KONČAR

Končar - Elektronika i informatika d.d.

Secondary equipment

USER MANUAL

KONCOM

Communication converter

INDEX:

1 INTRODUCTION

1.1 General

KONCOM is a unified name for Koncar-s group of converters used for converting communication interfaces. They are designed for use in industrial environments, have an increased resistance to interference, connect to a wide range of power sources, are encased in a metal chassis, compact and easy to use product. There are two basic types of transducers:

- KONCOM RS – Signal converter from RS232 interface to one of the RS485/RS422 interfaces with mutual isolation voltage of 2.5 kV.
- KONCOM RSFO MULTIPLEXER – Signal converter (multiplexer) from one of the RS232/RS485/RS422/FO interfaces to five (or six) FO (fiber optic) interfaces.

1.2 Abbreviations

AC	Alternating Current
DC	Direct Current
EIA	Electronic Industries Association
FO	Fiber optic
LED	Light Emitting Diode
MTBF	Mean time Between Fault
NC	Not Connected
RS232	Standard for Serial Binary Data Interchange
RS422	Standard for unidirectional balanced interface
RS485	Standard for bidirectional balanced interface

2 TECHNICAL DATA

2.1 Description

2.1.1 KONCOM RS

KONCOM RS is a signal transducer from RS232 to RS485 or RS422 interface. Between RS232 and RS485/RS422 there is a mutual isolation voltage of 2.5 kV. The converter is completely transparent as far as baud rate and numbers of bits in the message go. During the communication it is possible to change the message length and speed of transmission without any additional configuration of the device. For the purposes of testing the validity of communication channels is possible loop (connecting Tx to Rx) the RS232 and RS422 interfaces. Termination resistors for RS485 and RS422 are built into the device and can be connected if needed. Communication interfaces have a built-in protection against voltage spikes on the lines.

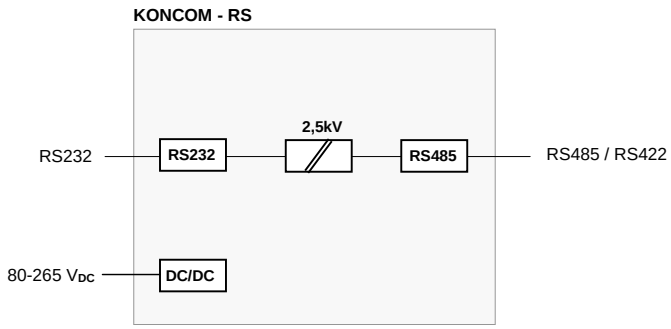


Figure 1: Block view of a KONCOM RS signal transducer.

2.1.2 KONCOM RSFO MUX

FO multiplexer can operate in three basic modes:

- As an optical multiplexer when FO1 channel connects to the remaining five channels FO (FO6 ÷ FO2)
- The RS232 protocol multiplexer FO to six channels (FO1 ÷ FO6)
- As a multiplexer RS485 or RS422 protocols to six FO channels (FO1 ÷ FO6).

There are two basic versions of FO interfaces:

- MUX1 – designed to connect plastic optical fiber cables (range of approximately 50 m),
- MUX2 – designed to connect glass optical fiber cables (range of approximately 2000 m).

The combination of both optical connections (glass and plastic) is possible. For this converter, the same characteristics for RS232, RS485 and RS422 interfaces apply. The converter is completely transparent as far as baud rate and numbers of bits in the message go. During the communication it is possible to change the message length and speed of transmission without any additional configuration of the device. For the purposes of testing the validity of communication channels it is possible loop (connecting Tx to Rx) the RS232, RS422 interfaces and FO. Termination resistors for RS485 and RS422 are built into the device and can be connected if needed. Communication interfaces have a built-in protection against voltage spikes on the RS232, RS485 and RS422 lines.

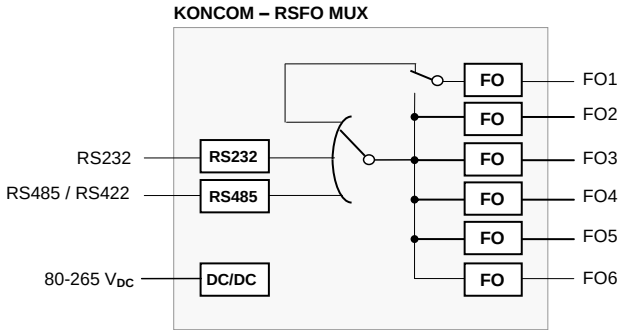


Figure 2: Block view of a KONCOM RSFO MUX signal transducer.

2.2 Physical data

	KONCOM RS	KONCOM RSFO MUX1	KONCOM RSFO MUX2
Height	90 mm	93 mm	115 mm
Width	55 mm	55 mm	55 mm
Depth	130 mm	130 mm	130 mm
Weight	450 g	520 g	540 g

2.3 Technical data

2.3.1 Connections

RS232 interface:

Transfer speed	120 kbps
ESD protection	± 15 kV
Over voltage protection	± 15 V
Current protection	125 mA
The choice of connection	DCE/DTE
Connection	DB9
Loop	yes

RS485 interface:

Transfer speed	250 kbps
ESD protection	± 15 kV
Over voltage protection	± 7,5 V
Current protection	125 mA
The choice of communication	Half / Full Duplex
Communication direction	AUTO / FIX
Closure	120Ω

FO interface-1 (plastic fiber):

Wave length	660 nm,
Connector type	HFBR, VPIN
Transfer speed	1 Mbd,
Range	≤ 40 m,
Loop	yes

