

TEL003
Version 2.0
Installation Instructions
(english)

12/99



GROUPE SCHNEIDER

■ Merlin Gerin ■ Modicon ■ Square D ■ Telemecanique

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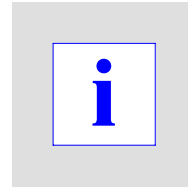
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Basic Information



This installation manual contains a general system description, as well as the necessary hardware and software prerequisites for TEL003 operation. In addition the software installation procedure is described.

- Chapter 1** presents TEL003 features and general information.
- Chapter 2** covers hardware and software prerequisites, as well as a presentation of supported modems.
- Chapter 3** describes TEL003 software installation.
- Chapter 4** gives an overview of the possible hardware connection methods.
- Chapter 5** relates program start procedures for message transfer.

Employed Symbols



Note

This symbol serves to highlight important facts.



Caution

This symbol points out frequently occurring sources of error.



Warning

This symbol alerts the user to principal sources of danger which can cause significant injury and financial damages or other serious consequences.



Expert

This symbol will be used whenever far-reaching information is offered, exclusively intended for experts (those individuals possessing specialized training). Disregarding this information has no influence on the intelligibility of this publication, and will not reduce the usage spectrum of the product.



Tip

This symbol points out explanations of invaluable Tips & Tricks regarding product usage.

Example

This symbol highlights application examples.



Proceed as follows:

This symbol marks the start of an instruction sequence whose execution is required to achieve a particular product function.

Supplemental Documentation

Description	Order No.
System Description for Telecontrol with IEC870-5-101 (=S=101), User Manual	840 USE 473 00
PRO TSX 101, User Manual and Block Library for Telecontrol with IEC 870-5-101 (=S=101)	840 USE 476 00

Validity Reference

This User Manual pertains to TEL003 version 2.0 under Microsoft Windows 95 or Windows NT.

TEL003 General Description

1

The TEL003 software package is a line monitor for Geadat telecontrol stations using the IEC 870-5-101 transmission protocol (international standard; and German standard DIN EN 60870-5-101) in leased-line or automatic call out (ACO) operation.

The system supports test and commissioning of data telecommunications, functioning either as telecontrol master station, outstation, or passive listener.

The following operating modes can be selected:

- Master - in leased-line or ACO operation
- Slave - in leased-line or ACO operation
- Listener - only in leased-line operation

The line monitor is suitable for:

- Commissioning
- Long-distance line examination
- Error diagnosis (expert, measured, or counted value status)
- Transmission of test messages
- Interrogation/value specification of objects and the associated parameters (e.g. measured-value limiting values, selection of archive entries, ...).

TEL003 offers:

- Automatic data-logging to file in ASCII.
- A trace buffer for message interchange analysis (with storage to disk or data media).



Note

The software operates directly through the serial ports COM1, COM2 ... or COM4. Operating mode selection takes place through the menu `Communication` → `Master/Slave/Listener...`

TEL003 Features

TEL003 is menu-driven. Menu selections have been restricted to the relevant functions corresponding to the respective situation. The shading of menu selections provides a visual indication of selectable menu items.

Symbol bars provide menu shortcuts for experienced users. They also adapt to the respective program situation and are largely standardized.

TEL003 offers further familiar Windows-based controls such as dialog boxes with buttons, option panels, text and list boxes.

The context-sensitive on-line help function provides support for the respective program situation. The software's documentation is also available within the on-line help. The help system structure corresponds to Windows, so that themes can be freely browsed.

Prerequisites

2

-
- Hardware Requirements
 - Software Requirements

2.1

Hardware Requirements

TEL003 has the same requirements, in principle, as Windows 95 or Windows NT. The following listed requirements should be understood as minimums. It holds for TEL003, just as for Windows, that the faster the processor and the more free RAM is available, the higher the processing speed and thereby the ease-of-use.

- PC with Intel 486 (or higher) processor
- 8 MB RAM
- 80 MB hard drive
- CD Rom drive
- VGA graphic adapter and monitor
- Microsoft compatible mouse

2.1.1

Supported Modems by Operating Mode

There are modems capable of leased-line operation, and those capable of providing connections by automatic call out (ACO) over normal POTS lines.

