VTWIN

Hardware Manual

405.1200.037.2 - Rel.: 2.03 of 13/11/2000

Quality Assurance

ESA elettronica's quality control system has been certified by the CSQ, EQNet and ITQS (certification N° 9115.ESAE) as complying with UNI EN ISO 9001 standards.

These represent the most comprehensive set of standards within the international framework of ISO and cover every aspect of the life-cycle of the product (planning, development, production, installation and customer care).

CE

All the products described in this manual comply with the following standards:
electromagnetic compatibility (EMC):

- emissions EN 50081-2 (1993)
- immunity EN 50082-2 (1995)

and thus are in line with:

Council Directives
89/336/EEC 92/31/EEC 93/68/EEC

Video terminals VT50 and VT60 have also obtained:

RINA Approval
Registro Navale Italiano
No ELE/797/1

c UL us
E189179 (M)

Table 0.1: Tests carried out for CE-mark.

Immunity	Disturbance characteristics	Standard
To disturbances	Electrostatic discharge: Contact Air	EN61000-4-2 4kV 8kV
	Radio-Frequency	ENV50140/ENV50141 10 V/m
	Rapid transitories: Power supply I/O serial	EN61000-4-4 2 kV 1 kV
	Impulsive transitories Common and Differential mode	EN61000-4-5
To radio disturbances	Emission	EN55011 Level of radio disturbance B

Tests carried out for RINA approval

- Publication IEC 68-2-6 (1982) Fc. test (Vibration)
- Publication IEC 68-2-30 (1980) Db. test (Hot wet cycle)
- Publication IEC 68-2-1/IEC 68-2-1A (1976) + A1 (1983) Ad-Amendment n°1 test (1983) (Cold)

Contents

Foreword

The hardware installation manual is valid for all types of Video Terminal.

The manual

The installation manual contains information on securing and connecting both VTs and optional accessories, on the functions offered by the terminals as well as on the cables connecting them to a device.

Its purpose

The manual contains all the notions, concepts and examples necessary to be able to install quickly and easily.

Conventions

Below are listed the symbols and styles found in the manual together with their respective meanings:

PLC	Programmable logic control or other intelligent device equipped with a serial connection.
Device	Intelligent device or PLC equipped with a serial connection.
[ ]	The contents of the bracket appears on the screen.
	Identifies a key or touch button.
	Indicates that the VT specified lacks this key.
	Indicates an important point that requires attention.
	There is a danger that the equipment will be damaged.

Introduction

What is a Video Terminal

A VIDEO TERMINAL (VT) is a device that allows the user to control or simply monitor a productive process. It can send commands using ▣▣ configured by the user; it can send data determining the process on hand and can display information deriving from the productive process. The information can be in the form of an Alarm, an Information (Info-) Message or in binary data format.

The VTs can be divided into two groups: those with a keyboard and those without but equipped with a Touch Screen.

All VTs can be supplemented with accessories to boost and broaden their performance.

VTs are connected to the device by means of a serial connection.

For the VT to function a project must be created and loaded into it. See Software Manual.

For detailed information on individual VTs see the relevant chapters below.

Chapter 1

General information on electromagnetic compatibility (EMC)

This chapter consists of 4 pages.

Electronic devices are being increasingly used in automated systems. programmable controllers (like the PLC) belong to this category, as do Man-machine-interface systems (e.g. the Video Terminal), control systems (e.g. diagnostic terminals), interface elements (e.g. interface boards) and AC-DC drives. Together with this type of electronic apparatus, you find installed classical electro-mechanical devices like contactors, electro-valves, motors etc.
Electrical disturbances caused by the operation of these devices can compromise the smooth functioning and the length of the working life of the electronic devices present on the same switchboard or the same plant. To get the best out of both the electrical and the electronic devices it is necessary to reduce electrical disturbance.

Laying cables

Remember to lay measurement, monitoring and communication cables so that they are kept apart from power cables. Power cables laid close and parallel to communication cables can cause coupling voltages that are strong enough to disturb or destroy electronic components.

Shielding of cables

It is essential to use suitably shielded cables for communication signal connections (total shielding is recommended). The shielding must be connected to the zero potential.

Earthing of shielding and electronic circuits

With many devices the "0V" is connected to the earth. The signal ground must be earthed but it is best to separate the ground of the shields and circuits from that of the power circuits. Note that the earth can only perform its function if the "Resistance of the earth circuit" is within the max. limits prescribed.

Switching of capacitive loads

The current peaks which occur when capacitive loads are switched on can damage or destroy control devices. Furthermore, the high-frequency component of the current peak can cause serious disturbance in electronic circuits as a result of inductive coupling between the connection cables.

Switching off inductive loads

When an inductive load is switched off, the magnetic energy stored tends to oppose this, discharging a voltage peak down the line which can damage or destroy the control device. Furthermore, the high-frequency component of the voltage peak can cause disturbance caused by capacitive coupling between the connection cables.
The physical structure and characteristics of an inductive load make it impossible to carry out switching without disturbance unless suitable measures are taken. The disturbance can be at least partially suppressed by fitting a suitable disturbance-suppression module in parallel with the inductive load. The disturbance-suppression module must not constitute an additional load during the work phase. Electrical disturbance is propagated both through the connection cables and electromagnetic transmission. If the disturbance is propagated by cable or electromagnetic transmission, it is much more difficult to suppress at the inputs to the units in the danger zone than it is to suppress the disturbance at its source. If the disturbance is cre-

ated by connection cables or by electronic transmission, it is much more difficult to suppress it at the inputs of the devices in dangerous areas than at source,

If possible, disturbance should be suppressed at source.

Disturbance suppression circuit - RC and DIODE

In the following tables there are the specifications of the disturbance suppression filter ciruits.

Table 1.1: Disturbance suppression circuit RC

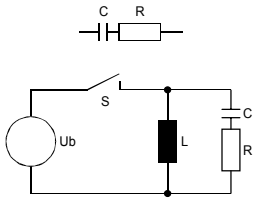
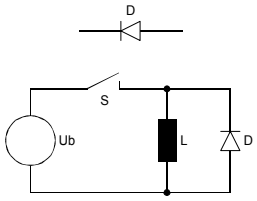
Circuit	Advantages	Disadvantages
	The residual component has a very low harmonic wave form component.	The best results are obtained by sizing the R/C suitably.
	The residual overvoltage can be limited to the very low values by optimizing the sizing.	Volume directly proportional to the inductance and power of the load.
	Switch-off time delay very low.	Optimal suppression is obtained as a direct consequence of a significant de-energizing delay.
	The effectiveness of the disturbance suppression is not affected by the voltage value. No switch-on delay.	The presence of the capacitor causes a high load current peak when switching on (and can cause pasting of the contact if undersized).
	Suitable for both AC and DC; no problem with reversed polarity.	The RC circuit constitutes an additional load when used with AC.
	No arc (low energy) on switching contact.	_

Table 1.2: Disturbance suppression circuit DIODE

Circuit	Advantages	Disadvantages
	Very compact.	High switch-off delay time.
	No residual voltage (total damping of disturbance impulse).	For direct current (DC) applications only.
	Easy to size.	Polarity must be respected.
	--	Switch-off delay can lead to the formation of a strong electric arc.
	--	Sensitive to disturbance voltage pulses in power supply circuit.

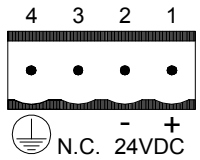
Chapter 2 Power Supply

This chapter consists of 4 pages.

Use a 24VDC (18..32Vdc) power supply unit to power the VT.

Connection pins

Table 2.1: 4 pin Power Supply Connector

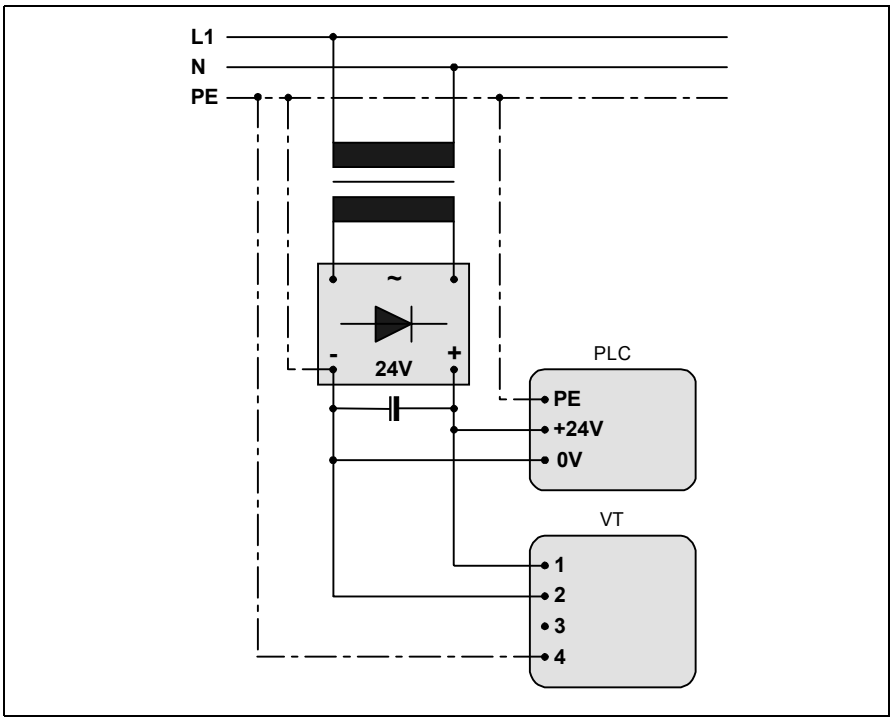
Connector	Pin	Meaning
	1	Input power +24Vdc
	2	Input power 0Vdc
	3	Not connected
	4	Earth protection

Check all connections before switching on.

Recommended connection

We recommend a wiring scheme as set out below in the interests of avoiding damaging the VT.

Table 2.2: Power supply with 0Vdc connected to PE

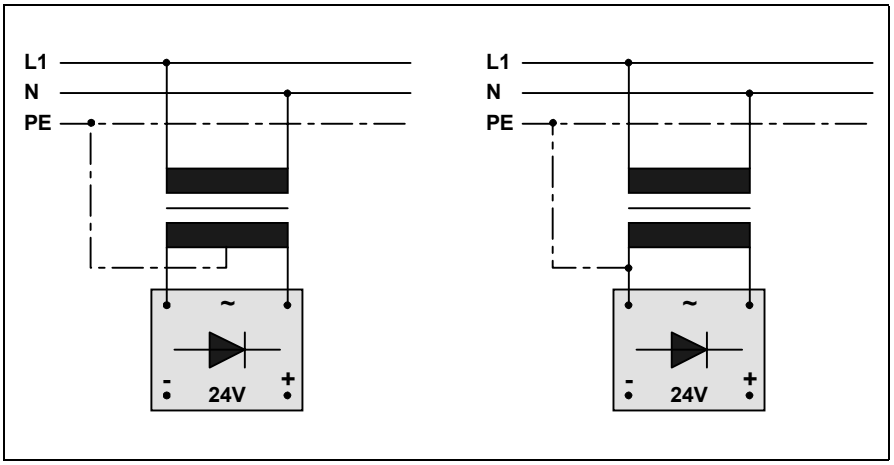


Correct earthing is essential.

Connections to be avoided

The connections illustrated below **must not** be made as they may cause the VT to be damaged.

Table 2.3: Connections to be avoided



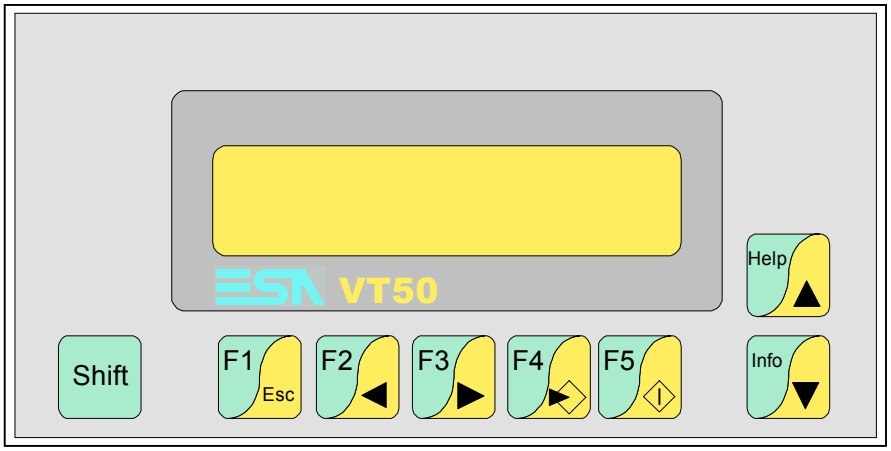
The above configurations will seriously damage certain components of the VT.

Beware of appliances with the POSITIVE connected to PE.

It is vital that the earth of the devices connected to the serial and/or parallel communication ports have the same voltage as the 0V supply of the VT. The circulation of current between the 0V supply and the earth of the communication ports could damage certain components of the VT or of the devices connected it.

Chapter 3 Video terminal VT50

This chapter consists of 14 pages.



Technical characteristics The following table lists the principal technical characteristics of the product in question.

Code of terminal	Characteristics of the terminal		
VT050 00000			
VT050 000CN		▼	▼
Display			
Type	LCD	●	●
Representational format	Text	●	●
Rows by characters	2 x 20	●	●
Display area size [mm]	73,5 x 11,5	●	●
Character matrix in text mode [pixels]	5 x 7	●	●
Character size [mm]	3,2 x 5,5	●	●
Contrast adjustment	Trimmer	●	●
Character sets	Ascii, Katakana	●	●
Backlighting			
Type	LED	●	●
	CCFL lamp		
Standard lamp-life at 25°C [hours]	--		
Keyboard			
Non-customizable function keys	5	●	●
Customizable function keys	--		
Function key LEDs	--		
Alphanumeric keys	--		
Operational keys	8	●	●
Operational key LEDs	--		
Diagnostic LEDs	--		
User memory			
Project [Bytes]	256K	●	●
Data memory [Byte]	--		
Memory Card for backup	--		
Memory Card for expansion	--		

Code of terminal	Characteristics of the terminal		
VT050 00000			
VT050 000CN			
Interfaces		▼	▼
MSP (Multi-serial port)	RS232/RS422/RS485/TTY-20mA		●
ASP (Auxiliary serial port)	RS232/RS485		
ASP-8 (Auxiliary serial port)	RS232	●	
ASP-9 (Auxiliary serial port)	RS232		
LPT parallel port	Centronics		
Auxiliary port	Connection for accessory devices		
Accessories			
Connectable accessories	See table ”Chapter 18”		●
Clock			
Hardware clock	With back-up battery		
Networks			
Integrated	Profibus-DP		
	CAN Open (Optoisolated interface)	●	
Optional	See table ”Chapter 18”		●
Proprietary networks			
ESA-Net	Network server		
	Network client		●
Technical data			
Power supply	24Vdc (18..32Vdc)		
Power absorbed at 24Vdc	5W		
Protection fuse	Ø5x20mm - 315mA Quick Blow F		
Protection level	IP65 (front-end)		
Working temperature	0..50°C		
Storage and transportation temperature	-20..+60°C		
Humidity (non-condensing)	<85%		
Weight	500gr		
Dimensions			
External L x H x D [mm]	166 x 86 x 41		
Cut-out L x H [mm]	157 x 77		
Certification			
Certifications and approvals	CE, RINA, UL CSA Registered		

Functions

The following table lists in alphabetical order all the functions of the VT in question.

Table 3.1: Functions and objects realizable with this VT (Part 1 of 4)

Code of terminal			
VT050 *****			
VT050 ***CN			
Objects/Functions	**Quantity**	▼	▼
Alarm field			
Alarm help			
Alarm history buffer			
Alarm statistics			
Alarms (Total/active simultaneously)			
Arc			
Backup/Restore		●	●
Bar data			
Bit-group-structured dynamic bitmaps			
Bit-wise password	8bits	●	●
Buttons			
Circles			
Command: Change language		●	●
Command: Clear trend buffer			
Command: Delete recipe			
Command: Hardcopy			
Command: Load recipe from data memory			
Command: Modify password			
Command: Next page			
Command: Page help			
Command: Password login			
Command: Password logout			
Command: Previous page			
Command: Print alarm history			
Command: Printer form feed			
Command: Quit project		●	●
Command: Report			
Command: Restarts reading time-sampled trend			
Command: Run pipeline			
Command: Save recipe in data memory			
Command: Save recipe received from device in buffer			
Command: Save recipe received from device in data memory			
Command: Send recipe from video buffer to device			
Command: Send recipe to device			
Command: Service page			
Command: Show alarms history			

*) indicative value determined by the dimensions of the project

Table 3.1: Functions and objects realizable with this VT (Part 2 of 4)

Code of terminal			
VT050 ✳✳✳✳✳			
VT050 ✳✳✳CN			
Objects/Functions	**Quantity**	▼	▼
Command: Show page directory			
Command: Show project information		●	●
Command: Show recipe directory			
Command: Show sequence directory		●	●
Command: Shows driver status page			
Command: Shows page help			
Command: Shows page with function: PG			
Command: Stops reading time sampled trend			
Command: Trend reading saved in device			
Command: Zero number of general pages			
Date field			
Day-of-the-week field			
Dynamic texts: Bit-group-structured dynamic texts	1024*	●	●
Dynamic texts: Single-bit dynamic texts		●	●
Dynamic texts: Value-structured dynamic texts		●	●
E-keys			
F-keys		●	●
Free terminal			●
Function: Disables key		●	●
Function: Go to page			
Function: Internal command		●	●
Function: Invert bit value		●	●
Function: Macro			
Function: None		●	●
Function: Reset bit permanently			
Function: Reset real-time bit			
Function: Sequences		●	●
Function: Sets bit permanently			
Function: Sets real-time bit		●	●
Function: Value-structure direct command		●	●
Global configuration of E-keys			
Global configuration of F-keys		●	●
Info-messages (Total/active simultaneously)	128/128	●	●
Labels		●	●
LEDs assigned to sequence			
Lines			
Lists of bitmap images			
Lists of texts		●	●

*) indicative value determined by the dimensions of the project

Table 3.1: Functions and objects realizable with this VT (Part 3 of 4)

Code of terminal			
VT050 *****			
VT050 ***CN			
Objects/Functions	**Quantity**	▼	▼
Local configuration of E-keys			
Local configuration of F-keys		●	●
Macro field	4 x pages	●	
Message field			
Message help	128	●	●
Multilanguage texts	4 Langs.	●	●
Page	127	●	●
Page help	127	●	●
Password			
Pipeline (Numero/Tot byte)			
Print			
Programmable fonts			
Project images			
Public variables of ESANET network (Number/Tolat bytes)	128/1024		●
Random sequences		●	●
Recipe field for recipe structure			
Recipes (Number of variables per recipe)			
Rectangles			
Redefinable characters	7	●	●
Single-bit-structured dynamic bitmaps			
Start/stop sequences		●	●
Static bitmaps			
System messages			
System variables assigned to recipe structure			
Time long field			
Time short field			
Trends (Trends x page/Channels x trend)			
Trends sampled automatically (Memory/Trends/Readings)			
Trends sampled on command (Memory/Trends/Readings)			
Value direct command: ADD			
Value direct command: AND			
Value direct command: OR			
Value direct command: SET		●	●
Value direct command: SUBTRACT			
Value direct command: XOR			
Value-structured dynamic bitmaps			

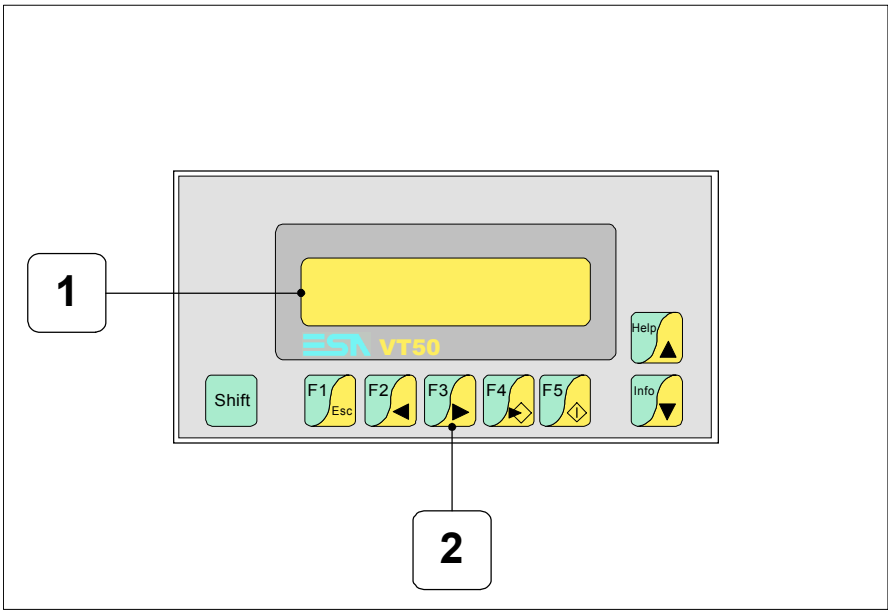
*) indicative value determined by the dimensions of the project

Table 3.1: Functions and objects realizable with this VT (Part 4 of 4)

Code of terminal			
VT050 *****			
VT050 ***CN			
Objects/Functions	**Quantity**	▼	▼
Variables: Floating Point numerical variablest	8 x pages		●
Variables: Numerical variables (DEC, HEX, BIN, BCD)		●	●
Variables: String variables (ASCII)			●

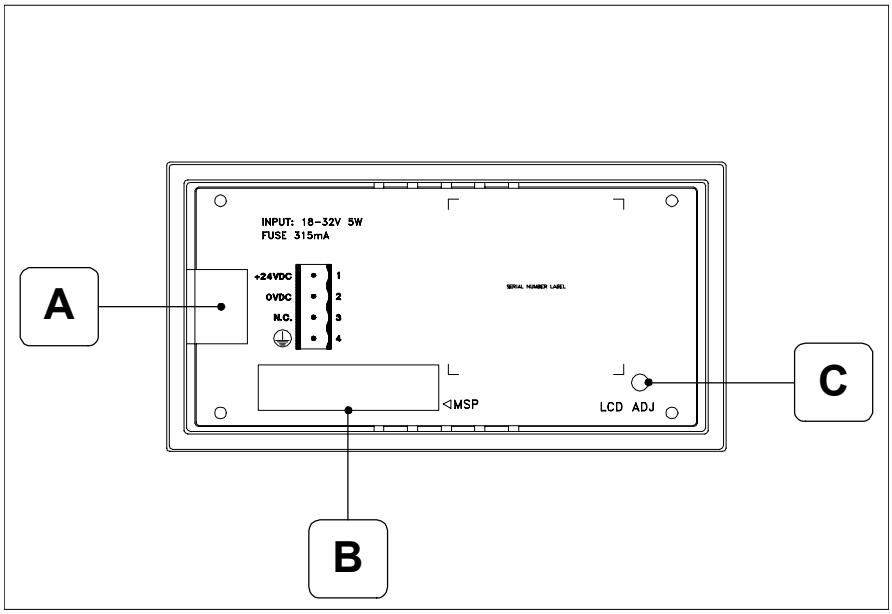
*) indicative value determined by the dimensions of the project

Front face



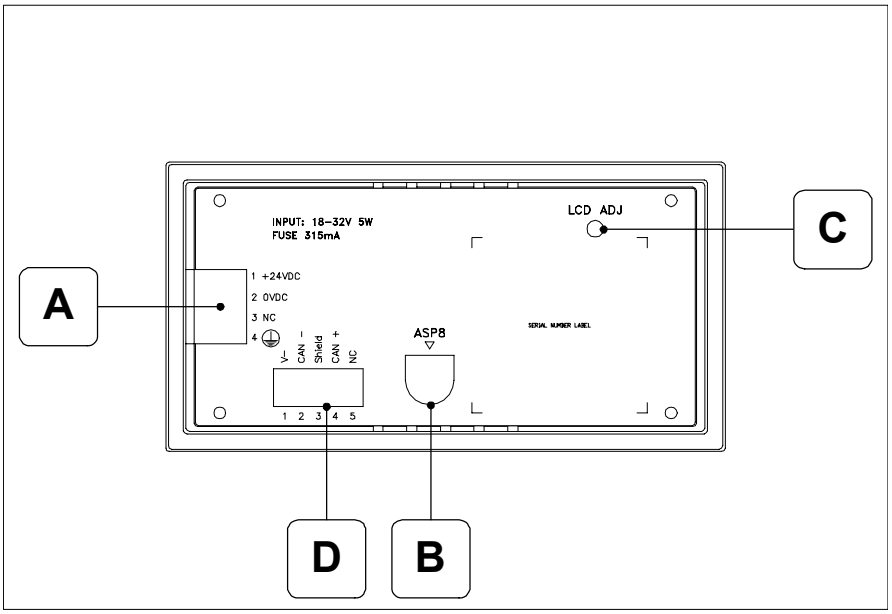
Key	Function
1	Display
Shift + 2	F-keys
F5	Confirms setting
Help	Next page
Info	Previous page
F4	Start in-putting
F3	Moving cursor between fields
F2	Moving cursor between fields
F1 Esc	Quits: setting of data, info-messages, directory of sequences, communication driver
Shift + Info	Displays information messages
Shift + Help	Displays according to context: info-message help or page help

Standard series rear view



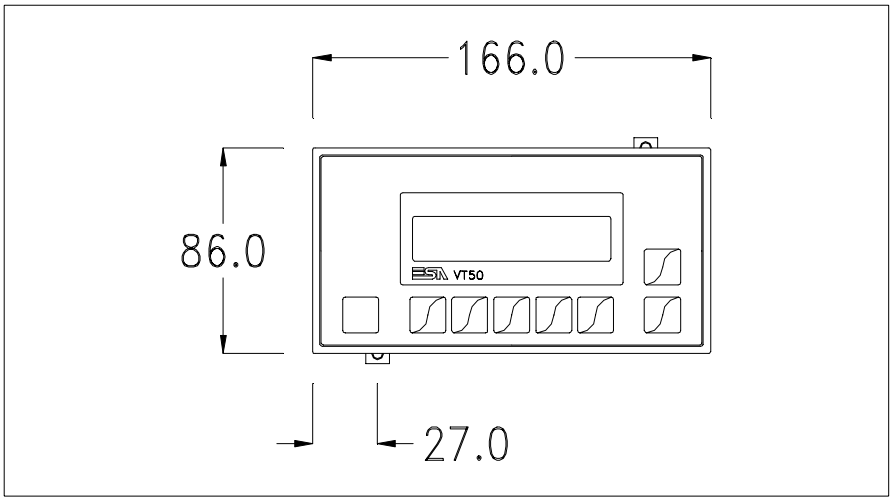
Position	Function
A	Power supply connector
B	MSP serial port
C	Trimmer for adjusting display contrast

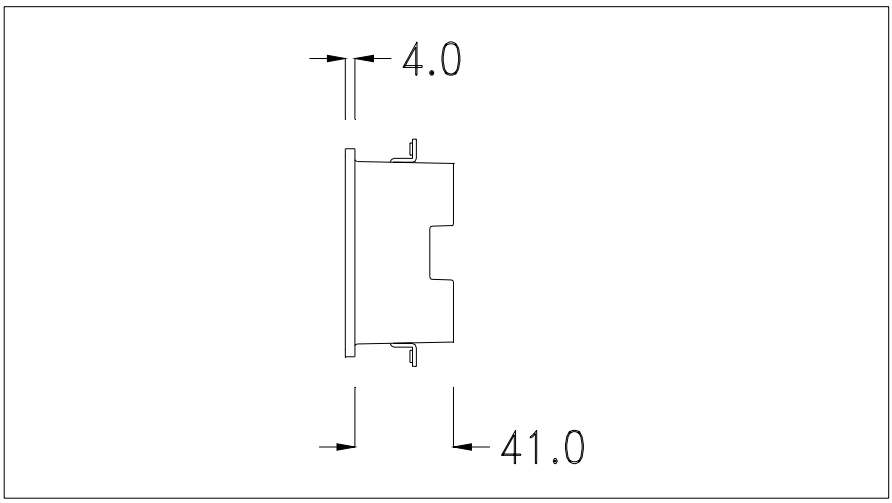
CAN series rear view

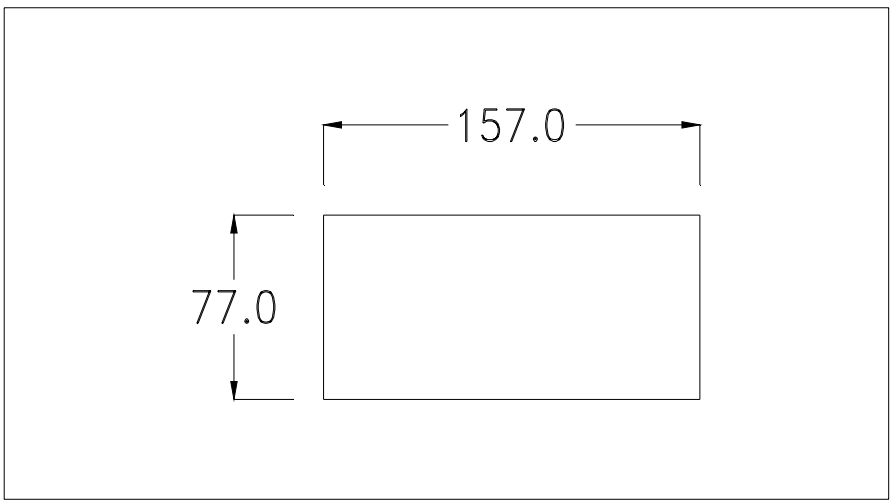


Position	Function
A	Power supply connector
B	ASP-8 serial port
C	Trimmer for adjusting display contrast
D	CAN serial port

Dimensions and Cut-out







To fix the sealing gasket and secure the VT to the container see “Chapter 16 -> Mounting the terminal within the container“.

Where accessories need to be fixed in or onto the VT terminal, you are advised to do this before securing the VT to its container.

Accessories

Any accessories should be mounted in accordance with the instructions in the relevant chapter (see “Chapter 18 -> Video terminal accessories“).