FO interface-2 (glass fiber):

Wave length	820 nm,
Connector type	ST, FST
Transfer speed	5 Mbd,
Range	≤ 2 km,
Loop	yes

Power source:

Supply voltage ver. A	80÷265V_{DC}, 220 V_{AC} +10% -15%,
Supply voltage ver. B	18÷80V_{DC}
The polarity oft he DC voltage	arbitrary
Consumption	≤ 3 W,
EMI	class B

2.3.2 Environment

Ambience:

- Temperature operating range -5 do +55 °C
- Storage temperature -25 do +55 °C
- Limit temperature during transport -25 do +70 °C
- Permissible humidity < 75 % per annum; 95 % 30 days per year.
- Condensation not allowed

Security demands:

- Meets the requirements defined by the standard[9] (EN 61010 –1):
  - Over voltage category III
  - Degree of pollution 2
  - Fire resistance classification V0

Insulation:

Meets the test of insulation defined by the standard EN61010, IEC255-5: ANSI / IEEC37.90.0:

- Power supply isolation test – the other interfaces 5,25 kV DC / 1s (parallel capacitator),
- Power supply isolation test – the other interfaces 3,7 kV AC / 50Hz (no parallel cap.),
- Impulse voltage power supply – the other interfaces 5 kV; 1,2/50 us; 0,5 J; (3 pos. & 3 neg. In intervals of 5 s, class III).

The emission of electromagnetic fields:

Meets the following requirements for the emission of electromagnetic fields:

- Allowable emissions in industrial areas (EN 61000-6-4:2008): 0 Hz - 400 GHz;
- Limits for harmonic current emissions (EN 61000-3-2:2008): 30 MHz - 1 GHz, Class B;

Resistance to electromagnetic interference:

Meets the following requirements for resistance to electromagnetic interference:

- Immunity for industrial environments (EN 61000-6-2:2008): 0 Hz - 400 GHz;
- Resistant to voltage fluctuations and flicker (EN 61000-3-3:1997 + A1: 2008)

Resistance to climatic stress:

According to standards EN 60068-2-2 and EN 60 068 fulfils the following:

- Operating temperature range: -5 to +55 ^{o}C;
- Short-term working temperature range: -20 to +70 ^{o}C;
- Storage temperature: -25 to +55 ^{o}C;
- Limit temperature during transport: -25 to +70 ^{o}C;
- Permissible humidity < 75 % per annum; 95 % 30 days per year; condensation is not allowed.

Resistance to mechanical stress:

Vibration:

- IEC 60255-21-1, class 1: sinusoidal 10-60 Hz, ± 0.035 mm amplitude;
- IEC 60068-2-6: increase in frequency 10 octaves / min, 20 cycles in three orthogonal axes.

Shock:

- IEC 60255-21-2, class 1: half-wave, 5 g acceleration, duration 11 ms, three shocks in each of 3 orthogonal axes.

Seismic vibrations:

- IEC 60255-21-2, class 1: sinus; 1-8 Hz; +3.5 mm ampl.: horizontal axis; sinus; 1-8 Hz; +1.5 mm ampl.; vertical axis
- IEC 60068-3-3: sinus: 8-35 Hz, 1 g acceleration, the horizontal axis; sinus: 8-35 Hz, 0.5 g acceleration, the vertical axis; increase in frequency 1 octave / min, 1 cycle for 3 orthogonal axes.

