TSX ETG 1000 Module
User's Manual

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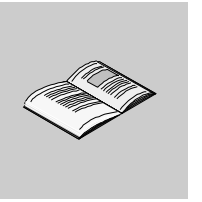
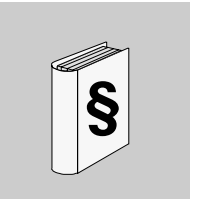


Safety Information



Important Information

NOTICE

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a Danger or Warning safety label indicates that an electrical hazard exists, which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

DANGER

DANGER indicates an imminently hazardous situation, which, if not avoided, **will result** in death, serious injury, or equipment damage.

WARNING

WARNING indicates a potentially hazardous situation, which, if not avoided, **can result** in death, serious injury, or equipment damage.

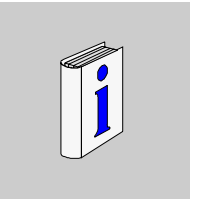
CAUTION

CAUTION indicates a potentially hazardous situation, which, if not avoided, **can result** in injury or equipment damage.

PLEASE NOTE

Electrical equipment should be serviced only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material. This document is not intended as an instruction manual for untrained persons.

About the Book



At a Glance

Document Scope Installing the TSX ETG 1000 Ethernet Communication Module

Related Documents

Title of Documentation	Reference Number
Communications Setup Manual	TLX DS COMPL7 V4
Ethernet Network - Reference Manual	TSX DR ETH
Modbus - User's Guide	TSX DG MDB
Wiring Guidelines - User's Guide	TSX DG KBL

User Comments We welcome your comments about this document. You can reach us by e-mail at techpub@schneider-electric.com

Security

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Security

Overview

TSX ETG 1000 product must not be used to support safety functions. Before configuring your website, you must plan how to secure it. Unlike default web site data, data from a custom web site is write enabled. You must pay particular attention to the people with access rights to the site and to the data that can be changed. This chapter describes security problems and presents security mechanisms accessible to users of the web utility.

What's in this Chapter?

This chapter contains the following topics:

Internal Security

Overview

The website is accessible over an intranet. The TSX ETG 1000 provides two mechanisms to ensure that only authorized users view and modify your data.

Security Mechanisms

On intranets, the TSX ETG 1000 module provides security through:

- password entry,
- write restrictions.

CAUTION

UNAUTHORIZED SECURITY ACCESS

Anyone who has access to your embedded server can override your security settings and download new settings to the server. Unauthorized or incorrect changes to data may change the behavior of your application in ways that may be undesirable or even hazardous.

Failure to follow this precaution can result in injury or equipment damage.

Password Entry

Although you may add unprotected Web pages to the site, the default Web pages and any other pages you choose to protect can only be viewed by users who supply the correct user name and password.

Restrictions

Restrictions are applied overall.
When you create a website and you want to protect it, you must place it in the folder called secure. The uploading of the custom website is subject to security conditions linked to an FTP password (See *Uploading to a Server, p. 137*).

CAUTION

UNAUTHORIZED CHANGES TO DIRECT ADDRESSES.

Carefully select the direct addresses as well as the people authorized to use the site. Unauthorized or incorrect changes to data may change the behavior of your application in ways that may be undesirable or even hazardous.

Failure to follow this precaution can result in injury or equipment damage.

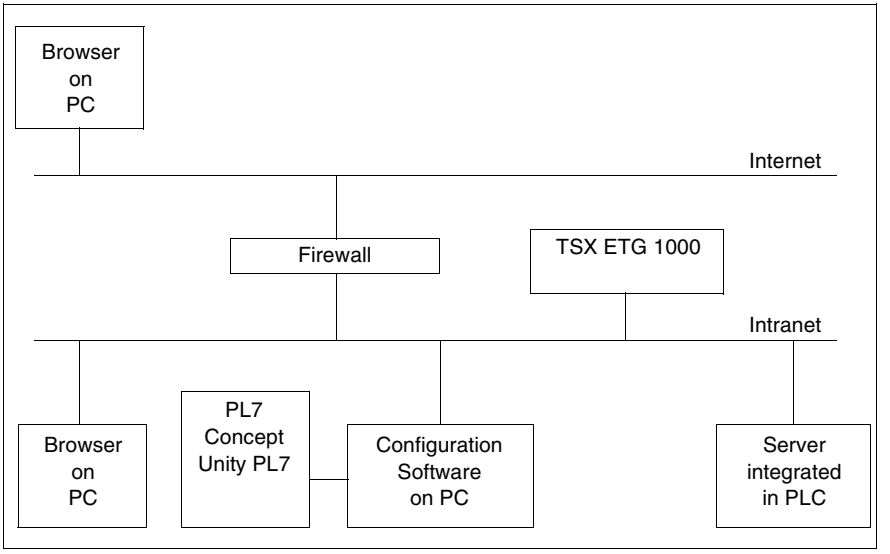
External Security

Overview

If your network has been configured to enable users to consult your Internet site, your security system is the same as that of an intranet site, only you have an additional security measure: a firewall.

Architecture of a firewall

A firewall forms a gateway between Internet and your embedded server, as illustrated below. You can use a firewall to restrict or forbid access to your website. This diagram explains how a firewall works on your embedded server and your PC.



Types of firewalls

There are two types of firewalls:
- network firewalls,
- application firewalls.

Network Firewalls

Network firewalls are often installed between Internet and a single entry point to an intranet or internal protected network.

Application Firewalls

An application firewall works for an application, for example FTP. It intercepts all traffic sent to this application, and decides whether or not to transmit this traffic to the application. Application firewalls are located on individual host computers.

About the TSX ETG 1000

If you want viewers to be able to access your site from the Internet and your embedded server is protected by a firewall, you must configure the firewall to authorize FTP traffic.

The firewall can be configured to authorize network connections to a limited range of ports, or to authorize traffic to or from certain IP addresses. Firewalls configured to allow data entry to 21 TCP/IP FTP port and to ports greater than 1024 authorize access to protected embedded servers.

The TSX ETG 1000 client follows the "Firewall Friendly FTP" standard, RFC 1579. It issues an FTP PASV command to the server before any attempt to establish an FTP data connection.

The TSX ETG 1000 uses 80 TCP/IP port to provide HTTP access to web pages saved to an embedded server. Access to operational data on a 502 TCP/IP port uses the Schneider Electric Modbus application protocol (MBAP). The firewall must also have access to the ports.

Note: The FTP name and password are ‘wsupgrade’.

Secure Access to Direct Addresses

Overview

In the data editor service for direct addresses, some Modbus registers are automatically read-only, particularly those set in read only.

WARNING

Unauthorized changes to direct addresses in the data editor.

Carefully select the addresses you authorize to be modified on-line, and the people authorized to do so. Unauthorized or incorrect modifications made to the direct addresses may have undesirable or even dangerous effects on the behavior of your application.

Failure to follow this precaution can result in death, serious injury, or equipment damage.

TSX ETG 1000 Module: General

2

Presentation

Scope of this Chapter

This chapter contains general information about the TSX ETG 1000 network module.

What's in this Chapter?

This chapter contains the following sections:

2.1 Description of the TSX ETG Module

Presentation

Scope of this Section

This section describes the TSX ETG 1000 module.

What's in this Section?

This section contains the following topics:

About ETHERNET

Introduction

ETHERNET communication is mainly responsible for the following applications:

- Coordination between PLCs
- Local or remote monitoring
- Communication with production management software
- Communication with remote I/O

TCP/IP communication profile on Ethernet, supported by the TSX ETG 1000 module, allows communication via:

- Modbus messaging

Acting as an agent, the TSX ETG 1000 module also supports management of the network monitoring standard SNMP.

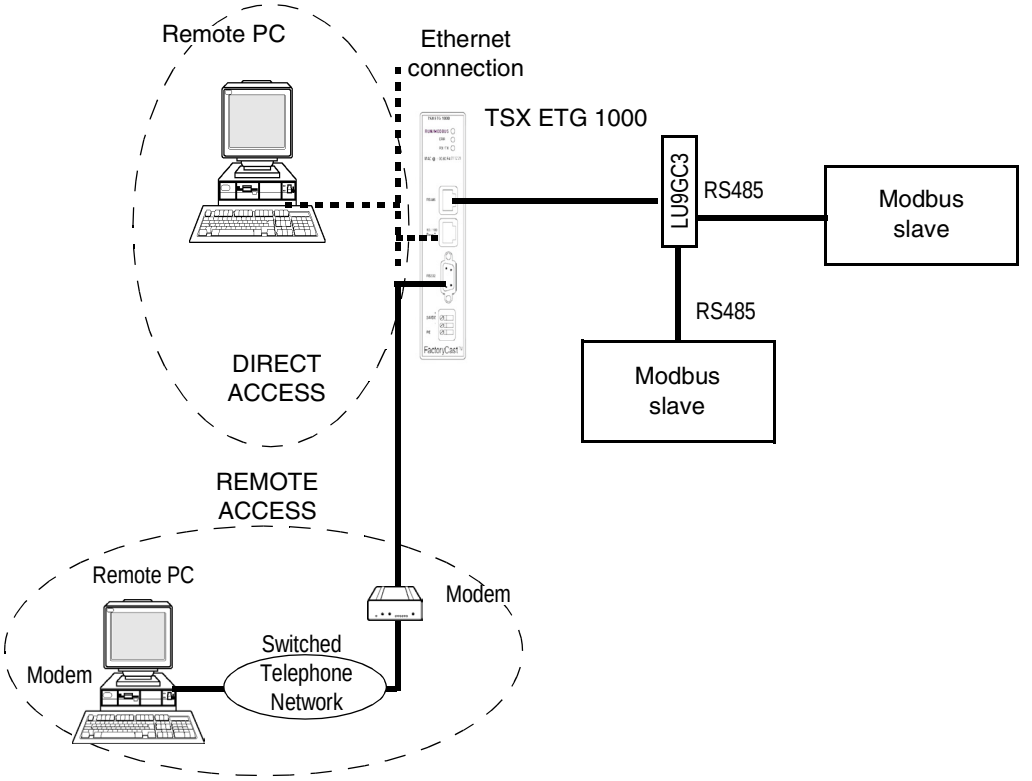
Presentation

General

The **TSX ETG 1000** is a standalone TCP-IP/Modbus gateway module that can be used to connect Modbus devices to a TCP-IP network. It is rated as class C20 (RT standard)
It is not inserted into a PLC rack.
The TSX ETG 1000 module can be configured using an embedded Web server.
This is an external module which can be mounted on a DIN rail or on a Telequick pre-slotted plate.
It has a 24 VDC power supply and includes an RS232 serial link for connecting an external modem.

Illustration

Simplified schematic:



General Information about the TSX ETG Module

Presentation

The TSX ETG 1000 module includes the following features:

- 24V DC power supply
- Ethernet 10/100 Base-T connection
- RS485 serial link for Modbus communication
- Modbus RTU master
- RS232 serial link for communication with an external modem or for configuration
- 3 LED indicators
- 8 MB of non-volatile Flash memory for backup of embedded software and website data

Note: The RS485 serial link is not isolated.

Module Services

The following services are available:

- configuration via web pages, Ethernet or RS232 serial link,
- IP module setup either by configuration or automatically:
  - BOOTP client,
  - DHCP client: automatic reconfiguration on replacement of module (FDR function),
- secure access to default server without configuration, comprising:
  - module configuration pages,
  - diagnostic services,
- SNMP V1 service management with MIB-II agent and private Ethernet Transparent Factory MIB,
- Modbus messaging on TCP/IP with a maximum of 64 simultaneous connections,
- diagnostics via LED indicators,
- mail management initiated by Modbus register value on Modbus devices,
- up to 16 Internet browsers can be connected simultaneously,
- 8 MB of additional Flash memory reserved for the user application: the user can add custom pages or applets to the initial website,
- FTP server for loading client pages.

Summary of the Module Functions

At a Glance

Various functions are available.

TSX ETG 1000 module

The table below summarizes the functions of the TSX ETG 1000:

Function	Details
Messaging via Port 502 (Modbus on TCP/IP)	• A maximum of 64 simultaneous connections (Client + Server) • Access control via configuration table
Bootp client service	-
DHCP (FDR) client service	-
SNMP service	• SNMP with MIB-II agent and Ethernet Transparent Factory MIB
RS232 link for external modem	• 4800, 9600, 19200, 38400 and 57400 baud
Modbus link	• Configurable speed (1200, 2400, 4800, 9600, 19200, 38400, 57400 and 115200 baud), parity, stop bit, time-out
Email	• Up to 8 alarms scanned
Website	• Simultaneous connection of up to 16 Internet browsers • Non-modifiable website, factory-installed, with configuration and diagnostics pages • 8 MB reserved for custom website

Services

3

Presentation

Scope of this Chapter

This chapter describes the services offered by the TSX ETG 1000 module.

What's in this Chapter?

This chapter contains the following sections:

3.1 Modbus Communication Function

Presentation

Scope of this Section

This section describes the Modbus communication function via the TSX ETG 1000 module.

What's in this Section?

This section contains the following topics:

Modbus Communication

Principles

The TSX ETG 1000 module is a TCP/IP/Modbus gateway for transmitting Modbus requests.
The TSX ETG 1000 module is the Modbus master. In order for the gateway to operate as Modbus master, the module has to be connected to a Modbus slave device.
The Modbus link (speed, parity, address, etc) must be configured so that it is compatible with the slave link.
In Modbus, the TSX ETG 1000 module is always master. This means that exchanges between the module and a device on the bus are always made at the request of the module, which waits for a response from the device (slave) until it is received or until time-out. Only one exchange can be made at a time: if the module is waiting for a response from the device, it cannot send a request. TCP requests are suspended on the network (a maximum of 128 pending requests). The various devices can be assigned a Modbus address from 1 to 254. The TSX ETG 1000 module is the Modbus server accessible via address 255.

Note: The TSX ETG 1000 module can only manage the Modbus RTU protocol (not Modbus ASCII).

Modbus Parameters

The table below shows the parameters that have to be configured for the module:

Parameters	Value
Baud rate	Speed: 115200, 57600, 38400, 19200, 9600, 4800, 2400, 1200 baud
Data bits	8 data bits.
Stop bits	1 or 2 stop bits.
Parity	Even, odd, or no parity.
Timeout	In milliseconds, between 1 and 10 seconds (3 seconds by default).
Delay before new request	Between 4 and 1000 characters (10 by default).

Modbus Server

At a Glance

The TSX ETG 1000 module includes a Modbus server.
It can be used to access internal module variable addressing (via Modbus TCP). To access the variables, the module address (UnitID) is 255.
The Modbus server manages the following requests:

- 03 ReadHoldingRegister,
- 16 WriteMultipleRegister,
- 43/14 ReadDeviceIdentification.

The compliance level of the ReadDeviceIdentification is regular with stream mode access and individual access.

Internal Module Registers

The TSX ETG 1000 module provides four register zones:
- User zone,
- Command zone
- Diagnostic zone
- Periodic zone

The user zone (registers 0 to 63).
This zone is available for unrestricted use. The user can read or write in this zone by means of Modbus TCP requests or by RDE/GDE (data table/graphics objects). This zone can be used in various ways:
- to send a mail from an Ethernet network
- to send a mail without a Modbus device: test email
- to store device values or to exchange values between devices
- to simulate a Modbus device,
- etc.

The command zone (register 500 to 511):

Register	Description
500	Command status for register 501: ● = 0 for command not OK ● = FFFF for command in progress ● <> 0 for command not OK
501	Command: ● = 0 no command ● = 1 for alarm test service ● = 2 for open PPP connection ● = 3 for close PPP connection
502	Register 501 = 1 then number of alarm to be tested
502 to 505	Register 501 = 2 or 3 and IP address = 86.16.0.4 (for example) ● Register 502 = 86 for the 1st value of the IP address ● Register 503 = 16 for the 2nd value of the IP address ● Register 504 = 0 for the 3rd value of the IP address ● Register 505 = 4 for the 4th value of the IP address
506 to 511	Reserved.

Note: a new command is not authorized if the status value (register 500) is FFFF. The command parameters for register 502 to 505 must be entered before the command (register 501).

The diagnostic zone (register 800 to 849) :

Register	Description
800 to 815	List of devices periodically scanned and present used by the alarms, 16 registers for 256 word bits = 1 bit per device.
816 to 819	Reserved.
820	Alarm service status (mail): ● = 2 for active ● = 1 for inactive ● = 0 for not configured
821	Number of emails sent without error
822	Connection error counter at the SMTP server.
823	Number of Modbus requests sent by the ALARM service.
824	Number of Modbus responses for the ALARM service received without error.
825	Number of Modbus responses for the ALARM service received with error.
826	Email send error counter.
827 to 829	Reserved.
830	PPP connection status: ● = 2 for server connection ● = 1 for client connection ● = 0 for PPP inactive
831 to 834	PPP : IP address of remote device, if = 0 PPP line closed.
835 to 838	PPP : IP address of TSX ETG module, if = 0 PPP line closed.
839 to 842	IP address opened by a client PPP connection, if = 0 PPP line closed.
843	Number of PPP connections opened without error.
844	Number of errors on opening a PPP connection.
845	Number of PPP connections closed without error.
846	Number of errors on closing a PPP connection.
847 to 849	Reserved.

The periodic zone (registers 1000 to 1007):

Register	Description
1000	Value of register configured for alarm 1 for each scan.
1001	Value of register configured for alarm 2 for each scan.
1002	Value of register configured for alarm 3 for each scan.
1003	Value of register configured for alarm 4 for each scan.
1004	Value of register configured for alarm 5 for each scan.

Register	Description
1005	Value of register configured for alarm 6 for each scan.
1006	Value of register configured for alarm 7 for each scan.
1007	Value of register configured for alarm 8 for each scan.

Note: all these variables can be read and written as follows:
- via a Modbus TCP request using 255 as the device address
- via the module website data editor page or on custom pages (using 255 as the device address).

3.2 TCP/IP Messaging

Presentation

Scope of this Section

This section describes the TCP/IP messaging service available via the TSX ETG 1000 module.

What's in this Section?

This section contains the following topics:

Reminder of TCP/IP Features

Communication Port	The communication port reserved for the TSX ETG 1000 module is Port 502 (port reserved for Schneider). When a client device wishes to access the module, it requests that a connection be opened to this port.
Time-Out on TCP Connection	If a TCP connection is unable to be established (destination unavailable, for example) the time-out for return of an error is 80 seconds. We recommend setting the time-out for communication functions to a value greater than 80 seconds if the 1st exchange was unsuccessful.
"Keep Alive" Function	This function automatically generates a frame every 2 hours or so to check for broken connections. This mechanism is explained in more detail in this section.

IP Address

General

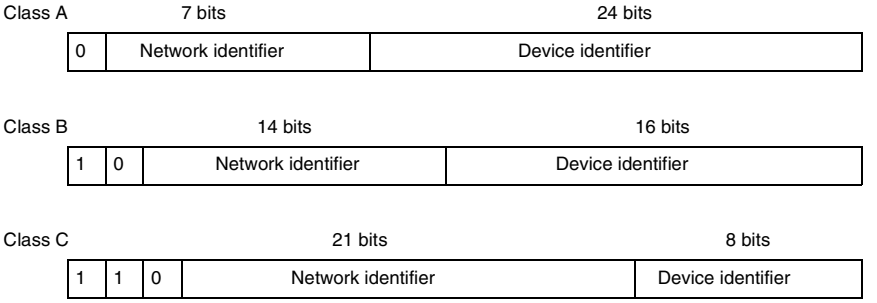
Each device on the network must have a **unique IP address**.
The unique nature of the IP address is ensured by the attribution of a "network ID" by an approved body. The choice between the various classes depends on the number of networks in the installation and the number of devices to be connected.

Address Structure

Each IP address consists of two elements (network name and device identifier), where network name identifies a network (or a site) and where device identifier identifies a device connected to this network. There are three classes of IP address.

Address Classes

The structure of the address classes is as follows:



Externally, a device's IP address is represented by a string of four 8-bit values (0 to 255), separated by dots: "a.b.c.d".

Class	First address of the class	Last address of the class
A	0.0.0.1	127.255.255.254
B	128.0.0.1	191.255.255.254
C	192.0.0.1	223.255.255.254

Default IP Address of the Ethernet Interface for the TSX ETG 1000 Module

The default IP address of the Ethernet interface for the TSX ETG 1000 module is constructed from its MAC address:
085.016.xxx.yyy where xxx and yyy are the last two numbers of the MAC address.

Example:
The MAC address of the module (in hexadecimal format) is: 00 80 F4 01 **12 20**.
In this case the default IP address (in decimal format) is: 085.016.**018.032**.

IP Address of the PPP Interface

The TSX ETG 1000 module manages one IP address per interface:

- the IP address of the Ethernet interface, configured by the user or pre-assigned (see above)
- the IP address of the PPP interface

The latter is assigned when a connection is established by the PPP protocol. The TSX ETG 1000 module is configured to accept any type of IP address when a connection is being established. We therefore recommend that any device with which the TSX ETG 1000 module has to establish a modem/PPP connection is configured to assign the IP address to the TSX ETG 1000 module.
However, if the remote device is configured to receive its IP address from the TSX ETG 1000, the IP addresses once a connection has been established will be as follows:

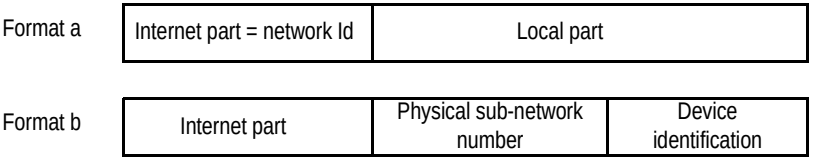
- TSX ETG 1000: **85.16.0.2**
- remote device: **85.16.0.1**

If the connection is a TSX ETG 1000 <-> TSX ETG 1000 connection, both devices use the IP address **85.16.0.2** for their PPP interface.

Sub-Addressing, Gateway

Sub-Addressing

The principle of sub-addressing is to divide the local part into a physical sub-network number and a device identification.
Illustration:

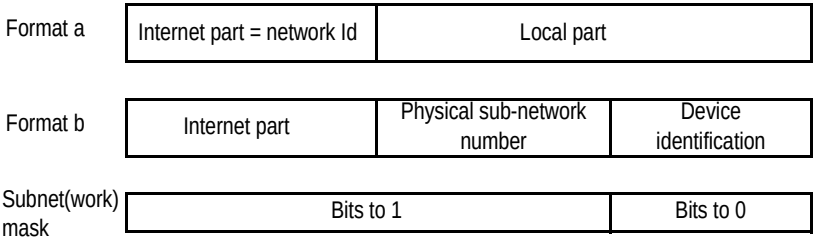


Mask

A sub-network mask (Subnet Mask), coded in 32-bits, is used to define the bits of an IP address as the network part.
The mask bits are:

- Set to 1 if the bits corresponding to the IP address are to be interpreted as part of the network address
- Set to zero to identify the device

This system allows local internal networks to be addressed with a single attributed IP address.
Illustration:



Gateway

The Gateway allows a message to be routed to a device which is not on the current network.

Connection Management

At a Glance

A connection can be opened by a remote device wishing to communicate with the module in order to retrieve data via the Modbus.

A connection is characterized by the module as follows:
Local TCP port, local IP address/remote TCP port, remote IP address.

Note: The maximum number of connections that can be open simultaneously is 64. The number of transactions managed by the TSX ETG 1000 is 128 for all port 502 connections.

The configuration screen can be used to configure the modem profile and the Ethernet profile.

Note: Connection management is transparent for the user.

Opening a Connection on the Ethernet Network

At a Glance

A connection can be opened in one of the following ways:

- by request from a remote device,
- by request to a remote device.

Request from a Remote Device

In this case the TSX ETG 1000 is the connection server.
On receiving a connection request from a remote device, the IP address of the remote device is verified if and only if access control is enabled in the configuration. The test involves checking that this address is included in the list of remote devices authorized to connect. If that is the case, the connection is accepted, otherwise the connection is closed.

Opening a Serial Link Connection via Modem

Presentation

A serial link connection via modem can be opened in one of the following ways:

- By request from a remote device (server mode)
- Or by email request from a module (client mode)
- Or by internal register command from a module (client mode)

Note: Client mode takes priority over server mode. If a remote device has established communication with the module in server mode, the connection will be closed by the TSX ETG 1000 if the module wishes to establish a connection to a remote device in client mode.

Note: Specialist line mode is not supported.

Note: Modem service must not be used to support safety functions.

PPP and PAP Protocols

The connection uses **PPP** (Point-to-Point Protocol). With this protocol, once a telephone connection has been established, the modem link is regarded at an application level as a TCP/IP link.
With a **PPP** connection, the identification protocol is **PAP** (Password Authentication Protocol). Any device with which the TSX ETG 1000 has a modem/PPP connection should be configured with the **PAP** protocol. The **CHAP** protocol is not implemented on the TSX ETG 1000.
In order for the connection to be accepted, you need to know the UserName and the **PAP** Password for the remote device. Before connecting the TSX ETG 1000 to the remote device, you must also configure the remote device to use the PAP protocol. The password and the user name for the TSX ETG 1000 used by the PAP protocol are the same as those for the HTTP server (default: USER/USER).
The modem connected to the TSX ETG 1000 must respond to AT commands in ASCII mode.

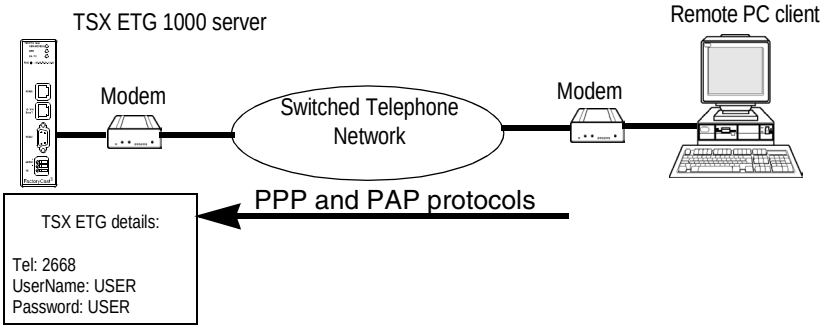
Diagnostics for the RS232 Modem Link

The PPP/Modem log file page on the HTTP server contains a log of the last four connections.

Connection by Request from a Remote Device

The TSX ETG 1000 is the connection server.
If the TSX ETG 1000 module is configured for use with a modem, the module listens for an incoming telephone connection request.
Once the telephone connection is established, the Username and Password (PAP) are verified. If identification is unsuccessful, PPP communication is not established.

Illustration:



Connection by Request from a Remote Device

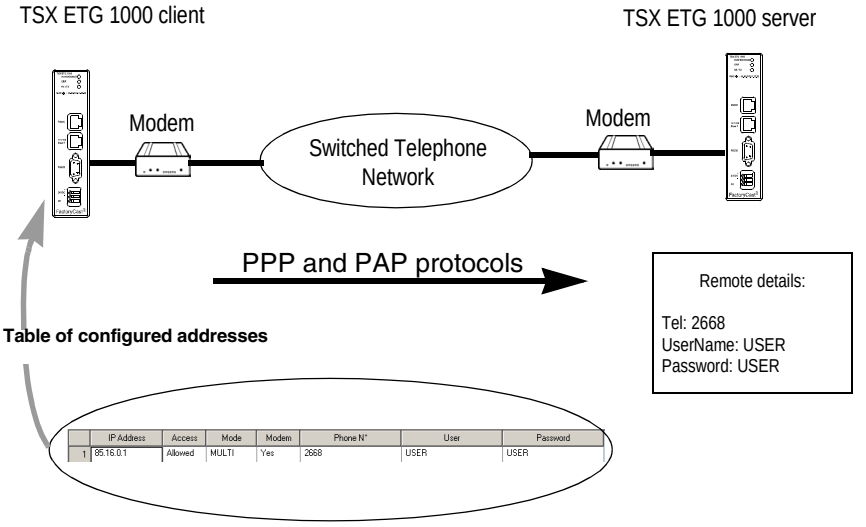
In this case the TSX ETG 1000 is the connection client.
Two types of modem connection can be opened:

- The SMTP mail server is configured for modem connection; the module opens the connection automatically when an email is to be sent
- By register command from a module (see internal module register) (See *Internal Module Registers, p. 27*); in this case the connection is opened when the request is written

Note: The email connection takes priority over the command; if the IP address is not the same, the email connection will close the current command. Otherwise the command will wait for the end of the email connection (during the wait the status assumes the value -1).

To open the connection, the module establishes a telephone connection by dialing the telephone number configured for this remote device.
The TCP/IP connection to port 502 on the remote device is then opened automatically by the TSX ETG 1000.
The remote device must be listed in the IP configuration table with its telephone number, name and password.

Illustration:



Note: Important: For a given remote device, the telephone number to be dialed can only be modified from the **Setup** menu on the Web server. The TSX ETG 1000 must then be restarted using the **Reboot** function in order for the new configuration to take effect.

Closing a Connection

At a Glance

A TCP/IP connection can be closed in one of two ways:

- by the remote station if it decides to end communication and send a TCP/IP connection cutoff,
- by the TSX ETG 1000; if the maximum number of open connections has been reached, the oldest open connection is closed.

When a connection is closed, it is signaled to the application by an error report (message rejected) as soon as an exchange is initiated.

In the case of a telephone connection, the connection is broken:

- by the remote station if it decides to end communication and hang up the telephone connection,
- if the remote device is not authorized to connect,
- if the time between two frames defined during configuration elapses,
- if the connection time exceeds the time defined during configuration (See *Configuration Parameters for TCP/IP Services, p. 108*),
- if a module acting as remote station server wants to establish a connection to another remote station in client mode via modem,
- if an email connection is terminated and a command (override on module command register) is sent by the device.

Behavior when a Connection is Broken

Presentation

A broken connection can take one of two forms:

- Disconnection of the network cable (cable unplugged, broken, etc.)
- Disappearance of the remote device (device failure, power outage, etc.)

The loss of connection is detected after 2 hours by the Keep Alive request.

If the connection is reestablished during this time, the restoration of communications depends on the way in which the connection was broken.

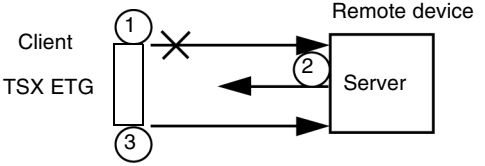
Cable Reconnection

In this case the connection was broken due to a network cable, but the two stations are still operational.

When the cable is reconnected, communication between the TSX ETG 1000 module and the remote device is resumed on the open TCP/IP connection.

Remote Device as Server

The remote device that disappeared was acting as server.



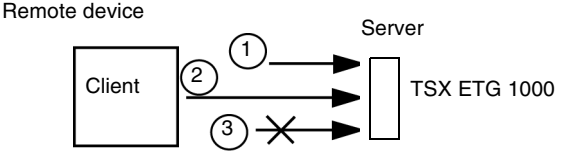
1 The client TSX ETG 1000 module continues to send data on the old connection (that remains partly open).

2 The server receiving data with no associated connection sends a Reset command and closes the old connection.

3 The client TSX ETG 1000 module opens a new connection.

Remote Device as Client

The remote device that disappeared was acting as client.



1 The client opens a new connection.

2 The server TSX ETG 1000 module receives the request to open a new connection.

3 The server TSX ETG 1000 module closes the old connection (if there is no activity in progress) and authorizes the new connection.

3.3 BOOTP and DHCP(FDR) Services

Presentation

Scope of this Section

This section describes the BOOTP and DHCP(FDR) services.

What's in this Section?

This section contains the following topics:

BOOTP/DHCP(FDR) Services - General

Presentation

The TSX ETG 1000 module can be configured directly with its Ethernet interface IP address in the **FDR Client** page or using an automatic configuration protocol. These protocols are: **BOOTP** and **DHCP**.
BootP (Bootstrap Protocol) and DHCP (Dynamic Host Configuration Protocol) are protocols for booting diskless terminals or stations using centralized management of network parameters.
Their main purpose is to provide an IP address or a configuration to a station booting on the network.
The TSX ETG 1000 is the BOOTP client or DHCP client.
The BOOTP/DHCP server can therefore be a Premium fitted with a TSX ETY module or a Quantum fitted with an NOE module.