Leased-line operation: RCM 909

In "compatible mode" transmission is made full-duplex over leased-lines, with either the ITU-T standard V.22 or V.22bis, depending upon the employed protocol. The UEM 201 can be replaced by a RCM 909 modul set to this mode.



Note

The RCM 909 modem can be employed in two operating modes: compatible and extended. Selection of the default operating mode is made by DIP switch (as shipped = compatible mode).

Features:

- Leased-line operation with the IEC 870-5-101 protocol
- Two ITU-T standards: V.22, V.22bis
- 2- or 4-wire connection
- Selectability of continuous transmission monitoring and high impedance reception
- 24 VDC modem supply voltage
- RS-232C port for external peripherals and PC connection

ACO operation:

Any of the following modems sanctioned for ACO operation by Schneider Automation GmbH may be used. For example:

- LGH 9600H1 from KE Kommunikationselektronik GmbH & Co, or modems from the German Telekom
- ELSA MicroLink 366 or 56
- LGH 64k ISDN adapter from KE Kommunikationselektronik GmbH & Co
- MicroLink TL ISDN adapter from the ELSA GmbH
- 470 RCM 909 00 (modem for Geadat)

**Note**

The RCM 909 modem can be employed in two operating modes: compatible and extended. Selection of the default operating mode is made by DIP switch (as shipped = compatible mode). Public phone lines may be utilized as the transmission medium in "extended mode", in what is known as a point to point connection. Use is made of the following ITU-T standards: V.22 and V.22bis. The actual data transmission is regulated by the IEC 870-5-101 protocol. The involved modems are controlled through standard (Hayes) AT commands.

The modem initial states should be 9600 bps, 8-bit data, 1 stop bit and no parity. This can generally be set with an AT&F command from most terminal programs.

Modem initialization will be carried out later in TEL003 through the menu selection Communication → Master/Slave/Listener → Modem tab → Edit... → Modem initialization.

2.2

Software Requirements

- Microsoft Windows 95 or Windows NT.

Installation

3

-
- TEL003 Installation
 - Update Installations
 - TEL003 Start Procedures

3.1

TEL003 Installation



Note

Various files are written to the hard drive during program installation.



Carry out the following steps to install TEL003:

1. Start Windows.
2. Insert the TEL003 system CD.

Result An Installation program starts automatically.

3. Follow the screen instructions.

Result TEL003 will be installed and a `tel003` shortcut will be placed in the Start menu Programs branch.

Update Installations

**Caution**

Be sure to always uninstall an old version of TEL003 before proceeding with a newer update installation.



To uninstall the old version of the software carry out the following steps:

1. Start Windows.
2. Open the Start menu and select `Settings` → `Control Panel` → `Add/Remove Programs`.
3. Then choose the TEL003 program from the `Install/Uninstall` list.

Result The existing TEL003 program installation is selected.

4. Verify the uninstall action by clicking the `Add/Remove` button.



Proceed with the following steps for update installation:

1. Start Windows.
2. Insert CD of the update package in drive.

Result An Installation program starts automatically.

3. Follow the screen instructions.

Result The presented options will be installed.

TEL003 Start Procedures

Windows 95/NT: Start TEL003 by clicking the `tel003` icon in `Start Menu` → `Programs`.

Here follow all possible parameters and their effects:

<code>-d</code>	German language software version
<code>file.opt</code>	Load the option file <code>file.opt</code> at program start

The program starts in the English language version by default. Lasting changes to the program parameters can be made by altering the shortcut properties as follows:

1. After program installation select the `tel003` shortcut residing in subdirectory `Programs` under the `Windows` directory `Start Menu`, and press the right mouse button.
2. Choose the `Properties` entry and select the `Shortcut` tab.
3. Supplement the program invocation string under `Target:` with the desired call-up parameters (i.e. `x:\Program Files\Tel003.exe -d my.opt`).



Note

In the example presented the German language version is started with the options stored in the file "my.opt".