Transfer PC -> VT

For everything to function properly, the first time the VT operator terminal is switched on it needs to be correctly loaded, that is it needs to have transferred to it:

- Firmware
- Communication driver
- Project

(Given that the transfer of the three files in practice occurs with a single operation, it will be defined as “Project transfer” for the sake of simplicity)

or:

- Free terminal protocol

For this it is essential that the VT be prepared to receive the transfer.

Preparation for reception

The program VTWIN (see Software Manual) must be used for the transfer, but the terminal must be set up to receive. This means carrying out the following steps:

- Check that the VT is off
- Check that there is a serial connection between the PC and the VT
- Switch on the VT with 

held down and wait a moment till the following mask appears on the VT

VT50 Service page

The VT is now ready to receive (refer to Software Manual for transfer procedure).

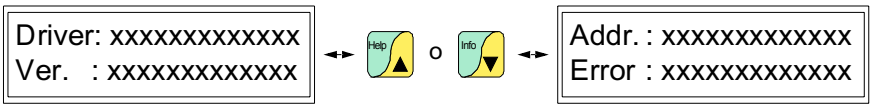
Information relating to driver

After the project has been transferred, the VT can make available information relating to what has been loaded. The information regards:

- The name of the driver loaded
- The version of the driver loaded
- Network address of the VT
- Last error to have occurred

To acquire this information carry out the following operations:

- Be situated in any page of the project
- Press Shift twice; you will see



The possible error messages are:

- PROT ERROR

  Problem-> Errors have been detected in the data exchange between the VT and the Device.
  Solution-> Check the cable; there may be disturbance.

- COM BROK

  Problem-> Communication between VT and Device interrupted.
  Solution-> Check the serial connection cable.

An error message followed by [*] indicates that the error is not currently present but was and has since disappeared.

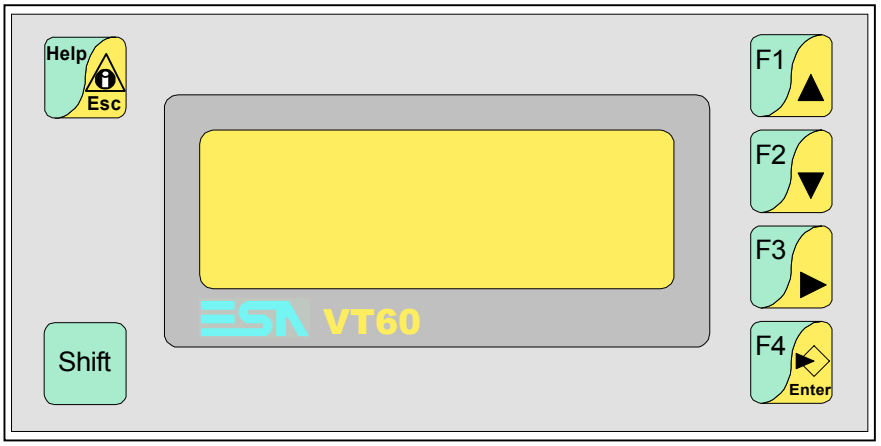
Example: COM BROK*

Adjusting the contrast on the display

To improve the quality of the representation on the display it may be necessary to adjust its contrast. This can be done by rotating the trimmer (C) at the back of the VT (see Page 3-9 or Page 3-10); turn it (using a small screwdriver or a trimmer tool) in one direction and, if the display quality worsens, turn it the other way.

Chapter 4 Video terminal VT60

This chapter consists of 12 pages.



Technical characteristics

The following table lists the principal technical characteristics of the product in question.

Code of terminal	Characteristics of the terminal	
VT060 00000		
Display		▼
Type	LCD	●
Representational format	Text	●
Rows by characters	4 x 20	●
Display area size [mm]	70,4 x 20,8	●
Character matrix in text mode [pixels]	5 x 7	●
Character size [mm]	2,95 x 4,75	●
Contrast adjustment	Trimmer	●
Character sets	Ascii, Katakana	●
Backlighting		
Type	LED	●
	CCFL lamp	
Standard lamp-life at 25°C [hours]	--	
Keyboard		
Non-customizable function keys	4	●
Customizable function keys	--	
Function key LEDs	--	
Alphanumeric keys	--	
Operational keys	6	●
Operational key LEDs	--	
Diagnostic LEDs	--	
User memory		
Project [Bytes]	256K	●
Data memory [Bytes]	--	
Memory Card for backup	--	
Memory Card for expansion	--	

Code of terminal	Characteristics of the terminal	
VT060 00000		
Interfaces		▼
MSP (Multi-serial port)	RS232/RS422/RS485/TTY-20mA	●
ASP (Auxiliary serial port)	RS232/RS485	
ASP-8 (Auxiliary serial port)	RS232	
ASP-9 (Auxiliary serial port)	RS232	
LPT parallel port	Centronics	
Auxiliary port	Connection for accessory devices	
Accessories		
Connectable accessories	See table ”Chapter 18”	●
Clock		
Hardware clock	With back-up battery	
Networks		
Integrated	Profibus-DP	
	CAN Open (Optoisolated interface)	
Optional	See table ”Chapter 18”	●
Proprietary networks		
ESA-Net	Network server	
	Network client	●
Technical data		
Power supply	24Vdc (18..32Vdc)	
Power absorbed at 24Vdc	5W	
Protection fuse	Ø5x20mm - 315mA Quick Blow F	
Protection level	IP65 (front-end)	
Working temperature	0..50°C	
Storage and transportation temperature	-20..+60°C	
Humidity (non-condensing)	<85%	
Weight	500gr	
Dimensions		
External L x H x D [mm]	166 x 86 x 41	
Cut-out L x H [mm]	157 x 77	
Certification		
Certifications and approvals	CE, RINA, UL CSA Registered	

Functions

The following table lists in alphabetical order all the functions of the VT in question.

Table 4.1: Functions and objects realizable with this VT (Part 1 of 3)

Code of terminal		
VT060 *****		
Objects/Functions	**Quantity**	▼
Alarm field		
Alarm help		
Alarm history buffer		
Alarm statistics		
Alarms (Total/active simultaneously)		
Arc		
Backup/Restore		●
Bar data		
Bit-group-structured dynamic bitmaps		
Bit-wise password	8bits	●
Buttons		
Circles		
Command: Change language		●
Command: Clear trend buffer		
Command: Delete recipe		
Command: Hardcopy		
Command: Load recipe from data memory		
Command: Modify password		
Command: Next page		
Command: Page help		
Command: Password login		
Command: Password logout		
Command: Previous page		
Command: Print alarm history		
Command: Printer form feed		
Command: Quit project		●
Command: Report		
Command: Restarts reading time-sampled trend		
Command: Run pipeline		
Command: Save recipe in data memory		
Command: Save recipe received from device in buffer		
Command: Save recipe received from device in data memory		
Command: Send recipe from video buffer to device		
Command: Send recipe to device		
Command: Service page		
Command: Show alarms history		
Command: Show page directory		

*) indicative value determined by the dimensions of the project

Table 4.1: Functions and objects realizable with this VT (Part 2 of 3)

Code of terminal		
VT060 *****		
Objects/Functions	Quantity	▼
Command: Show project information		●
Command: Show recipe directory		
Command: Show sequence directory		●
Command: Shows driver status page		
Command: Shows page help		
Command: Shows page with function: PG		
Command: Stops reading time sampled trend		
Command: Trend reading saved in device		
Command: Zero number of general pages		
Date field		
Day-of-the-week field		
Dynamic texts: Bit-group-structured dynamic texts	1024*	●
Dynamic texts: Single-bit dynamic texts		●
Dynamic texts: Value-structured dynamic texts		●
E-keys		
F-keys		●
Free terminal		●
Function: Disables key		●
Function: Go to page		
Function: Internal command		●
Function: Invert bit value		●
Function: Macro		
Function: None		●
Function: Reset bit permanently		
Function: Reset real-time bit		
Function: Sequences		●
Function: Sets bit permanently		
Function: Sets real-time bit		●
Function: Value-structure direct command		●
Global configuration of E-keys		
Global configuration of F-keys		●
Info-messages (Total/active simultaneously)	128/128	●
Labels		●
LEDs assigned to sequence		
Lines		
Lists of bitmap images		
Lists of texts		●
Local configuration of E-keys		
Local configuration of F-keys		●

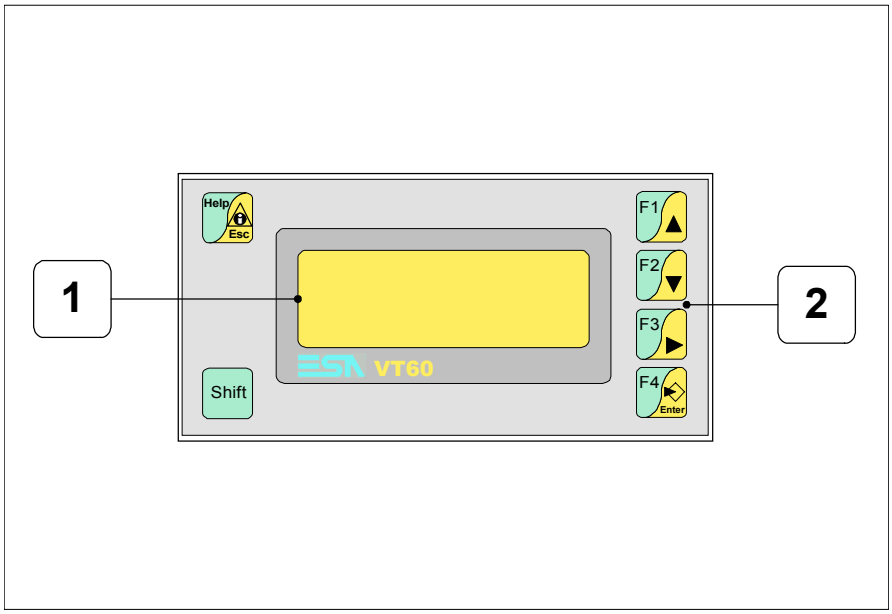
*) indicative value determined by the dimensions of the project

Table 4.1: Functions and objects realizable with this VT (Part 3 of 3)

Code of terminal		
VT060 *****		
Objects/Functions	**Quantity**	▼
Macro field	4 x pages	
Message field		
Message help	128	●
Multilanguage texts	4 Langs.	●
Page	127	●
Page help	127	●
Password		
Pipeline (Numero/Tot byte)		
Print		
Programmable fonts		
Project images		
Public variables of ESANET network (Number/Tolat bytes)	128/1024	●
Random sequences		●
Recipe field for recipe structure		
Recipes (Number of variables per recipe)		
Rectangles		
Redefinable characters	7	●
Single-bit-structured dynamic bitmaps		
Start/stop sequences		●
Static bitmaps		
System messages		
System variables assigned to recipe structure		
Time long field		
Time short field		
Trends (Trends x page/Channels x trend)		
Trends sampled automatically (Memory/Trends/Readings)		
Trends sampled on command (Memory/Trends/Readings)		
Value direct command: ADD		
Value direct command: AND		
Value direct command: OR		
Value direct command: SET		●
Value direct command: SUBTRACT		
Value direct command: XOR		
Value-structured dynamic bitmaps		
Variables: Floating Point numerical variablest		●
Variables: Numerical variables (DEC, HEX, BIN, BCD)	8 x pages	●
Variables: String variables (ASCII)		●

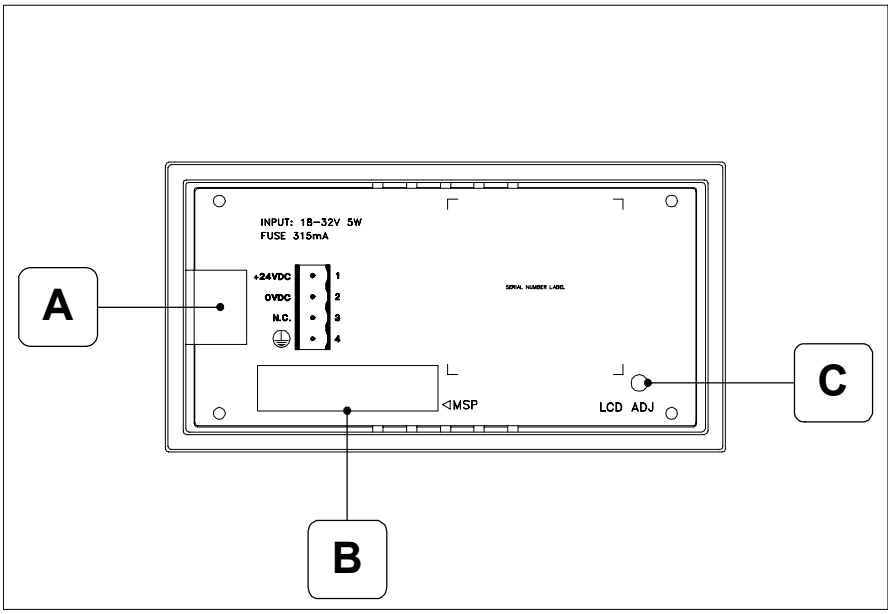
*) indicative value determined by the dimensions of the project

Front view



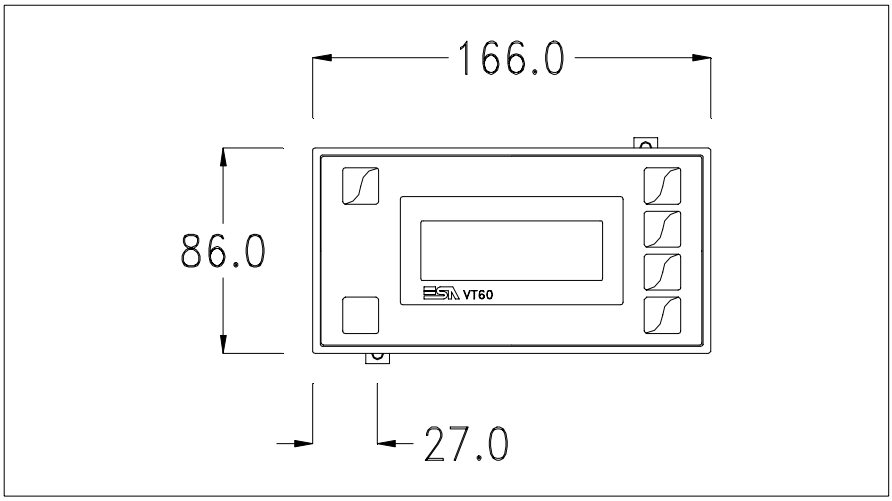
Key	Function
1	Display
Shift + 2	F-keys
F4 Enter	Opens and confirms setting
F1	Page up
F2	Page down
F3	Move cursor between fields
Help Esc	Quits: setting of data, information messages, sequence directory, communication driver
Help Esc	Displays information messages
Shift + Help Esc	Displays according to context: info-message help or page help

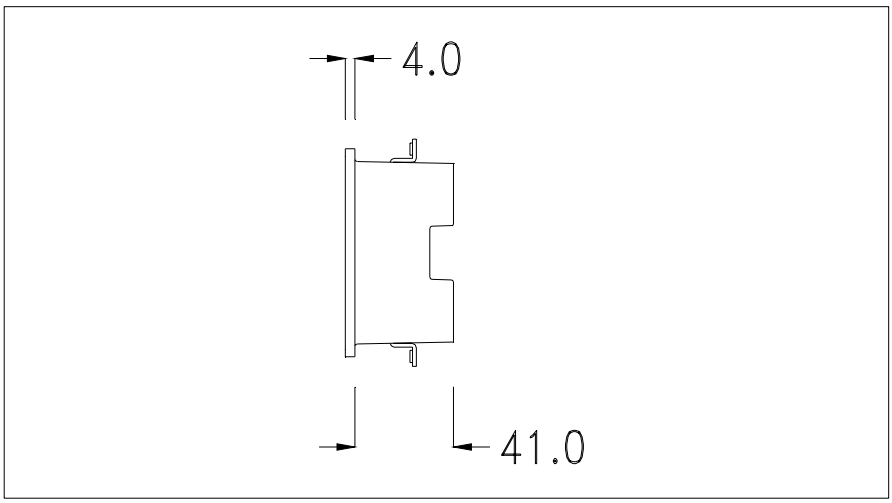
Rear view

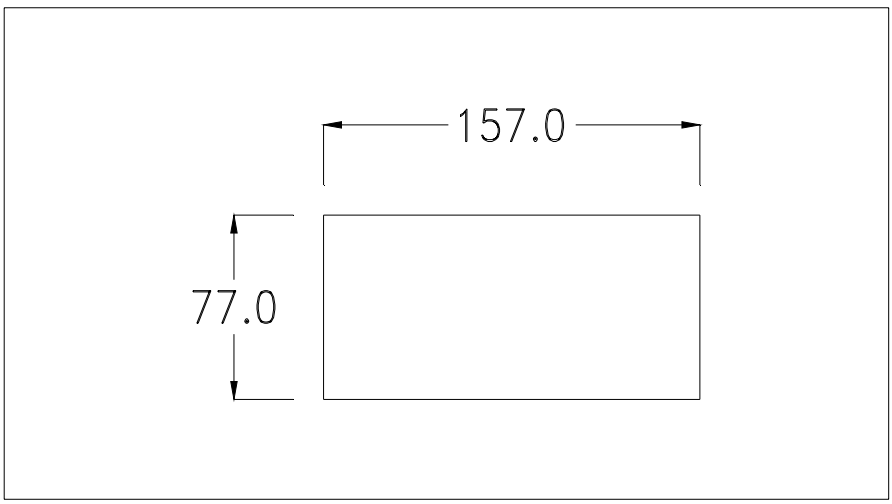


Position	Function
A	Power supply connector
B	MSP serial port
C	Trimmer for adjusting display contrast

Dimensions and Cut-out







To fix the sealing gasket and secure the VT to the container see “Chapter 16 -> Mounting the terminal within the container“.

Where accessories need to be fixed in or onto the VT terminal, you are advised to do this before securing the VT to its container.

Accessories

Any accessories should be mounted in accordance with the instructions in the relevant chapter (see “Chapter 18 -> Video terminal accessories“).

Transfer PC -> VT

For everything to function properly, the first time the VT operator terminal is switched on it needs to be correctly loaded, that is it needs to have transferred to it:

- Firmware
- Communication driver
- Project

(Given that the transfer of the three files in practice occurs with a single operation, it will be defined as “Project transfer” for the sake of simplicity.)

or:

- Free terminal protocol

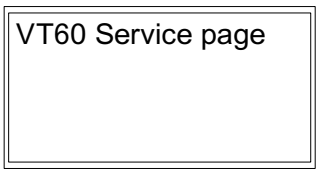
For this it is essential that the VT be prepared to receive the transfer.

Preparation for reception

The program VTWIN (see Software Manual) must be used for the transfer, but the terminal must be set up to receive. This means carrying out the following steps:

- Check that the VT is off
- Check that there is a serial connection between the PC and the VT
- Switch on the VT with 

pressed down and wait a moment until the following mask appears on the VT



The VT is now ready to receive (refer to Software Manual for transfer procedure).

Information relating to driver

After the project has been transferred, the VT can make available information relating to what has been loaded. The information regards:

- The name of the driver loaded
- The version of the driver loaded
- Network address of the VT
- Last error to have occurred

To acquire this information carry out the following operations:

- Be situated in any page of the project
- Press Shift twice; you now see

```
Driver: xxxxxxxxxxxxx
Ver.  : xxxxxxxxxxxxx
Addr. : xxxxxxxxxxxxx
Error : xxxxxxxxxxxxx
```

The possible error messages are:

- PROT ERROR

  Problem-> Errors have been detected in the data exchange between the VT and the Device.
  Solution-> Check the cable; there may be disturbance.

- COM BROK

  Problem-> Communication between VT and Device interrupted.
  Solution-> Check the serial connection cable.

An error message followed by [*] indicates that the error is not currently present but was and has since disappeared.

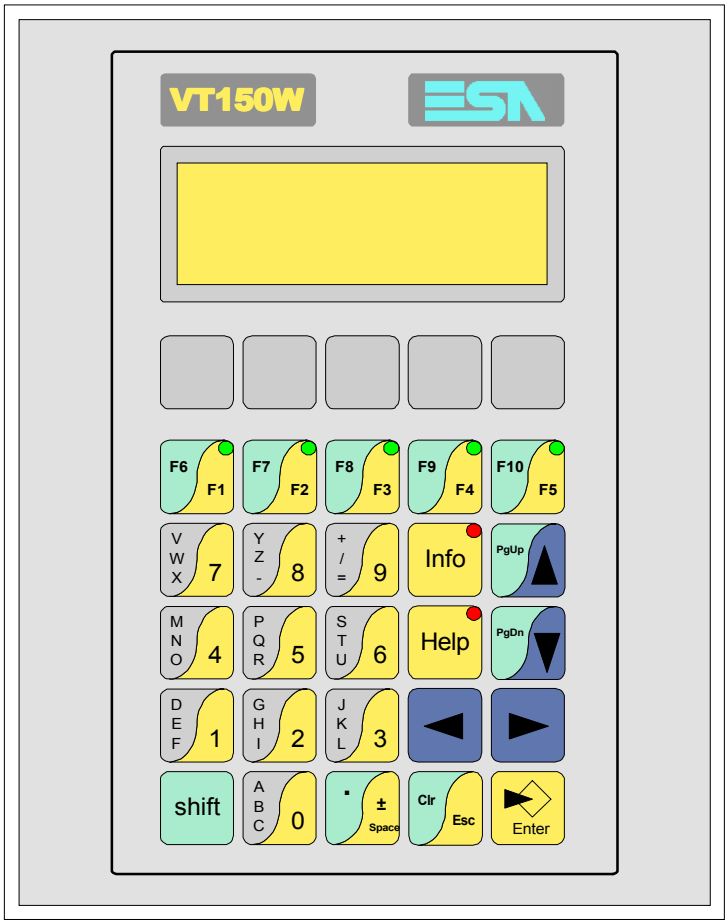
Example: COM BROK*

Adjusting the contrast on the display

To improve the quality of the representation on the display it may be necessary to adjust its contrast. This can be done by rotating the trimmer (C) at the back of the VT (see Page 4-8); turn it (using a small screwdriver or a trimmer tool) in one direction and, if the display quality worsens, turn it the other way.

Chapter 5 Video terminal VT150W

This chapter consists of 16 pages.



Technical characteristics The following table lists the principal technical characteristics of the product in question.

Code of terminal	Characteristics of the terminal			
VT150W 00000				
VT150W 000DP				
VT150W A00CN				
Display		▼	▼	▼
Type	LCD	●	●	●
Representational format	Text	●	●	●
Rows by characters	4 x 20	●	●	●
Display area size [mm]	70,4 x 20,8	●	●	●
Character matrix in text mode [pixels]	5 x 7	●	●	●
Character size [mm]	2,95 x 4,75	●	●	●
Contrast adjustment	Trimmer	●	●	●
Character sets	Ascii, Katakana	●	●	●
Backlighting				
Type	LED	●	●	●
	CCFL lamp			
Standard lamp-life at 25°C [hours]	--			

Code of terminal	Characteristics of the terminal			
VT150W 00000				
VT150W 000DP				
VT150W A00CN				
Keyboard		▼	▼	▼
Non-customizable function keys	--			
Customizable function keys	5	●	●	●
Function key LEDs	5	●	●	●
Alphanumeric keys	11	●	●	●
Operational keys	9	●	●	●
Operational key LEDs	2	●	●	●
Diagnostic LEDs				
User memory				
Project [Bytes]	256K	●	●	●
Data memory [Bytes]	--			
Memory Card for backup	--			
Memory Card for expansion	--			
Interfaces				
MSP (Multi-serial port)	RS232/RS422/RS485/TTY-20mA		●	●
ASP (Auxiliary serial port)	RS232/RS485			
ASP-8 (Auxiliary serial port)	RS232	●		
ASP-9 (Auxiliary serial port)	RS232			
LPT parallel port	Centronics			
Auxiliary port	Connection for accessory devices		●	●
Accessories				
Connectable accessories	See table ”Chapter 18”		●	●
Clock				
Hardware clock	With back-up battery			
Networks				
Integrated	Profibus-DP		●	
	CAN Open (Optoisolated interface)	●		
Optional	See table ”Chapter 18”		●	●
Proprietary networks				
ESA-Net	Network server			
	Network client		●	●
Technical data				
Power supply	24Vdc (18..32Vdc)			
Power absorbed at 24Vdc	15W			
Protection fuse	Ø5x20mm - 800mA Quick Blow F			
Protection level	IP65 (front-end)			
Working temperature	0..50°C			
Storage and transportation temperature	-20..+60°C			
Humidity (non-condensing)	<85%			
Weight	700gr			
Dimensions				
External L x H x D [mm]	148 x 188 x 41			
Cut-out L x H [mm]	123 x 175			
Certification				
Certifications and approvals	CE			

Functions

The following table lists in alphabetical order all the functions of the VT in question.

Table 5.1: Functions and objects realizable with this VT (Part 1 of 4)

Code of terminal			
VT150W *****			
VT150W ***CN			
Objects/Functions	**Quantity**	▼	▼
Alarm field			
Alarm help			
Alarm history buffer			
Alarm statistics			
Alarms (Total/active simultaneously)			
Arc			
Backup/Restore		●	●
Bar data			
Bit-group-structured dynamic bitmaps			
Bit-wise password	8bits	●	●
Buttons			
Circles			
Command: Change language		●	●
Command: Clear trend buffer			
Command: Delete recipe			
Command: Hardcopy			
Command: Load recipe from data memory			
Command: Modify password		●	●
Command: Next page			
Command: Page help			
Command: Password login		●	●
Command: Password logout		●	●
Command: Previous page			
Command: Print alarm history			
Command: Printer form feed			
Command: Quit project		●	●
Command: Report			
Command: Restarts reading time-sampled trend			
Command: Run pipeline			
Command: Save recipe in data memory			
Command: Save recipe received from device in buffer			
Command: Save recipe received from device in data memory			
Command: Send recipe from video buffer to device			
Command: Send recipe to device			
Command: Service page			
Command: Show alarms history			

*) indicative value determined by the dimensions of the project

Table 5.1: Functions and objects realizable with this VT (Part 2 of 4)

Code of terminal			
VT150W *****			
VT150W ***CN			
Objects/Functions	**Quantity**	▼	▼
Command: Show page directory			
Command: Show project information		●	●
Command: Show recipe directory			
Command: Show sequence directory		●	●
Command: Shows driver status page			
Command: Shows page help			
Command: Shows page with function: PG			
Command: Stops reading time sampled trend			
Command: Trend reading saved in device			
Command: Zero number of general pages			
Date field			
Day-of-the-week field			
Dynamic texts: Bit-group-structured dynamic texts	1024*	●	●
Dynamic texts: Single-bit dynamic texts		●	●
Dynamic texts: Value-structured dynamic texts		●	●
E-keys		●	●
F-keys		●	●
Free terminal			
Function: Disables key		●	●
Function: Go to page			
Function: Internal command		●	●
Function: Invert bit value		●	●
Function: Macro		●	●
Function: None		●	●
Function: Reset bit permanently		●	●
Function: Reset real-time bit		●	●
Function: Sequences		●	●
Function: Sets bit permanently		●	●
Function: Sets real-time bit		●	●
Function: Value-structure direct command		●	●
Global configuration of E-keys		●	●
Global configuration of F-keys		●	●
Info-messages (Total/active simultaneously)	1024/128	●	●
Labels		●	●
LEDs assigned to sequence		●	●
Lines			
Lists of bitmap images			
Lists of texts		●	●

*) indicative value determined by the dimensions of the project

Table 5.1: Functions and objects realizable with this VT (Part 3 of 4)

Code of terminal			
VT150W ∗∗∗∗∗			
VT150W ∗∗∗CN			
Objects/Functions	**Quantity**	▼	▼
Local configuration of E-keys		●	●
Local configuration of F-keys		●	●
Macro field	8 x pages	●	
Message field		●	●
Message help	1024	●	●
Multilanguage texts	6 Langs.	●	●
Page	1024	●	●
Page help	1024	●	●
Password	10	●	●
Pipeline (Numero/Tot byte)			
Print			
Programmable fonts			
Project images			
Public variables of ESANET network (Number/Tolat bytes)	128/1024		●
Random sequences		●	●
Recipe field for recipe structure			
Recipes (Number of variables per recipe)			
Rectangles			
Redefinable characters	7	●	●
Single-bit-structured dynamic bitmaps			
Start/stop sequences		●	●
Static bitmaps			
System messages		●	●
System variables assigned to recipe structure			
Time long field			
Time short field			
Trends (Trends x page/Channels x trend)			
Trends sampled automatically (Memory/Trends/Readings)			
Trends sampled on command (Memory/Trends/Readings)			
Value direct command: ADD		●	●
Value direct command: AND		●	●
Value direct command: OR		●	●
Value direct command: SET		●	●
Value direct command: SUBTRACT		●	●
Value direct command: XOR		●	●
Value-structured dynamic bitmaps			

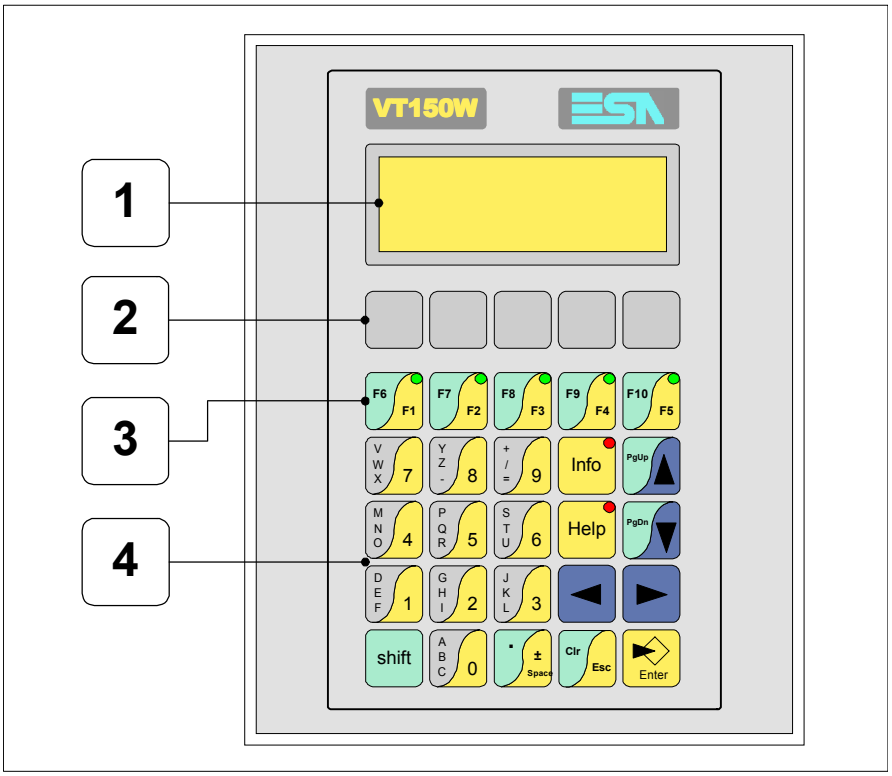
*) indicative value determined by the dimensions of the project

