Unicont SPb Ltd

NMEA0183 signal multiplicator MDU-102

Technical Documentation

(102-1-21012011)

St. Petersburg

2011

Table of Contents

1. Introduction

MDU-102 is intended to multiply NMEA 0183 signal (versions 1, 2) or other signals (RS- 232 и RS-422/485 serial transfer, 1 or 2 supplies). MDU-102 is provided for a checksum option of CH1 data.

2. Delivery Set

1. NMEA0183 signal multiplicator MDU-102   1 piece
2. Operation manual   1 piece

3. Technical specifications

Electrical Specifications:

Supply Voltage	10..36 VDC / 18..36 VDC
Power Consumption no more than	3 W
Galvanic Isolation (mains supply)	+
Loop back protection	+
Over voltage protection	+ (fuse 1A)

Inputs Specifications:

Number of inputs	2 (CH1, CH2)
Supported Interfaces	RS-232, RS-422/485
Max data receive rate	115200 bps
Optical isolation	+

Outputs Specifications:

Number of outputs	8 (2 x 4)
Output groups' number	2 (A and B)
Optical isolation	4 non-isolated
	4 isolated
Supported Interfaces	RS-232, RS-422/485
Max data receive rate	115200 bps

Overalls:

|	
Overall dimensions:	194 x 117 x 29 mm
Weight:	0.5 kg
Temperature of operation:	-25..+55 °C
Storage temperature:	-55..+75 °C
Protection class:	IP 22

4. Operation

4.1 *Modes of operation*

MDU-102 operates in 3 different modes:

− Signals' multiplication (active channel option)
− Independent mode of operation
− Signals' multiplication (checksum option)

Use DIP-switchers S1 on device's PCB to tune modes and other settings:

1 ON	not used
2	stop-bits
3	parity
4	
5	
6	
7	baudrate
8	
9	operating mode
10	

DIP-switchers S1 location on PCB:
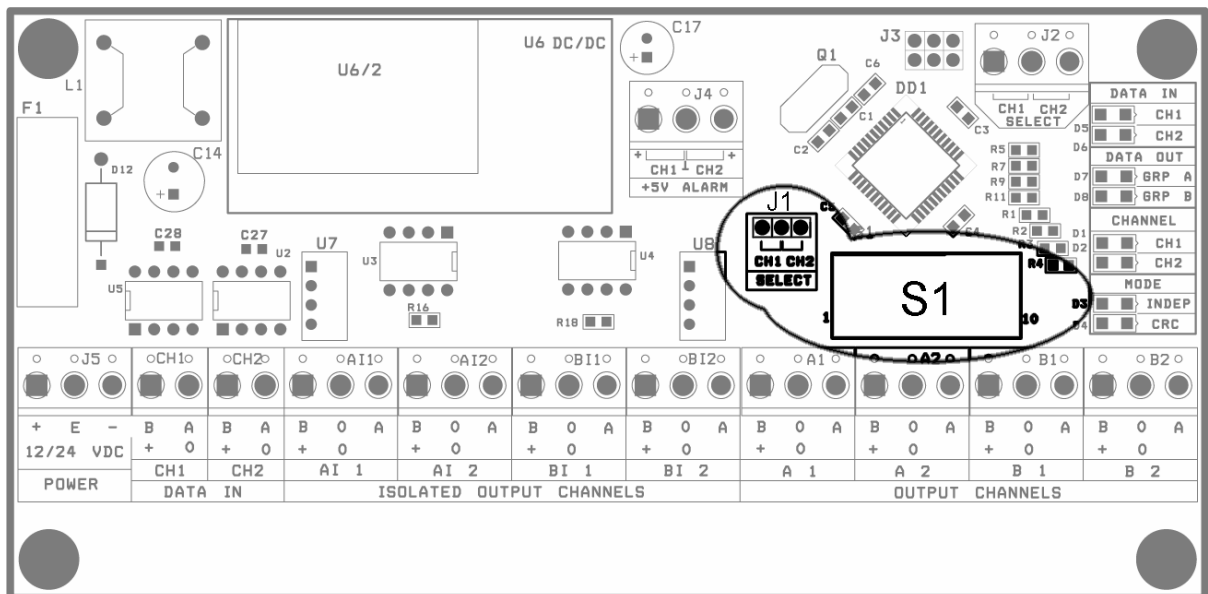
Use DIP-switchers S1-9, S1-10 to tune operating modes:

Table 1 Modes of operation and DIP-switchers S1 positions:

Multiplication Mode	Input channel	[S1]9	[S1]10	J1
Active channel option	CH1	0	0	1-2
	CH2			2-3
	Auto selection			X
Independent	-	0	1	-
Checksum option	Auto selection	1	0	-
Notice: «0» – OFF, «1» – ON, «X» – jumper is not set.				

4.1.1. Active channel option mode.

MDU-102 receives data of CH1 or CH2 (in case of its activity) inputs and transfers it to 8 channels.

**Signals' multiplication operating mode**
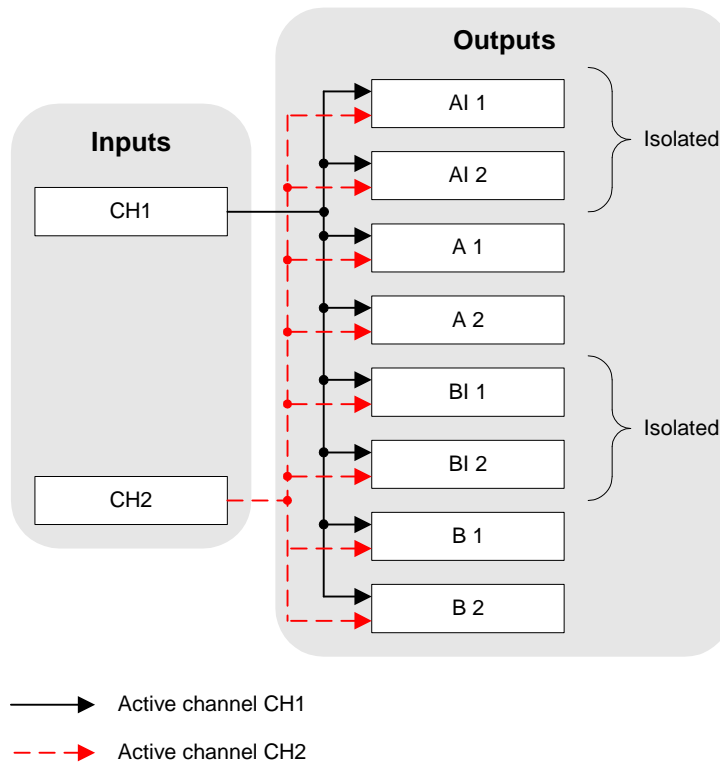
Select active channel as follows:

Active channel auto selection

This way MDU-102 receives data from CH1 input and transfers it to 8 channels. In the absence of input CH1 data or its fail (for instance, channel breakdown), MDU-102 in 3 seconds switch over to CH2 (this way, CH2 is a standby one). MDU-102 transfers input CH2 data to 8 channels, at the same time MDU-102 keeps on controlling CH1. If CH1 resumes its operation, MDU-102 switches over to CH1 automatically.

Active channel manual selection

Active channel manual selection is possible. Use jumper, set it on J1.
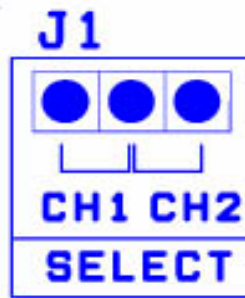
If you set jumper on CH1, input CH1 is activated forcedly, while CH1 is failed, MDU-102 does not switch over to CH2. Accordingly, if you set jumper on CH2, input CH2 is activated forcedly, while CH2 is failed, MDU-102 does not switch over to CH1.

