

STR 100 Signal Transducer User manual

STR 100 / 232.NON.IOxx
STR 100 / 485.NON.IOxx
STR 100 / FOT.NON.IOxx
STR 100 / FOS.NON.IOxx
STR 100 / FOF.NON.IOxx
STR 100 / FOU.NON.IOxx
STR 100 / ETH.NON.IOxx



Company:	Device:	Document:	Code:	Date:
Ediseja 21	STR 100	User manual	STRMUED1	05.05.2020

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1 PREFACE

Liability statement

We have checked the contents of this manual to ensure that the descriptions of both hardware and software are as accurate as possible. However, deviations may occur so that no liability can be accepted for any errors or omissions contained in the information given.

The contents of this manual will be checked in periodical intervals, corrections will be made in the following editions.

We reserve the right to make technical improvements without notice.

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Copyright

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Explanation of the symbols



Read the instructions!



Device was tested with 2,5 kV AC voltage to check the device insulation.



Device ground terminal.



Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC; the affixed product label indicates that you must not discard this electrical/electronic product in domestic household waste.

Warnings

In this paper the following terms are used:

Danger

indicates that death, severe personal injury or substantial property damage will result if proper precautions are not taken.

Warning

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PREFACE

indicates that death, severe personal injury or substantial property damage can result if proper precautions are not taken.

Caution

indicates that minor personal injury or property damage can result if proper precautions are not taken. This particularly applies to damage on or in the device itself.

General information

These paper contain the information that is necessary for the proper and safe operation of the described devices. This paper is intended for technically qualified personnel.



Warning!

Hazardous voltage is present inside the device during operation. Disregarding of safety rules can result in severe personal injury or property damage.

Only qualified personnel may work with described devices after being familiar with warnings and safety notices in this paper and other safety regulations.



Warning!

Device must operate completely assembled! Device must be used as described. No modifications of the device should be made.



Warning!

Do not open device while it is energized! Hazardous voltage is present inside the device. Disconnect all connectors before opening!



Warning!

If device is damaged disconnect it from power supply! Send it to the manufacturer for inspection.



Warning!

Connect to earth before attaching power supply!

If device is equipped with singlemode fiber optic interface:



Warning!

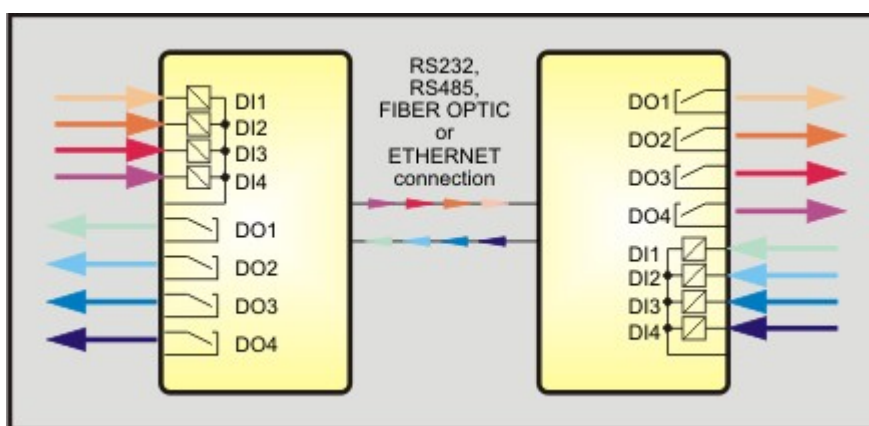
Radiation emitted by single mode laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.

2 STR 100 SYSTEM

2.1 DESCRIPTION

STR 100 is modular system of communication devices that can be used for various of tasks such as:

- ◆ distance protection criteria transfer
- ◆ disconnector and circuit breaker statuses transfer between substations
- ◆ signal transfer via communication through noisy industrial enviroment
- ◆ status and command transfer for remote switch



Picture 1: STR 100 block schematic

2.2 FEATURES

- ◆ Wide range power supply
- ◆ Digital input voltage suitable for substation's power supply
- ◆ RS232, RS485, Multimode & Singlemode Fiber Optic, or Ethernet communication interface
- ◆ Switch selected BAUD rate
- ◆ 4 digital inputs
- ◆ 4 digital outputs
- ◆ DIN 35 rail mount
- ◆ Short response time

2.3 FUNCTION

Two devices from STR 100 system works in pair. Input statuses from one device are transferred to second device outputs and vice versa.

Devices are coupled through full duplex communication link. Communication is based on special protocol. If communication link is broken DO statuses of both devices are returned to their initial states. Speed of communication can be selected by switches.

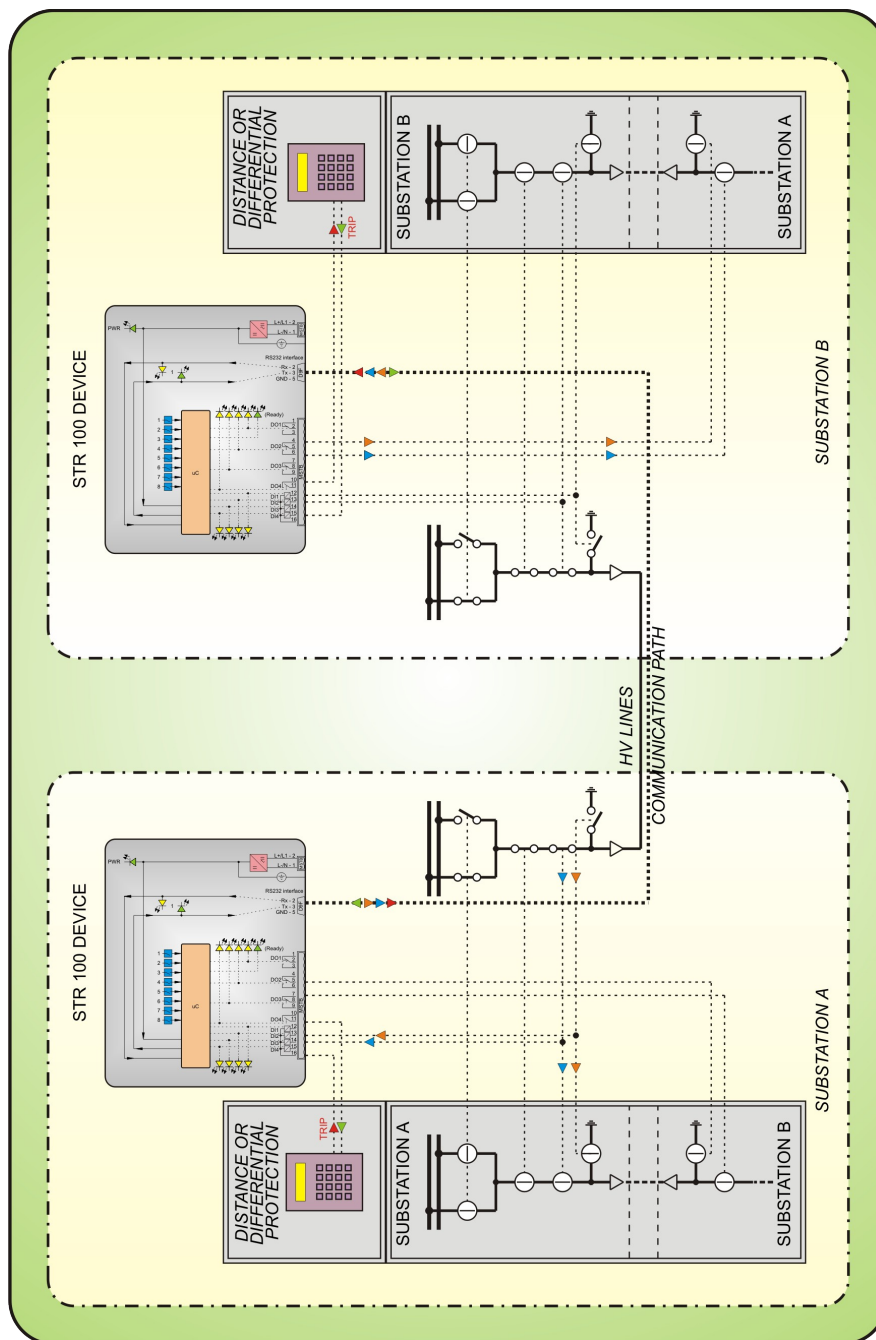
FUNCTION

One of DOs has two functions. It can operate as normal DO or as communication failed signalization. Selection between functions is made by switch.

All normally used connectors, switches and light indicators are accessed at the front side of the device. One light indicator indicates power supply voltage, others indicate communication and IOs activity.

2.4 TYPICAL APPLICATION

Typical application is transfer of trip command and circuit breaker status between two substations.