Note: Automatic configuration only works with an Ethernet connection and not with an RS232 or modem connection.

TSX ETG 1000 as BOOTP Client

Principle

The principle used is as follows:

- The TSX ETG 1000 module requests an IP configuration (IP address, subnet mask, gateway) from a BOOTP server by means of its MAC address.
- The BOOTP server uses a MACAddress/IP Configuration correspondence table to return the IP configuration to the TSX ETG 1000.

Note: Important: In order to use the BOOTP service, you must configure the address server as BOOTP server and identify the client device by its MAC address.

Note: The BOOTP server only returns the IP address, the subnet mask and the gateway; the other data can be found in the configuration page.

Initial Startup

Behavior of the TSX ETG 1000 module on initial startup:
The TSX ETG 1000 module sends a configuration request to the server:

- If the module is not recognized, it starts up with its default IP configuration (factory-set)
- If the BOOTP server sends an IP configuration, the TSX ETG 1000 uses it but **without storing it in Flash memory**.

Subsequent Startups

Behavior of the module on subsequent startups:
The TSX ETG 1000 module sends a configuration request to the server:

- If the BOOTP server sends a configuration, the TSX ETG 1000 uses it.
- If the BOOTP server does not respond within about 5 minutes, the TSX ETG 1000 module switches to downgraded operating mode and uses the IP configuration stored in the Flash memory (the factory-set default configuration).

TSX ETG 1000 as DHCP(FDR) Client

At a Glance

This service allows the automatic retrieval of IP, Modbus, SNMP and email configurations by a TSX ETG 1000 module connected to an Ethernet segment with Transparent Factory.
The FDR function uses a combination of the DHCP and FTP/TFTP protocols.
The TSX ETG 1000 uses a name (Device Role Name) to obtain its configuration from the server. The **Device Role Name** is a string of characters (maximum of 15) associated with the module that must be **unique** within the architecture.
The TSX ETG 1000 is therefore able to configure itself automatically using a parameters file previously saved in the DHCP server, for example a Premium TSX ETY 5102 module.

Note: In order to use the FDR service, you must configure the address server (e.g. TSX ETY 4102/5102) as DHCP server and identify the client device by its Role Name. When configured as FDR server, the TSX ETY 4102/5102 can manage a maximum of 16 TSX ETG 1000 clients.

Note: Passwords are not stored in the server. The passwords retrieved will therefore be default passwords.

Operation

The operating principle of the FDR service is as follows:

1	A TSX ETG is connected to the network with a configured name (Device Role Name).
2	The TSX ETG sends a DHCP request, indicating its associated Device Role Name.
3	If the Device Role Name is included in the DHCP server's configuration table, the server sends the following to the module: ● the IP address that it must use ● the IP address of the FTP/TFTP server ● the location of the configuration file for retrieval from the FTP/TFTP server
4	The TSX ETG 1000 then accesses the FTP/TFTP server to upload or download the configuration file to or from the FTP/TFTP server. The configuration file is identified by a name consisting of the Device Role name with the extension .prm.

Initial Startup

Behavior of the TSX ETG 1000 module on initial startup:
The TSX ETG 1000 module sends a configuration request to the server:

- if the module is not recognized, it starts up with the default configuration (factory-set) after approximately 5 minutes.
- if the module is recognized, the TSX ETG 1000 starts up with the configuration provided and stores it in its Flash memory (according to the IP configuration).

Subsequent Startups

Behavior of the module on subsequent startups:
The TSX ETG 1000 module sends a configuration request to the server:

- If the module is recognized, the TSX ETG 1000 starts up with the configuration provided and stores it in its Flash memory (according to the IP configuration).
- If the module is not recognized, it starts up after approximately 5 minutes with the default configuration based on its MAC address.

3.4 SNMP Server

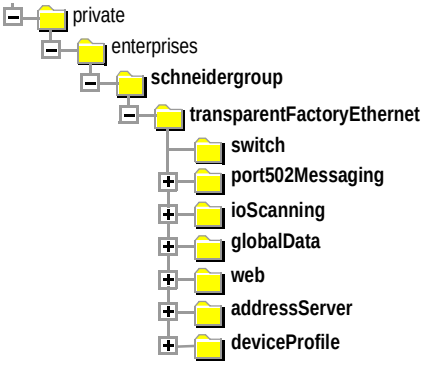
SNMP Communication in UDP/IP

At a Glance

The SNMP standard (Simple Network Management Protocol) defines network management solutions in terms of protocol and supervised data exchange.

The SNMP architecture is based on the following key elements:
- the **Manager** is used to supervise all or part of the network,
- one or more **Agents**. Each device being supervised has a software module called an **Agent** used by the SNMP protocol,
- an **MIB** (Management Information Base) is a database or collection of objects updated by the agents.

The SNMP agent service is implemented on the TSX ETG 1000 module. The SNMP protocol allows a Manager to access standard MIB objects in the TSX ETG 1000 module.
The **MIB-II** is used to manage TCP/IP communication layers.
The **MIB Ethernet Transparent Factory** allows a Manager to access data on the messaging service on port 502.
View of the Ethernet Transparent Factory MIB tree via a Manager:



The source file of the **Ethernet Transparent Factory MIB** is available on the TSX ETG 1000 module. It can be downloaded from an Internet browser by clicking the **MIB Upload** link on the **Diagnostics** (See *Home Page, p. 59*) home page. The MIB version is 1.2. This file can be compiled with most commercial SNMP Managers.

The SNMP Protocol

The SNMP protocol defines 5 types of message between agent and manager: these messages are stored in **UDP** datagrams.

Messages from the manager to an agent:

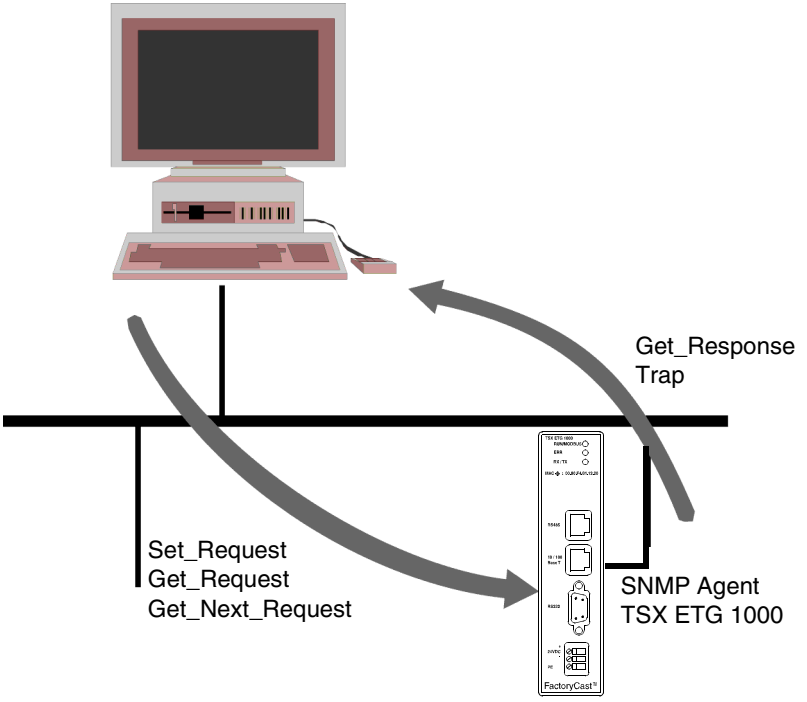
- `Get_Request`: message used to obtain the value of one or more variables
- `Get_Next_Request`: used to obtain the value of subsequent variables
- `Set_Request`: used to position the value of a variable

Messages from an agent to the manager:

- `Get_Response`: used by the agent to return the variable value requested
- `Trap`: used by the agent to signal an event to the Manager (unauthorized access attempt or rebooting of the device)

Description of Services

The SNMP manager sends write or read requests (`Set_Request`, `Get_Request`, `Get_Next_Request`, etc.) for objects defined in the SNMP MIB-II, and the SNMP agent for the TSX ETG 1000 module responds.



The module's SNMP agent sends events (Traps) to the Manager. The following System Traps are managed:

- `Coldstart Trap`:
  - The event is only sent when the module is powered up
- `Authentication Failure Trap`: event sent after an authentication problem. The **Community Name** field in the message received is different from that configured on the module. This trap can be validated when the TSX ETG 1000 module is configured.

3.5 SMTP Server

Email

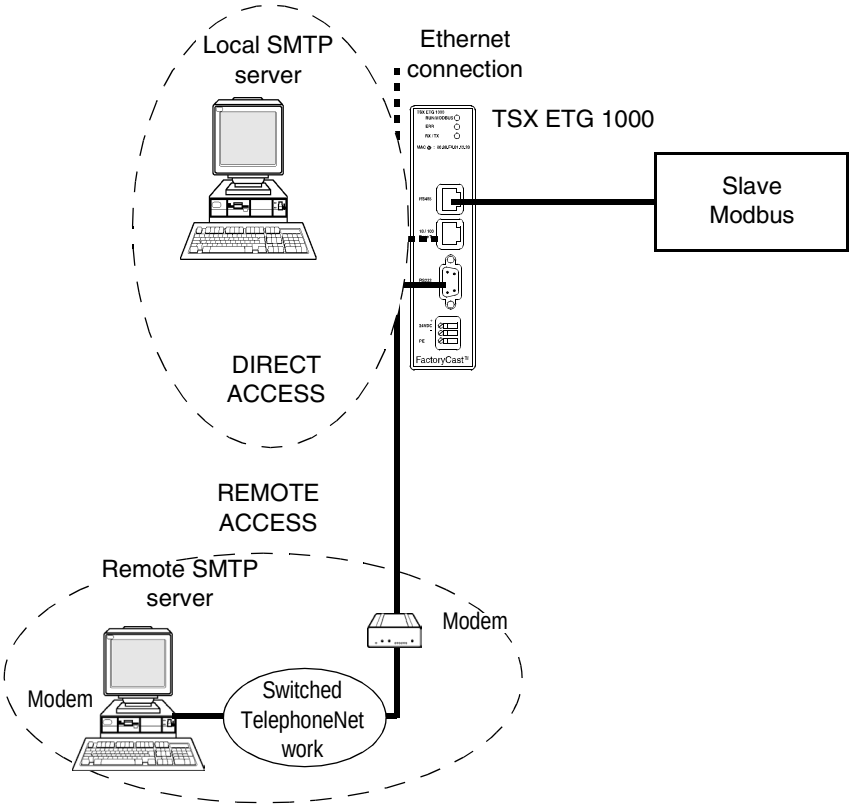
General

The TSX ETG 1000 module provides an email function. The sending of emails is initiated by the scanning of Modbus device registers or of internal module registers. The SMTP server address must be configured; this server can be connected either via the Ethernet or via a modem.

Note: Email service must not be used to support safety functions.

Illustration

Example:



Note: It is possible to test the sending of an email (alarm) using the register command (See *Internal Module Registers, p. 27*) or by clicking Test email (See *Test Email Page, p. 65*) in the **Diagnostics** menu to initiate one of the configured alarms.

The modem connection is established automatically when an email is to be sent. This connection takes priority and can interrupt all other modem connections established by a remote device or by a module register command.

3.6 HTTP Server

Presentation

Scope of this Section

This section describes the HTTP server included with the TSX ETG 1000 module.

What's in this Section?

This section contains the following topics:

Embedded HTTP Server

At a Glance

TSX ETG 1000 modules are provided as standard with a web server which can be used:

- to configure the module:
  - TCP/IP parameters,
  - modem,
  - Modbus parameters,
  - SNMP,
  - SMTP,
- to change the user name and password for accessing the site,
- to access PLC or device data,
- to assign a Device Role Name if automatic configuration has been chosen.

The functions provided by the website require no configuration or pre-programming of the module.

All the server data is constructed in the form of standard web pages in HTML format. These pages can be viewed with an Internet browser.

Module functions:

Functions	**TSX ETG 1000**
Number of browsers connected	16 max.
Website embedded as standard	Yes
Memory reserved for creation of custom pages	8 MB

Default Web Server Functions

The following functions are available:

- module diagnostic functions:
  - Ethernet and Modbus network statistics,
  - statistics and email test,
  - RS232 modem connection statistics and diagnostics via log file,
  - FDR statistics,
  - MIB upload,
- module setup functions:
  - security or password change,
  - TCP/IP and Modbus parameter configuration,
  - FDR client configuration,
  - SNMP and SMTP parameter configuration,
  - alarm configuration,
  - module rebooting,
- module monitoring functions:
  - reading and editing Modbus device or module data,
  - monitoring custom graphic pages.

Note: The page loading progress bar (functions or services) is only visible if the browser is using Java version 1.4 or later from SUN.

HTTP Connections

The following connection rules must be observed:

- 1 connected Internet browser can open 2 connections, and the TSX ETG 1000 allows a maximum of 32 connections,
- each HTTP connection closes automatically after one minute of inactivity,
- the connection remains active when passwords are being entered.

This means that up to 16 Internet browsers can be connected to one TSX ETG 1000 module.

When the maximum number of HTTP connections is reached, the following screen is displayed:

Home Page for the HTTP Server

Presentation

This page is the website home page. It is used to access the service pages on the site:

- The module diagnostics access page: **Diagnostics**
- the **Monitoring** page
- the module configuration access page: **Setup**

Note: On this home page you can also choose the language you wish to use to navigate the various service pages and determine the product version.

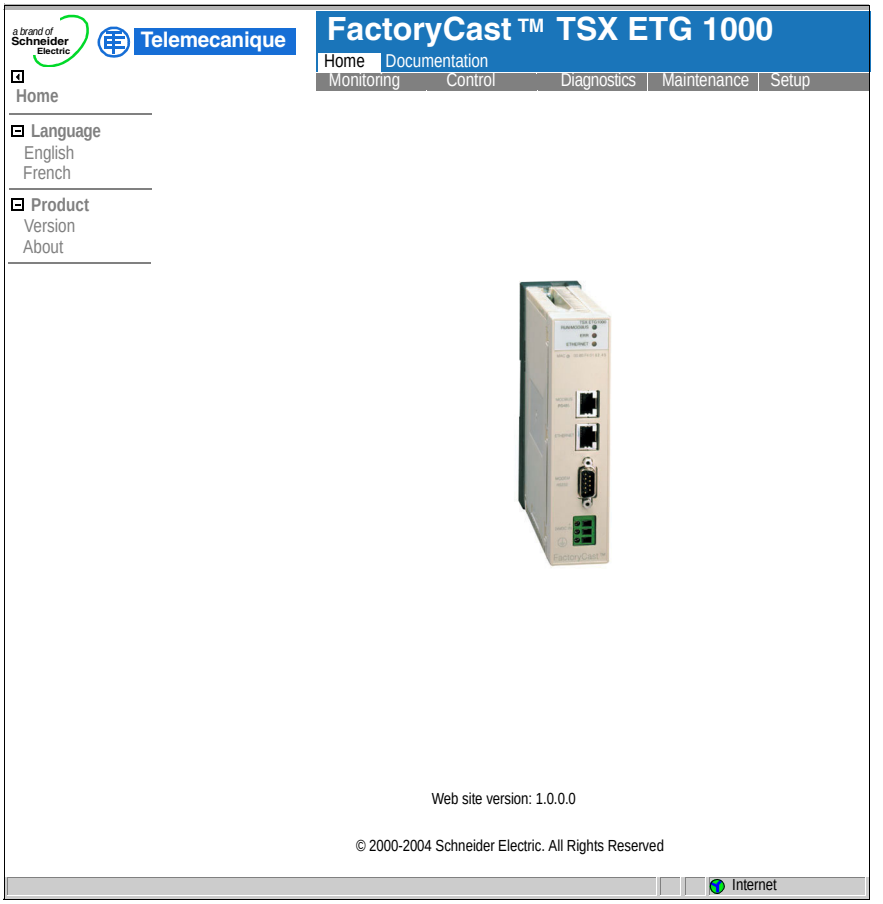
Accessing the Home Page

The procedure below shows how to access the website home page.

Step	Action
1	Open your usual browser.
2	Enter the IP address of the ETHERNET module in the **Address** zone

Illustration

The TSX ETG 1000 home page looks like this:



Note: The Documentation link allows you to access and open product documentation in HTML format.

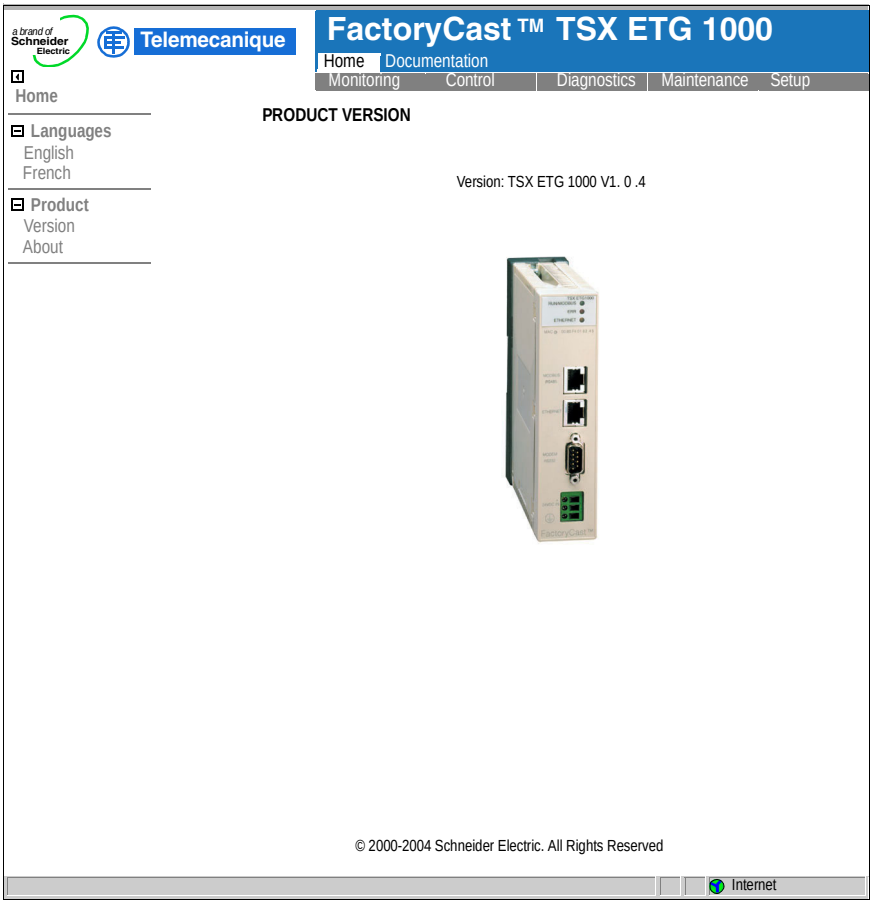
TSX ETG 1000 Version Page

At a Glance

This page gives the version of the TSX ETG 1000 module.

Illustration

The TSX ETG 1000 version page is shown below:



Diagnostics Home Page

Home Page

This page lists the various diagnostic services supported by the web server of the TSX ETG 1000 module and provides links for accessing the service you require.

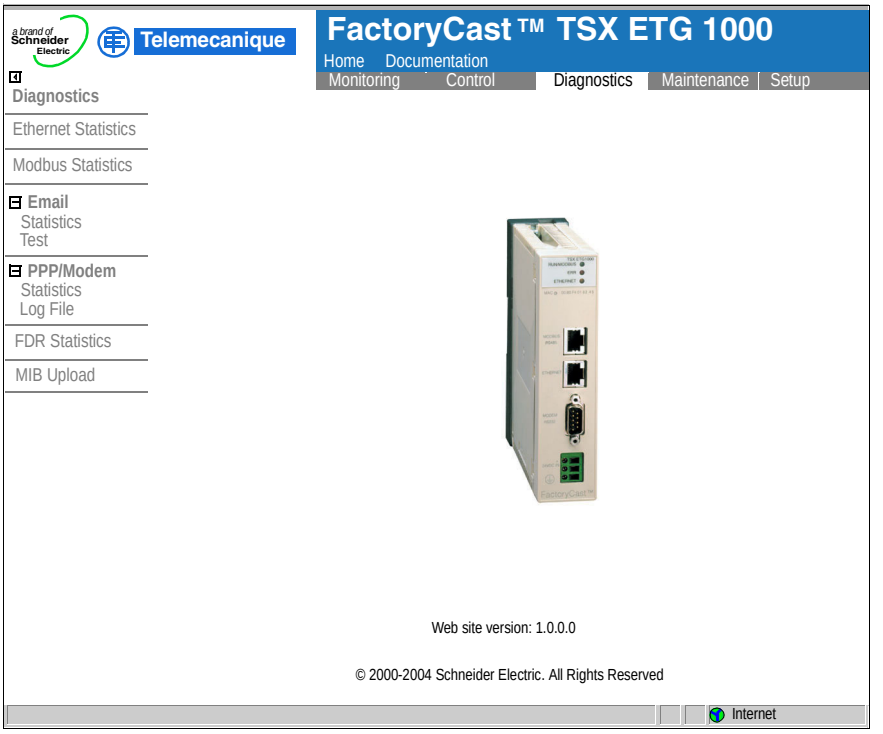
Accessing the Diagnostics Page

To access the Diagnostics page, follow the steps below:

Step	Action
1	Click the **Diagnostics** link on the Home page. Click one of the services offered on the Diagnostics home page.
2	**Result:** a window opens, asking for your user name and password. Enter your user name and password (these fields are case-sensitive). **Note**: The default values are as follows: ● user name: **USER** ● password: **USER**
3	Click OK to confirm.

Illustration

The Diagnostics home page looks like this:



To access the service you require, click on one of the following links:

- Ethernet statistics to find out about managing the diagnostics counters for Ethernet communications,
- Modbus statistics to find out about managing the diagnostics counters for messaging, timeout and CRC counters for Modbus messages,
- email Statistics to find out about managing the diagnostics counters for messaging,
- email test to simulate sending alarms by email,
- PPP statistics to find out about managing diagnostic and IP address counters for PPP communications,
- log file to view the modem connection log file,
- FDR statistics to find out about managing the diagnostic parameters and counters for the FDR service(Faulty Device Remplacement),
- MIB upload to upload the module MIB (Management Information Base) onto the PC.

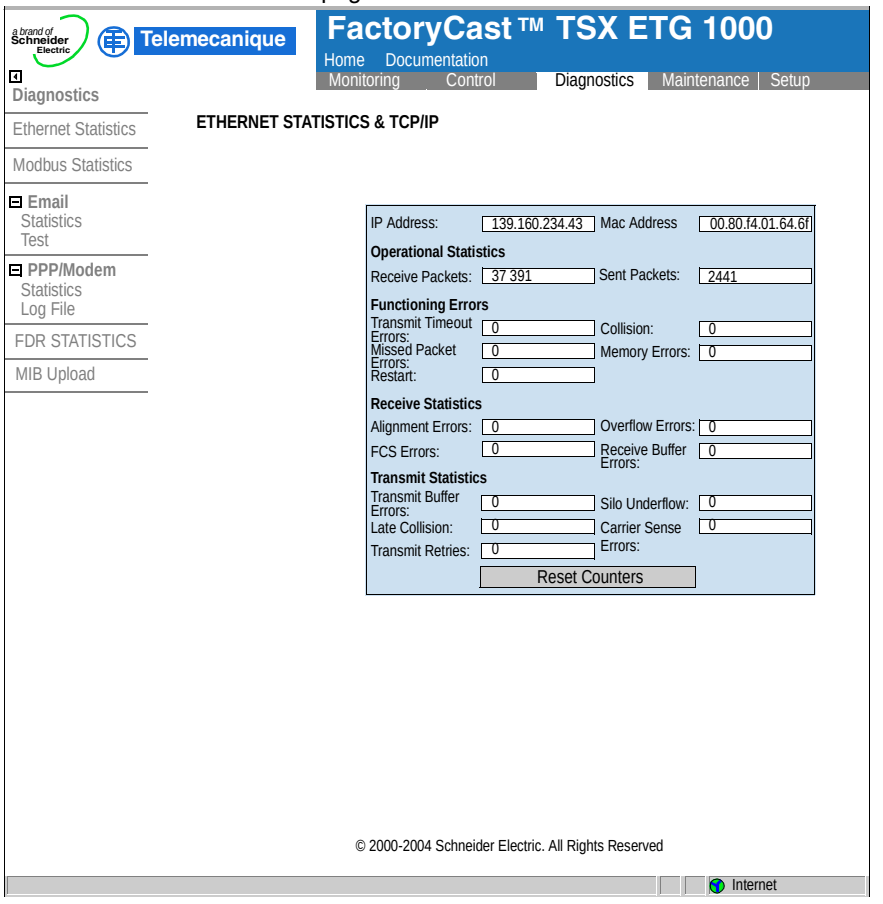
Ethernet Statistics Page

At a Glance

This page provides statistics about the Ethernet network. It can be used to perform diagnostics on a network.

Illustration

View of the Ethernet Statistics page for a TSX ETG 1000:



Modbus Statistics Page

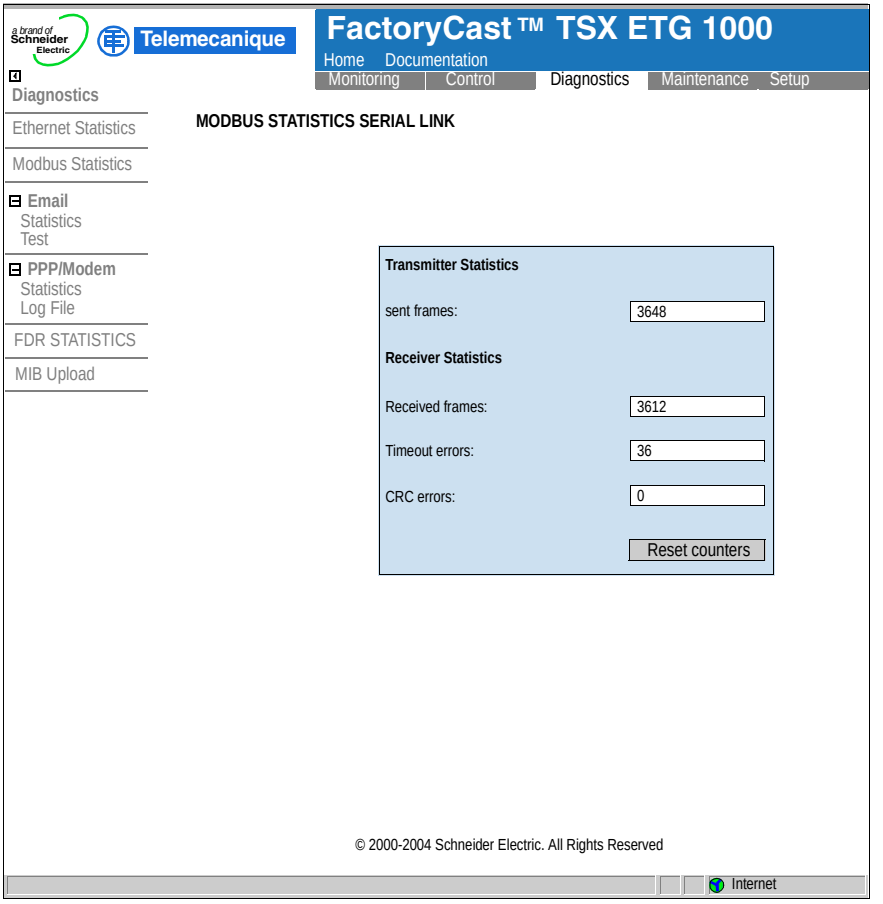
At a Glance

This page provides statistics about the Modbus network. It can be used to perform diagnostics on a network.
It provides access to the following counters:

- number of frames sent
- Number of frames received
- number of Modbus requests received with no response
- number of responses received with CRC errors

Illustration

View of the Modbus Statistics page for a TSX ETG 1000:



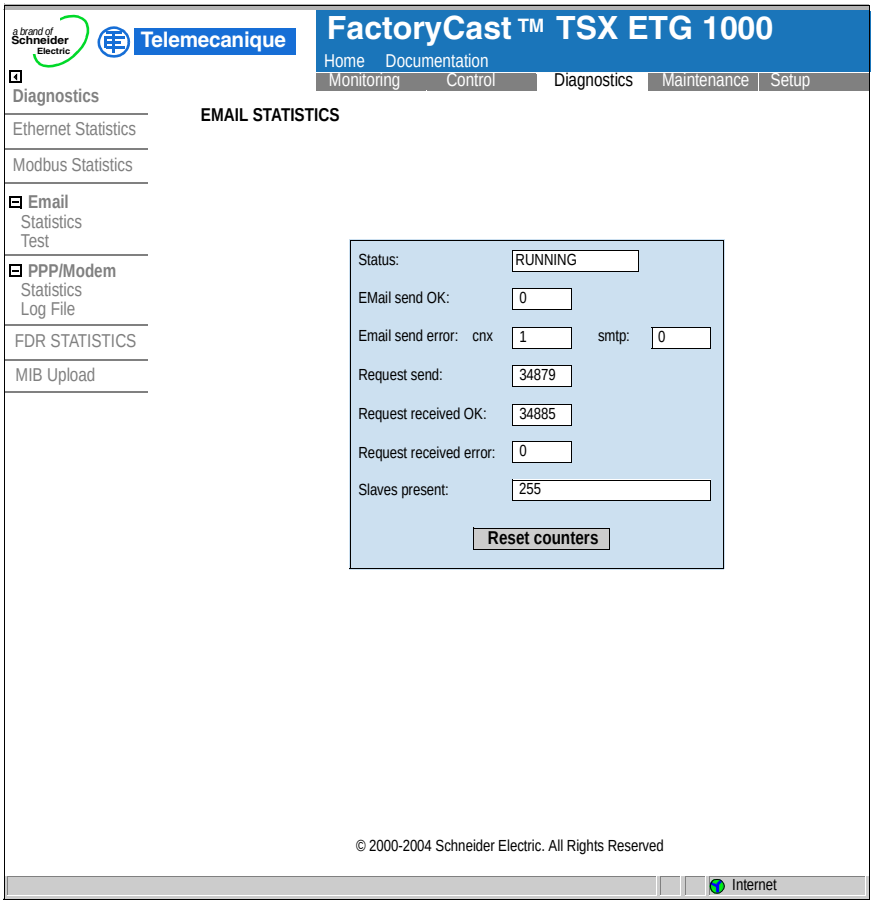
Email Statistics Page

At a Glance

This page can be used to view the status of the email service.

Illustration

View of the email statistics page:



Parameters

Description of parameters:

Text	Description
Status	Indicates the status of the email function: ● Not configured: no alarms declared in the **alarm configuration** page, ● Inactive: alarms declared but actions disabled (Enable alarms: unchecked in the **alarm configuration page**), ● Running: alarms declared and action enabled (Enable alarms selected in the **alarm configuration** page).
Email send OK	Number of alarms sent without error.
Email send error cnx	Number of alarms sent with problem connecting to SMTP server.
Email send error smtp	Number of alarms sent with SMTP protocol error.
Email received OK	Number of responses to Modbus requests received without error.
Email received error OK	Number of responses to Modbus requests received with error.
Slaves present	List of Modbus slaves present (configured in the **alarm configuration** page).