Remote active channel selection

It is a sort of a manual channel selection mode. To select mode use terminal block (3 outputs), noted as SELECT.
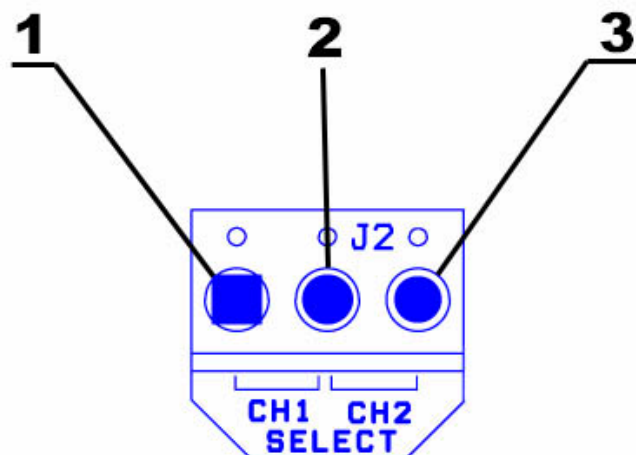

Three-core cable is connected to the aforesaid terminal block, while closing remote cable outlets (using switcher; for instance), it became possible to select active channel. To select CH1, you should close between one another outlets "1" and "2"/CH2 – outlets "2" and "3" conformably.

4.1.2. Independent mode of operation.

Independent mode of operation is used to multiply data accepted simultaneously from 2 input channels. There are 2 groups of output channels: A and B. Each one has 2 optoisolated and non-isolated outputs.

Independent mode of operation
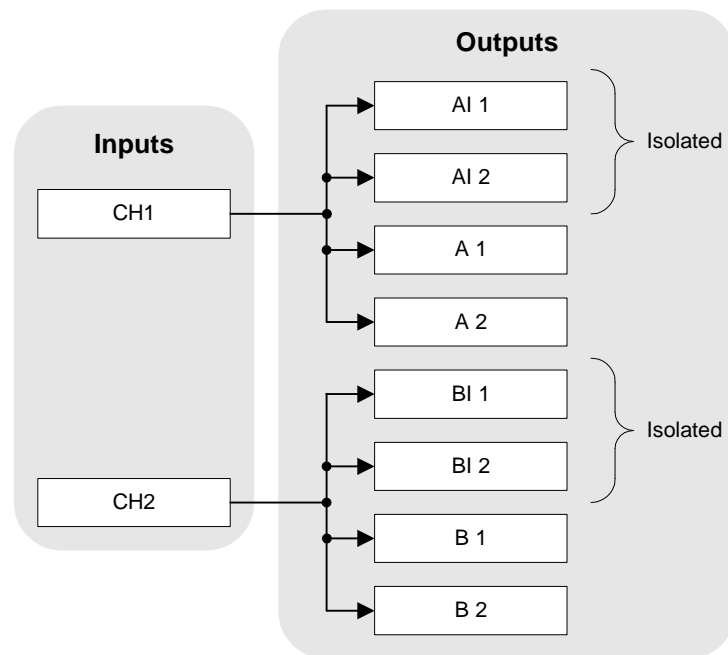
CH1 data transfers to "A" outputs (AI 1; AI 2; A 1; A 2), AI – optoisolated ones.

CH2 data transfers to "B" outputs (BI 1; BI 2; B 1; B 2), BI – optoisolated ones.

Using this mode of operation, you have got 2 independent signal NMEA (FMT 1x4) multiplicators.

4.1.3. Signals' multiplication mode (checksum option)

This mode is used to control data (accepted from CH1) adequacy.

Built in processor calculates NMEA 0183 checksum. In the presence of mismatch, in 3 seconds MDU-102 switches over to CH2. CH2 data is transmitted to all 8 outputs.

Attention!!! Checksum (switched over to CH2) is not checked, standby channel's data is a priori correct.

