

R033

R034

Realport Ethernet – RS485 data converter Modbus RTU/TCP router



Summary

R033 and R034 are Ethernet to RS485 converters which serve as replacement for the R035 converter.

R033 is a 10/100 Mbit Realport Ethernet to RS485 converter, also called Terminal server.

R034 serves as a Modbus RTU/TCP router.

Application

- **remote Modbus RTU/RS485 device to SCADA Modbus TCP connection via an Ethernet network (R034)**
- **connection of Domat I/O modules for data transmission and signal readout**
- **the usage depends on the communication protocol at the RS485; in some situations, the Ethernet delays may not meet the timing requirements of the serial protocol driver.**

Function

The R033 module is able to connect a RS485 device to a PC over an Ethernet network. The Lantronix RealPort Software creates a virtual COM port on the host PC. This virtual port allows any software to communicate with a remote RS485 device. The COM port redirector runs under Microsoft Windows, UNIX and Linux. Maximum baudrate is 115200 bps.

The R034 module works as a Modbus RTU/TCP router. On the TCP side the module acts as slave (server) and sends the requests as master (client) to the serial line with Modbus RTU. Inverse functionality (serial slave) is also possible.

Power presence is indicated by a green PWR LED close to the serial connector. The Ethernet connector provides two LEDs: Link and Network activity. The network switches automatically between 10 and 100 Mbit/s.

To connect the RS485 bus there are 2 screw terminals. The RS485 data flow is indicated by LEDs: TxD (green) and RxD (red). The RS485 bus may be terminated by

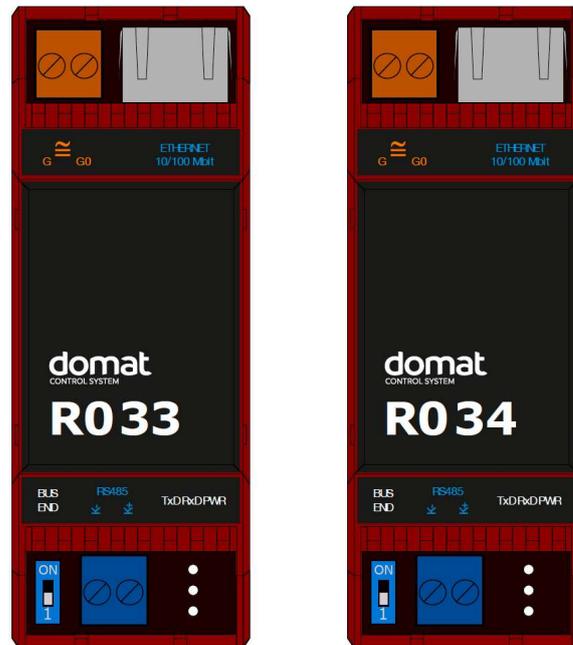
a DIP switch (close to the RS485 terminals). The RS485 bus is galvanically isolated (insulation voltage 1000 V).

The module is 36.2 mm wide and mounts on a standard DIN rail.

Technical data

Power	24 V AC/DC \pm 10 %; max. 2 W
Ethernet	1 \times Ethernet 10/100BaseT (automatic baudrate change) RJ45, 2 \times LED (link, data) integrated in the connector
RS485	(K+, K-) galvanically insulated, insulating voltage 1 kV baudrate 300...115 200 bit/s maximal bus length 1200 m 120 Ohm bus termination – DIP switch maximum number of modules depends on requested response time – up to 255 addresses
3 \times LED	TxD, RxD, PWR
Hardware	NS7520 (RISC processor, 32-bit NET+ARM), 55 MHz, 4 MB Flash, 8 MB RAM
Software	Lantronix (creates a virtual COM port for R033 on the host PC) configuration over a TCP terminal or Lantronix DeviceInstaller
Housing	Polycarbonate box (certification UL94V0)
Dimensions	36.2 \times 98.7 \times 64 mm
Protection degree	IP20 (EN 60529)
Terminals	Screw terminals M3, maximum wire cross-section 2.5 mm ² (recommended wire cross-section is 0.35...1.5 mm ²)
Ambient conditions	-20...50 °C; 5...85 % relative humidity; non-condensing gases and chemically non-aggressive conditions (according EN 60721-3-3 ed. 2:2019, classes 3K22, 1K21, 3M11) for installation at high altitude, it is necessary to consider the reduction of dielectric strength and a limited cooling by air (EN IEC 60664-1 ed.3:2020)
Standards conformity	EMC EN 61000-6-2 ed.4:2019, EN 61000-6-4 ed.3:2019 (industrial safety) EN 62368-1 ed.2:2020 + A11:2020 (electrical safety) EN 63000:2019 (ROHS)