Test Email Page

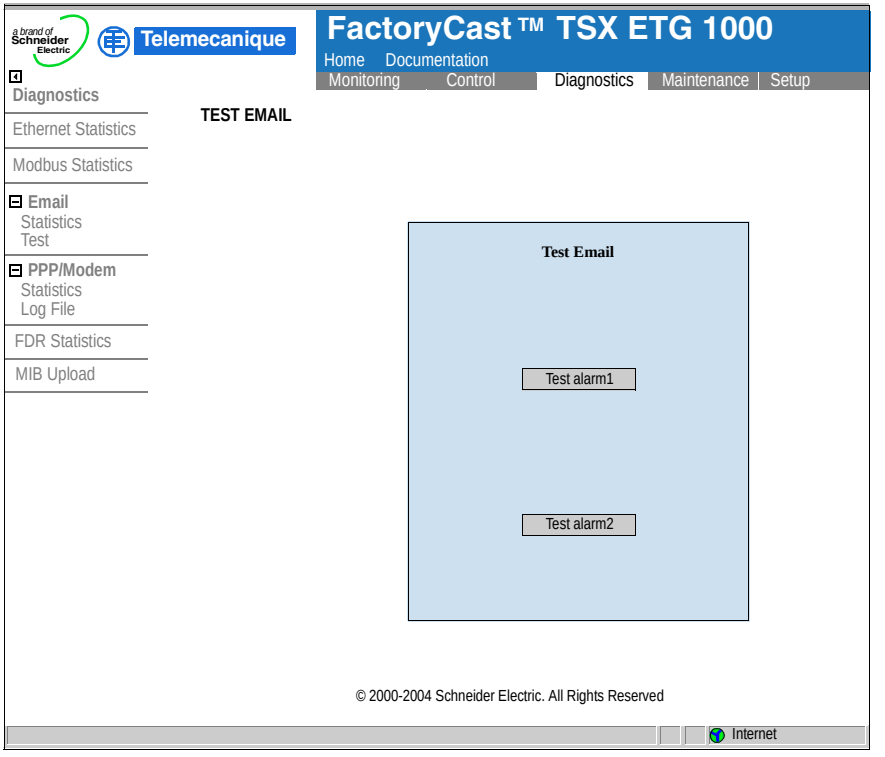
At a Glance

This page can be used to test the sending of an email with just one click.

Note: Before it can be used, you must configure at least one alarm in the alarm configuration page.

Illustration

View of the test email page:



There is one button per alarm; in this illustration two alarms have been configured so two buttons are displayed.

Note: To send an email, the page uses an internal module command register. If a command is in progress (status = -1), the email is not sent.

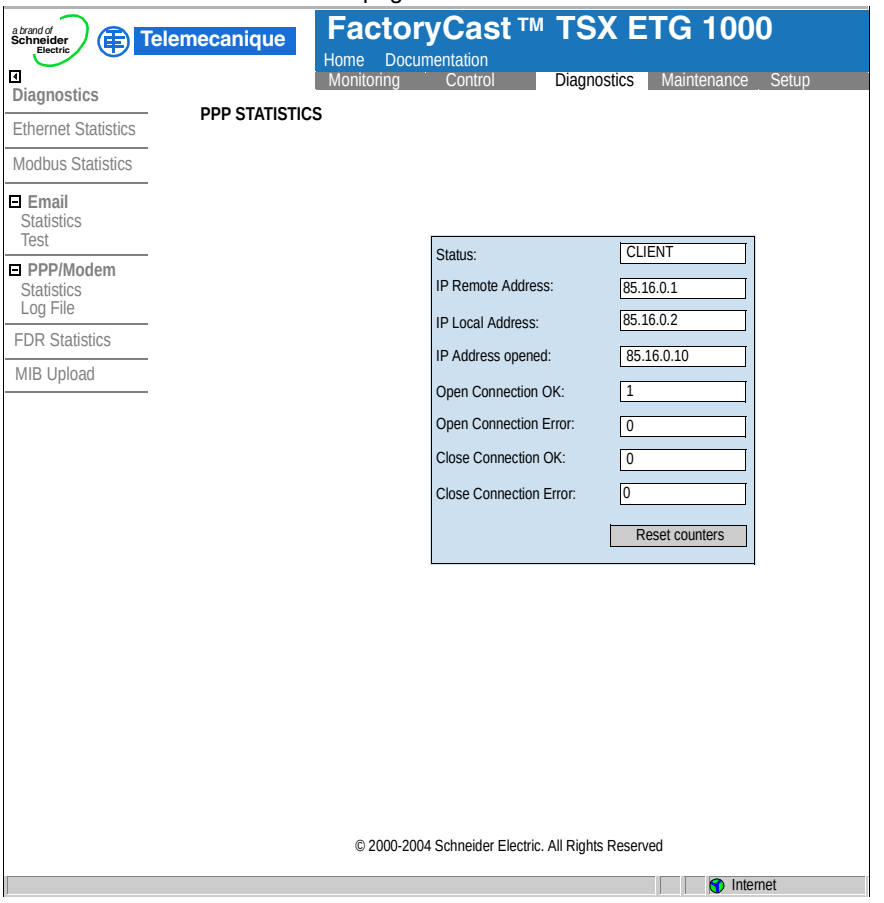
PPP/Modem Statistics Page

At a Glance

This page can be used to view PPP/modem statistics.

Illustration

View of the PPP/modem statistics page:



Parameters

Description of parameters:

Text	Description
Status	Indicates the status of the PPP connection: ● inactive if there is no connection, ● server if there is a remote connection, ● client if the TSX ETG 1000 is connected (command or sending email).
IP remote address	IP PPP address of the remote connection. If the PPP connection is closed IP=0.0.0.0.
IP local address	PPP IP address of the local connection (module). If the PPP connection is closed IP=0.0.0.0.
IP address opened	Current IP address opened for the PPP connection (for client connections only). If the PPP connection is closed IP=0.0.0.0.
Open connection OK	Number of PPP connection opened without error.
Open connection error	Number of PPP client connection opened with error (IP address error, no response from modem, line busy, etc.).
Close connection OK	Number of PPP connection closed without error.
Close connection error	Number of PPP client connection closed with error (IP address error, no response from modem, line busy, etc.).

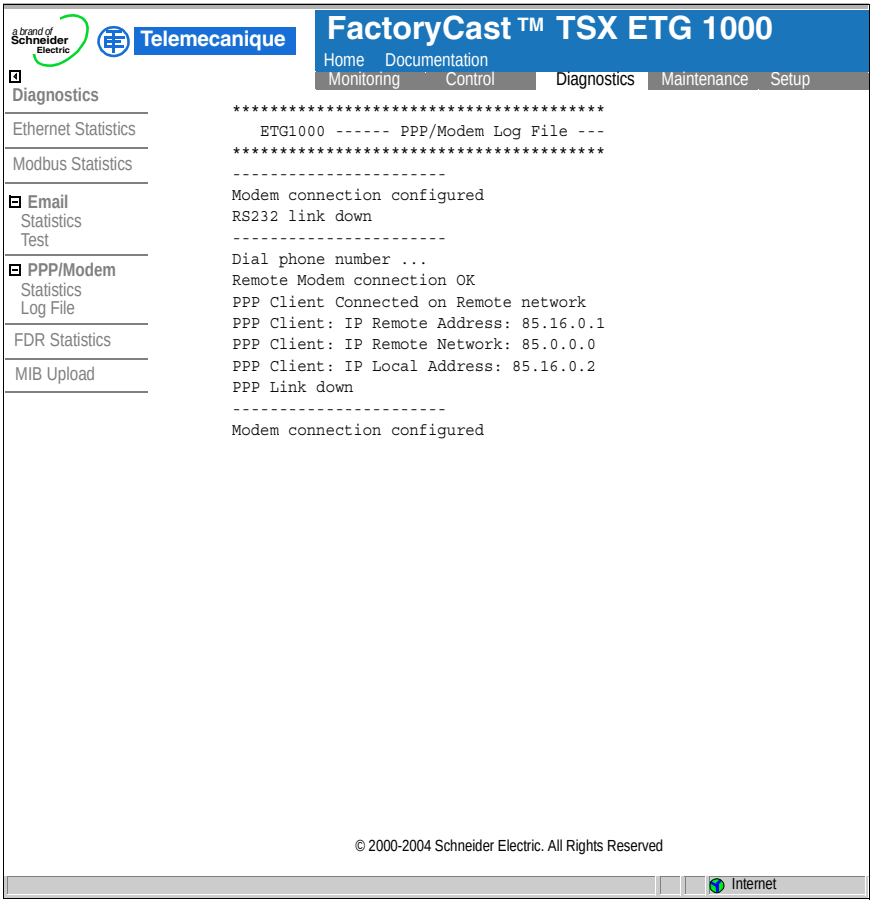
RS232 Modem Connection Diagnostics Page

At a Glance

This page can be used to perform diagnostics on the RS232 Modem connection.

Illustration

View of the PPP/Modem Log File page:



Description

This page displays a text file showing a log of the last four connections.
The following reports can be displayed:

Text	Meaning
Dial phone number...	The modem is dialing the remote telephone number.
No Remote Modem Answer	The remote modem is not responding.
Remote Modem connection OK	The modem connection has been established.
Phone line busy	The remote modem is already connected.
Phone Line Error	Faulty connection on the phone line.
No Modem Answer	The local modem is not responding.
PPP Client Connected on Remote Network	The local client has connected to a network or a remote station.
PPP Client: IP Remote Address: xx.xx.xx.xx	IP address of the station called.
PPP Client: IP Remote Network: xx.xx.xx.xx	IP network number of the station called.
PPP Client: IP Local Address: xx.xx.xx.xx	Local IP address of the station that is calling.
PPP Client Connection Error	No PPP connection has been established (password or IP address problem).
Direct cable connection configured	The RS232 connection is ready for a cable connection.
Modem connection configured	A modem connection has been configured.
PPP server ok	A call from a remote station has been established.
PPP server: IP Remote Address	IP address of the remote station that is calling.
PPP server: IP Local Address	Local IP address of the station.
RS232 lind down	Communication interrupted (cable disconnected, etc.). **Caution**: this report is normal before the modem dials the remote number (Dial phone number).
PPP connection timeout expired	Connection timeout detected, communication has been interrupted.
PPP link down	Modem communication has been interrupted.

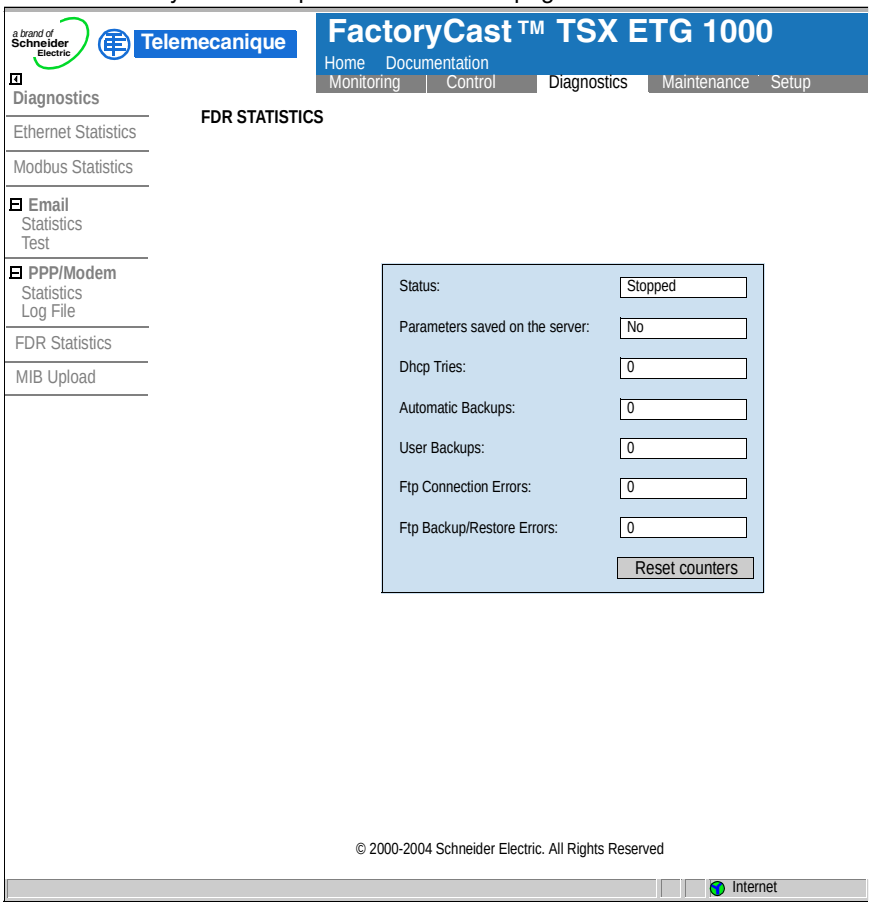
Statistics Page for Faulty Device Replacement - FDR

At a Glance

This page can be used to perform diagnostics on the Faulty Device Replacement (FDR) function.

Illustration

View of the Faulty Device Replacement statistics page for a TSX ETG 1000:



Parameters

Description of parameters:

Text	Description
Status	Indicates the status of the FDR function: ● Starting, Running, Stopped, Error.
Parameters saved on server	Parameters saved on server: ● Yes, No. This information is only relevant if the FDR function is enabled.
Dhcp Tries	Total number of DHCP tries.
Automatic Backups	Total number of successful automatic backups of the TSX ETG 1000 configuration to the server.
User Backups	Total number of successful backups of the TSX ETG 1000 configuration to the server, initiated by the user by means of the button on the Force Backup of the **Client FDR** (See *Command Area, p. 112*) page.
Ftp Connections Errors	Number of failed FTP connections in FDR mode. This error counter shows FTP errors other than configuration file write or read errors.
Ftp Backup/Restore Errors	Number of failed configuration file backup or restore attempts by FTP in FDR mode.

MIB Upload Page

Presentation

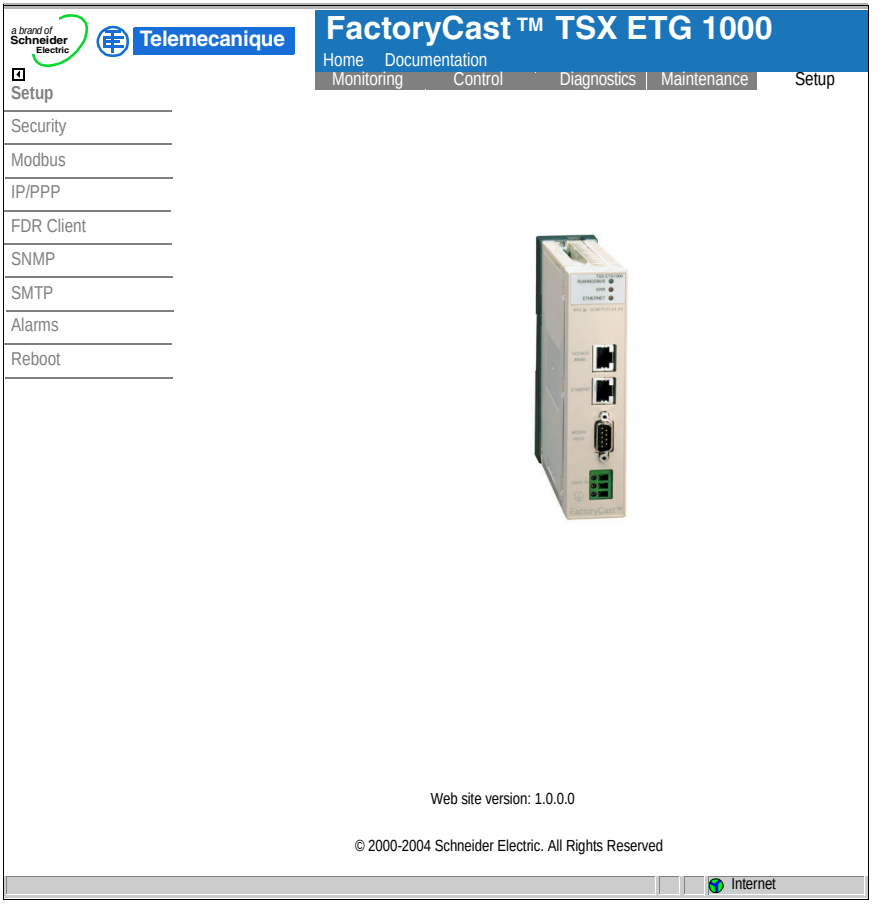
This page is used to upload the MIB of the TSX ETG 1000 to a PC connected to the module.

TSX ETG 1000 Setup Home Page

Home Page	This page lists the various setup services supported by the default web server of the TSX ETG 1000 module and provides links for accessing the service you require.
Accessing the Setup Page	To access the setup page, click Setup. You will be asked to enter your user name and password to access the services (default is USER).

Illustration

The Online Setup home page looks like this:



To access the service you require, click one of the links.

- Security to configure user name or password
- Modbus to configure the Modbus serial connection
- IP/PPP to configure IP and PPP services
- FDR Client to configure the choice of BootP or DHCP
- SNMP to configure the SNMP service
- SMTP to inform the SMTP server module
- Alarms to configure remote email alarms
- Reboot to reinitialize the module

Security Page

Presentation

For HTTP access, this page allows you to change:

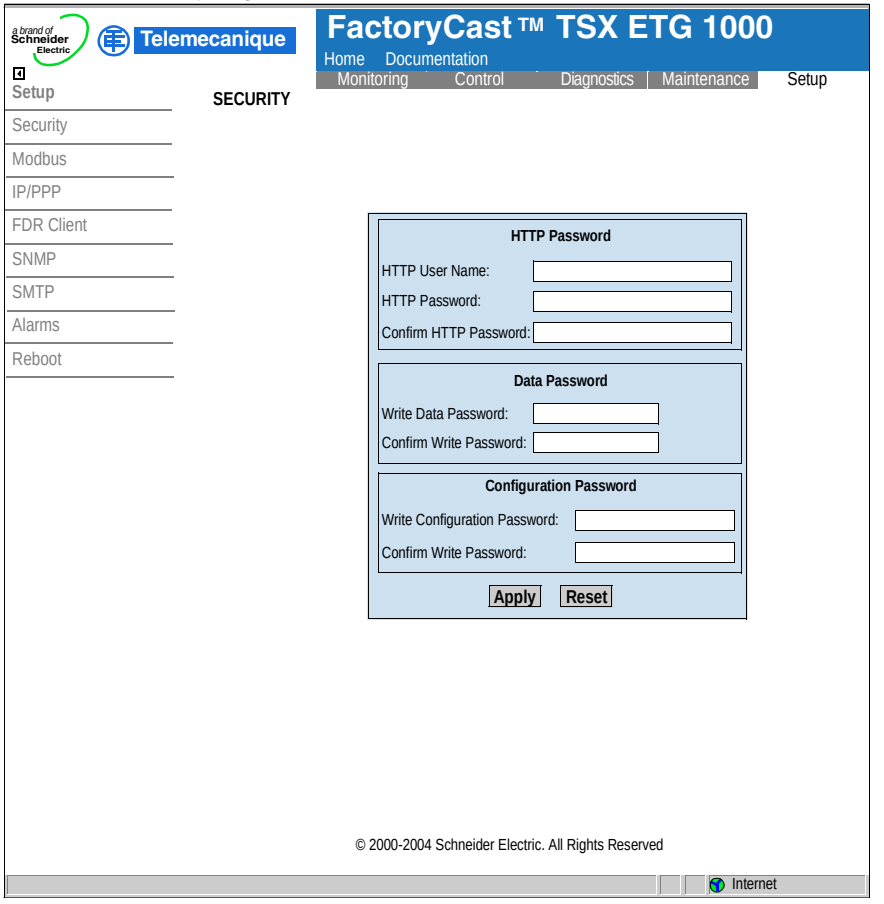
- The user name and password to access the home page
- The password for writing variables to the data editor
- The password for accessing the configuration parameters

The maximum length of the user name and password is 15 characters (a-z, A-Z and 0-9).

The default values for the Username/Password fields protecting Web page access are **USER/USER**.

Illustration

View of the Security page for a TSX ETG 1000 :



Modifying HTTP Access Rights

The procedure is as follows:

Step	Action
1	Enter the new **User Name**.
2	Enter the new password.
3	Confirm the new password.
4	Confirm the change by clicking the Apply button. **Result:** a confirmation window appears.
5	Click Reboot for the changes to take effect in the module.

Changing the Data Password

The procedure is as follows:

Step	Action
1	Enter the current password (field is case-sensitive).
2	Enter the new password.
3	Confirm the new password.
4	Confirm the change by clicking the Apply button. **Result:** a confirmation window appears.
5	Click **OK** for the changes to take effect in the module. **Result:** a window appears to confirm that the password has been changed successfully.

Changing the Configuration Password

The procedure is as follows:

Step	Action
1	Enter the current password (field is case-sensitive).
2	Enter the new password.
3	Confirm the new password.
4	Confirm the change by clicking the Apply button. **Result:** a confirmation window appears.
5	Click **OK** for the changes to take effect in the module. **Result:** a window appears to confirm that the password has been changed successfully.

TCP/IP Services Configuration Page

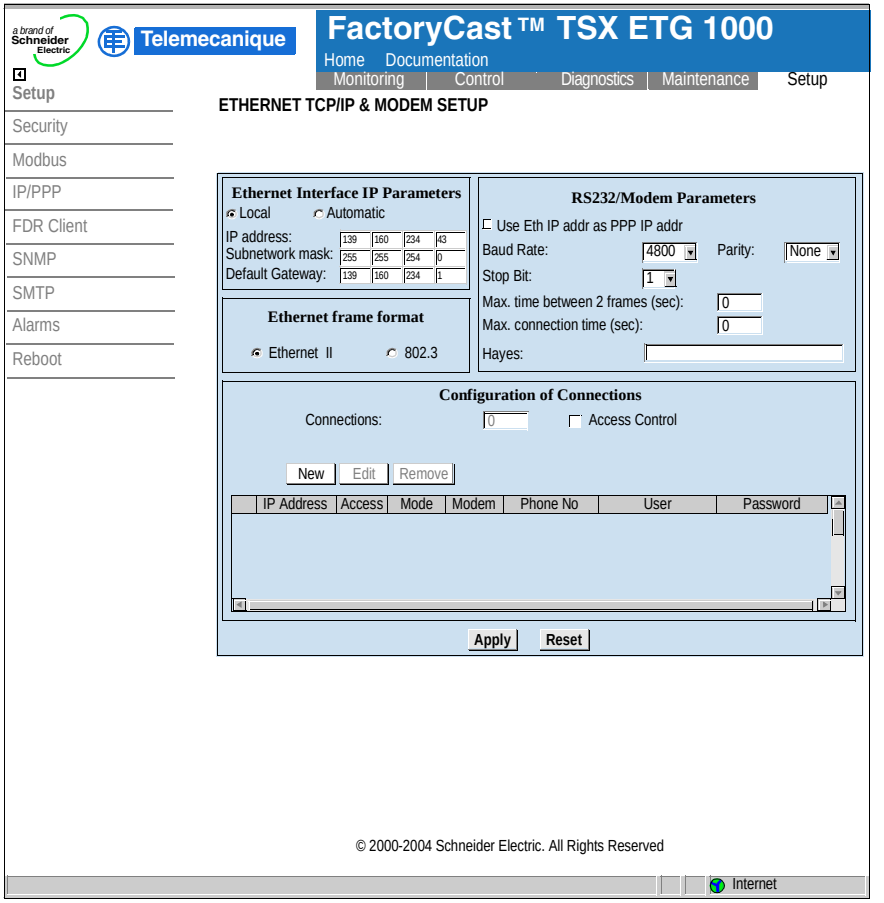
Presentation

This page is used to configure TCP/IP services for the TSX ETG 1000 module.

Note: Write access is controlled by a password (**Security**) whose default value is **USER**.
The contents of this page are described in more detail in IP/PPP Configuration for the TSX ETG Module (See *Configuration Parameters for TCP/IP Services, p. 108*).

Illustration

View of the IP Configuration page:



Modbus Connection Configuration Page

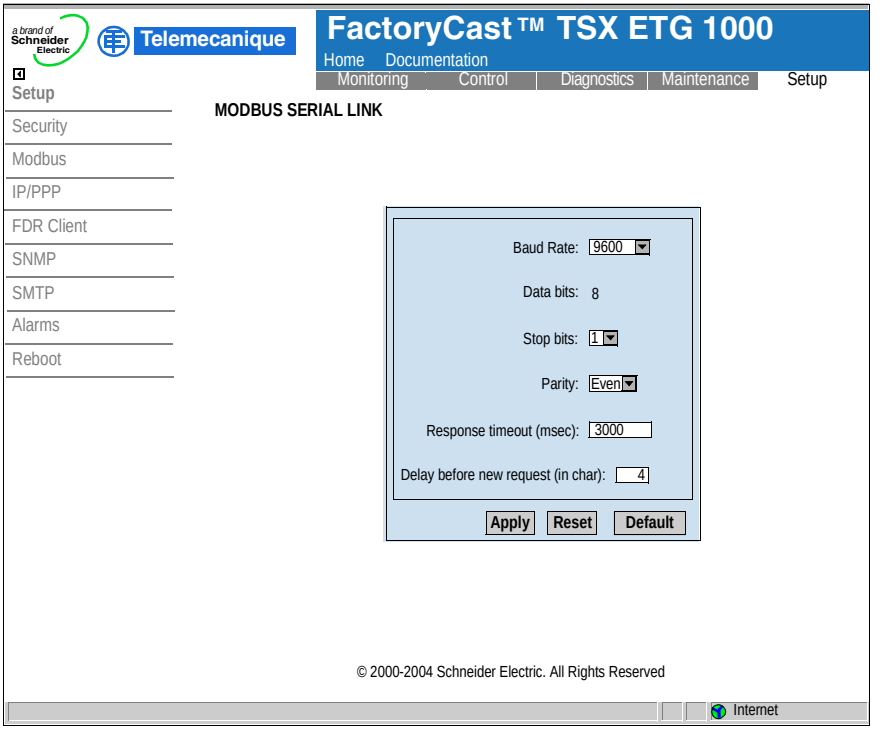
Presentation

This page is used to configure the Modbus function for the TSX ETG 1000 module.

Note: Write access is controlled by a password (**Security**) whose default value is **USER**.
The contents of this page are described in more detail in Modbus Configuration for the TSX ETG 1000 Module (See *Configuration Parameters for the Modbus Link, p. 110*).

Illustration

View of the Modbus Configuration page:



Automatic Configuration Page

Presentation

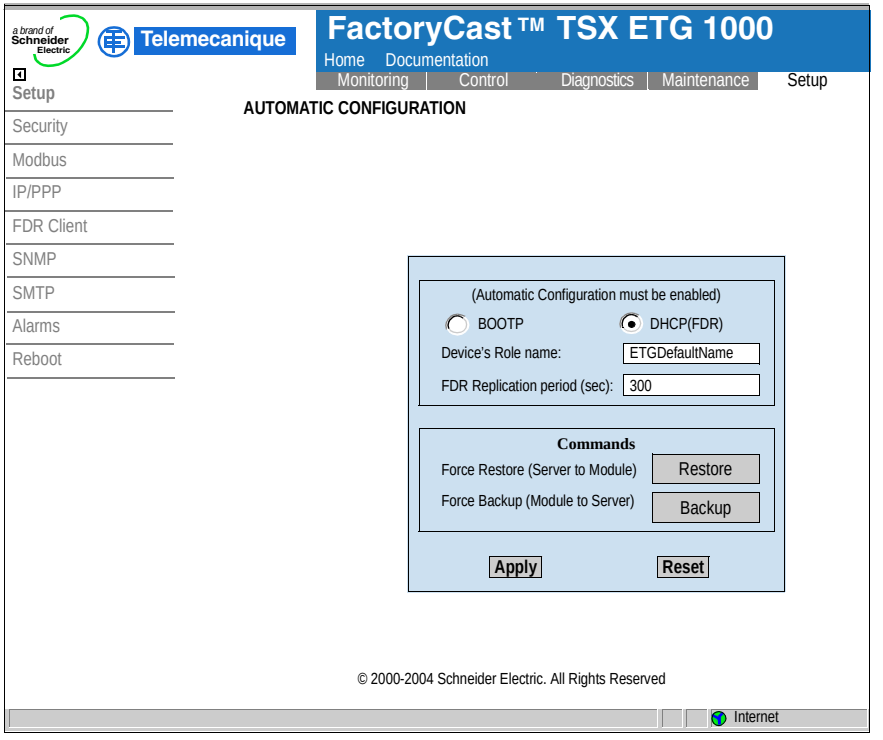
This page is used to configure the TSX ETG 1000 module as BOOTP or DHCP(FDR) client.

Note: Important: The Automatic Configuration field must have been selected first in the **IP/PPP** (See *Configuration Parameters for TCP/IP Services, p. 108*) page.

Note: Write access is controlled by a password (**Security**) whose default value is **USER**.
The contents of this page are described in more detail in Automatic Configuration of the TSX ETG Module (See *Automatic Configuration, p. 111*).

Illustration

View of the FDR Client page:



SNMP Function Configuration Page

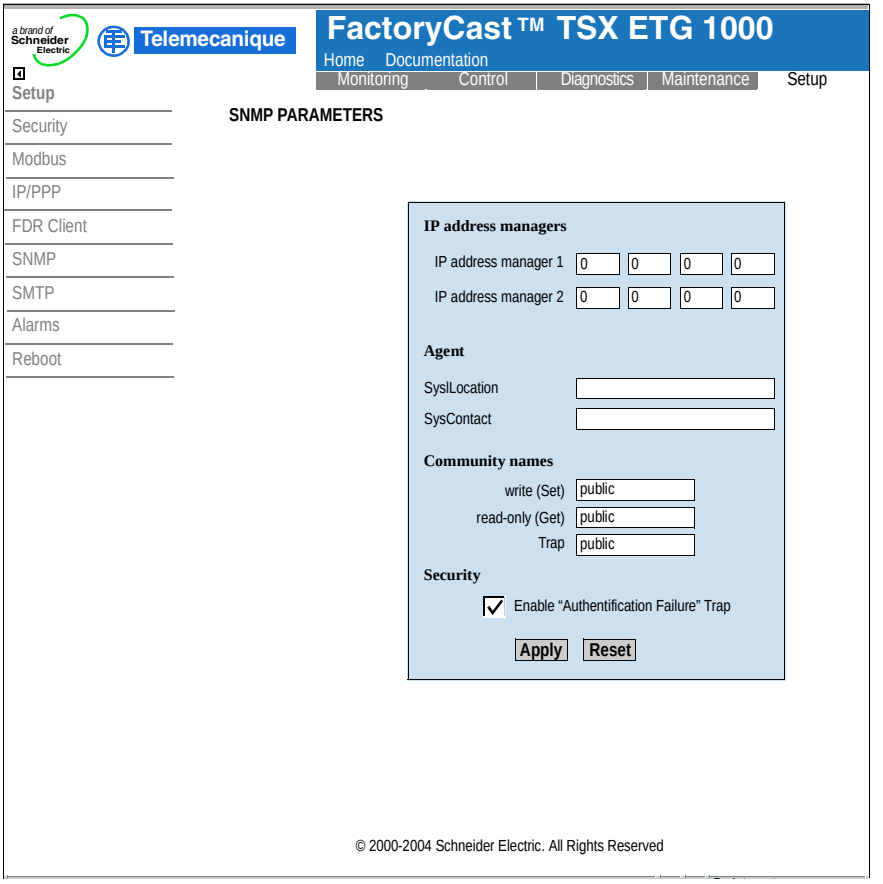
Presentation

This page is used to configure the SNMP function for the TSX ETG 1000 module.

Note: Write access is controlled by a password (**Security**) whose default value is **USER**.
The contents of this page are described in more detail in SNMP Service Configuration (See *SNMP Service Configuration, p. 113*).