Signals' multiplication mode (checksum option)
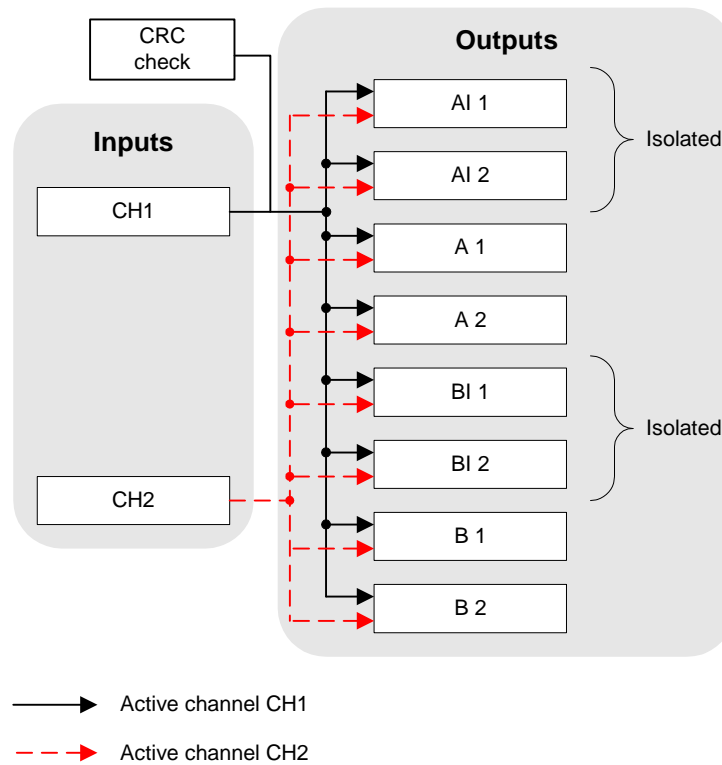
Use DIP-switchers on PCB to set input signal's characteristics; you should set it beforehand for MDU-102 to decode input data correctly.

Input interfaces characteristics' setting (DIP-switcher S1):
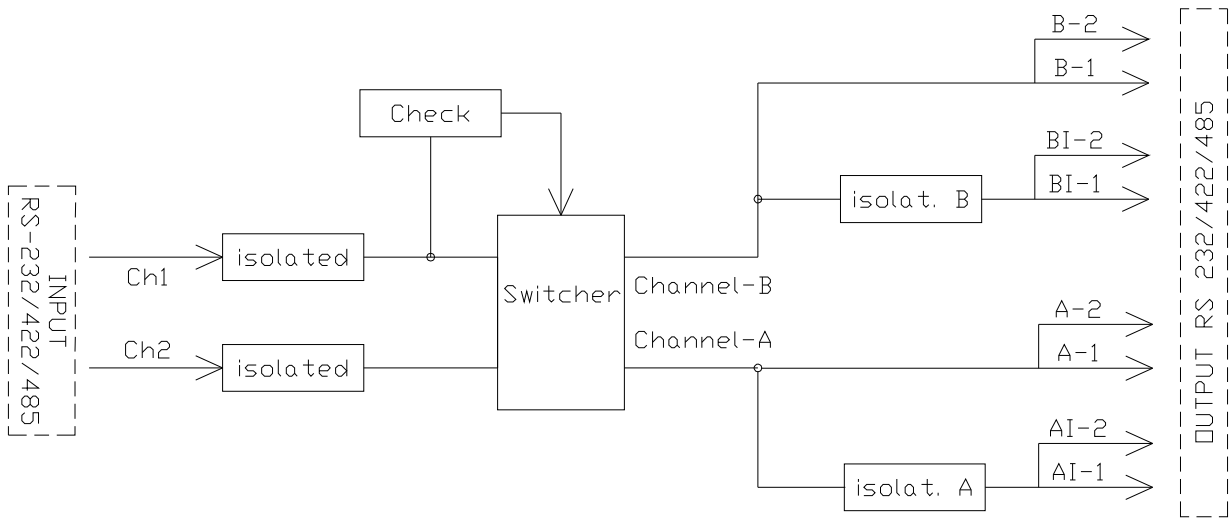
Stop-bit	S1-2
1	0
2	1