Table 5.1: Functions and objects realizable with this VT (Part 4 of 4)

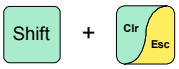
Code of terminal			
VT150W *****			
VT150W ***CN			
Objects/Functions	**Quantity**	▼	▼
Variables: Floating Point numerical variablest	16 x pages		●
Variables: Numerical variables (DEC, HEX, BIN, BCD)		●	●
Variables: String variables (ASCII)			●

*) indicative value determined by the dimensions of the project

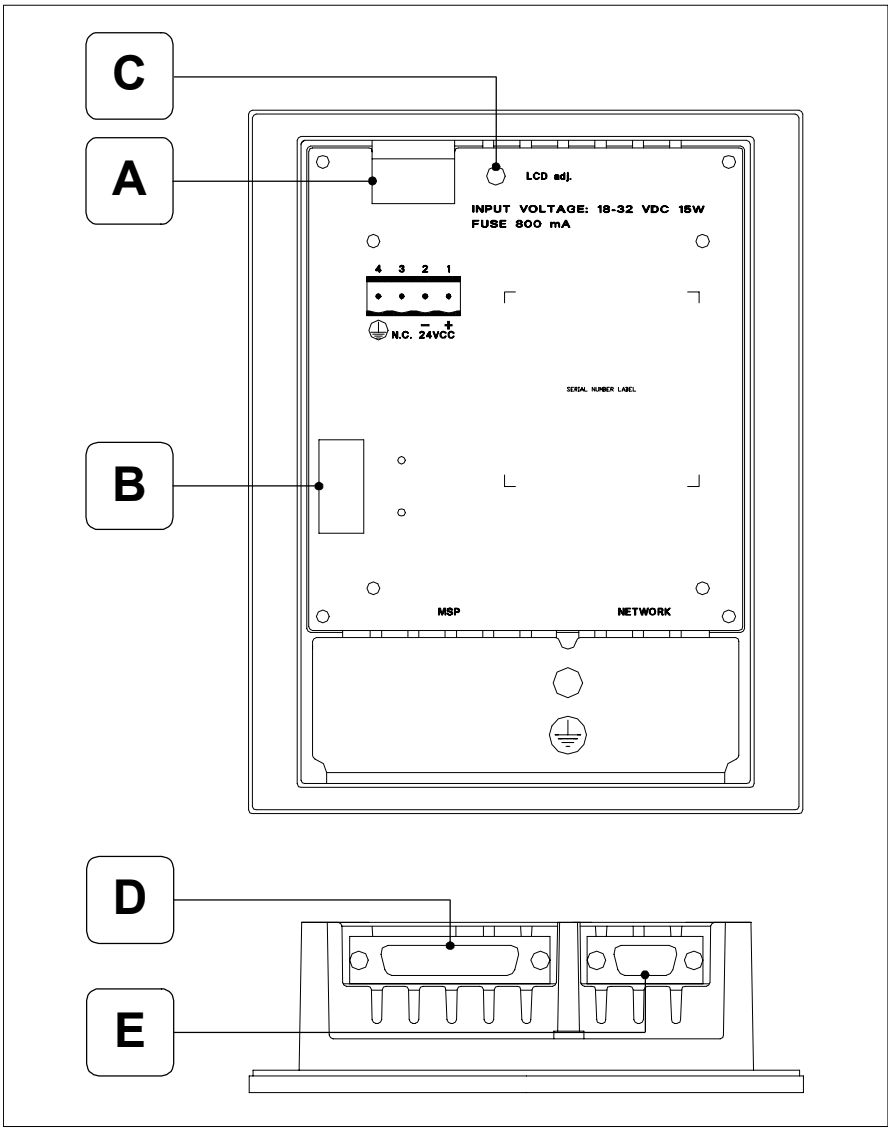
Front view



Key	Function
1	Display
2	F-key customizing label
3	F-keys
4	Alphanumeric and operative keys
Enter	Opens and confirms input
PgUp	Page up When in setting phase, edits dynamic text
PgDn	Page down When in setting phase, edits dynamic
◄	Moves the cursor between settable fields When in setting phase, moves cursor to the left of the field
►	Moves the cursor between settable fields When in setting phase, moves cursor to the right of the field

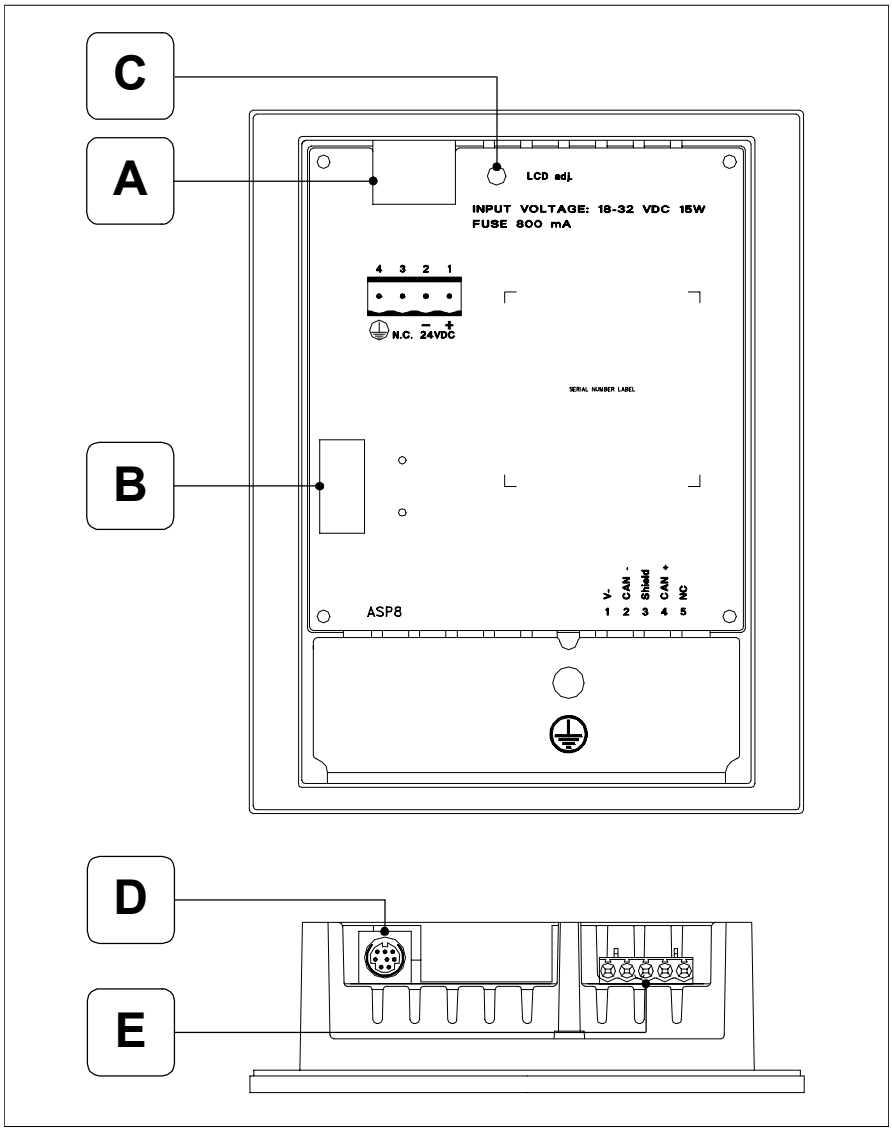
Key	Function
	Quits: setting of data, info-messages, sequence directory, communication driver
	Displays info-messages
	Displays according to context: information message help or page help
	In setting phase restores the initial value of the field

Standard series rear view



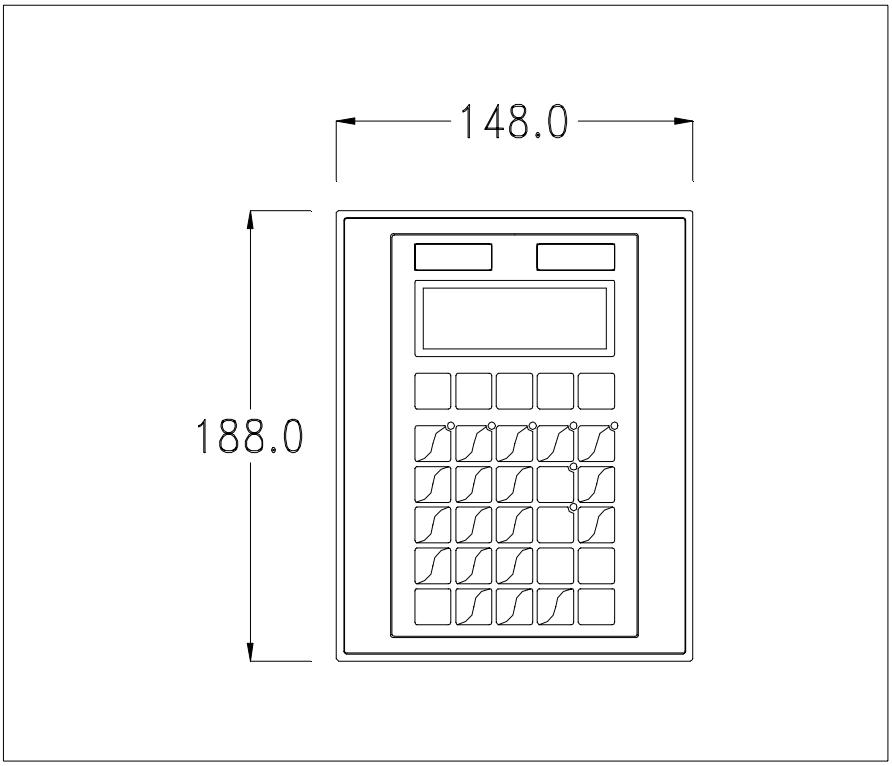
Position	Function
A	Power supply connector
B	Auxiliary port for connecting optional accessories
C	Trimmer for adjusting contrast of the display
D	MSP serial port
E	NETWORK serial port for network communication (Option)

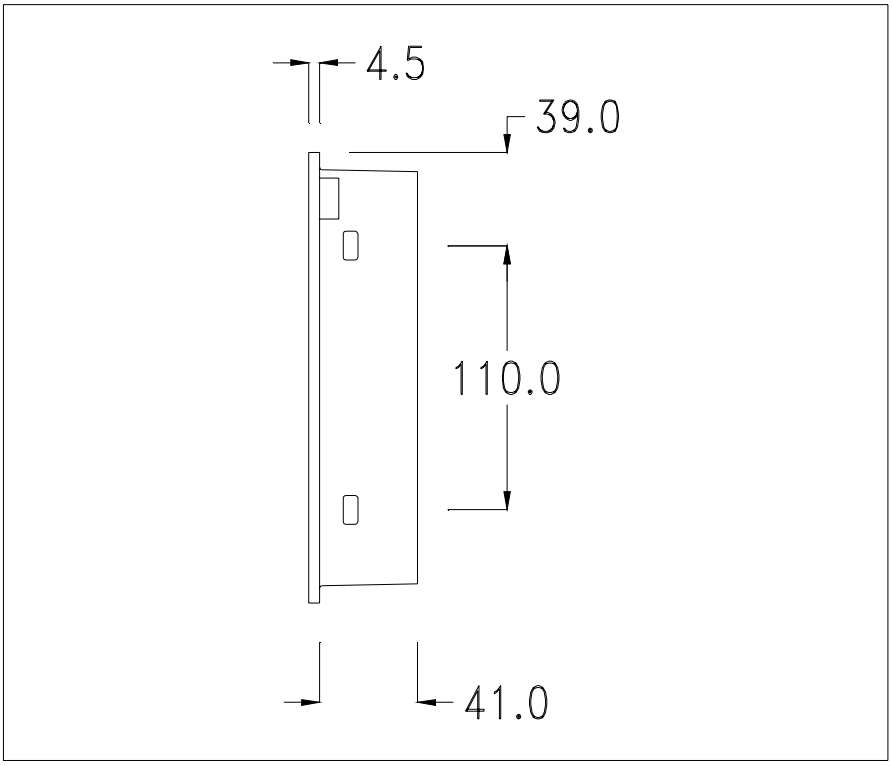
CAN series rear view

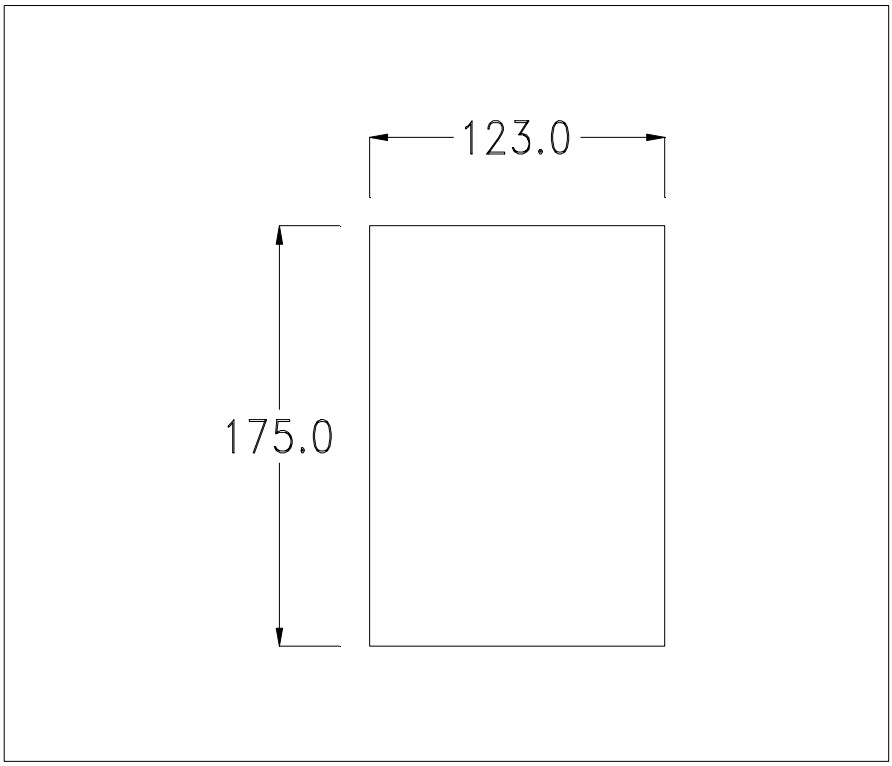


Position	Function
A	Power supply connector
B	Auxiliary port for connecting optional accessories
C	Trimmer for adjusting contrast of the display
D	ASP-8 serial port
E	CAN serial port

Dimensions and Cut-out







To fix the sealing gasket and secure the VT to the container see “Chapter 16 -> Mounting the terminal within the container“.

Where accessories need to be fixed in or onto the VT terminal, you are advised to do this before securing the VT to its container.

Accessories

Any accessories should be mounted in accordance with the instructions in the relevant chapter (see “Chapter 18 -> Video terminal accessories“).

Transfer PC -> VT

For everything to function properly, the first time the VT operator terminal is switched on it needs to be correctly loaded, that is it needs to have transferred to it:

- Firmware
- Communication driver
- Project

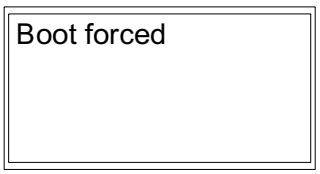
(Given that the transfer of the three files in practice occurs with a single operation, it will be defined as “Project transfer” for the sake of simplicity.)

For this it is essential that the VT be prepared to receive the transfer.

Preparation for reception

The program VTWIN (see Software Manual) must be used for the transfer, but the terminal must be set up to receive. This means carrying out the following steps:

- Check that the VT is off
- Check that there is a serial connection between the PC and the VT
- Switch on the VT with Enter pressed down or with the VT on press together shift + Enter; in either case wait a moment until the following mask appears on the VT



The VT is now ready to receive (refer to Software Manual for transfer procedure).

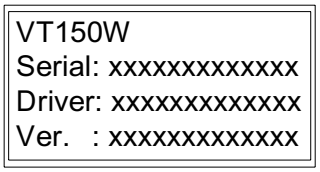
Information relating to driver

After the project has been transferred, the VT can make available information relating to what has been loaded. The information regards:

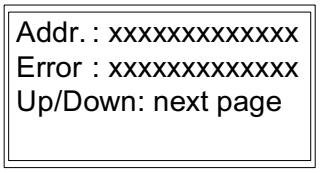
- The name of the driver loaded
- The version of the driver loaded
- Network address of the VT
- Last error to have occurred

To acquire this information carry out the following operations:

- Be situated in any page of the project
- Press Shift twice; you will see



- Press PgDn or PgUp to display



Possible error messages are:

- PROT ERROR

  Problem-> Errors have been detected in the data exchange between the VT and the Device.
  Solution-> Check the cable; there may be disturbance.

- COM BROKEN

  Problem-> Communication between VT and Device interrupted.
  Solution-> Check the serial connection cable.

An error message followed by [*] indicates that the error is not currently present but was and has since disappeared.

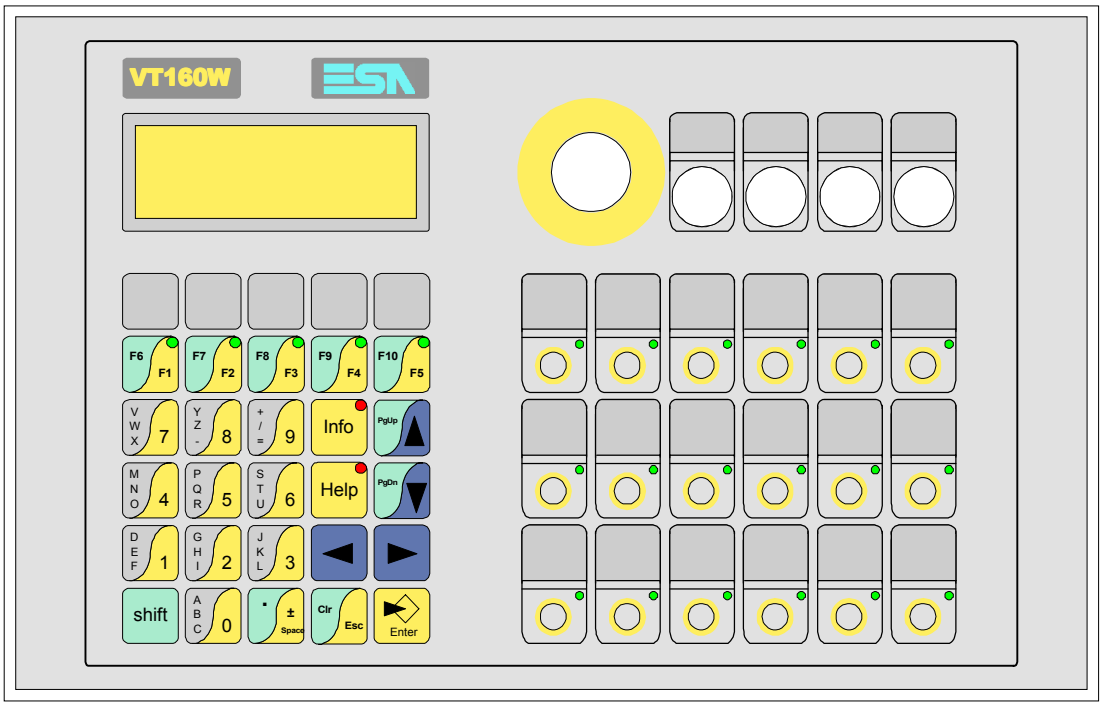
Example: COM BROKEN*

Adjusting the contrast on the display

To improve the quality of the representation on the display it may be necessary to adjust its contrast. This can be done by rotating the trimmer (C) at the back of the VT (see Page 5-10 or Page 5-11); turn it (using a small screwdriver or a trimmer tool) in one direction and, if the display quality worsens, turn it the other way.

Chapter 6 Video terminal VT160W

This chapter consists of 14 pages.



Technical characteristics The following table lists the principal technical characteristics of the product in question.

Code of terminal	Characteristics of the terminal		
VT160W 00000			
VT160W 000DP			
Display		▼	▼
Type	LCD	●	●
Representational format	Text	●	●
Rows by characters	4 x 20	●	●
Display area size [mm]	70,4 x 20,8	●	●
Character matrix in text mode [pixels]	5 x 7	●	●
Character size [mm]	2,95 x 4,75	●	●
Contrast adjustment	Trimmer	●	●
Character sets	Ascii, Katakana	●	●
Backlighting			
Type	LED	●	●
	CCFL lamp		
Standard lamp-life at 25°C [hours]	--		

Code of terminal	Characteristics of the terminal		
VT160W 00000			
VT160W 000DP			
Keyboard		▼	▼
Non-customizable function keys	--		
Customizable function keys	23	●	●
Function key LEDs	23	●	●
Alphanumeric keys	11	●	●
Operational keys	9	●	●
Operational key LEDs	2	●	●
Diagnostic LEDs	--		
User memory			
Project [Bytes]	256K	●	●
Data memory [Bytes]	--		
Memory Card for backup	--		
Memory Card for expansion	--		
Interfaces			
MSP (Multi-serial port)	RS232/RS422/RS485/TTY-20mA	●	●
ASP (Auxiliary serial port)	RS232/RS485		
ASP-8 (Auxiliary serial port)	RS232		
ASP-9 (Auxiliary serial port)	RS232		
LPT parallel port	Centronics		
Auxiliary port	Connection for accessory devices	●	●
Accessories			
Connectable accessories	See table ”Chapter 18”	●	●
Clock			
Hardware clock	With back-up battery		
Networks			
Integrated	Profibus-DP	●	
	CAN Open (Optoisolated interface)		
Optional	See table ”Chapter 18”	●	●
Proprietary			
ESA-Net	Network server		
	Network client	●	●
Technical data			
Power supply	24Vdc (18..32Vdc)		
Power absorbed at 24Vdc	15W		
Protection fuse	Ø5x20mm - 800mA Quick Blow F		
Protection level	IP65 (front-end)		
Working temperature	0..50°C		
Storage and transportation temperature	-20..+60°C		
Humidity (non-condensing)	<85%		
Weight	880gr		
Dimensions			
External L x H x D [mm]	296 x 188 x 42		
Cut-out L x H [mm]	See diagram		
Certification			
Certifications and approvals	CE		

Functions

The following table lists in alphabetical order all the functions of the VT in question.

Table 6.1: Functions and objects realizable with this VT (Part 1 of 3)

Code of terminal		
VT160W *****		
Objects/Functions	**Quantity**	▼
Alarm field		
Alarm help		
Alarm history buffer		
Alarm statistics		
Alarms (Total/active simultaneously)		
Arc		
Backup/Restore		●
Bar data		
Bit-group-structured dynamic bitmaps		
Bit-wise password	8bits	●
Buttons		
Circles		
Command: Change language		●
Command: Clear trend buffer		
Command: Delete recipe		
Command: Hardcopy		
Command: Load recipe from data memory		
Command: Modify password		●
Command: Next page		
Command: Page help		
Command: Password login		●
Command: Password logout		●
Command: Previous page		
Command: Print alarm history		
Command: Printer form feed		
Command: Quit project		●
Command: Report		
Command: Restarts reading time-sampled trend		
Command: Run pipeline		
Command: Save recipe in data memory		
Command: Save recipe received from device in buffer		
Command: Save recipe received from device in data memory		
Command: Send recipe from video buffer to device		
Command: Send recipe to device		
Command: Service page		
Command: Show alarms history		
Command: Show page directory		

*) indicative value determined by the dimensions of the project, **) not present with VT160I/O driver

Table 6.1: Functions and objects realizable with this VT (Part 2 of 3)

Code of terminal		
VT160W *****		
Objects/Functions	**Quantity**	▼
Command: Show project information		●
Command: Show recipe directory		
Command: Show sequence directory		●
Command: Shows driver status page		
Command: Shows page help		
Command: Shows page with function: PG		
Command: Stops reading time sampled trend		
Command: Trend reading saved in device		
Command: Zero number of general pages		
Date field		
Day-of-the-week field		
Dynamic texts: Bit-group-structured dynamic texts	1024*	●
Dynamic texts: Single-bit dynamic texts		●
Dynamic texts: Value-structured dynamic texts		●
E-keys		●
F-keys		●
Free terminal		
Function: Disables key		●
Function: Go to page		
Function: Internal command		●
Function: Invert bit value		●
Function: Macro		●
Function: None		●
Function: Reset bit permanently		●
Function: Reset real-time bit		●
Function: Sequences		●
Function: Sets bit permanently		●
Function: Sets real-time bit		●
Function: Value-structure direct command		●
Global configuration of E-keys	**	●
Global configuration of F-keys		●
Info-messages (Total/active simultaneously)	1024/128	●
Labels		●
LEDs assigned to sequence		●
Lines		
Lists of bitmap images		
Lists of texts		●
Local configuration of E-keys	**	●
Local configuration of F-keys		●

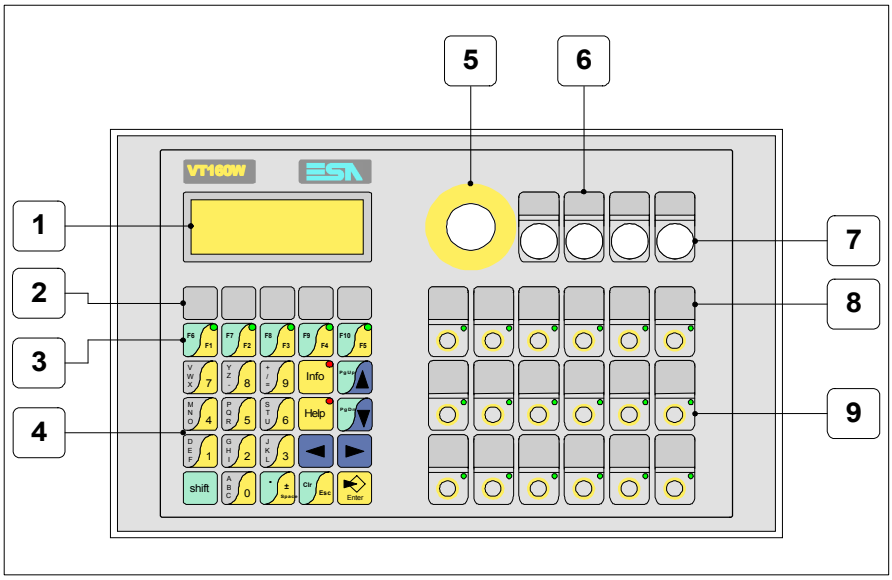
*) indicative value determined by the dimensions of the project, **) not present with VT160I/O driver

Table 6.1: Functions and objects realizable with this VT (Part 3 of 3)

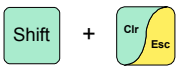
Code of terminal		
VT160W *****		
Objects/Functions	**Quantity**	▼
Macro field		
Message field		●
Message help	1024	●
Multilanguage texts	6 Langs.	●
Page	1024	●
Page help	1024	●
Password	10	●
Pipeline (Numero/Tot byte)		
Print		
Programmable fonts		
Project images		
Public variables of ESANET network (Number/Tolat bytes)	128/1024	●
Random sequences		●
Recipe field for recipe structure		
Recipes (Number of variables per recipe)		
Rectangles		
Redefinable characters	7	●
Single-bit-structured dynamic bitmaps		
Start/stop sequences		●
Static bitmaps		
System messages		●
System variables assigned to recipe structure		
Time long field		
Time short field		
Trends (Trends x page/Channels x trend)		
Trends sampled automatically (Memory/Trends/Readings)		
Trends sampled on command (Memory/Trends/Readings)		
Value direct command: ADD		●
Value direct command: AND		●
Value direct command: OR		●
Value direct command: SET		●
Value direct command: SUBTRACT		●
Value direct command: XOR		●
Value-structured dynamic bitmaps		
Variables: Floating Point numerical variablest		●
Variables: Numerical variables (DEC, HEX, BIN, BCD)	16 x pages	●
Variables: String variables (ASCII)		●

*) indicative value determined by the dimensions of the project, **) not present with VT160I/O driver

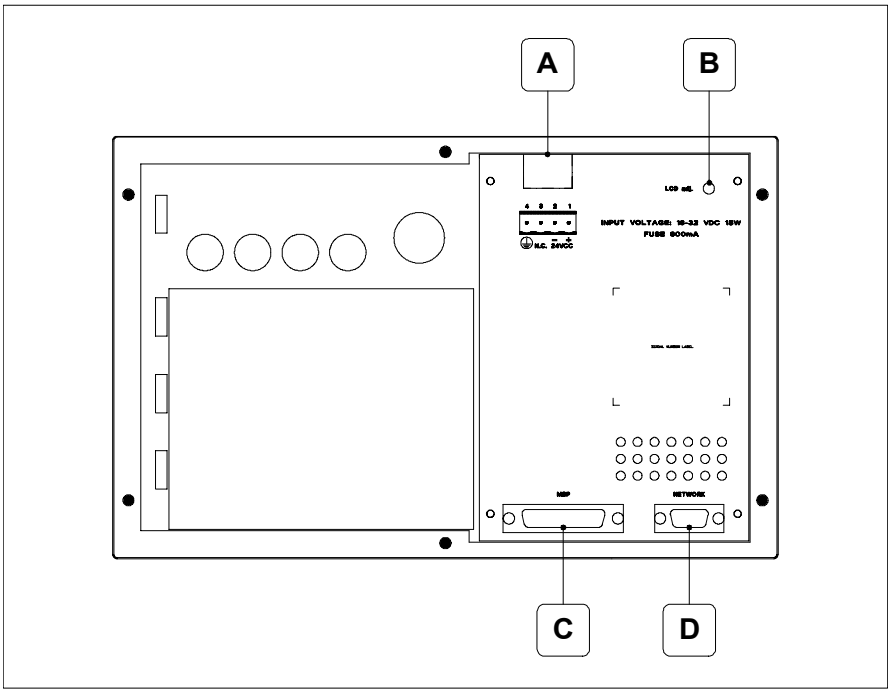
Front view



Key	Function
1	Display
2	F-key customizing label
3	F-keys
4	Alphanumeric and operative keys
5	22mm diameter pre-cut for mounting emergency stop button
6	Customizing label for command and/or signal elements
7	16mm diameter pre-cuts for mounting command and/or signal elements
8	E-key customizing label
9	E-keys
	Opens and confirms input
	Page up When in setting phase, edits dynamic text