Illustration

View of the SNMP Configuration page:



SMTP Function Configuration Page

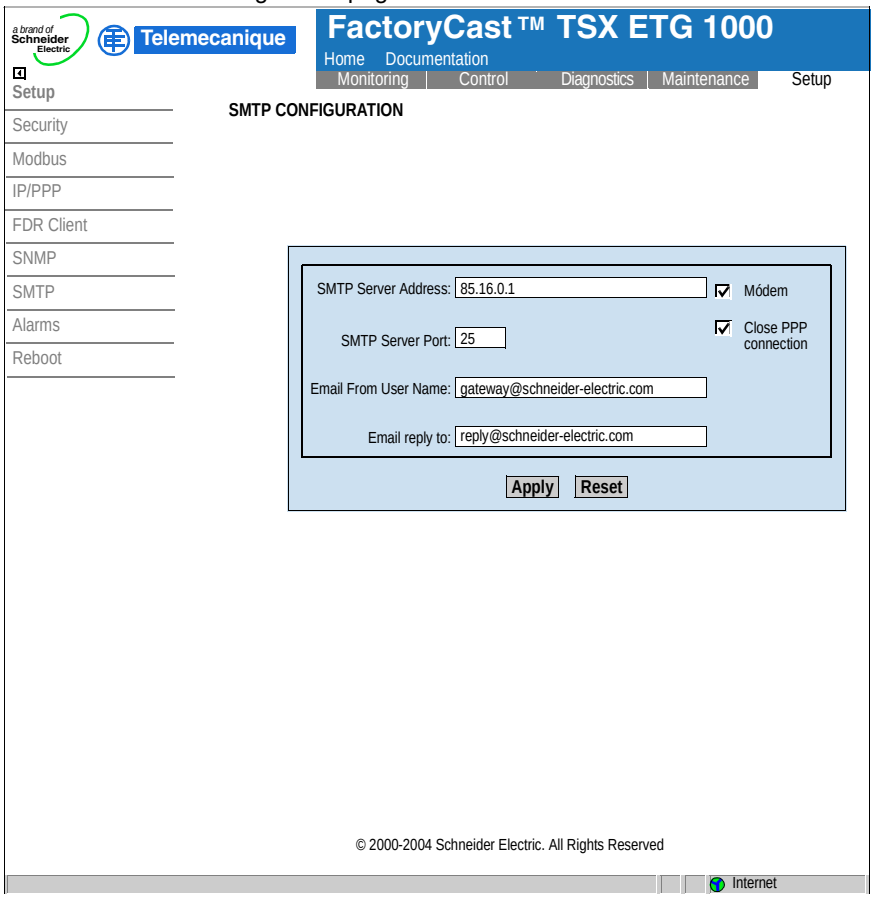
Presentation

This page is used to configure the SMTP function for the TSX ETG 1000 module.

Note: Write access is controlled by a password (**Security**) whose default value is **USER**.
The contents of this page are described in SMTP Service Configuration (See *SMTP Service Configuration, p. 116*).

Illustration

View of the SMTP Configuration page:



Alarm Configuration Page

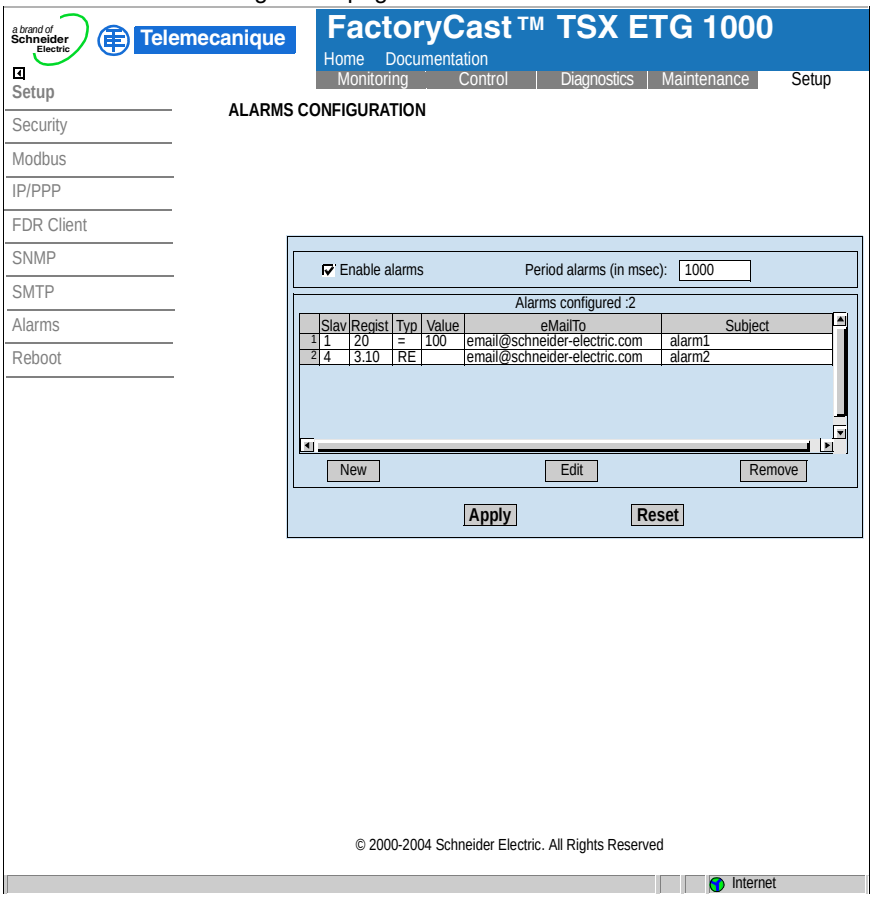
Presentation

This page is used to configure email alarms for the TSX ETG 1000 module.

Note: Write access is controlled by a password (**Security**) whose default value is **USER**.
The contents of this page are described in Alarm Configuration (See *Alarm Configuration, p. 117*).

Illustration

View of the SMTP Configuration page:



Module Reboot Page

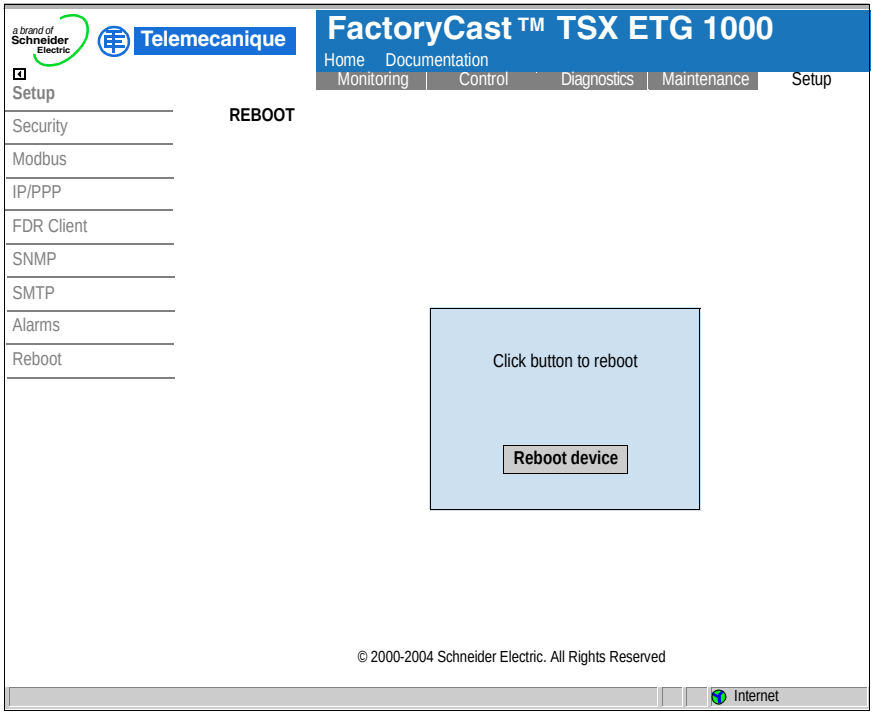
Presentation

This page is used to reinitialize the TSX ETG 1000 module. The module must be reinitialized (rebooted) in order for new configuration parameters to take effect. All connections are broken when the module is rebooted.

Note: Rebooting is controlled by a **security** password whose default value is **USER**.

Illustration

View of the Reboot page:



Monitoring Pages for the TSX ETG 1000

Home Page

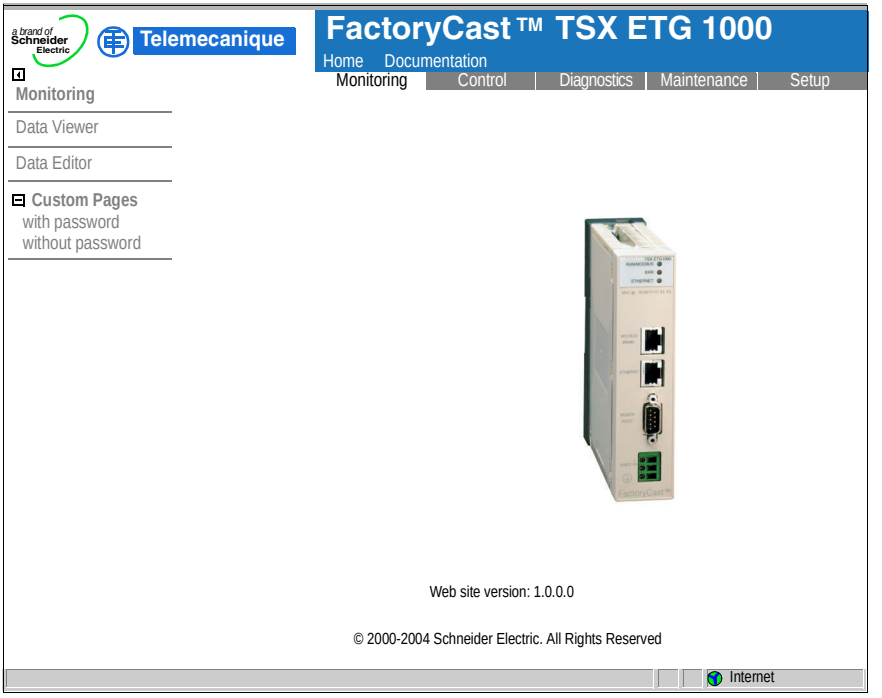
This page lists the various monitoring services supported by the default web server of the TSX ETG 1000 module and provides links for accessing the services you require.

Accessing the Setup Page

Click on Monitoring. The various services are displayed on the left of the window.

Illustration

The Monitoring home page looks like this:



To access the service you require, click one of the links.

- Data Viewer to access data tables created by the user with the data editor.
- Data Editor to create data tables for Modbus device or module variables so that the values can be displayed in the table animation.
- Custom Pages with password to view screen pages (accessible with password) created by the user
- Custom Pages without password to view screen pages (accessible to all) created by the user

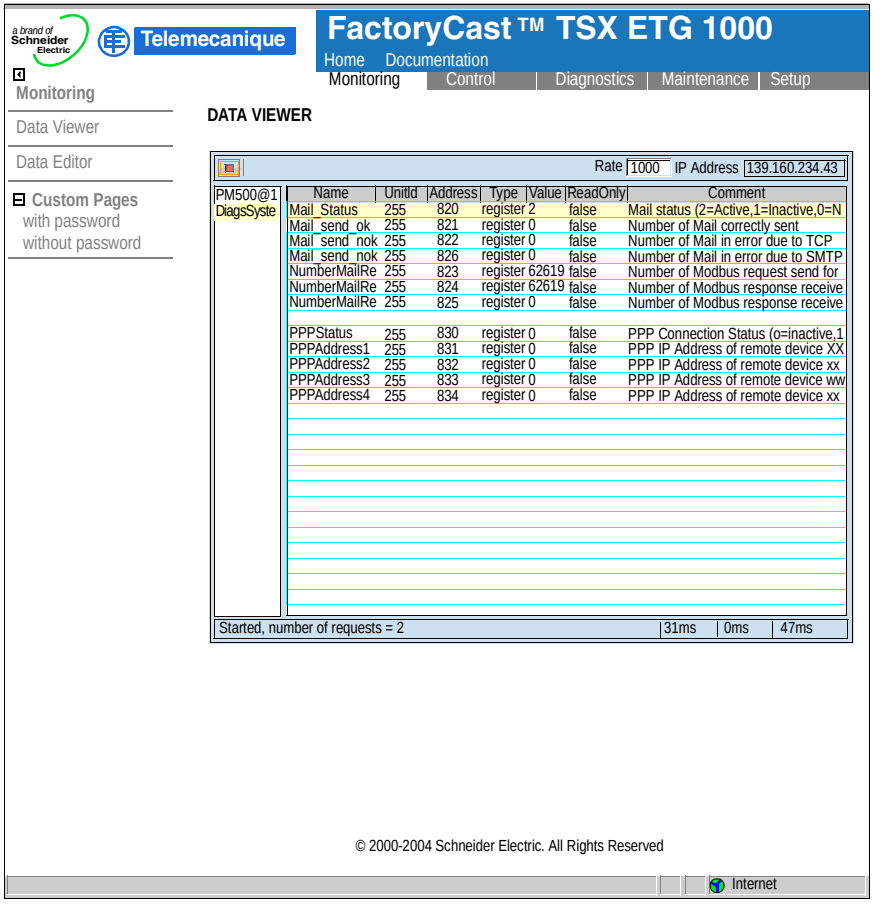
Data Viewer Page

At a Glance

This page can be used to view animation tables containing lists of Modbus device variables or internal module variables. This page cannot be used to create a table, to modify a variable or to force a variable value. The data viewer page uses the tables created by the data editor. The data viewer page is not password protected because it is only an animation page.

Illustration

View of the data viewer page for a TSX ETG 1000:



Note: In the left-hand field the window displays the available tables created by the editor. The user can select which table to display.

The variable comprises the following elements:

FIELD	FUNCTION
Name	Name of the variable (mnemonic)
UnitID	Address of the Modbus slave (1 to 255)
Address	Address of the register (0 to 65535)
Type	Data type: input or output register, input or output bit
Value	Value of the variable in unsigned decimal format; if there is a communication error the value is "????"
ReadOnly	If this box is selected the variable cannot be output directly
Comment	Comment about the variable

Note: The types of data are register, coil, discrete input, input register, int32 (most significant 32-bit word), int32swap (least significant 32-bit word).

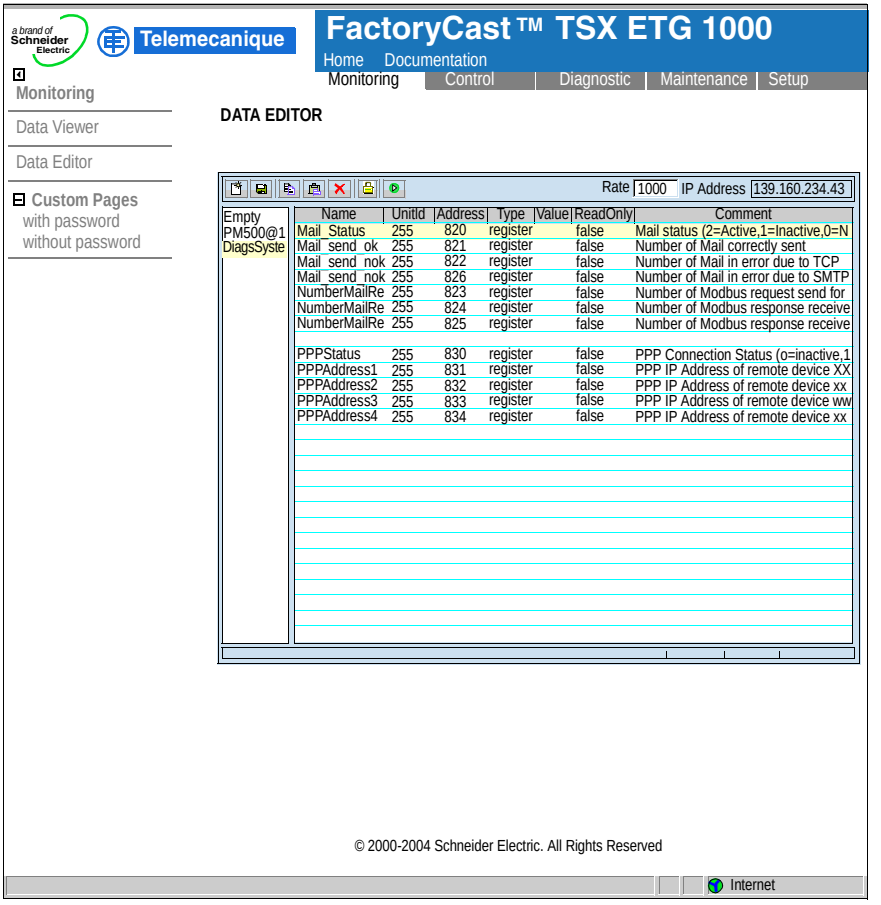
Data Editor Page

At a Glance

This page is used to create animation tables containing lists of PLC or device variables to be viewed or modified.

Illustration

View of the Data Editor page for a TSX ETG 1000:



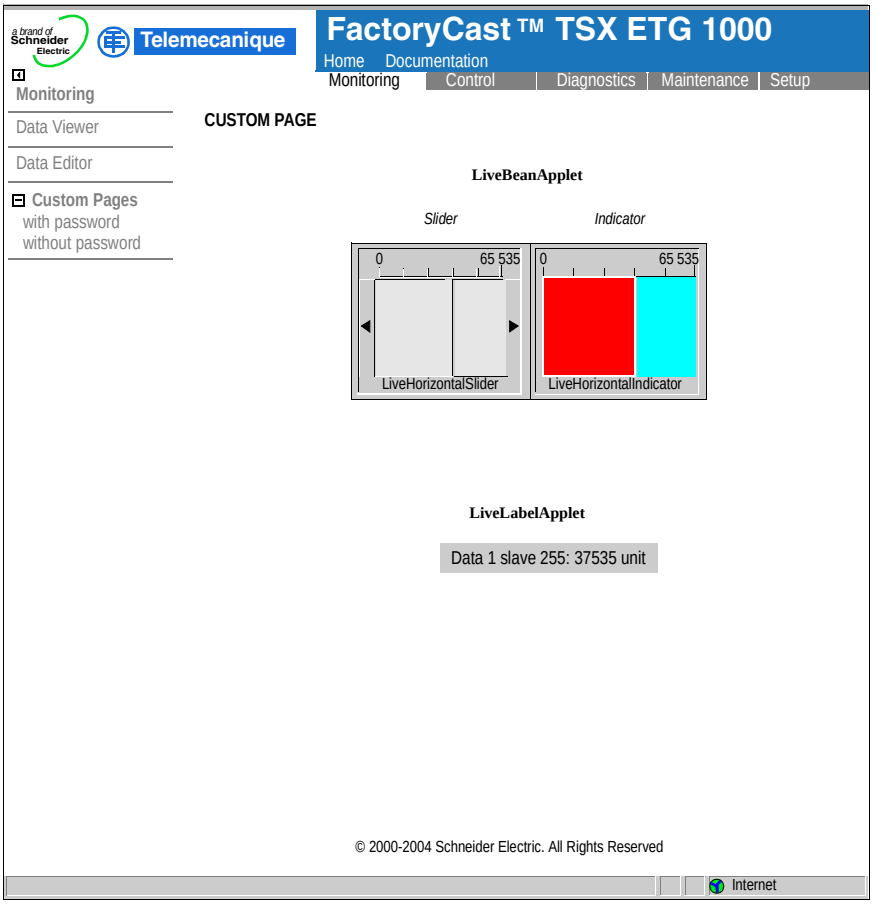
Custom Data Pages

At a Glance

This page gives access to pages created by the user with FrontPage or similar programs. These pages can be accessible to all (pages without password) or protected (with password). They allow the user to interpret Modbus device values more effectively (other than via a data table). The Creating Custom Pages (See *Creating Custom Pages, p. 127*) chapter provides information about creating and transferring pages.

Illustration

View of a custom page for a TSX ETG 1000:



Setting Up the TSX ETG 1000 Module

4

Presentation

Scope of this Chapter

This chapter describes how to set up the TSX ETG 1000 module.

What's in this Chapter?

This chapter contains the following sections:

4.1 Main Topologies

Presentation

Scope of this Section

This section describes the main connection topologies for the TSX ETG 1000 module.

What's in this Section?

This section contains the following topics:

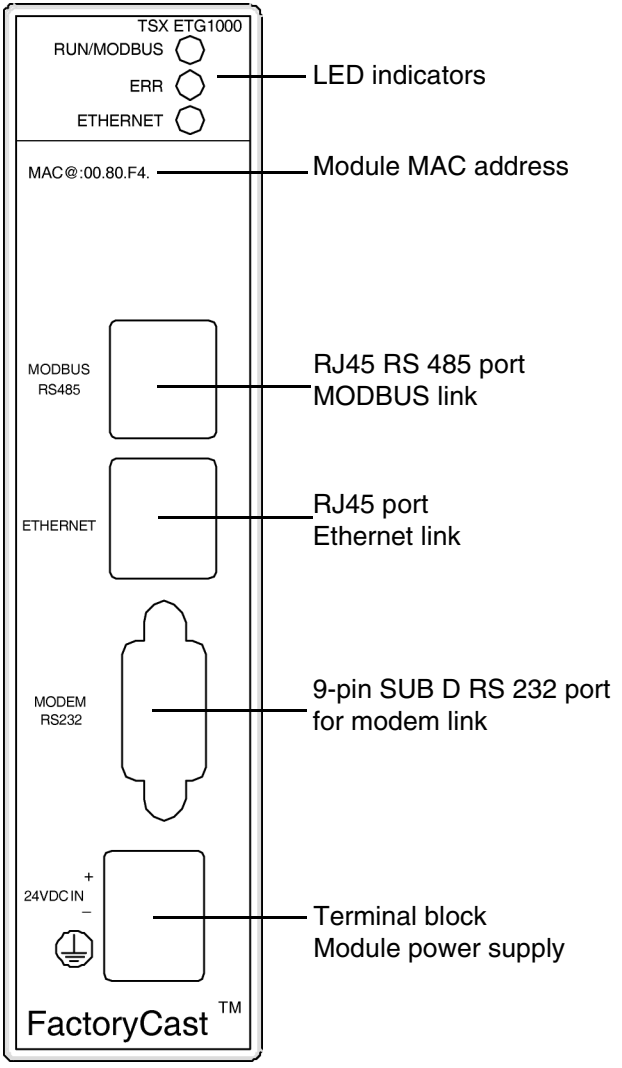
General

At a Glance

The TSX ETG 1000 is an autonomous module.
Its speed on the Ethernet medium (10/100 Mbps) is adjusted automatically. In order for the module to be used, it must be supplied with power and connected via a Modbus network to a Modbus slave.
The RUN/MODBUS LED flashes according to the Modbus communication speed (module configured for TCP/IP, etc.).
There is no concept of cold or warm startup for the module, since the memory is not saved when the power supply is disconnected.
When it is powered up, the module systematically performs a hardware and software reboot.

Front Panel

View of the TSX ETG 1000 module front panel:



Connection Options

At a Glance

The TSX ETG 1000 offers various types of connection option:

- for accessing device data,
- for accessing maintenance,
- for accessing the mail service,
- for the RAS function (Remote Access Service),
- For the routing function.

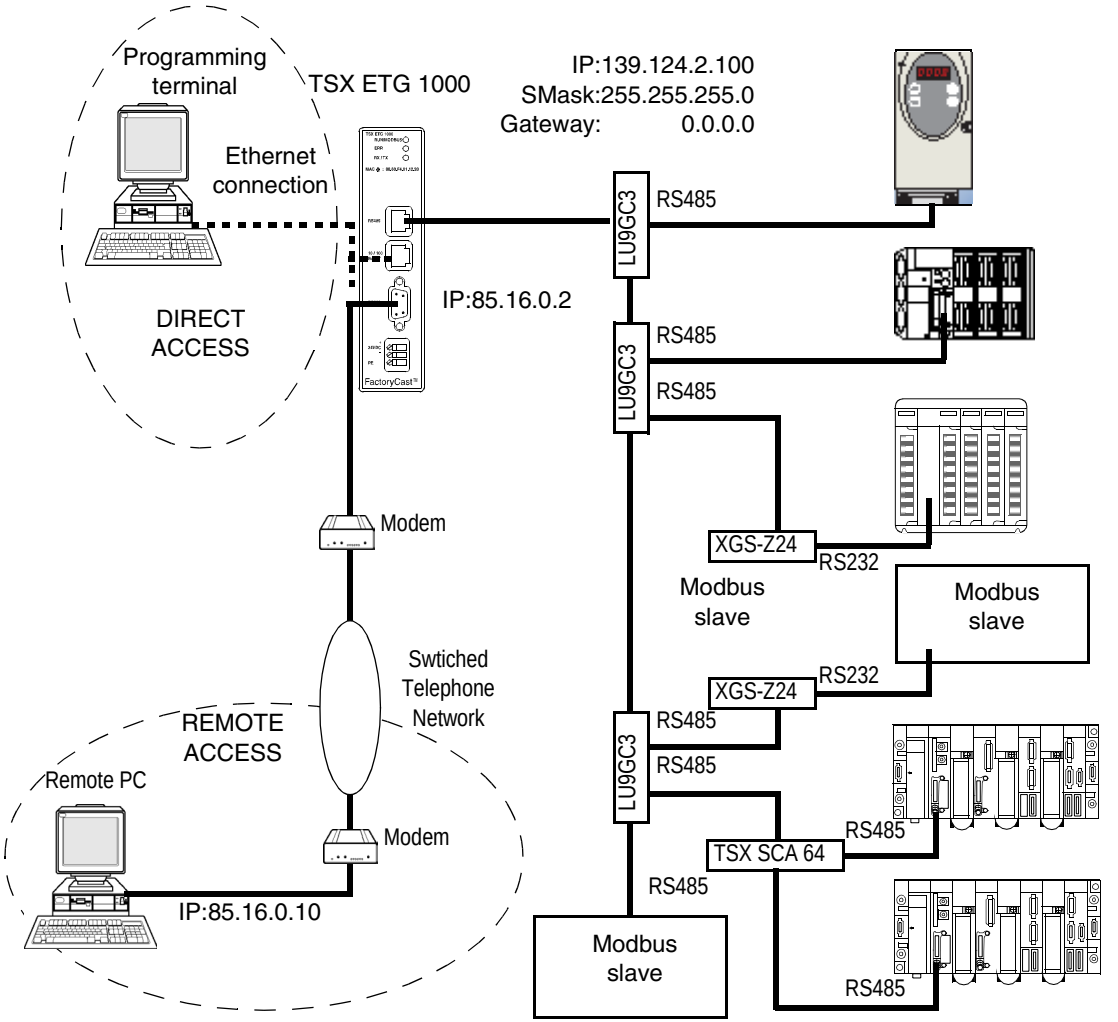
Connection for Accessing Registers

There are 3 ways of accessing remote device data:

- Directly, where the PC is connected directly to the module via the Ethernet network,
- Remotely, where the PC polls the module via the telephone network (via modem) and can therefore acquire Modbus device data,
- By a combination of the two (direct and remote), where the PC is connected to the module directly (via Ethernet) and remotely (via modem).

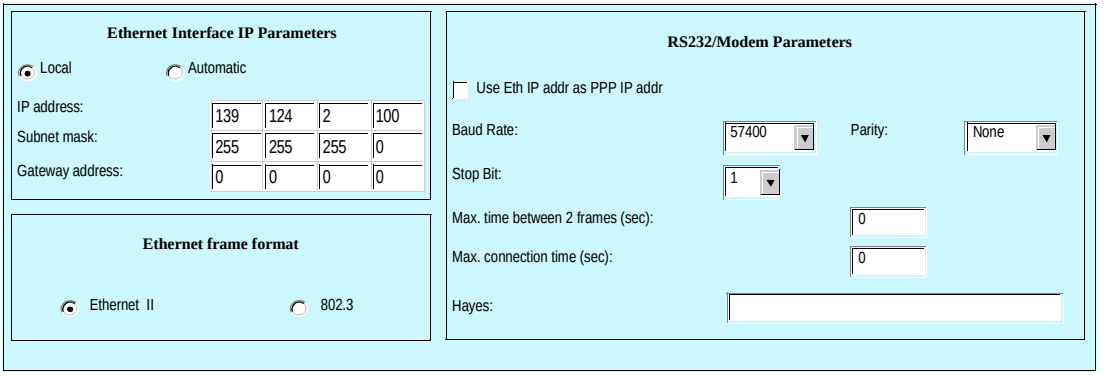
With any of these 3 connections, the user can access Modbus device data, HTML pages, variable tables, animation tables, and screen pages.

Connection example:



Note: To connect LU9GC3 to a TSX ETG 1000, you must use cable reference **VW3A8606R30** (RJ45-RJ45 cable).
To connect the LU9GC3 to a TSX SCA 62, you must use cable reference **VW3A8606R30** (RJ45-SUBD15M cable).

For this example the module must be configured in the IP/PPP Configuration page as follows:



Maintenance Connection

There are two ways of modifying a PLC program (for example) using the module:

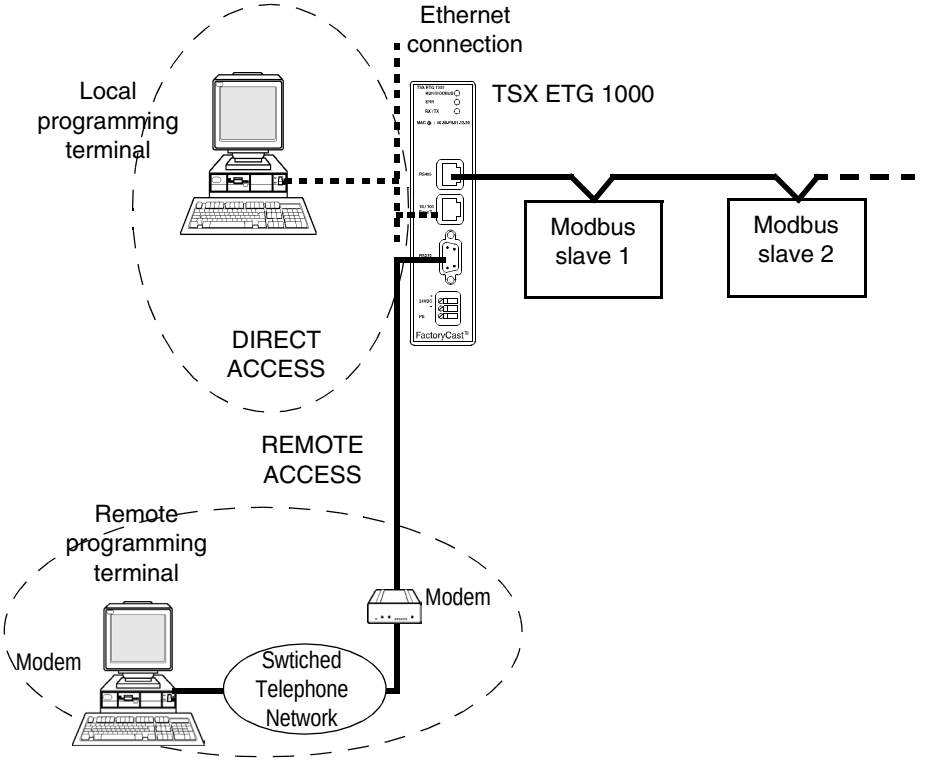
- directly, where the PC is connected directly to the module via the Ethernet network
- remotely, where the PC polls the module via the telephone connection (via modem)

Note: This type of connection is suitable for Twido, ATV 31, Quantum Unity, Premium Unity, etc.

Note: To connect a Twido to a TSX ETG 1000, you must use cable reference **TWDXCARJ030** (3 meter cable, Twido RJ45 miniDIN).

Note: To be sure of pointing to the correct slave, it is preferable to repatriate the data or program from the slave to the programming terminal to avoid any confusion before transferring from the terminal to the wrong slave.