3 OPERATING INSTRUCTIONS

3.1 Exterior

3.1.1 View of a KONCOM RS transducer

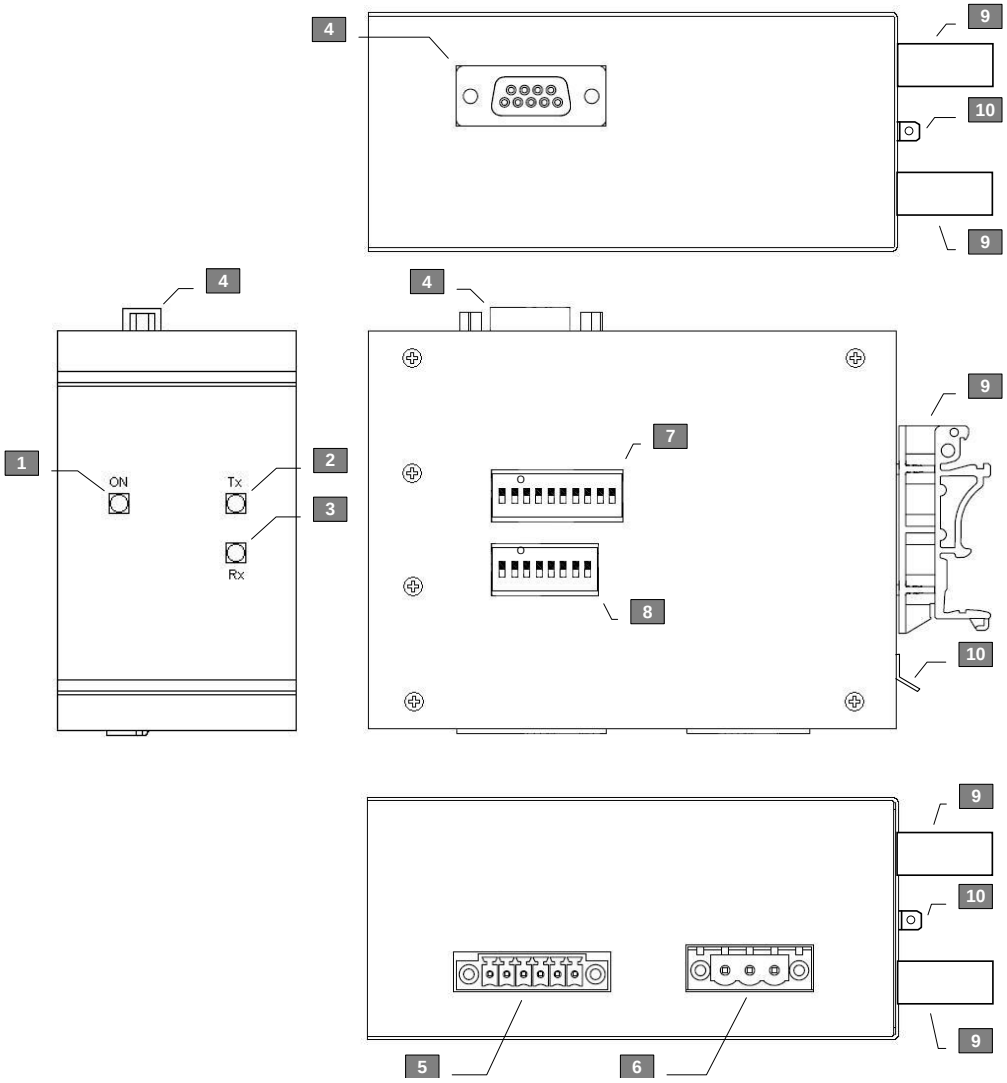


Figure 3: View of a KONCOM RS transducer.

CODE	DESCRIPTION
1	An indication of presence of power supply (LED - green)
2	An indication of presence of handing Tx (LED - yellow)
3	An indication of presence of receipt Rx (LED - yellow)
4	Connector for RS232 interface (DB9)
5	Connector for RS485 and R422 interface
6	Connector for power supply
7	Micro switch S2
8	Micro switch S1
9	Holder for mounting on the rail (35 mm)
10	Earthing terminal

3.1.2 View of a KONCOM RSFO MUX transducer

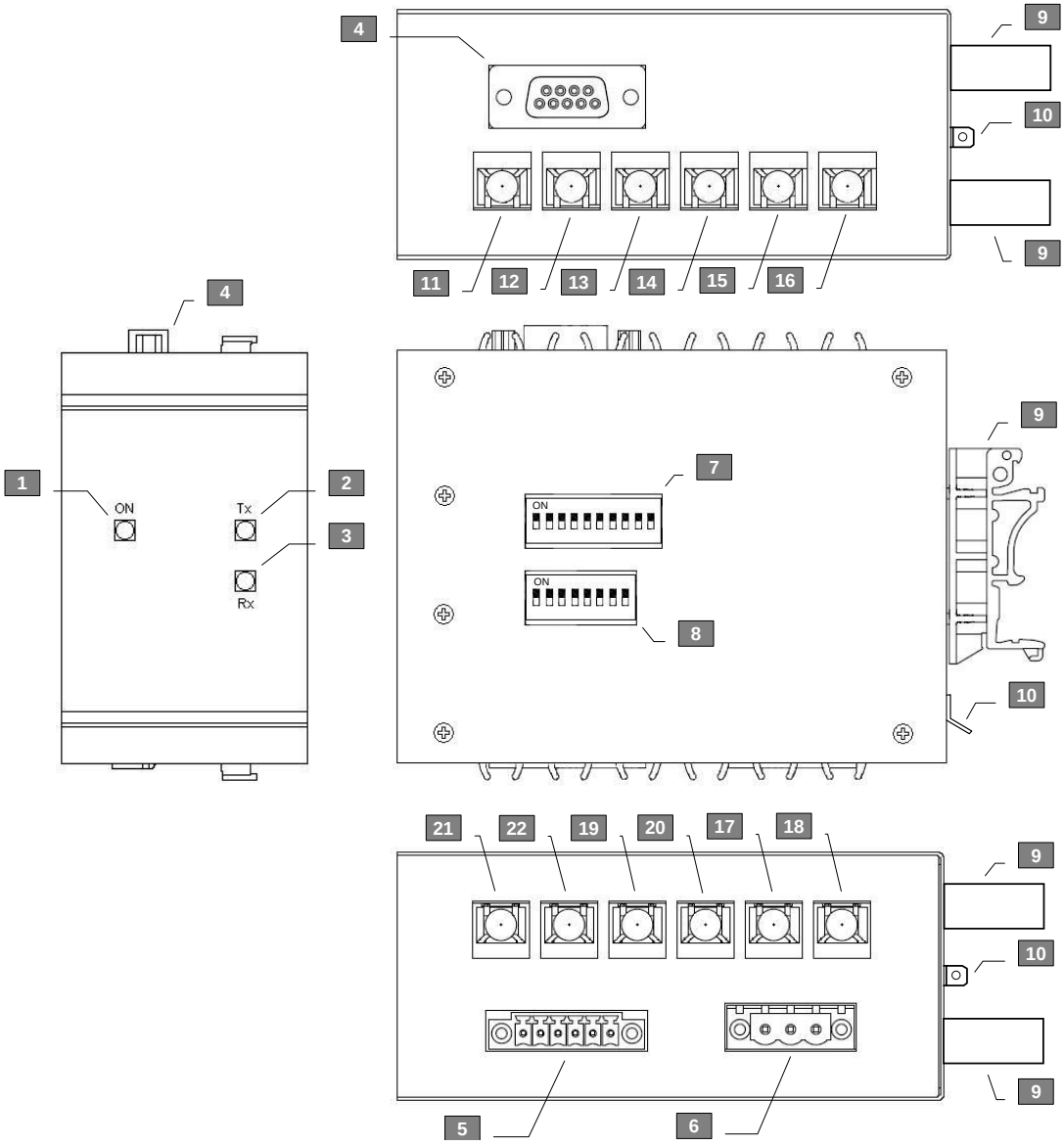


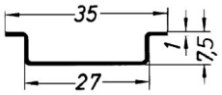
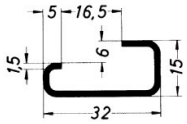
Figure 4: View of a KONCOM RSFO MUX1 transducer.