Picture 2: STR 100 typical application

2.5 CONSTRUCTION

All devices from STR 100 system are based on various boards. There are three groups of boards. One main board, one or two communication boards and one IO board is used in one device :

- ◆ main board with power supply
 - ◆ HI – high voltage power supply board
 - ◆ MD – medium voltage power supply board
 - ◆ LO – low voltage power supply board
- ◆ communication interface
 - ◆ RS232 board
 - ◆ RS485 board
 - ◆ Versatile (650 nm) 1 mm plastic fiber optic board (~110 m)
 - ◆ Multimode (820 nm) fiber optic board (~2000 m)
 - ◆ Singlemode (1310 nm) fiber optic board (~20 km)
 - ◆ Ethernet board
- ◆ IO board
 - ◆ IOL – 4 Digital Input (24 V DC), 4 Digital Output board
 - ◆ IO4 – 4 Digital Input (48 V DC), 4 Digital Output board
 - ◆ IO1 – 4 Digital Input (110 V DC), 4 Digital Output board
 - ◆ IO2 – 4 Digital Input (220 V DC), 4 Digital Output board

User can order any combination that suits him or her best.

2.6 HOUSING

Housing of SAU 100 system devices is aluminium and intended for mount on standard DIN 35 rail (acc. to DIN EN 50022-35). Housing is same for all combinations.

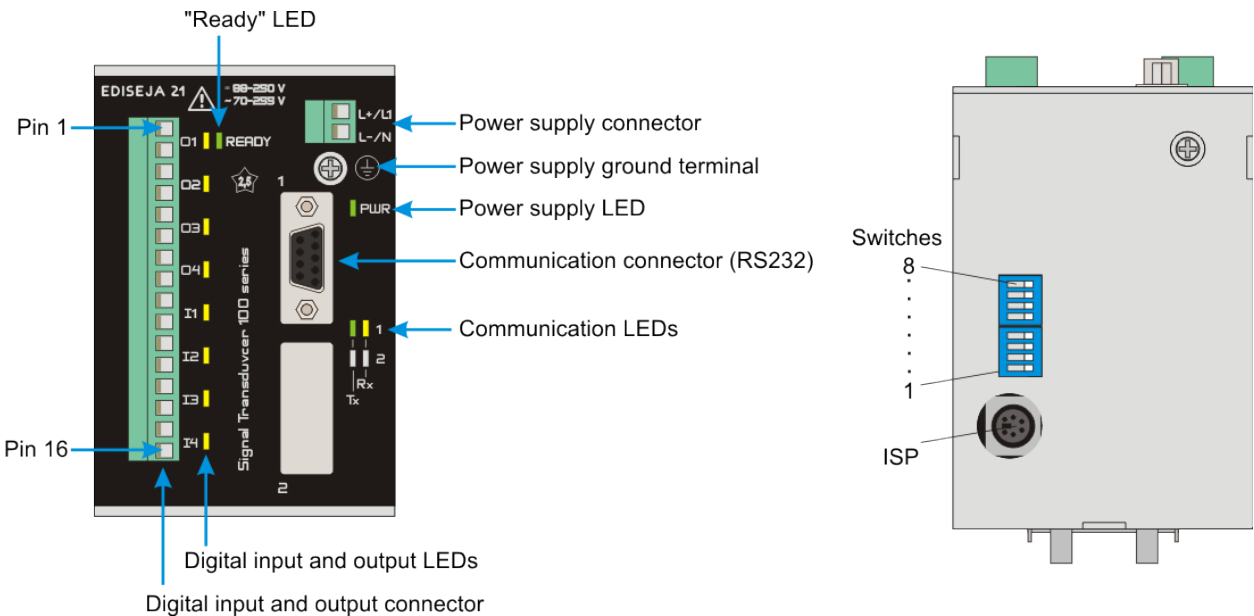
2.7 INTENDED USE

Device are intended for use in cubicles and cabinets in all kinds of power production, transmission and distribution stations as well as in industry. It requires no maintenance.

3 DEVICE

3.1 APPEARANCE

Other types of device are same except communication interface connectors are different.



Picture 3: STR 100 / x.232.NON.x front view (left), bottom view (right)

4 HARDWARE DESCRIPTION

Hardware is based on main board (power supply), interface board and IO board (DIs and DOs).

4.1 MAIN BOARD

Main board provides necessary power to other parts of the device and place for interface board. On the board there are also three LEDs. The yellow LED shows activity on receive (Rx) line and the green one shows activity on transmit (Tx) line. Additional green LED indicates the device power supply activity.

User can choose between two main boards:

- ◆ HI – high voltage power supply board
- ◆ MD – medium voltage power supply board
- ◆ LO – low voltage power supply board

Connector pin table

Phoenix MSTB	1	2
Description	L- , N	L+, L1

For further technical data see chapter „TECHNICAL DATA“.

4.2 INTERFACE BOARDS

User can choose between following interface boards:

- ◆ RS232 board
- ◆ RS485 board
- ◆ Versatile link (650 nm) 1 mm plastic fiber optic (~110 m) board
- ◆ Multimode (820 nm) fiber optic board (ST connector, ~2000 m) board
- ◆ Singlemode (1310 nm) fiber optic (SC connector, ~20 km) board
- ◆ Singlemode (1310 nm) fiber optic (FC connector, ~20 km) board
- ◆ Singlemode (1310 nm) fiber optic (ST connector, ~20 km) board
- ◆ Ethernet board

4.2.1 RS232 INTERFACE BOARD

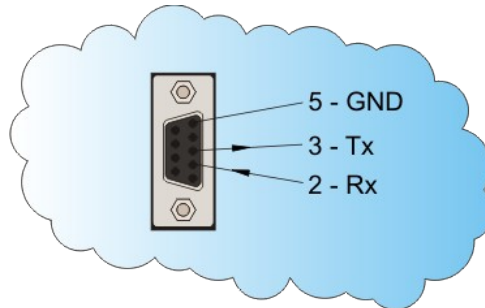
Description

Single, nonisolated, full duplex, RS232 port with DB9 female connector. Supported Rx, Tx and GND pins.

Connector pin table

DB9 F	2	3	5
Description	RX	TX	GND

DB9 F	2	3	5
Direction	IN	OUT	-



Picture 4: DB9 Female connector

Cable for connection to PC

CMU 100		Direction	PC	
DB9 M pin	Signal		Signal	DB9 F pin
2	RX	<-----	TX	3
3	TX	----->	RX	2
5	GND	<----->	GND	5

4.2.2 RS485 INTERFACE BOARD

Description

Single, galvanically isolated, half duplex, RS485 port with Phoenix 3 pin screw connector, with automatic switch to receive after end of transmission and with additional terminating and stabilizing resistors.

Hardware settings

For proper functioning of that board some settings must be done:

- ◆ RS485 bus termination and stabilisation
- ◆ baud rate

RS485 bus termination and stabilisation

TERMINATION

At high transmission rates or long distance, RS485 bus termination is necessary.

The termination on RS485 bus must be set on both ends of the RS485 bus.

STABILISATION

Some device, to work properly, demands that RS485 must always be in known and valid state. That is, when + (positive) pin is more than 200 mV positive than – (negative) pin. Pins + and – are sometimes marked as A and B. In case that no device on RS485 bus is transmitting or in

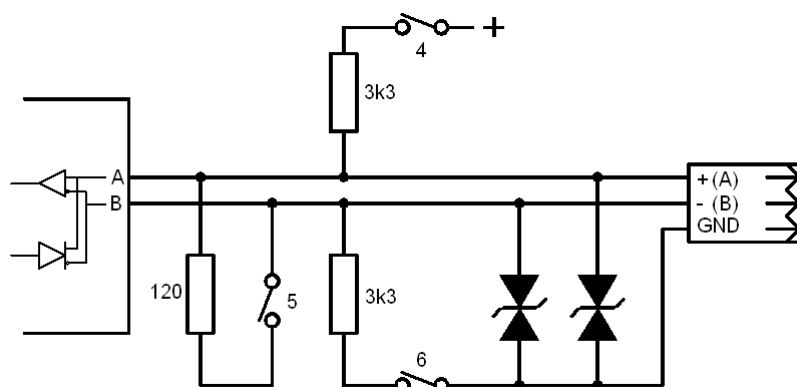
INTERFACE BOARDS

case of short circuit, there is no voltage difference between those pins and some device do not work correctly.