Parity	S1-3	S1-4
none	0	0
even	0	1
odd	1	1

Rate (bps)	S1-5	S1-6	S1-7	S1-8
1200	0	0	0	0
2400	1	0	0	0
4800	0	1	0	0
9600	1	1	0	0
14400	0	0	1	0
19200	1	0	1	0
28800	0	1	1	0
38400	1	1	1	0
48600	0	0	0	1
56000	1	0	0	1
57600	0	1	0	1
76800	1	1	0	1
115200	0	0	1	1
Note: 1 – ON, 0 – OFF				

Attention!!! Output signal characteristics are corresponding to the input ones.
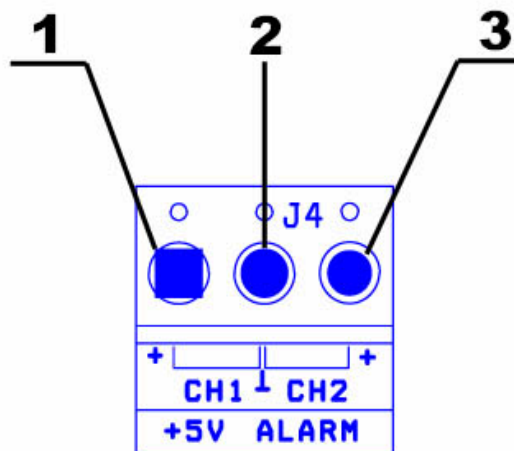
4.1.4. MDU-102 flowchart

4.2 *Signaling mode of operation*

Signaling mode of operation is based on output voltage +5 VDC.

Use terminal block "+5 V ALARM" on PCB to connect external signaling unit (AU-106).

You've got fixed voltage level on terminal "1"if input channel is CH1.

You've got fixed voltage level on terminal "2"if input channel is CH2.

Attention!!! Max current consumption of an external signaling <= 20mA.

4.3 *«Hot-switch» setting.*

At the change of input interfaces'/operating mode's settings MDU-102 software restarts automatically. It spares you necessity to switch off and on input power in order to change anything.

4.4 *Device's settings on default (S1)*

Switcher	Position	Description
1	0	None
2	0	Stop-bit: 1
3	0	Parity: switched off
4	0	
5	0	Data receive/transfer rate: 4800 bps
6	1	
7	0	
8	0	
9	0	Operation mode: multiplication mode (active channel auto-selection)
10	0	

5. Indication

LEDs on PCB perform the following functions:

LED	Параметр (назначение)
DATA IN (input data)	
CH1	Signal at the input «CH1» (data receiving – LED flashes)
CH2	Signal at the input «CH2» (data receiving – LED flashes)
DATA OUT (output data)	
GRP A	Output signal at the group of outputs «A» (data transfer – LED flashes)
GRP B	Output signal at the group of outputs «B» (data transfer – LED flashes)
ACTIVE CH (active channel)	
CH1	Current active channel – «CH1» (CH1 – active – LED flashes)
CH2	Current active channel – «CH2» (CH2 – active – LED flashes)
MODE (operation mode)	
INDEP	Independent mode of operation (independent mode is selected – LED flashes)
CRC	Checksum mode of operation (checksum mode is selected – LED flashes)

Note: In the signal multiplication mode (Active channel selection) INDEP and CRC are not active.