CODE	DESCRIPTION
1	An indication of presence of power supply (LED - green)
2	An indication of presence of handing Tx (LED - yellow)
3	An indication of presence of receipt Rx (LED - yellow)
4	Connector for RS232 interface (DB9)
5	Connector for RS485 and R422 interface
6	Connector for power supply
7	Micro switch S2
8	Micro switch S1
9	Holder for mounting on the rail (35 mm)
10	Earthing terminal
11	Connector for FO1 – Rx
12	Connector for FO1 – Tx

13	Connector for FO2 – Rx
14	Connector for FO2 – Tx
15	Connector for FO3 – Rx
16	Connector for FO3 – Tx
17	Connector for FO4 – Rx
18	Connector for FO4 – Tx
19	Connector for FO5 – Rx
20	Connector for FO5 – Tx
21	Connector for FO6 – Rx
22	Connector for FO6 – Tx

3.2 Installation - removal

KONCOM converters are designed for mounting on DIN-rails of the following types:

PICTURE	CODE	NAME
	EN 50022	Omega – rail
	EN 50035	G - rail

Way of mounting the device on the DIN rail is shown in Figures 5 and 6.

SAFETY WARNING!

After mounting the device on the rail, it must be the grounded!

Mounting:

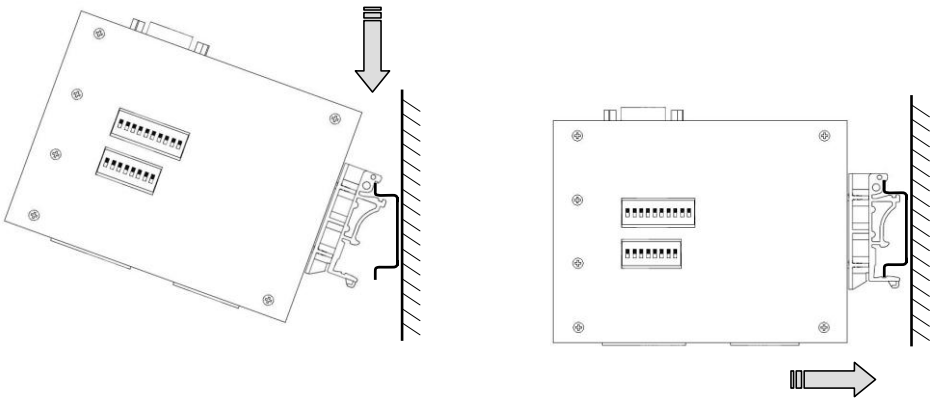


Figure 5: Ways of mounting the "Omega" rack.

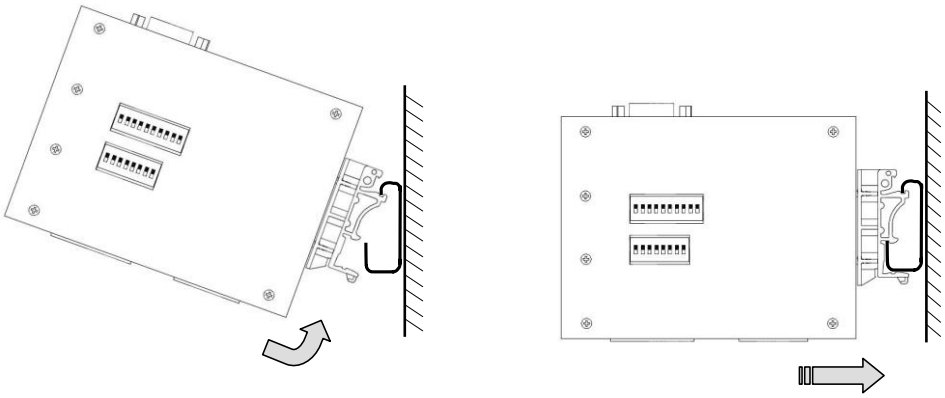


Figure 6: Ways of mounting the „G“ rack.

Removal:

SAFETY WARNING!

Before you start disassembling the unit, first disconnect its power port, and then all of its remaining ports!

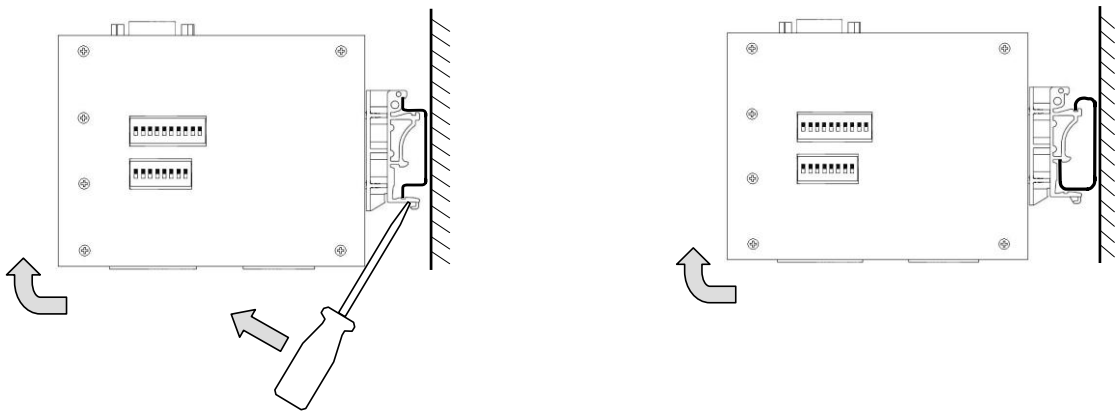


Figure 7: Dismantling process.

