

THERMOCOUPLE ACQUISITION MODULE

RME1-TC



SCIGATE AUTOMATION (S) PTE LTD

No.1 Bukit Batok Street 22 #01-01 Singapore 659592

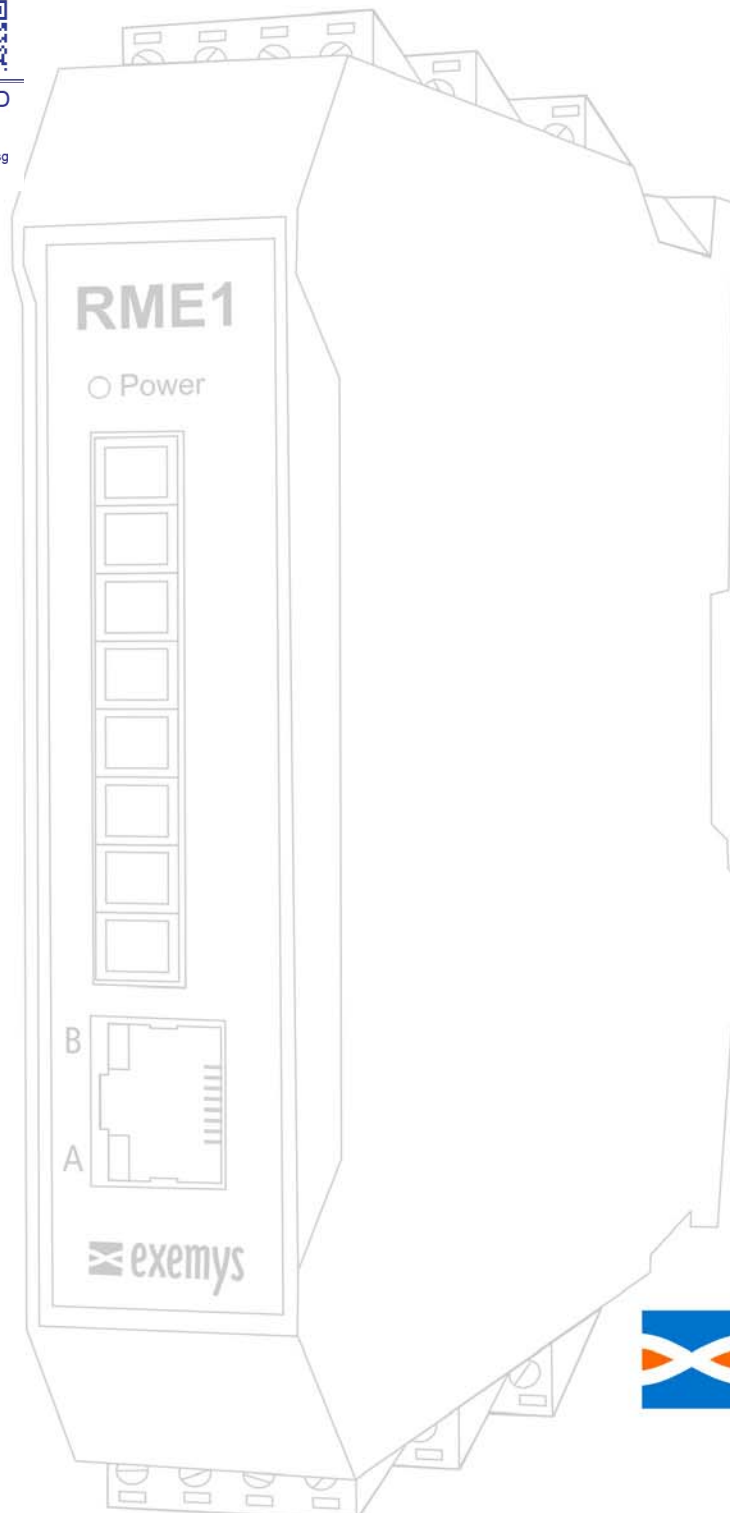
Tel: (65) 6561 0488

Fax: (65) 6562 0588

Email: sales@scigate.com.sg

Web: www.scigate.com.sg

Business Hours: Monday - Friday 8.30am - 6.15pm



ISO 9001:2000 Management System



Exemys Products are in constant evolution to meet our customers' needs. For that reason, specifications and capabilities are subject to change without previous notice.

Updated information can be found at www.exemys.com

Copyright © Exemys, 2007. All rights reserved

Rev. 1.0

Index

INTRODUCTION	6
1.1 About this manual	6
1.1.1 Purpose of this manual	6
1.1.2 Conventions, terms and acronyms	6
1.2 Product General Description	7
1.3 RME1-TC models codification	7
INSTALLATION	9
2.1 Connectors general diagram	9
2.2 Power connection	9
2.3 RS-232 serial port connection (only for configuration)	10
2.4 Ethernet connection	11
2.4.1 Hub or Switch connection	12
2.5 Analog inputs description	12
2.6 Indicator Leds	13
CONFIGURATION	15
3.1 Basic ethernet configuration	15
3.2 Device parameters configuration	18
3.2.1 Network configuration	19
3.2.2 Analog inputs configuration	20
3.2.3 Alarms configuration	20
3.2.4 Monitor	21
3.2.5 Advanced configuration	22
OPERATION	23
4.1 TCP Modbus operation	23
4.2 CVS/XML mode operation	24
4.2.1 CSV	24
4.2.2 XML mode operation	25
4.3 SNMP mode operation	27
4.3.1 Introduction	27
4.3.2 MIB	28
4.3.3 SNMP tree description	28
4.3.4 SNMP traps	28

4.4 Web page operation mode (HTTP)	29
A MOUNTING OF THE DEVICE ON DIN RAIL	31
B. ORIGINAL MANUFACTURER'S CONFIGURATION	33
C. TECHNICAL SPECIFICATIONS	34
D. CONFIGURATION CONSOLE	35
D.1 Configuration command console (Serial and TELNET)	35
D.2. Commands	36
D.2.1 Password Command	36
D.2.2 Host name Command	36
D.2.3 NetConfig Command	36
D.2.4. FACTRESET Command	37
D.2.5. Reset Command	37
D.2.6 AINPUT Command	37
D.2.7 ALIST Command	37
D.2.8 AALARM Command	38
D.2.9. ANAME Command	38
D.2.10. SNMPENABLE command	38
D.2.11. SNMPTRASPENABLE command	38
D.2.12 SNMPMANAGER1 command	39
D.2.13 SNMPMANAGER2 command	39
D.2.14. SNMPREADCN command	39
D.2.15. SNMPWRITECN command	39
D.2.16. SNMPTRAPCN command	39
D.2.17. Other Configuration commands	40
E. ARP METHOD TO CONFIGURE IP ADDRESS	42

Figures

Figure 1 - Usage general diagram	7
Figure 2 - Models codification details	8
Figure 3 - Connectors general diagram	9
Figure 4 - Power connection diagram	10
Figure 5 - Serial and Ethernet connectors position	10
Figure 6 - Serial RS-232 terminal detail	11
Figure 7 - Serial cable for configuration serial terminal	11
Figure 8 - Straight-through cable scheme	12
Figure 9 - RJ45 connector	12
Figure 10 - RME1-TC analog inputs in each channel arrangement	13
Figure 11 - A thermocouple connection	13
Figure 12 - Leds indicators	14
Figure 13 - Exemys device locator	16
Figure 15 - Enter the IP address in the Web browser.	18
Figure 16 - Enter the Host name in the Web browser	19
Figure 17 - Net configuration	20

Figure 18 - Inputs configuration	20
Figure 19 - Alarms configuration	21
Figure 20 - User's monitor configuration	21
Figure 21 - Advanced options	22
Figure 22 - Csv analog example	25
Figure 23 - SNMP configuration	27
Figure 24 - Administrator's monitor	29
Figure 25 - User's monitor	30
Figure 26 - Net configuration	30
Figure 27 - Device assembly	31
Figure 28 - Device Disassembly	32

Tables

Table 1 - Acronyms	6
Table 2 - Terms	7
Table 3 - Conventions	7
Table 4 - Indicator Leds	14
Table 5 - ModBus Registers	24
Table 6 - OID Values	28
Table 7 - SNMP Traps	29
Table 8 - Original manufacturer's configuration	33
Table 9 - PASSWORD command	36
Table 10 - Host name Command	36
Table 11 - NETCONFIG Command	37
Table 12 - FACTRESET Command	37
Table 13 - Reset Command	37
Table 14 - AINPUT command	37
Table 15 - ALIST command	38
Table 16 - AALARM command	38
Table 17 - ANAME Command	38
Table 18 - SNMPENABLE command	38
Table 19 - SNMPTRAPSENABLE command	38
Table 20 - SNMPPMANAGER1 command	39
Table 21 - SNMPPMANAGER2 command	39
Table 22 - SNMPREADCN command	39
Table 23 - SNMPWRITECN command	39
Table 24 - SNMPTRAPCN command	40
Table 25 - Other Commands	40
Table 26 - Telnet commands	41

Chapter 1

Introduction

2.1 About this manual

2.1.1 Purpose of this manual

The purpose of this manual is to provide instructions to install and operate the Thermocouple Acquisition Module RME1-TC in a quick and easy way.