On this port board so called „true fail-safe“ RS485 chip is used so board works correctly without stabilisation at invalid RS485 bus state. But still switches for stabilisation are provided on port board. **The stabilisation on RS485 bus may be set on one device only!**

Switches at the lower side of connector:

Switch	4	5	6
Description	RS485 stabilisation	RS485 termination	RS485 stabilisation



Picture 5: RS485 BUS schematic

Switches at the upper side of connector:

BAUD rate

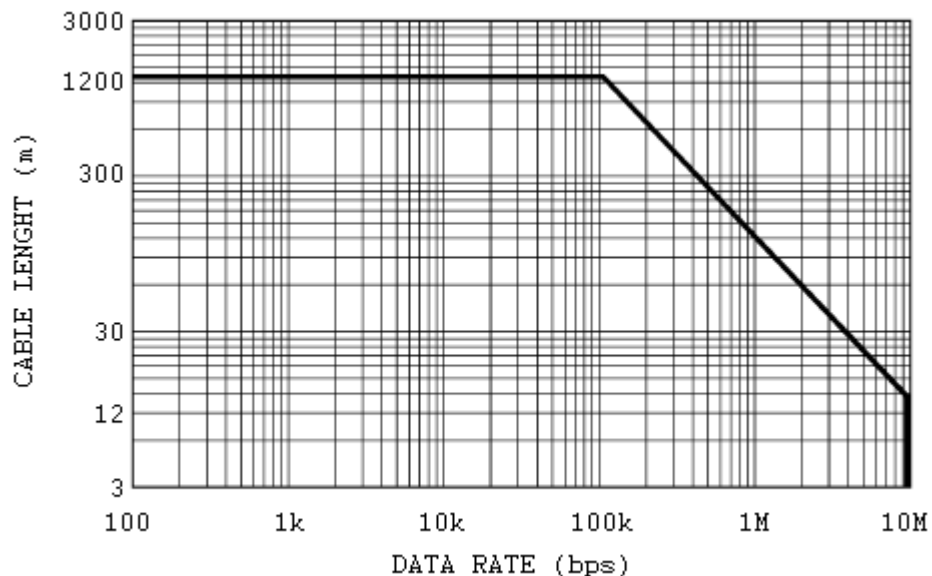
BAUD rate			Switch		
Interface 5	Interface M	Interface L	1	2	3
19200	4800	300	OFF	OFF	OFF
38400	9600	600	OFF	OFF	ON
57600	19200	1200	OFF	ON	OFF
115200	38400	2400	ON	OFF	OFF

BAUD rate setting 19k2 (bps) is valid for all standard communication protocols, that do not request special timings. If special protocols (small request-respond time required) are used please note it in order.

NOTE! If there are problems with communication, try using higher speed setting. Some manufacturer have different markings for B and A line. Try to switch A and B wires. See <http://en.wikipedia.org/wiki/RS-485> for detailed information.

Connector pin table

MSTB	1	2	3
Description	GND	- (B)	+ (A)



Picture 7: Data rate vs cable length

4.2.3 VERSATILE LINK FIBER OPTIC INTERFACE BOARD

Description

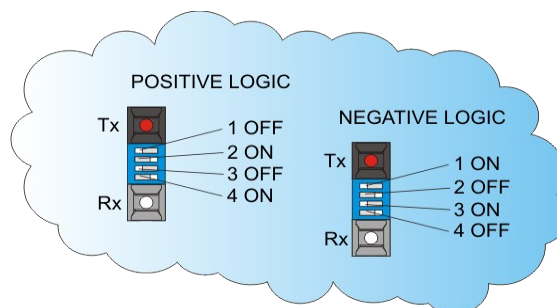
Single receiver and transmitter, full duplex, 660 nm wave length, fiber optic port for 1 mm diameter plastic fiber cable, up to 100 distance, with positive or negative logic, up to 40 kbit/s.

Hardware settings

For proper functioning of that port, optic logic must be set the same, on both devices that communicates:

Fiber optic logic settings

Switch SW1	Light in idle state	1	2	3	4
Positive logic	OFF	OFF	ON	OFF	ON
Negative logic	ON	ON	OFF	ON	OFF



Picture 8: Versatile link fiber optic interface board appearance

4.2.4 MULTIMODE FIBER OPTIC INTERFACE BOARD

Description

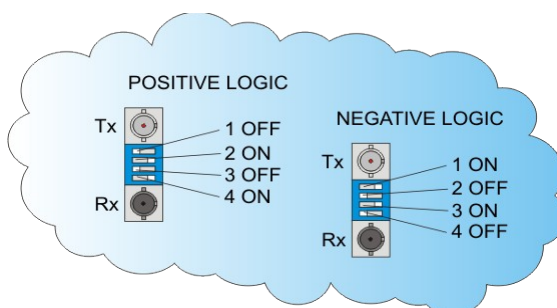
Single, full duplex, multimode, fiber optic port with ST connectors with positive or negative logic.

Hardware settings

For proper functioning of that board, optic logic must be set:

Fiber optic logic settings

Switch SW1	Light in idle state	1	2	3	4
Positive logic	OFF	OFF	ON	OFF	ON
Negative logic	ON	ON	OFF	ON	OFF



Picture 9: Multimode fiber optic interface board appearance

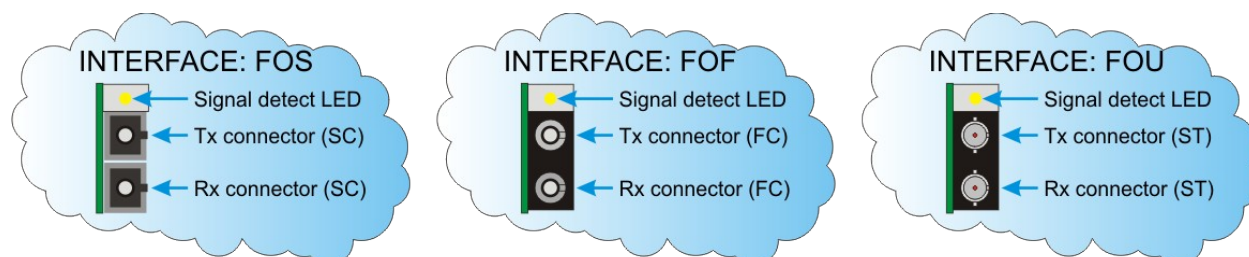
4.2.5 SINGLEMODE FIBER OPTIC INTERFACE BOARD

Description

Full duplex, singlemode, 1310 nm, up to 2,048 Mbit/s fiber optic port with SC connectors (interface FOS), FC connectors (interface FOF) or ST connectors (interface FOU). This interface allows transmission up to 20 km. Signal detect LED is activated, when receiver receives enough light signal from transmitter from another end of the fiber cable.

**Warning!**

Radiation emitted by single mode laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.



Picture 10: Singlemode fiber optic interface board appearance

4.2.6 10/100BASE-TX ETHERNET INTERFACE BOARD

Description

Ethernet port with RJ45 connector.

Interface signals

Signal	Direction	Contact	Function
TX+	Out	1	Differential Ethernet transmit data +
TX-	Out	2	Differential Ethernet transmit data -
RX+	In	3	Differential Ethernet receive data +
RX-	In	4	Differential Ethernet receive data -
Not used		5	Terminated
Not used		6	Terminated
Not used		7	Terminated
Not used		8	Terminated

LED functions

Upper LED - Link	
Description	Meaning
Off	No Link
Amber	10 Mbps
Green	100 Mbps

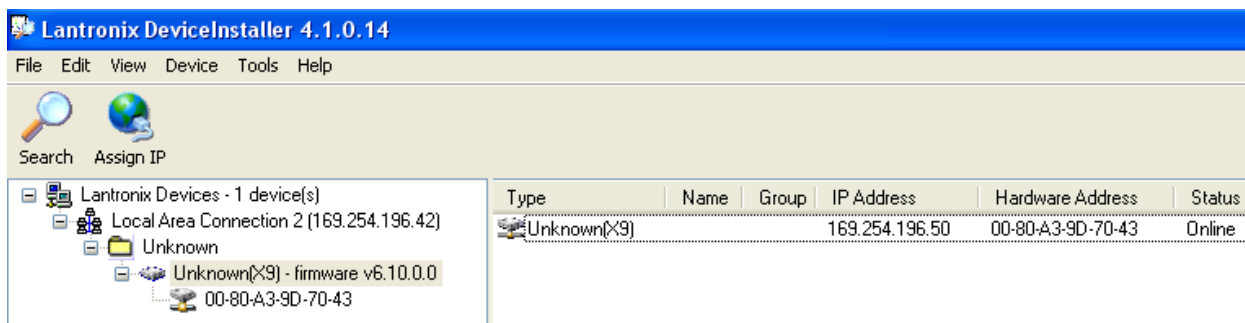
Lower LED - Activity	
BAUD rate selection	BAUD rate selection
Off	No Activity
Amber	Half Duplex
Green	Full Duplex

Software setting

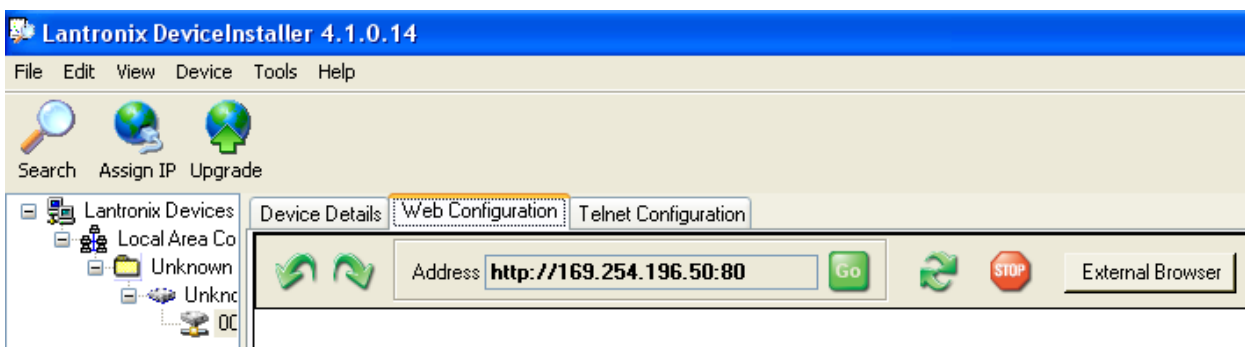
INTERFACE BOARDS

For using this interface Installer program is needed. It can be obtained from www.ediseja21.com/STR100-4channel-signal-transucer.htm. Installer program is needed for setting IP, network mask,... Software can be obtained from www.lantronix.com.