Hardware Connection Methods



4

-
- Structure of the Various Connection Styles
 - ACO Configuration Examples

4.1

Structure of the Various Connection Styles

The connection between the TEL003 line monitor software and the telecontrol stations can be accomplished through different styles of connections:

- RS-232C interface
- Leased-line by modem (RCM)
- ACO dialing services over POTS (RCM)

Figure 1 RS-232C Interfacing

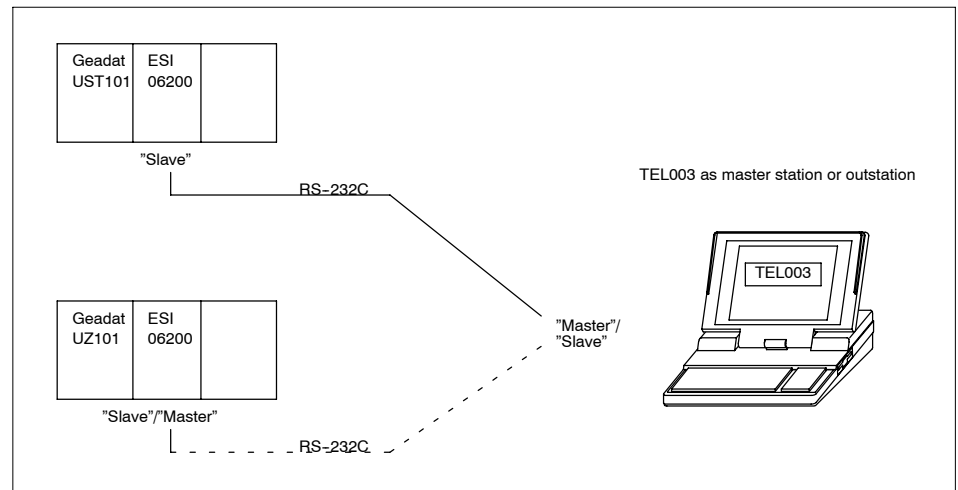
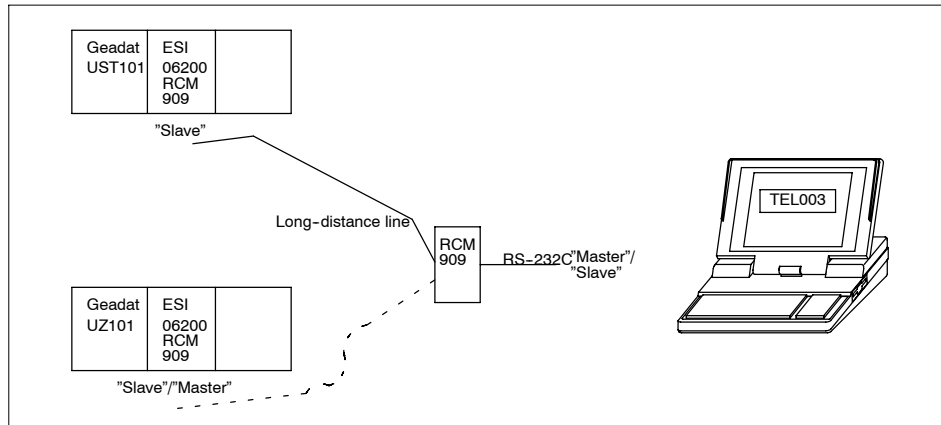


Figure 2 Long-distance connection with the RCM001 (only for KOS)/RCM909 FSK modems

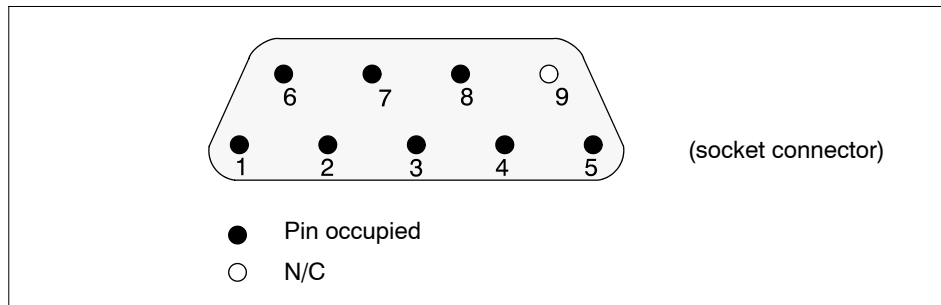


Note

The RS-232C interface is implemented as Sub-D9 and terminal block connectors in parallel. Only one of the connectors may be active. Making use of both connectors is strictly prohibited.

RS-232C interface connection to a PC requires a 1 to 1 cable (without handshake).