3.3 Connectivity

3.3.1 Linking KONCOM RS signal transducer

Description of micro switches S1 and S2:

Micro switches S1 ([8]) and S2 ([7]) are located on the right lateral side of the device. Position "ON" on them has a double meaning:

- Indicates a first switch in series,
- Indicates that a switch in this position is connected.

Micro switch S1 refers to the setting RS485 (RS422) communication protocol. There are three groups of switches:

- DIRECTION CONTROL - (switches 2, 3, 4) These switches determine whether the direction of communication is determined to be fixed (FIX - RS422) or it will automatically change depending on the direction of communication (AUTO - RS485).
- COMMUNICATION MODE - (switches 5, 6) These switches determine the one-way (full duplex - RS422) or two-way (half duplex - RS485) communication mode.
- TERMINATION - (switches 7, 8) With these switches we combine the necessary conclusion of the receiving (RX) and transmit (TX) lines with 120Ω. In the case of RS485 protocol connects to only one conclusion, because the communication takes place by a pair so that the receiving and transmitting lines connected together.

SWITCH – S1		1	2	3	4	5	6	7	8
DIRECTION CONTROL	AUTO		Y	N	Y				
	FIX		N	Y	N				
COMMUNICATION MOD	FULL					N	N		
	HALF					Y	Y		
TERMINATION	RX							Y	
	TX								N

Y - ON

Table 1: Defining the position of the micro switches S1 for the RS485 / RS422 interface.

Micro switch S2 refers to the RS232 interfaces settings and testing of communication channels by creating a loop. There are two groups of switches:

- DCE / DTE - (switches 1, 2, 3, 4) the switch will determine whether the RS232 interface act as a DCE port (for connecting to a PC) or as a DTE port (for connecting to the modem).
- LOOP - (switches 5, 6, 7, 8, 9, 10) these switches can, the for the purpose of testing, make a loop on the RS232 or RS422 interfaces. In normal operation the loop cannot be connected (NO).

SWITCH – S2		1	2	3	4	5	6	7	8	9	10
DCE/DTE	DCE	Y	Y	N	N						
	DTE	N	N	Y	Y						
LOOP	NO					N	Y	N	N	Y	N
	RS232					Y	N	N	N	N	Y
	RS422					N	N	Y	Y	N	N

Table 2: Defining the position of the micro switches S2.

Connecting the RS232 interface:

RS232 interface is to be connected to the DB9 connector ([4]). To connect using a standard RS232 interfaces cable (1 to 1) that at one end has a male DB9 connector (for connecting to KONCOM RS), and on another female DB9 connector (for connection to a PC or modem). Details of the cable can be seen in the chapter "Appendix - Display of the standard RS232 cable".

Connecting the RS485 interface:

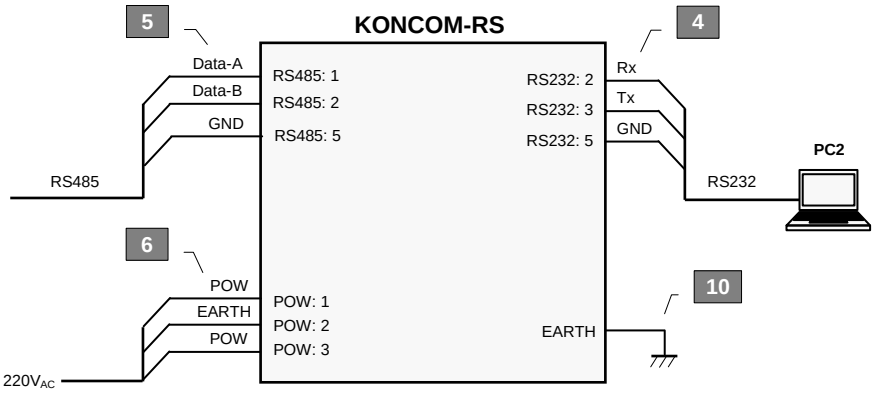


Figure 8: RS485 interface connection diagram.

Connecting the RS422 interface:

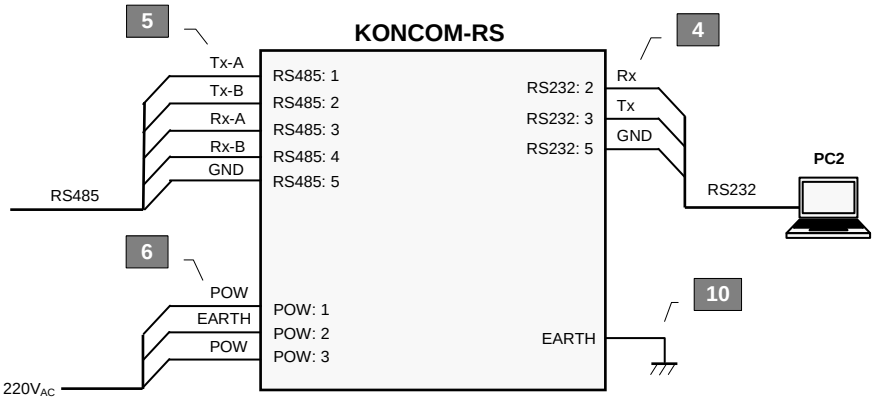


Figure 9: RS422 interface connection diagram.