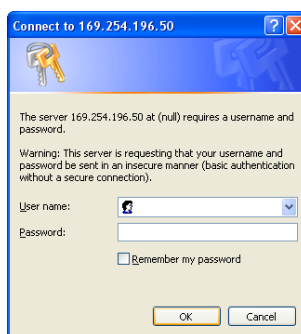
4.2.6.1 LANTRONIX INSTALLER SETTINGS



Picture 11: Start program and press "Search" to find device, then select device to be set, press icon Assign IP, type request IP number and press button Assign



Picture 12: Press "Web Configuration"



Picture 13: Press "Ok"

Address: <http://169.254.196.50:80> Go External Browser

XPort LANTRONIX

Network Settings

- Network
- Server
- Serial Tunnel
- Hostlist
- Channel 1
- Serial Settings
- Connection
- Email
- Trigger 1
- Trigger 2
- Trigger 3
- Configurable Pins
- Apply Settings
- Apply Defaults

Network Mode: **Wired Only**

IP Configuration

☐ Obtain IP address automatically

Auto Configuration Methods

BOOTP: ☒ Enable ☐ Disable

DHCP: ☒ Enable ☐ Disable

AutoIP: ☒ Enable ☐ Disable

DHCP Host Name:

☒ Use the following IP configuration:

IP Address:

Subnet Mask:

Default Gateway:

DNS Server:

Ethernet Configuration

☒ Auto Negotiate

Speed: ☒ 100 Mbps ☐ 10 Mbps

Duplex: ☒ Full ☐ Half

OK

Picture 14: Use „IP Configuration/Use the following IP configuration:“ settings and set IP according to your needs.

Address: <http://169.254.196.50:80> Go External Browser

XPort LANTRONIX

Server Settings

- Network
- Server
- Serial Tunnel
- Hostlist
- Channel 1
- Serial Settings
- Connection
- Email
- Trigger 1
- Trigger 2
- Trigger 3
- Configurable Pins
- Apply Settings
- Apply Defaults

Server Configuration

Enhanced Password: ☐ Enable ☒ Disable

TelnetWeb Manager Password:

Retype Password:

Advanced

ARP Cache Timeout (secs):

TCP Keepalive (secs):

Monitor Mode @ Bootup: ☒ Enable ☐ Disable

CPU Performance Mode: ☐ Low ☒ Regular ☐ High

HTTP Server Port:

Config Server Port:

MTU Size:

TCP Re-transmission timeout (ms):

OK

Picture 15: Set as shown on both STR devices

Address:

XPort
LANTRONIX

- [Home](#)
- [Network](#)
- [Server](#)
- [Serial Tunnel](#)
- [Hostlist](#)
- [Channel 1](#)
- [Serial Settings](#)
- [Connection](#)
- [Email](#)
- [Trigger 1](#)
- [Trigger 2](#)
- [Trigger 3](#)
- [Configurable Pins](#)
- [Apply Settings](#)
- [Apply Defaults](#)

Hostlist Settings

Retry Settings
 Retry Counter: Retry Timeout:

Host Information

No.	Host Address	Port	No.	Host Address	Port
1	0.0.0.0	0	2	0.0.0.0	0
3	0.0.0.0	0	4	0.0.0.0	0
5	0.0.0.0	0	6	0.0.0.0	0
7	0.0.0.0	0	8	0.0.0.0	0
9	0.0.0.0	0	10	0.0.0.0	0
11	0.0.0.0	0	12	0.0.0.0	0

Picture 16: Hostlist settings on both STR devices

XPort **LANTRONIX**

- [Home](#)
- [Network](#)
- [Server](#)
- [Serial Tunnel](#)
- [Hostlist](#)
- [Channel 1](#)
- [Serial Settings](#)
- [Connection](#)
- [Email](#)
- [Trigger 1](#)
- [Trigger 2](#)
- [Trigger 3](#)
- [Configurable Pins](#)
- [Apply Settings](#)
- [Apply Defaults](#)

Serial Settings

Channel 1
☐ Disable Serial Port

Port Settings
 Protocol: Flow Control:
 Baud Rate: Data Bits: Parity: Stop Bits:

Pack Control
☒ Enable Packing
 Idle Gap Time:
 Match 2 Byte Sequence: ☐ Yes ☒ No Send Frame Immediate: ☐ Yes ☒ No
 Match Bytes: Send Trailing Bytes: ☒ None ☐ One ☐ Two
(Hex)

Flush Mode

Flush Input Buffer
 With Active Connect: ☐ Yes ☒ No
 With Passive Connect: ☐ Yes ☒ No
 At Time of Disconnect: ☐ Yes ☒ No

Flush Output Buffer
 With Active Connect: ☐ Yes ☒ No
 With Passive Connect: ☐ Yes ☒ No
 At Time of Disconnect: ☐ Yes ☒ No

Picture 17: Serial Settings on both STR devices

Setting	Settings on both STR devices
<i>Port Settings / Protocol</i>	<i>RS232</i>
<i>Port Settings / Flow control</i>	<i>None</i>
<i>Port Settings / Baud Rate</i>	<i>57600</i>
<i>Port Settings / Data Bits</i>	<i>8</i>
<i>Port Settings / Parity</i>	<i>Even</i>
<i>Port Settings / Stop Bits</i>	<i>1</i>
<i>Pack Control / Enable Packing</i>	<i>"checked"</i>
<i>Pack Control / Idle Gap Time</i>	<i>12 ms</i>

NOTE! This are default factory settings. Do not change any of this settings, otherwise device can stop working correctly!

INTERFACE BOARDS

The image shows two side-by-side screenshots of the LANTRONIX XPort web interface, specifically the 'Connection Settings' page. The left screenshot shows the full interface with a sidebar menu on the left containing options like Network, Server, Serial Tunnel, Hostlist, Channel 1, Serial Settings, Connection, Email, Trigger 1, Trigger 2, Trigger 3, Configurable Pins, Apply Settings, and Apply Defaults. The right screenshot is a cropped version of the same page, focusing on the settings fields.

Connection Settings

Channel 1

Connect Protocol:

Connect Mode

Passive Connection: Accept Incoming: Password Required: ☐ Yes ☒ No Password: Modem Escape Sequence Pass Through: ☒ Yes ☐ No

Active Connection: Active Connect: Start Character: (in Hex) Modem Mode: Show IP Address After RING: ☒ Yes ☐ No

Endpoint Configuration:

Local Port: Remote Port: ☐ Auto increment Local Port for active connect Remote Host:

Common Options:

Telnet Com Port Cntrl: Connect Response: Terminal Name: Use Hostlist: ☐ Yes ☒ No LED:

Disconnect Mode

On Mdm_Ctrl_In Drop: ☐ Yes ☒ No Hard Disconnect: ☒ Yes ☐ No Inactivity Timeout: : (mins : secs)

WebManager Version: 2.0.0.6 Copyright © Lantronix, Inc. 2007-2014. All rights reserved.

Picture 18: Connection Settings

Setting	Left picture - settings on the first STR device	Right picture - settings on the second STR device
Connect Mode / Active Connect	"Auto Start"	"None"
Endpoint Configuration / Local Port	10001	10001
Endpoint Configuration / Remote Port	10001	10001
Endpoint Configuration / Auto Increment Local..	"unchecked"	"unchecked"

NOTE! This are default factory settings. Do not change any of this settings, otherwise device can

stop working correctly!

Setting	Left picture - settings on the first STR device (exam. IP: 10.9.81. 80)	Right picture - settings on the second STR device (exam. IP: 10.9.81. 81)
<i>Endpoint Configuration / Remote Host</i>	Second STR device IP (IP: 10.9.81. 81)	First STR device IP (IP: 10.9.81. 80)

Set IP on both STR devices according to your needs.

NOTE! Always press "OK" when settings is changed. Press „Apply Settings“ to save settings into device! Wait for device to reset.

NOTE! If you want to check the setting on the device, close your web browser otherwise (old) settings will be displayed from computer's cache rather than from STR device itself.

4.3 IO BOARDS

On boards are:

- ◆ microcontroller
- ◆ 4 DIs
- ◆ 4 DOs or 3DOs + 1 „device ready“ DO (depends on ordering)
- ◆ 8 switches

Microcontroller is the heart of device. It scans DIs, controls DOs and communicates via protocol. Digital inputs are scanned every 0,1 ms. Debounce filter is 20. That means that digital input will be recognized as active, if in all 20 cycles status of digital input will be high.