Figure 3 RS-232C port



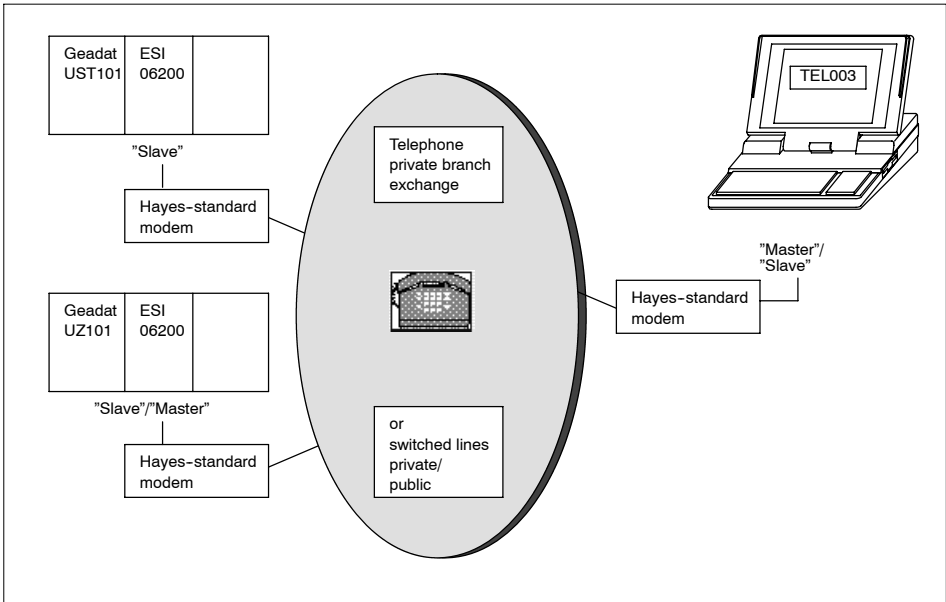
Pin	Signal	Function
1	M5 (DCD)	Data Carrier Detect
2	D2 (RXD)	Received Data
3	D1 (TXD)	Transmitted Data
4	S1 (DTR)	Data Terminal Ready
5	E2 (GND)	Signal Ground
6	M1 (DSR)	Data Set Ready
7	S2 (RTS)	Request To Send
8	M2 (CTS)	Clear To Send

The following pinouts are necessary for connection over the RCM 909 modem's terminal block connector:

Table 1 Terminal block connections (parallel to Sub-D9)

Pin	Signal	Subset	Function
6	D1 (TXD)	RS-232C	Transmitted Data
7	D2 (RXD)	"	Received Data
8	S2 (RTS)	"	Request To Send
9	S1 (DTR)	"	Data Terminal Ready
10	M5 (DCD)	"	Data Carrier Detect
11	M1 (DSR)	"	Data Set Ready
12	M2 (CTS)	"	Clear To Send
13	E2 (GND)	"	Signal Ground
	not used		
14	WT1 (a)	local or long-distance line	Terminal 1
15	WT2 (b)	"	Terminal 2
16	WT3	"	Terminal 3
17	WT4	"	Terminal 4, reference potential for supply voltage
14	not used		
15	not used		
16	not used		
18	UB (24 VDC)	Module power supply	Supply voltage
1	M	"	Reference potential (0 V)
PE	PE		Protective earth

Figure 4 ACO connection



The standard modem accessory cables can be used for the PC connection to the modems.

4.2

ACO Configuration Examples

Figure 5 Configuration 1: normal operation

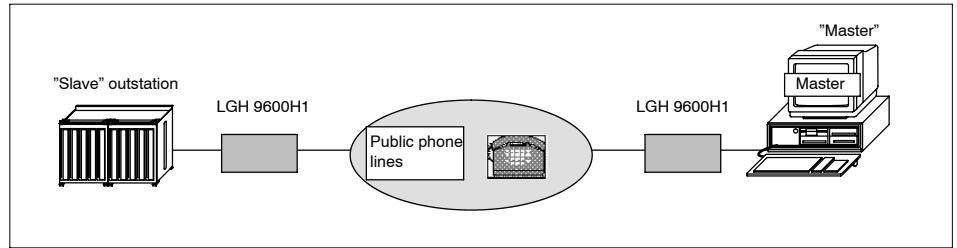


Figure 6 Configuration 2: TEL003 as outstation (including modem)

