

**TCP2RS+**



The **TCP2RS+** is a communications gateway used to convert the physical Ethernet environment to serial RS-485 or RS-232 communications or vice versa in the routing mode.

This document provides the instructions for use and describes the operation of the TCP2RS + device. You can download the manual from CIRCUTOR's web site in case it is misplaced:  
[www.circutor.com](http://www.circutor.com)

**Warning:** Before performing any maintenance operations, connection modifications, repairs, etc., you must disconnect the unit from the power supply. If you suspect an operational fault in the unit or in its protection system, remove the unit from service. The design of the unit makes it easy to replace in the event of a fault.

**1.- DESCRIPTION**

The purpose of the **TCP2RS+** device is to convert the physical series environment to Ethernet communications with TCP/IP communication packets. The gateway is responsible for the transparent conversion under TCP or UDP connections. The operation is determined by the parameterisation carried out in the internal configuration web menu.

**2.- COMMUNICATION**

The device is equipped with a self-detecting 10BaseT / 100Base TX connection for the physical connection of the **TCP2RS+** converter to an Ethernet network. For its configuration has an internal web site from which the user can define the network protocol used to communicate with the management software or communications system master.

**2.1.- Ethernet addressing**

The device is connected to the master communication system by means of an IP connection, and the addressing parameters must be configured. The configuration modes include the assignment of a fixed IP or configuration of a DHCP name.

**2.1.1.- Ethernet address assignment**

To configure the IP address configuration in any of the available formats, run program **IPSetup.exe**, supplied with the equipment.

**2.1.2.- Fixed IP assignment**

To assign the fixed IP address, enter the **MAC** address shown on the permanent side label attached to the device, the format of which is 00:26:45:XX:XX:XX.

MAC: 00:26:45:00:01:9f

Dirección: 172 . 16 . 4 . 130

Netmask: 255 . 255 . 0 . 0

Gateway: 172 . 16 . 4 . 1

Configurar Salir

In the **Address** field, enter the IP address being configured; do the same with the **(Netmask)** and the **(Gateway)** port if necessary. After entering the device

settings, press "Setup" to send the configuration to the equipment.

**2.1.3.- DHCP IP assignment**

To assign the DHCP name, choose this option using the arrow on the upper right, and select **On**. Once the configuration fields have been enabled, enter the **MAC** address that can be seen on the permanent side label attached to the device, the format of which is 00:26:45:XX:XX:XX. In the **Address** field, enter an unused, temporary IP address, which is within the working range of your computer. In the **Host Name** field, enter the DHCP name to be assigned to the equipment. Optionally, the user can configure the parameters of the **ClientID** field. The default **VendorID** of the device is **CIRCUTOR**.

DHCP: On Off

MAC: 00:26:45:00:01:9f

Host Name: bus1

Dirección: 172 . 16 . 4 . 130

Client ID:

Netmask:

Primary DNS Server:

Gateway:

Secondary DNS Server:

Configurar Salir

**2.2.- Configuration web site**

After connecting to the Local Area Network (LAN), and configuring the IP address or the DHCP name, the device has an internal web site where all the parameters related to the network protocol and configuration of the serial port can be configured. To access the web site, simply use a conventional Internet browser and enter the IP address or the name assigned to the device (for example <http://172.16.4.130>)

**2.2.1.- IP address or DHCP name**

The internal web site can be used by the user to apply changes to the DHCP name or to the IP address previously assigned to the device.

Network setup

Host name: CIRCUTOR

DHCP: On Off

Address:

Netmask:

Gateway:

Primary DNS server:

Secondary DNS server:

**2.2.2.- Network protocol**

The device can be connected to the master communications system by means of three types of network protocols and to a configurable port (TCP, UDP or Modbus/TCP). In the case of the Modbus/TCP protocol, port modification will be disabled and fixed at 502.