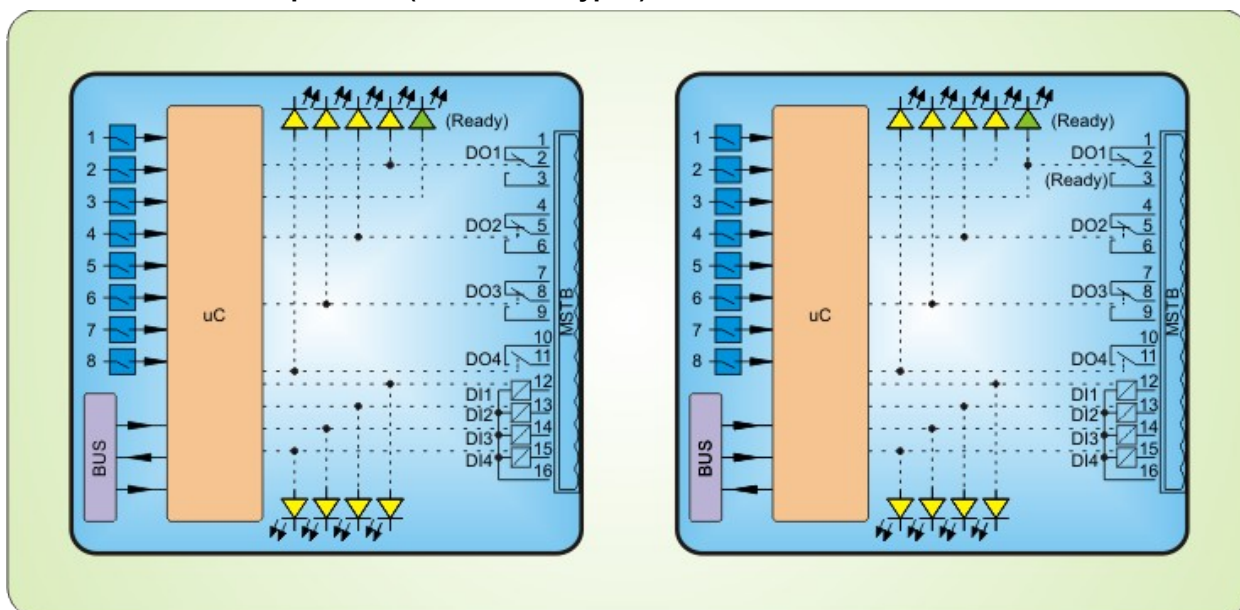
Digital outputs 1-3 are controlled by communication. After positive command request, requested digital output will be activated for 500 ms. After that time, digital output will be automatically returned to its initial state.

Digital inputs and digital outputs statuses are indicated by LEDs on front side of device.

User can choose from following list:

- ◆ IOL – 4 Digital Input (24 V DC), 4 Digital Output board
- ◆ IO4 – 4 Digital Input (48 V DC), 4 Digital Output board
- ◆ IO1 – 4 Digital Input (110 V DC), 4 Digital Output board
- ◆ IO2 – 4 Digital Input (220 V DC), 4 Digital Output board
- ◆ IO4R – 4 Digital Input (48 V DC), 3 Digital Outputs + 1 „device ready“ DO board
- ◆ IO1R – 4 Digital Input (110 V DC), 3 Digital Outputs + 1 „device ready“ DO board
- ◆ IO2R – 4 Digital Input (220 V DC), 3 Digital Outputs + 1 „device ready“ DO board

IO connector pin table (all IO board types)



Picture 19: (left) IO1, IO2 & IO4 board schematic
 Picture 20: (right) IO1R, IO2R & IO4R board schematic
 (difference is in DO1 relay)

Pin	Description
1	potential free DO1 N ormally C lose contact pin
2	potential free DO1 C ommon pin
3	potential free DO1 N ormally O pen contact pin
4	potential free DO2 N ormally C lose contact pin
5	potential free DO2 C ommon pin
6	potential free DO2 N ormally O pen contact pin
7	potential free DO3 N ormally C lose contact pin
8	potential free DO3 C ommon pin
9	potential free DO3 N ormally O pen contact pin
10	potential free DO4 N ormally O pen contact pin
11	potential free DO4 N ormally O pen contact pin
12	DI1 input
13	DI2 input
14	DI3 input
15	DI4 input
16	DIs common GND

Difference between IOx and IOxR board is in operation of first DO (DO1).

Operation of DO1 on IOx boards

On IOx boards DO1 has two functions. They can operate as:

- ◆ normal DO which is activated by activation of DI1 on other device
- ◆ communication activity indicator. If communication is established DO1 is activated. If communication is not established DO1 is in its initial position.

Function of DO1 is set by switch 5 at the bottom of device.

Operation of DO1 on IOxR boards

On IOxR boards DO1 has ready function. DO1 is energized when device is operating normally. DO1 is deactivated when device has no power or device is not working correctly.

Operation of DO2 on IOx and IOxR boards

DO2 has two functions. It can operate as:

- ◆ normal DO which is activated by activation of DI2 on other device
- ◆ communication activity indicator. If communication is established DO2 is activated. If communication is not established DO2 is in its initial position.

Function of DO2 is set by switch 6 at the bottom of device.

LEDs operation

LED ready signalize when device normaly operates. If power is on and green LED ready:

- ◆ blinks or does not light; device does not operate correctly
- ◆ lights; device operates normally

Switches at the bottom of the device - valid EXCEPT for STR 100 / x.ETH.x.x

Switch	1	2	3	4		
Description	BAUD rate selection				BAUD rate	Trans. time
Position	OFF	OFF	OFF	OFF	1200	110 ms
	ON	OFF	OFF	OFF	2400	61 ms
	OFF	ON	OFF	OFF	4800	34 ms
	ON	ON	OFF	OFF	9600	20 ms
	OFF	OFF	ON	OFF	14400	14 ms
	ON	OFF	ON	OFF	19200	13 ms
	OFF	ON	ON	OFF	38400	10 ms
	ON	ON	ON	OFF	57600	9 ms
	OFF	OFF	OFF	ON	76800	8 ms
	ON	OFF	OFF	ON	115200	7 ms
Default position	ON	OFF	ON	OFF		

Note that setting of the BAUD rate must be same on both devices working in pair.

Switch	5	6	7	8
Description	DO1	DO2 function	"master" /	ethernet

Switch	5	6	7	8
	function		"slave"	type
Position OFF	normal DO (IOx boards) or „ready“ DO (IOxR boards)	normal DO	must be used!	must be used!
Position ON	communic. active (IOx boards) or „ready“ DO (IOxR boards)	communic. active	do not use!	do not use!
Default position	ON	OFF	OFF	OFF

If device is not ready, all DOs are deactivated!

It is recommended, that device setting is made before device is powered up.

Device settings set by this switches are not regarded during operation, but only once after power up! If change during operation is made, disconnect power supply for a few moments (until power LED stops emitting) and connect power supply back. New settings are then accepted.

Switches at the bottom of the device - valid for STR 100 / x.ETH.x.x devices only

Switch	1	2	3	4	
Description	communication fail delay				delay (ms)
Position	OFF	OFF	OFF	OFF	100
	ON	OFF	OFF	OFF	200
	OFF	ON	OFF	OFF	400
	ON	ON	OFF	OFF	800
	OFF	OFF	ON	OFF	1000
	ON	OFF	ON	OFF	2000
	OFF	ON	ON	OFF	4000
Default position	ON	ON	OFF	OFF	

It is recommended that settings of time delay is the same on both devices working in pair. Settings do not affect actual transmitting time. It only affects how long communication between STR devices must be broken to each STR device drops output relays. Actual transmitting time depends on network latency.

Switch	5	6	7	8
Description	DO1 function	DO2 function	"master" / "slave"	ethernet type
Position OFF	normal DO (IOx boards) or „ready“ DO (IOxR boards)	normal DO	first STR device	do not use!
Position ON	communic. active (IOx boards) or „ready“ DO (IOxR boards)	communic. active	second STR device	must be used!

Switch	5	6	7	8
Default position	ON	OFF	OFF/ON	ON

If device is not ready, all DOs are deactivated!

It is recommended, that device setting is made before device is powered up.