3.3.2 Linking KONCOM RSFO MUX signal transducer

Description of micro switches S1 and S2:

Micro switches S1 ([8]) and S2 ([7]) are located on the right lateral side of the device. Position "ON" on them has a double meaning:

- Indicates a first switch in series,
- Indicates that a switch in this position is connected.

Micro switch S1 refers to the setting of the RS485 (RS422) communication protocol. There are three groups of switches:

- DIRECTION CONTROL - (switches 2, 3, 4) these switches determine whether the direction of communication is determined to be fixed (FIX - RS422) or it will automatically change depending on the direction of communication (AUTO - RS485).
- COMMUNICATION MODE - (switches 5, 6) these switches determine the one-way (full duplex - RS422) or two-way (half duplex - RS485) communication mode.
- TERMINATION - (switches 7, 8) with these switches we combine the necessary conclusion of the receiving (RX) and transmit (TX) lines with 120Ω. In the case of RS485 protocol connects to only one conclusion, because the communication takes place by a pair so that the receiving and transmitting lines connected together.

SWITCH – S1		1	2	3	4	5	6	7	8
DIRECTION CONTROL	AUTO		Y	N	Y				
	FIX		N	Y	N				
COMMUNICATION MOD	FULL					N	N		
	HALF					Y	Y		
TERMINATION	RX							Y	
	TX								N

Y - ON

Table 3: Defining the position of the micro switches S1 for the RS485 / RS422 interface.

Micro switch S2 refers to the RS232 interface settings and selects the main (MASTER) communication carrier. There are two groups of switches:

- DCE / DTE - (switches 1, 2, 3, 4) the switch will determine whether the RS232 interface act as a DCE port (for connecting to a PC) or as a DTE port (for connecting to the modem).
- MASTER - (switches 6, 7, 8, 9, 10) these switches will determine who will be the main carrier of the communication. It may be RS232 / RS485 / RS422 interface (RSxxx), or the optical channel 1 (FO 1). In the configurations where the optical channels are connecting to a ring structure, it is necessary to transmit the signal receiver to the surrender (ECHO)

SWITCH – S2		1	2	3	4	5	6	7	8	9	10
DCE/DTE	DCE	Y	Y	N	N						
	DTE	N	N	Y	Y						
MASTER	RSxxx						Y	N	Y	N	
	FO						N	Y	N	Y	
	ECHO										N

Table 4: Defining the position of the micro switches S2.

Connecting the RS232 interface:

RS232 interface is to be connected to the DB9 connector ([4]). To connect we use the standard RS232 interfaces cable (1 to 1) that at one end has a male DB9 connector (for connecting to KONCOM RS), and on another female DB9 connector (for connection to a PC or modem). Details of the cable can be seen in the chapter "Appendix - Display of the standard RS232 cable".

Connecting a RS232 multiplexer:

With this connection mode we have a RS232 interface as the main (MASTER) communication carrier that is rerouted to the other six optical channels.

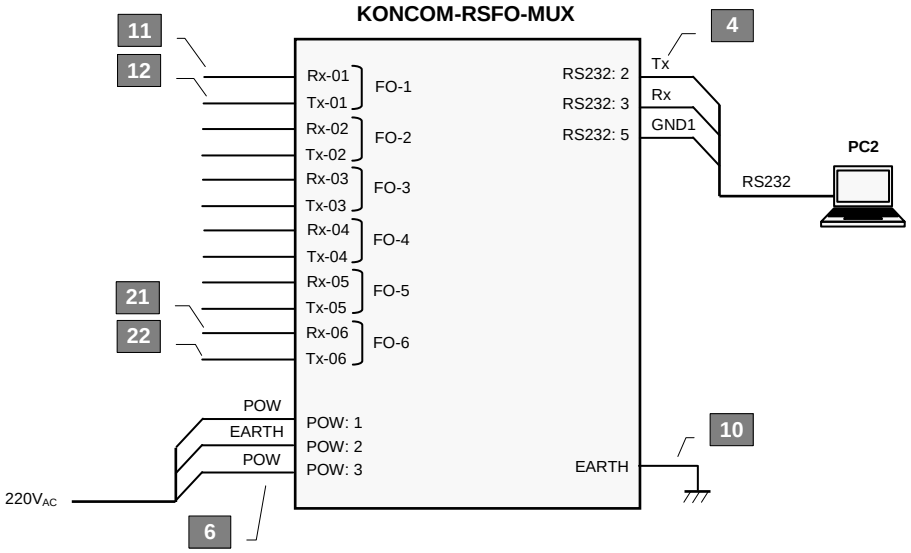


Figure 10: Connection diagram as RS232 multiplexer.