6. Setting

Setting is recommended in the following way:

1. To set MDU-102 choose a place (a vertical wall or a mounting panel); use the outline drawing (see Figure 1).

2. Route and pass connecting cables from power supply and external devices through cable entries. (see below Figure 2)

3. Adjust mode of operation you need (see earlier Part 4.1.3). Remember to adjust the one with checksum option (CRC) you should set input signal's characteristics (see earlier Part 4.1.3)
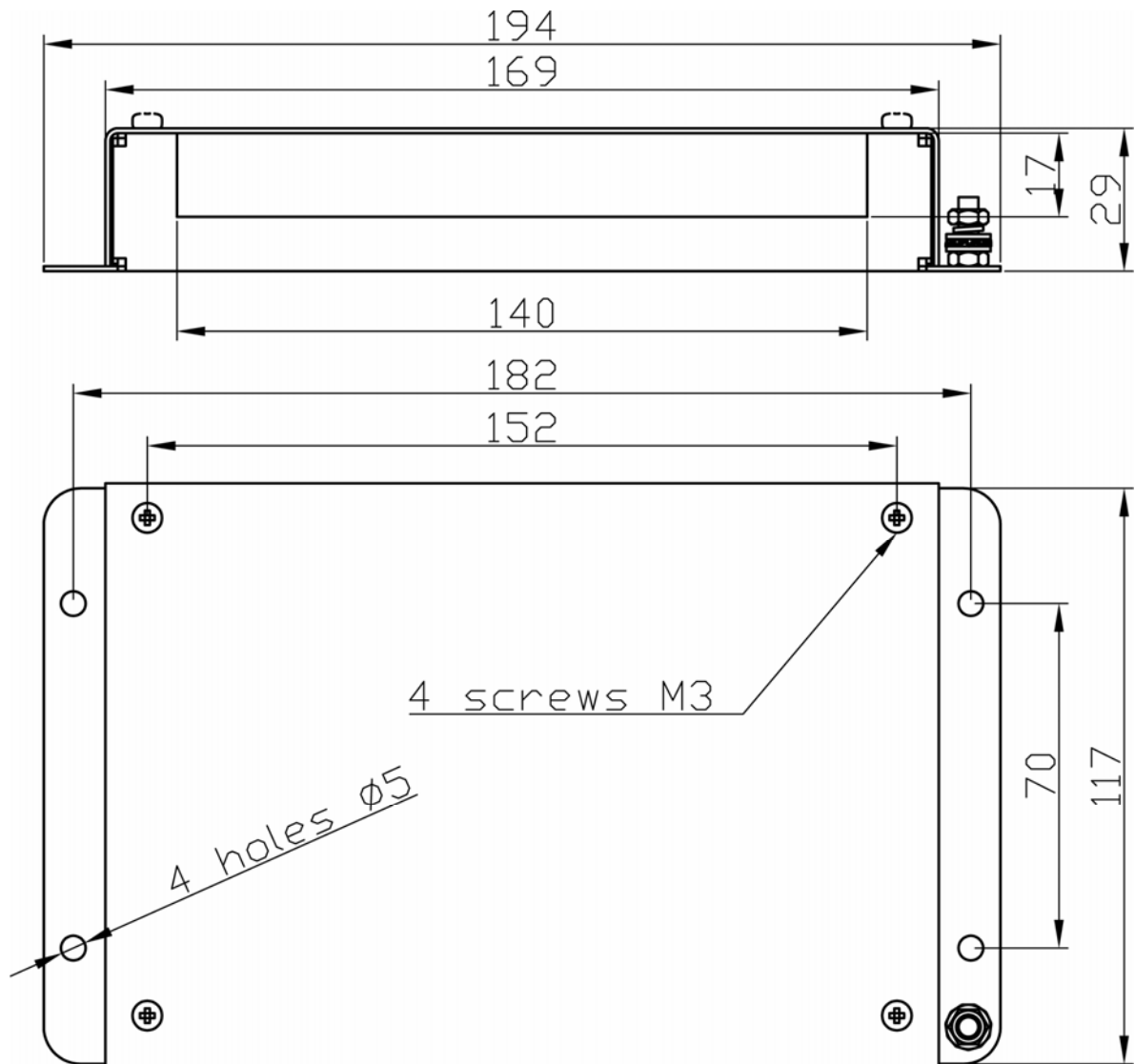
4. Check up device's operation.