*** Device settings set by this switches are not regarded during operation, but only once after power up! If change during operation is made, disconnect power supply for a few moments (until power LED stops emitting) and connect power supply back. New settings are then accepted.**

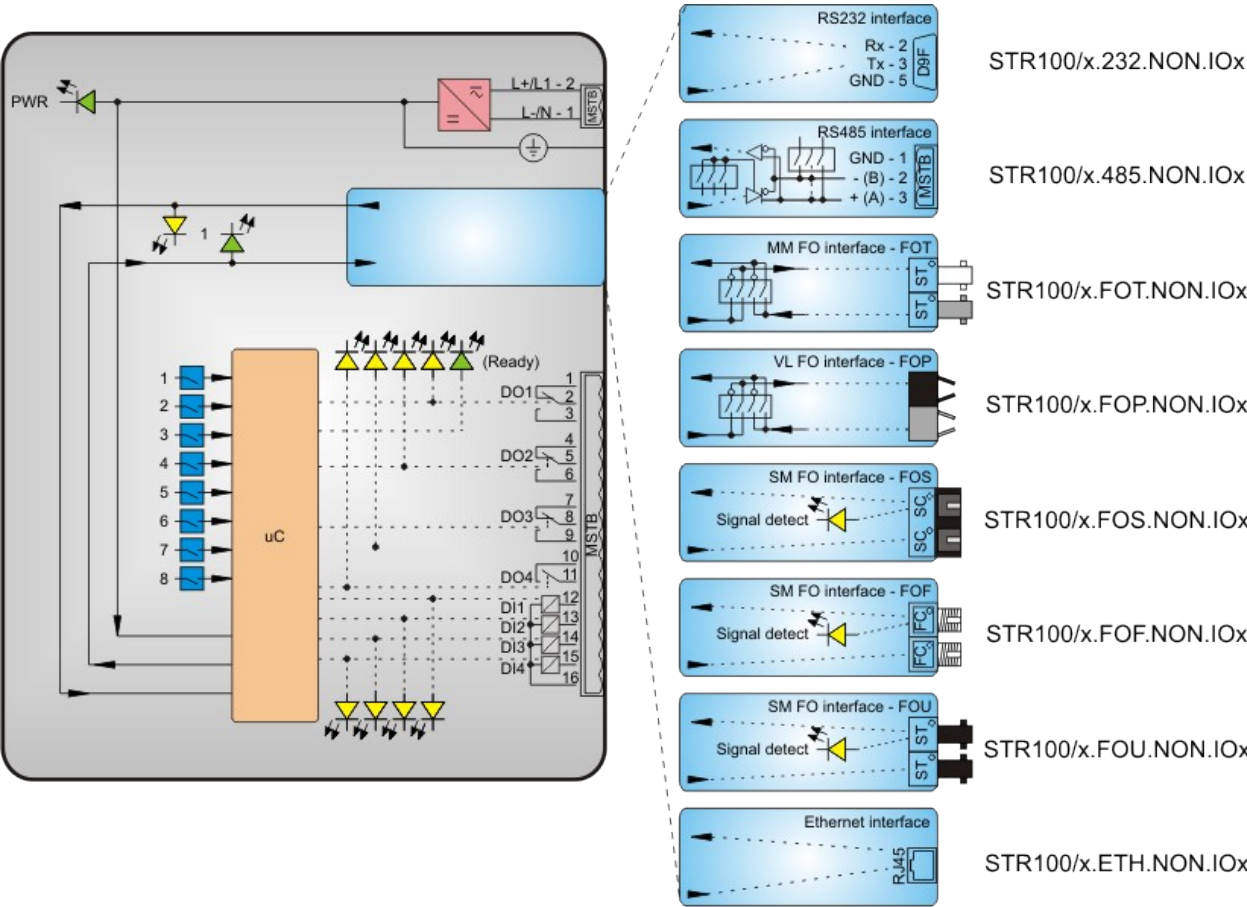
On the bottom side of device are switches for device setting and ISP connector which is intended for upgrading software. Do not connect anything to that connector.
For further technical data see chapter „TECHNICAL DATA“.

5 SCHEMATIC

Difference between schematics is in operation of DO1. On first picture DO1 is normal digital output. On second picture DO1 works as „ready“ indicator. For further details see chapter „HARDWARE DESCRIPTION/IO BOARDS“.

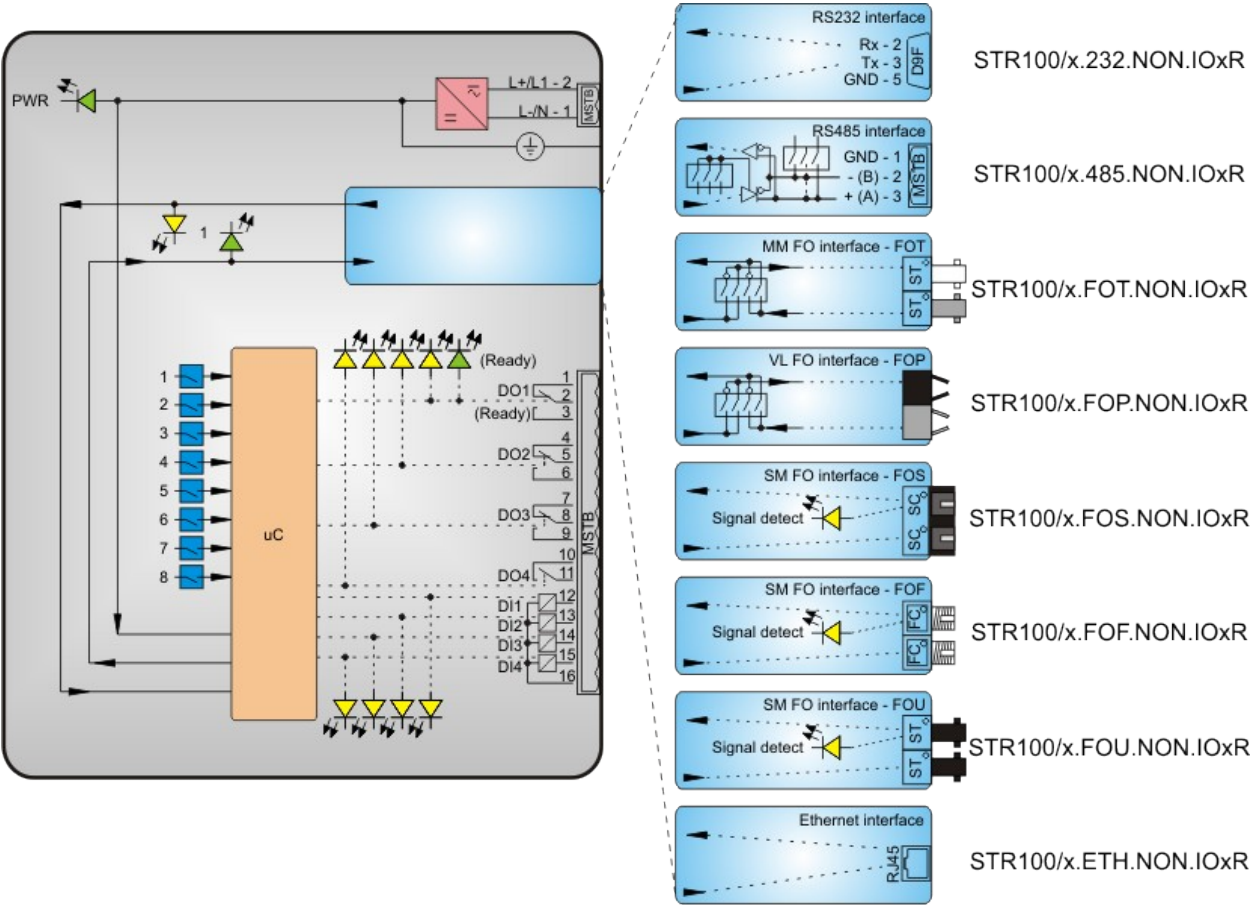
5.1 STR 100 / x.x.NON.IOx

x - means any type, for types description see chapter Ordering.