Connecting a RS485 multiplexer:

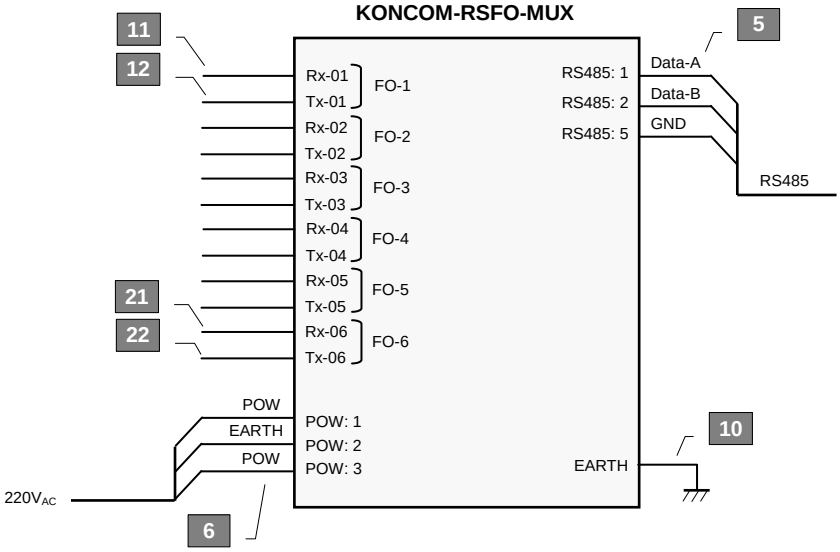


Figure 11: Connection diagram as RS485 multiplexer.

Connecting as an optical multiplexer:

When we want to connect the converter as an optical multiplexer channel FO1 then becomes the holder of communication (MASTER) and its signal is transmitted to the remaining 5 FO channels..

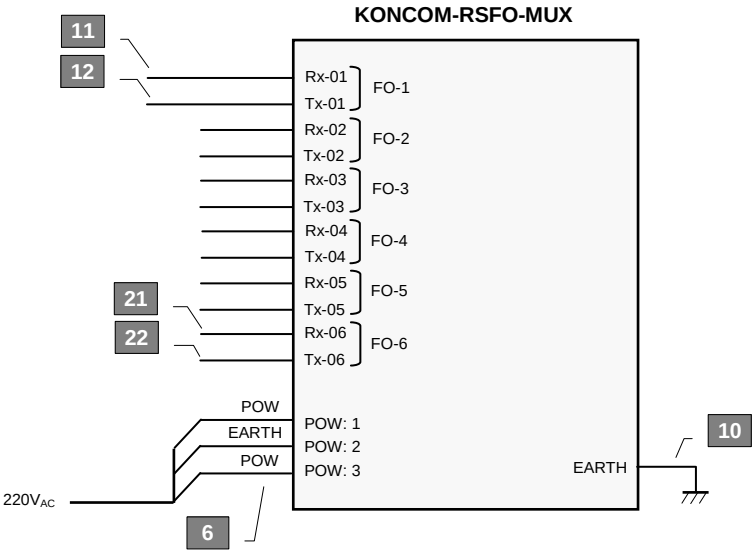


Figure 12: Connection diagram for optical multiplexer.

Connecting in a ring structure:

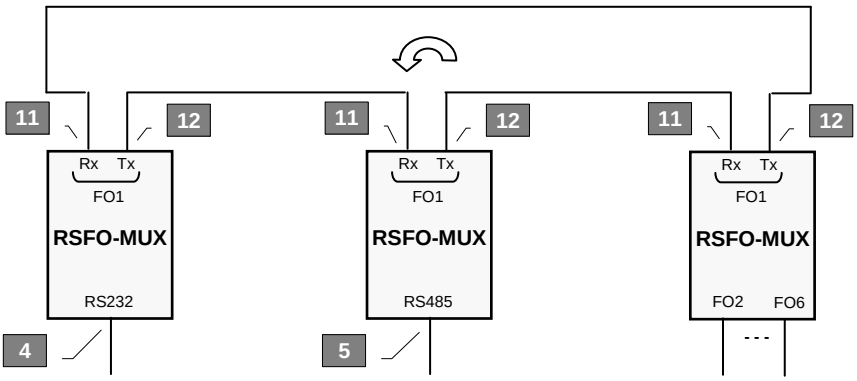


Figure 13: Connection diagram for a ring structure.

Ring structure is achieved through FO1 interface and the ECHO must be turned on (switch pos. 10) on the micro switch S2 ([7]), in order to transmit the signal from the transmitting to the receiving side. ECHO is not switched on only on the device that is the main (MASTER) so that the information would not be eternally circling the loop

Connecting in a complex structure:

With the KONCOM converters we can realize complex and demanding communication structures. Some of them are shown in Figure 14.

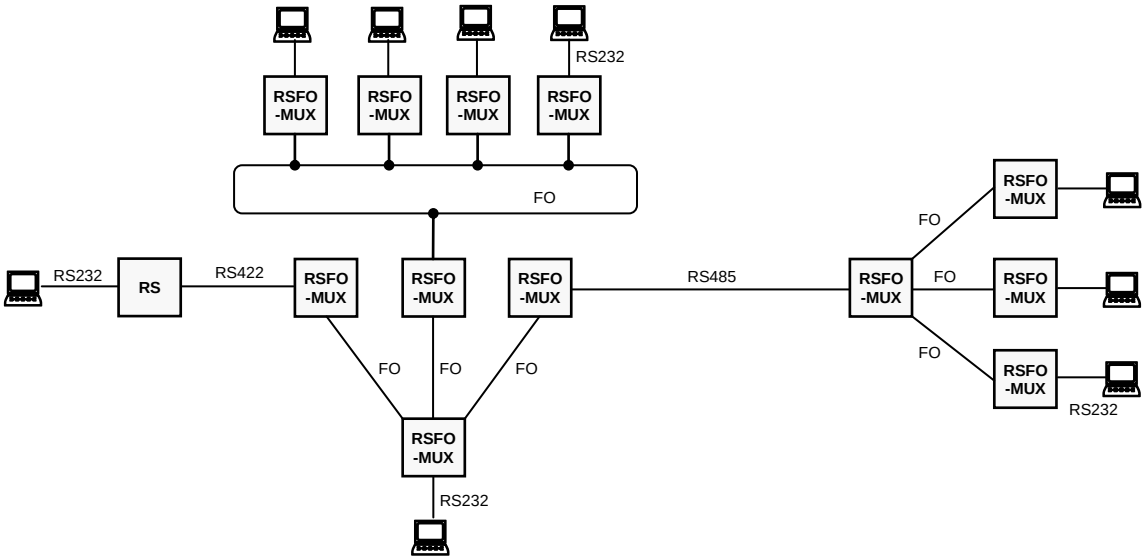


Figure 14: Connecting KONCOM converters in a complex communication structures.