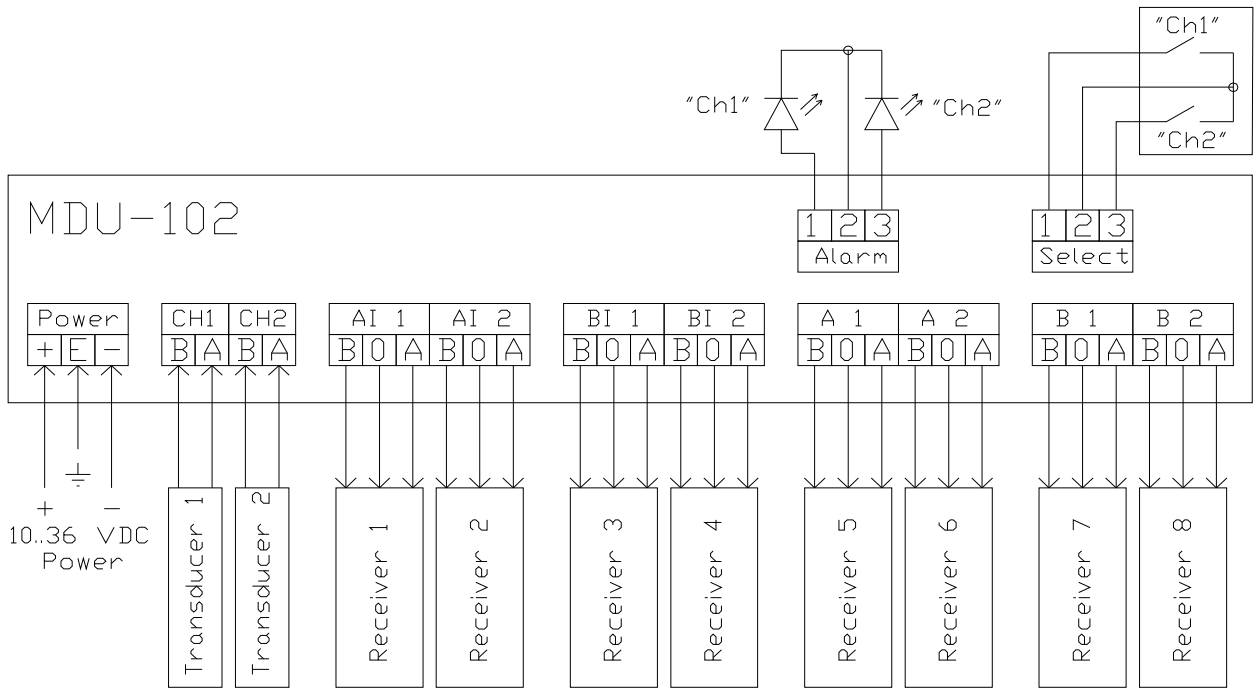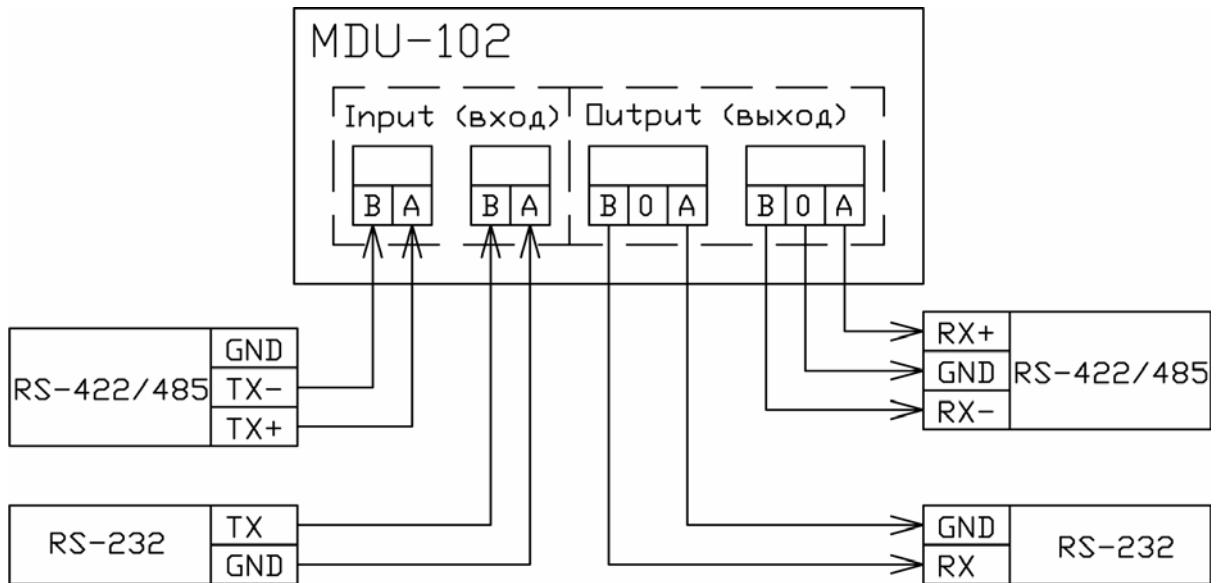Figure 1 MDU-102 overall and setting-out sizes.

