

Let's communicate



RS – 485 to Multimode Fibre Optic Converter



ELO E171

Operation manual

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1.0 Introduction

Fiber Optic (SINGLE MODE and/or MULTI MODE) has been used for signal transmission in automation for communication more and more often.

The main advantage of Fiber Optic is its immunity to electromagnetic interference, slight radiation and high transmission capacity

1.1 Use of the converter

Conversion of metallic media to more expensive fiber optic is mainly suitable:

- 1] in the environment of high interference level,
- 2] if the higher isolation is required, (switching stations, transformers),
- 3] if the metallic line can not be used because of EMI ,
- 4] if the higher transport security and safety is necessary,
- 5] if isolation via the optocouplers is not suitable for different reasons

These problems can be solved if the converter ELO E 171 (MULTI MODE) is applied.

2.0 Operation principles

ELO E171 transfers signal received from RS-485 interface to transmitting fiber of the optic cable and the signal from receiving fiber is transmitted to RS-485.

Besides the signal transfer, the converter matches the full duplex fiber to the half duplex RS-485 (data-flow direction switching).

Its independent operation is based on the set data rate (1200 to 115200 bps) and data format which must be asynchronous of 10 and/or 11bits (start bit, 8 to 9 information bits, stop bit). The switching speed is sufficient to use the converter in data transmission network organized as MASTER-SLAVE and MULTI MASTER.

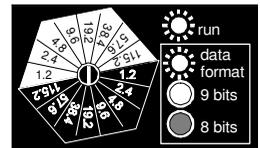
The converter also corrects bits width distortion which could occur during transmission. For fiber optic connection optical connector ST is used as standard.

3.0 Installation

There are two different problems of installation to discuss: RS-485 link and fiber optic link connection and setting characteristics of the converter.

The converter needs data range and data format setting (asynchronous word length). There is the rotating switch on the top converter case (see the figure). Switch slot points to the light and dark scale sector at the same time.

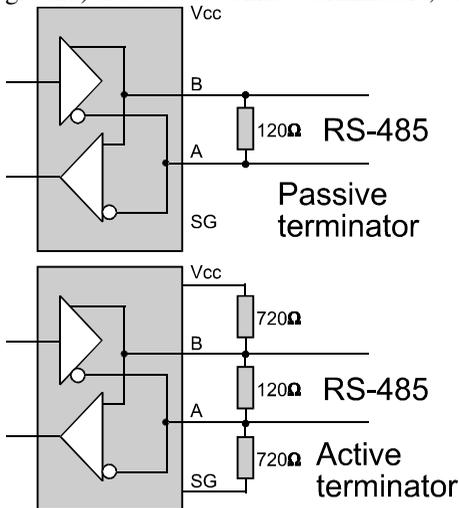
If the LED "data format" is alight, 9 bits data format is set (e.g.8 data bits and a parity bit), if it is not alight 8 bits format is



selected (e.g. 8 data bits without parity). 19.2 kbps rate and 9 bits format is set in the picture. When in operation, received and transmitted data and data flow direction is also indicated by LED.

3.1 RS-485 Interface Connection

There is the isolation between the RS-485 interface clamp and all the other converter circuits. The 3kV voltage can be applied for 1 second without a failure. The RS-485 interface signal is placed on A-B clamps. The clamps VCC (+5V) and SG (signal ground) are used to connect terminators, see the figure.



Both the RS-485 link ends should be terminated with the 100-120 Ω resistors (so-called passive terminators), which are placed between A-B wires. These terminators are used for the converter impedance matching, they suppress the undesirable echo and they influence the transfer immunity against interference. Inserting the optical converter into the metallic link terminates this link right on the A-B clamps of the converter therefore it is necessary to connect the passive converter.

There are also the active terminators beside the passive ones. Only one active terminator can be installed to one metallic section of the link and its role is as follows:

The RS-485 signal is symmetric. The differential receiver interprets the difference $U_A - U_B$. It does not depend on the signal ground potential. The receiver interprets the obtained signal $|U_A - U_B| > 200$ mV as log. 1 or log. 0.

In addition to these levels the third state can occur, it is so-called IDLE state. No transmitter is activated, each communicating partner is just listening so $|U_A - U_B| < 200$ mV. The problem is how to interpret the third state in the two-state logic. The active terminator gives the signal into the IDLE state line and it is interpreted as IDLE in the two-state logic.

3.2 Fibre Link Connection

The fibre optic cable is connected through the ST400 connectors. To connect the ELO E171, the transmitter of the remote converter must be connected to the receiver of the local ELO E171 and the remote receiver must be connected to the local transmitter (fibres cross).

Both converters must be set to the right data range and data format. The rotating switch on the top converter case is used to it.

3.3 Power Connection

The external supply has to have the output voltage of 12-24V and it is connected via DC+ and DC- clamps. The supply take off is c.200 mA. If the supply is on operation the indicator RUN switches on.

The converter contains two isolated zones. The RS-485 circuits are separated from the other ones and supplied via the internal isolated DC/DC converter. If it is necessary to keep this separation the external power supply must be isolated from the signal grounds of all RS-485 partners.

4.0 Specification

4.1 Parameters

Transmitted signals		differential signal AB
Type and connection of RS-485 connector		clamps
Isolation		RS-485 galvanic isolation from GND 3 kV/1 sec supply
Transmit mode		asynchronous, half-duplex
Fibre optic cable		two multimode fibres cables 50/125 μm (62/125 μm)
Optic connectors		ST type
Maximum data rate		115 200 bps
Minimum data rate		1200 bps
Supply		external DC supply 9-24V/200 mA
Dimension:	Length	115 mm
	Width	55 mm
	Height	24 mm
Weight		137 g

4.2 Other

Stocking temperature	-10° to +55°C
Working temperature	+0° to +50°C
Humidity	0 – 85% (non-condensing)

5.0 Testing

In case of proper installation the RUN diode is alight. If 9bit data format is selected the 9 bits indicator must be alight. The TxD and RxD indicators must blink during transmission.

6.0 Troubleshooting

Symptom	Action
ELO 171 does not work after installation	Check if the RUN is alight. Check the power supply. Check the RS-485 link connection.
Connection in normal operation quit working	Check the power supply Check if the cables are OK.. Turn off and on the power supply and detect if the converter starts again.

7.0 Ordering Information

Supply code is ELO E171.

Note