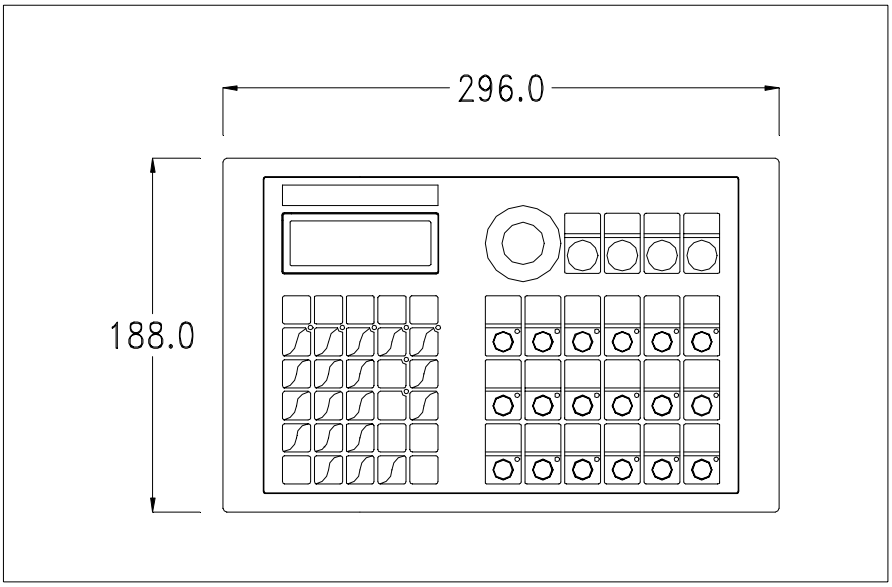
Key	Function
	Page down When in setting phase, edits dynamic
	Moves the cursor between settable fields When in setting phase, moves cursor to the left of the field
	Moves the cursor between settable fields When in setting phase, moves cursor to the right of the field
	Quits: setting of data, info-messages, sequence directory, communication driver
	Displays info-messages
	Displays according to context: information message help or page help
	In setting phase restores the initial value of the field

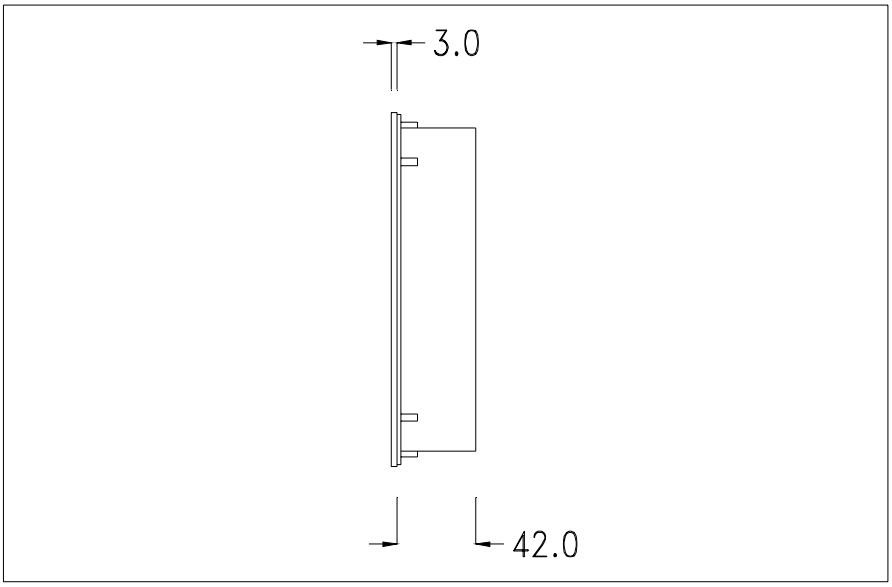
Rear view

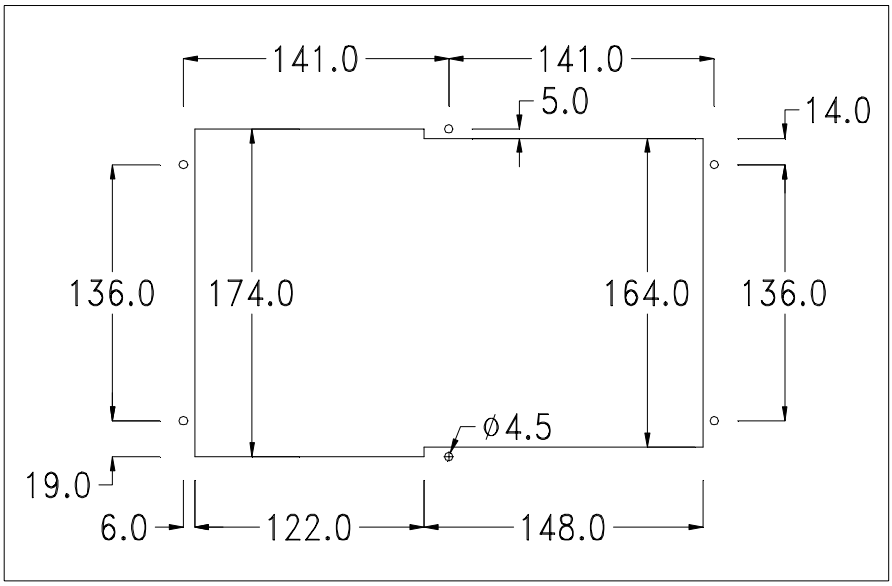


Position	Function
A	Power supply connector
B	Trimmer for adjusting contrast of the display
C	MSP serial port
D	NETWORK serial port for network communication (Optional)

Dimensions and Cut-out







To fix the sealing gasket and secure the VT to the container see “Chapter 16 -> Mounting the terminal within the container“.

Where accessories need to be fixed in or onto the VT terminal, you are advised to do this before securing the VT to its container.

Accessories

Any accessories should be mounted in accordance with the instructions in the relevant chapter (see “Chapter 18 -> Video terminal accessories“).

Transfer PC -> VT

For everything to function properly, the first time the VT operator terminal is switched on it needs to be correctly loaded, that is, it needs to have transferred to it:

- Firmware
- Communication driver
- Project

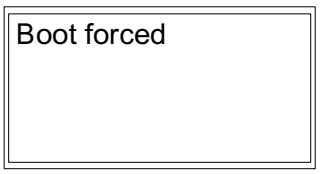
(Given that the transfer of the three files in practice occurs with a single operation, it will be defined as “Project transfer” for the sake of simplicity.)

For this it is essential that the VT be prepared to receive the transfer.

Preparation for reception

The program VTWIN (see Software Manual) must be used for the transfer, but the terminal must be set up to receive. This means carrying out the following steps:

- Check that the VT is off
- Check that there is a serial connection between the PC and the VT
- Switch on the VT with Enter pressed down or with the VT on press together shift + Enter; in either case wait a moment until the following mask appears on the VT



The VT is now ready to receive (refer to Software Manual for transfer procedure).

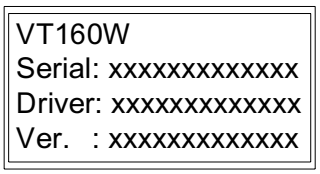
Information relating to driver

After the project has been transferred, the VT can make available information relating to what has been loaded. The information regards:

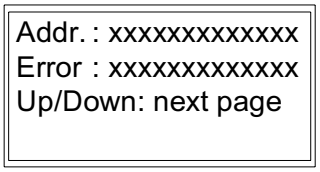
- The name of the driver loaded
- The version of the driver loaded
- Network address of the VT
- Last error to have occurred

To acquire this information carry out the following operations:

- Be situated in any page of the project
- Press Shift twice; you will see



- Press PgDn or PgUp to display



Possible error messages are:

- PR ERROR

  Problem-> Errors have been detected in the data exchange between the VT and the Device.
  Solution-> Check the cable; there may be disturbance.

- COM BROKEN

  Problem-> Communication between VT and Device interrupted.
  Solution-> Check the serial connection cable.

An error message followed by [*] indicates that the error is not currently present but was and has since disappeared.

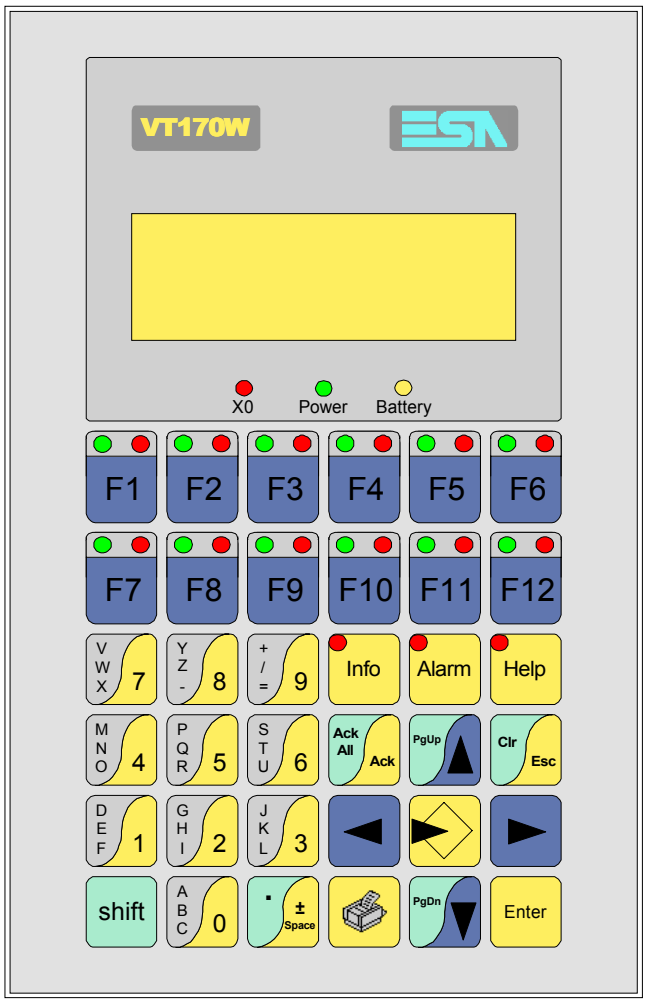
Example: COM BROKEN*

Adjusting the contrast on the display

To improve the quality of the representation on the display it may be necessary to adjust its contrast. This can be done by rotating the trimmer (C) at the back of the VT (see Page 6-9); turn it (using a small screwdriver or a trimmer tool) in one direction and, if the display quality worsens, turn it the other way.

Chapter 7 Video terminal VT170W

This chapter consists of 16 pages.



Technical characteristics The following table lists the principal technical characteristics of the product in question.

Code of terminal	Characteristics of the terminal	
VT170W A0000		
Display		▼
Type	LCD	●
Representational format	Text	●
Rows by characters	4 x 20	●
Display area size [mm]	70,4 x 20,8	●
Character matrix in text mode [pixels]	5 x 7	●
Character size [mm]	2,95 x 4,75	●
Contrast adjustment	Trimmer	●
Character sets	Ascii, Katakana	●

Code of terminal	Characteristics of the terminal	
VT170W A0000		
Backlighting		▼
Type	LED	●
	CCFL lamp	
Standard lamp-life at 25°C [hours]	--	
Keyboard		
Non-customizable function keys	--	
Customizable function keys	12	●
Function key LEDs	24	●
Alphanumeric keys	11	●
Operational keys	13	●
Operational key LEDs	3	●
Diagnostic LEDs	3	●
User memory		
Project [Bytes]	320K	●
Data memory [Bytes]	32K (With back-up battery)	●
Memory Card for backup	--	
Memory Card for expansion	--	
Interfaces		
MSP (Multi-serial port)	RS232/RS422/RS485/TTY-20mA	●
ASP (Auxiliary serial port)	RS232/RS485	
ASP-8 (Auxiliary serial port)	RS232	
ASP-9 (Auxiliary serial port)	RS232	●
LPT parallel port	Centronics	
Auxiliary port	Connection for accessory devices	
Accessories		
Connectable accessories	See table ”Chapter 18”	●
Clock		
Hardware clock	With back-up battery	●
Networks		
Integrated	Profibus-DP	
	CAN Open (Optoisolated interface)	
Optional	See table ”Chapter 18”	●
Proprietary networks		
ESA-Net	Network server	●
	Network client	●
Technical data		
Power supply	24Vdc (18..32Vdc)	
Power absorbed at 24Vdc	9W	
Protection fuse	Ø5x20mm - 500mA Quick Blow F	
Protection level	IP65 (front-end)	
Working temperature	0..50°C	
Storage and transportation temperature	-20..+60°C	
Humidity (non-condensing)	<85%	
Weight	900gr	
Dimensions		
External L x H x D [mm]	126 x 196 x 60	
Cut-out L x H [mm]	107 x 178	
Certification		
Certifications and approvals	CE	

Functions

The following table lists in alphabetical order all the functions of the VT in question.

Table 7.1: Functions and objects realizable with this VT (Part 1 of 3)

Code of terminal		
VT170W *****		
Objects/Functions	**Quantity**	▼
Alarm field		●
Alarm help	1024	●
Alarm history buffer	256	●
Alarm statistics		
Alarms (Total/active simultaneously)	1024/128	●
Arc		
Backup/Restore		●
Bar data		
Bit-group-structured dynamic bitmaps		
Bit-wise password	8bits	●
Buttons		
Circles		
Command: Change language		●
Command: Clear trend buffer		
Command: Delete recipe		●
Command: Hardcopy		●
Command: Load recipe from data memory		●
Command: Modify password		●
Command: Next page		
Command: Page help		●
Command: Password login		●
Command: Password logout		●
Command: Previous page		
Command: Print alarm history		●
Command: Printer form feed		●
Command: Quit project		●
Command: Report		●
Command: Restarts reading time-sampled trend		
Command: Run pipeline		
Command: Save recipe in data memory		●
Command: Save recipe received from device in buffer		●
Command: Save recipe received from device in data memory		●
Command: Send recipe from video buffer to device		●
Command: Send recipe to device		●
Command: Service page		●
Command: Show alarms history		
Command: Show page directory		

*) indicative value determined by the dimensions of the project

Table 7.1: Functions and objects realizable with this VT (Part 2 of 3)

Code of terminal		
VT170W *****		
Objects/Functions	**Quantity**	▼
Command: Show project information		●
Command: Show recipe directory		●
Command: Show sequence directory		●
Command: Shows driver status page		
Command: Shows page help		
Command: Shows page with function: PG		
Command: Stops reading time sampled trend		
Command: Trend reading saved in device		
Command: Zero number of general pages		●
Date field		●
Day-of-the-week field		●
Dynamic texts: Bit-group-structured dynamic texts	1024*	●
Dynamic texts: Single-bit dynamic texts		●
Dynamic texts: Value-structured dynamic texts		●
E-keys		
F-keys		●
Free terminal		
Function: Disables key		●
Function: Go to page		
Function: Internal command		●
Function: Invert bit value		●
Function: Macro		●
Function: None		●
Function: Reset bit permanently		●
Function: Reset real-time bit		●
Function: Sequences		●
Function: Sets bit permanently		●
Function: Sets real-time bit		●
Function: Value-structure direct command		●
Global configuration of E-keys		
Global configuration of F-keys		●
Info-messages (Total/active simultaneously)	1024/128	●
Labels		●
LEDs assigned to sequence		●
Lines		
Lists of bitmap images		
Lists of texts		●
Local configuration of E-keys		
Local configuration of F-keys		●

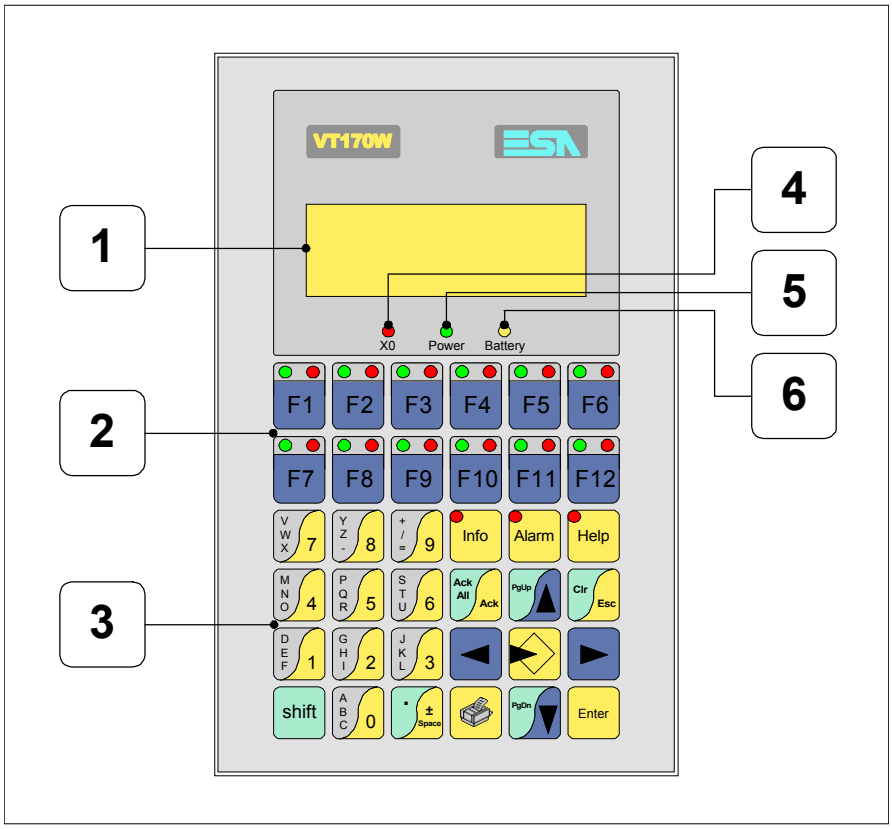
*) indicative value determined by the dimensions of the project

Table 7.1: Functions and objects realizable with this VT (Part 3 of 3)

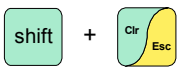
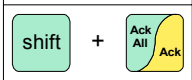
Code of terminal		
VT170W *****		
Objects/Functions	**Quantity**	▼
Macro field		
Message field		●
Message help	1024	●
Multilanguage texts	8 Langs.	●
Page	1024	●
Page help	1024	●
Password	10	●
Pipeline (Numero/Tot byte)		
Print		●
Programmable fonts		
Project images		
Public variables of ESANET network (Number/Tolat bytes)	128/1024	●
Random sequences		●
Recipe field for recipe structure		●
Recipes (Number of variables per recipe)	1024/256	●
Rectangles		
Redefinable characters	7	●
Single-bit-structured dynamic bitmaps		
Start/stop sequences		●
Static bitmaps		
System messages		●
System variables assigned to recipe structure		●
Time long field		●
Time short field		●
Trends (Trends x page/Channels x trend)		
Trends sampled automatically (Memory/Trends/Readings)		
Trends sampled on command (Memory/Trends/Readings)		
Value direct command: ADD		●
Value direct command: AND		●
Value direct command: OR		●
Value direct command: SET		●
Value direct command: SUBTRACT		●
Value direct command: XOR		●
Value-structured dynamic bitmaps		
Variables: Floating Point numerical variablest	16 x pages	●
Variables: Numerical variables (DEC, HEX, BIN, BCD)		●
Variables: String variables (ASCII)		●

*) indicative value determined by the dimensions of the project

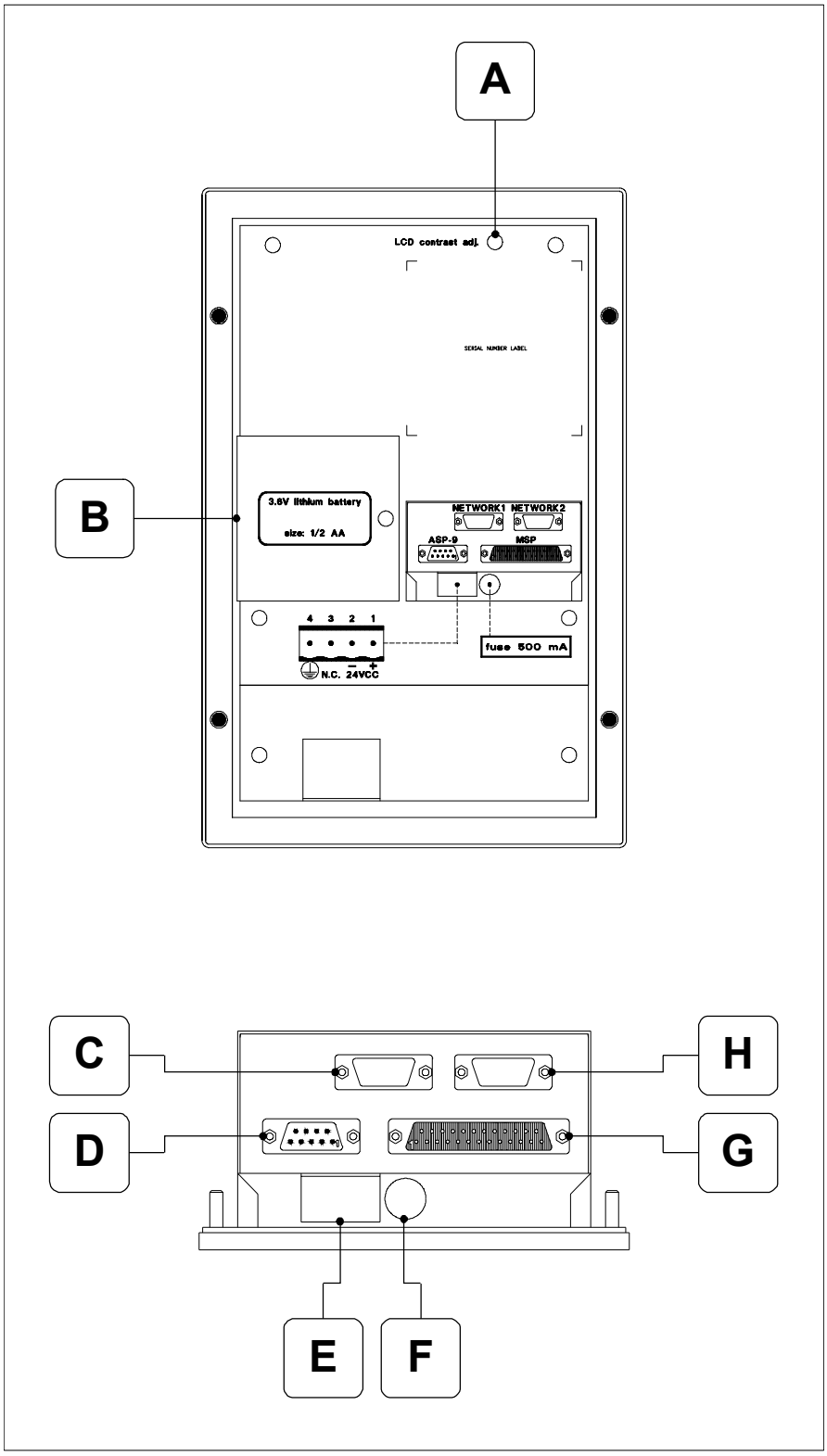
Front view



Key	Function
1	Display
2	F-keys
3	Alphanumeric and operative keys
4	X0 LED. Blinks when communication error is detected
5	Power LED. Lights up when power in ON
6	Battery LED. Lights up when the battery has nearly run out
	Start input
	Confirms setting of data

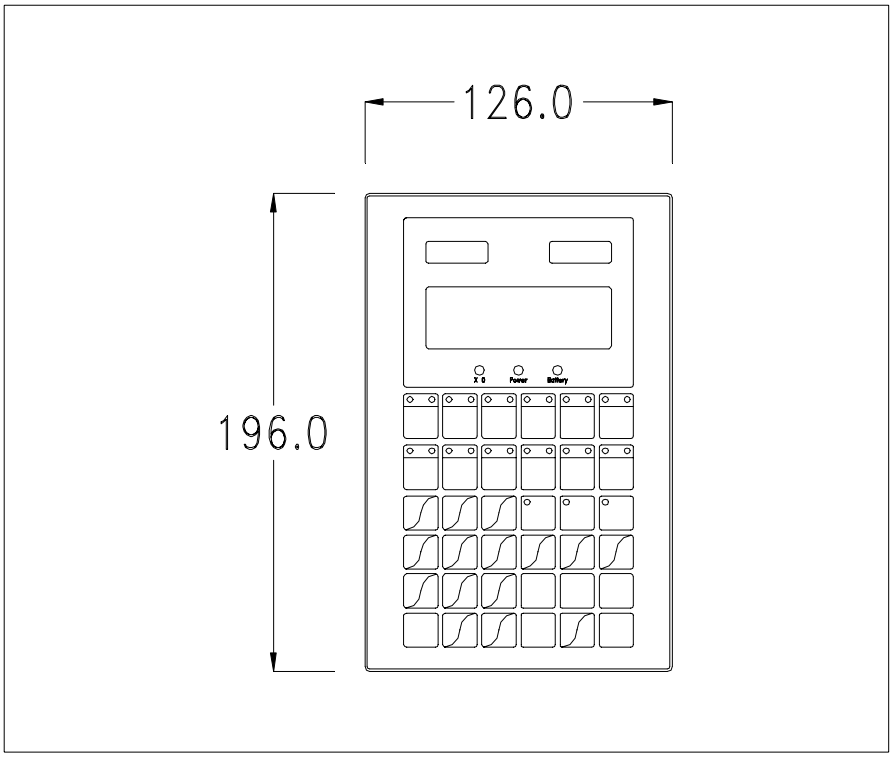
Key	Function
	Page up When in setting phase, edits dynamic text
	Page down When in setting phase, edits dynamic
	Moves the cursor between settable fields When in setting phase, moves cursor to the left of the field
	Moves the cursor between settable fields When in setting phase, moves cursor to the right of the field
	Quits: setting of data, info-messages, sequence directory, communication driver
	Displays info-messages
	Displays ISA alarms
	Displays according to context: information message help, alarm help or page help
	Acknowledgment of ISA alarms on display
	Print the entire display area
	In setting phase restores the initial value of the field
	Acknowledges all ISA alarms

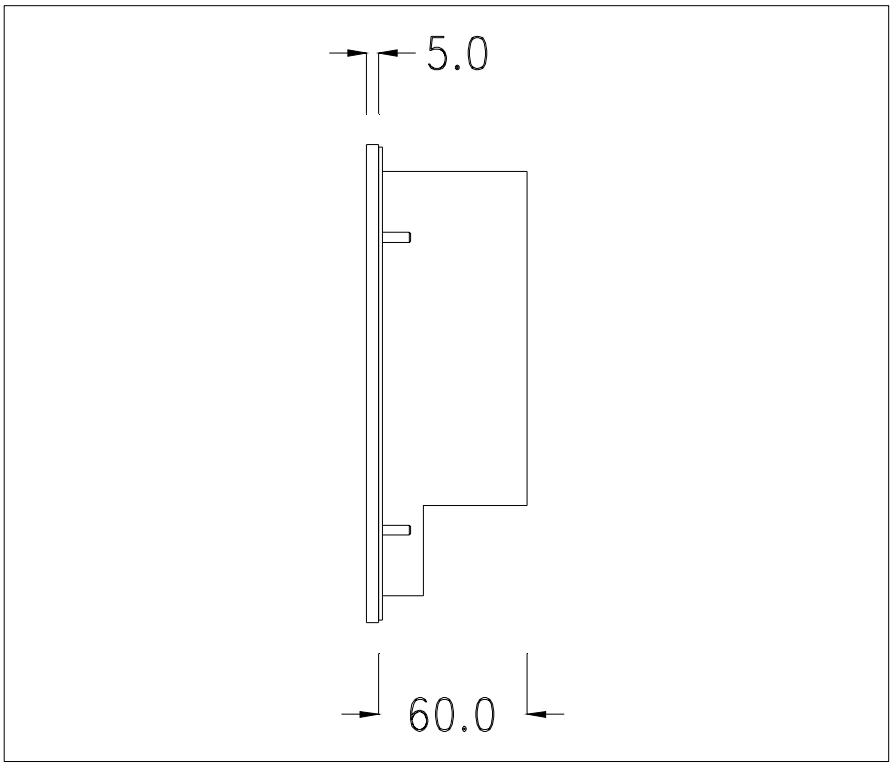
Rear view

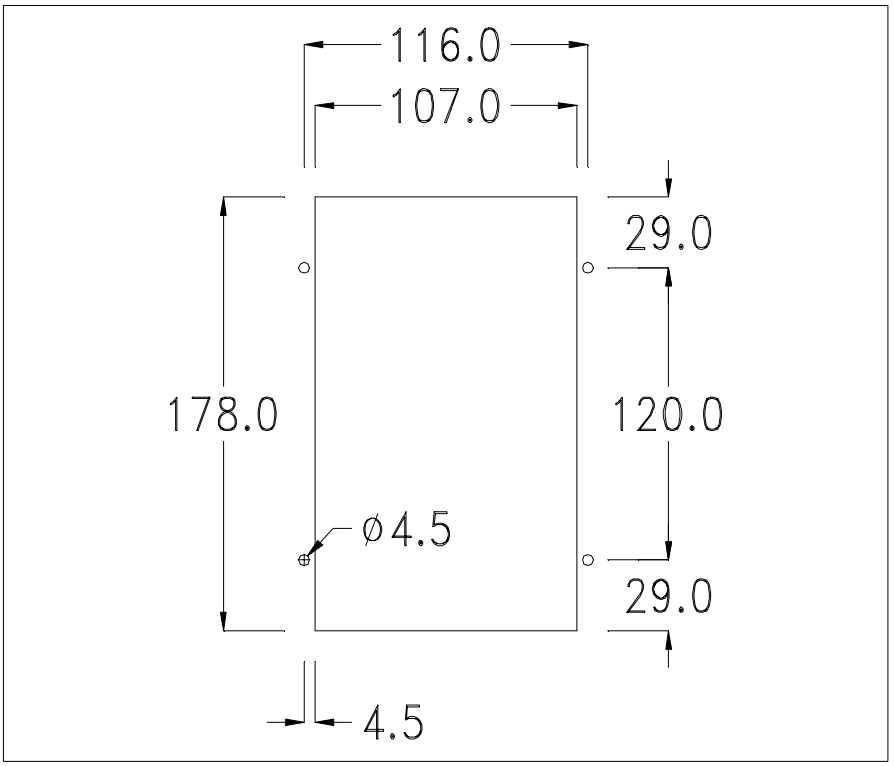

A
LCD contrast adj.
SERIAL NUMBER LABEL
B
3.6V lithium battery
size: 1/2 AA
NETWORK1
NETWORK2
ASP-9
MSP
4 3 2 1
fuse 500 mA
N.C. 24VCC
C
D
H
G
E
F

Position	Function
A	Trimmer for adjusting display contrast
B	Battery compartment
C	NETWORK1 serial port for network communication (Optional)
D	ASP-9 serial port for communicating with PC or other devices
E	Power supply connector
F	Fuse holder
G	MSP serial port for communicating with PLC/PC
H	NETWORK2 serial port for network communication (Optional)

Dimensions and Cut-out







To fix the sealing gasket and secure the VT to the container see “Chapter 16 -> Mounting the terminal within the container“.