Figure 2 MDU-102 connection chart.

RS-232, RS-422/485 interfaces' connection – see below

7. **Warranty**

The manufacturer guarantees the unit MDU-102 complies with this manual provided that the operation, transportation and storage conditions are adhered to during the warranty period.

The unit's warranty period expires 24 months from the date of its shipping from the manufacturer's storehouse.

Within the warranty period, the owner is entitled for a free repair, or a replacement of a separate part, provided that the malfunction occurred through the manufacturer's fault.

Warranty repair is provided if the unit is submitted with the manufacturer's label and a legible serial number available on it, as well as this operating manual.

The manufacturer is not responsible and cannot guarantee the unit's operation:

1. After the warranty period is over;
2. In case of the failure to observe the unit's operation, transportation, storage and installation rules and conditions;
3. If the unit is in an unmarketable condition, or has a damaged body, and other causes beyond the manufacturer's control;
4. If self-made electrical devices were used.
5. If there was an attempt to repair the unit by a person who is not an authorized representative of the manufacturer.

If the owner loses this operating manual or the manufacturer's label with a serial number, the manufacturer shall not provide their copies, and the owner shall be divested of the right for a free repair during the warranty period.

Upon the warranty expiry, the manufacturer shall facilitate the repair of the unit at the owner's expense.

Note: in case of warranty repair, the unit's disassembling from the installation site and its delivery to the manufacturer's service center are done at the owner's expense.

Visit the manufacturer's website www.unicont.spb.ru (section "support/warranty") to find:

- – forms to fill in claims,
- – full warranty description;
- – full description of the warranty service rendering procedure.

The manufacturer service center's address and contact details:
Unicont SPb, Ltd.
Bld. 26E Kibalchich Str., Saint Petersburg, 192174, Russia
tel.: + 7 (812) 622 23 10, +7 (812) 622 23 11
fax: +7 (812) 362 76 36
e-mail: service@unicont.spb.ru

8. DATE OF PACKING

NMEA0183 signal multiplicator   MDU-102   №
        name of article   designation   serial number

Packed _____*Unicont SPb Ltd., Russia.*_____
                                    Manufacturer

according to the requirements of the current technical documentation.

_____   _____   _____
            post   signature   clarification of signature

_____
        year, month, day

9. ACCEPTANCE DETAILS

NMEA0183 signal multiplicator   MDU-102   №
        name of article   designation   serial number

was manufactured and accepted in accordance with the regulatory requirements of the state standards and applicable technical documentation, and is suitable for operation.

Quality control representative

Stamp_____   _____
here   signature   clarification of signature

_____
        year, month, day

10. DATE OF COMMISSIONING

NMEA0183 signal multiplicator   MDU-102   №
        name of article   designation   serial number

The unit has been put into operation.

Date of installation: _____

Place of installation: _____

Person in charge of installation: _____