Scheme Terminals



Terminals and connectors

G power

G0 power

Ethernet network interface

RS485 port COM - serial link RS485; terminals K+, K-

LED indication

TxD green LED – RS485 transmitting data
(flashing: transmitting data; OFF: no data traffic)

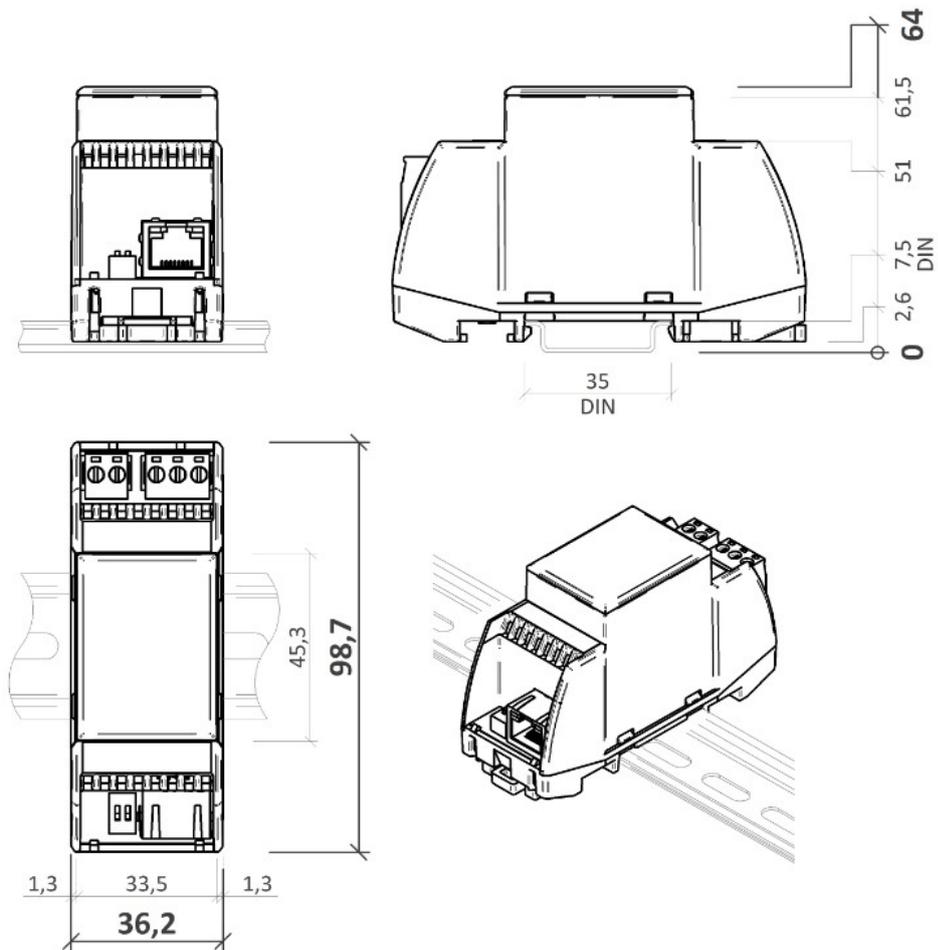
RxD red LED – RS485 receiving data
(flashing: transmitting data; OFF: no data traffic)

PWR green LED – power (ON: power OK; OFF: no power applied, weak or damaged power supply, ...)

DIP switch

BUS END DIP on the left of the RS485 terminals, ON = bus end; the first and last devices on bus should have bus end ON

Dimensions



All dimensions are in *mm*.