Protocol setup

Protocol: UDP

Port: 10001

Packing timeout: 10

**2.2.3.- Configuration of the Serial port**

The communications bus parameters can be fully configured in terms of type of serial Interface (RS-485/RS-232), transmission speed (from 4800 bps to 115.2 kbps), data bits (7 or 8), parity (no parity, odd or even) and stop bit (1 or 2). The data will be configured by default to 8 by selecting the Modbus/TCP communications protocol.

Serial port setup

Interface: 485

Baud rate: 19200

Data bits: 8

Parity: None

Stop bits: 1

**2.2.4.- Configuration of the setup password**

Password can be activated to enable the edition password. In case of use, the access user is "admin" and the setup password introduced.

Security setup

Password: On Off

New password:

Repeat password:

**2.2.5.- Device information**

The lower part of the screen shows the firmware version and the machine address of the device (the same address as that shown on the permanent side label).

Information

Version: 1.0

MAC: 00:26:45:00:00:01

**2.2.6.- Save changes**

Once any change has been made to the aforementioned sections, the information must be saved using the "Save Setup" option. If you wish to return to the default configuration, select "Load default setup".

Save setup Load default setup

**2.3.- Configuration of network protocols**

**2.3.1.- TCP Protocol**

In the protocol stack TCP/IP, TCP is the intermediate layer between the Internet protocol (IP) and the application. In general, applications need reliable communications. The IP layer offers an unreliable datagram service (no confirmation), so the TCP adds the functions required to offer a secure, error-free and zero loss service for the communications between two systems.

Protocol setup

Protocol: TCP

Port: 10001

Packing timeout: 10

- **Protocol:** TCP Mode
- **Port:** Destination TCP Port Lumber  
*\*In any case you can configure the port 80, so is the web configuration part*
- **Packing timeout:** maximum waiting time

**2.3.2.- UDP Protocol**

The User Datagram Protocol (UDP) is a message-oriented minimum transport level protocol that has been documented in the RFC 768 of the IETF.

In the Internet protocol family, UDP provides a simple interface between the network layer and the application layer. UDP does not offer guarantees during the delivery of its messages and the UDP origin does not withhold the states of UDP messages sent to the network. UDP only adds the multiplexing functionality to the application and the verification sum of the header and useful load. Any type of guarantees for the transmission of information must be implemented in higher layers.

Protocol setup

Protocol: UDP

Port: 10001

Packing timeout: 10

- **Protocol:** UDP Mode
- **Port:** Destination UDP Port Lumber  
*\*In any case you can configure the port 80, so is the web configuration part*
- **Packing timeout:** maximum waiting time

**2.3.3.- Modbus/TCP Protocol**

Modbus/TCP is a variation or extension of the Modbus® protocol, which enables it to be used on the TCP/IP transport layer. Therefore, Modbus/TCP can be used throughout the Local Area Network or the Internet. This was one of the objectives that motivated its development (the specification of the protocol was submitted to the IETF (Internet Engineering Task Force)).

**Protocol setup**

Protocol: ModbusTCP

Port: 502

RTU timeout: 500

TX delay: 30

- **Protocol:** Modbus/TCP Mode
- **Port:** Fixed port number 502
- **RTU timeout:** maximum bus waiting time
- **TX delay:** additional delay on serial RS bus

**2.3.4.- Modbus Protocol/TCP Bridges (routing)**

The purpose of this work mode is to implement RS-485 or RS-232 networks over existing Ethernet network infrastructures, either Local Area Networks or remote networks.

In the Modbus/TCP Bridges mode the unit performs a constant supervision of the Modbus RTU frames received through the serial port of the **TCP2RS+**, and its function is to address the frames in accordance with the features programmed in the unit's configuration web menu.

To do so, the master **TCP2RS+** must be configured with the Modbus Protocol/TCP Bridges, as shown in Figure 2. Its purpose is to address the frames received through the RS port, depending on the node number and destination IP at which the Modbus sentence is sent.

The paths must be loaded into the device before performing the addressing operations.

The slave **TCP2RS+** device(s) must be configured with the standard procedure in the Modbus/TCP protocol, with the serial port communications parameters and in accordance with the equipment that is physically connected to the RS-232 or RS-485

communications bus (speed, parity, data bits and stop bit).