Where accessories need to be fixed in or onto the VT terminal, you are advised to do this before securing the VT to its container.

Accessories

Any accessories should be mounted in accordance with the instructions in the relevant chapter (see “Chapter 18 -> Video terminal accessories“).

Transfer PC -> VT

For everything to function properly, the first time the VT operator terminal is switched on it needs to be correctly loaded, that is it needs to have transferred to it:

- Firmware
- Communication driver
- Project

(Given that the transfer of the three files in practice occurs with a single operation, it will be defined as “Project transfer” for the sake of simplicity.)

For this it is essential that the VT be prepared to receive the transfer.

Preparation for reception

The program VTWIN (see Software Manual) must be used for the transfer, but the terminal must be set up to receive. This means carrying out the following steps:

- Check that the VT is off
- Check that there is a serial connection between the PC and the VT
- Switch on the VT with Enter pressed down or with the VT on press together shift + Enter; in either case wait a moment until the following mask appears on the VT

```
Boot sequence forced
F1=ASP down/up load
F2=MSP down/up load
ENTER=run project
```

Press the function ▣ corresponding to the port to be used.

The VT is now ready to receive (refer to Software Manual for transfer procedure).

Information relating to driver

After the project has been transferred, the VT can make available information relating to what has been loaded. The information regards:

- The name of the driver loaded
- The version of the driver loaded
- Network address of the VT
- Last error to have occurred

To acquire this information carry out the following operations:

- Be situated in any page of the project
- Press Shift twice; you will see

```
VT170W
Serial: xxxxxxxxxxxx
Driver: xxxxxxxxxxxx
Ver.  : xxxxxxxxxxxx
```

• Press PgDn or PgUp; you will see

```
Addr. : xxxxxxxxxxxx
Error : xxxxxxxxxxxx
Up/Down = next page
Enter = set clock
```

While displaying this page, press Enter to access the clock setting page

```
Time        Date
hh:mm:ss    dd/mm/yy
Lf/Rt/Up/Dw = change
Esc=Prj  Enter=Memo
```

Lf is the equivalent of ◄, Rt is the equivalent of ►, Up of PgUp, Dw of PgDn; using Clr Esc you quit the display, while with Enter the settings are confirmed and you return to the project page.

Possible error messages that can be displayed on the appropriate line are:

• PR ERR

Problem-> Errors have been detected in the data exchange between the VT and the Device.
Solution-> Check the cable; there may be disturbance.

• COM BROKEN

Problem-> Communication between VT and Device interrupted.
Solution-> Check the serial connection cable.

An error message followed by [*] indicates that the error is not currently present but was and has since disappeared.

Example: COM BROKEN*

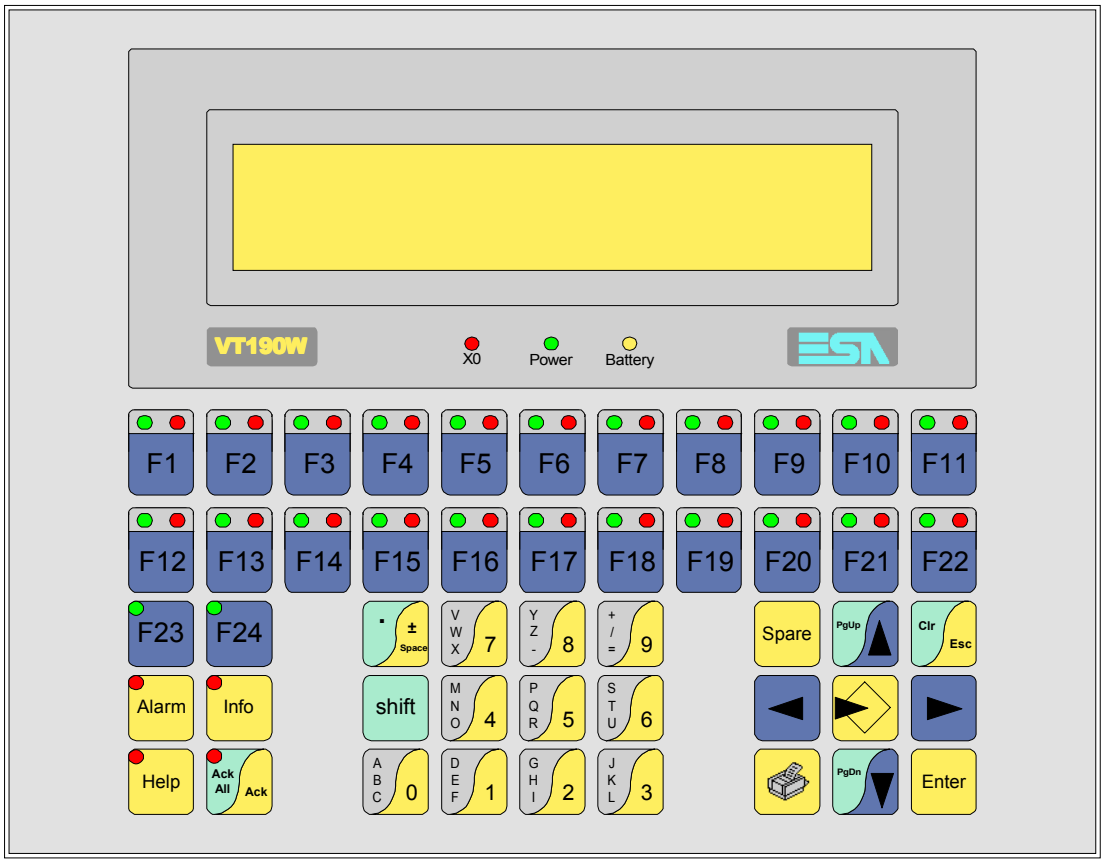
By pressing Clr Esc you pass back to the project page.

Adjusting the contrast on the display

To improve the quality of the representation on the display it may be necessary to adjust its contrast. This can be done by rotating the trimmer (C) at the back of the VT (see Page 7-9); turn it (using a small screwdriver or a trimmer tool) in one direction and, if the display quality worsens, turn it the other way.

Chapter 8 Video terminal VT190W

This chapter consists of 16 pages.



Technical characteristics The following table lists the principal technical characteristics of the product in question.

Code of terminal	Characteristics of the terminal		
VT190W A0000			
VT190W AP000			
Display		▼	▼
Type	LCD	●	●
Representational format	Text	●	●
Rows by characters	4 x 40	●	●
Display area size [mm]	140,5 x 23,2	●	●
Character matrix in text mode [pixels]	5 x 7	●	●
Character size [mm]	2,8 x 4,9	●	●
Contrast adjustment	Software	●	●
Character sets	Ascii, Katakana	●	●
Backlighting			
Type	LED	●	●
	CCFL lamp		
Standard lamp-life at 25°C [hours]	--		

Code of terminal	Characteristics of the terminal		
VT190W A0000			
VT190W AP000			
Keyboard		▼	▼
Non-customizable function keys	2	●	●
Customizable function keys	22	●	●
Function key LEDs	46	●	●
Alphanumeric keys	11	●	●
Operational keys	14	●	●
Operational key LEDs	4	●	●
Diagnostic LEDs	3	●	●
User memory			
Project [Bytes]	256K	●	●
Data memory [Bytes]	96K (With back-up battery)	●	●
Memory Card for backup	--		
Memory Card for expansion	--		
Interfaces			
MSP (Multi-serial port)	RS232/RS422/RS485/TTY-20mA	●	●
ASP (Auxiliary serial port)	RS232/RS485		
ASP-8 (Auxiliary serial port)	RS232		
ASP-9 (Auxiliary serial port)	RS232	●	●
LPT parallel port	Centronics	●	
Auxiliary port	Connection for accessory devices		
Accessories			
Connectable accessories	See table ”Chapter 18”	●	●
Clock			
Hardware clock	With back-up battery	●	●
Networks			
Integrated	Profibus-DP		
	CAN Open (Optoisolated interface)		
Optional	See table ”Chapter 18”	●	●
Proprietary networks			
ESA-Net	Network server	●	●
	Network client	●	●
Technical data			
Power supply	24Vdc (18..32Vdc)		
Power absorbed at 24Vdc	9W		
Protection fuse	Ø5x20mm - 800mA Quick Blow F		
Protection level	IP65 (front-end)		
Working temperature	0..50°C		
Storage and transportation temperature	-20..+60°C		
Humidity (non-condensing)	<85%		
Weight	1500gr		
Dimensions			
External L x H x D [mm]	252 x 196 x 60		
Cut-out L x H [mm]	232 x 178		
Certification			
Certifications and approvals	CE		

Functions

The following table lists in alphabetical order all the functions of the VT in question.

Table 8.1: Functions and objects realizable with this VT (Part 1 of 3)

Code of terminal		
VT190W *****		
Objects/Functions	**Quantity**	▼
Alarm field		●
Alarm help	1024	●
Alarm history buffer	256	●
Alarm statistics		
Alarms (Total/active simultaneously)	1024/128	●
Arc		
Backup/Restore		●
Bar data		
Bit-group-structured dynamic bitmaps		
Bit-wise password	8bits	●
Buttons		
Circles		
Command: Change language		●
Command: Clear trend buffer		
Command: Delete recipe		●
Command: Hardcopy		●
Command: Load recipe from data memory		●
Command: Modify password		●
Command: Next page		
Command: Page help		●
Command: Password login		●
Command: Password logout		●
Command: Previous page		
Command: Print alarm history		●
Command: Printer form feed		●
Command: Quit project		●
Command: Report		●
Command: Restarts reading time-sampled trend		
Command: Run pipeline		●
Command: Save recipe in data memory		●
Command: Save recipe received from device in buffer		●
Command: Save recipe received from device in data memory		●
Command: Send recipe from video buffer to device		●
Command: Send recipe to device		●
Command: Service page		●
Command: Show alarms history		
Command: Show page directory		

*) indicative value determined by the dimensions of the project

Table 8.1: Functions and objects realizable with this VT (Part 2 of 3)

Code of terminal		
VT190W *****		
Objects/Functions	**Quantity**	▼
Command: Show project information		●
Command: Show recipe directory		●
Command: Show sequence directory		●
Command: Shows driver status page		
Command: Shows page help		
Command: Shows page with function: PG		
Command: Stops reading time sampled trend		
Command: Trend reading saved in device		
Command: Zero number of general pages		●
Date field		●
Day-of-the-week field		●
Dynamic texts: Bit-group-structured dynamic texts	1024*	●
Dynamic texts: Single-bit dynamic texts		●
Dynamic texts: Value-structured dynamic texts		●
E-keys		
F-keys		●
Free terminal		
Function: Disables key		●
Function: Go to page		
Function: Internal command		●
Function: Invert bit value		●
Function: Macro		●
Function: None		●
Function: Reset bit permanently		●
Function: Reset real-time bit		●
Function: Sequences		●
Function: Sets bit permanently		●
Function: Sets real-time bit		●
Function: Value-structure direct command		●
Global configuration of E-keys		
Global configuration of F-keys		●
Info-messages (Total/active simultaneously)	1024/128	●
Labels		●
LEDs assigned to sequence		●
Lines		
Lists of bitmap images		
Lists of texts		●
Local configuration of E-keys		
Local configuration of F-keys		●

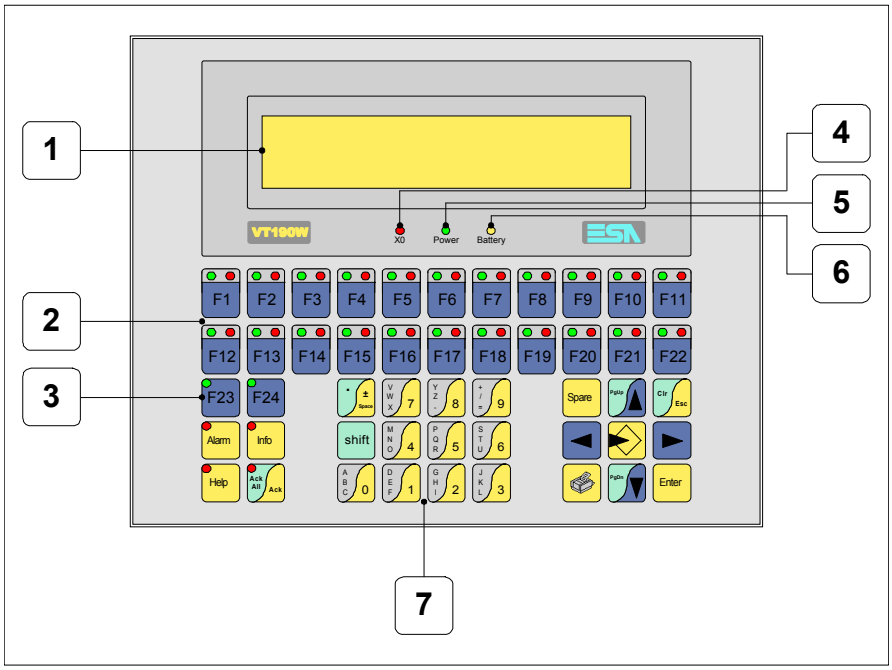
*) indicative value determined by the dimensions of the project

Table 8.1: Functions and objects realizable with this VT (Part 3 of 3)

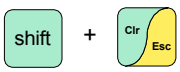
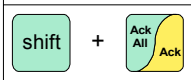
Code of terminal		
VT190W *****		
Objects/Functions	**Quantity**	▼
Macro field		
Message field		●
Message help	1024	●
Multilanguage texts	8 Langs.	●
Page	1024	●
Page help	1024	●
Password	10	●
Pipeline (Numero/Tot byte)	64/512	●
Print		●
Programmable fonts		
Project images		
Public variables of ESANET network (Number/Tolat bytes)	128/1024	●
Random sequences		●
Recipe field for recipe structure		●
Recipes (Number of variables per recipe)	1024/256	●
Rectangles		
Redefinable characters	7	●
Single-bit-structured dynamic bitmaps		
Start/stop sequences		●
Static bitmaps		
System messages		●
System variables assigned to recipe structure		●
Time long field		●
Time short field		●
Trends (Trends x page/Channels x trend)		
Trends sampled automatically (Memory/Trends/Readings)		
Trends sampled on command (Memory/Trends/Readings)		
Value direct command: ADD		●
Value direct command: AND		●
Value direct command: OR		●
Value direct command: SET		●
Value direct command: SUBTRACT		●
Value direct command: XOR		●
Value-structured dynamic bitmaps		
Variables: Floating Point numerical variablest	32 x pages	●
Variables: Numerical variables (DEC, HEX, BIN, BCD)		●
Variables: String variables (ASCII)		●

*) indicative value determined by the dimensions of the project

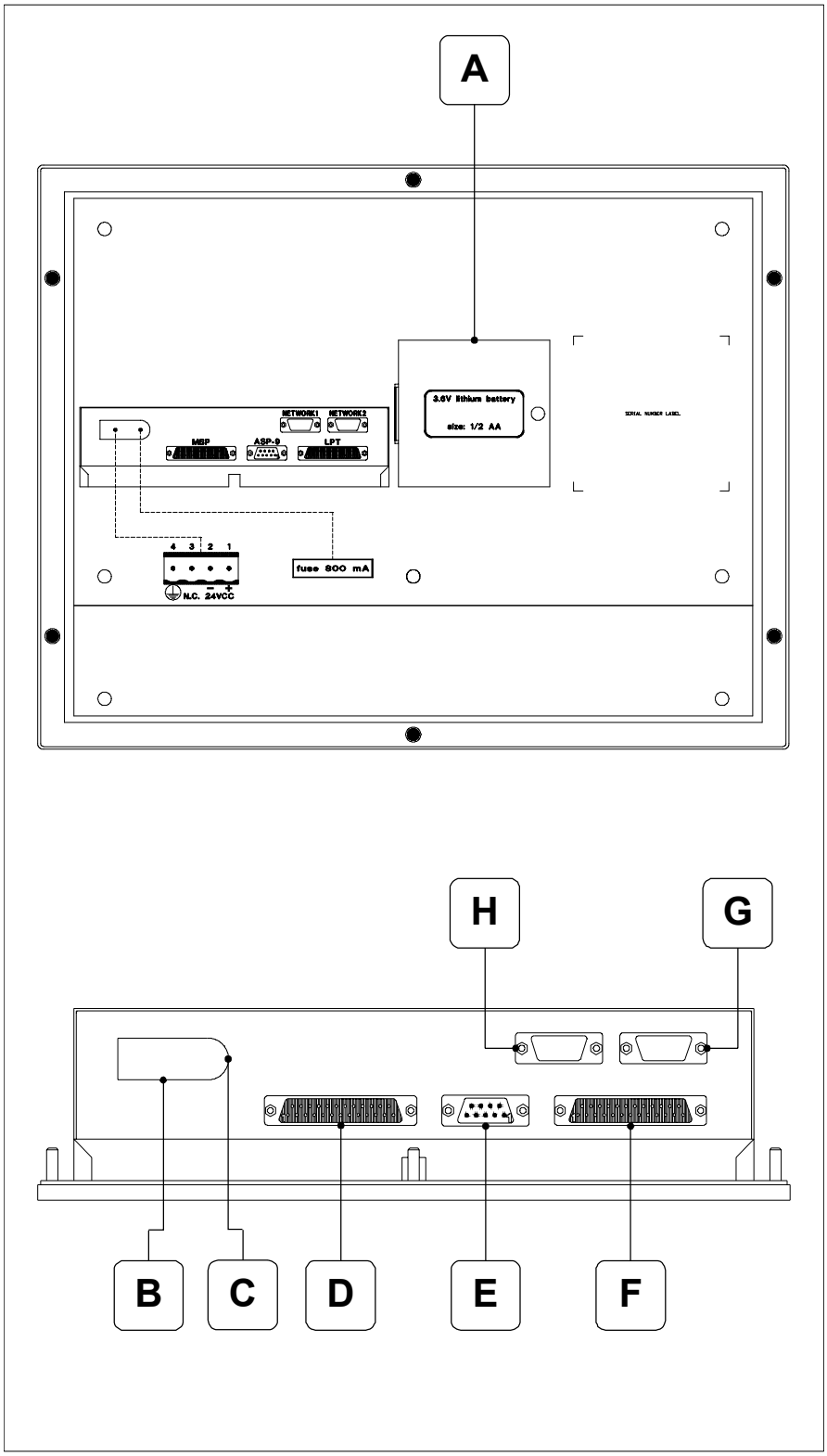
Front view



Key	Function
1	Display
2	F-keys with two LEDs
3	F-keys with one LED
4	X0 LED. Blinks when communication error is detected
5	Power LED. Lights up when power in ON
6	Battery LED. Lights up when the battery has nearly run out
7	Alphanumeric keys
	Starts input
	Confirms setting of data
	Page up When in setting phase, edits dynamic text

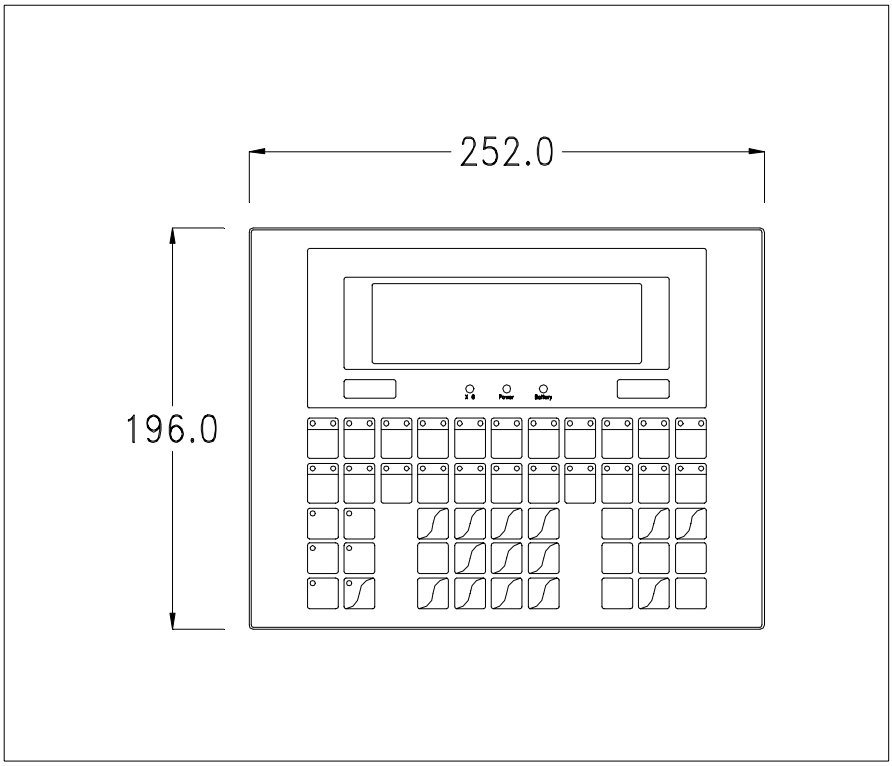
Key	Function
	Page down When in setting phase, edits dynamic text
	Moves the cursor between settable fields When in setting phase, moves cursor to the left of the field
	Moves the cursor between settable fields When in setting phase, moves cursor to the right of the field
	Quits: setting of data, info-messages, sequence directory, communication driver
	Displays info-messages
	Displays ISA alarms
	Displays according to context: information message help, alarm help or page help
	Acknowledgment of ISA alarms on display
	Print the entire display area
	No predefined function
	In setting phase restores the initial value of the field
	Acknowledges all ISA alarms

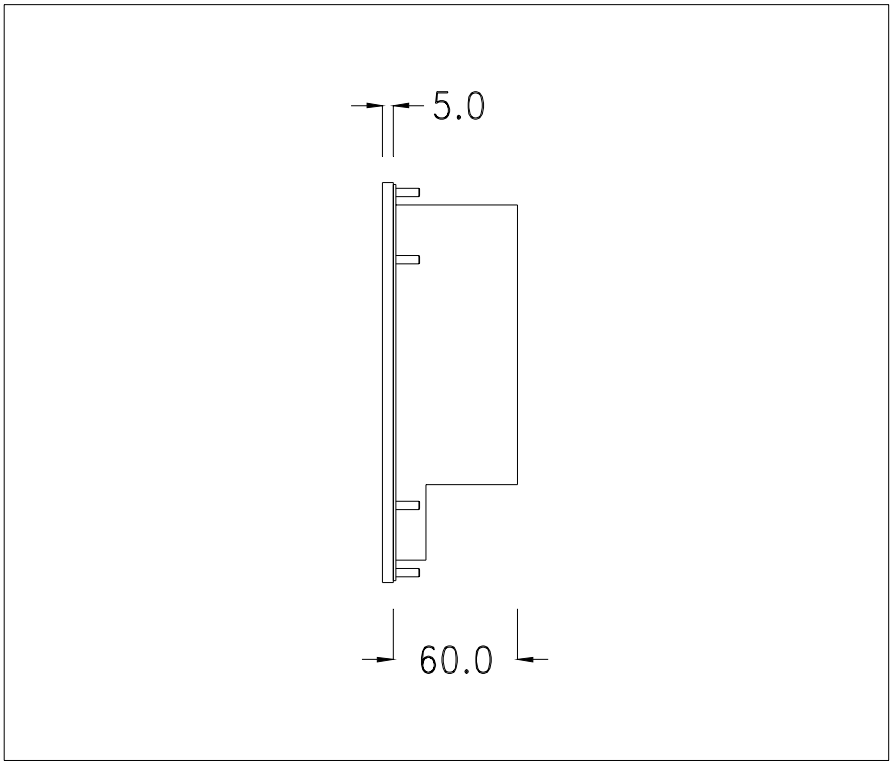
Rear view

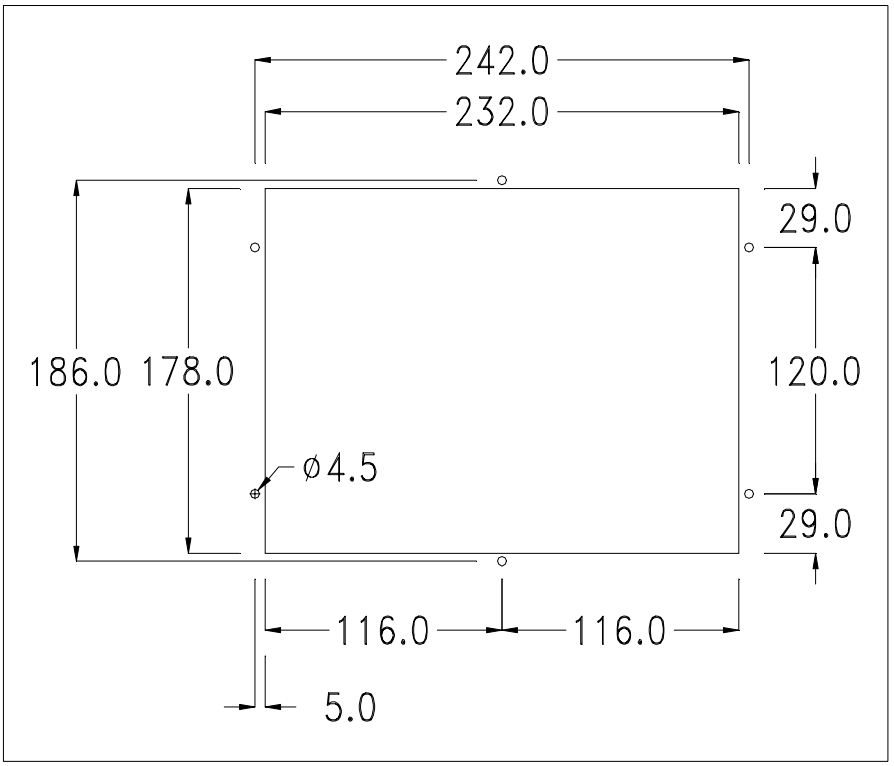

A
3.6V lithium battery
size: 1/2 AA
NETWORK1
NETWORK2
MSP
ASP-9
LPT
4 3 2 1
N.C. 24VCC
fuse 800 mA
H
G
B
C
D
E
F

Position	Function
A	Battery compartment
B	Power supply connector
C	Fuse holder
D	MSP serial port for communicating with PLC/PC
E	ASP-9 serial port for communicating with PC or other devices
F	LPT port for connecting printer (Optional)
G	NETWORK2 serial port for network communication (Optional)
H	NETWORK1 serial port for network communication (Optional)

Dimensions and Cut-out







To fix the sealing gasket and secure the VT to the container see “Chapter 16 -> Mounting the terminal within the container“.

Where accessories need to be fixed in or onto the VT terminal, you are advised to do this before securing the VT to its container.

Accessories

Any accessories should be mounted in accordance with the instructions in the relevant chapter (see “Chapter 18 -> Video terminal accessories“).

Transfer PC -> VT

For everything to function properly, the first time the VT operator terminal is switched on it needs to be correctly loaded, that is it needs to have transferred to it:

- Firmware
- Communication driver
- Project

(Given that the transfer of the three files in practice occurs with a single operation, it will be defined as “Project transfer” for the sake of simplicity.)

For this it is essential that the VT be prepared to receive the transfer.

Preparation for reception

The program VTWIN (see Software Manual) must be used for the transfer, but the terminal must be set up to receive. This means carrying out the following steps:

- Check that the VT is off
- Check that there is a serial connection between the PC and the VT
- Switch on the VT with Enter pressed down or with the VT on press together shift + Enter; in either case wait a moment until the following mask appears on the VT

```
Boot sequence forced
F1=      ASP  down/up load
F2=      MSP  down/up load
ENTER=run    project
```

Press the function ▣ corresponding to the port to be used.

The VT is now ready to receive (refer to Software Manual for transfer procedure).

Information relating to driver

After the project has been transferred, the VT can make available information relating to what has been loaded. The information regards:

- The name of the driver loaded
- The version of the driver loaded
- Network address of the VT
- Last error to have occurred

To acquire this information carry out the following operations:

- Be situated in any page of the project
- Press Shift twice; you will see

```
VT190W
Serial: xxxxxxxxxxxxx
Driver: xxxxxxxxxxxxx
Ver.   : xxxxxxxxxxxxx
```

• Press PgDn or PgUp; you will see

```
Addr. : xxxxxxxxxxxx
Error : xxxxxxxxxxxx
Up/Down = next page
Enter = settings page
```

If while displaying this page you press Enter you will access the page for setting the clock and the contrast

```
CONTRAST:±####
TIME: hh:mm:ss    DATE: dd:mm:yy
Left/Right = select. Up/Down = change
ESC = project ENTER = memo
```

Left/Right is equivalent to ◄ ►, Up/Down to PgUp PgDn; using Clr Esc you quit display, while with Enter the settings are confirmed and you pass back to the project page.

Possible error messages are:

• PR ERR

Problem-> Errors have been detected in the data exchange between the VT and the Device.
Solution-> Check the cable; there may be disturbance.

• COM BROKEN

Problem-> Communication between VT and Device interrupted.
Solution-> Check the serial connection cable.

An error message followed by [*] indicates that the error is not currently present but was and has since disappeared.