Example:



Connection for Mail Service

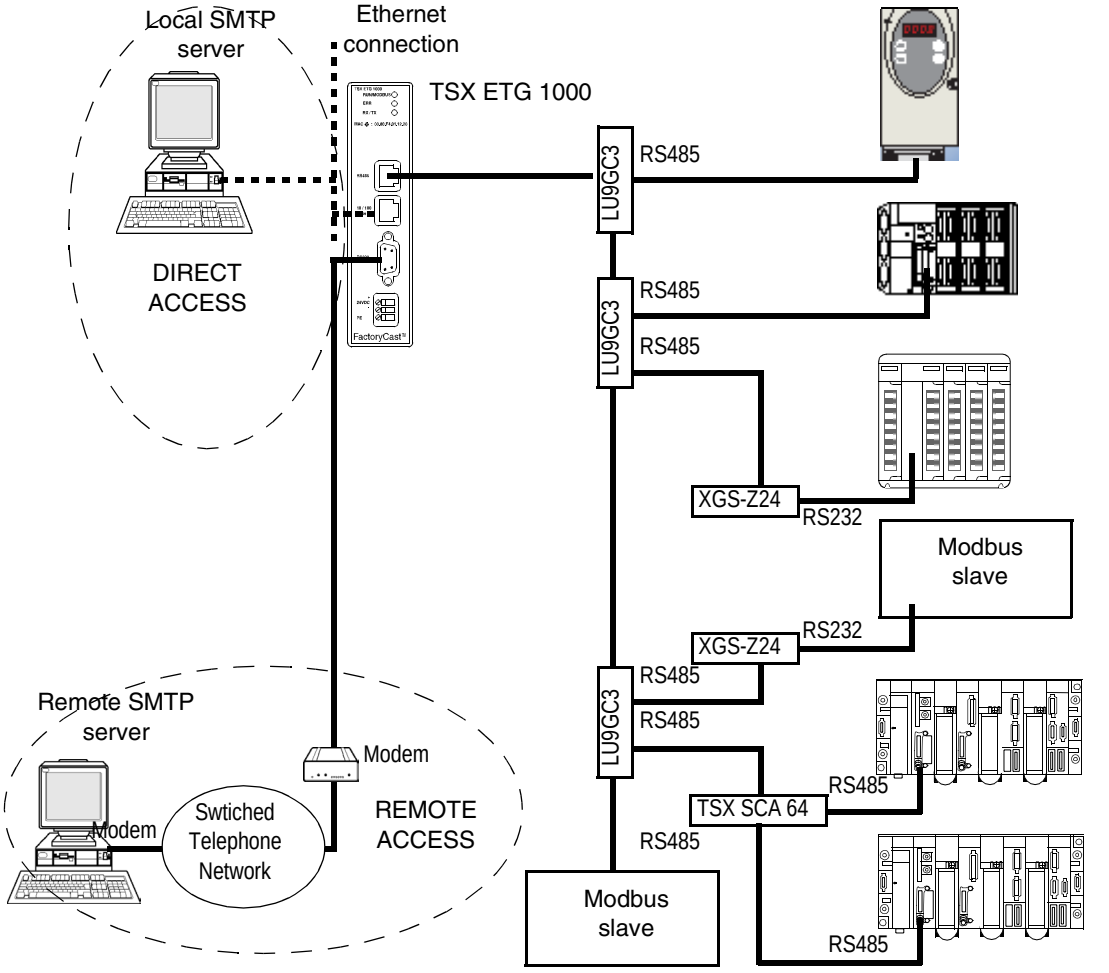
There are 2 ways of accessing mail services:

- directly, where the PC is connected directly to the module via the Ethernet network
- remotely, where the PC polls the module via the telephone connection (via modem)

With either of these 2 connections, the SMTP server can receive by email all internal (module) or external (device) data or events (that have been set up).

Note: The 2 configurations cannot be combined because there can only be one SMTP server.

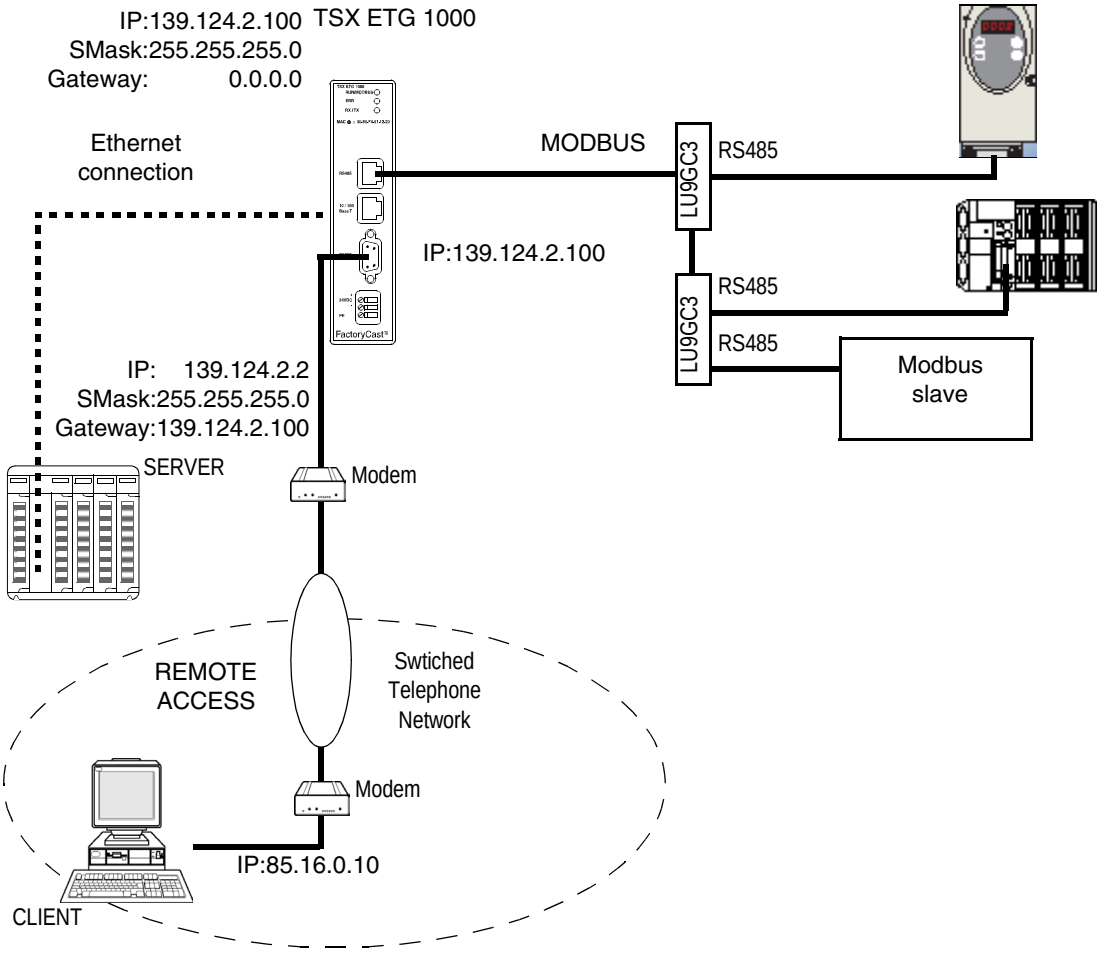
Example:



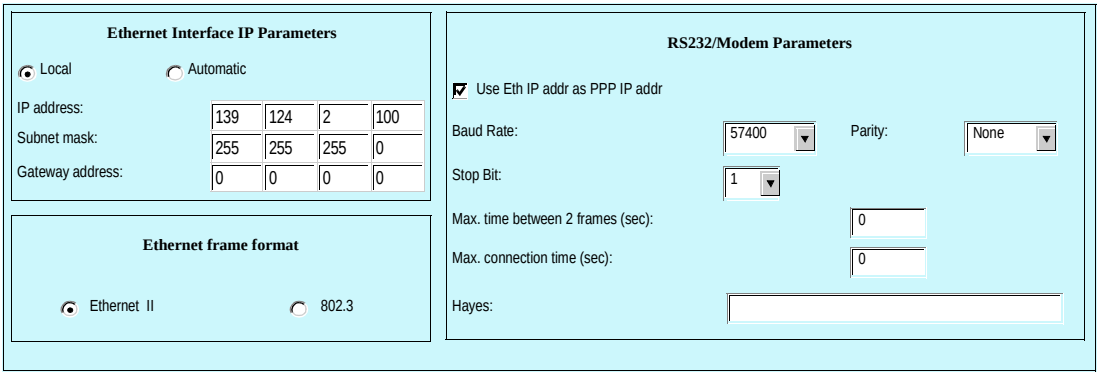
Remote Access Server Connection

With this modem connection the user can access the device Modbus data and the server Ethernet data. Simply check the **Use Eth IP Addr as PPP IP Addr** box in the **IP/PPP Configuration** page so that the PPP address of the module (85.16.0.2) becomes that of the IP address. The client PC then polls the Ethernet server device directly.

Connection example:



For this example the module must be configured in the IP/PPP Configuration page as follows:

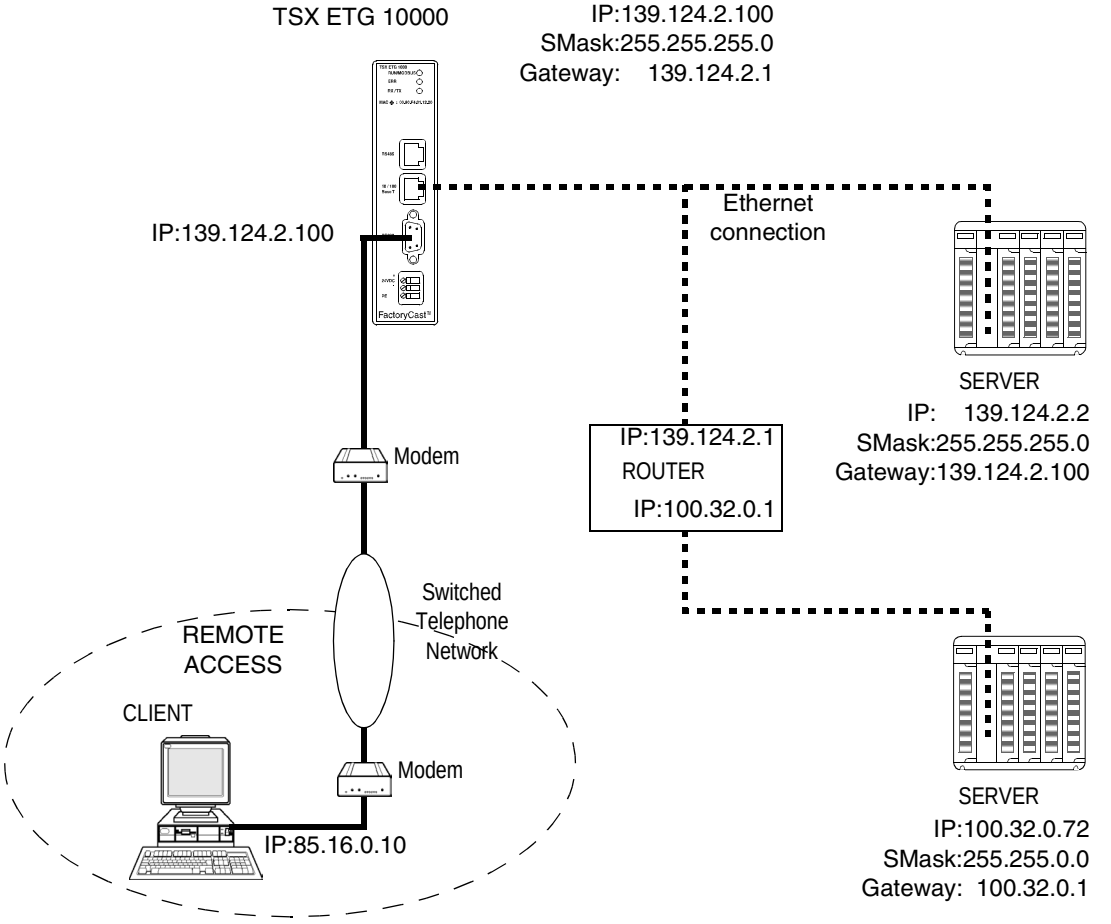


Routing Connection

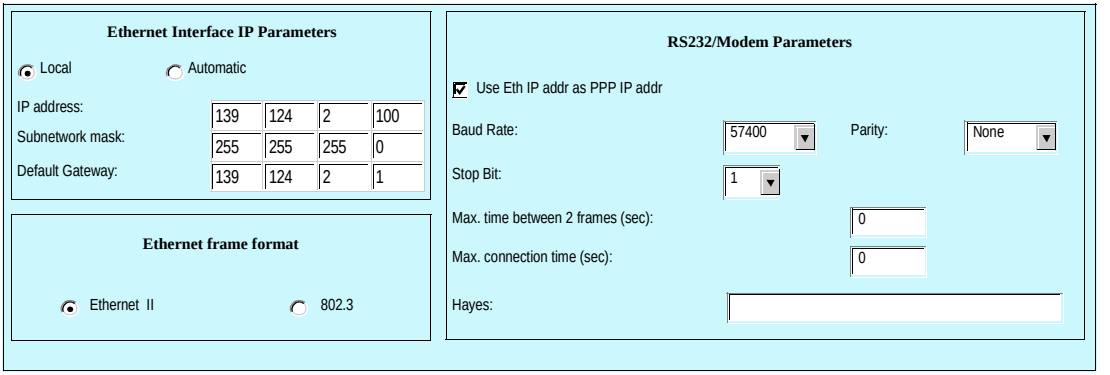
With this modem connection the user can access Modbus device data and Ethernet server data and can also access the server on a different network.
Simply:

- check the **Use Eth IP Addr as PPP IP Addr** box in the **IP/PPP Configuration** page so that the PPP address of the module (85.16.0.2) becomes that of the IP address. The client PC then polls the Ethernet server device directly,
- give the IP address of the router as the module gateway address (Default Gateway) so that requests pass through the router,
- modify the server gateway addresses (Default Gateway) so that requests arrive at the correct destination.

Connection example:



For this example the module must be configured in the IP/PPP Configuration page as follows:



4.2 Configuration of the TSX ETG Module

Presentation

Scope of this Section

This section deals with the configuration of the TSX ETG 1000 module.

What's in this Section?

This section contains the following topics:

Accessing the Module Configuration

At a Glance

The TSX ETG 1000 module can only be configured using an Internet browser that is currently commercially available.
The configuration pages can be accessed via either an Ethernet link or an RS232 serial link.

Configuration via Ethernet Link

To access the module configuration pages **for the first time**, via an HTTP link, follow the steps below:

Step	Action
1	Connect the module to the Ethernet network and power up.
2	Open your Internet browser on the PC.
3	In the "Address" field enter the command: http://<default_ETG_IP_address>, then press <Enter>. **Note:** The default IP address is derived from the module's MAC address, which is printed on the front panel. The home page appears on the screen.
4	Click the **Setup** link.
5	The configuration index page appears: click the service you require.
6	Enter the default UserName "USER" and the default password "USER" (without inverted commas), then press <Enter>.

Note: For subsequent connections proceed in the same way, but enter the appropriate IP address, UserName and password if they have been changed.

Default IP address:
The default module IP address is 85.16.x.y, where x and y are the last two decoded hexadecimal/decimal numbers of the MAC address.
If the module MAC address is 00.80.F4.01.53.CF, then the IP address of the module will be 85.16.83.207. In hexadecimal format 53 becomes 83, in decimal format, CF becomes 207.

Configuration via RS232 Serial Link

For the first connection you must configure the components of your operating system in order to be able to communicate with the TSX ETG 1000 module. All the configuration steps are explained in a manual called 'Configuration of your computer for TSX ETZ direct connection by serial link', delivered with the CD. Once these components have been configured, follow the steps below:

Step	Action
1	Connect an RS 232 crossed cable between a COM port on the PC and the 9-pin SUB D socket on the TSX ETG 1000 module (see *Connection Cables, p. 178*).
2	Establish the serial connection between the PC and the module.
3	Open your Internet browser on the PC.
4	In the "Address" field type: **http://85.16.0.2**, then press <Enter>.
5	The configuration index page appears: click the service you require.
6	Enter the default UserName "USER" and the default password "USER" (without inverted commas), then press <Enter>.

Note: For subsequent connections, the IP address to be entered is always the same, but enter the appropriate UserName and password if they have been changed.

Ethernet Connection Parameters

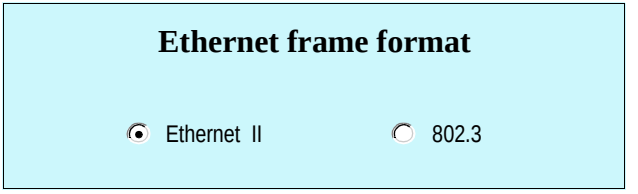
At a Glance

If **Ethernet** is selected in the Network Connection area, the configuration page can be used to modify:

- the Ethernet format in Ethernet frame format,
- the configuration and the list of connections that can be opened by the module, in Configuration of connections.

Ethernet Format

This is configured in the following area:



The two buttons can be used to select either:

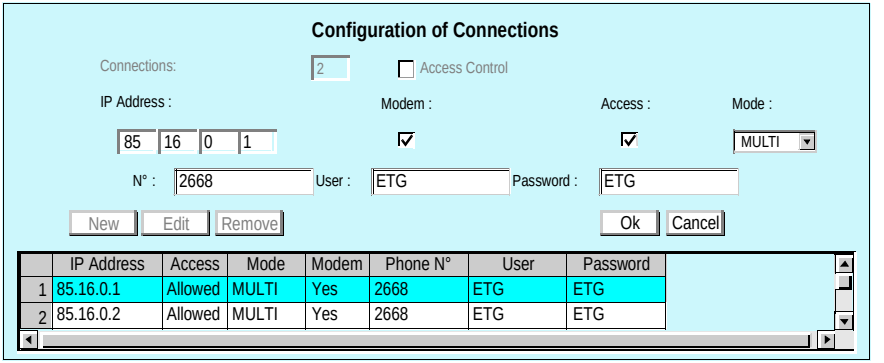
- Ethernet II format, corresponding to standard RFC 894 (the most commonly used),
- 802.3 format, corresponding to standard RFC 1042. This format is used if the remote devices are using this format.

Configuration of Connections

This zone is used:

- to configure the number of connections that can be opened by the module,
- to activate an access control service,
- to enter the remote devices which can connect to the module, depending on whether a mono- or multi-connection communication protocol is used.

Illustration:



General parameters:

Parameters	Value to be entered
Connections	This field is used to enter the maximum number of remote devices that are able to connect to the module in parallel. ● the default value is 8 ● the setting range is from 1 to 32 connections
Access Control	This check box is used to enable or disable control of remote devices wishing to open a TCP connection to the module: ● if the box is checked, access control management is activated and the Access column in the table is de-grayed (active). If the module operates in server mode, only remote devices selected by the Accessbox are authorized to connect as a client and to then communicate, ● if the box is unchecked, control management is disabled and the Access column in the table is grayed out (not active). If the module is operating in server mode, third party remote devices can connect as client and then communicate with the module without being declared in the table.

Entering data for remote devices connecting to the module:

Parameters	**Values**
Edit buttons	
	• New : Enter a new device • Edit : Modify a device • Remove : Delete a device • OK : Confirm the input • Cancel : Cancel current changes
Input fields	
IP Address	Enter the device IP address.
Access	If this box is checked, it indicates that the remote device is authorized to open a TCP connection.
Mode	• MONO: The module only allows a single connection to a remote IP address. • MULTI: The module allows a single connection in client mode to a remote IP address and multiple connections in server mode to the same remote IP address.
The checked modem box:	
No.	Enter the telephone number for each remote device
User	Enter the name of each remote device
Password	Enter the password for each remote device.
Modem	If this box is checked, you can configure the three previous fields (No, User, Password).

Note: If the module is used for routing, the Ethernet and modem IP addresses are identical and the connection screen applies to all connections (TCP/IP and PPP). Checking the Modem box enables the modem link. You can then configure the No., User and Password fields and distinguish between PPP connection and TCP connection.
In server mode the module does not manage the password associated with the modem connection. All telephone connections are accepted. The Access control check box takes effect with an IP address for a remote device, as for the PAP protocol. The password must be managed at modem level.

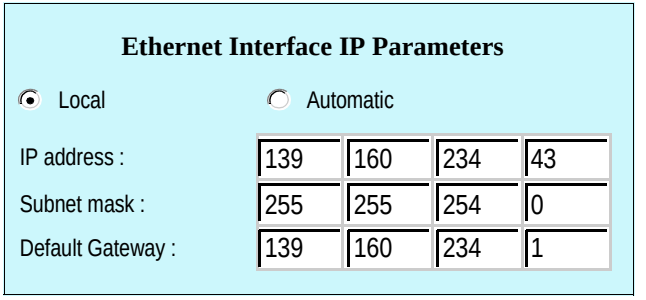
Configuration Parameters for TCP/IP Services

At a Glance

TCP/IP services are configured with the **IP/PPP Configuration** (See *TCP/IP Services Configuration Page, p. 77*) screen accessed via the **Setup** menu for the module's embedded HTTP server.

Area: IP Parameters

View of the IP Parameters



This area is used to define the Ethernet interface IP address of the module in two different ways:

- either the address is configured manually by clicking on Local.
- or the address is provided by a BOOTP server by clicking on Automatic, in which case the address input area is grayed out

- If you choose Local, you can then enter:
  - the module IP address in IP Address,
  - the subnetwork mask, Subnet mask,
  - the address of the Default Gateway.
- If you choose Automatic, the IP address of the module is configured via a remote device acting as a BOOTP/DHCP server.

Note: The Automaticservice is not available if the format of the Ethernet frames is 802.3

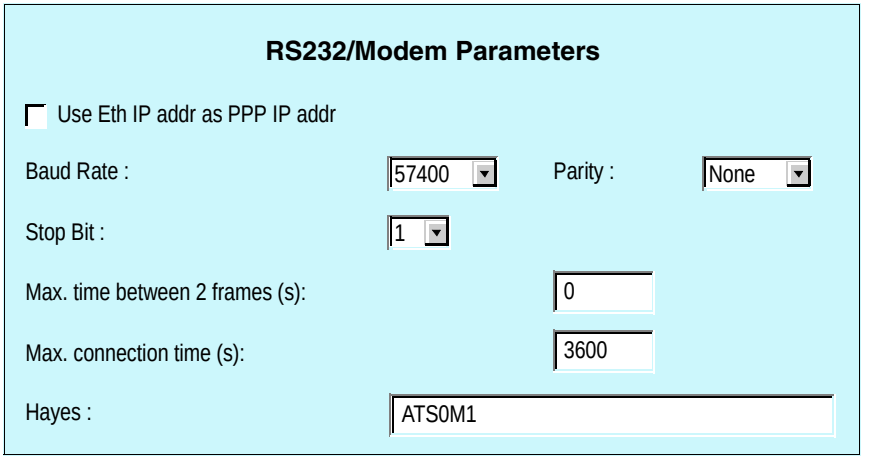
Modem Connection Parameters

Presentation

The configuration page is used to modify the configuration and the list of connections that can be opened by the module, in the Configuration of connections area.

Configuring RS 232/Modem Parameters

The parameters are configured in the following area:



Parameters to be configured:

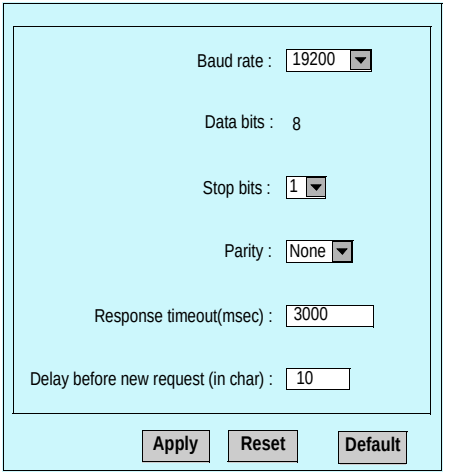
Parameters	Values
Baud Rate	Speed of the RS 232 link; the choice depends on the modem you are using: 4800, 9600, 19200, 38400 and 57400.
Parity	Even, odd or no parity
Stop Bit	Number of stop bits
Max. time between 2 frames	If the time between two frames exceeds the value entered (in seconds) in this field, the connection is broken. If the time entered is 0, no control is performed.
Max. connection time	This field is used to define the maximum connection time (in seconds). At the end of this time the connection is broken. If the time entered is 0, no control is performed.
Hayes	Configuration by Hayes character string (maximum of 40). This can be used to send commands to the modem in Hayes format*.
Use Eth IP addr as PPP IP addr	If this box is checked, the IP address of the modem interface will be the same as that of the Ethernet interface, otherwise the IP address of the modem interface will be 85.16.0.2.

* Refer to your modem documentation to find out which Hayes commands are supported.
Example: AT&FS0=2

Configuration Parameters for the Modbus Link

At a Glance

The Modbus link is configured using this screen, which can be accessed from the **Setup** menu for the module's embedded HTTP server.
View of the input area:



Parameters

Table of parameters:

Parameters	Value
Baud rate	Speed: 115200, 57600, 38400, 19200, 9600, 4800, 2400, 1200 baud
Data bits	8 data bits.
Stop bits	1 or 2 stop bits.
Parity	Even, odd, or no parity.
Response time Out	In milliseconds, from 1 to 10 seconds (default is 3 sec)
Delay before new request	4 to 1000 characters (default is 10)

Click on Apply to confirm the changes you have made.
Click on Reset to cancel current changes.
Click on Default to return to the Modbus default configuration.

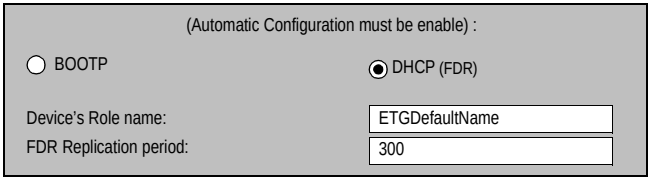
Automatic Configuration

At a Glance

In order to use the module in automatic configuration mode, you must set the configuration parameters. These parameters are configured using the **FDR Client** (See *Main Parameters Area, p. 111*) page, which is accessed from the **Setup** menu. The Automatic option must then be selected in the **IP/PPP** (See *At a Glance, p. 108*) page.
Two buttons, Apply and Reset, are used to confirm changes or to restore the previous values.

Main Parameters Area

Illustration:



Choice of service:

- The BOOTP and DHCP(FDR) buttons are used to choose between a BOOTP or a DHCP(FDR) server.

If you wish to use the Faulty Device Replacement function (FDR), select DHCP(FDR) and then:

- in the Device's Role Name field, enter the name of the module,
- in the FDR Replication period field enter the time (in seconds) for automatic comparison between the configuration of the TSX ETG 1000 and that stored on the DHCP server. If a difference is found, the TSX ETG 1000 automatically saves the configuration to the server.

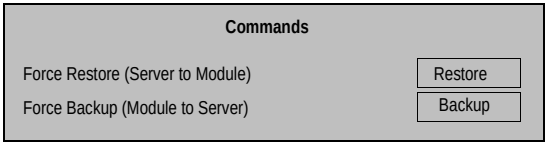
Note: Do not modify the Device's Role Name when the module is configured for automatic mode with the DHCP(FDR) service.

Note: To switch back to automatic mode with the DHCP(FDR) service when the module is configured for local mode, you must do the following twice:

- select the automatic mode in the **IP/PPP**service,
- confirm the change by clicking on Apply,
- Reinitialize the module with Reboot,

Once this is done the FDR server is updated.

Command Area Illustration:



- The button Restore: forces the TSX ETG 1000 to retrieve the configuration from the server.
- The button Backup: forces the TSX ETG 1000 to save its configuration to the server.

Important

Note: When DHCP(FDR) mode is enabled, any changes to the contents of a configuration page will be automatically saved to the server (Backup), once the changes are confirmed by clicking the Applybutton.

Note: The TSX ETG 1000 module automatically saves its configuration in the DHCP(FDR) server as soon as the server is available.

SNMP Service Configuration

At a Glance

In order to use the module as an SNMP agent, you must set the configuration parameters.
The SNMP service is configured using the **SNMP** (See *SNMP Administrator IP Address Area, p. 113*) screen, which is accessed from the **Setup** menu for the module's embedded HTTP server.
The parameters for SNMP services are divided into 4 areas:

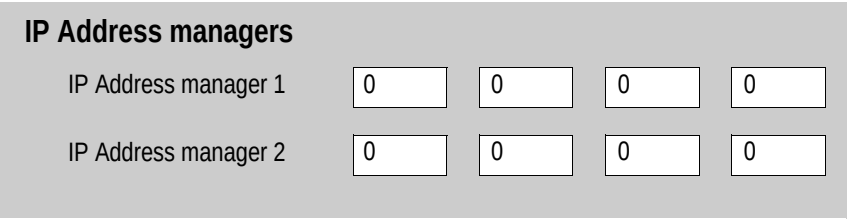
- area IP address managers
- area Agent
- area Community names
- area Security

The two buttons Apply and Reset, are used to confirm changes or to restore the previous values.

Note: Only ASCII 7-bit characters can be used in the character string input fields.

SNMP Administrator IP Address Area

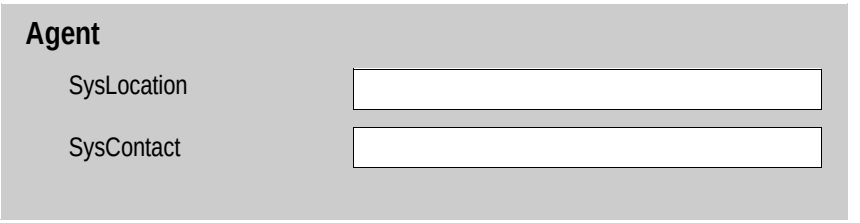
Illustration:



This area is used to enter the IP addresses of the SNMP administrators. The modules allow a maximum of two administrators.
These addresses are used for transmitting events (TRAP).

Location Area

Illustration:

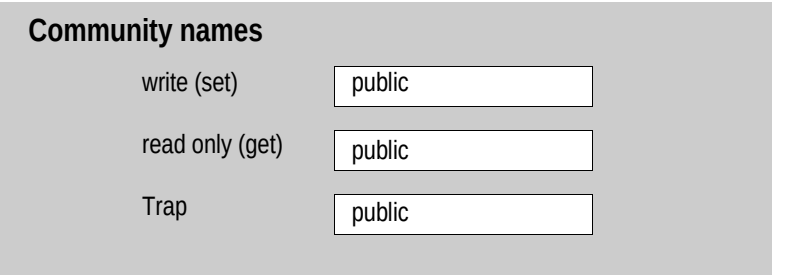


This area is used to locate and identify an agent, from the SNMP administrator. It comprises two fields:

- the field SysLocation: indicates the physical location of the device (string of 32 characters maximum).
- the field SysContact: indicates the person to contact for management of the device and the way to contact them (string of 32 characters maximum).

Community Names Area

Illustration:

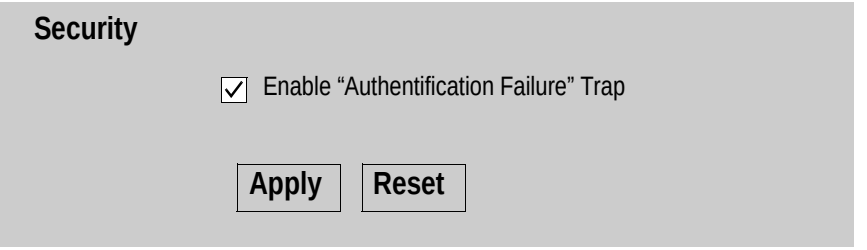


This area is used to define a community name for the Set, Get and Trap service families. It comprises three fields:

- the field write (Set) : defines the community name for the Set service (string of 16 characters maximum). The default value is "Public".
- the field read only (Get): defines the community name for the Get service (string of 16 characters maximum). The default value is "Public".
- the field Trap: defines the community name for the Trap service (string of 16 characters maximum). The default value is Public".

Security Area

Illustration:



This area contains a check box which allows you to enable sending an SNMP agent authentication fault event (TRAP) to the administrator who originated the request. This allows the agent to notify the administrator that the request has been refused due to an authentication failure (community name configured in the administrator differs from that configured in the agent).

SMTP Service Configuration

At a Glance

The email function is used to send an email when an alarm is triggered.
An alarm is triggered when the register of a Modbus device or the module reaches the defined limiting value (setpoint): upper limit, lower limit, equal measurement, rising or falling edge of a bit, etc.