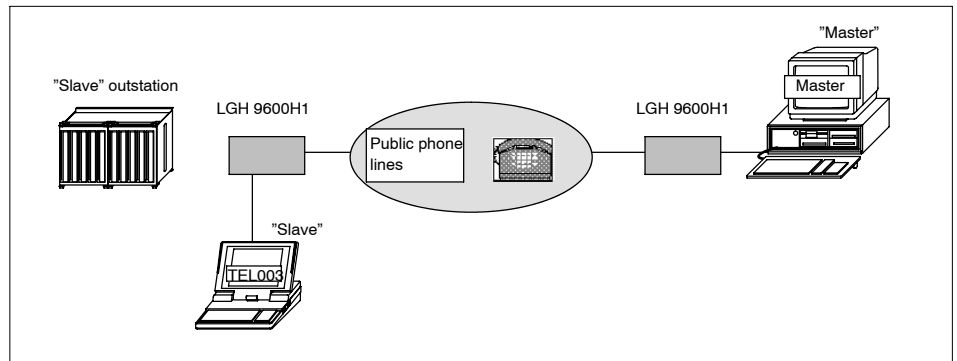
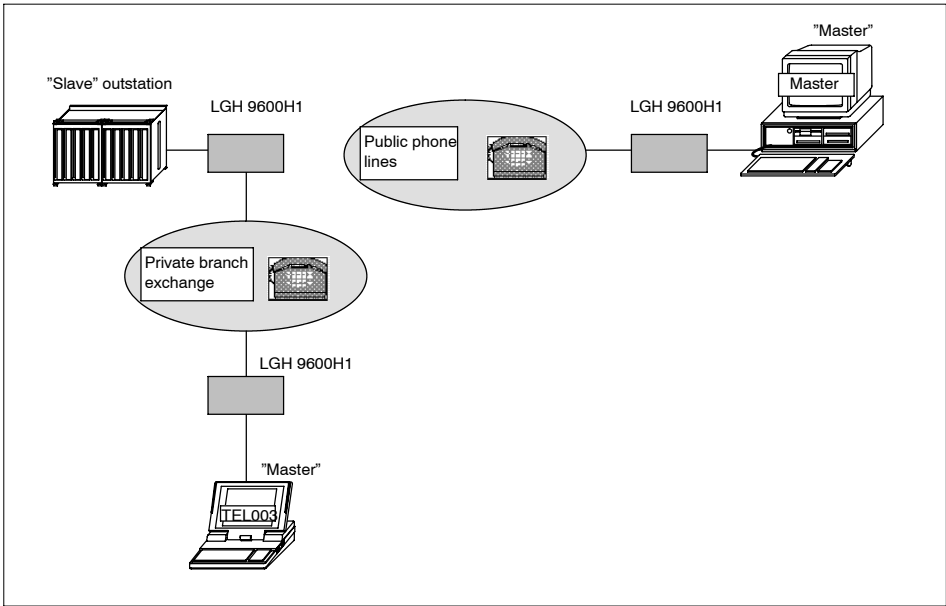


Figure 7 Configuration 3: TEL003 as master station (including modem)



Program Start

5

Start TEL003 by clicking the `tel003` icon in `Start Menu` → `Programs`. The menu bar opens with the standard menu items `File`, `Communication` and `Help`.

Message analysis/handling is determined by the master, slave or listener modes:

- **Master:** Master station simulation. Messages can be sent to and received from the outstation. Remote-parameterization of the outstation can also be performed.
- **Slave:** Outstation simulation. Messages can be sent to the master either as spontaneous or interrogated data.
- **Listener:** Listener mode only allows the reception of messages (from both directions). Message interchanges on the line are passively monitored.

Thereafter the transmission parameters, time-outs, and station address details must be determined. In leased-line operation the polling cycle should begin after acceptance of these settings. Transferred messages are registered and protocolled within the scrollable message list window.

5.1 Message Transfer

5.1.1 Transmission parameters

Before any transfers take place the transmission parameters must first be defined. These settings are saved in the *.opt file, and can be activated with `File → Open...`

Modem communications parameters are defaulted when with (`File → New...`) a new *.opt file is created. The polling cycle should start in leased-line operation when these settings are accepted in the `Master/Slave/Listener` dialog with the `Transmission start` button.