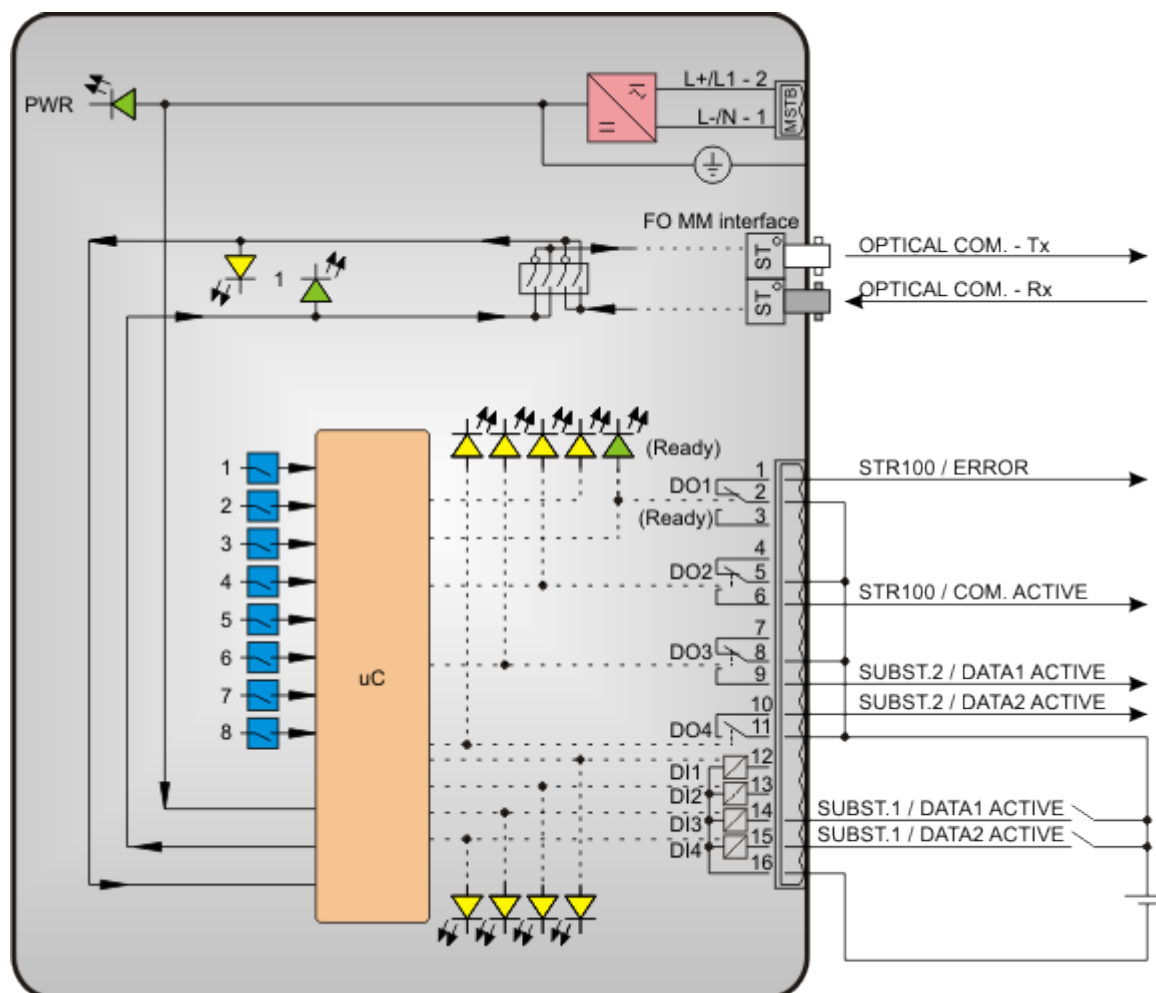
Picture 21: STR 100 / x.x.NON.IOx schematic

5.2 STR 100 / x.x.NON.IOxR



Picture 22: STR 100 / x.x.NON.IOxR schematic

6 TYPICAL CONNECTION



Picture 23: STR 100 / x.FOT.NON.IOxR typical connection

7 INSTALLATION

7.1 INSTALLATION

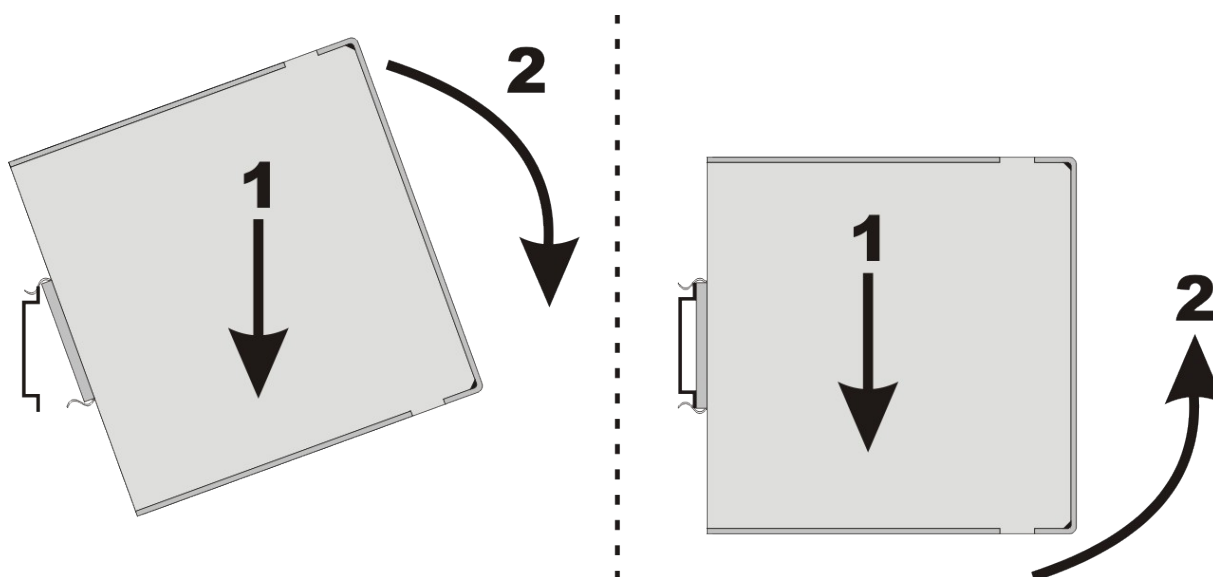
**Warning!**

Hazardous voltage is present inside the device during operation. Disregarding of safety rules can result in severe personal injury or property damage.

Only qualified personnel may work with described devices after being familiar with warnings and safety notices in this paper and other safety regulations.

Following instruction must be taken into consideration:

- ◆ The device must be accessible to qualified personnel only.
- ◆ The device is permitted to operate in enclosed housing or cabinet only.
- ◆ The device location must be vibration-free.
- ◆ The admissible operating temperature must be observed.
- ◆ Check the device for damage at unpacking. If device is damaged it must not be installed but it should be send to the manufacturer for repair.
- ◆ The device should not be opened.
- ◆ The device should be mounted on a 35 mm rail (acc to EN 50022).
- ◆ Attach ground wire before attaching power supply. Device must be grounded during operation!
- ◆ Single core or stranded wire 0,5 – 2,5 mm² must be used for power supply connection. If stranded wire is used, ferrules must be used to prevent fraying. Recommended stripping lenght is 5 mm.
- ◆ Protective earthing wire must be terminated with tinned copper ear terminal.
- ◆ The prescribed bending radius of the optical fibre cables must be observed.



Picture 24: left. installation, right: deinstallation

7.2 DEVICE SETTING

It is recommended, that device setting is made before device is powered up.

Some device settings are not regarded during operation, but only once after power up! If change during operation is made, disconnect power supply for a few moments (until power LED stops emitting) and connect power supply back. Settings are then accepted.

For further details see chapter „HARDWARE DESCRIPTION“.

8 COMMISSIONING & MAINTENANCE

8.1 COMMISSIONING

**Warning!**

Hazardous voltage is present inside the device during operation. Disregarding of safety rules can result in severe personal injury or property damage.

Only qualified personnel may work with described device after being familiar with warnings and safety notices in this paper and other safety regulations.

Following instruction must be taken into consideration:

- ◆ Device must operate completely assembled! Device must be used as described. No modifications of the device should be made.
- ◆ Attach ground wire before attaching power supply. Device must be grounded during operation!
- ◆ Check if the power supply voltage complies with device operation voltage.
- ◆ Do not open device while it is energized! Hazardous voltage is present inside the device.

If device is equipped with singlemode fiber optic interface:

**Warning!**

Radiation emitted by single mode laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.

8.2 MAINTENANCE

The device is maintenance-free. Disconnect power supply before cleaning it. Use moist cloth. Do not use liquids.

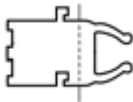
9 TECHNICAL DATA

Power supply				
		Type HI	Type MD	Type LO
Rated input voltage	DC	110 - 250 V	48 - 60 V	24 V
	AC	230 V	48 V	18 V
Permissible voltage range	DC	88 - 350 V	38 - 72 V	18 - 36 V
	AC	70 - 264 V	30 - 50 V	15 - 24 V
Input current	DC	38 - 18 mA	64 - 52 mA	140 mA
	AC	20 mA	120 - 80 mA	200 mA
Fuse (internal)	2 A T			
Power supply indicator	green LED marked PWR			
Voltage dips	20 ms			
Connector type	screw type „MSTB“ Phoenix 2pin			
Power Supply Wire	crossection	0,5 – 2,5 mm ²		
	type	single or stranded wire		
	voltage rating	500 V		
	colour	see valid standard		
Ground wire	crossection	Cu, 2,5 mm ²		
	colour	see valid standard		

Communication port RS232 (interface type 232)	
Type	RS232
Direction	full duplex
Speed	up to 230 k BAUD
Number of ports	1
Distance	up to 15 m
Isolation	none; (GND earthed)
Connector type	DB9 female
Lines in	1 (RX)
Lines out	1 (TX)

Communication port RS485 (interface type 485, 48M & 48L)	
Type	RS485
Direction	half duplex

Communication port RS485 (interface type 485, 48M & 48L)		
Speed	Interface type 485	19200 - 115200 BAUD
	Interface type 48M	4800 - 38400 BAUD
	Interface type 48L	300 - 2400 BAUD
Number of ports	1	
Distance	up to 1200 m	
Isolation	1000 V DC	
Connector type	„MSTB“ Phoenix 3pin	
Termination	120 Ohm	
Max number of devices on BUS	32	