3.4 Labelling

Figure 15 shows how the selection of different varieties of communication converters.

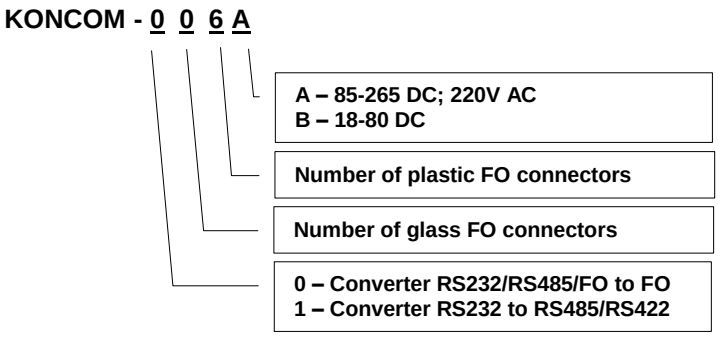


Figure 15: KONCOM – Selection mode of certain device variants.

4 MAINTENANCE

4.1 General

In the event that the device is properly installed it does not require any special maintenance, except for regular cleaning of dust. Cleaning the dust is carried out only with a dry cotton cloth and it is not necessary to interrupt the normal operation of the device.

4.2 Breakdown

In the event of failure of the device it must be removed according to the instructions of dismantling the device (see Section 3.2), and send in for repair to the manufacturer or authorized service centres.

WARNING!

User is not allowed to open the device or repair it! Repairs are carried out exclusively by the manufacturer or authorized service.

4.3 Storage

Prior to the device storage it is necessary to check whether storage area is corresponding to the storage conditions defined in the Technical Requirements (Section 2.3.2 Environment).

KONCOM converters are stored in the following way:

- They must be properly packaged,
- Storage Temperature -25 to +55°C,
- Permissible humidity < 75 % per annum, 95% 30 days of the year,
- Condensation not allowed.

Note:

Do not store broke down devices.

4.4 Transport

It is recommended to transport the device in for it anticipated packaging and in a way that eliminates the possibility of its damage. Take into account that during transport they do not put heavier items on the packaged device, because it might damage the connector device

5 APPENDIX

5.1 Appendix A – Display of the standard RS232 cable

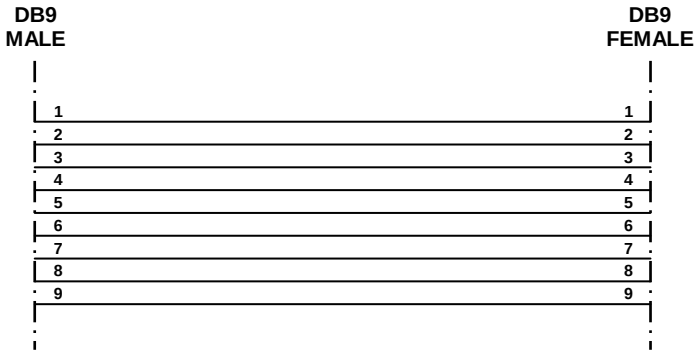
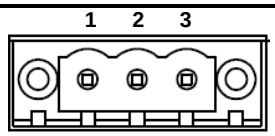


Figure 16: Display oft he standard 1 to 1 RS 232 cable.

5.2 Appendix B – Description of connections

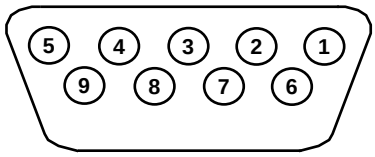
Power supply connector POW:



Clamping male connector
MC 2,5/3-GF-5,08

PIN	DESCRIPTION
1	POW
2	EARTH
3	POW

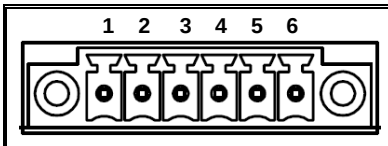
RS232 connector:



Female DB9 connector

PIN	SIGNAL DESCRIPTION	DTE INPUT/OUTPUT	DCE INPUT/OUTPUT
1	CD – Carrier Detect	Input	Output
2	RD – Received Data	Input	Output
3	TD – Transmitted Data	Output	Input
4	DTR – Data Terminal Ready	Output	Input
5	GND – Signal Ground	GND	GND
6	DSR – Data Set Ready	Input	Output
7	RTS – Request To Send	Output	Input
8	CTS – Clear To Send	Input	Output
9	RI – Ring Indicator	NC	NC

RS485 (RS422) connector:



Clamping male connector
MC 1,5/6-G-3,5

PIN	RS422	RS485
1	TX - A	DATA - A
2	TX - B	DATA - B
3	RX - A	DATA - A
4	RX - B	DATA - B
5	GND	GND
6	EARTH	EARTH

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