</b>
650nm / RPopto-clamp	901 SV 232 C 6095

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### 6 Options

On request the modem can be ordered with following options:

- latching element for rail mounting.
- inverted opt. signal (see 8 Operation)
- F-ST, F-SMA or other standardized opt. connectors

### 7 CE-Declaration of Conformity

The RS232 1Channel modem meets the basic requirements according to Article 4 and Appendix III of Directive 89/336/EWG:

Electromagnetic Interference (EMI).

The modem complies with the followings standards:

- EN 55022 or EN 50081-1
- EN 55024 or EN 50082-1

### 8 Operation

The RS232 1Channel Modem is a code transparent electro-optical transceiver. Incoming data at the electrical interface is converted into optical signals and transmitted by optical fiber. The optical receiver at the other side recovers the optical signal to the corresponding RS232 format.

The RS232-FO conversion takes place acc. to following scheme:

$$\begin{aligned}
 U_{IN} \geq +3V &= '0' &\Rightarrow & \text{opt. Out=On} \\
 U_{IN} \leq -3V &= '1' &\Rightarrow & \text{opt. Out=Off}
 \end{aligned}$$

For applications requiring an inverted optical signal, appropriate modems can be ordered (optional).

### 9 Power Supply

The modem draws all necessary operating power from the TxD data line.

Therefore no external power supply is needed.

For proper operation it must be guaranteed that the application line drivers are in accordance with the EIA-RS232-C standard and that the TxD application line driver is not turned off (into high-Z) during transmission idle.

Fig. 3 shows the modem current consumption subject to line driver output voltage on TxD line:

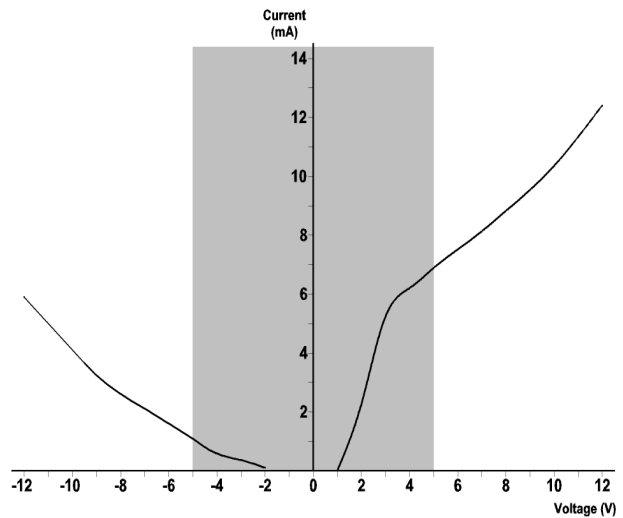


Fig. 3 Input Voltage Range

Within the shaded area modem function is not guaranteed, because optical output power and optical sensitivity drops to undefined levels.

Pic. 4 shows the relative optical output power ( $P_{OUTrel}$ ) subject to line driver voltage on TxD.

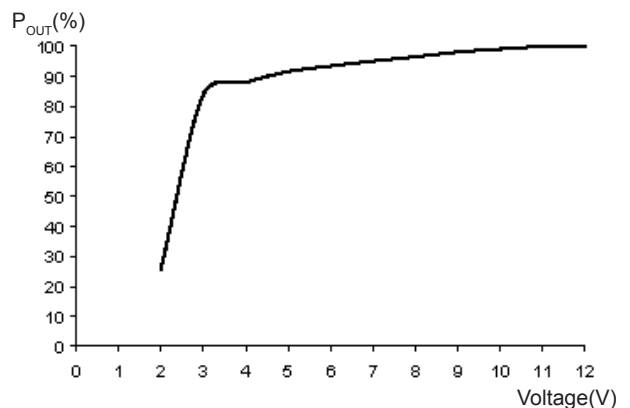


Fig. 4 Optical power output

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### 10 Installation

- Make sure that all equipment is off power to avoid electrical damage during installation
- Connect the Fiber-Optic-Interface to the Com.-interface
- Connect the FO cable with the Fiber-Optic Interface (see Pic. 5).