The manual starts with a general description of the product followed by instructions to install its hardware correctly. Further on the RME1-TC configuration and operation are provided in detail.

2.1.2 Conventions, terms and acronyms

The acronyms used in this manual are listed below in table 1

Table 1 - Acronyms

Acronym	Description
ARP	Address Resolution Protocol
Bps	Bits per second
HTTP	HyperText transfer Protocol
IP	Internet Protocol
LAN	Local Area Network
NBNS	NetBios Name Server
PC	Personal Computer
UDP	User Datagram Protocol
TCP	Transmission Control Protocol
DHCP	Dynamic Host Configuration Protocol
GND	Ground (Reference)
CSV	Comma Separated Value
XML	Extensible Markup Language
SNMP	Simple Network Management Protocol

Table 2 - Terms

Terms	Description
IP Address	Logical address in a device within a network
NetMask	Defines which part of the IP Address belongs to the subnet.
Gateway Host	Output of a network towards others. Name of the equipment to identify NBNS

The conventions listed below are used in this manual

Table 3 - Conventions

Conventions	Description
A B C	A set of possible values for command parameters. You can type A, B or C.
n . . m	A range of possible values. You can type any value in the range including n and m.
aaa.bbb.ccc.ddd	An IP address.

2.2 Product General Description

The RME1-TC is a complete interface for your thermocouples. It allows monitoring and supervising in a remote way up to 8 thermocouples.

The information can be read by any of the four RME1-TC work modes.

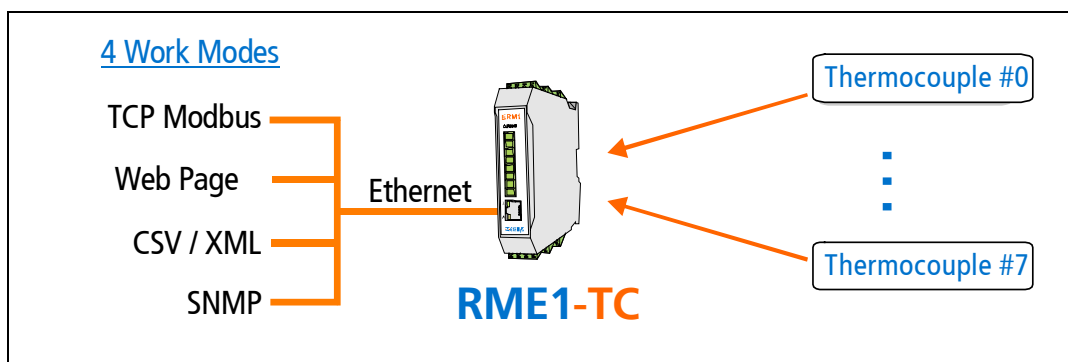


Figure 1 - Usage general diagram

2.3 RME1-TC models codification

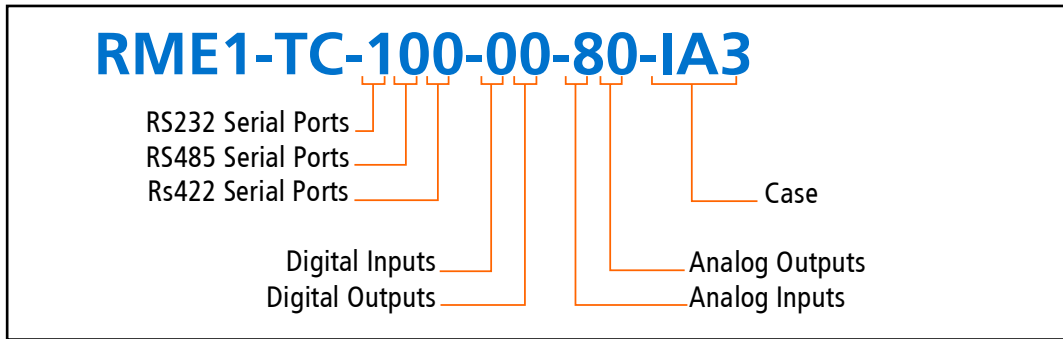


Figure 2 - Models codification details

Chapter 2

INSTALLATION

2.1 Connectors general diagram

On the device frontal connector there can be found the power input terminals as well as the terminals of the different communication ports.

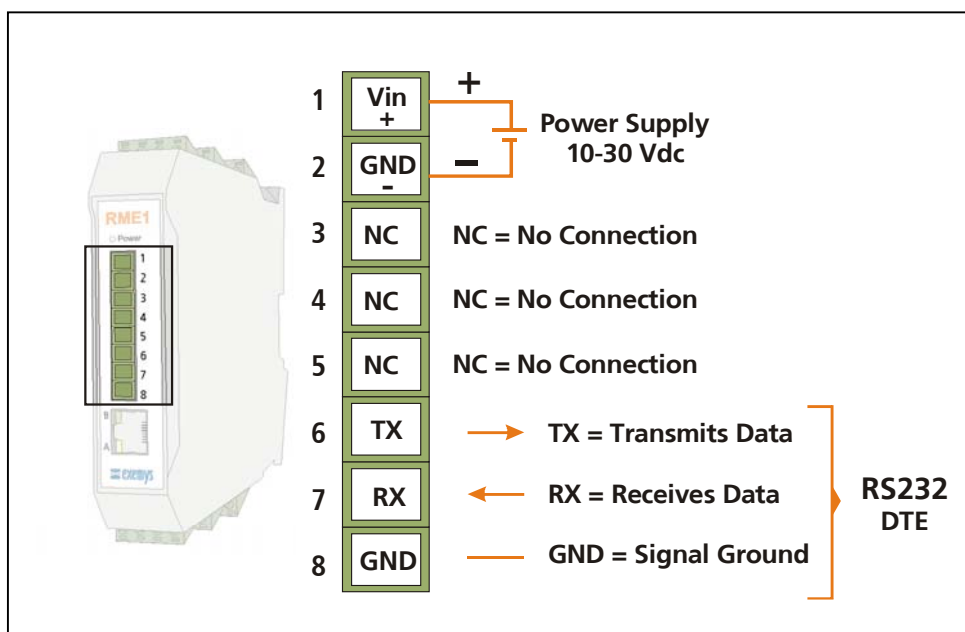


Figure 3 - Connectors general diagram

2.2 Power connection

Picture 4 shows the power input connection. It is found in the first two terminals called **Vin (+)** and **GND (-)**. The RME1-TC power connection has polarity and it accepts the range of 10 to 30 Vdc.

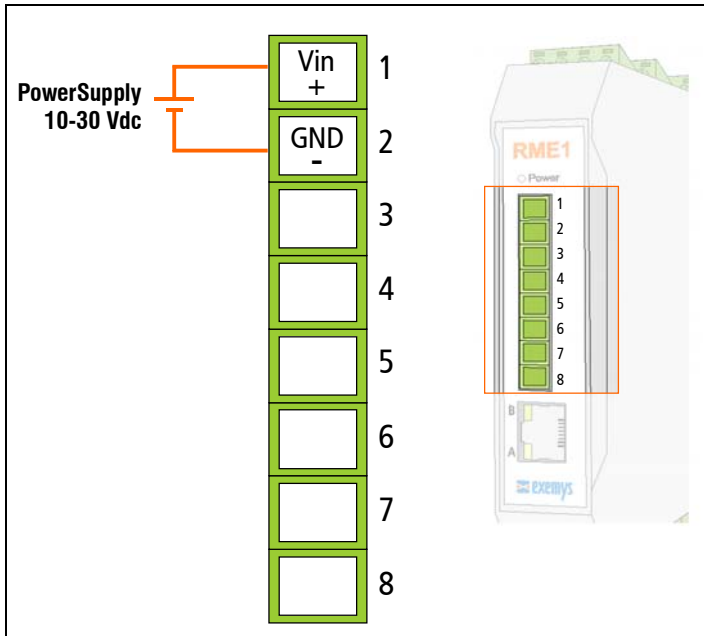


Figure 4 - Power connection diagram

2.3 RS-232 serial port connection (only for configuration)

The RME1-TC has one configuration serial port whose connection terminals are shown in the picture below. The configuration serial port is available for all the RME1-TC models. The same picture also shows where the Ethernet connector is placed.

Note: The configuration method through serial port is an alternative. The suggested method is through the configuration WEB page.