Communication port Versatile Link Fiber Optic (interface type FOP)	
Type	plastic fiber optic
Wave lenght	660 nm
Fiber size	1 mm diameter plastic optical fiber
Laser class	I (IEC 60825-1) - eye safe
Direction	full duplex
Speed*	up to 40 kbit/s
Input	1 receiver (grey connector)
Output	1 transmitter (black connector)
Logic	light OFF (positive logic) or light ON (negative logic) in idle state, set by manual switch (see table)
Distance	up to 100 m
Connector type	

Communication port Multimode Fiber Optic (interface type FOT)				
Type	multimode fiber optic			
Wave lenght	820 nm			
Fiber size	50/125 µm	62,5/125 µm	100/140 µm	200 µm HCS
Distance (approx.)	600 m	2000 m	1800 m	
Optical output power	-18 dB			
Reciver sensitivity	-24 dB			
Laser class	I (IEC 60825-1)			
Direction	full duplex			

Communication port Multimode Fiber Optic (interface type FOT)	
Speed	up to 115200 BAUD
Input	1 receiver (grey connector)
Output	1 transmitter (white connector)
Logic	light ON or OFF in idle state set by switch (see table)
Connector type	ST

Communication port Singlemode Fiber Optic (interface type FOS, FOF & FOU)		
Type	singlemode fiber optic	
Wave lenght	1310 nm	
Fiber size	8-9/125 μ m	
Optical output power	-7 to 0 dBm	
Reciver sensitivity	-18 dBm	
Receiver overload	-7 dBm	
Laser class	I (IEC 60825-1)	
Direction	full duplex	
Speed	up to 115200 BAUD	
Input	1 receiver	
Output	1 transmitter	
Distance	up to 20 km	
Connector type	STR 100 / x.x. FOS	SC
	STR 100 / x.x. FOF	FC
	STR 100 / x.x. FOU	ST

Communication port 10/100BASE-TX (interface type ETH)	
Type	ethernet
Direction	full duplex
Speed	57600 BAUD
Manufacturer	Lantronix
Type	Xport XP1001000-05R
Link	WWW.lantronix.com

Digital inputs		
Input voltage	IOL	24 V DC (+/- 20%)
	IO4 and IO4R	48 V DC (+/- 20%)

Digital inputs		
	IO1and IO1R	110 V DC (+/- 20%)
	IO2 and IO2R	220 V DC (+/- 20%)
Input current	1 mA	
Connector type	screw type „MSTB“ Phoenix 16 pin	
Wire	crosection	0,5 – 2,5 mm ²
	type	single or stranded wire
	voltage rating	500 V
	colour	see valid standard

Digital outputs		
Max breaking voltage	440 V AC	
Max current	AC	5 A at 250 V
	DC	5 A at 32 V (resistive bourden)
		1,3 A at 48 V (resistive bourden)
		0,4 A at 110 V (resistive bourden)
		0,35 A at 220 V (resistive bourden)
Connector type	screw type „MSTB“ Phoenix 16 pin	
Wire	crosection	0,5 – 2,5 mm ²
	type	single or stranded wire
	voltage rating	500 V
	colour	see valid standard

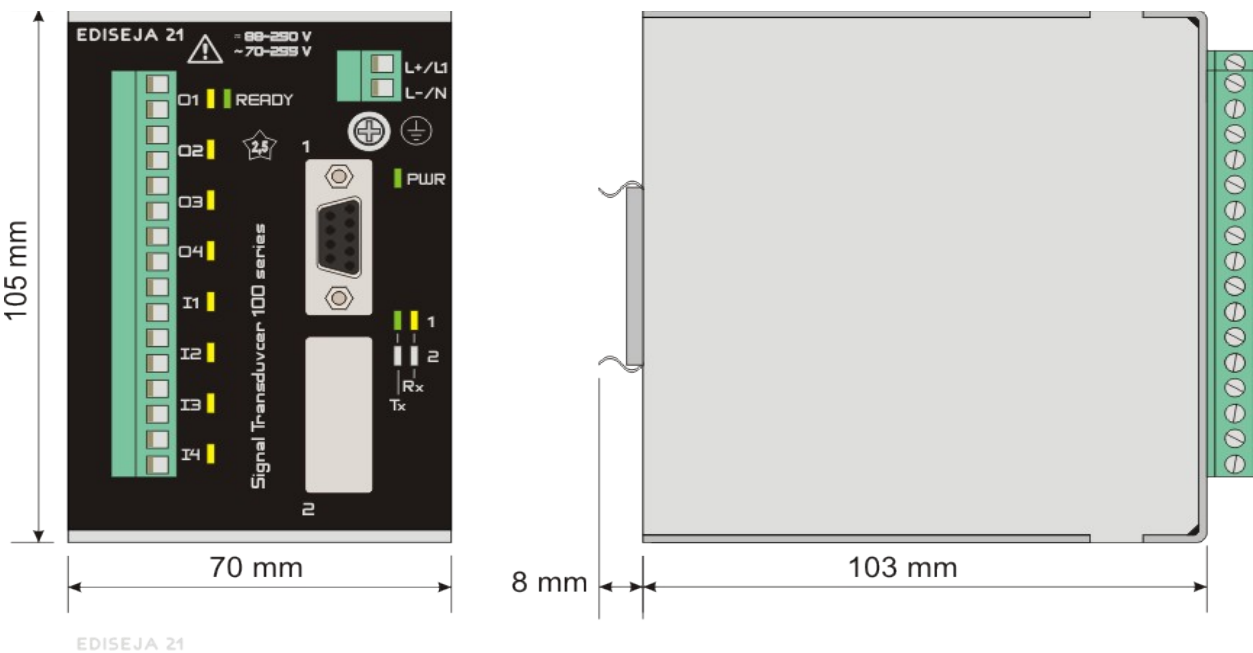
Communication speed vs transmission time		
Transition time	1200 BAUD	110 ms
	2400 BAUD	61 ms
	4800 BAUD	34 ms
	9600 BAUD	20 ms
	14400 BAUD	14 ms
	19200 BAUD	13 ms
	38400 BAUD	10 ms
	57600 BAUD	9 ms
	76800 BAUD	8 ms
	115200 BAUD	7 ms

Valid for devices except **STR 100/x.ETH.x.x**. For device **STR 100/x.ETH.x.x** transition time depends on network latency.

TECHNICAL DATA

Device			
Weight	0,35 kg		
Dimensions (see picture)	(H)	(D)	(W)
	105 mm	111 mm + connectors	70 mm
Temperature range	0 °C to +55 °C		
Humidity operating	up to 95 % (noncondensing)		
Enclosure	Material	Al	
	IP	20	
Mount type	standard DIN 35 rail (acc. to DIN EN 50022-35)		
Class	I		
Overvoltage category	II		
Communication indicator	Receiveing	yellow LED marked Rx	
	Tranmitting	green LED marked Tx	

10 DIMENSIONS



Picture 25: Dimensions

11 ORDERING

ORDERING NUMBER:

STR 100 /

Power supply:

110 - 250 V DC or 230 V AC	HI
48 - 60 V DC or 48 V AC	MD
24 V DC	LO

Interfaces:

none (mark second interf. with „NON“ in case that second interf. is not needed)	NON
RS232 (15 m)	232
RS485 isolated, half duplex (1200 m, 19200 - 115200 BAUD)	485
RS485 isolated, half duplex (1200 m, 4800 - 38400 BAUD)	48M
RS485 isolated, half duplex (1200 m, 300 - 2400 BAUD)	48L
Versatile (650 nm) fiber optic for 1 mm plastic connector (~110 m)	FOP
Multimode (820 nm) fiber optic with ST connector (~2000 m)	FOT
Singlemode (1310 nm) fiber optic with SC connector (~20 km)	FOS
Singlemode (1310 nm) fiber optic with FC connector (~20 km)	FOF
Singlemode (1310 nm) fiber optic with ST connector (~20 km)	FOU
10/100Base-Tx (Ethernet)	ETH

Digital input & output:

4 DI (24 V DC), 4 DO (250 V AC, 5 A)	IO L
4 DI (48 V DC), 4 DO (250 V AC, 5 A)	IO 4
4 DI (110 V DC), 4 DO (250 V AC, 5 A)	IO 1
4 DI (220 V DC), 4 DO (250 V AC, 5 A)	IO 2
4 DI (24 V DC), 3 + 1 ready DO (250 V AC, 5 A)	IO LR
4 DI (48 V DC), 3 + 1 ready DO (250 V AC, 5 A)	IO 4R
4 DI (110 V DC), 3 + 1 ready DO (250 V AC, 5 A)	IO 1R
4 DI (220 V DC), 3 + 1 ready DO (250 V AC, 5 A)	IO 2R

Software Version:

software version	leave empty
------------------------	-------------

Software Revision:

software revision	leave empty
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Accessories:

Description

- power supply cable with „schuko“ plug, 2 m
- communication cable RS232 port to PC, 2 m
- fiber optic cable ST-ST connector, 2 m

For other cable lengths please contact us.

Contact:**Ediseja 21 d.o.o.**

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