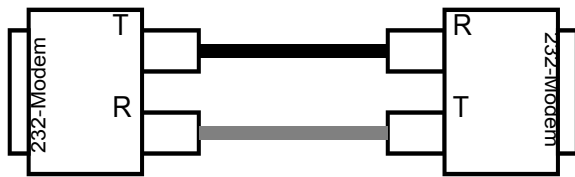


Fig. 5 FO-connection

### Example 2: Pinout 25-way Sub-D

Pin	Name	DCE	DTE
1	CG	Earth	Earth
2	TxD	Input	Output
3	RxD	Output	Input
4	RTS	Input	Output
5	CTS	Output	Input
6	DSR	Output	Input
7	GND	Ground	Ground
8	DCD	Output	Input
12	DCD2	Output	Input
13	CTS2	Output	Input
14	TXD2	Input	Output
15	TxC	Output	Input
16	RxD2	Output	Input
17	RxC	Output	Input
19	RTS2	Input	Output
20	DTR	Input	Output
22	RI	Output	Input
23	DRS	I/O	I/O
24	TxC	Input	Output
25	BUSY	Output	Input

### 11 EIA-RS232 Standard

The full declaration of the RS232 Interface and the meaning of the signal names and symbols can be derived from the EIA RS232-C standard.

An agreed case is that RS232 devices are separated into two classes: DTE (Data Terminal Equipment exp. Computers) and DCE (Data Communication Equipment e.g. Modems).

The standard describes the 25-way Sub-D, however the 9-way Sub-D is now more used.

DCE = Sub-D female  
 DTE = Sub-D male

#### Example 1: Pinout 9-way Sub-D

Pin	Name	DCE	DTE
1	DCD	Output	Input
2	RxD	Output	Input
3	TxD	Input	Output
4	DTR	Input	Output
5	GND	Ground	Ground
6	DSR	Output	Input
7	RTS	Input	Output
8	CTS	Output	Input
9	RI	Output	Input

### 12 Sub-D Pin Out

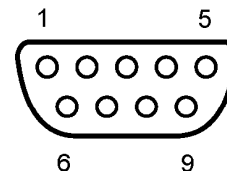


Fig. 6 Sub-D pin out

PIN Nr.	Name	Funktion
1	DCD	shorted to DTR,DSR
2	RxD	Data IN
3	TxD	Data OUT
4	DTR	shorted DCD,DSR
5	GND	Ground
6	DSR	shorted to DCD,DTR
7	RTS	shorted to CTS
8	CTS	shorted to RTS
9	NC	not used

**! Not used pins are without function and should be left open. !**

## RS232 1Channel Data Line Powered / RPopto-clamp DCE

### 13 Maximum Ratings \_\_\_\_\_

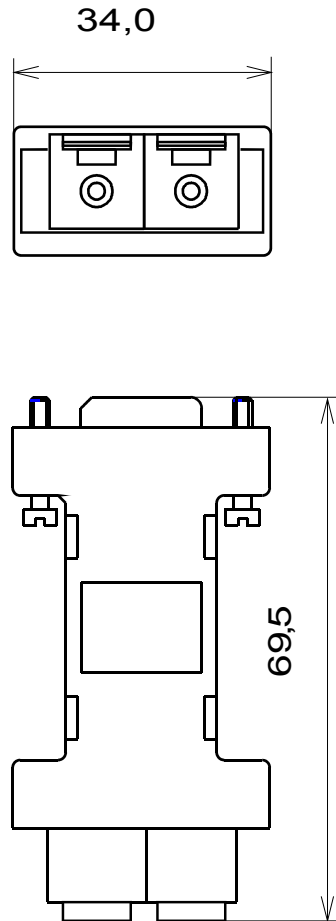
TxD driver voltage \_\_\_\_\_ ±12V DC  
 Output current \_\_\_\_\_ 10mA  
 Storage temperature \_\_\_\_\_ -55...+125°C  
 Operating temperature \_\_\_\_\_ -10..+85°C

**Stresses beyond those listed under 'Maximum Ratings' may cause permanent damage to the modem. Above listed values are stress limits only and functional operation of the media converter at these conditions is not recommended. Exposure to maximum rating conditions for extended periods may affect the modem reliability.**

### 14 Technical Data \_\_\_\_\_

**Data rate:** 0 .. 120 kBit/s  
**Wavelength:** 650nm  
**opt. Interface:** RPopto clamp  
**max. Link length:** 60m min. POF-fiber  
 100m typ. POF-fiber  
**Data format el.:** RS232-C/V24  
**el. Interface:** 9-way Sub-D male  
**Power supply:** from data line  
**Current cons.:** app. 10mA  
**Case:** Plastic, metalized  
**Dimension:** app. 66x34x17mm (L x W x H)  
**Protection class:** IP40  
**Weight:** 30g  
**Temperature range:** 0 .. +80°C

### 15 Technical Drawing \_\_\_\_\_



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