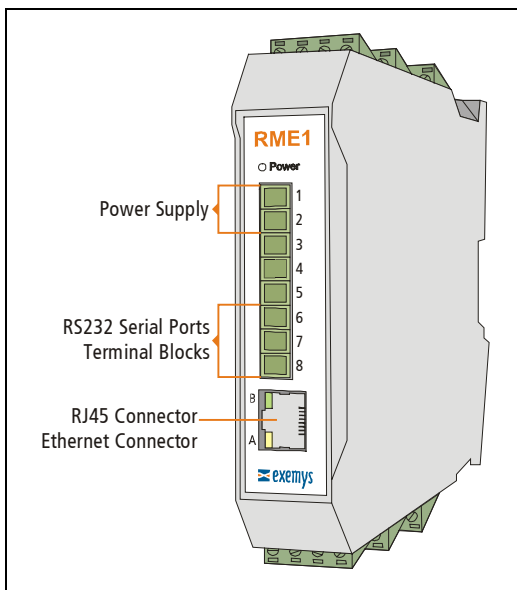


Figure 5 - Serial and Ethernet connectors position

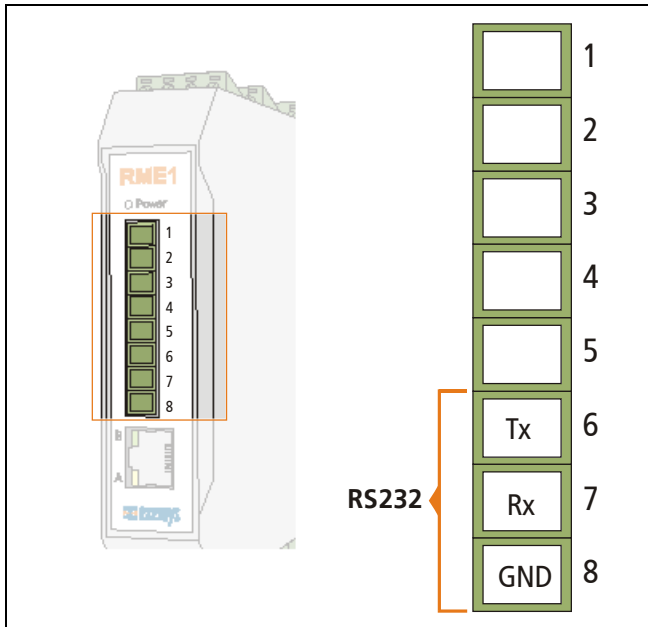


Figure 6 - Serial RS-232 terminal detail

For configuration, a connection cable can be used as it is shown in picture 7

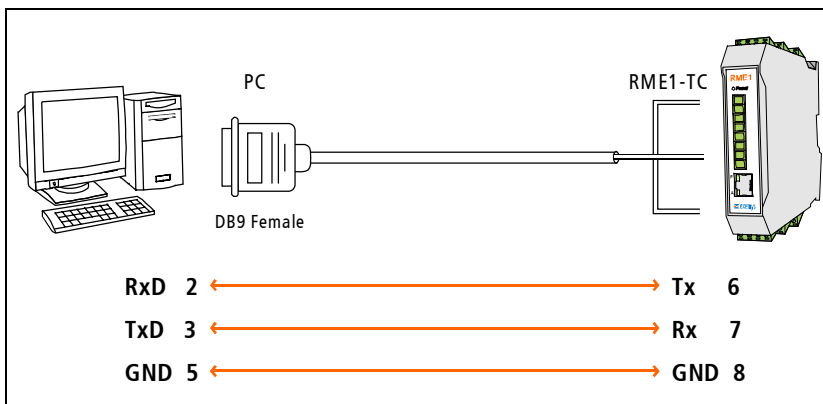


Figure 7 - Serial cable for configuration serial terminal

2.4 Ethernet connection

The RJ45 connector is for Ethernet connection. This connection is essential for the RME1-TC to work.

2.4.1 Hub or Switch connection

To connect the RME1-TC to Ethernet through a Hub or Switch, it is necessary to use a straight-through UTP network cable.

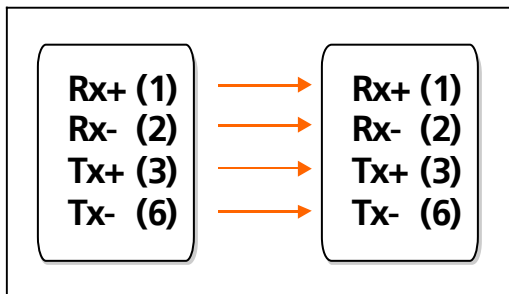


Figure 8 - Straight-through cable scheme

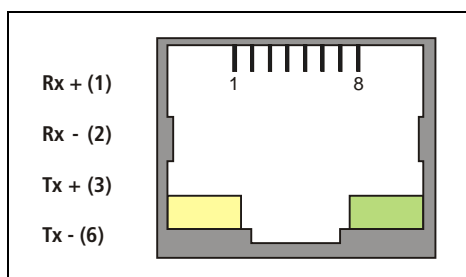


Figure 9 - RJ45 connector

2.5 Analog inputs description

In Figure 10 it can be seen where the RME1-TC analog terminals are placed. The inputs are in columns on both sides of the device

The inputs start numbering from 0. So that the first channel is **CH0**. The same way, each terminal is numbered for its function and the channel it belongs to. So, the RME1-TC first terminal in Channel 0 is called (PTO-), meaning: negative terminal of the thermocouple.

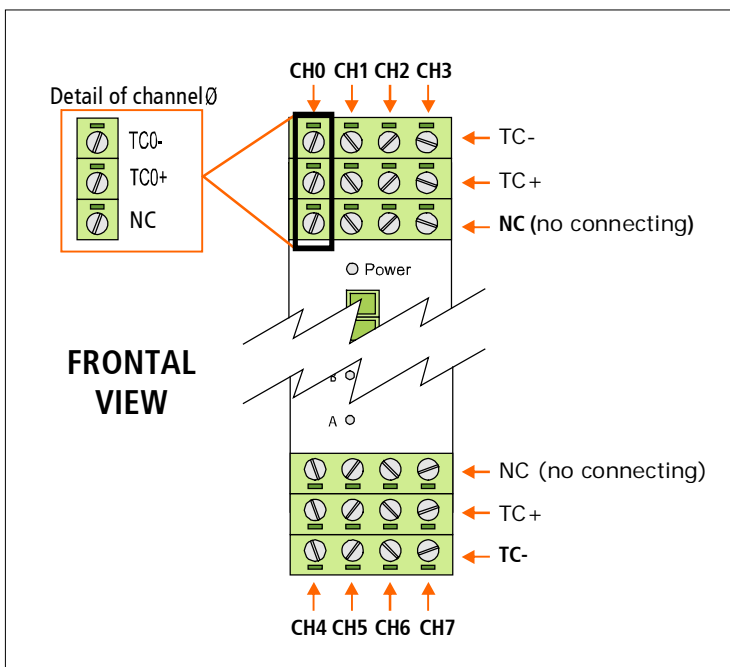


Figure 10 - RME1-TC analog inputs in each channel arrangement

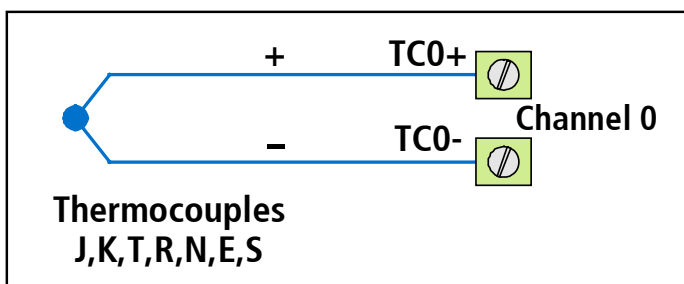


Figure 11 - A thermocouple connection

2.6 Indicator Leds

The RME1-TC has three luminous indicators (leds)

- The Power led indicates that the device is turned on
- The yellow led shows the Ethernet interface status
- The green led indicates Modbus TCP status

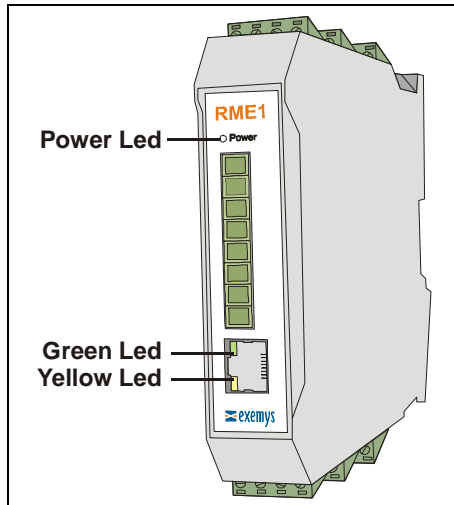


Figure 12 - Leds indicators

Table 4 - Indicator Leds

Yellow Led	Green Led	Description
It is steady on	Do not care	RME1-TC is searching for a DHCP server in the network.
It is ½ second on and ½ second off.	Do not care	RME1-TC is starting. During this period the equipment may be set in serial configuration mood.
It blinks like a beacon, 90% of a second off and the remaining 10% on.	Do not care	RME1-TC has an IP address and a carrier (link) on the connection. This is the normal operation status.
It is 90% of a second on and the remaining 10% off.	Do not care	RME1-TC has no IP address and cannot find a DHCP server. It will search the DHCP server at 60 seconds interval.
It blinks very fast.	Do not care	Absence of Ethernet carrier.
Do not care	It is steady on and it turns off for short periods of time.	RME1-TC has detected a Modbus TCP connection.
It flashes alternately with green led	It flashes alternately with yellow led	Critical failure. (contact technical support at support@exemys.com)

Chapter 3

Configuration

3.1 Basic ethernet configuration

The first step to be taken is the network parameters configuration by any of the following methods:

- a) DHCP (AUTOMATIC CONFIGURATION)
- b) Exemys Device Locator (Best recommended method)
- c) Serial Port
- d) ARP Method

a) IP address configuration with DHCP

The RME1-TC default configuration is IP 0.0.0.0, so when turned on, it will search a DHCP server. RME1-TC tries to negotiate an IP address with the DHCP server for a maximum period of 10 seconds. If the DHCP fails to answer in that period, the RME1-TC will show an error code by means of its indicator LEDs (See Table 4) and will try to establish connection with the DHCP server 60 seconds later. This process will be repeated indefinitely until a DHCP server assigns an IP address to RME1-TC or until the user assigns a static IP address.

a) IP address configuration with Exemys Device Locator (EDL)

The Exemys Device Locator Application Program is intended to be used for the basic configuration of any Exemys device over your ethernet network. It allows searching, identifying and configuring the basic network parameters.

