

Let's communicate

elo

Serial interfaces to optic cable multiplexers



**ELO E246, ELO E247,
ELO E248, ELO E249,
ELO E24A, ELO E24B**

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 multiplexer

Using a pair of multiplexers several absolutely independent transmission channels over one optic line can be established. The individual channels can be used that way:

- several independent simultaneous applications (according to the number of channels),
- simultaneous data transfer over one channel and control, status or clock signals over the rest of channels.

Multiplexer can work without any setting.

2.0 Operation principles

Multiplexer associates following serial channels to one pair of fibers:

Interface / model	E246	E247	E248	E249	E24A	E24B
Number of RS232	4	4	4	--	--	--
Number of RS422	--	--	--	2	2	2

The data rate in one channel is absolutely independent on other channels and the data rate can be any range from zero to maximum 230 000 kbps.

Multiplexer is independent on communication protocol.

3.0 Installation

There are three different problems of installation to discuss: RS232 or RS422 link connection, optic fiber link connection, respectively two multiplexers interconnecting and power supply connection.

3.1 Metallic interfaces connection

All interfaces except optic fiber and supply input are taken out to DB9 female connector. The connector description is in tables shown in following chapters. The interfaces concentrated to one connector can be distributed to separate connectors by ELO E24E and ELO E24F cables.

3.2 RS232 interface

There are three different ways how to use the multiplexer ELO E246, E247 or E248 with RS232 interfaces:

1 - Four independent duplex channels with RS232 interface. First with signals TxD1 and RxD1 (contacts 6,1), second with signals TxD2, RxD2 (contacts 7,2), third TxD3, RxD3 (contacts 8,3) and fourth TxD4 and RxD4 (contacts 9,4). Contact 5 - GND is common for all channels. When the cable ELO E24E is used each channel has its own standard connector DB9F with the signals RxD (contact 2), TxD (contact 3) and GND (contact 5).

2 - One duplex line, transmitting data (TxD and RxD) through the channel e.g. (No.1) and accompanying control and status signals, RTS, CTS, DTR, DSR and DCD through the rest of channels.

3 - Two duplex lines, each uses one channel for data and second one for control and status signal - handshake (e.g. RTS-CTS, or DTR-DSR).

The data rate is allowed in range from 0 to 230 000 bps.

The cable between end device and multiplexer must not exceed 15 m.

contact	signal	meaning	direction
1	RxD1	received data of the 1st RS232	from the multiplexer
2	RxD2	received data of the 2nd RS232	from the multiplexer
3	RxD3	received data of the 3rd RS232	from the multiplexer
4	RxD4	received data of the 4th RS232	from the multiplexer
5	GND	common signal ground	
6	TxD1	transm. data of the 1st RS232	into the multiplexer
7	TxD2	transm. data of the 2nd RS232	into the multiplexer
8	TxD3	transm. data of the 3rd RS232	into the multiplexer
9	TxD4	transm. data of the 4th RS232	into the multiplexer

3.3 RS422 interface

RS422 is destined for two point connection. The signal is symmetric, differential. Each signal is distributed over its twisted pair. The wires are marked for instance Rx1+ and Rx1-. In idle state (which is according to stop bit in asynchronous mode) the potential of Rx1+ is higher than the potential of Rx1-. The connector is described in following table:

contact	signal	meaning	direction
1	Rx1+	received data of the 1st RS422	from the multiplexer
2	Rx2+	received data of the 2nd RS422	from the multiplexer
3	Tx1+	transm. data of the 1st RS422	into the multiplexer
4	Tx2+	transm. data of the 2nd RS422	into the multiplexer
5	GND	ground	
6	Rx1-	received data of the 1st RS422	from the multiplexer
7	Rx2-	received data of the 2nd RS422	from the multiplexer
8	Tx1-	transm. data of the 1st RS422	into the multiplexer
9	Tx2-	transm. data of the 2nd RS422	into the multiplexer

To improve the transfer over the RS422 line the terminating resistors 100 -120 Ω can be connected between the corresponding pair of wires. The installation of terminators is very easy by the switching on the switches on the back side of multiplexer.

The maximum cable length between end device and multiplexer must not exceed 1200 m.

Multiplexer can work without any setting – the data rate can be any in the range from 0 to 230 000 bps. The transfer does not depend on other channels and on the communication protocol.

SW	terminated line
1	On= Rx1
2	On=Rx2
3	On=Tx1
4	On=Tx2
5-8	not used

3.4 Two multiplexers interconnection

The optic cable is connected through the SC connector (models E247, E249, E24A, E24B), or ST one (models E246, 249). The remote multiplexer's transmitter must be connected to local receiver and remote receiver must be connected to local transmitter (the fibers are crossing). The correctly connected multiplexers are indicated by LINK indicator.

3.5 Power Connection

The external power supply must have from 9V to 24V DC. It can be connected through the DC connector on the back side of the multiplexer. The correct function is signalized by PWR indicator. The power take off depends on the voltage rating of the used supply. If the voltage is 12V it doesn't exceed 400 mA, if 24V 150 mA.

4.0 Specification

4.1 Parameters

Transferred interfaces E246, E247, E248	4 x RS232 (V.24),
Transferred interfaces E249, E24A, E24B	2 x RS422 (V.11),
Interfaces connector	DB9 female,
Transfer mode	duplex
Optic connector E246, E249	ST
E247, E248, E24A, E24B	SC
Optic cable E246, E247, E249, E24A	two multimode fibers 50 / 125 μ m or 62.5 / 125 μ m
Optic cable E248, E24B	two single mode fibers 9 / 125 μ m
Maximum data rate RS232	230 000 bps,
Maximum data rate RS422	230 000 bps,
Minimum Maximum data rate	0 bps,
Supplying	external DC 9-24V/400-150 mA

4.2 Dimensions and weight

Length x width x height	120x80x25 mm
Weight	160 g

4.3 Other

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

5.0 Testing

In case of proper installation of power supply the PWR diode is alight. The correct optic link installation is indicated by LINK. The Tx/RxD indicator must blink during transmission.

6.0 Troubleshooting

Symptom	Action
Multiplexer does not work after installation	Check the LINK – it is shining when the optic cables are connected properly. Check the power supply (PWR). Check the interfaces' connection. Check the correct directions of transmission.
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 multiplexer will start again.

7.0 Ordering information

The ordering codes are:

ELO E246	MUX 4xRS232 / ST multimode,
ELO E247	MUX 4xRS232 / SC multimode,
ELO E248	MUX 4xRS232 / SC single mode,
ELO E249	MUX 2xRS422 / ST multimode,
ELO E24A	MUX 2xRS422 / SC multimode,
ELO E24B	MUX 2xRS422 / SC single mode.

7.1 Related products

ELO E0Q6	Power supply 12V / 500 mA
ELO E24E	cable 4 x RS232,
ELO E24F	cable 2x RS422.