After selection of a modem file for ACO operation, (enabled by checking `Connection by modem` within the `Connection` section), a protocol of the modem's initialization responses is made to the program's message list window.



Note

During ACO operation the menu item `Communication` includes the additional menu entries `Line connect by phone` and `Modem initialization`.

5.1.2 Time-Outs

Correspondence with the connected stations requires that time-out values first be set.

Message transfer time-out values are entered in this tab page.

Transmit pre-run control time (*1 ms)	Enter a lead time for transmission start-up. *)
Transmit after-run control time (*1 ms)	Enter a delay time for transmission shut-down. *)
Transmission delay time (*1 ms)	Enter an idle time occurring between messages.
Receive pre-run time-out (*10 ms)	Enter a reception lead time-out value (DCD).
Receive after-run time-out (*10 ms)	Enter a reception delay time-out value (DCD).
Response time-out (*10 ms)	Enter a time-out value. (Only available in master operation).
Polling cycle time-out (*10 ms)	Enter a time-out value. (Only available in slave and listener operation).

*) These parameters are not relevant in ACO operation. But when the communications link between master and slave is in service, these time-out values in master and slave must be in agreement.

5.1.3 **Polling List**

After station addresses are designated, the concerned stations can be entered in the polling list. A station address may appear several times in the list, and consequently be processed more than once.



Note

Stations are polled in the entered sequence.

Only one station is configurable in ACO operation (point to point connection)!

5.1.4 **Start of Transfer**

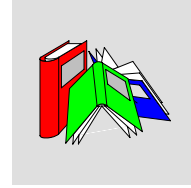
Once transmission has been started messages are logged to the message log file (*.log), which is also presented in an editable message list window.



Caution

The `Exit` button causes data entry to be aborted, resulting in the loss of any new values, since changes are not saved automatically. Any data values entered can only be stored through the `Save` button.

Glossary



Here you will find a short description of the terms.

A**ACO**

Automatic call out operation

Active window

The presently selected window. Only one window can be active at any given time. When a window becomes active, its title bar changes color, differentiating it from the other windows. Non-selected windows are inactive.

Actual parameter

Currently connected input-/output parameters.

Application window

That window containing the application's workspace, menu, and toolbars. The application's name appears in the title bar of its main window. An application window can contain more than one document window.

ASCII mode

American Standard Code for Information Interchange

The ASCII communications mode is employed with various host devices. ASCII information is encoded with 7 bits.

ASDU

Application Service Data Unit

ATA

AT command = answer call

ATH

AT command = hang up

B**Bit string**

A data element consisting of one or more bits.

BYTE

BYTE represents the "bit string 8" data type. Its values are entered either as base 2 literal, base 8 literal, or base 16 literal. Data element length is 8 bits. Numeric values cannot be assigned to this data type.

C**Clipboard**

The clipboard is a Windows memory area where "Cut" or "Copy" objects are temporarily held. These objects can be "Pasted" (inserted) into foreign documents as desired. The old Clipboard contents are lost as a result of each new "Cut" or "Copy".

D

DCD

Data Carrier Detect (modem signal)

Delay value

Difference between the last transferred counter value and the current counter value.

DI

Data image, data base

Document window

A window within a application window. Several document windows can be opened simultaneously within an application window. Only one document window can be active at a time.

DT

Delay time

DT

Data time

DTI

Deviation time integral

DTS receiver

The DTS signal provides CET (Central European Time) derived from an atomic clock at the Physikalisch-Technischen Bundesanstalt (Federal Institute for Weights & Measures) in Braunschweig and transmitted from Mainflingen over LW.

By contrast the GPS signal originates from special low-orbiting satellites and provides GMT (Greenwich Mean Time).

E

EXP

Expert module, e.g. 140 ESI 062 00, KOS260

F

G

GI

The general interrogation command is a generalized substation interrogation. The interrogated data are marked, and then transferred to the master station by polling cycle.

H

I**I/O module**

Input/output module

Icon

refer to symbol

IEC standard

Programming language standard

IEC 1131-3 International Standard: Programmable Logic Controllers – Part 3: Programming languages. March 1993.

IEC 870-5-101 International Standard: Telecontrol Devices and Systems – Part 5: Transmission protocols. 1995

EN 60870-5-101 German Version 1995: Telecontrol Devices and Systems – Part 5: Transmission protocols. 1996

Initial value

The value assigned to a variable at program start.