This simple application program is distributed with any Exemys product in the accompanying CD. You can also download the latest version of this program from the Exemys Web Site (www.exemys.com).

The Device Locator application must be run from any PC within the network where the Exemys devices to be configured are installed.

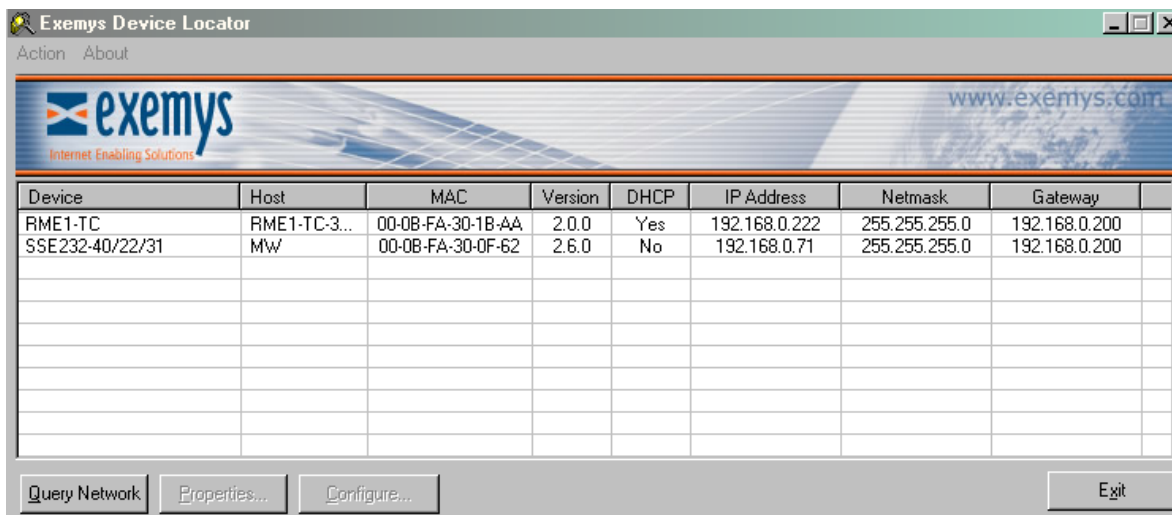


Figure 13 - Exemys device locator

- **DEVICE:** Name of the device, such as RME1-TC or SSE232-ST
- **MAC ADDRESS:** Hardware Ethernet Address of the device.
- **VERSION:** Firmware version running in that device
- **PASSWORD**
- **HOST:** Name of the equipment of NBNS identification
- **DHCP:** If the CheckBox is activated, the device net parameters will be obtained from a DHCP server.
- **IP:** IP address configured in the device.
- **NETMASK:** Subnet mask configured in the device
- **GATEWAY:** Output from a net to others.

**IMPORTANT****IMPORTANT:**

It is not necessary for the device to be properly configured. If the device is correctly connected and working, it will be found by the Device Locator Application Program.

To refresh the grid, click on the "Query Network" button. This action will make the device Locator search any Exemys device in the network again.
You can change any of these basic network parameters within the Device Locator program.

To configure any Exemys device found by the Device Locator:

- Select the device in the grid and click on the "Properties" button, or open the "Actions" menu and select the "Properties" command. You will see the Properties dialog box.
- All Exemys devices provide a Remote Configuration Password. This password is used by the Web configuration page and remote command Console in the device.

- If the device has a configured password, enter the password in the Device Password box. The manufacturer's box has a blank.

Figure 14 - Device locator

- You can type an IP address, Netmask and Gateway IP Address or you can click on the "Use DHCP" check box to make the device search a DHCP Server. The RME1-TC has been manufactured with the DHCP feature activated.
- You can give the device a personal name within the field "Host Name" or you can leave the one predetermined when manufactured.
- Click on the OK button for the Device Locator send this information to the device.
- If the password is not correct, you will see the message "Error when changing the configuration". Check the equipment to be

configured password. The device will not answer any message sent by the Device Locator during the first five seconds after an incorrect password. This is to avoid any brute force method to change the network parameters of the device.

- If the device does not respond, the Device Locator will show a "No Response from Device" message. Make sure the device is turned on and connected to the ethernet network.
- The Exemys device will reset so the changes in the configuration take effect.
- If no change is necessary, click on the "Close" button to close the Properties dialog box.
- After a few seconds the device being reset will answer again to the requests of the Device Locator software. Click on the "Query network" button to refresh the grid and make sure the parameters were changed.

c) IP address configuration with serial port

Connecting the serial port of the PC to the serial port of the device, as it was shown in Picture 7, you can use an utilitarian software such as the Hyperterminal (Microsoft Windows®) to be connected with the equipment and modify all its parameters. Once the port is opened with the serial 9600,8,N,1 parameters configuration, the RME1-TC must turn on and type "cfg" with the Hyperterminal before 7 seconds have elapsed from the moment it is turned on. You will get access of the configuration through serial port and will see :

RME1-TC - Exemys :

It is important to mention that this way not only the net parameters can be modified but also all the equipment parameters can be reached. For further information consult Appendix D.

d) IP address configuration with ARP method

If the RME1-TC receives ICMP packets after being turned on, it will take the destination IP of these packets and this will start being the device IP address. For further information see appendix E.

3.2 Device parameters configuration

Configuration parameters can be modified by three different ways:

- Web page configuration
- Telnet console configuration (See Appendix D)
- Serial console configuration (See Appendix D)

Once the RME1-TC has a valid IP address you may access the web page to configure the rest of the parameters.

1. If your web navigator is configured to search for a Proxy server, disable that option.
2. If you have the Exemys Device Locator software, select the device and press the button "Configure".
3. Type the RME1-TC IP address field of your navigator.

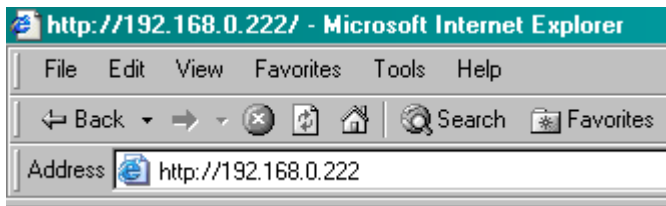


Figure 15 - Enter the IP address in the Web browser.

4. In your web browser you will see the inputs value and a link to configure the device.
5. If you click on the link the RME1-TC will ask for the password to enter the page. Type "admin" as user name and then the password to enter. The RME1-TC defaults have no password, so that the device will not ask for it unless the user enables it.

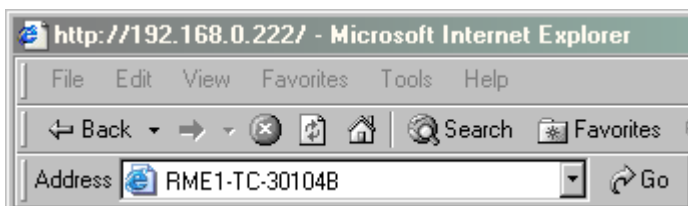


Figure 16 - Enter the Host name in the Web browser

As it is shown in the figure above, the name of the analog module in the manufacturer's configuration is NBNS: RME1-TC (last digits from Mac address) , and this name can be changed using the Exemys Device Locator by means of the Host name parameter, in properties. For example, if the Mac address of the device is 00:0B:FA:30:10:4B, The name in the manufacturer's configuration will be RME1-TC- 30104B
There is no need for the device to be correctly configured. If the device is connected and works well, you will be able to get access by means of a web browser using NBNS as its name

NOTE:

In several sections of the web interface, the RME1-TC has a help symbol  . If you click on it, you will get a help window for the configuration section you are.

3.2.1 Network configuration

Network parameters can be configured by all the methods already mentioned but it can be done through the WEB interface too.

It is important to make it clear that the name of the device is useful for two tasks. One of them is to identify each device in the Exemys Device Locator, when a searching is in progress. The other is to use the name of the device instead of its IP address (NBNS protocol)

The NBNS (NetBios Name Server) allows the user, in case of ignoring or simply not remembering the module IP address, search it literally through the name in the LAN net from a web browser.

Figure 17 - Net configuration

3.2.2 Analog inputs configuration

- Type of thermocouple: It allows the selection of the kind of thermocouple connected to an input.