Configuration of the SMTP Server

In order to use the email function to send an alarm, you must configure the SMTP server.
Illustration:

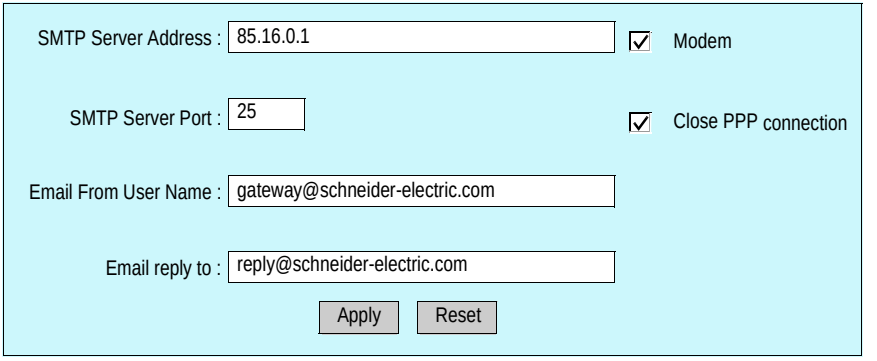


Table of parameters:

Parameters	Value
SMTP Server Address	IP address of the SMTP server (the domain name is not managed).
Modem	Check this box if a remote server is being used (transfer via modem).
Close PPP connection	If the Modem box has been checked, check the Close PPP connections box to close the line connection automatically after sending an email. Otherwise the line will remain open.
SMTP Port Server	TCP port used by the SMTP server (the port number is often 25).
Email From User Name	Email sender address. The module is identified as the sender when the email is opened by the user.
Email Reply to	The email sender address to reply to if the recipient is not found by the SMTP server.

Note: If the modem box is checked, do not forget to set up the modem connection in the IP/PPP page (configuration of connection) by specifying the telephone number to dial and the password. The PPP connection is opened automatically.

Alarm Configuration

The module allows the user to configure up to 8 alarms. These alarms are Modbus device register setpoints. Depending on the alarm setpoint and the register value, the alarm triggers the sending of a email.
Illustration for alarm configuration:

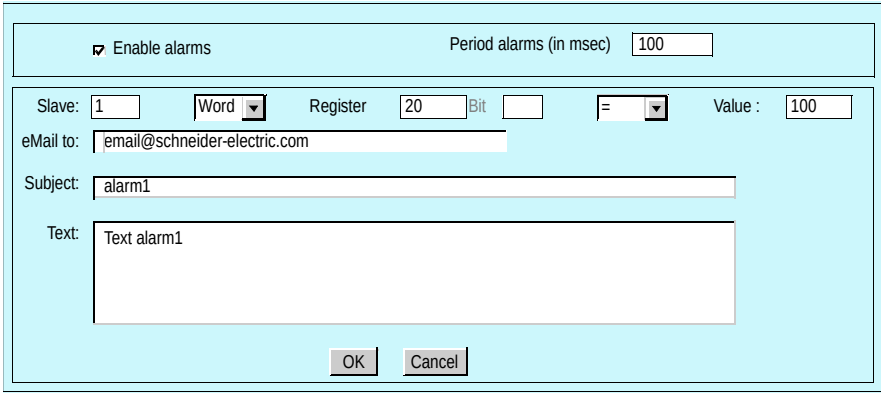
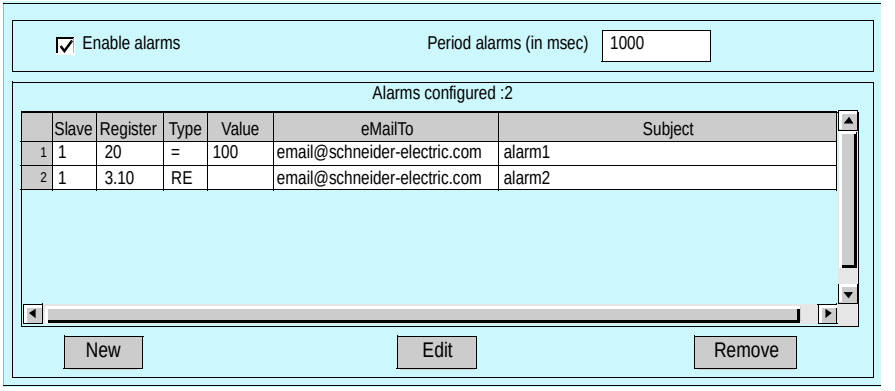


Illustration of configured alarms:



In this illustration, 2 alarms are configured:

- for the first one, as soon as the value of register 20 of slave 1 reaches the setpoint of 100, an email is sent to "email@schneider.electric.com" with the subject "alarm1".
- for the second one, at the rising edge of bit 10 of register 3 of Modbus slave 4, an email is sent to "email@schneider.electric.com" with the subject ‘alarm2’.

Table of parameters for the two illustrations:

Parameters	**Value**
Enable alarms	Check this box to send alarm emails. Otherwise the configured emails will not be sent but the registers will still be scanned.
Period alarms	Scanning period in milliseconds for the configured register values.
Slave	Address of the Modbus slave.
Type	Bit for word bit or Word for a complete word.
Register	Address of register.
Bit	Accessible if Bit is selected as type, this field indicates the word bit number.
Operator	Trigger operation: ● for words: None (no alarm to trigger), <, <=, >, >=, =, <>, bad (for exceptions and timeouts on request). ● for word bits: None (no alarm to trigger), RE (rising edge), FE (falling edge), bad (for exceptions and timeouts on request).
Value	Setpoint, decimal value compared with the current value (Modbus register).
Email to	Destination email address (maximum length 80 characters).
Subject	Subject of the email (80 characters maximum).
Text	Text part of the email (512 characters maximum).

Configuration of the Data Editor

At a Glance

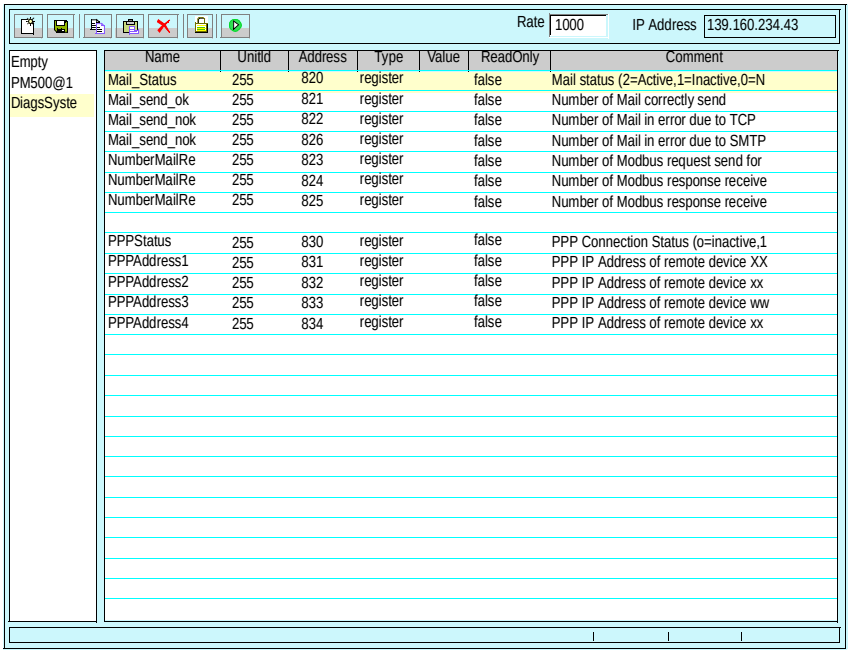
In a data editor table, the configured variables come from Modbus devices or from the module (internal register). You can view or force the variable values. There are two ways of creating animation tables containing these lists of variables.

- By means of the module site via an Internet browser
- By means of the executable file **RdeETGW.exe**, which is included in the CD and installed on the PC.

Note: Write access is password controlled (default value is USER).

Illustration using an Internet Browser

View of the Data Editor page for a TSX ETG 1000:



Name	UnitId	Address	Type	Value	ReadOnly	Comment
Mail_Status	255	820	register		false	Mail status (2=Active,1=Inactive,0=N
Mail_send_ok	255	821	register		false	Number of Mail correctly send
Mail_send_nok	255	822	register		false	Number of Mail in error due to TCP
Mail_send_nok	255	826	register		false	Number of Mail in error due to SMTP
NumberMailRe	255	823	register		false	Number of Modbus request send for
NumberMailRe	255	824	register		false	Number of Modbus response receive
NumberMailRe	255	825	register		false	Number of Modbus response receive
PPPStatus	255	830	register		false	PPP Connection Status (o=inactive,1
PPPAddress1	255	831	register		false	PPP IP Address of remote device XX
PPPAddress2	255	832	register		false	PPP IP Address of remote device xx
PPPAddress3	255	833	register		false	PPP IP Address of remote device ww
PPPAddress4	255	834	register		false	PPP IP Address of remote device xx

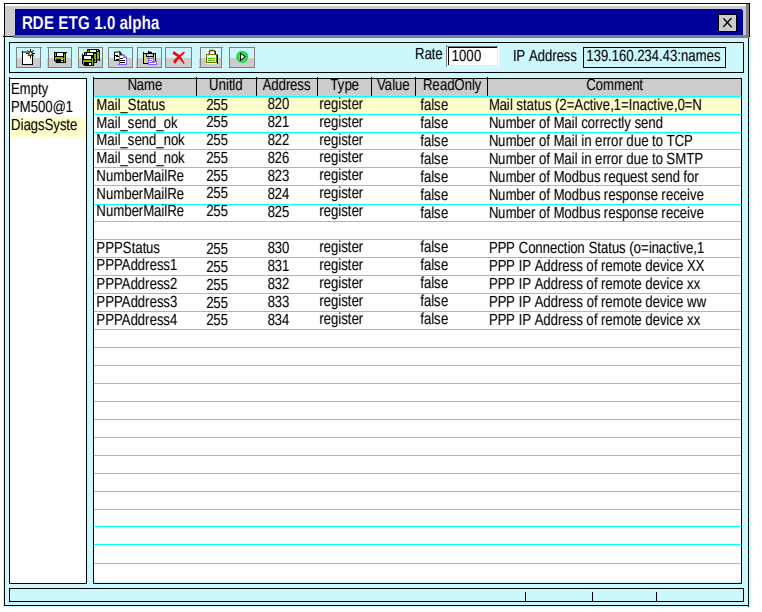
Description of the data editor buttons for a TSX ETG 1000:

In the order shown above:

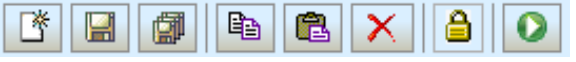
- create a new table of variables
- save a table
- copy the selected table or the selected variable
- paste the copied table or the copied variable
- delete a table or a variable
- change the password
- start or stop the animation

Illustration using the Executable File

View of the Data Editor page for a TSX ETG 1000:



Description of the data editor buttons for a TSX ETG 1000:



In the order shown above:

- create a new table of variables
- save the file containing the tables
- upload the file containing the tables to another module
- edit an existing table

- copy the selected table or the selected variable
- paste the copied table or the copied variable
- delete a table or a variable
- change the password
- start or stop the animation

Note: Tables can be saved in one of the following ways:
- In the module if the module's IP address is entered in the IP address
- in the directory on the hard disk containing RdeETGW.exe (Desktop, for example) if localhost is entered in the IP address

Table Fields

Description of the data editor table fields:

Name	UnitId	Address	Type	Value	ReadOnly	Comment
NAME1	1	820	register	0	true	
NAME2	1	821	register	1000	false	

Double click a variable line in the table to display the properties of the variable and modify a value. Double click in the table to close the information window.

Field	**Function**
Name	Name of the variable (mnemonic)
UnitID	Address of the Modbus slave (1 to 255)
Address	Modbus address of the data type (0 to 65535)
Type	Data type: input or output register, input or output bit
Value	Value of the variable in unsigned decimal format; if there is a communication error the value is "????"
ReadOnly	If this box is selected the variable cannot be output directly
Comment	Comment about the variable

Note: Modbus requests are optimized if the variables come from the same device, if they have the same data type and if they are adjacent.

Reference to I/O scanning

Important

Note: The TSX ETG 1000 module can be I/O scanned or fed by the I/O scanning service with Ethernet modules. In this hypothesis, ensure you configure the same scanning period for the TSX ETG 1000 module and for all Modbus devices connected to it.

4.3 Configuration of RS232 Serial Links

Configuration of RS232 Serial Links

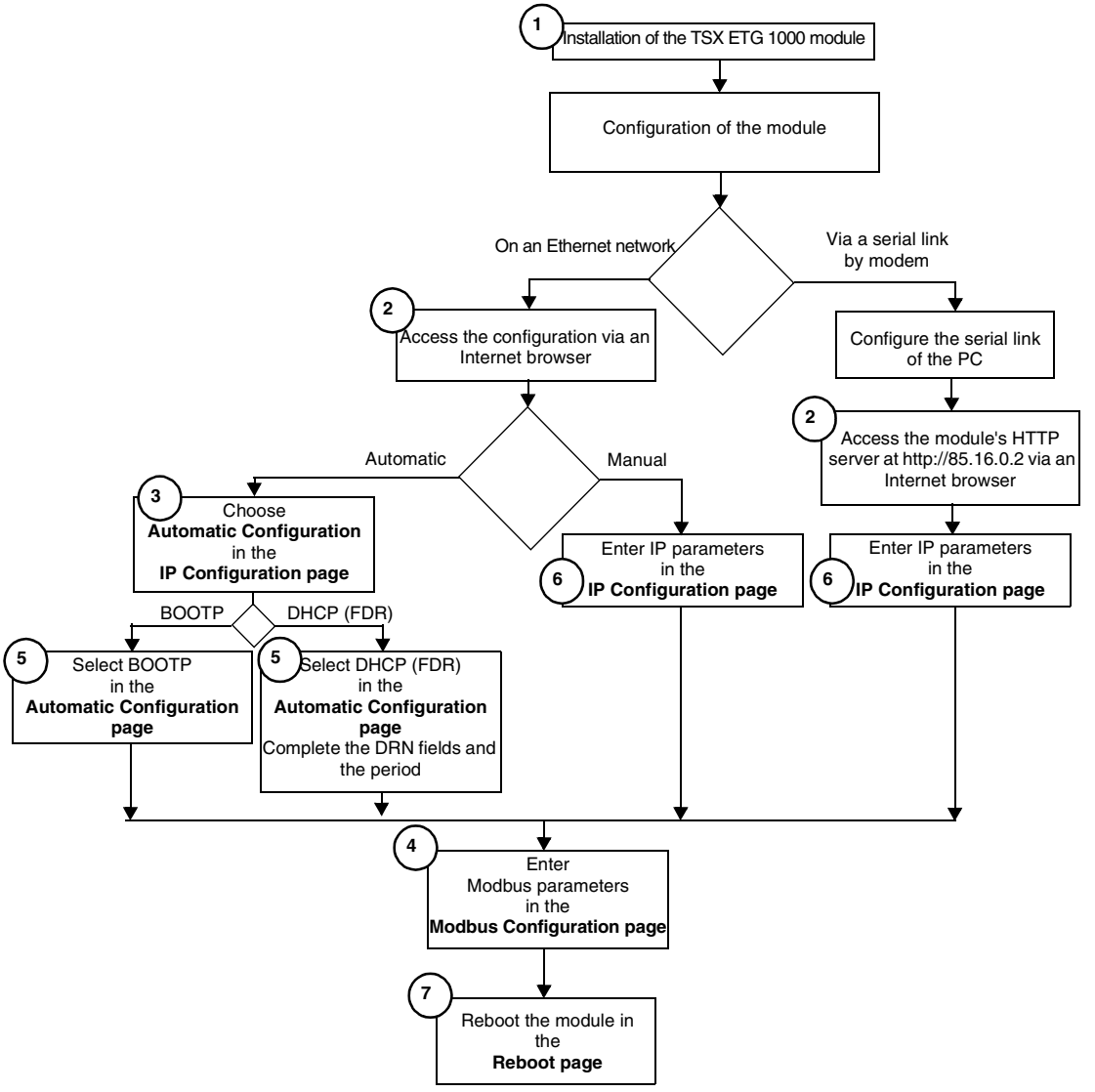
At a Glance

In order to use a connection via modem serial link, you must install and configure certain elements of your operating system. For more information, refer to the documentation configuration of your computer for TSX ETZ direct connection by serial link, on the CD.

4.4 Setting up the TSX ETG 1000 - Summary

Setting up the TSX ETG 1000 - Summary

Illustration Summary of the operations to be performed



Rapid Access

Reference	Page number
1	*Installation of the TSX ETG Module, p. 168*
2	*Accessing the Module Configuration, p. 103*
3	*Configuration Parameters for TCP/IP Services, p. 108*
4	*Configuration Parameters for the Modbus Link, p. 110*
5	*Automatic Configuration, p. 111*
6	*Ethernet Connection Parameters, p. 105*
7	*Module Reboot Page, p. 83*

Creating Custom Pages

5

At a Glance

Scope of this Chapter

This chapter describes how to create custom pages and upload these pages, and describes the graphic objects for the TSX ETG 1000. The TSX ETG 1000 website includes a library of graphic objects in java applet format, which the user can call in his or her HTML pages. The objects can be used to give a graphic and dynamic representation of register values, coil values, etc., for Modbus devices. A macro (or file) in Microsoft FrontPage format is provided to help the user to create HTML pages more easily, along with a description of the graphic objects

What's in this Chapter?

This chapter contains the following sections:

5.1 Creating Pages with FrontPage

Presentation

Scope of this Section

This section describes how to create custom pages for the TSX ETG 1000 with FrontPage.

What's in this Section?

This section contains the following topics:

Installing the Macro in Microsoft FrontPage

Overview

This section describes how to install the extension or macro ETG1000_applet for Microsoft FrontPage 2000.

Installing the Macro:

To install the macro ETG1000_Applet for FrontPage 2000, proceed as follows:

- for Windows 95/98: copy the file "Microsoft FrontPage.fpm" to the C:\WINDOWS\Application Data\Microsoft\FrontPage\Macros folder (create the final "Macros" folder, if it does not exist).
- for Windows NT/2000/XP: copy the file "Microsoft FrontPage.fpm" to the %USERPROFILE%\Application Data\Microsoft\FrontPage\Macros folder. (create the "Macros" folder if it does not exist). The value of the USERPROFILE environment variable is normally C:\WINNT\Profiles\<username> for NT, or C:\Documents and Settings\<username> for Windows XP. You can check this value by typing SET at a command prompt.

Note: The "Microsoft FrontPage.fpm" macro is located on the CD-ROM under ETG1000\Software\Microsoft FrontPage.fpm.

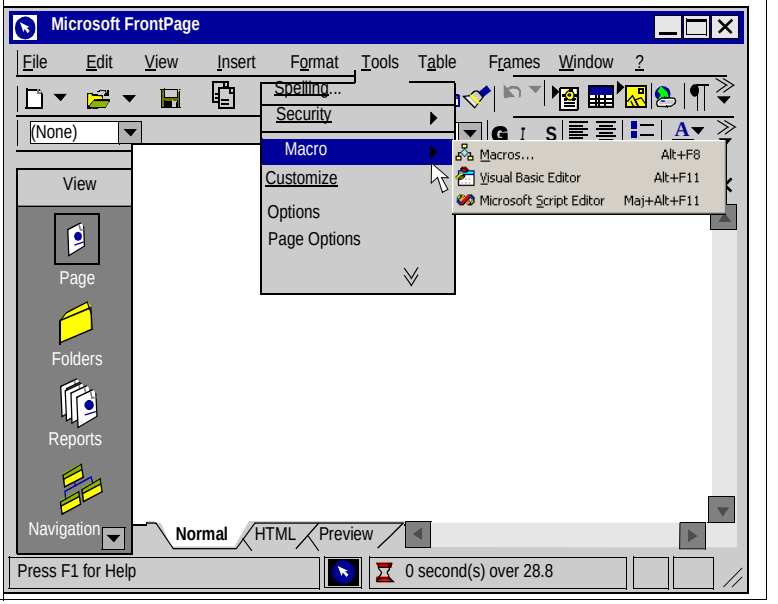
Inserting a LiveLabelApplet with FrontPage

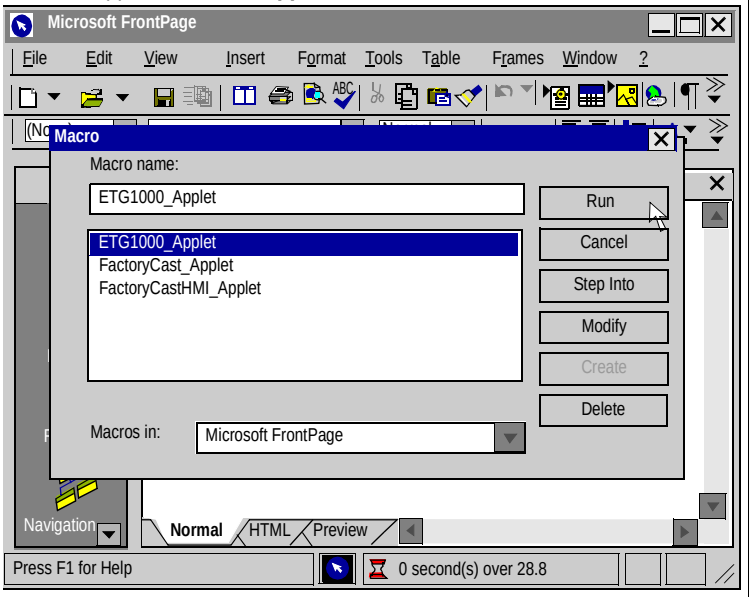
Overview

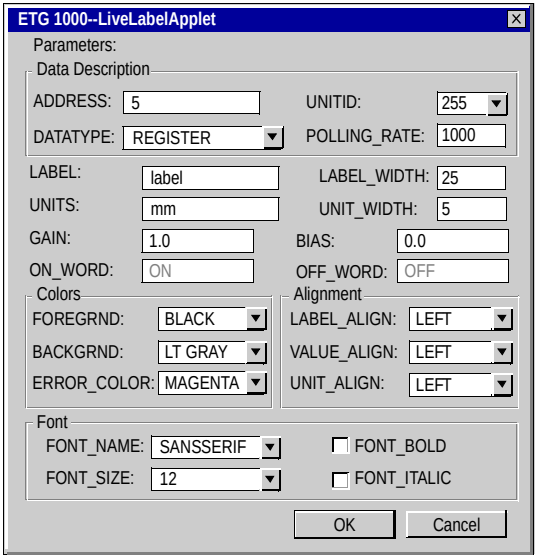
This section describes how to insert a LiveLabelApplet in a web page.

Inserting a LiveLabelApplet

To insert a LiveLabelApplet, follow the steps below:

Step	Action
1	Select **Tools** I **Macro**, then to display the applet selection window click on **Macros**. 

Step	Action
2	Select the applet **ETG1000_Applet**, then click **Run**. 
3	Select the **LiveLabelApplet** applet and then click **OK**. The Parameters edit window opens.

Step	Action
4	Enter the label parameters, then click **OK**.  **Note:** For a description on each parameter, see *Graphic Objects, p. 142*.

5	A window opens containing the code that will be inserted in your HTML document. Click the **Insert** button to end insertion of this applet.
	`<APPLET`
	`codebase="/classes"`
	`archive="mbclient.jar,widgets.jar"`
	`code="com.schneiderautomation.factorycast.gateway`
	`.livelabel.LiveLabelApplet"`
	`width="180" height="160" >`
	`<PARAM name="progressbar" value="true">`
	`<PARAM name="progresscolor" value="#000000">`
	`<PARAM name="address" value="5">`
	`<PARAM name="unitID" value="255">`
	`<PARAM name="rate" value="1000">`
	`<PARAM name="datatype" value="REGISTER">`
	`<PARAM name="label" value="label">`
	`<PARAM name="LalelWidth" value="50">`
	`<PARAM name="Unit" value="mm">`
	`<PARAM name="UnitWidth" value="50">`
	`</APPLET>`

6	Continue to add additional instances of `LiveLabelApplet` to your Web page. Once you have inserted the last applet, click the **Cancel** button in the applets selection window to return to editing your web page.

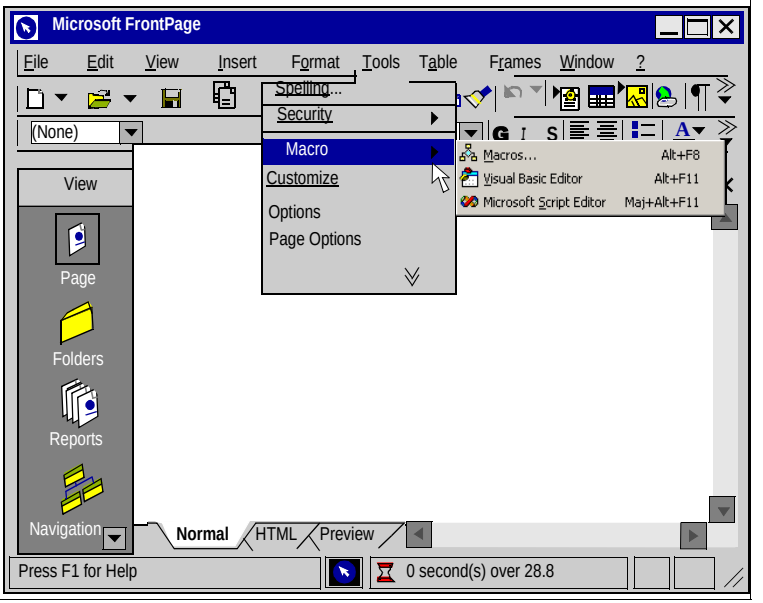
Inserting a LiveBeanApplet with FrontPage

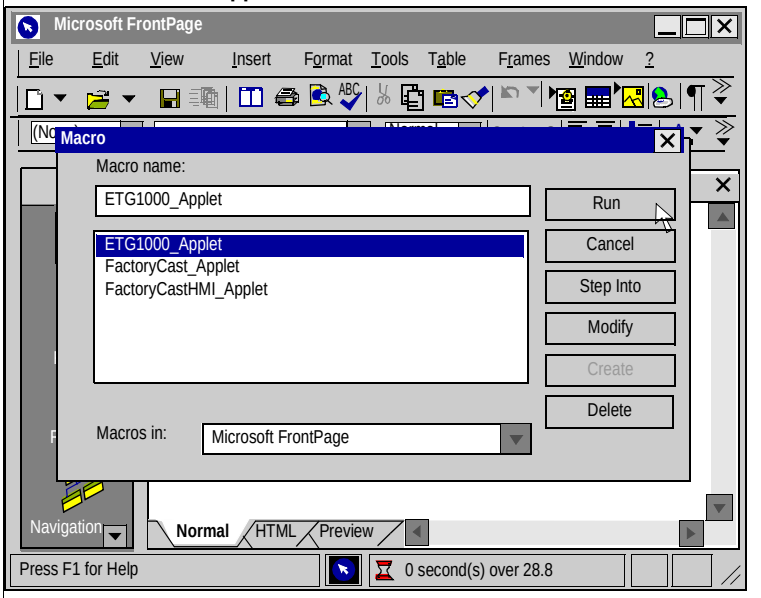
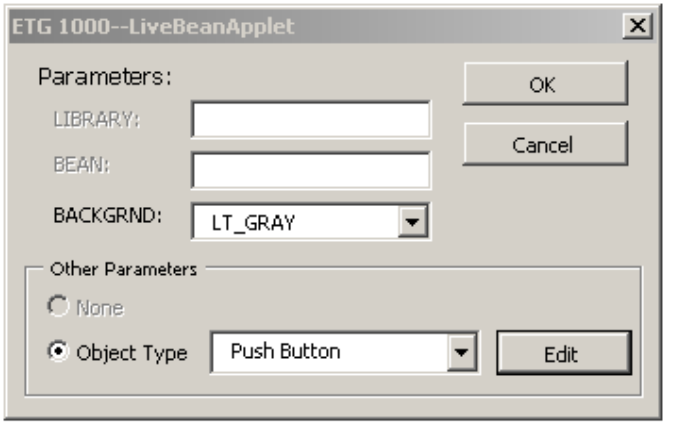
Overview

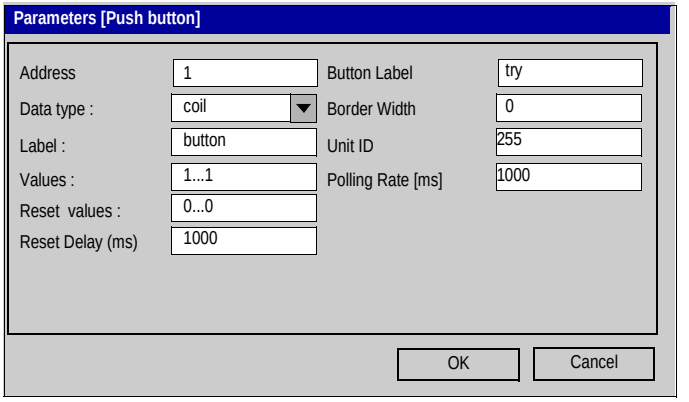
This section describes how to insert a `LiveBeanApplet` in a web page.

Inserting a LiveBeanApplet

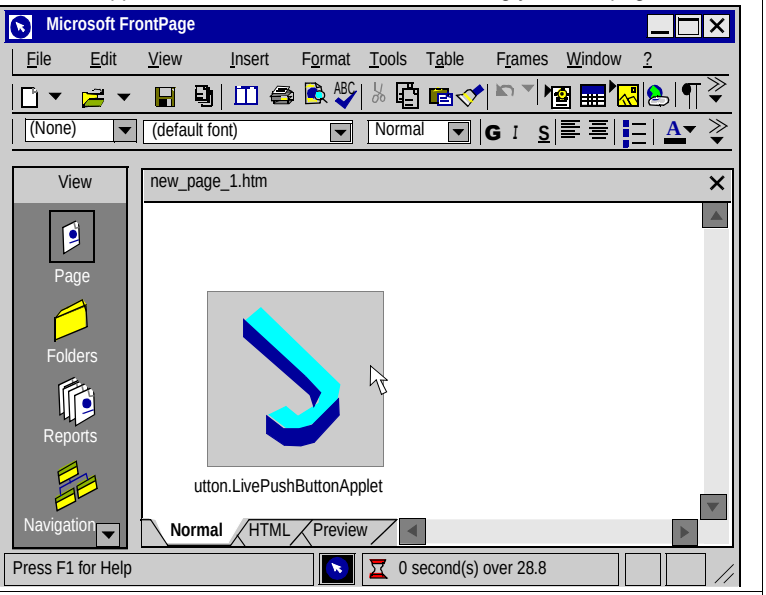
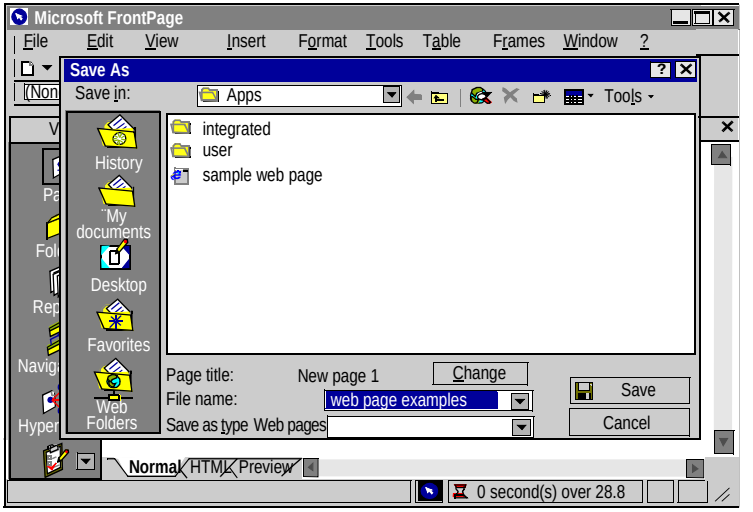
To insert a LiveBeanApplet, follow the steps below:

Step	Action
1	In FrontPage,select **Tools** I **Macro**, then click on Macros to display the applet selection window. 

Step	Action
2	Select the **ETG1000_Applet** macro. 
3	Select the applet **LiveBeanApplet**, then click **OK**. The selection window opens.
4	Select the object type in the **Object Type**box.  Click the **Edit** button when you have finished.

Step	Action
5	In the edit window, enter the parameters. Click the **OK** button when you have finished. 