Communication

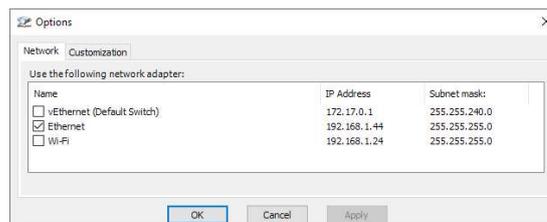
Default network settings are:

IP address	192.168.1.37
subnet mask	255.255.255.0
default gateway	192.168.1.1

Nastavení

To detect the device in the local network, use the Lantronix Device Installer, available for download at <https://www.lantronix.com/products/deviceinstaller/>.

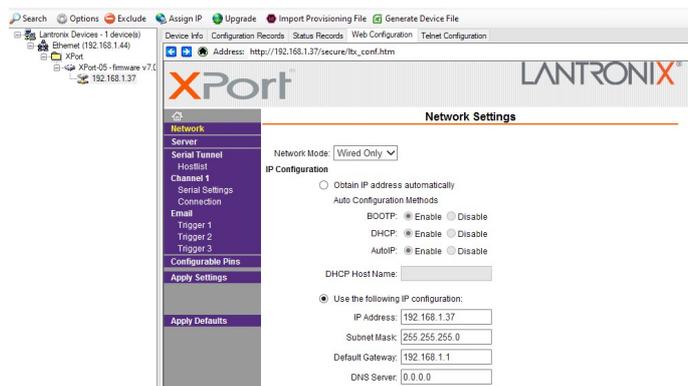
- Install and run the software.
- In Tools – Options select the network interface where the converter is connected, and confirm by OK.



- The Search button detects the converters in the local network.



- Click the converter in the list of detected devices to open the configuration menu.



- Network address and other parameters can be set by several ways:
 - o in the DeviceInstaller program in the Assign IP menu (for R033 also over web, name and password are blank)
 - o for R033 only: direct access to the configuration web on the IP address of the converter using a web browser (default name and password are blank)
 - o using a terminal (Telnet) on the IP address of the converter and TCP port 9999.

The R033 terminal server has the following menu:

Network: Setting of IP parameters

Server: Detailed setting of terminal server properties

Serial tunnel – Host list: Setup of limited access from a list of IP addresses

Channel 1 – Serial settings: RS485 properties

(due to hardware properties the setting must be Protocol: RS485-2wire, Flow control: None)

Connection: Details for connection from a virtual COM port, passwords, TCP port settings, etc.

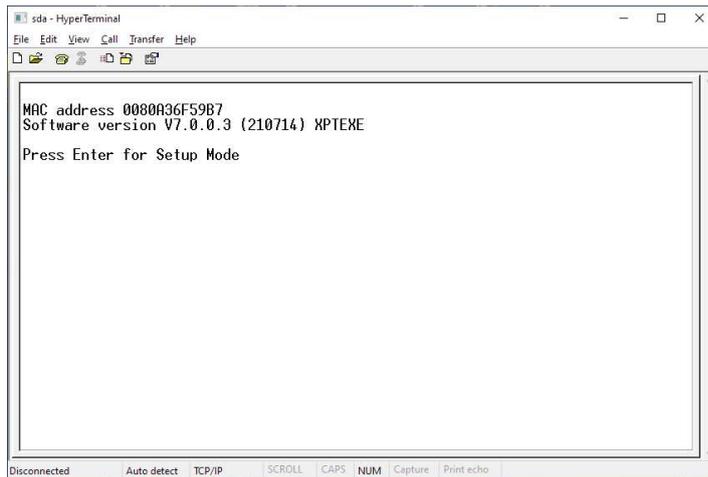
Email: not used here; in other hardware constructions used for sending e-mails on interface pin activation. Do not change these settings.

Configurable pins: not used here; in other hardware constructions used for sending e-mails on interface pin activation. Do not change these settings.