Example: COM BROKEN*

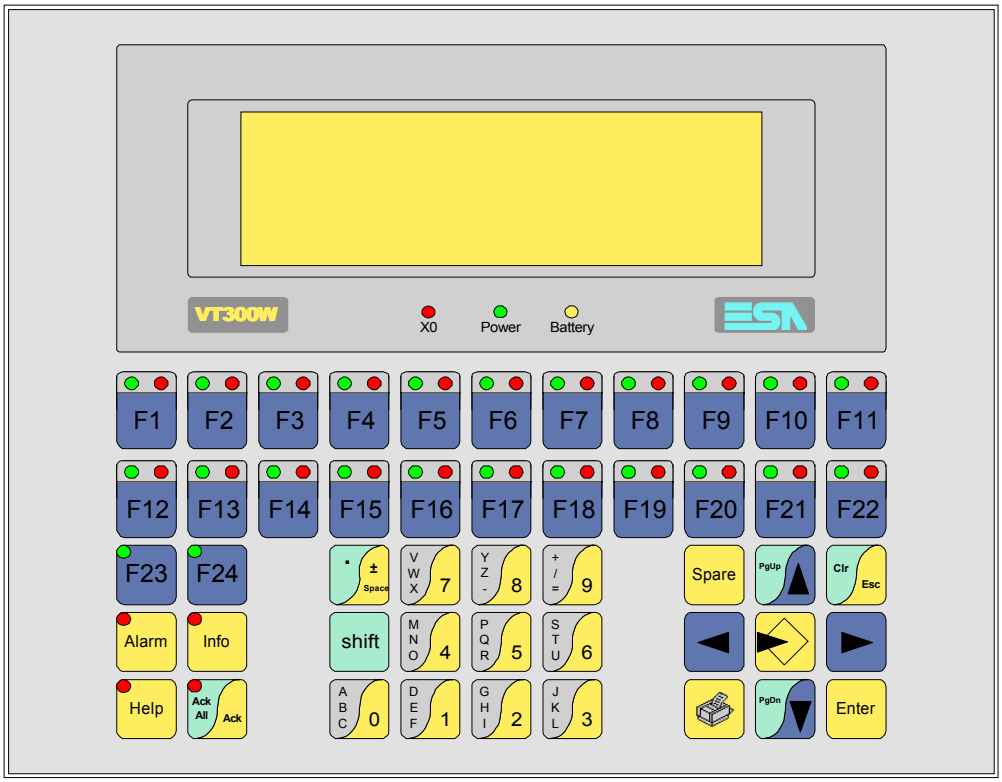
By pressing Clr Esc you pass back to the project page.

Adjusting the contrast on the display

To improve the quality of the representation on the display it may be necessary to adjust its contrast. This can be done by going to the page proposed (see Page 8-9) and changing the value (from +31 to -32) in evidence at that moment. Increase the value to darken the display; to lighten it decrease the value.

Chapter 9 Video terminal VT300W

This chapter consists of 20 pages.



Technical characteristics

The following table lists the principal technical characteristics of the product in question.

Code of terminal	Characteristics of the terminal			
VT300W A0000				
VT300W AP000				
VT300W 000CN				
Display		▼	▼	▼
Type	LCD monochromatic STN	●	●	●
	LCD 16 Colors STN			
	LCD 16 Colors TFT			
Representational format	Graphic	●	●	●
Resolution [pixels]	240 x 64	●	●	●
Rows by characters	8 x 40 / 4 x 20 / 2 x 10	●	●	●
Display area size [mm]	132 x 39	●	●	●
Character matrix in text mode [pixels]	6 x 8 / 12 x 16 / 24 x 32	●	●	●
Character size [mm] x 1 / x 2 / x 4	3,2 x 4,2 / 6,5 x 8,5 / 12,7 x 17	●	●	●
Contrast adjustment	Software	●	●	●
Character sets	Programmable fonts	●	●	●
Backlighting				
Type	LED	●	●	●
	CCFL lamp			
Standard lamp-life at 25°C [hours]	--			

Code of terminal	Characteristics of the terminal			
VT300W A0000				
VT300W AP000				
VT300W 000CN				
Keyboard		▼	▼	▼
Non-customizable function keys	2	●	●	●
Customizable function keys	22	●	●	●
Function key LEDs	46	●	●	●
Alphanumeric keys	11	●	●	●
Operational keys	14	●	●	●
Operational key LEDs	4	●	●	●
Diagnostic LEDs	3	●	●	●
User memory				
Project [Bytes]	192K + 384K (Text+ Graphics)	●	●	●
Data memory [Bytes]	128K (With back-up battery)	●	●	●
Memory Card for backup	4Mb	●	●	●
Memory Card for expansion	--			
Interfaces				
MSP (Multi-serial port)	RS232/RS422/RS485/TTY-20mA	●	●	●
ASP (Auxiliary serial port)	RS232/RS485		●	●
ASP-8 (Auxiliary serial port)	RS232			
ASP-9 (Auxiliary serial port)	RS232			
LPT parallel port	Centronics		●	
Auxiliary port	Connection for accessory devices	●	●	●
Accessories				
Connectable accessories	See table ”Chapter 18”	●	●	●
Clock				
Hardware clock	With back-up battery	●	●	●
Networks				
Integrated	Profibus-DP			
	CAN Open (Optoisolated interface)	●		
Optional	See table ”Chapter 18”	●	●	●
Proprietary networks				
ESA-Net	Network server	●	●	●
	Network client	●	●	●
Technical data				
Power supply	24Vdc (18..32Vdc)			
Power absorbed at 24Vdc	11W			
Protection fuse	Ø5x20mm - 800mA Quick Blow F			
Protection level	IP65 (front-end)			
Working temperature	0..50°C			
Storage and transportation temperature	-20..+60°C			
Humidity (non-condensing)	<90%			
Weight	1500gr			
Dimensions				
External L x H x D [mm]	252 x 196 x 60			
Cut-out L x H [mm]	232 x 178			
Certification				
Certifications and approvals	CE			

Functions

The following table lists in alphabetical order all the functions of the VT in question.

Table 9.1: Functions and objects realizable with this VT (Part 1 of 4)

Code of terminal			
VT300W *****			
VT300W ***CN			
Objects/Functions	**Quantity**	▼	▼
Alarm field		●	●
Alarm help	1024	●	●
Alarm history buffer	256	●	●
Alarm statistics			
Alarms (Total/active simultaneously)	1024/256	●	●
Arc		●	●
Backup/Restore		●	●
Bar data		●	●
Bit-group-structured dynamic bitmaps		●	●
Bit-wise password	8bits	●	●
Buttons			
Circles		●	●
Command: Change language		●	●
Command: Clear trend buffer		●	●
Command: Delete recipe		●	●
Command: Hardcopy		●	●
Command: Load recipe from data memory		●	●
Command: Modify password		●	●
Command: Next page			
Command: Page help		●	●
Command: Password login		●	●
Command: Password logout		●	●
Command: Previous page			
Command: Print alarm history		●	●
Command: Printer form feed		●	●
Command: Quit project		●	●
Command: Report		●	●
Command: Restarts reading time-sampled trend		●	●
Command: Run pipeline		●	●
Command: Save recipe in data memory		●	●
Command: Save recipe received from device in buffer		●	●
Command: Save recipe received from device in data memory		●	●
Command: Send recipe from video buffer to device		●	●
Command: Send recipe to device		●	●
Command: Service page		●	●
Command: Show alarms history		●	●

*) indicative value determined by the dimensions of the project, **) depends on memory available

Table 9.1: Functions and objects realizable with this VT (Part 2 of 4)

Code of terminal			
VT300W *****			
VT300W ***CN			
Objects/Functions	**Quantity**	▼	▼
Command: Show page directory			
Command: Show project information		●	●
Command: Show recipe directory		●	●
Command: Show sequence directory		●	●
Command: Shows driver status page			
Command: Shows page help			
Command: Shows page with function: PG			
Command: Stops reading time sampled trend		●	●
Command: Trend reading saved in device		●	●
Command: Zero number of general pages		●	●
Date field		●	●
Day-of-the-week field		●	●
Dynamic texts: Bit-group-structured dynamic texts	1024*	●	●
Dynamic texts: Single-bit dynamic texts		●	●
Dynamic texts: Value-structured dynamic texts		●	●
E-keys		●	●
F-keys		●	●
Free terminal			
Function: Disables key		●	●
Function: Go to page			
Function: Internal command		●	●
Function: Invert bit value		●	●
Function: Macro		●	●
Function: None		●	●
Function: Reset bit permanently		●	●
Function: Reset real-time bit		●	●
Function: Sequences		●	●
Function: Sets bit permanently		●	●
Function: Sets real-time bit		●	●
Function: Value-structure direct command		●	●
Global configuration of E-keys		●	●
Global configuration of F-keys		●	●
Info-messages (Total/active simultaneously)	1024/256	●	●
Labels		●	●
LEDs assigned to sequence		●	●
Lines		●	●
Lists of bitmap images		●	●
Lists of texts		●	●

*) indicative value determined by the dimensions of the project, **) depends on memory available

Table 9.1: Functions and objects realizable with this VT (Part 3 of 4)

Code of terminal			
VT300W ∗∗∗∗∗			
VT300W ∗∗∗CN			
Objects/Functions	**Quantity**	▼	▼
Local configuration of E-keys		●	●
Local configuration of F-keys		●	●
Macro field	16 x pages	●	
Message field		●	●
Message help	1024	●	●
Multilanguage texts	8 Langs.	●	●
Page	1024	●	●
Page help	1024	●	●
Password	10	●	●
Pipeline (Numero/Tot byte)	64/512	●	●
Print		●	●
Programmable fonts		●	●
Project images		●	●
Public variables of ESANET network (Number/Tolat bytes)	128/1024	●	●
Random sequences		●	●
Recipe field for recipe structure		●	●
Recipes (Number of variables per recipe)	1024/256	●	●
Rectangles		●	●
Redefinable characters			
Single-bit-structured dynamic bitmaps		●	●
Start/stop sequences		●	●
Static bitmaps		●	●
System messages		●	●
System variables assigned to recipe structure		●	●
Time long field		●	●
Time short field		●	●
Trends (Trends x page/Channels x trend)	2/2	●	●
Trends sampled automatically (Memory/Trends/Readings)	512byte /**/40	●	●
Trends sampled on command (Memory/Trends/Readings)		●	●
Value direct command: ADD		●	●
Value direct command: AND		●	●
Value direct command: OR		●	●
Value direct command: SET		●	●
Value direct command: SUBTRACT		●	●
Value direct command: XOR		●	●
Value-structured dynamic bitmaps		●	●

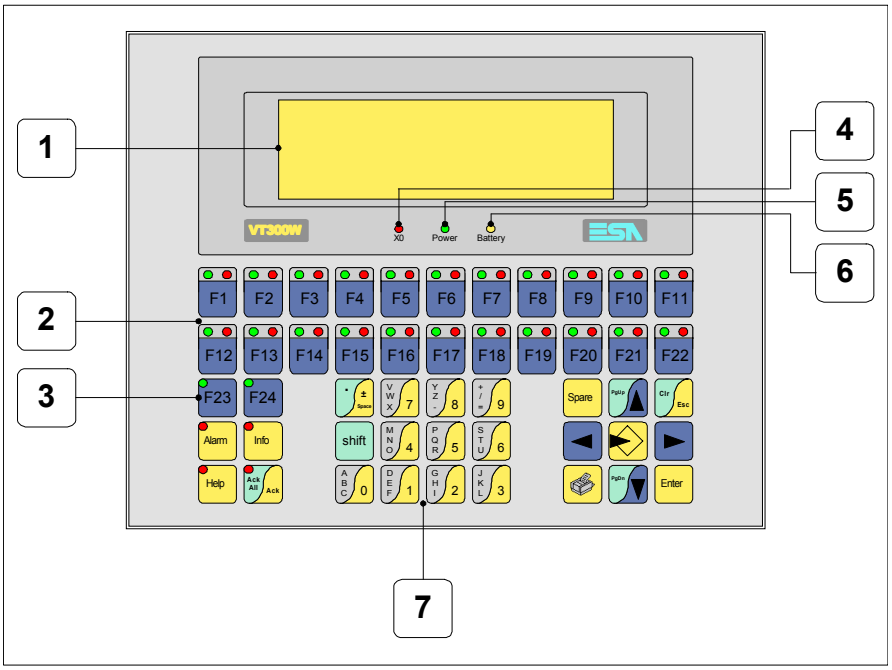
*) indicative value determined by the dimensions of the project, **) depends on memory available

Table 9.1: Functions and objects realizable with this VT (Part 4 of 4)

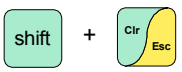
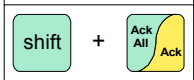
Code of terminal			
VT300W *****			
VT300W ***CN			
Objects/Functions	**Quantity**	▼	▼
Variables: Floating Point numerical variablest	32 x pages		●
Variables: Numerical variables (DEC, HEX, BIN, BCD)		●	●
Variables: String variables (ASCII)			●

*) indicative value determined by the dimensions of the project, **) depends on memory available

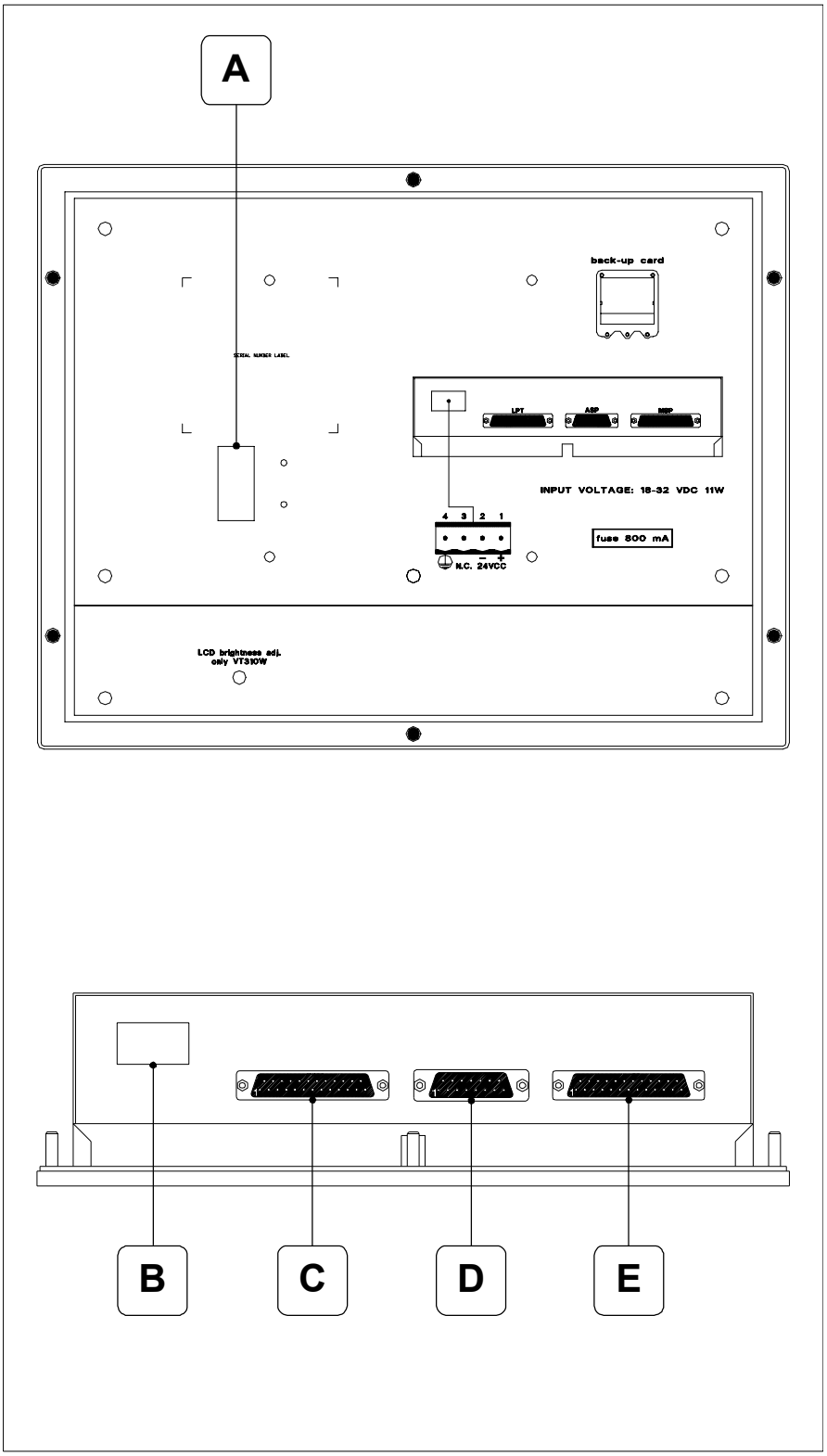
Front view



Key	Function
1	Display
2	F-keys with two LEDs
3	F-keys with one LED
4	X0 LED. Blinks when communication error is detected
5	Power LED. Lights up when power in ON
6	Battery LED. Lights up when the battery has nearly run out
7	Alphanumeric keys
	Starts input
	Confirms setting of data
	Page up When in setting phase, edits dynamic text

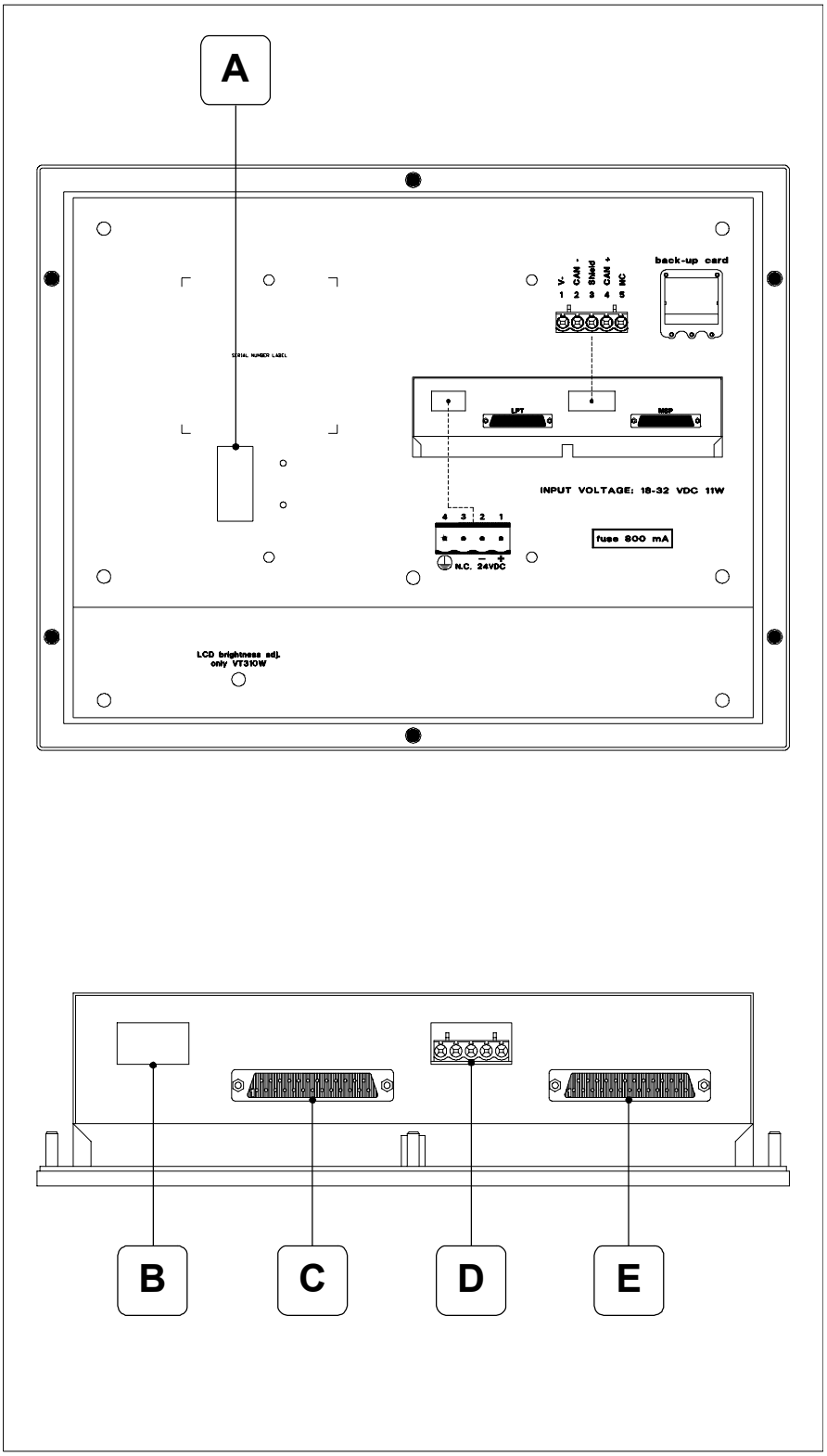
Key	Function
	Page down When in setting phase, edits dynamic text
	Moves the cursor between settable fields When in setting phase, moves cursor to the left of the field
	Moves the cursor between settable fields When in setting phase, moves cursor to the right of the field
	Quits: setting of data, info-messages, sequence directory, communication driver
	Displays info-messages
	Displays ISA alarms
	Displays according to context: information message help, alarm help or page help
	Acknowledgment of ISA alarms on display
	Print the entire display area
	No predefined function
	In setting phase restores the initial value of the field
	Acknowledges all ISA alarms

Standard series rear view



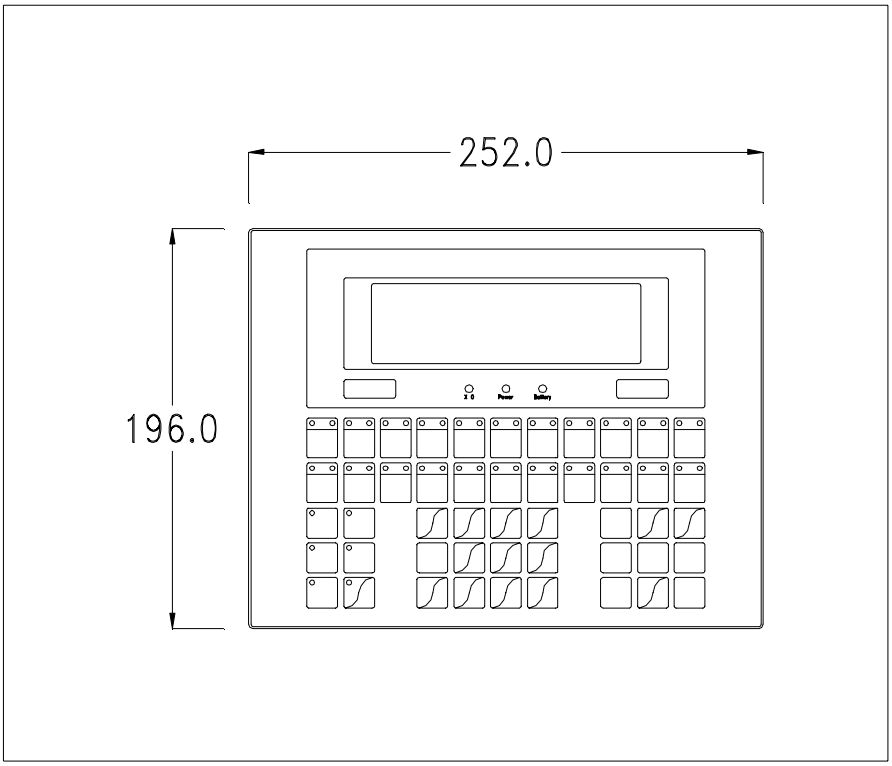
Position	Function
A	Auxiliary port for connecting optional accessories
B	Power supply connector
C	LPT port for connecting printer (Optional)
D	ASP serial port for communicating with PC or other devices
E	MSP serial port for communicating with PLC/PC

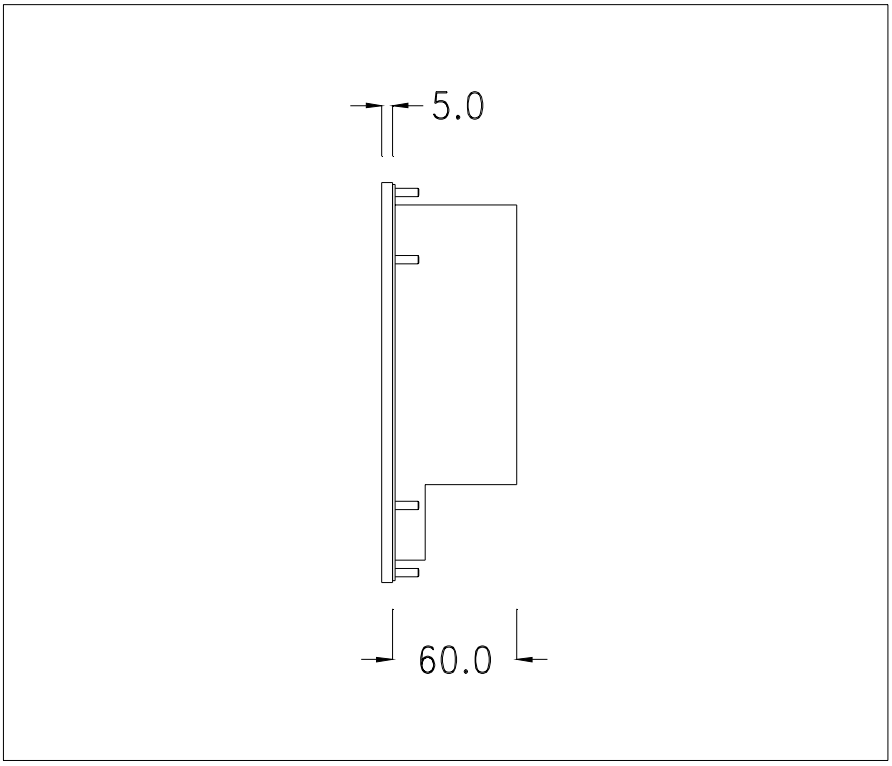
CAN series rear view

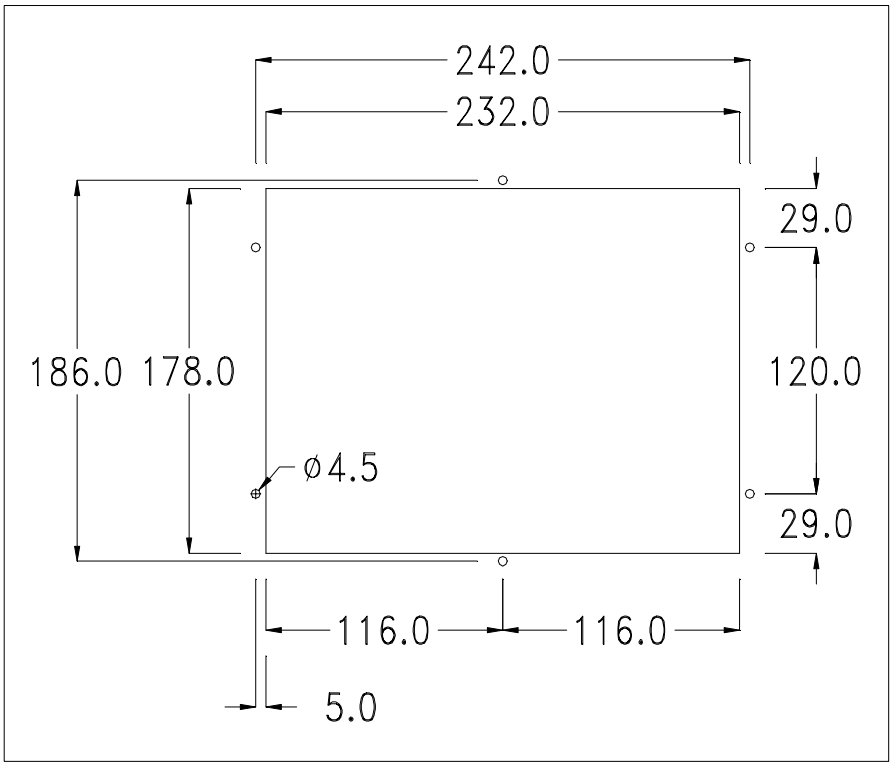


Position	Function
A	Auxiliary port for connecting optional accessories
B	Power supply connector
C	LPT port for connecting printer (Optional)
D	CAN serial port
E	MSP serial port for communicating with PLC/PC

Dimensions and Cut-out







To fix the sealing gasket and secure the VT to the container see “Chapter 16 -> Mounting the terminal within the container“.

Where accessories need to be fixed in or onto the VT terminal, you are advised to do this before securing the VT to its container.

Accessories

Any accessories should be mounted in accordance with the instructions in the relevant chapter (see “Chapter 18 -> Video terminal accessories“).

Transfer PC -> VT

For everything to function properly, the first time the VT operator terminal is switched on it needs to be correctly loaded, that is it needs to have transferred to it:

- Firmware
- Communication driver
- Project

(Given that the transfer of the three files in practice occurs with a single operation, it will be defined as “Project transfer” for the sake of simplicity.)

For this it is essential that the VT be prepared to receive the transfer.

Preparation for reception

The program VTWIN (see Software Manual) must be used for the transfer, but the terminal must be set up to receive. This means carrying out the following steps:

- Check that the VT is off
- Check that there is a serial connection between the PC and the VT
- Switch on the VT with Enter pressed down or with the VT on press together shift + Enter; in either case wait a moment until the following mask appears on the VT

```
VT300 TRANSFER PAGE

Graphic controller BOOT check : OK
Graphic controller RAM check : OK

F1=MSP  F2=ASP  F3=MemoCARD  ENTER=Prj
```

The function ▣ to press depends on which port you intend to use (MSP or ASP).

The VT is now ready to receive (refer to Software Manual for transfer procedure).

▣ F3=MemoCARD is only enabled when a Memory Card has been inserted in the VT terminal (see Page 9-18).