Input #	Type
0	TC-K
1	TC-K
2	TC-K
3	TC-K
4	TC-K
5	TC-K
6	TC-K
7	TC-K

Figure 18 - Inputs configuration

3.2.3 Alarms configuration

The RME1-tc has two alarms for each input, a low one and a high one. You will be able to enable, disable and modify the set point for each one.



IMPORTANT

IMPORTANT: Alarms are taken upon temperature values multiplied by 10

Input	Low level enable	Low level value [°Cx10]	High level enable	High level value [°Cx10]
0	<input type="checkbox"/>	0	<input type="checkbox"/>	5000
1	<input type="checkbox"/>	0	<input type="checkbox"/>	5000
2	<input type="checkbox"/>	0	<input type="checkbox"/>	5000
3	<input type="checkbox"/>	0	<input type="checkbox"/>	5000
4	<input type="checkbox"/>	0	<input type="checkbox"/>	5000
5	<input type="checkbox"/>	0	<input type="checkbox"/>	5000
6	<input type="checkbox"/>	0	<input type="checkbox"/>	5000
7	<input type="checkbox"/>	0	<input type="checkbox"/>	5000

Figure 19 - Alarms configuration

3.2.4 Monitor

In the monitor web page you can configure the user's monitor page.

This configuration consists in selecting the inputs you want to visualize and the name you want to assign to each input.

Input	Name	Visualize
0	Input 0	YES
1	Input 1	YES
2	Input 2	YES
3	Input 3	YES
4	Input 4	YES
5	Input 5	YES
6	Input 6	YES
7	Input 7	YES

Figure 20 - User's monitor configuration

**IMPORTANT****IMPORTANT:**

Each name can be formed for up to 16 characters.

3.2.5 Advanced configuration

Among the possible advanced configurations you can find:

- Change password: It allows changing manufacturer's default password for another one

Note: The name of the user must be "admin"

- Set the device: It can be used to reset the device in the same way it can be done by cutting the power.
- Set device to factory default: It allows to change all configuration parameters to manufacturer's default. Be careful. See values in Appendix B.
- Modbus exceptions: Enable or disable Modbus exceptions.
-

The screenshot shows the 'Advanced Configuration' page of the RME1-TC Temperature Module web interface. The browser window title is 'Temperature Module - Microsoft Internet Explorer'. The address bar shows 'http://192.168.0.222/index.html'. The page has a sidebar with the 'exemys' logo and navigation links: Configuration, NETWORK, INPUTS, ALARMS, MONITOR, SNMP, and ADVANCED. Under 'Configuration', there are links for Monitor, Administrator, and User. The main content area is titled 'Advanced Configuration' and contains several sections:

- Password Change:** Fields for 'New Password' and 'Retype New Password', followed by a 'Change Password' button with a lock icon.
- Reset Options:** Two buttons: 'Reset RME1-AI' and 'Set RME1-AI to Factory Defaults'.
- Modbus Exceptions:** A checkbox labeled 'MODBUS Exceptions' which is checked, with a lock icon.
- Device Information:** A table showing 'MAC Address' as '00:0B:FA:30:1B:AA' and 'Firmware version' as 'V2.0.0'.

Figure 21 - Advanced options

Chapter 4

Operation

Introduction

The RME1-TC has four different work modes. These are:

- Modbus TCP
- CVS /XML
- SNMP
- Web page (HTTP)

4.1 TCP Modbus operation

In the RME1-TC each one of the thermocouple inputs, matches with one Modbus TCP Holding Register. This way , once the communication has been established, data is moved in a transparent way from the PT100 inputs to the corresponding Modbus TCP address.

Registers from 40.017 up to 40.100 and from 40.106 up to 40.200 and from 40.209 to 40.248 are reserved bank of memory.

Registers from 40.001 up to 40.016 are read only and show information about each input status.

Registers from 40.101 up to 40.105 show information about the device (read only).

Registers from 40.201 up to 40.208 and from 40.249 to 40.272 are read/write registers and store the information about the analog inputs configuration.

- Type of thermocouple
- Alarms enable: This device has two alarms for each input and each one can be enabled or disabled
- Low alarm: Value by which a low alarm is activated.
- High alarm: Value by which a high alarm is activated

Table 5 - ModBus Registers

MODBUS TCP Register	Description
40.001 up to 40.008	Temperature value (Inputs value in centigrade degrees multiplied by 10).
40.009 up to 40.016	Status (shows the alarm status of each input) 0: Normal 1: Low alarm 2: High alarm
40.101	Firmware version
40.102	Hardware version
40.103 up to 40.105	Serial number
40.201 up to 40.208	Type of Thermocouple 1= Thermocouple E 2= Thermocouple J 3= Thermocouple K 4= Thermocouple N 5= Thermocouple R 6= Thermocouple S 7= Thermocouple T
40.249 up to 40.256	Alarms enable of each one of the inputs 0: Both alarms disabled 1: Low alarm enabled 2: High alarm enabled 3: Both alarms enabled
40.257 up to 40.264	Low alarm set point variable (value between 32.767 and 32.767)
40.265 up to 40.272	High alarm set point (value between 32.767 and 32.767)

The registers with gray background can be modified with Modbus TCP. All the other are only for reading.

4.2 CVS/XML mode operation

4.2.1 CSV

If you want to make an automatic data acquisition through other query method under HTTP, the RME1-TC has 3 web pages where you can get, in plain text format delimited by commas, its analog inputs status.

The available information in these pages is as follows:

- **temp.csv:** Temperature value in centigrade multiplied by 10.

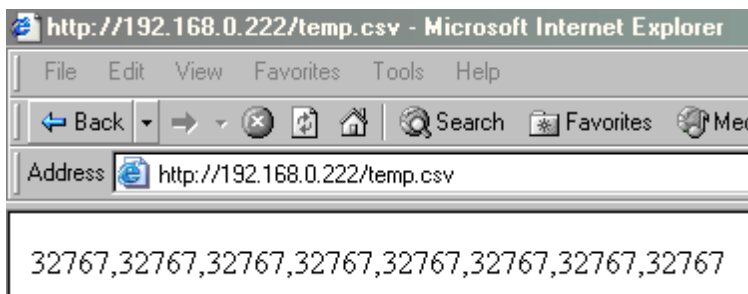


Figure 22 - Csv analog example

In this example the temperature values will be:

- Input 0: 4.2 °C
- Input 1: 9.6 °C
- Input 2: 0.0 °C
- Input 3: 2.4 °C
- Input 4: 4.9 °C
- Input 5: 7.0 °C
- Input 6: 3.9 °C
- Input 7: 16.0 °C

Example:

If you want to visualize the acquired values, from a work sheet (Microsoft Excel®), execute the command "Open File" and in its name write:

http://192.168.0.240/temp.csv (192.168.0.240 is the RME1-TC IP address).

Bear in mind that the information belongs to the inputs value at the moment you opened the file

4.2.2 XML mode operation

To make an automatic information acquisition, the RME1-TC has a web page in which all configuration and status information is available in XML format.

The name of this page is **rme1-tc.xml** (this page is within RME1-PT). Any time you access to this page you can get the following updated information from the analog module

```

<RME1-TC>
  <INFO>
    <FIRMWARE>V1.0.0</FIRMWARE>
    <MACADDRESS>000BFA30104B</MACADDRESS>
  </INFO>
  <NETWORK>
    <IPADDRESS>192.168.0.223</IPADDRESS>
    <NETMASK>255.255.255.0</NETMASK>
    <GATEWAY>192.168.0.200</GATEWAY>
  </NETWORK>
</RME1-TC>

```

```

    <HOSTNAME>RME1-TC-30104B</HOSTNAME>
  </NETWORK>
  = <AINPUTS>
    = <AINPUTSTABLE>
      = <ENTRY-0>
        <NUMBER>0</NUMBER>
        <NAME>Entrada 0</NAME>
        <AVALUE>000.0</AVALUE>
        <ATYPE>TC-K</ATYPE>
        <ALARM>LOW</ALARM>
      </ENTRY-0>
      = <ENTRY-1>
<NUMBER>1</NUMBER>
        <NAME>Entrada 1</NAME>
        <AVALUE>000.0</AVALUE>
        <ATYPE>TC-K</ATYPE>
        <ALARM>LOW</ALARM>
      </ENTRY-1>
      = <ENTRY-2>
        <NUMBER>2</NUMBER>
        <NAME>Entrada 2</NAME>
        <AVALUE>000.0</AVALUE>
        <ATYPE>TC-K</ATYPE>
        <ALARM>LOW</ALARM>
      </ENTRY-2>
      = <ENTRY-3>
        <NUMBER>3</NUMBER>
        <NAME>Entrada 3</NAME>
        <AVALUE>000.0</AVALUE>
        <ATYPE>TC-K</ATYPE>
        <ALARM>LOW</ALARM>
      </ENTRY-3>
      = <ENTRY-4>
        <NUMBER>4</NUMBER>
        <NAME>Entrada 4</NAME>
        <AVALUE>000.0</AVALUE>
        <ATYPE>TC-K</ATYPE>
        <ALARM>LOW</ALARM>
      </ENTRY-4>
      = <ENTRY-5>
        <NUMBER>5</NUMBER>
        <NAME>Entrada 5</NAME>
        <AVALUE>000.0</AVALUE>
        <ATYPE>TC-K</ATYPE>
        <ALARM>LOW</ALARM>
      </ENTRY-5>
      = <ENTRY-6>
        <NUMBER>6</NUMBER>
        <NAME>Entrada 6</NAME>
        <AVALUE>000.0</AVALUE>
        <ATYPE>TC-K</ATYPE>
        <ALARM>LOW</ALARM>
      </ENTRY-6>
      = <ENTRY-7>
        <NUMBER>7</NUMBER>
        <NAME>Entrada 7</NAME>
        <AVALUE>000.0</AVALUE>
        <ATYPE>TC-K</ATYPE>
        <ALARM>LOW</ALARM>
      </ENTRY-7>
    </AINPUTSTABLE>
  </AINPUTS>
</RME1-TC>

```

The RME1-TC also includes the file crossdomain.xml. This is a reading politics file that allows reading the rme1-tc.xml from any domain in Action Script applications.