**2.3.4.1.- Loading path to the master equipment**

In the case of RS-232 or RS-485 topologies over Ethernet networks, the paths being addressed must be loaded to the master, according the Modbus@ node number.

**Protocol setup**

Protocol: ModbusTCP bridges

Addresses	Local	Remote	Host	Port
1		172.16.4.160		502
2		172.16.4.160		502
3		172.16.4.161		502
4		172.16.4.161		502

Buttons: Remove, Add

List of routes

**TCP2RS+** can be used to address the node numbers. In some cases, the slave equipment located in different Ethernet networks and connected to different **TCP2RS+** can have a peripheral number parameterised that is the same as other devices in other IP networks.

To make sure that the user does not have to change the node numbers, **TCP2RS+** can convert the node number in the Modbus frame, replacing the local node number issued by the communications master number with the real node that the equipment has available.

In the **List of routes**, in the example of the Local node No. 3, how the master sends the Modbus command for node 03 and **TCP2RS+** replaces node

03 with node 01 in the Modbus/TCP frame, sending the Modbus command to the slave **TCP2RS+** converter with 172.16.4.161. Even when there is a different node number that is identical to that of bus IP 172.16.4.160 (first path position), **TCP2RS+** routes the information in accordance with the node number and Ethernet address (IP) previously loaded to the device.

- **Local Address:** Local node in the master
- **Remote Address:** Real node in the slave
- **Host:** IP of the destination or slave **TCP2RS+**
- **Port:** IP Port of the destination connection (502)

**2.3.4.2.- Parameterisation of IP connection ports**

Modbus/TCP works in the fixed mode with TCP port number 502. For this reason, there may be a problem when working in remote mode, with installations where the connection is established through a router, in which various communication buses may operate in parallel to slave **TCP2RS+**.

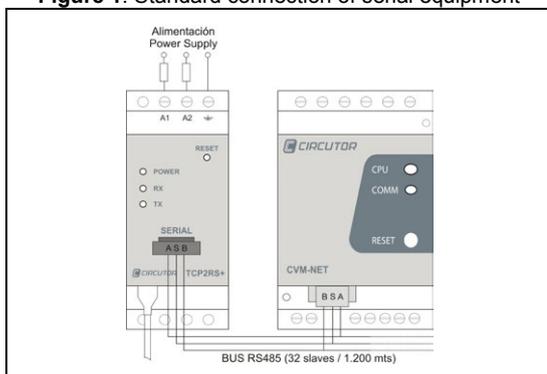
In the Modbus Bridges mode, **TCP2RS+** allows the random parameterisation of the connection TCP port, receiving the prior configurations on the router connecting to the Internet. It is worth noting that, in this mode, the routing functions would be carried out by the connection router first, and then by the configuration of the internal web menu of the device (path load).