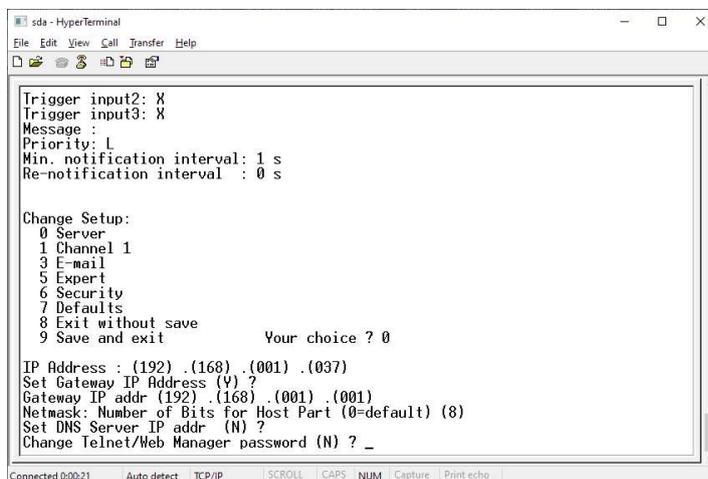
Apply settings: Writes all changes permanently into the device.

Apply defaults: Sets default values of all parameters.

Setting using a terminal software: connect to the IP address of the converter (default is 192.168.1.37) and TCP port 9999.



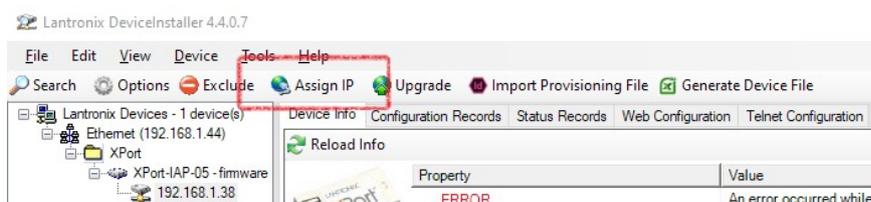
Press Enter to list a menu, and select an item. Press Enter to set up parameters similarly to the web interface.



The network mask (Netmask) is not to be entered as „255.255.255.0“, but rather as the number of zeros in the binary representation of the mask. E.g for a 255.255.255.0 network, which reads 11111111 11111111 11111111 00000000 in binary, „8“ must be entered.

Find more details in the Lantronix XPort user guide, https://cdn.lantronix.com/wp-content/uploads/pdf/XPort_UG.pdf

The Modbus router R034 is configured only using a TCP terminal. However, the basic network setting can be configured also in the Lantronix Device Installer in the *Assign IP* menu:



Connect a TCP terminal to the device IP address, port 9999. The main menu is listed:

```

Modbus/TCP to RTU Bridge Setup
1) Network/IP Settings:
   IP Address ..... 192.168.1.37
   Default Gateway ..... 192.168.1.1
   Netmask ..... 255.255.255.0
2) Serial & Mode Settings:
   Protocol ..... Modbus/RTU,Slave(s) attached
   Serial Interface ..... 9600,8,N,1,RS485
   Modbus Port No ..... 502
3) Modem/Configurable Pin Settings:
   CP1 ..... RS485 Output Enable
   CP2 ..... Not Used
   CP3 ..... Not Used
4) Advanced Modbus Protocol settings:
   Slave Addr/Unit Id Source .. Modbus/TCP header
   Modbus Serial Broadcasts ... Disabled (Id=0 auto-mapped to 1)
   MB/TCP Exception Codes .... Yes (return 00AH and 00BH)
   Char, Message Timeout ..... 00050msec, 00500msec
   Serial TX Delay ..... 0005msec
7) Security Settings:
   SNMP ..... Enabled
   SNMP Community Name ..... public
   Telnet Setup ..... Enabled
   TFTP Download ..... Enabled
   Port 77FEh ..... Enabled
   Web Server ..... Enabled
   Enhanced Password ..... Enabled
   Port 77F0h ..... Enabled
   Telnet Authentication ..... Disabled
8) Expert Settings:
   TCP Re-transmission timeout 500 ms

D)efault settings, S)ave, Q)uit without save
Select Command or parameter set (1..7) to change:

```

1) Network/IP Settings:

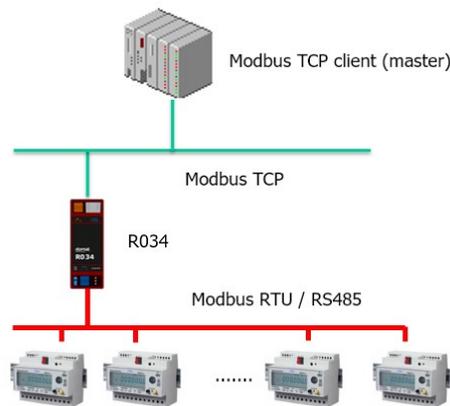
Configuration of network parameters.

2) Serial & Mode Settings:

Protocol:

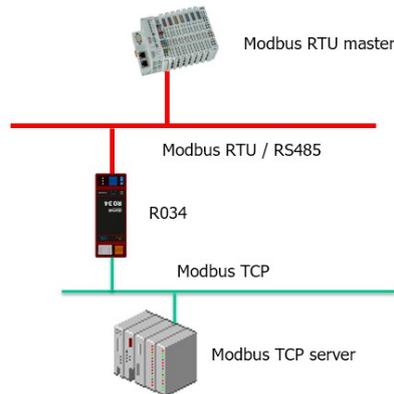
Modbus/RTU,Slave(s) attached:

A topology where a Modbus master is in the IP network, and Modbus slaves jsare connected to the RS485. The most common settings, suitable for applications as metering data acquisition, integration of room controllers, etc.



Modbus RTU, Master attached:

For topologies where a Modbus TCP server (e.g. an AHU unit with a Modbus IP interface) shall be integrated into a Modbus RTU client (e.g. a PLC with RS485).



In this case, a routing table entry in the converter must be added

5) Unit ID -> IP Address Table:

for the router to know to which IP address the Modbus RTU requests shall be routed. After setting of TCP parameters, a dialog to add a routing entry appears:

```
Close Idle TCP sockets after (3-60 sec, 0=leave open) (10)
Redundant entry retries after (15-60 sec, 0=disable feature) (0)
(Set 4th octet to 0 to use Slave Address as part of IP)
```

A)dd, D)elete, E)xit - select function

Press the „A“ key to add an entry:

```
A)dd, D)elete, E)xit - select function
Modbus addr from (1) ? 1
Modbus addr to (1) ? 10
Slave IP address (192) . (168) . (001) . (000)55

1):      001-010: 192.168.1.55
```

In this entry, telegrams for requests to Modbus slave addresses of 1 to 10 will be routed to a Modbus server („slave“) on IP address of 192.168.1.55. There may be more routing entries defined if the topology is more complex. However, there must be defined at least one routing entry.

3) Modem/Configurable Pin Settings

Do not change these settings.

4) Advanced Modbus Protocol Settings:

Modbus Serial Broadcasts: If Enabled, telegrams with link address of 0 are sent to the RS485 with no changes. The Disabled option changes address 0 to 1 automatically.

7) Security settings

8) Expert settings

See detailed description in the Lantronix Modbus Protocol User Guide, available at https://cdn.lantronix.com/wp-content/uploads/pdf/Modbus_Protocol_UG_Rev_J.pdf

Contact technical support, support@domat.cz, for more information.

Safety note

The device is designed for monitoring and control of heating, ventilation, and air conditioning systems. It must not be used for protection of persons against health risks or death, as a safety element, or in applications where its failure could lead to physical or property damage or environmental damage. All risks related to device operation must be considered together with design, installation, and operation of the entire control system which the device is part of.

Cyber security note

The product may influence the information and cyber security (ICS) of the control system. It is supplied in default settings. Implementation and continuous compliance with the ICS rules (e.g. creating and upload of certificates and keys, their updates and management, protection against misuse, etc.) are fully the responsibility of the control system operator. The manufacturer is not responsible for damages which originated or may originate due of wrong or insufficient implementation of ICS rules when using the device. In case of questions, please contact Domat Control System technical support.

Changes in versions

06/2023 – First version of the datasheet.