4.3 SNMP mode operation

4.3.1 Introduction

The RME1-TC supports the SNMP supervision protocol. The RME1-TC works as a SNMP agent, this means that it answers queries under this protocol and it is also able to generate unsolicited messages (Traps) for certain events / alarms notification.

In the configuration web page you can enable or disable this service.

With the SNMP service enabled, it is possible to enable or disable SNMP traps. The RME1-PT allows to configure up to two IP manager addresses (IP addresses where SNMP traps are to be sent) as a security redundancy method, and to configure the communities of read, write and traps.

It has to be clear that if you configure the same IP address in both IP manager address fields, alarms will be doubled.

Parameters "Read community" and "Write community" are passwords to access to the information of the device with read and write permission respectively. Parameter "Trap community" is the password sent with each trap from the device.

Figure 23 - SNMP configuration



IMPORTANT

IMPORTANT

The passwords of the community can be up to 15 characters long.

4.3.2 MIB

The MIB file (Management Information Base) describes the set of objects or parameters of the RME1-TC managed under the SNMP protocol. This file has information about the object type, the access level, etc.

The RME1-TC.MIB file is included within the CD accompanying the device. This file has to be loaded in the SNMP manager console for the correct management of the different objects of the RME1-TC.

4.3.3 SNMP tree description

The following information is a detail of the SNMP tree within the RME1-TC: this is only for descriptive purpose, because all this information is in the rme1-tc.mib file. Fields from Index up to Status form a table with 8 entries, one for each analog input.

Table 6 - OID Values

Variable	OID	Description
sysDescr	1.3.6.1.2.1.1.1 .iso.org.dod.internet.mgmt.mib-2.system.sysDescr	Device's description
sysOID	1.3.6.1.2.1.1.2 .iso.org.dod.internet.mgmt.mib-2.system.sysObjectID	It is the OID that the enterprise gives for this SNMP device.
Indice	1.3.6.1.4.1.18284.1.3.2.1.1.1.1 *.RME1TC.status.aiTable.aiEntry.tcIndex	Input Number (from 0 to 7).
Nombre	1.3.6.1.4.1.18284.1.3.2.1.1.1.2 *.RME1TC.status.aiTable.aiEntry.tcName	Name configured for this input.
Valor de temperatura	1.3.6.1.4.1.18284.1.3.2.1.1.1.3 *.RME1TC.status.aiTable.aiEntry.tcAvalue	Temperature in centigrade degrees multiplied by 10.
Estado	1.3.6.1.4.1.18284.1.3.2.1.1.1.4 *.RME1TC.status.aiTable.aiEntry.alarmstate	Alarm status for this input, it can be low alarm, high alarm or normal.
Dirección Física	1.3.6.1.4.1.18284.1.3.2.2.1 *.RME1TC.info.macAddress	Device's MAC address.
Dirección IP	1.3.6.1.4.1.18284.1.3.2.3.1.1 *.RME1TC.config.net.ipConfigAddress	Device's IP address.
Máscara de Red	1.3.6.1.4.1.18284.1.3.2.3.1.2 *.RME1TC.config.net.ipConfigSubnetMask	Device's subnet mask.
Gateway	1.3.6.1.4.1.18284.1.3.2.3.1.3 *.RME1TC.config.net.ipConfigGateway	Device's Gateway.
Nombre de Host	1.3.6.1.4.1.18284.1.3.2.3.1.4 *.RME1TC.config.net.hostName	Device's Host Name.

Text format OIDs with * begin with:

.iso.org.dod.internet.private.enterprises.exemys.products.analogacq

4.3.4 SNMP traps

When an input temperature value reaches an alarm set point configured for that input, it moves its status from normal to alarm. The RME1-TC notifies this event by sending a SNMP trap to the manager's IP address configured as Manager.

The information sent in each trap is explained in the device's MIB file.
Traps RME1-TC sends are the following:

Table 7 - SNMP Traps

Trap	Description
Cold Start	This trap is sent each time the device is powered.
Warm Start	This trap is sent each time the device does a soft reset
New Alarm , Type 1	This trap is sent when an input moves its status from normal to alarm
End Alarm , Type 2	This trap is sent when an input moves its status from alarm to normal

4.4 Web page operation mode (HTTP)

The RME1-TC web interface allows two different types of monitor. In the administrator's monitor it is possible to visualize the assigned name, the temperature value and the alarm status for each input. This page is protected by password.

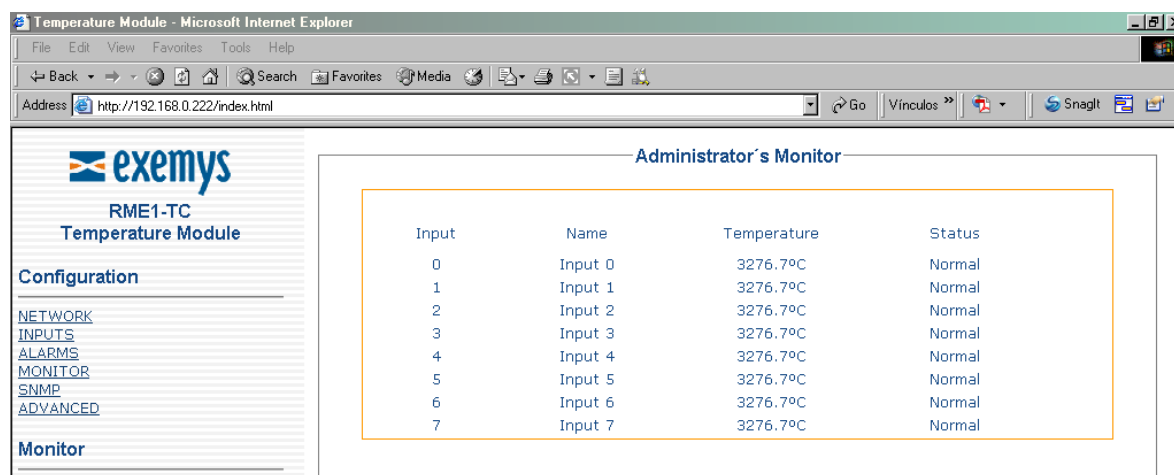


Figure 24 - Administrator's monitor

In the user's monitor it is possible to visualize each input which were configured to be visualized (in the monitor configuration page) with its name, the temperature value, and the alarm status for each one. This page is free access page, it means that it is not password protected.

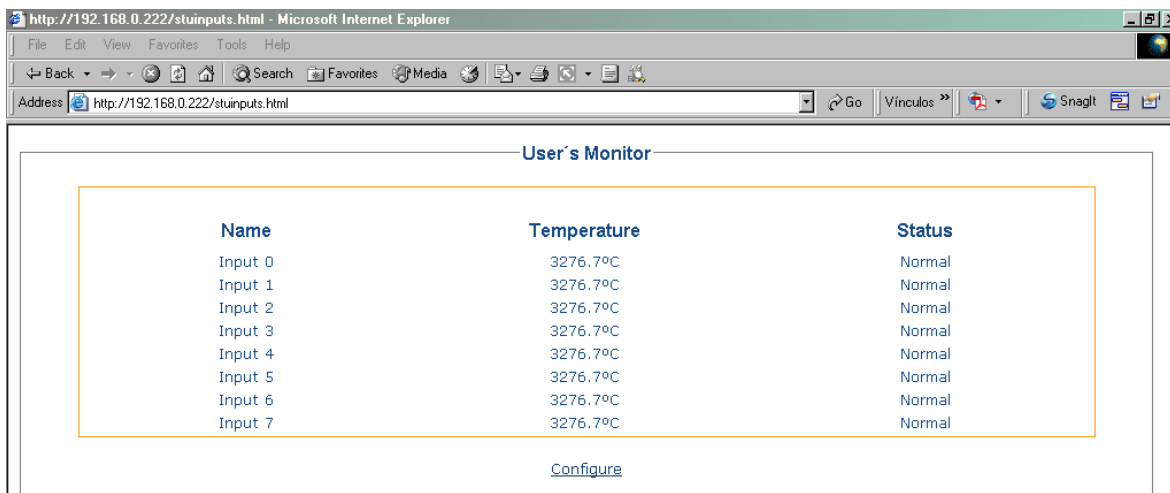


Figure 25 - User's monitor

In the RME1-ATC web interface there are several links available with useful information for the user:

- CSV pages: RME1-TC has 3 csv pages where you can get information about the input status.
- XML page: RME1-TC has one xml page where you can get information about device's configuration and status.
- User's manual: This link goes to the RME1-TC user's manual in the Exemys web site.
- Exemys web site: This link goes to the Exemys web site where you can get updated information for this and other Exemys products.