6	Click **OK**. A window opens, showing the Java code which will be inserted in your HTML document. Click the **Insert** button to end insertion of this applet.
	`<APPLET`
	`codebase="/classes"`
	`archive="mbclient.jar,widgets.jar"`
	`code="com.schneiderautomation.factorycast.gateway.`
	`pushButton.LivePushButtonApplet"`
	`width="180" height="160" >`
	`<PARAM name="progressbar" value="true">`
	`<PARAM name="progresscolor" value="#000000">`
	`<PARAM name="BACKGRND" value="LT_GRAY">`
	`<PARAM name="debug" value="0">`
	`<PARAM name="address" value="1">`
	`<PARAM name="datatype" value="REGISTER">`
	`<PARAM name="label" value="label">`
	`<PARAM name="values" value="1">`
	`<PARAM name="resetValues" value="0">`
	`<PARAM name="resetDelay" value="1000">`
	`<PARAM name="borderWidth" value="0">`
	`<PARAM name="buttonLabel" value="button">`
	`<PARAM name="rate" value="1000">`
	`<PARAM name="unitID" value="255">`
	`</APPLET>`

Step	Action
7	Continue inserting instances of the `LiveBeanApplet` applet in your web page. Once you have inserted the last applet, click the **Cancel** button in the ETG100_applets selection window to return to editing your web page. 
8	Register your custom web page. 
9	Transfer the custom web page to the module's web server.
10	Test the application.

Uploading FrontPage Support Pages

Overview

If you add support web pages to the default website, you may choose to protect them with the same user name and the same password as those used for the default pages, or to authorize access to all users (no password required).
To add pages to the site, you must specify the folder in which the pages are stored before you can upload them to the server.

Indicating the File Location

Place the folders containing your web pages and any associated graphics in a common directory. Each subdirectory should normally contain a page called `index.htm`.
Make sure that all graphics file names are in DOS 8.3 format (a maximum of eight characters for the name and three characters for the extension).
Security pages (with a password) should be copied to the \wwwroot\secure\user directory of the embedded server.
Pages accessible to all should be copied to the \wwwroot\unsecure\user directory of the embedded server.

Note: Do not forget to create new hyperlinks to other web pages to enable these pages to be accessed via the browser.

Uploading to a Server

To upload the pages to the server, follow the steps below.

Step	Action
1	Save your project.
2	Select **File I Publish Web Site** in the menu. **Result:** the **Publish Web Site** dialog box opens with the FTP address to be incorporated. Use ftp://module_ip_address/wwwroot/unsecure/user for your free access pages. Use ftp://module_ip_address/wwwroot/secure/user for your password-secured pages.
3	Click on **Publish** to confirm the start of uploading. **Note:** A window will appear, asking for a name and password. The default value for both is '**wsupgrade**'.

5.2 Creating Pages with an HTML Editor

Presentation

Scope of this Section

This section describes how to integrate custom pages for the TSX ETG 1000 with an HTML editor.

What's in this Section?

This section contains the following topics:

Creating Support Pages with an HTML Editor

At a Glance

FrontPage is not the only web page design software. All the applets are coded, so you can create HTML pages in Notepad (for example) by saving them in HTML format.

Note: A description of the various parameters of the graphic objects, which the user must code in HTML format, can be found in Description of Graphic Objects (See *Description of Graphic Objects, p. 142*).

Uploading Support Pages via a Client FTP

Overview

If you add support web pages to the default website, you may choose to protect them with the same user name and the same password as those used for the default pages, or to authorize access to all users (no password required).
To add pages to the site, you must specify the folder in which the pages are stored before you can upload them to the server.

Indicating the File Location

Place the folders containing your web pages and any associated graphics in a shared directory. Each subdirectory should normally contain a page called `index.htm`.
Make sure that all graphics file names are in DOS 8.3 format (a maximum of eight characters for the name and three characters for the extension).
Security pages (with a password) should be copied to the \wwwroot\secure\user directory of the embedded server.
Pages accessible to all should be copied to the \wwwroot\unsecure\user directory of the embedded server.

Note: Do not forget to create new hyperlinks to other web pages to enable these pages to be accessed via the browser.

Uploading to a Server

To upload the pages to the server, follow the steps below.

Step	Action
1	Save your project.
2	Open a client FTP (e.g.: filezilla).
3	Enter the IP address, the user name (**wsupgrade**) and the password (**wsupgrade**) to connect to the site. Find your web project in the tree structure for your local site (hard disk). In the tree structure for the remote site select /FLASH1/wwwroot/unsecure/user for your free access pages. In the tree structure for the remote site select /FLASH1//wwwroot/secure/user for your password-secured pages.
4	Copy the relevant files from the local site to the desired location in the remote site (module).

Uploading a Custom Home Page

Overview

To replace the default home page with a page of your choice, follow the steps below:

- Save the initial configuration so that you can restore it later if necessary
- Create your home page
- Move the default home page to a secure location
- Replace it with your own home page
- Upload your home page to the embedded server

Saving the Initial Configuration

Before modifying the default home page, you should save the configuration. In this way, in the event of a problem on the embedded server, you can restore the initial configuration.

Note: The CD-ROM contains a backup copy of the default site under ETG1000\wwwroot.

Creating your Home Page

You must give your home page the same name as the default home page: index.htm.

Placing your Home Page

Copy your home page to the wwwroot directory containing the default home page.

Uploading

To upload your new home page to the embedded server, follow the steps in the table below.

Step	Action
1	Save your project.
2	Open a client FTP.
3	Enter the IP address, the user name (**wsupgrade**) and the password (**wsupgrade**) to connect to the site. Find your web project in the tree structure for your local site (hard disk). In the tree structure for the remote site select /FLASH1//wwwroot/secure/system for your custom pages.
4	Copy the relevant files from the local site to the desired location in the remote site.

5.3 Description of Graphic Objects

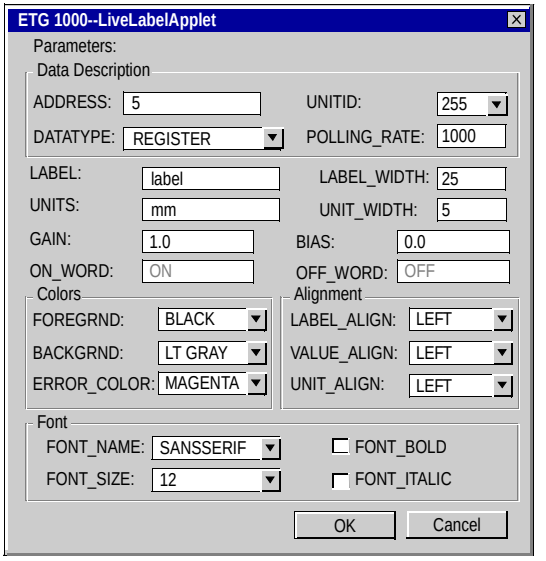
Graphic Objects

Overview

The set of graphic objects provided in the ETG1000_Applet is intended to help you create graphic displays similar to the Human-Machine interface screens. All the data control and monitoring objects have integrated communication functions and are designed as standalone graphic objects.
This section describes the standard graphic objects and their properties.

LiveLabelApplet This window gives the value of a direct address of a Modbus slave in a text field.

Setup



The properties of this window are as follows:

Property	HTML code	Description	Limits
Address	Address	Modbus address of the data type (1 to 65535).	See Note 1, (See *Notes, p. 162*)
Data type	Datatype	Modbus address data type.	See Note 2, (See *Notes, p. 162*)
Label	Label	Label to be displayed as part of the graphic object.	See Note 5, (See *Notes, p. 162*)
Label Width	Label_Width	Width of label.	
Unit Width	Units_Width	Width of unit.	
Unit ID	UnitId	Address of the Modbus slave	1 to 255
Polling rate [ms]	Rate	Scanning value	
Gain	Gain	The gain (multiplier) is used for the scale of the value retrieved in physical units.	1.0
Bias	bias	The bias (multiplier) is used for the scale of the value retrieved in physical units.	0.0
On_Word	On_Word	Text value to be displayed when the value is not zero (use if the data type format is binary).	ON
Off_Word	Off_Word	Text value to be displayed when the value is not zero (use if the data type format is binary).	OFF

Property	HTML code	Description	Limits
Foregrnd	Foregrnd	Color of the applet foreground.	BLACK
Backgrnd	Backgrnd	Color of the applet background.	LT_GRAY
Error_Color	Error_Color	Color of the applet foreground if the address value cannot be retrieved.	MAGENTA
Label_Align	Label_Align	Alignment of text in the Label field if the size is greater than the length of the text.	LEFT
Value_Align	Value_Align	Alignment of text in the Value field if the size is greater than the length of the text.	LEFT
Units_Align	Units_Align	Alignment of text in the Units field if the size is greater than the length of the text.	LEFT
Font_Name	Font_Name	Font name for the applet text.	SANSSERIF
Font_Bold	Font_Bold	Applet text is bold if configured as TRUE.	FALSE
Font_Italic	Font_Italic	Applet text is italic if configured as TRUE.	FALSE
Font_Size	Font_Size	Applet text size.	12

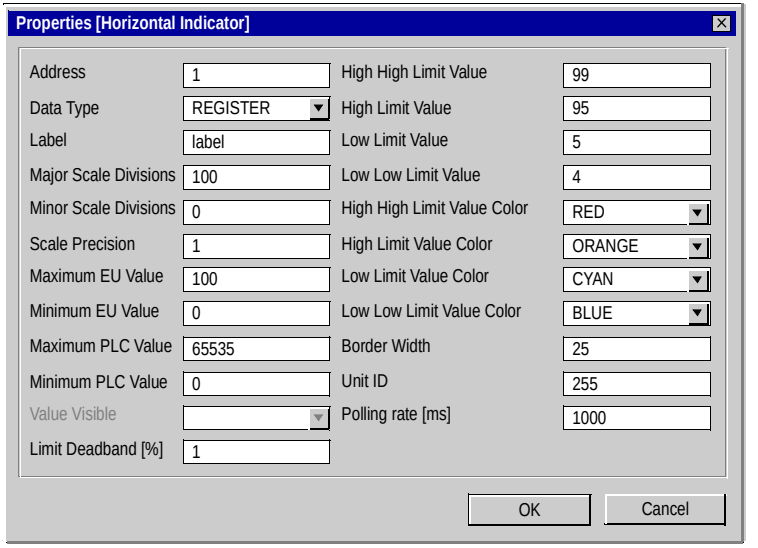
The HTML code with the parameters in the window above is as follows:

```
<APPLET
codebase="/classes"
archive="mbclient.jar,widgetslite.jar"
code="com.schneiderautomation.factorycast.gateway.widgetsl
ite.LiveLabelApplet"
width="130" height="30" >
   <PARAM name="progressbar"    value="true">
   <PARAM name="progresscolor"    value="#000000">
   <PARAM name="ADDRESS"    value="1">
   <PARAM name="UNITID"    value="255">
   <PARAM name="RATE"    value="1000">
   <PARAM name="DATATYPE"    value="REGISTER">
   <PARAM name="LABEL"    value="label">
   <PARAM name="LABEL_WIDTH"    value="25">
   <PARAM name="UNITS"    value="mm">
   <PARAM name="UNITS_WIDTH"    value="5">
</APPLET>
```

Horizontal or Vertical Indicator

The indicator gives an analog representation of the value of a direct address of a Modbus slave by drawing a horizontal or vertical bar whose length is proportional to the value and which represents a percentage of its range in physical units.

Setup



The properties of the indicator are as follows :

Property	HTML code	Description	Limits
Address	Address	Modbus address of the data type (1 to 65535).	See Note 1, (See *Notes, p. 162*)
Data type	Datatype	Modbus address data type.	See Note 2, (See *Notes, p. 162*)
Label	Label	Label to be displayed as part of the graphic object.	See Note 5, (See *Notes, p. 162*)
Major scale graduation	MajorTics	Number of major graduations (marked) in the scale.	0 to 100
Minor scale graduation	MinorTics	Number of minor graduations (not marked) in the scale.	0 to 100
Scale precision	Precision	Number of decimal places to be shown for the scale graduations (set to -1 to use a general exponential format).	-1 to 6
Maximum EU Value	Maximum	Maximum value, in physical units, of the direct address for scaling.	
Minimum EU Value	Minimum	Minimum value, in physical units, of the direct address for scaling.	

Property	HTML code	Description	Limits
Maximum PLC Value	MaxValue	Gross maximum value (without scale) of the direct address in the PLC.	See Note 3, (See *Notes, p. 162*)
Minimum PLC Value	MinValue	Gross minimum value (without scale) of the direct address in the PLC.	See Note 3, (See *Notes, p. 162*)
Limit Deadband[%]	Deadband	Neutral range (as a percentage of the UP range) to apply to verification of the High/Low limit.	0 to 10
High High Limit Value	LimitHiHi	Value expressed in physical units of the "High High" limit.	
High Limit Value	LimitHi	Value expressed in physical units of the "High" limit.	
Low Limit Value	LimitLo	Value expressed in physical units of the "Low" limit.	
Low Low Limit Value	LimitLoLo	Value expressed in physical units of the "Low Low" limit.	
High High Limit Value Color	ColorHiHi	Color of the indicator bar if the scale value is greater than the "High High" limit.	
High Limit Value Color	ColorHi	Color of the indicator bar if the scale value is greater than the "High" limit.	
Low Limit Value Color	ColorLo	Color of the indicator bar if the scale value is less than the "Low" limit.	
Low Low Limit Value Color	ColorLoLo	Color of the indicator bar if the scale value is less than the "Low Low" limit.	
Border Width	BorderWidth	Width of border.	
Unit ID	UnitId	Address of the Modbus slave.	1 to 255
Polling rate [ms]	Rate	Scanning value.	

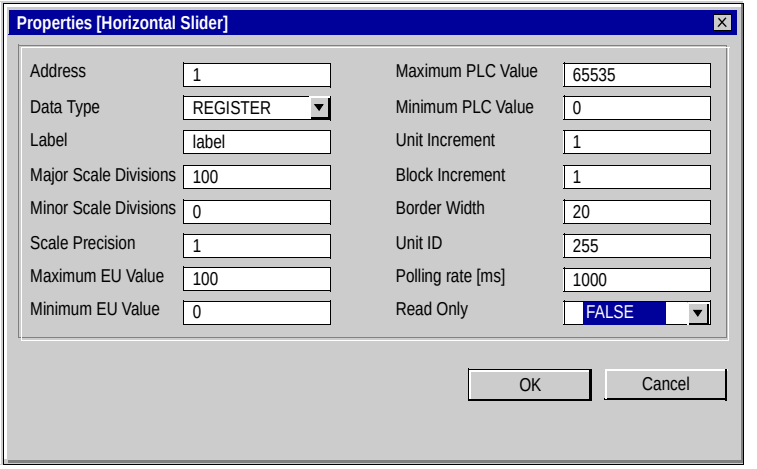
The HTML code with the parameters in the window above is as follows:

```
<APPLET
codebase="/classes"
archive="mbclient.jar,widgetslite.jar"
code="com.schneiderautomation.factorycast.gateway.
indicators.LiveHorizontalIndicatorApplet"
width="180" height="160" >
   <PARAM name="progressbar"    value="true">
   <PARAM name="progresscolor"    value="#000000">
   <PARAM name="debug"    value="0">
   <PARAM name="BACKGRND"    value="LT_GRAY">
   <PARAM name="address"    value="1">
   <PARAM name="datatype"    value="REGISTER">
   <PARAM name="label"    value="label">
   <PARAM name="majorTics"    value="100">
   <PARAM name="minorTics"    value="0">
   <PARAM name="precision"    value="1">
   <PARAM name="maximum"    value="100">
   <PARAM name="minimum"    value="0">
   <PARAM name="maxValue"    value="65535">
   <PARAM name="minValue"    value="0">
   <PARAM name="borderWidth"    value="25">
   <PARAM name="limitHiHi"    value="99">
   <PARAM name="limitHi"    value="95">
   <PARAM name="limitLo"    value="5">
   <PARAM name="limitLoLo"    value="4">
   <PARAM name="deadband"    value="1">
   <PARAM name="rate"    value="1000">
   <PARAM name="unitId"    value="255">
   <PARAM name="colorHiHi"    value="RED">
   <PARAM name="colorHi"    value="ORANGE">
   <PARAM name="colorLoLo"    value="BLUE">
   <PARAM name="colorLo"    value="CYAN">
</APPLET>
```

Horizontal or Vertical Slider

A horizontal or vertical slider gives an analog representation of the value of a direct address of a Modbus device by drawing a slider whose cursor is proportional to the value and which represents a percentage of its range in physical units. Using the mouse, the user can change the value of the slider and trigger the sending of a new value to the Modbus slave.

Setup



The properties of the slider are as follows:

Property	HTML code	Description	Limits
Address	Address	Modbus address of the data type (1 to 65535).	See Note 1, (See *Notes, p. 162*)
Data type	Datatype	Modbus address data type.	See Note 2, (See *Notes, p. 162*)
Label	Label	Label to be displayed as part of the graphic object.	See Note 5, (See *Notes, p. 162*)
Major Scale Division	MajorTics	Number of major graduations (marked) in the scale.	0 to 100
Minor Scale Division	MinorTics	Number of minor graduations (not marked) in the scale.	0 to 100
Scale Precision	Precision	Number of decimal places to be shown for the scale graduations (set to -1 to use a general exponential format).	-1 to 6
Maximum EU value	Maximum	Maximum value, in physical units, of the direct address for scaling.	
Minimum EU Value	Minimum	Minimum value, in physical units, of the direct address for scaling.	

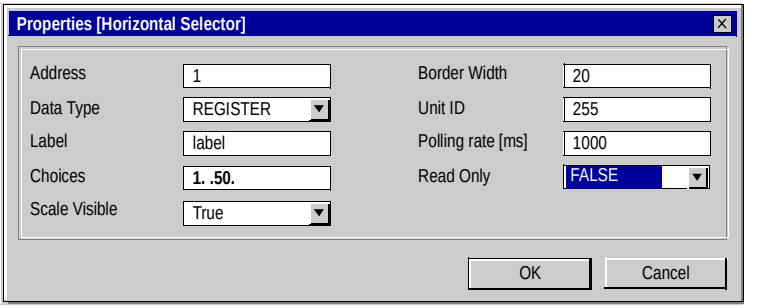
Property	HTML code	Description	Limits
Maximum PLC Value	MaxValue	Gross maximum value (without scale) of the direct address in the PLC.	See Note 3, (See *Notes, p. 162*)
Minimum PLC Value	MinValue	Gross minimum value (without scale) of the direct address in the PLC.	See Note 3, (See *Notes, p. 162*)
Unit Increment	UnitIncrement	Amount by which the scale value is modified when the user clicks on the slider arrows.	
Block Increment	BlockIncrement	Amount by which the scale value is modified when the user clicks on the slide area of the bar.	
Border Width	BorderWidth	Width (in pixels) of the border of the graphic object.	
Unit ID	UnitID	Address of the Modbus slave.	1 to 255
Polling rate [ms]	Rate	Scanning value.	
Read Only	ReadOnly	TRUE = read value, FALSE = read/write value.	

The HTML code with the parameters in the window above is as follows:

```
<APPLET
codebase="/classes"
archive="mbclient.jar,widgetslite.jar"
code="com.schneiderautomation.factorycast.gateway.sliders.
LiveHorizontalSliderApplet"
width="180" height="160" >
   <PARAM name="progressbar"    value="true">
   <PARAM name="progresscolor"    value="#000000">
   <PARAM name="debug"    value="0">
   <PARAM name="BACKGRND"    value="LT_GRAY">
   <PARAM name="address"    value="1">
   <PARAM name="datatype"    value="REGISTER">
   <PARAM name="label"    value="label">
   <PARAM name="majorTics"    value="100">
   <PARAM name="minorTics"    value="0">
   <PARAM name="precision"    value="1">
   <PARAM name="maximum"    value="100">
   <PARAM name="minimum"    value="0">
   <PARAM name="maxValue"    value="65535">
   <PARAM name="minValue"    value="0">
   <PARAM name="unitIncrement"    value="1">
   <PARAM name="blockIncrement"    value="1">
   <PARAM name="rate"    value="1000">
   <PARAM name="unitId"    value="255">
   <PARAM name="borderWidth"    value="20">
   <PARAM name="readOnly"    value="False">
</APPLET>
```

Horizontal or Vertical Selector

A horizontal or vertical selector allows the user to choose from a number of options. Once the selection has been made, the value corresponding to the choice is sent to the PLC. The choices are represented by the marks on a "scale", the current selection being indicated by the position of the cursor on a slider.
Setup:



The properties of the slider are as follows:

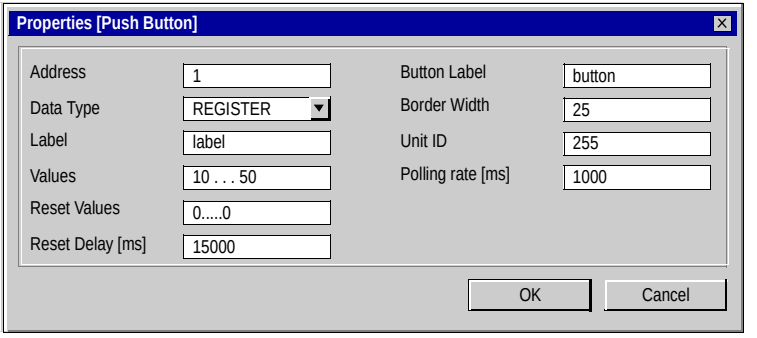
Property	HTML code	Description	Limits
Address	Address	Modbus address of the data type (1 to 65535)	See Note 1, (See *Notes, p. 162*)
Data type	Datatype	Modbus address data type	See Note 2, (See *Notes, p. 162*)
Label	Label	Label to be displayed as part of the graphic object	See Note 5, (See *Notes, p. 162*)
Choices	Choices	Setpoints to apply to the address value.	
Border Width	BorderWidth	Width (in pixels) of the border of the graphic object	
Unit ID	UnitId	Address of the Modbus slave	1 to 255
Polling rate [ms]	Rate	Scanning value	
Read Only	ReadOnly	True = read value, False = read/write value	

The HTML code with the parameters in the window above is as follows:

```
<APPLET
codebase="/classes"
archive="mbclient.jar,widgetslite.jar"
code="com.schneiderautomation.factorycast.gateway.selectors
.LiveHorizontalSelectorApplet"
width="180" height="160" >
   <PARAM name="progressbar"    value="true">
   <PARAM name="progresscolor"    value="#000000">
   <PARAM name="debug"    value="0">
   <PARAM name="BACKGRND"    value="LT_GRAY">
   <PARAM name="address"    value="1">
   <PARAM name="datatype"    value="REGISTER">
   <PARAM name="label"    value="label">
   <PARAM name="scaleVisible"    value="True">
   <PARAM name="choices"    value="1=1000,9=9000,50=50000">
   <PARAM name="rate"    value="1000">
   <PARAM name="unitId"    value="255">
   <PARAM name="borderWidth"    value="20">
   <PARAM name="readOnly"    value="False">
</APPLET>
```

Push Button

When actuated with the mouse, a push button allows the user to send a preset value to one or more Modbus slaves.
Setup:



The properties of the push button are as follows:

Property	HTML code	Description	Limits
Address	Address	Modbus address of the data type (1 to 65535).	See Note 1, (See *Notes, p. 162*)
Data type	Datatype	Modbus address data type.	See Note 2, (See *Notes, p. 162*)
Label	Label	Label to be displayed as part of the graphic object.	See Note 5, (See *Notes, p. 162*)
Values	Values	Setpoints to apply to the address value when the button is pressed.	See Note 4, (See *Notes, p. 162*)
Reset Values	ResetValues	Value to apply when the Reset Delay ends.	
Reset Delay [ms]	ResetDelay	Time in ms counted down after the button is pressed.	
Button Label	ButtonLabel	Label to display on the button.	
Border Width	BorderWidth	Width (in pixels) of the border of the graphic object.	
Unit ID	UnitId	Address of the Modbus slave.	1 to 255
Polling rate [ms]	Rate	Scanning value.	

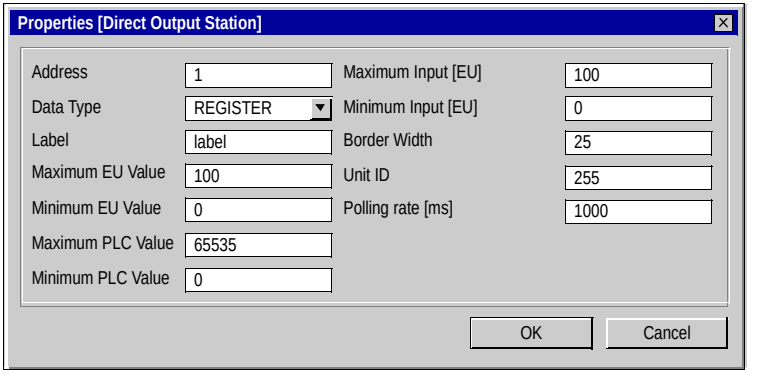
The HTML code with the parameters in the window above is as follows:

```
<APPLET
codebase="/classes"
archive="mbclient.jar,widgetslite.jar"
code="com.schneiderautomation.factorycast.gateway.pushButton
.LivePushButtonApplet"
width="180" height="160" >
   <PARAM name="progressbar"    value="true">
   <PARAM name="progresscolor"    value="#000000">
   <PARAM name="debug"    value="0">
   <PARAM name="BACKGRND"    value="LT_GRAY">
   <PARAM name="address"    value="1">
   <PARAM name="datatype"    value="REGISTER">
   <PARAM name="label"    value="label">
   <PARAM name="values"    value="10,50">
   <PARAM name="resetValues"    value="0">
   <PARAM name="resetDelay"    value="15000">
   <PARAM name="borderWidth"    value="25">
   <PARAM name="buttonLabel"    value="button">
   <PARAM name="rate"    value="1000">
   <PARAM name="unitID"    value="255">
</APPLET>
```

Note: In this example, when the user presses the button the value 10 is applied to address 1 and the value 50 to address 2 for 15,000 ms. After 15,000 ms the two address are set to the value 0 (resetValue).

Direct Output Window

This applet allows a user to enter a value in a text input field directly from the keyboard. If the text entered is a numerical value between the upper and lower preset limits, an OK button is activated. The value entered is sent to the Modbus slave each time the user clicks on the OK button or presses the ENTER key (if the input field is active for keyboard input).
Setup:



The direct output properties are as follows:

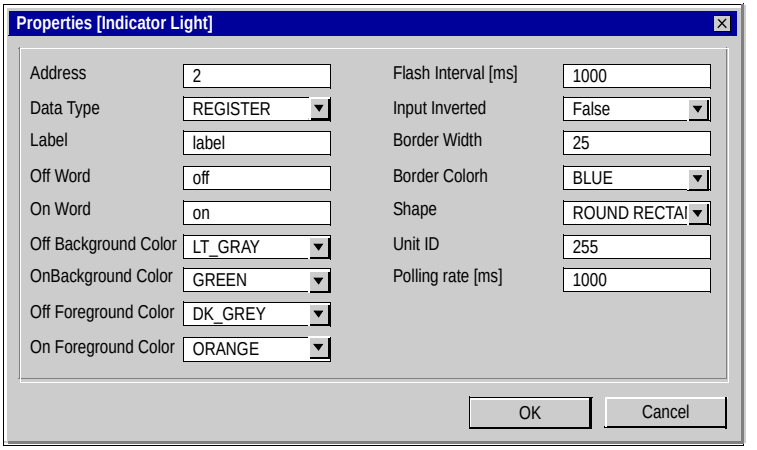
Property	HTML code	Description	Limits
Address	Address	Modbus address of the data type (1 to 65535).	See Note 1, (See *Notes, p. 162*)
Data type	Datatype	Modbus address data type.	See Note 2, (See *Notes, p. 162*)
Label	label	Label to be displayed as part of the graphic object.	See Note 5, (See *Notes, p. 162*)
Maximum EU Value	maximum	Maximum value, in physical units, of the direct address for scaling.	
Minimum EU Value	minimum	Minimum value, in physical units, of the direct address for scaling.	
Maximum PLC Value	maxValue	Gross maximum value (without scale) of the direct address in the PLC.	See Note 3, (See *Notes, p. 162*)
Minimum PLC Value	minValue	Gross minimum value (without scale) of the direct address in the PLC.	See Note 3, (See *Notes, p. 162*)
Maximum Input [EU]	MaxInputValue	Maximum setpoint for the input.	
Minimum Input [EU]	MinInputValue	Minimum setpoint for the input.	
Border Width	BorderWidth	Width (in pixels) of the border of the graphic object.	
Unit ID	UnitId	Address of the Modbus slave.	1 to 255
Polling rate [ms]	Rate	Scanning value.	

The HTML code with the parameters in the window above is as follows:

```
<APPLET
codebase="/classes"
archive="mbclient.jar,widgetslite.jar"
code="com.schneiderautomation.factorycast.gateway.direct
Output.LiveDirectOutputApplet"
width="180" height="160" >
   <PARAM name="progressbar"    value="true">
   <PARAM name="progresscolor"    value="#000000">
   <PARAM name="debug"    value="0">
   <PARAM name="BACKGRND"    value="LT_GRAY">
   <PARAM name="address"    value="1">
   <PARAM name="datatype"    value="REGISTER">
   <PARAM name="label"    value="label">
   <PARAM name="maximum"    value="100">
   <PARAM name="minimum"    value="0">
   <PARAM name="maxValue"    value="65535">
   <PARAM name="minValue"    value="0">
   <PARAM name="maxInputValue"    value="100">
   <PARAM name="minInputValue"    value="0">
   <PARAM name="rate"    value="1000">
   <PARAM name="unitId"    value="255">
   <PARAM name="borderWidth"    value="25">
</APPLET>
```

Indicator Light

The indicator light provides a double indication of the value of a direct address in a PLC. If the Input inverted property is not set to TRUE, a zero input value is declared OFF, and a non-zero value is declared ON. If the Flash Interval property is set to a positive value, the indicator light will flash when the input value is equal to ON. Setup:



The properties of the indicator light are as follows:

Property	HTML code	Description	Limits
Address	Address	Modbus address of the data type (1 to 65535).	See Note 1, (See *Notes, p. 162*)
Data type	Datatype	Modbus address data type.	See Note 2, (See *Notes, p. 162*)
Label	Label	Label to be displayed as part of the graphic object.	See Note 5, (See *Notes, p. 162*)
Off Word	OffWord	Text to be displayed when the input value is OFF.	
On Word	OnWord	Text to be displayed when the input value is ON.	
Off Background Color	OffWordBackground	Background color of the indicator light when Off Word is displayed.	
ON Background Color	OnWordBackground	Background color of the indicator light when ON Word is displayed.	
Off Foreground Color	OffWordForeground	Color of the text of the Off Word.	
On Foreground Color	OnWordForeground	Color of the text of the On Word.	

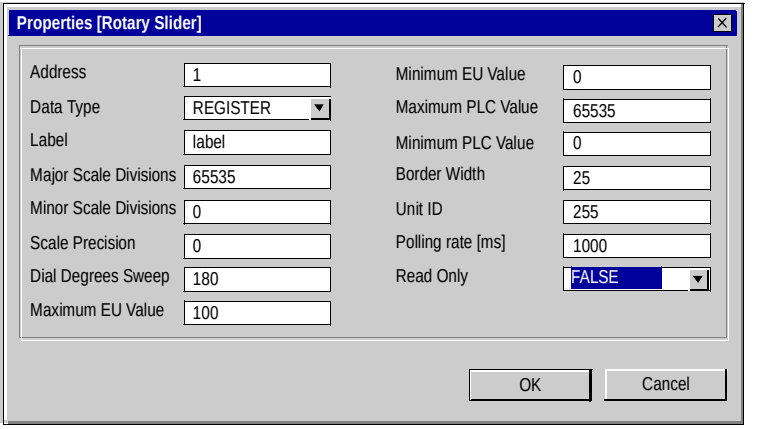
Property	HTML code	Description	Limits
Flash Interval	FlashInterval	The flashing time for the indicator light (expressed in milliseconds) when the input value is ON. Set to zero for no flashing.	200 to 2000
Input inverted	InputInverted	On TRUE, inverts the input value (the indicator light displays the Off Word when the input value is ON).	
Border Width	BorderWidth	Width (in pixels) of the border of the graphic object.	
Border Color	BorderColor	Color of the border.	
Shape	Shape	Shape (circular, rectangular, etc.) of the indicator light.	
Unit ID	UnitId	Address of the Modbus slave.	1 to 255
Polling rate [ms]	Rate	Scanning value.	