**3.- TECHNICAL SPECIFICATIONS**

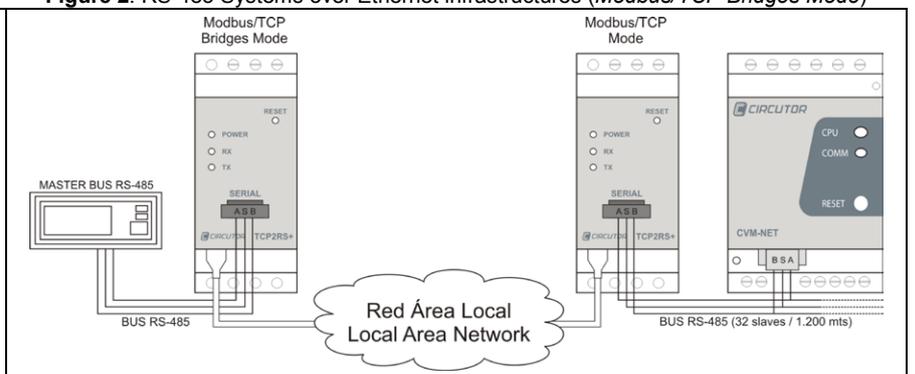
<p><b>Power circuit:</b></p> <ul style="list-style-type: none"> <li>- Single-phase (A1 – A2) :</li> <li>- Earth connection terminal:</li> <li>- Frequency:</li> <li>- Maximum consumption:</li> <li>- Working temperature:</li> <li>- Humidity (no condensation) :</li> </ul>	<p>85...264 V<sub>ac</sub> / 120...300 V<sub>dc</sub></p> <p>47...63 Hz</p> <p>4.6...7.5 VA</p> <p>-10...+60 °C</p> <p>5...95%</p>	<p><b>LED symbols:</b></p> <ul style="list-style-type: none"> <li>- Flashing power LED</li> <li>- Flashing RX</li> <li>- Flashing TX</li> <li>- Full/Half (left in RJ45)</li> <li>- 10 M/100 M (right in RJ45)</li> </ul>	<p>Powered unit and CPU activity</p> <p>Activity in the receipt of RS-485 / RS-232 frames</p> <p>Activity in the output of RS-485 / RS-232 frames</p> <p>Green: Full Duplex connection / Yellow: Half Duplex</p> <p>Green: Speed 100 Mbps / Yellow: 10 Mbps</p>
<p><b>Mechanical features:</b></p> <ul style="list-style-type: none"> <li>- Case material:</li> <li>- Equipment protection degree:</li> <li>- Dimensions (mm):</li> <li>- Weight:</li> <li>- Maximum operating height:</li> </ul>	<p>UL94 - V0 self-extinguishing plastic</p> <p>IP 20</p> <p>35.4 x 73 x 84.68 mm (2 modules)</p> <p>120 g</p> <p>2,000 m</p>	<p><b>Standards:</b></p> <p>IEC 60664, VDE 0110, UL 94, EN61010-1, EN55011, EN 61000-4-2, EN 61000-4-3, 61000-4-11, EN 61000-6-4, EN 61000-6-2, EN 61000-6-1, EN 61000-6-3, EN 61000-4-5, CE</p>	
<p><b>Network interface:</b></p> <ul style="list-style-type: none"> <li>- Type:</li> <li>- Connector:</li> <li>- Network Protocols - Accesses:</li> </ul>	<p>Ethernet 10BaseT / 100BaseTX self-detectable</p> <p>RJ45</p> <p>TCP / UDP / Modbus/TCP - HTTP</p>	<p><b>Safety:</b></p> <p>Installation category Category III / EN61010 double-insulated electric shock protection class II. The equipment must be connected to a power circuit protected with type gI fuses, in compliance with IEC 269, or type M, with values from 0.5 to 1A. It must be fitted with a circuit breaker switch or an equivalent device, in order to be able to disconnect the equipment from the power supply grid. The minimum section of the power supply cable shall be of 1 mm<sup>2</sup>.</p> <p>If the equipment is not used according to the manufacturer's specifications, the protection provided by the equipment may be compromised.</p>	
<p><b>Serial interface:</b></p> <ul style="list-style-type: none"> <li>- Type:</li> <li>- Transmission speed (configurable):</li> <li>- Data bits:</li> <li>- Parity:</li> <li>- Stop bit</li> </ul>	<p>RS-485 / RS-232 three wires (A/S/B) (RX/GND/TX)</p> <p>4800, 9600, 19200, 34800, 57600, 115200 bps</p> <p>7, 8</p> <p>No parity, odd, even</p> <p>1 or 2</p>		

**4.- CONNECTIONS**

**Figure 1.** Standard connection of serial equipment



**Figure 2.** RS-485 Systems over Ethernet infrastructures (Modbus/TCP Bridges Mode)



**5.- TECHNICAL SERVICE**

If you have any doubts about the operation of the unit or suspect any malfunction, contact our service staff at CIRCUTOR, SA

**CIRCUTOR, SA - Technical Assistance**

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