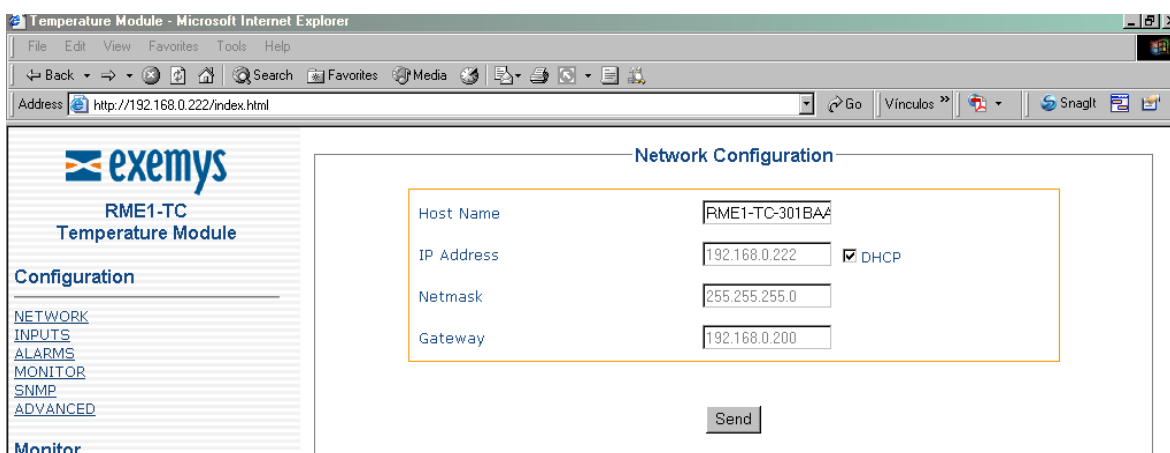


Figure 26 - Net configuration

Appendix A

A Mounting of the device on DIN rail

The RME1-TC can be mounted on a DIN rail.

To fasten the module to this type of rail, orientate the upper part of the device towards the rail, then fit the slot of the **adapter** on the upper edge, such as it is shown in the figure below. Push the RME1-TC firmly until you hear a click at the moment of fastening the module on the DIN rail.

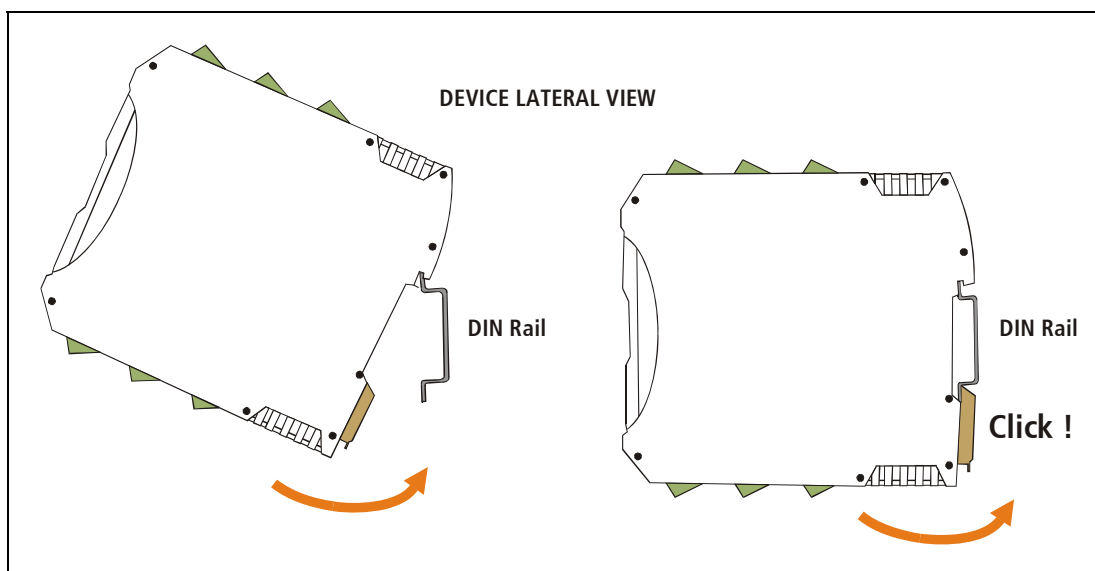


Figure 27 -Device assembly

To disassemble the device from the rail, first take the device terminals off. Then introduce a screwdriver in the RME1-TC DIN connector lower clasp and push the connector downwards until the module can be removed from the rail.

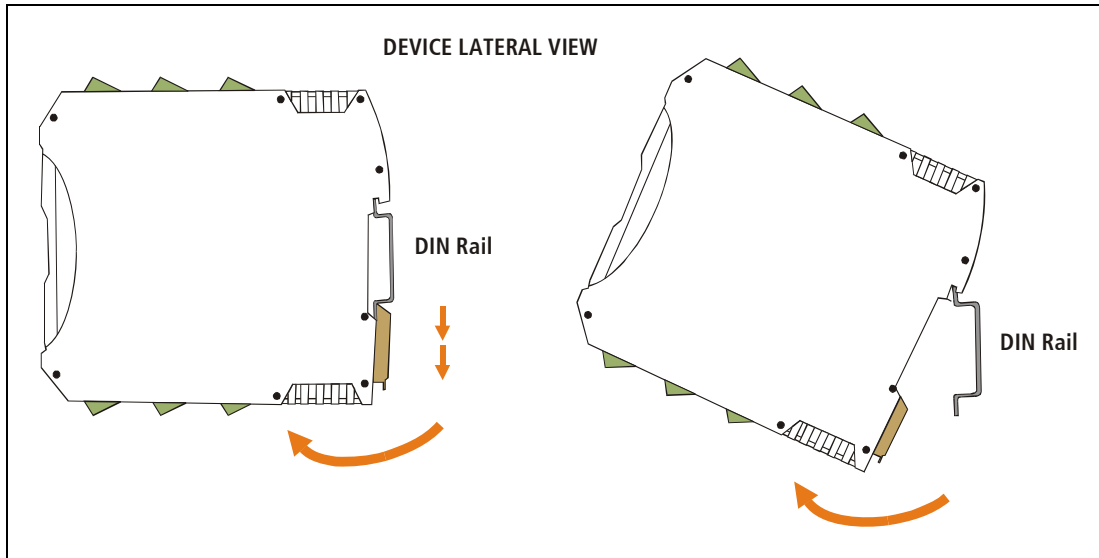


Figure 28 - Device Disassembly

Appendix B

B. ORIGINAL MANUFACTURER'S CONFIGURATION

Table 8 - Original manufacturer's configuration

Menu	Parameter	Value
Network	Hostname	RME1-TC-XXXXXX (*)
	IP Address	0.0.0.0 (DHCP enable)
	Netmask	0.0.0.0
	Gateway	0.0.0.0
Inputs (all inputs)	Type of thermocouple	Thermocouple Type K
Alarms (all inputs)	Low alarm enable	Yes
	Low alarm set point	0
	High alarm enable	Yes
	High alarm set point	500°C
Monitor (all inputs)	Name	Input i (i=input number)
	Visualize	Yes
SNMP	General enable	No
	Traps enable	No
	Manager 1-- IP address	0.0.0.0
	Manager 2 – IP address	0.0.0.0
	Read community	Public
	Write community	Private
	Trap community	Trap
Advanced	Password	Without password
	Modbus exceptions	Yes

Appendix C

C. Technical specifications

• Resolution:	0,1°C
• Input type and quantity:	8 Inputs for thermocouples J, K, T, R, N, E.
• Protocols:	<ul style="list-style-type: none"> - TCP / IP, ICMP, ARP, DHCP, NBNS, HTTP. - TELNET. - ModBus TCP. - SNMP (versión 1). - CSV / XML.
• Network Port:	Ethernet 10 BaseT, RJ45 connector.
• Serial:	RS232 for device's configuration.
• Administration:	HTTP Server, password protected. Telnet console, password protected.. RS232 Serial console.
• Leds:	Power Led, link Led, data Led.
• Power:	10 to 30 Vdc. Consumption: 200mA maximum. Powered with 10 Vdc. 90 mA powered with 30 Vdc.
• Isolation:	1200 Vrms (1 minute).
• Dimensions:	100mm x 22,5mm x 112mm (HeightxWithxLength)
• Temperature:	Operating temperature: -5 a 65°C Storage temperature: -40 a 75°C
• Guarantee:	1 year guarantee.

Appendix D

D. Configuration Console

D.1 Configuration command console (Serial and TELNET)

Through serial port

Connecting the PC serial port to the device serial port (see Chapter II), you can use an utilitarian software such as the Hyperterminal (Windows) to connect to the device and modify all its parameters.