Instantiation

Creation of an instance.

IV

Invalid

J**K****L****Landscape Format**

Portrait format means that when looking at the printed text, the page width is greater than the height.

Local Link

The local link is that network segment, connecting the local node with other nodes either directly, or through a bus repeater.

Local network node

The local node is that being currently configured.

M**Message list window**

The message list window presents the information resulting from communication with the outstation(s) as well as any link layer error messages. It encompasses up to 32000 lines of text; when the maximum length is reached the oldest lines are over-written. Window content can be edited. Before the Windows "Notepad" editor is actually started however, the running communication is suspended while the message list is stored as the editable intermediate file "LogFile.Txt". Since this intermediate file is overwritten at the start of every new message list edit, a further function is provided to save the message list to a user-selectable (*.txt) file.

Message list window example in master mode:

Date	Time	Type	identification	Phys. Address	Cause	Object Address	Value
9.09.98	16:00:41.---	M_SP_NA_1	P:0	L:1	U:3	O:246	1
9.09.98	01:41.123	M_SP_TA_1	P:0	L:1	U:3	O:247	1
9.09.98	16:02:41.456	M_SP_TB_1	P:0	L:1	U:3	O:248	1
9.09.98	16:00:12.---	*C_SC_NA_1	P:0	L:1	U:6	O:147	2
9.09.98	15:53:00.---	*P_GP_NA_1	P:0	L:1	U:6	O:220	T=21H, 00000091H

■ **Date**

Format	Based upon...	Significance
9.09.98	System time	Date for those information objects without time tags
	3-octet time tag	Not available for information objects with 3-octet time tags
9.09.98	7-octet time tag	Message date for information objects with 7-octet time tags

- **Time** – The * character in the "Time" column marks the send direction as seen by the station.

Format	Based upon...	Significance
16:00:41.---	System time	Time for those information objects without time tags
01:41.123	3-octet time tag	Time for information objects with 3-octet time tags. The message's milliseconds field (0...59999) is given as seconds (0...59) and milliseconds (0...999).
16:02:41.456	7-octet time tag	Time for information objects with 7-octet time tags

- **Type identification** – Corresponds to the IEC-870-5-101 standard text designation for the type identification as declared in the message.
- **Physical address** – Equivalent to a station in the polling list in master mode, the physical station address in slave mode, or an address from the station list in listener mode.
- **Station address** – Corresponds to the common address of the ASDUs.
- **Cause** – The transmission cause, directly as stated by the message.
- **Object address** – Address of the information object (0...65535).
- **Value** – Value of the process information. Data types providing a separate quality descriptor octet within the message, are given in the format: (Q=xxH)(value). Data type declarations in the data units with the type identifications 210, 211, and 212 are given in the format: (T=xxH)(value).

N

Network

A network is the interconnection of devices along a shared data path, communicating through a common protocol.

Node address

The node address uniquely identifies a network node along the routing path. The address is set directly on the node device, e.g. through rotary switches on the module's rear.

O

OSI

Open systems interconnection

P

PLC

Programmable logic controller

Portrait Format

Portrait format means that when looking at the printed text, the page height is greater than the width.

Programming panel

Hardware and software which support the programming, configuring, testing, commissioning, and trouble shooting of PLC and distributed system applications, to accomodate source archiving and documentation. If necessary, the programming panel can also be utilized for process visualization.

PV

Process variable

Q

R

Remote-parameterization

The explicit manipulation/readout of parameters by remote transmission (WAN) from the master station

S

SA

Station address, common address of the ASDUs.

Serial ports

Serial (COM) ports transfer information bit by bit.

SP

Short poll

SQF

Sequential file

SU

Summertime (Daylight savings time)

Symbol (Icon)

A graphic representation of various Windows objects, e.g. drives, application programs and document windows.

T

Threshold

Difference between the last transferred measured values and the current measured values.

TT

S2 (RTS) trailer time

U**OST**

Outstation

V**LT**

S2 (RTS) lead time

W**WAN**

Wide Area Network

WORD

WORD represents the "bit string 16" data type. Its values are entered either as base 2 literal, base 8 literal, or base 16 literal. Data element length is 16 bits. Numeric values cannot be assigned to this data type.

X**Y****Z**