Information relating to driver

After the project has been transferred, the VT can make available information relating to what has been loaded. The information regards:

- Serial ports present
- The name of the driver loaded
- The version of the driver loaded
- Network address of the VT
- Last error to have occurred

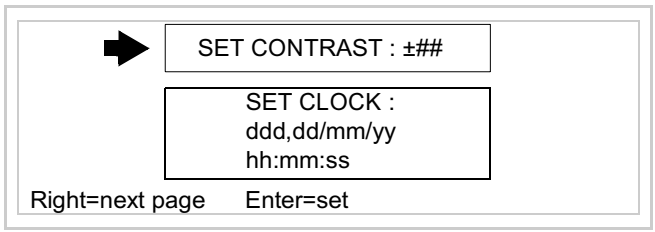
To acquire this information carry out the following operations:

- Be situated in any page of the project
- Press Shift twice; you will see

There is one of these pages for each communication port; you can move between the various pages by pressing  .

If you press 

while displaying this page you can access the page for setting the clock and the contrast.

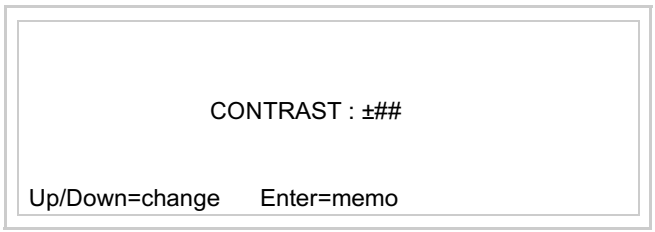


In order to access the contrast setting, use 

or 

to select the SET CONTRAST option that is displayed in reverse colors and press 

; the following mask will appear:



Use 

and/or 

to effect any variation and 

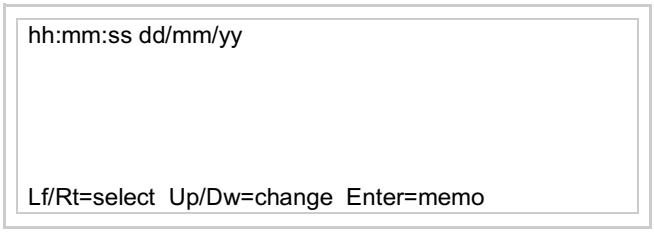
for the confirmation.

To be able to set the clock use 

or 

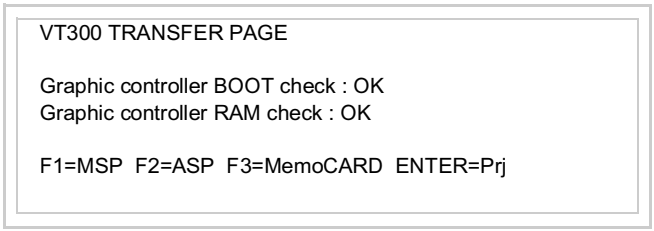
to select the SET CLOCK option that is displayed in reverse colors and press 

; the following mask will appear:

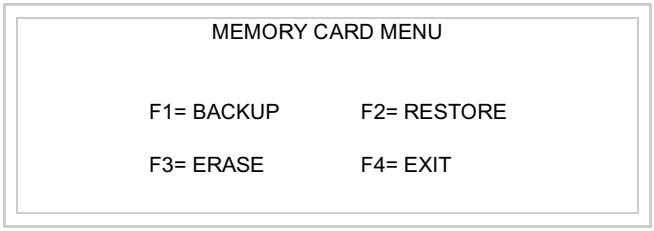


Use ◄ and/or ► to select the field and PgUp and/or PgDn to effect any variation; use Enter to confirm.

To use the Memory Card either switch on the VT with Enter held down or, if the VT is already on, press shift + Enter together; in both cases it will be necessary to wait a moment before the following mask appears on the VT:



Press ▣ F3=MemoCARD (if the key is not on screen, see Page 9-16) and the following mask will appear:



For the meaning and function of the keys see “Chapter 18 -> Memory card“.

Possible error messages are:

- PR ERR

  Problem-> Errors have been detected in the data exchange between the VT and the Device.
  Solution-> Check the cable; there may be disturbance.

- COM BROKEN

  Problem-> Communication between VT and Device interrupted.
  Solution-> Check the serial connection cable.

An error message followed by [*] indicates that the error is not currently present but was and has since disappeared.

Example: COM BROKEN*

When 

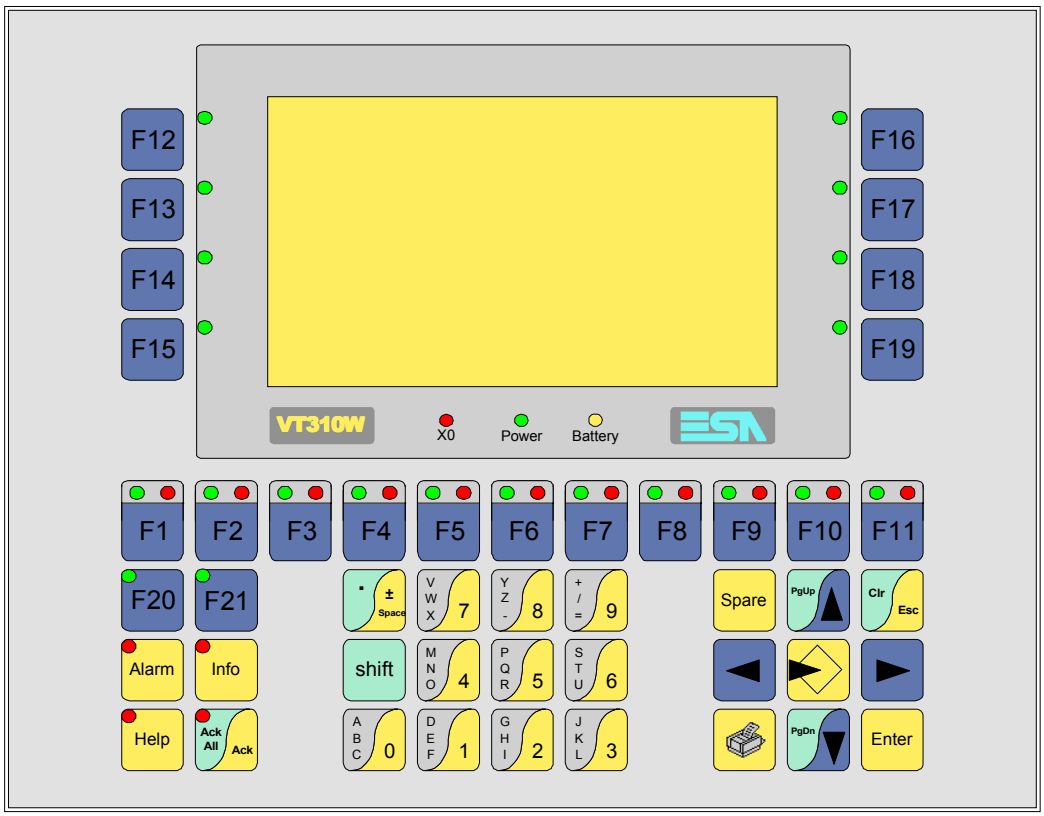
is pressed you quit the display of information regarding the driver.

Adjusting the contrast on the display

To improve the quality of the representation on the display it may be necessary to adjust its contrast. This can be done by going to the page proposed (see Page 9-17) and changing the value (from +31 to -32) in evidence at that moment. Increase the value to darken the display; to lighten it decrease the value.

Chapter 10 Video terminal VT310W

This chapter consists of 18 pages.



Technical characteristics

The following table lists the principal technical characteristics of the product in question.

Code of terminal	Characteristics of the terminal		
VT310W A0000			
VT310W AP000			
Display		▼	▼
Type	LCD monochromatic STN	●	●
	LCD 16 Colors STN		
	LCD 16 Colors TFT		
Representational format	Graphic	●	●
Resolution [pixels]	240 x 128	●	●
Rows by characters	16 x 40 / 8 x 20 / 4 x 10	●	●
Display area size [mm]	123 x 68 (5,5”)	●	●
Character matrix in text mode [pixels]	6 x 8 / 12 x 16 / 24 x 32	●	●
Character size [mm] x 1 / x 2 / x 4	3 x 4 / 6 x 8 / 12 x 16	●	●
Contrast adjustment	Software	●	●
Character sets	Programmable fonts	●	●
Backlighting			
Type	LED		
	CCFL lamp	●	●
Standard lamp-life at 25°C [hours]	10000	●	●

Code of terminal	Characteristics of the terminal		
VT310W A0000			
VT310W AP000			
Keyboard		▼	▼
Non-customizable function keys	10	●	●
Customizable function keys	11	●	●
Function key LEDs	32	●	●
Alphanumeric keys	11	●	●
Operational keys	14	●	●
Operational key LEDs	4	●	●
Diagnostic LEDs	3	●	●
User memory			
Project [Bytes]	192K + 384K (Text + Graphics)	●	●
Data memory [Bytes]	128K (With back-up battery)	●	●
Memory Card for backup	4Mb	●	●
Memory Card for expansion	--		
Interfaces			
MSP (Multi-serial port)	RS232/RS422/RS485/TTY-20mA	●	●
ASP (Auxiliary serial port)	RS232/RS485	●	●
ASP-8 (Auxiliary serial port)	RS232		
ASP-9 (Auxiliary serial port)	RS232		
LPT parallel port	Centronics	●	
Auxiliary port	Connection for accessories	●	●
Accessories			
Connectable accessories	See table ”Chapter 18”	●	●
Clock			
Hardware clock	With back-up battery	●	●
Networks			
Integrated	Profibus-DP		
	CAN Open (Optoisolated interface)		
Optional	See table ”Chapter 18”	●	●
Proprietary networks			
ESA-Net	Network server	●	●
	Network client	●	●
Technical data			
Power supply	24Vdc (18..32Vdc)		
Power absorbed at 24Vdc	11W		
Protection fuse	Ø5x20mm - 800mA Quick Blow F		
Protection level	IP65 (front-end)		
Working temperature	0..50°C		
Storage and transportation temperature	-20..+60°C		
Humidity (non-condensing)	<85%		
Weight	1500gr		
Dimensions			
External L x H x D [mm]	252 x 196 x 60		
Cut-out L x H [mm]	232 x 178		
Certification			
Certifications and approvals	CE		

Functions

The following table lists in alphabetical order all the functions of the VT in question.

Table 10.1: Functions and objects realizable with this VT (Part 1 of 3)

Code of terminal		
VT310W *****		
Objects/Functions	**Quantity**	▼
Alarm field		●
Alarm help	1024	●
Alarm history buffer	256	●
Alarm statistics		
Alarms (Total/active simultaneously)	1024/256	●
Arc		●
Backup/Restore		●
Bar data		●
Bit-group-structured dynamic bitmaps		●
Bit-wise password	8bits	●
Buttons		
Circles		●
Command: Change language		●
Command: Clear trend buffer		●
Command: Delete recipe		●
Command: Hardcopy		●
Command: Load recipe from data memory		●
Command: Modify password		●
Command: Next page		
Command: Page help		●
Command: Password login		●
Command: Password logout		●
Command: Previous page		
Command: Print alarm history		●
Command: Printer form feed		●
Command: Quit project		●
Command: Report		●
Command: Restarts reading time-sampled trend		●
Command: Run pipeline		●
Command: Save recipe in data memory		●
Command: Save recipe received from device in buffer		●
Command: Save recipe received from device in data memory		●
Command: Send recipe from video buffer to device		●
Command: Send recipe to device		●
Command: Service page		●
Command: Show alarms history		●
Command: Show page directory		

*) indicative value determined by the dimensions of the project, **) depends on memory available

Table 10.1: Functions and objects realizable with this VT (Part 2 of 3)

Code of terminal		
VT310W *****		
Objects/Functions	**Quantity**	▼
Command: Show project information		●
Command: Show recipe directory		●
Command: Show sequence directory		●
Command: Shows driver status page		
Command: Shows page help		
Command: Shows page with function: PG		
Command: Stops reading time sampled trend		●
Command: Trend reading saved in device		●
Command: Zero number of general pages		●
Date field		●
Day-of-the-week field		●
Dynamic texts: Bit-group-structured dynamic texts	1024*	●
Dynamic texts: Single-bit dynamic texts		●
Dynamic texts: Value-structured dynamic texts		●
E-keys		●
F-keys		●
Free terminal		
Function: Disables key		●
Function: Go to page		
Function: Internal command		●
Function: Invert bit value		●
Function: Macro		●
Function: None		●
Function: Reset bit permanently		●
Function: Reset real-time bit		●
Function: Sequences		●
Function: Sets bit permanently		●
Function: Sets real-time bit		●
Function: Value-structure direct command		●
Global configuration of E-keys		●
Global configuration of F-keys		●
Info-messages (Total/active simultaneously)	1024/256	●
Labels		●
LEDs assigned to sequence		●
Lines		●
Lists of bitmap images		●
Lists of texts		●
Local configuration of E-keys		●
Local configuration of F-keys		●

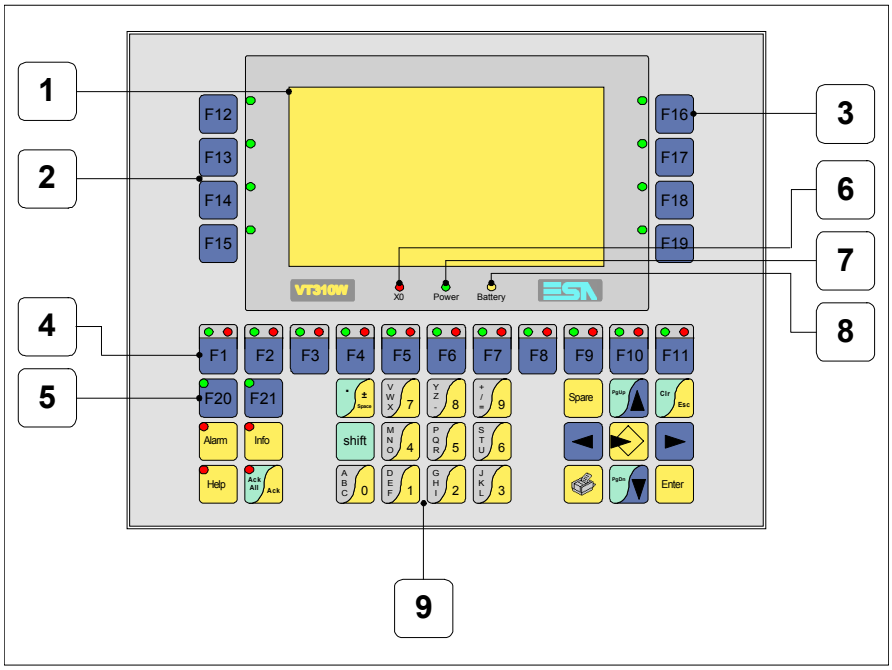
*) indicative value determined by the dimensions of the project, **) depends on memory available

Table 10.1: Functions and objects realizable with this VT (Part 3 of 3)

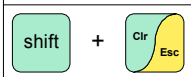
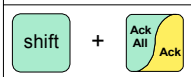
Code of terminal		
VT310W *****		
Objects/Functions	**Quantity**	▼
Macro field		
Message field		●
Message help	1024	●
Multilanguage texts	8 Langs.	●
Page	1024	●
Page help	1024	●
Password	10	●
Pipeline (Numero/Tot byte)	64/512	●
Print		●
Programmable fonts		●
Project images		●
Public variables of ESANET network (Number/Tolat bytes)	128/1024	●
Random sequences		●
Recipe field for recipe structure		●
Recipes (Number of variables per recipe)	1024/256	●
Rectangles		●
Redefinable characters		
Single-bit-structured dynamic bitmaps		●
Start/stop sequences		●
Static bitmaps		●
System messages		●
System variables assigned to recipe structure		●
Time long field		●
Time short field		●
Trends (Trends x page/Channels x trend)	4/4	●
Trends sampled automatically (Memory/Trends/Readings)	512byte /**/40	●
Trends sampled on command (Memory/Trends/Readings)		●
Value direct command: ADD		●
Value direct command: AND		●
Value direct command: OR		●
Value direct command: SET		●
Value direct command: SUBTRACT		●
Value direct command: XOR		●
Value-structured dynamic bitmaps		●
Variables: Floating Point numerical variablest	48 x pages	●
Variables: Numerical variables (DEC, HEX, BIN, BCD)		●
Variables: String variables (ASCII)		●

*) indicative value determined by the dimensions of the project, **) depends on memory available

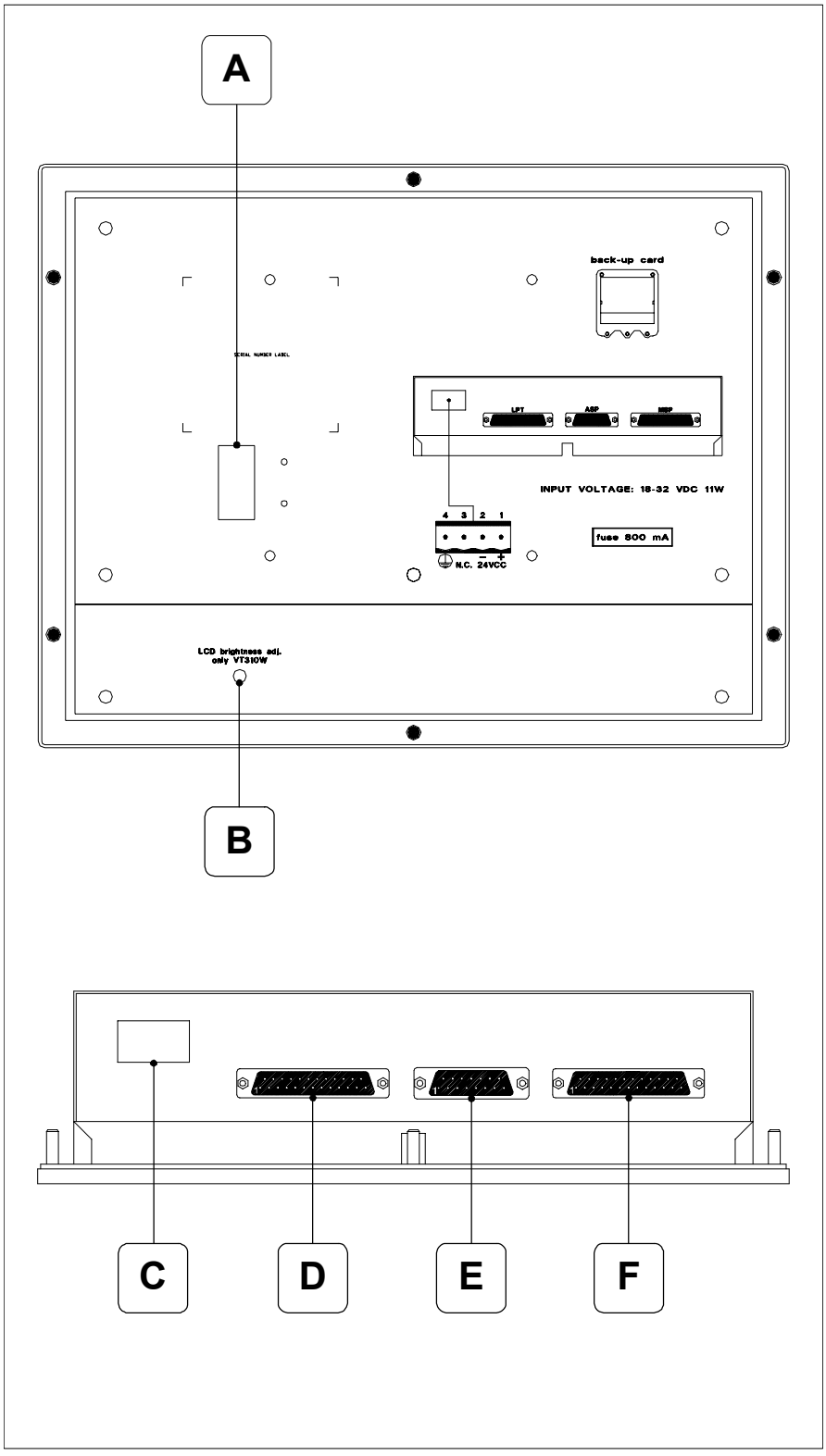
Front view



Key	Function
1	Display
2	F-keys with one LED
3	F-keys with one LED
4	F-keys with two LEDs
5	F-keys with one LED
6	X0 LED. Blinks when communication error is detected
7	Power LED. Lights up when power in ON
8	Battery LED. Lights up when the battery has nearly run out
9	Alphanumeric keys
	Starts input

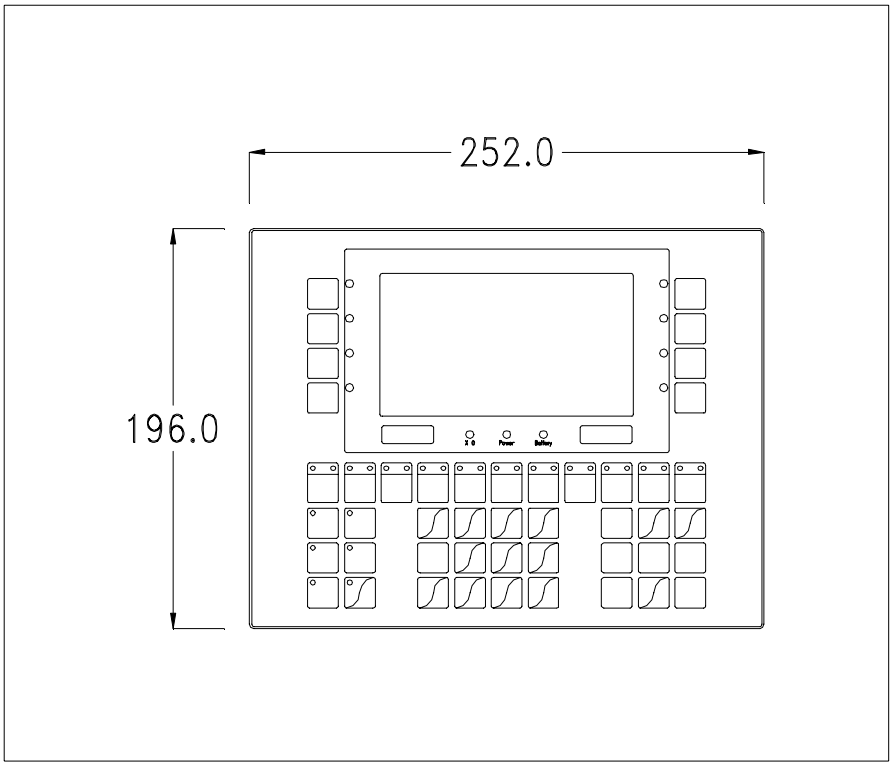
Key	Function
	Confirms setting of data
	Page up When in setting phase, edits dynamic text
	Page down When in setting phase, edits dynamic text
	Moves the cursor between settable fields When in setting phase, moves cursor to the left of the field
	Moves the cursor between settable fields When in setting phase, moves cursor to the right of the field
	Quits: setting of data, info-messages, sequence directory, communication driver
	Displays info-messages
	Displays ISA alarms
	Displays according to context: information message help, alarm help or page help
	Acknowledgment of ISA alarms on display
	Print the entire display area
	No predefined function
	In setting phase restores the initial value of the field
	Acknowledges all ISA alarms

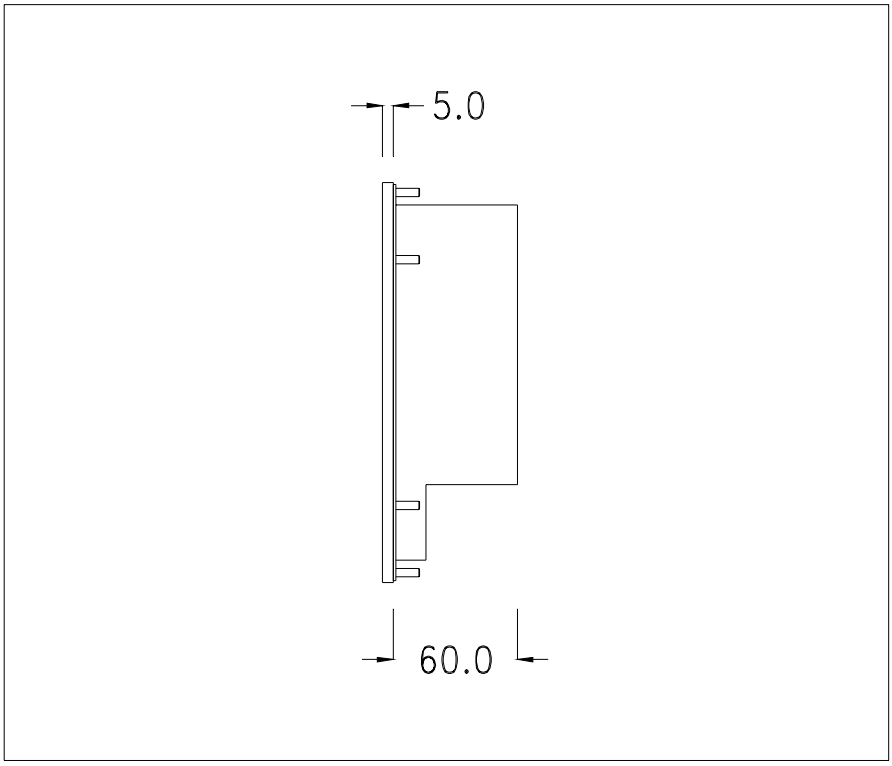
Rear view

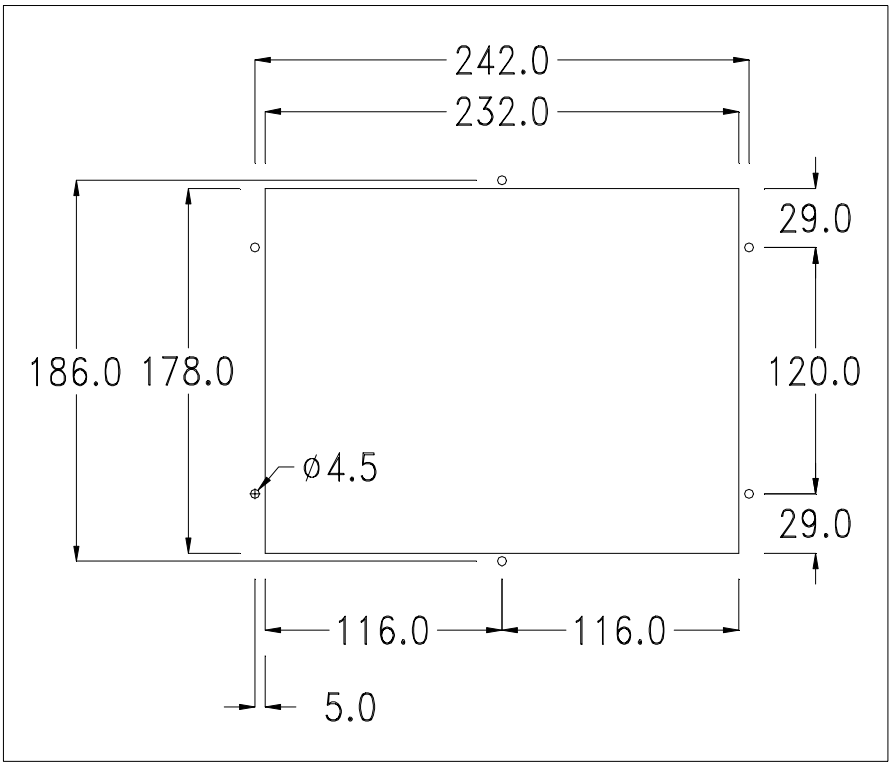

A
back-up card
SERIAL NUMBER LABEL
LPT
ASP
MSP
INPUT VOLTAGE: 18-32 VDC 11W
4 3 2 1
N.C. 24VCC
fuse 800 mA
LCD brightness adj.
only VT310W
B
C
D
E
F

Position	Function
A	Auxiliary port for connecting optional accessories
B	Trimmer for brightness control
C	Power supply connector
D	LPT port for connecting printer (Optional)
E	ASP serial port for communicating with PC or other devices
F	MSP serial port for communicating with PLC/PC

Dimensions and Cut-out







To fix the sealing gasket and secure the VT to the container see “Chapter 16 -> Mounting the terminal within the container“.

Where accessories need to be fixed in or onto the VT terminal, you are advised to do this before securing the VT to its container.

Accessories

Any accessories should be mounted in accordance with the instructions in the relevant chapter (see “Chapter 18 -> Video terminal accessories“).

Transfer PC -> VT

For everything to function properly, the first time the VT operator terminal is switched on it needs to be correctly loaded, that is it needs to have transferred to it:

- Firmware
- Communication driver
- Project

(Given that the transfer of the three files in practice occurs with a single operation, it will be defined as “Project transfer” for the sake of simplicity.)

For this it is essential that the VT be prepared to receive the transfer.

Preparation for reception

The program VTWIN (see Software Manual) must be used for the transfer, but the terminal must be set up to receive. This means carrying out the following steps:

- Check that the VT is off
- Check that there is a serial connection between the PC and the VT
- Switch on the VT with Enter pressed down or with the VT on press together shift + Enter; in either case wait a moment until the following mask appears on the VT

```
VT310 TRANSFER PAGE

Graphic controller BOOT check : OK
Graphic controller RAM check : OK

Graphic controller synchronization : OK

Main FIRMWARE check : NOT PRESENT
Graphic controller FIRMWARE : ERROR

F1=MSP   F2=ASP   F3=MemoCARD   ENTER=Prj
```

The function ▣ to press depends on which port you intend to use (MSP or ASP).

The VT is now ready to receive (refer to Software Manual for transfer procedure).

▣ F3=MemoCARD is only enabled when a Memory Card has been inserted in the VT terminal (see Page 10-15).

Information relating to driver

After the project has been transferred, the VT can make available information relating to what has been loaded. The information regards:

- Serial ports present
- The name of the driver loaded
- The version of the driver loaded
- Network address of the VT
- Last error to have occurred

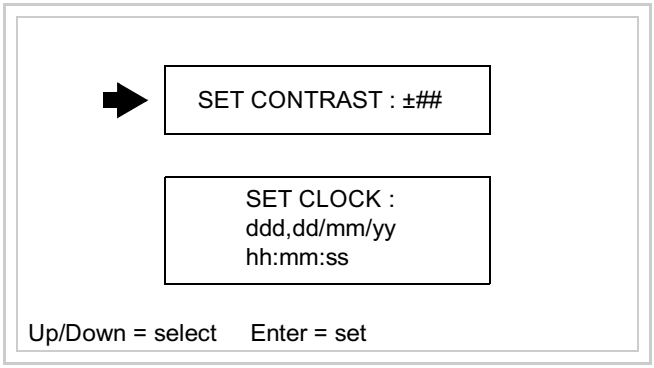
To acquire this information carry out the following operations:

- Be situated in any page of the project

• Press Shift twice; you will see

There is one of these pages for each communication port; you can move between the various pages by pressing ►.