Once the port is opened with the serial 9600,8,N,1 parameters configuration the RME1-TC must turn on and type 'cfg' followed by ENTER with the Hyperterminal before 7 seconds have elapsed from the moment it was turned on. You will reach the configuration through serial port (no password is required).

Through TCP/IP Ethernet Port (TELNET)

The RME1-TC supplies a command console to allow configuration by TCP in the port 23. The device will only administer one TCP connection in this port, preventing the device to be configured in simultaneous consoles.

To enter the command console establish a telnet connection to port 23. In Windows, open a window of commands and type the following command:

```
telnet aaa.bbb.ccc.ddd
```

Where aaa.bbb.ccc.ddd is the RME1-TC IP address to be configured.

When the connection is established, the RME1-TC will show a welcome message to the configuration command console.

```
RME1-TC - Exemys:
-----
Pass word:
```

The RME1-TC will ask for a "Password".

You have three opportunities to enter your password. After that, the console will be blocked for 5 seconds before allowing you to re-enter your password.

D.2. Commands

All commands can be entered in capital or lower case letters.

D.2.1 Password Command

The TCP configuration console and Web configuration interface are protected with a password. The device's administrator can assign a password to the device providing a secure method to access the RME1-TC configuration.

With the PASSWORD command you can change the password from the TCP configuration console.

Table 9 - PASSWORD command

Command	Description
PASSWORD: <i>password</i>	Changes the access key for remote configuration (TCP command console or configuration Web Page). The key word must not have more than 10 characters

D.2.2 Host name Command

With this command you can change the device's name. So that as the device works with the NBNS protocol, it will be possible to connect to the device (TCP console or web page) through its name instead of its IP address.

Table 10 - Host name Command

Command	Description
HOSTNAME: <i>name</i>	Changes device's name. The name must not have more than 15 characters.

D.2.3 NetConfig Command

With this command you can change the network configuration parameters (IP address, netmask and gateway). With the NETCONFIG command the device will be restarted to produce the changes. If the console is run from a Telnet session, the communication with the device will be interrupted. You will have to reopen the TCP session using the new IP address.

Table 11 - NETCONFIG Command

Command	Description
NETCONFIG:IP_address,Netmask Gateway	Changes network configuration parameters. Netmask and IP address equal to 0.0.0.0 enables DHCP

D.2.4. FACTRESET Command

At any time, the RME1-TC administrator can reset the original manufacturer's configuration. This option can be executed through the command console with the FACTRESET command, this way you will have the original configuration.

Table 12 - FACTRESET Command

Command	Description
FACTRESET	Resets the original manufacturer's configuration.

D.2.5. Reset Command

At any time you can restart the RME1-TC.

To restart the device you can execute the RESET command from the command Console.

Table 13 - Reset Command

Command	Description
RESET	Resets RME1-PT.

D.2.6 AINPUT Command

By means of this command you will be able to configure this type of thermocouple for each one of the inputs.

From the command console you can execute the command AINPUT followed by the input number to be configured (0-7) showing the type of thermocouple (0= Thermocouple B, 1= Thermocouple E, 2= Thermocouple J, 3= Thermocouple K, 4= Thermocouple N, 5= Thermocouple R, 6= Thermocouple S, 7= Thermocouple T)

Table 14 - AINPUT command

Comando	Descripción
AINPUTn: type	It changes the <i>type</i> of thermocouple for input n.

D.2.7 ALIST Command

From the command console, you can see all the analog inputs value by executing **ALIST** command.

Table 15 - ALIST command

Command	Description
ALIST	Lists all the analog inputs status.

D.2.8 AALARM Command

With this command you can enable or disable Low and High alarms and configure its set points.

Table 16 - AALARM command

Command	Description
AALARMn:enableL,valueL,enableH,valueH	For input n enables (1) or disables (0) low alarms (L) or high alarms (H) and configure its set points. Minimum and maximum values for these parameters are: - 32.767 y 32.767 respectively.

D.2.9. ANAME Command

With this command you can assign a name to an input, and configure to visualize it or not in the user monitor.

Table 17 - ANAME Command

Command	Description
ANAMEn:nam,visualized	Assigns the name <i>nam</i> to the input n and configure it to be visualized (1) or not (0)

D.2.10. SNMPENABLE command

With this command you can enable or disable the SNMP service

Table 18 - SNMPENABLE command

Command	Description
SNMPENABLE:option	E Enables ,D Disables, the SNMP service

D.2.11. SNMPTRASPENABLE command

With this command you can enable or disable the SNMP traps delivery

Table 19 - SNMPTRAPSEnable command

Command	Description
SNMPTRAPSEnable:option	E Enables ,D Disables, , the SNMP traps delivery

D.2.12 SNMPMANAGER1 command

With this command you can configure the SNMP manager 1 IP address. It is possible to enter the 0.0.0.0 IP address and it means that the manager does not exist

Table 20 - SNMPMANAGER1 command

Command	Description
<code>SNMPMANAGER1 : ip_addr</code>	Configures the Manager 1 IP address

D.2.13 SNMPMANAGER2 command

With this command you can configure the SNMP manager 2 IP address. It is possible to enter the 0.0.0.0 IP address and it means that the manager does not exist.

Table 21 - SNMPMANAGER2 command

Command	Description
<code>SNMPMANAGER2 : ip_addr</code>	Configures the Manager 2 IP address

D.2.14. SNMPREADCN command

With this command you can configure the SNMP read community

Table 22 - SNMPREADCN command

Command	Description
<code>SNMPREADCN : com</code>	Configures the SNMP read community

D.2.15. SNMPWRITECN command

With this command you can configure the SNMP write community

Table 23 - SNMPWRITECN command

Command	Description
<code>SNMPWRITECN : com</code>	Configures the SNMP write community

D.2.16. SNMPTRAPCN command

With this command you can configure the SNMP trap community.

Table 24 - SNMPTRAPCN command

Command	Description
<code>SNMPTRAPCN:com</code>	Configures the SNMP trap community

D.2.17. Other Configuration commands

The following commands allow asking for help, listing the configuration and saving the configuration in device's memory.

Table 25 - Other Commands

Command	Description
<code>HELP</code>	Lists help for the configuration commands
<code>LIST</code>	Lists the equipment's configuration
<code>END</code>	Ends configuration .

**IMPORTANT****NOTE:**

After a configuration change the command `END` must be entered. Then, the device will restart loosing communication. To reconnect, a new Telnet session must be opened

Table 26 - Telnet commands

Command: Syntax	Description
END	Ends configuration
HELP	Lists configuration commands
LIST	Shows configuration values
NETCONFIG:ip_addr,netmask,gateway	IP configuration Netconfig:0.0.0.0, 0.0.0.0, 0.0.0.0 Enables DHCP service
HOSTNAME:name	Device's name
PASSWORD:XXXXXX	Device's password (XXXXXX is the password to configure)
FACTRESET	Set configuration to factory default
RESET	Restart the device
ALIST	Lists inputs value and status
AINPUT:type	Configuration of input 'n' Type: 1= Thermocouple E 2= Thermocouple J 3= Thermocouple K 4= Thermocouple N 5= Thermocouple R 6= Thermocouple S 7= Thermocouple T
AALARMn:hb,vb,ha,va	Alarms enable and set points hb: enable low alarm(0,1) vb: set point low alarm ha: enable high alarm(0,1) va: set point high alarm
ANAMEn:name,visualize	Input 'n' name and enable to visualize in web
EXCEPTIONS:option	Modbus Exceptions option: E(enable), D (disable)
SNMPENABLE:option	SNMP enable option: E(enable), D (disable)
SNMPTRAPSENABLE:option	SNMP traps enable option: E(enable), D (disable)
SNMPMANAGER1:ip_addr	SNMP Manager 1 IP address
SNMPMANAGER2:ip_addr	SNMP Manager 2 IP address
SNMPREADCN:name	SNMP read community
SNMPWRITECN:name	SNMP write community
SNMPTRAPCN:name	SNMP trap community

Appendix E

E. ARP method to configure IP address

In case you want the RME1-TC to have a static IP address (no DHCP service), you can assign it to the device using the ARP method.

If RME1-TC receives, within the first 7 seconds after power on, an ICMP packet (ping) it will get that packet destination address.

With this purpose you can force an entry in a PC ARP table within a network.

1. The ARP table has to have at least one IP address different to itself, for the ARP command to work properly. Check the ARP table has at least one entry with the command:

```
arp -a
```

If the only entry is the local PC send a ping to other network device.

2. In Windows, you can force an entry in the ARP table with the following command:

```
arp -s 192.168.0.105 00-90-C2-XX-XX-XX
```

3. In Unix the command to add an entry in the ARP table is:

```
arp -s 192.168.0.105 00:90:C2:XX:XX:XX
```

4. Send a ping to the IP address you forced in the ARP table with the following command:

```
ping 192.168.0.105 -t
```

The `-t` option will send it continuously.

Turn on the RME1-TC. You will not get any response after a few seconds. When the RME1-TC answers the ping, you can access to the device through the network.