The HTML code with the parameters in the window above is as follows:

```
<p><APPLET
codebase="/classes"
archive="mbclient.jar,widgetslite.jar"
code="com.schneiderautomation.factorycast.gateway.indica-
torLight.LiveIndicatorLightApplet"
width="180" height="160" >
   <PARAM name="progressbar"    value="true">
   <PARAM name="progresscolor"    value="#000000">
   <PARAM name="debug"    value="0">
   <PARAM name="BACKGRND"    value="LT_GRAY">
   <PARAM name="address"    value="2">
   <PARAM name="datatype"    value="REGISTER">
   <PARAM name="label"    value="label">
   <PARAM name="offWord"    value="off">
   <PARAM name="onWord"    value="on">
   <PARAM name="offWordBackground"    value="LT_GRAY">
   <PARAM name="onWordBackground"    value="GREEN">
   <PARAM name="offWordForeground"    value="DK_GRAY">
   <PARAM name="onWordForeground"    value="ORANGE">
   <PARAM name="flashInterval"    value="1000">
   <PARAM name="inputInverted"    value="False">
   <PARAM name="borderWidth"    value="25">
   <PARAM name="borderColor"    value="BLUE">
   <PARAM name="shape"    value="ROUND RECTANGLE">
   <PARAM name="rate"    value="1000">
   <PARAM name="unitId"    value="255">
</APPLET>
```

Rotary Slider

A rotary slider gives an analog representation of the value of a direct address of a Modbus device. On a circular dial, it draws a position proportional to the value of the address and represents a percentage of its range in physical units. The size of the circular dial (cycle in degrees of a circle) and the color of the button can be configured. Using the mouse, the user can change the value of the rotary slider and trigger the sending of a new value to the PLC.
Setup:



The properties of the slider are as follows:

Property	HTML code	Description	Limits
Address	Address	Modbus address of the data type (1 to 65535).	See Note 1, (See *Notes, p. 162*)
Data type	Datatype	Modbus address data type.	See Note 2, (See *Notes, p. 162*)
Label	Label	Label to be displayed as part of the graphic object.	See Note 5, (See *Notes, p. 162*)
Major scale graduation	MajorTics	Number of major graduations (marked) in the scale.	0 to 100
Minor scale graduation	MinorTics	Number of minor graduations (not marked) in the scale.	0 to 100
Scale precision	Precision	Number of decimal places to be shown for the scale graduations (set to -1 to use a general exponential format).	-1 to 6
Dial Degrees Sweep	DegSweep	Portion of circular dial to be used to draw the scale.	60 to 300
Maximum EU Value	Maximum	Maximum value, in physical units, of the direct address for scaling.	

Property	HTML code	Description	Limits
Minimum EU Value	Minimum	Minimum value, in physical units, of the direct address for scaling.	
Maximum PLC Value	MaxValue	Gross maximum value (without scale) of the direct address in the PLC.	See Note 3 (See *Notes, p. 162*)
Minimum PLC Value	MinValue	Gross minimum value (without scale) of the direct address in the PLC.	See Note 3 (See *Notes, p. 162*)
Border Width	BorderWidth	Width (in pixels) of the border of the graphic object.	
Unit ID	UnitId	Address of the Modbus slave.	1 to 255
Polling rate [ms]	Rate	Scanning value.	
Read Only	ReadOnly	True = read value, False = read/write value.	

The HTML code with the parameters in the window above is as follows:

```
<APPLET
codebase="/classes"
archive="mbclient.jar,widgetslite.jar"
code="com.schneiderautomation.factorycast.gateway.sliders.
LiveRotosliderApplet"
width="180" height="160" >
   <PARAM name="progressbar"    value="true">
   <PARAM name="progresscolor"    value="#000000">
   <PARAM name="debug"    value="0">
   <PARAM name="BACKGRND"    value="LT_GRAY">
   <PARAM name="address"    value="1">
   <PARAM name="datatype"    value="REGISTER">
   <PARAM name="label"    value="label">
   <PARAM name="majorTics"    value="65535">
   <PARAM name="minorTics"    value="0">
   <PARAM name="precision"    value="0">
   <PARAM name="degSweep"    value="180">
   <PARAM name="maximum"    value="100">
   <PARAM name="minimum"    value="0">
   <PARAM name="maxValue"    value="65535">
   <PARAM name="minValue"    value="0">
   <PARAM name="borderWidth"    value="25">
   <PARAM name="rate"    value="1000">
   <PARAM name="readOnly"    value="False">
   <PARAM name="unitID"    value="255">
```

Trend curves

The trend curve can be used to represent the value of a direct address of a Modbus device or of a module internal register graphically on a curve according to a time interval. This graphic object has no configuration window, therefore the HTML code must be written out.
The properties of the slider are as follows:

HTML code	Description	Limits
Address	Modbus address of the data type (1 to 65535).	See Note 1, (See *Notes, p. 162*)
Datatype	Modbus address data type.	See Note 2, (See *Notes, p. 162*)
Label	Label to be displayed as part of the graphic object.	See Note 5, (See *Notes, p. 162*)
Pens	Color of the curve (black by default).	
Griddivisions	Number of intervals on the grid.	
Chartbackground	Curve background color.	
Gridcolor	Color of the interval grid.	
Scalecolor	Color of the text for the X-axis and Y-axis information.	
Updateinterval	Time in seconds between each interval.	
Timedivisions	Number of time intervals.	
Maximum	Maximum value, in physical units, of the direct address for scaling.	
Minimum	Minimum value, in physical units, of the direct address for scaling.	
MaxValue	Gross maximum value (without scale) of the direct address in the PLC.	See Note 3 (See *Notes, p. 162*)
MinValue	Gross minimum value (without scale) of the direct address in the PLC.	See Note 3 (See *Notes, p. 162*)
BorderWidth	Width (in pixels) of the border of the graphic object.	
UnitId	Address of the Modbus slave.	1 to 255
Rate	Scanning value.	

The HTML code with the parameters in the window above is as follows:

```
<APPLET
codebase="/classes"
code="com.schneiderautomation.factorycast.gateway.chart.Li
veChartApplet"
archive="mbclient.jar,widgetslite.jar "width="685"
height="363">
<param name="progressbar" value="true">
<param name="progresscolor" value="#000000">
<param name="pens" value="p1=black,p2=blue,p3=green">
<param name="address" value="5,6,7">
<param name="minimum" value="0">
<param name="maximum" value="100">
<param name="minValue" value="0">
<param name="maxValue" value="100">
<param name="griddivisions" value="5">
<param name="gridcolor" value="blue">
<param name="updateinterval" value="10">
<param name="timedivisions" value="10">
<PARAM name="unitId"    value="255">
<param name="chartbackgrnd" value="white">
</applet>
```

Notes

The notes relating to this chapter are as follows:

1.	The Data type property must correspond exactly to the actual data type of the variable. If the Address property is the direct address of a binary PLC reference (reference 0x/ 1x Quantum for example), the Data type property must be set to Coil for outputs or Discrete Input for discrete inputs.	
2.	The various values of the Data type property have the following meaning:	
	Type de données	Signification
	`COIL`	`output bit (Boolean)`
	`DISCRETE INPUT`	`input bit (Boolean)`
	`REGISTER`	`16-bit signed integer`
	`REGISTER32`	`32-bit signed integer`
	`INPUT REGISTER`	`16-bit signed integer for analog input`
3.	The limits of the Maximum PLC Value and Minimum PLC Value properties are the natural limits of the configured Data type property.	
4.	For a push button you must specify at least one value. If several values are entered, they will be assigned to an address table starting with the direct address indicated.	
5.	In the HTML code, by specifying param name = "label" value = "$data$", the applet will display the numerical value of the data in place of a label.	

Hardware Characteristics

6

Presentation

Scope of this Chapter

This chapter covers the hardware characteristics of the TSX ETG 1000 module.

What's in this Chapter?

This chapter contains the following sections:

6.1 Description

Presentation

Scope of this Section

This section covers the physical description of the TSX ETG 1000 module.

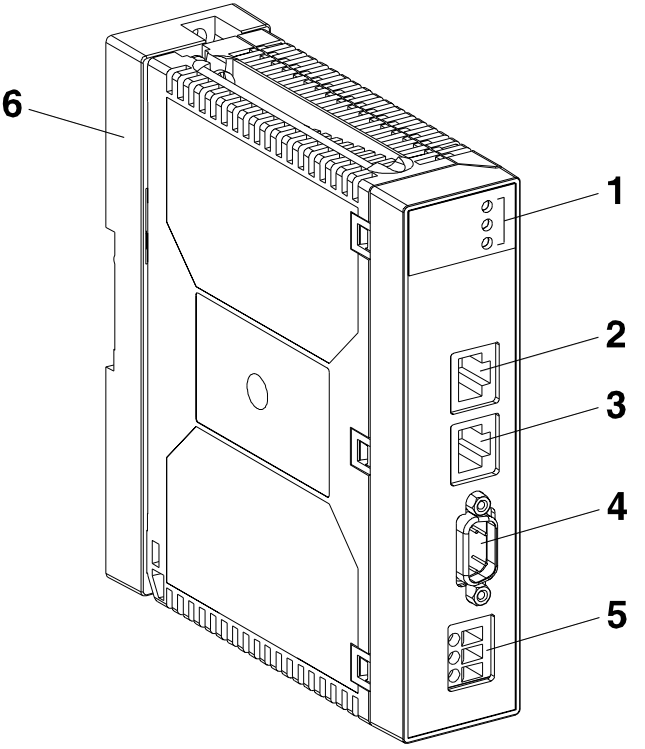
What's in this Section?

This section contains the following topics:

Physical Description

At a Glance

View of the TSX ETG 1000 module:



Description

Description of the module front panel:

Reference	Description
1	3 LED indicators (See *Diagnostics, p. 179*): ● one RUN/MODBUS LED (green) ● one ERR LED (red) ● one Rx/Tx LED (orange).
2	RJ45 connector for Modbus RS 485 link (See *RJ45 Modbus Link Connector, p. 176*).
3	RJ45 connector for Ethernet link (See *RJ45 Ethernet Connector, p. 174*).
4	9-pin SUB D connector for modem link (See *RS232 Serial Modem Link Connector, p. 175*).
5	Screw terminal for 24 VDC power supply connection (See *Power Supply Terminals, p. 173*).
6	Support plate for fixing the module directly to an AM1-DE200/DP200 DIN rail or to a Telequick AM1-PA pre-slotted plate.

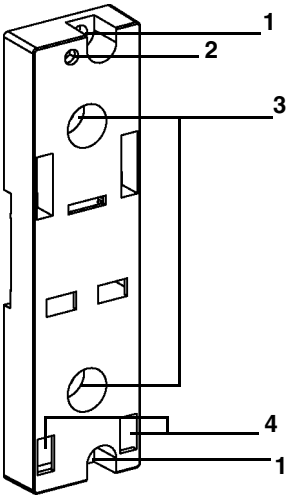
Description of the Support Plate

Presentation

Each TSX ETG 1000 module is supplied fixed to a support plate which can be mounted on either an AM1-DE200 or AM1-DP200 DIN rail, or on a Telequick AM1-PA pre-slotted plate.

Illustration

View of the plate:



Description

Description of the plate:

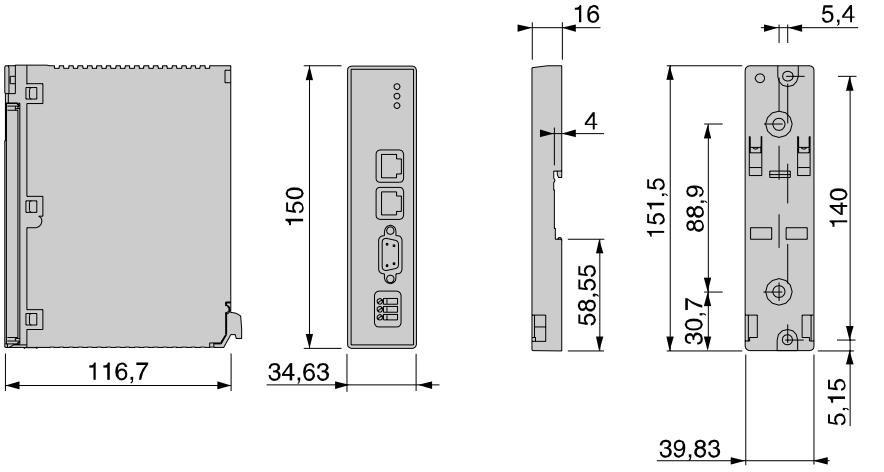
Reference	Description
1	Two 5.5 mm holes for securing the plate to a panel or to an AM1-PA pre-slotted plate, with fixing centers of 140 mm (Micro fixing centers).
2	M4 fixing hole for securing the TSX ETG 1000 module.
3	Two 6.5 mm holes for securing the plate to a panel or to an AM1-PA pre-slotted plate, with fixing centers of 88.9 mm (Premium fixing centers).
4	Windows for marking the pins located on the base and rear of the module.

6.2 Installation of the TSX ETG Module

Dimensions and Mounting of the TSX ETG 1000 Module

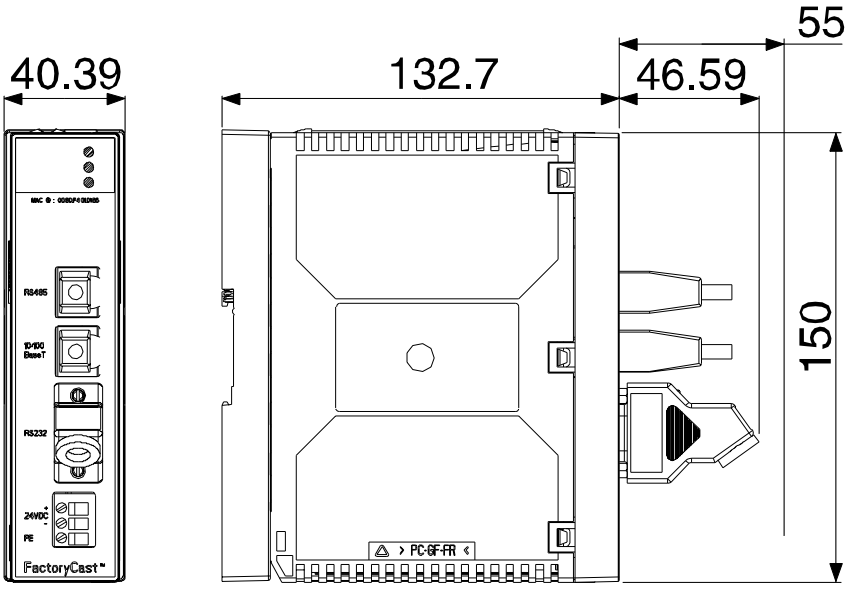
Dimensions

Illustration:



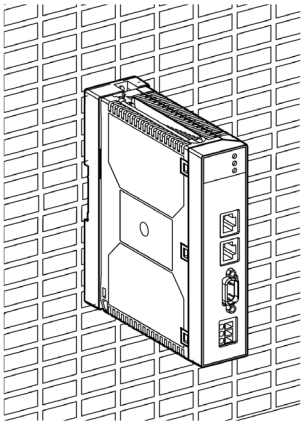
Dimensions of Ready-Assembled Module

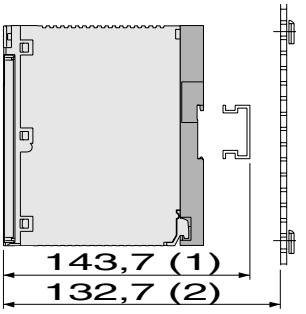
Dimensions of the ready-assembled module with its cables connected to the front panel

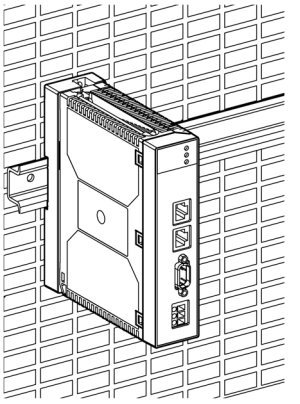


Mounting on a Rail or Plate

Illustration of the module mounted on an **AM1-DE200** or **AM1-DP200** rail or on an **AM1-PA** plate:





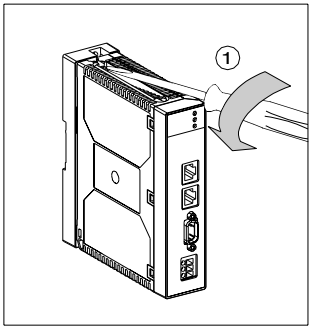
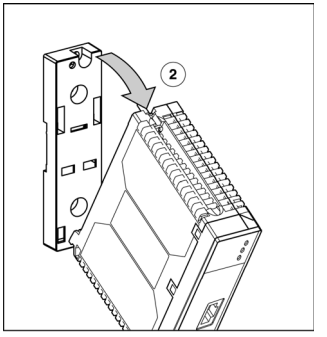


(1) 143.7mm (AM1-DE200)
136.2mm (AM1-DP200)

(2) 132.7mm (AM1-PA)

Detaching the Module from its Support Plate

To detach the module from its support plate, follow the steps below:

Step	Action	Illustration
1	Unfasten the screw located in the top of the module to loosen it from its support.	
2	Pivot the module forwards and disengage the pins from the holes located in the bottom of the support.	

6.3 Connections

Presentation

Scope of this Section

This section covers the electrical connections for the TSX ETG 1000 module.

What's in this Section?

This section contains the following topics:

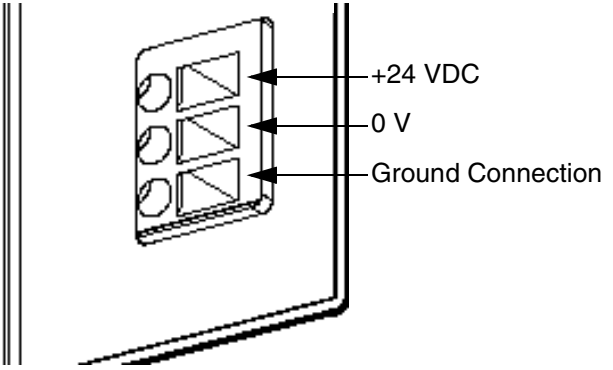
Module Connectors

At a Glance

The various connectors for the TSX ETG 1000 module are described below.

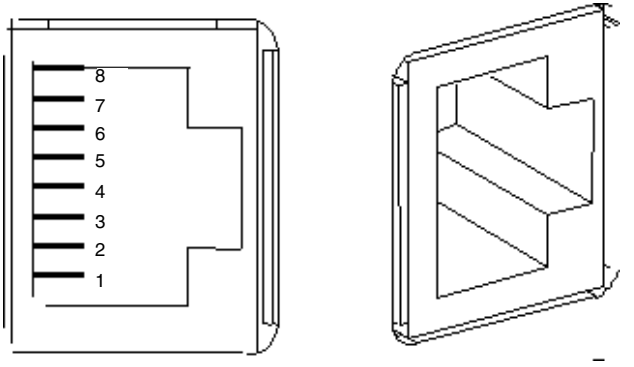
Power Supply Terminals

The power supply terminals comprise three front screw terminals. It is not removable. Each terminal takes a cable of maximum width 2.5 mm^2.
Illustration:



RJ45 Ethernet Connector

Illustration of the RJ45 shielded connector for the Ethernet link:

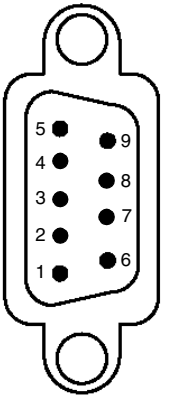


Wiring:

No.	Signal
1	Tx+
2	Tx-
3	Rx+
4	Not connected
5	Not connected
6	Rx-
7	Not connected
8	Not connected

RS232 Serial Modem Link Connector

Illustration of the 9-pin SUB D connector for the RS232 serial modem link:



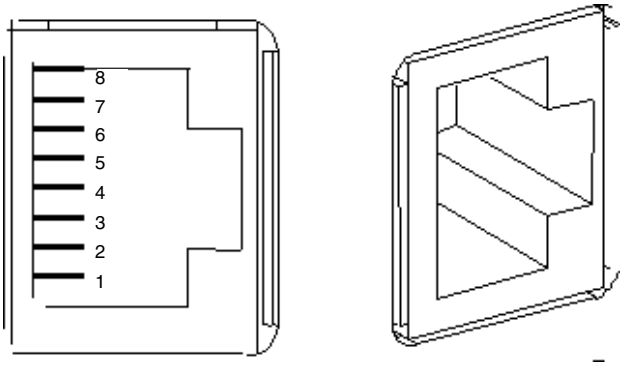
Wiring:

No.	Signal
1	Data Carrier Detect
2	Received Data
3	Transmitted Data
4	Data Terminal Ready
5	Signal Ground
6	Data Set Ready
7	Request to send
8	Clear to Send
9	Ring Indicator

Note: This connector conforms to the PC standard.

RJ45 Modbus Link Connector

Illustration of the shielded non-insulated RJ45 connector for the RS 485 Modbus link:



Wiring:

No.	Signal
1	Not connected
2	Not connected
3	Not connected
4	D1 (B/B')
5	D0 (A/A')
6	Not connected
7	Not connected
8	Shared

Note: The pin connection conforms to the Schneider standard. The connector is master and includes the polarity on the line.

Ground Connection

The potential of the ground connection located at the end of the Ethernet cable may be different from that of the module.
Given the length of the Ethernet cable, the potential difference may be significant.
All grounds must be connected locally to the base of the module.
For more information, please refer to the ground connection wiring guide TSX DGKBLE.

	**WARNING** The module must be connected to ground via the power supply terminals. **Failure to follow this precaution can result in death, serious injury, or equipment damage.**

Connection Cables

Presentation

Various cables can be used for connecting the TSX ETG 1000 module. These cables can be obtained from the Schneider Automation catalog or can be constructed by the user. For details of how to set up a MODBUS bus, please refer to the **TSX DG MDB** manual.

Ethernet Network Connection Cables

For connecting to the Ethernet network we recommend using cables with **100 Ω RJ 45 STP (shielded twisted pair) connectors (10/100baseT interface)** or category 5 Ethernet cables conforming to standard TIA/EIA-568A.

RS232 Cable to PC

This is a standard commercial DTE/DTE type crossed cable. This type of cable is also referred to as a "null modem" cable by certain suppliers.
Example of a suitable cable type: EYN257H-0006-FF from Black Box.
Connectors: 9-pin female Sub D with UNC-4-40-2B screws
Shielded cable.
Wiring:

9-pin female Sub D			**9-pin female Sub D**		
2	RD		3	TD	
3	TD		2	RD	
4	DTR		6 and 1	DSR + CD	
5	GND		5	GND	
6 and 1	DSR + CD		4	DTR	
7	RTS		8	CTS	
8	CTS		7	RTS	
9	NC		9	NC	
Body	-	Shielding braid	Body	-	Shielding braid

Note: The DSR and CD signals are linked to make the application believe it is on line.

6.4 Diagnostics

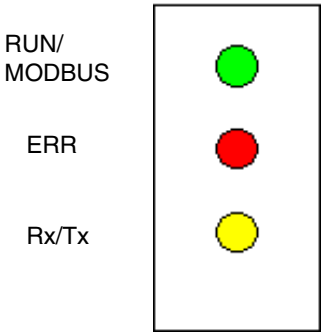
LED Indicators

At a Glance

On the front panel of the module there are three LED indicators used for performing diagnostics on the TSX ETG 1000 module.

Diagnostics

Illustration of the LEDs:



Meaning of the LEDs:

Module status	RUN	ERR	Comments
Power on	ON	ON	Transient state
Self-test in progress	Flashing	Flashing	-
Module hardware fault	OFF	ON	Replace the module
Configuration error Invalid IP address	OFF	Flashing	HTTP server can still be accessed
RJ45 Ethernet not connected to the module	OFF	3 LEDs	-
TSX ETG 1000 BOOTP or DHCP(FDR) client: The module is configured in auto-configuration mode and is awaiting a response from the server.	OFF	Flashes 5 times	Waiting time: approx. 5 minutes
TSX ETG 1000 BOOTP or DHCP(FDR) client: No response from server	ON	Flashes 6 times	Downgraded mode: the module uses its default configuration
Operating	ON	OFF	-

The Rx/Tx LED flashes according to the Ethernet communication speed and the RUN/MODBUS LED flashes according to the Modbus communication speed.

6.5 Electrical Characteristics

Electrical Characteristics

General

The TSX ETG 1000 is a standalone module requiring a 24 VDC power supply.

Characteristics

Table of electrical characteristics:

Parameter	Minimum	Nominal	Maximum
Supply voltage	19.2 VCC	24 VCC	30 VCC
Ripple factor	-	-	5%
Permissible overvoltage (for 1 hour and per 24 hours)	-	-	34 VCC
Current consumption	50 mA	100 mA	200 mA
Power loss (without consumption via terminal port)	-	2.4 W	4 W
Length of invisible power outage	-	-	1 ms

Note: The power supply input is protected against accidental polarity inversions.

6.6 Performance

Module Performance

Data

The two tables below show the speed performance of the TSX ETG 1000. The first table shows the results of requests per second based on the Modbus speed setting and request length. In the second table, eight alarms continuously scanned at 100 ms are added to the configuration.

Performance (with no alarms)

Performance table:

Requests/sec	**Request length (in words)**					
Modbus speed	**64**	**32**	**16**	**8**	**4**	**2**
2400 bauds	1.4	2.5	4	5.6	7.1	8.3
4800 bauds	2.8	5	7.7	11.1	14.2	16.6
9600 bauds	5.6	10	14.2	19.9	25	25
19200 bauds	11.1	16.6	25	33.2	49.8	49.9
38400bds	19.9	32.8	39.9	49.8	49.9	49.9
57600 bauds	25	33.2	49.8	49.8	50.8	63.1
115200 bauds	49.9	49.9	89.7	99.6	99.7	99.8

Examples:

- with a Modbus speed of 19,200 baud, 25 Modbus slaves can be pooled with 16-word requests,
- the pooling need is for 30 Modbus slaves every 500 ms with a bus speed of 19,200 bauds. The maximum requests are for 8 words.

Performance (with 8 alarms)

Performance table:

Requests/sec	**Request length (in words)**					
Modbus speed	**64**	**32**	**16**	**8**	**4**	**2**
2400 baud	1.2	2	2.7	3.6	4.2	4.5
4800 baud	2.4	3.8	5.5	8.2	10.2	11.5
9600 baud	4.8	7.9	11.9	16.3	20.3	20.7
19200 baud	10	14.5	21.6	28.8	42.3	42.3
38400 baud	18.3	30	39.8	45.7	45.8	45.9
57600 bauds	23.2	31.4	46	46.2	49.9	57.9
115200 bauds	45.8	46	82.1	91.4	91.5	91.5

6.7 Standards

Standards

Compliance with Standards

The TSX ETG 1000 module complies with the following standards:

- ISO/IEC 8802-3,
- ANSI/IEEE Std 802.3 (4th edition 1993-07-08),
- UL 508,
- CEI 1131-2,
- IEC 1131-2,
- CSA C22.2 142,
- compliance with regulation FCC-B for radiated emissions (50082-1)
- CE marking
- marine classification by the principal European bodies: BV, DNV, GL, LROS, RINA.

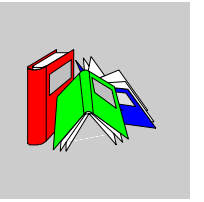
6.8 Conditions of Use

Conditions of Use

Applicable Conditions

- **Conditions of use:**
  - temperature: 0 to +60°C,
  - relative humidity: 10 to 95% (without condensation),
  - altitude: 0 to 2000m,
  - vibration resistance: compliant with IEC 68-2-6 test Fc,
  - impact resistance: compliant with IEC 68-2-27 test Ea,
  - resistance to dropping, in packaging: compliant with standard 1131-2.
- **Storage conditions:**
  - temperature: -25 to +70°C,
  - relative humidity: 5 to 95% (without condensation).

Glossary



A

ASCII — **American Standard Code for Information Interchange**.
Pronounced "aski". This is an American code (but now an international standard) which allows all alphanumerical characters used in English, punctuation marks, some graphics characters and various commands to be defined with 7 bits.

B

BIT — Contraction of Binary Digit.
This is the binary unit of information content, which can represent two separate values (or states): 0 or 1.
A field of 8 bits constitutes 1 **byte**.

BOOTP — **Bootstrap Protocol**: Protocol for booting diskless terminals or stations by centralized management of network parameters.

C

Communication error — Error detected by the module when the periodic exchanges with the PLC stop.

Configuration — The configuration comprises all the data that defines the device (invariable) and that is necessary to the operation of the module.

CPU — **Central Processing Unit.**
The microprocessor. This comprises the entire control unit and the arithmetic unit. The purpose of the control unit is to extract the execution instruction from the central memory along with the data needed to execute this instruction, to establish electrical connections in the arithmetic and logic unit and to start the processing of this data in the unit. **ROM** or **RAM** memories are sometimes included on the same chip, and sometimes even I/O interfaces or buffers.

D

DHCP — **Dynamic Host Configuration Protocol**: Protocol allowing a station connected to the network to obtain its configuration dynamically.

DIN — **Deutsches Institut für Normung**: German standards institute.

Driver — Program which informs the operating system of the presence and characteristics of a peripheral.

F

FDR — **Faulty Device Replacement**: Automatic configuration recovery service provided by the module.

FTP/TFTP — **File Transfer Protocol/Trivial File Transfer Protocol**: Network file transfer protocol.

H

HTTP — **HyperText Transfer Protocol**: Network transfer protocol for documents written in hypertext (links).

I

IP — **Internet Protocol**: Communication protocol used by the Internet.

ISO — International Standards Organization. The ISO code is the most widely used. Formats, symbols, transmission rules are all covered by ISO standards. AFNOR is a member of ISO.

M

MIB — **Management Information Base**: Batabase used by the SNMP protocol for network management and containing information on data transmission, station or router components, etc.
- MIB II: standard MIB
- Schneider Automation MIB: private MIB

O

Operating mode — The rules governing the behavior of the module during transient phases or in the event of a fault.

P

PAP — **Password Authentication Protocol**: Password identification protocol used for remote modem connections.

PL7 — Schneider Automation PLC programming software.

PPP — **Point-to-Point Protocol**: Point-to-point communication protocol used for modem connections.

Premium — Family of Schneider Automation PLCs.

Q

Quantum Family of Schneider Automation PLCs.

R

RS 232C Serial communication standard that in particular defines the following operating voltage:
- A signal of +3 to +25V indicates a logic 0
- A signal of -3V to -25V indicates a logic 1

Between +3V and -3V the signal is regarded as invalid.
RS 232 connections are relatively sensitive to interference. The standard recommends not exceeding a distance of 15 meters and a speed of 20,000 baud (bps) maximum.

RS 485 Serial connection standard operates at +/-5V differential. The connection uses separate wires for transmission and receipt. Their "3-status" outputs allow them to switch to listening mode when transmission is completed.

RUN Function used to start execution of the application program in the PLC.

S

SMTP **Simple Mail Transfer Protocol**: Application protocol used to transmit messages via the Internet and direct them to a mailbox.

SNMP **Simple Network Management Protocol**: Network management protocol for controlling a network remotely by polling the stations for their status and modifying their configuration, performing security tests and viewing information relating to data transmission. It can also be used to manage software and databases remotely.

T

TCP **Transmission Control Protocol**: Network data transmission protocol.

Time Out	**Expiry of a waiting time.** Stops the application or disconnects after a lengthy period of non-use.

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