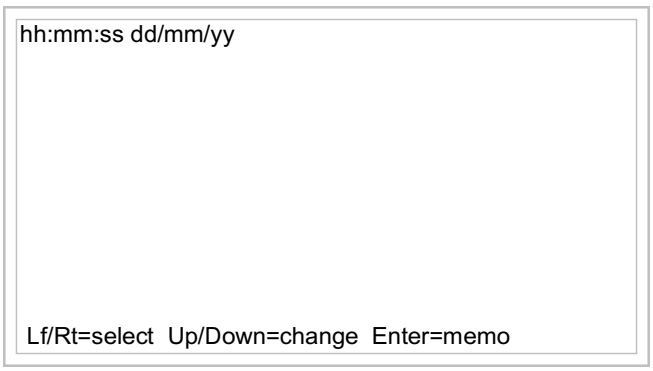
If you press Enter while displaying this page you can access the page for setting the clock and the contrast.



In order to access the contrast setting, use PgUp or PgDn to select the SET CONTRAST option that is displayed in reverse colors and press Enter; the following mask will appear:

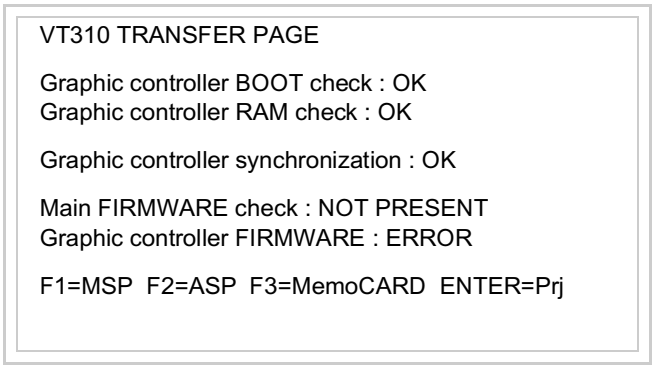
Use PgUp and/or PgDn to effect any variation and Enter for the confirmation.

To be able to set the clock use PgUp or PgDn to select the SET CLOCK option that is displayed in reverse colors and press Enter; the following mask will appear:

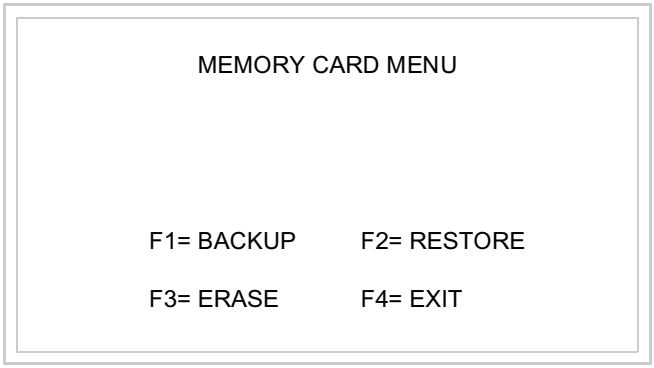


Use ◄ and/or ► to select the field and PgUp and/or PgDn to effect any variation; use Enter to confirm.

To use the Memory Card either switch on the VT with Enter held down or, if the VT is already on, press shift + Enter together; in both cases it will be necessary to wait a moment before the following mask appears on the VT:



Press ⧈ F3=MemoCARD (if the key is not on the screen, see Page 10-13) and the following mask will appear:



For the meaning and function of the keys see “Chapter 18 -> Memory card“.

Possible error messages are:

- PR ERR

  Problem-> Errors have been detected in the data exchange between the VT and the Device.
  Solution-> Check the cable; there may be disturbance.

- COM BROKEN

  Problem-> Communication between VT and Device interrupted.
  Solution-> Check the serial connection cable.

An error message followed by [*] indicates that the error is not currently present but was and has since disappeared.

Example: COM BROKEN*

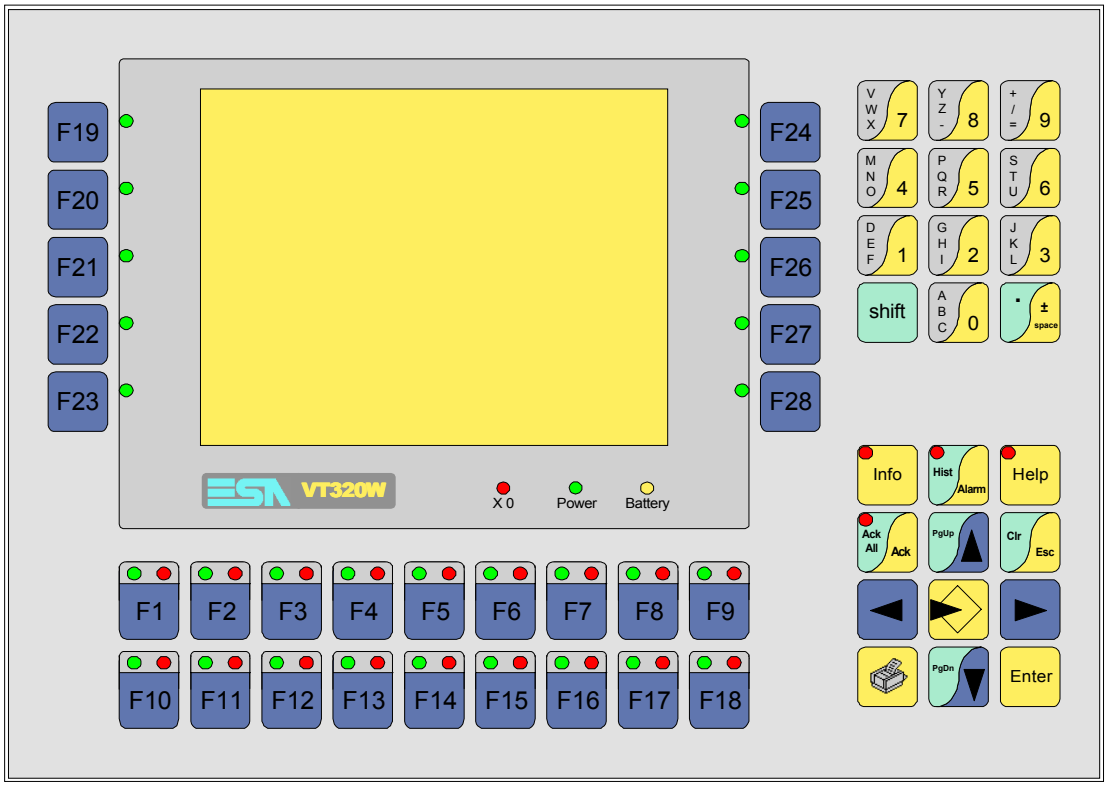
When Esc is pressed you quit the display of information regarding the driver.

Adjusting the contrast on the display

To improve the quality of the representation on the display it may be necessary to adjust its contrast. This can be done by going to the page proposed (see Page 10-14) and changing the value (from +31 to -32) in evidence at that moment. Increase the value to darken the display; to lighten it decrease the value.

Chapter 11 Video terminal VT320W

This chapter consists of 16 pages.



Technical characteristics

The following table lists the principal technical characteristics of the product in question.

Code of terminal	Characteristics of the terminal		
VT320W A0000			
VT320W AP000			
Display		▼	▼
Type	LCD monochromatic STN		
	LCD 16 Colors STN	●	●
	LCD 16 Colors TFT		
Representational format	Graphic	●	●
Resolution [pixels]	320 x 240	●	●
Rows by characters	16 x 40 / 8 x 20 / 4 x 10	●	●
Display area size [mm]	115,6 x 87 (5,7”)	●	●
Character matrix in text mode [pixels]	8 x15 / 16 x 30 / 32 x 60	●	●
Character size [mm] x 1 / x 2 / x 4	2,8 x 5,2 / 5,6 x 10,4 / 11,2 x 20,8	●	●
Contrast adjustment	Software	●	●
Character sets	Programmable fonts	●	●
Backlighting			
Type	LED		
	CCFL lamp	●	●
Standard lamp-life at 25°C [hours]	15000	●	●

Code of terminal	Characteristics of the terminal		
VT320W A0000			
VT320W AP000			
Keyboard		▼	▼
Non-customizable function keys	10	●	●
Customizable function keys	18	●	●
Function key LEDs	46	●	●
Alphanumeric keys	11	●	●
Operational keys	13	●	●
Operational key LEDs	4	●	●
Diagnostic LEDs	3	●	●
User memory			
Project [Bytes]	192K + 832K (Text+ Graphics)	●	●
Data memory [Bytes]	256K (With back-up battery)	●	●
Memory Card for backup	4Mb	●	●
Memory Card for expansion	--		
Interfaces			
MSP (Multi-serial port)	RS232/RS422/RS485/TTY-20mA	●	●
ASP (Auxiliary serial port)	RS232/RS485	●	●
ASP-8 (Auxiliary serial port)	RS232		
ASP-9 (Auxiliary serial port)	RS232		
LPT parallel port	Centronics	●	
Auxiliary port	Connection of accessories	●	●
Accessories			
Connectable accessories	See table ”Chapter 18”	●	●
Clock			
Hardware clock	With back-up battery	●	●
Networks			
Integrated	Profibus-DP		
	CAN Open (Optoisolated interface)		
Optional	See table ”Chapter 18”	●	●
Proprietary networks			
ESA-Net	Network server	●	●
	Network client	●	●
Technical data			
Power supply	24Vdc (18..32Vdc)		
Power absorbed at 24Vdc	15W		
Protection fuse	Ø5x20mm - 800mA Quick Blow F		
Protection level	IP65 (front-end)		
Working temperature	0..50°C		
Storage and transportation temperature	-20..+60°C		
Humidity (non-condensing)	<90%		
Weight	2000gr		
Dimensions			
External L x H x D [mm]	305 x 196 x 60		
Cut-out L x H [mm]	275 x 176		
Certification			
Certifications and approvals	CE		

Functions

The following table lists in alphabetical order all the functions of the VT in question.

Table 11.1: Functions and objects realizable with this VT (Part 1 of 3)

Code of terminal		
VT320W *****		
Objects/Functions	**Quantity**	▼
Alarm field		●
Alarm help	1024	●
Alarm history buffer	256	●
Alarm statistics		
Alarms (Total/active simultaneously)		●
Arc		●
Backup/Restore		●
Bar data		●
Bit-group-structured dynamic bitmaps		●
Bit-wise password	8bits	●
Buttons		
Circles		●
Command: Change language		●
Command: Clear trend buffer		●
Command: Delete recipe		●
Command: Hardcopy		●
Command: Load recipe from data memory		●
Command: Modify password		●
Command: Next page		
Command: Page help		●
Command: Password login		●
Command: Password logout		●
Command: Previous page		
Command: Print alarm history		●
Command: Printer form feed		●
Command: Quit project		●
Command: Report		●
Command: Restarts reading time-sampled trend		●
Command: Run pipeline		●
Command: Save recipe in data memory		●
Command: Save recipe received from device in buffer		●
Command: Save recipe received from device in data memory		●
Command: Send recipe from video buffer to device		●
Command: Send recipe to device		●
Command: Service page		●
Command: Show alarms history		●
Command: Show page directory		

*) indicative value determined by the dimensions of the project, **) depends on memory available

Table 11.1: Functions and objects realizable with this VT (Part 2 of 3)

Code of terminal		
VT320W *****		
Objects/Functions	**Quantity**	▼
Command: Show project information		●
Command: Show recipe directory		●
Command: Show sequence directory		●
Command: Shows driver status page		
Command: Shows page help		
Command: Shows page with function: PG		
Command: Stops reading time sampled trend		●
Command: Trend reading saved in device		●
Command: Zero number of general pages		●
Date field		●
Day-of-the-week field		●
Dynamic texts: Bit-group-structured dynamic texts	1024*	●
Dynamic texts: Single-bit dynamic texts		●
Dynamic texts: Value-structured dynamic texts		●
E-keys		●
F-keys		●
Free terminal		
Function: Disables key		●
Function: Go to page		
Function: Internal command		●
Function: Invert bit value		●
Function: Macro		●
Function: None		●
Function: Reset bit permanently		●
Function: Reset real-time bit		●
Function: Sequences		●
Function: Sets bit permanently		●
Function: Sets real-time bit		●
Function: Value-structure direct command		●
Global configuration of E-keys		●
Global configuration of F-keys		●
Info-messages (Total/active simultaneously)	1024/256	●
Labels		●
LEDs assigned to sequence		●
Lines		●
Lists of bitmap images		●
Lists of texts		●
Local configuration of E-keys		●
Local configuration of F-keys		●

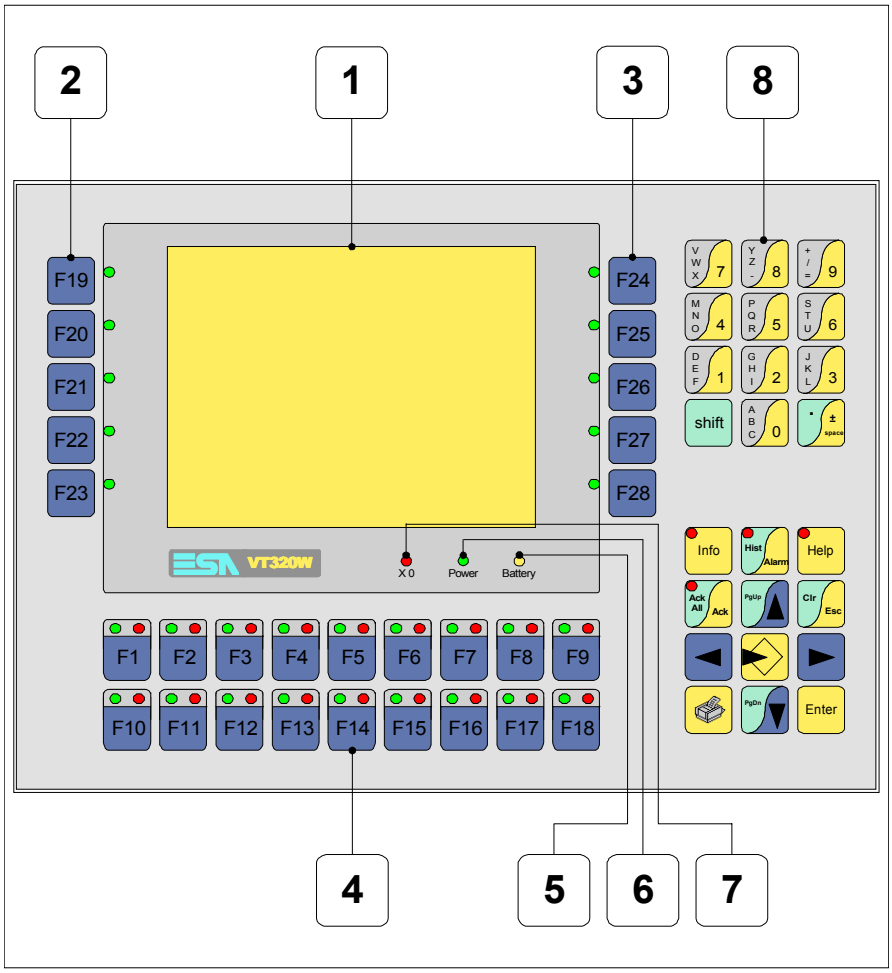
*) indicative value determined by the dimensions of the project, **) depends on memory available

Table 11.1: Functions and objects realizable with this VT (Part 3 of 3)

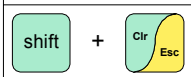
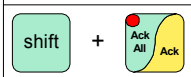
Code of terminal		
VT320W *****		
Objects/Functions	**Quantity**	▼
Macro field		
Message field		●
Message help	1024	●
Multilanguage texts	8 Langs.	●
Page	1024	●
Page help	1024	●
Password	10	●
Pipeline (Numero/Tot byte)	64/512	●
Print		●
Programmable fonts		●
Project images		●
Public variables of ESANET network (Number/Tolat bytes)	128/1024	●
Random sequences		●
Recipe field for recipe structure		●
Recipes (Number of variables per recipe)	2048/512	●
Rectangles		●
Redefinable characters		
Single-bit-structured dynamic bitmaps		●
Start/stop sequences		●
Static bitmaps		●
System messages		●
System variables assigned to recipe structure		●
Time long field		●
Time short field		●
Trends (Trends x page/Channels x trend)	4/4	●
Trends sampled automatically (Memory/Trends/Readings)	2048byte /**/320	●
Trends sampled on command (Memory/Trends/Readings)		●
Value direct command: ADD		●
Value direct command: AND		●
Value direct command: OR		●
Value direct command: SET		●
Value direct command: SUBTRACT		●
Value direct command: XOR		●
Value-structured dynamic bitmaps		●
Variables: Floating Point numerical variablest	64 x pages	●
Variables: Numerical variables (DEC, HEX, BIN, BCD)		●
Variables: String variables (ASCII)		●

*) indicative value determined by the dimensions of the project, **) depends on memory available

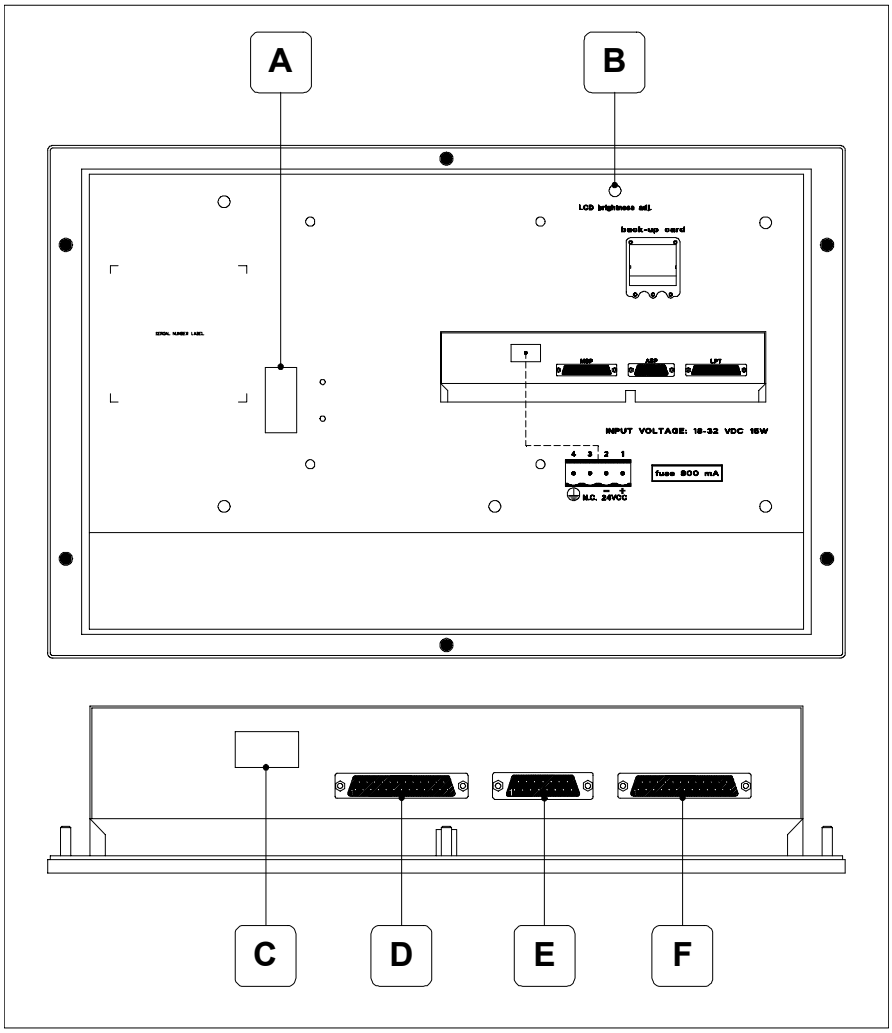
Front view



Key	Function
1	Display
2	F-keys with one LED
3	F-keys with one LED
4	F-keys with two LEDs
5	X0 LED. Blinks when communication error is detected
6	Power LED. Lights up when power in ON
7	Battery LED. Lights up when the battery has nearly run out

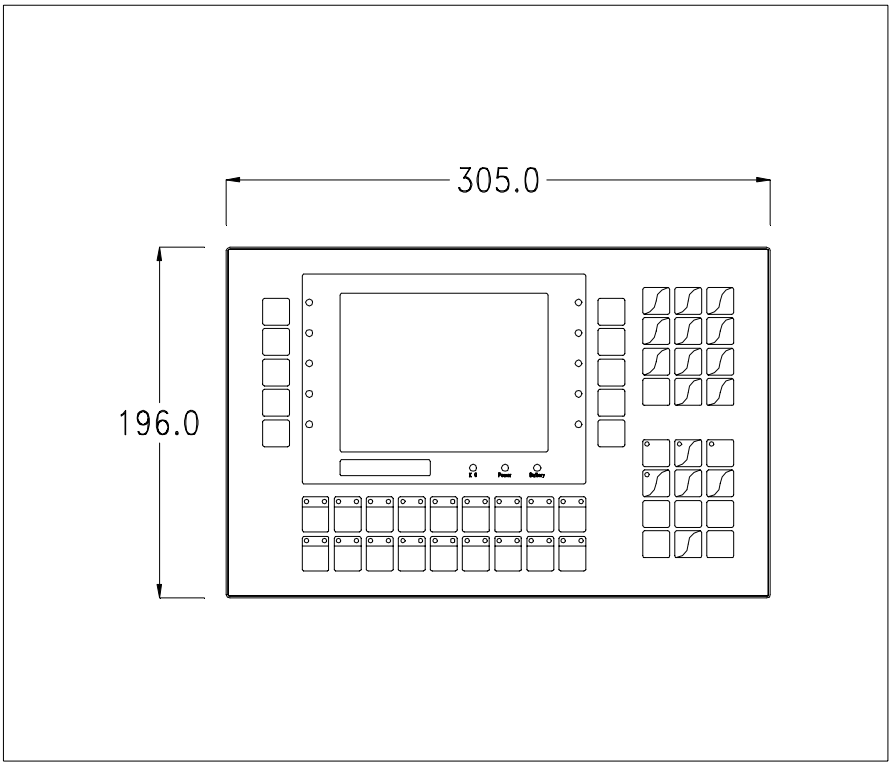
Key	Function
8	Alphanumeric keys
	Starts input
	Confirms setting of data
	Page up When in setting phase, edits dynamic text
	Page down When in setting phase, edits dynamic text
	Moves the cursor between settable fields When in setting phase, moves cursor to the left of the field
	Moves the cursor between settable fields When in setting phase, moves cursor to the right of the field
	Quits: setting of data, info-messages, sequence directory, communication driver
	Displays info-messages
	Displays ISA alarms
	Displays according to context: information message help, alarm help or page help
	Acknowledgment of ISA alarms on display
	Print the entire display area
	No predefined function
	In setting phase restores the initial value of the field
	Acknowledges all ISA alarms

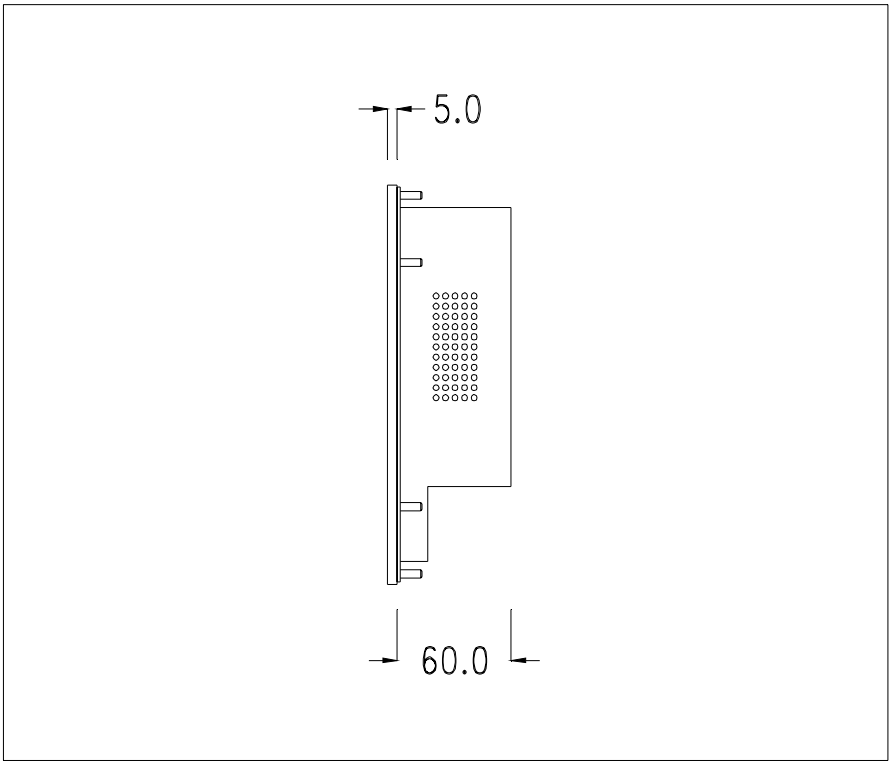
Rear view

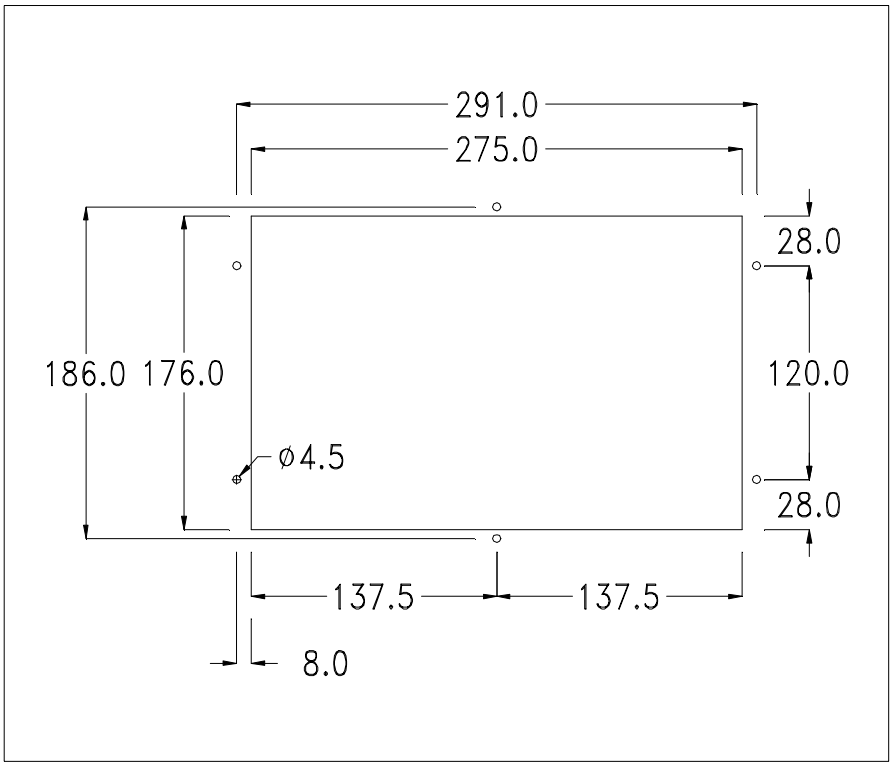


Position	Function
A	Auxiliary port for connecting optional accessories
B	Trimmer for brightness control
C	Power supply connector
D	MSP serial port for communicating with PLC/PC
E	ASP serial port for communicating with PC or other devices
F	LPT port for connecting printer (Optional)

Dimensions and Cut-out







To fix the sealing gasket and secure the VT to the container see “Chapter 16 -> Mounting the terminal within the container“.

Where accessories need to be fixed in or onto the VT terminal, you are advised to do this before securing the VT to its container.

Accessories

Any accessories should be mounted in accordance with the instructions in the relevant chapter (see “Chapter 18 -> Video terminal accessories“).

Transfer PC -> VT

For everything to function properly, the first time the VT operator terminal is switched on it needs to be correctly loaded, that is it needs to have transferred to it:

- Firmware
- Communication driver
- Project

(Given that the transfer of the three files in practice occurs with a single operation, it will be defined as “Project transfer” for the sake of simplicity.)

For this it is essential that the VT be prepared to receive the transfer.

Preparation for reception

The program VTWIN (see Software Manual) must be used for the transfer, but the terminal must be set up to receive. This means carrying out the following steps:

- Check that the VT is off
- Check that there is a serial connection between the PC and the VT
- Switch on the VTSwitch on the VT; when the message [WAIT FOR BOOT FORCED] is displayed, press Enter or with the VT on press together shift + Enter; in either case wait a moment until the following mask appears on the VT

```
VT320 TRANSFER PAGE


Graphic controller BOOT check : OK
Graphic controller RAM check : OK

Graphic controller synchronization : OK

Main FIRMWARE check : NOT PRESENT
Graphic controller FIRMWARE : ERROR

F1=MSP  F2=ASP  F3=MemoCARD  ENTER=Prj
```

The function ▣ to press depends on which port you intend to use (MSP or ASP).

The VT is now ready to receive (refer to Software Manual for transfer procedure).

▣ F3=MemoCARD is only enabled when a Memory Card has been inserted in the VT terminal (see Page 11-15).

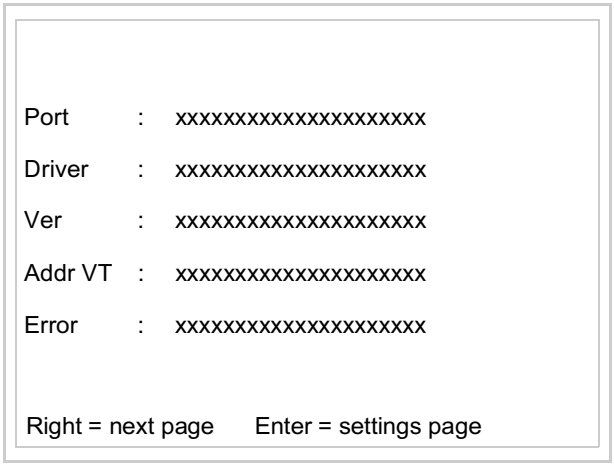
Information relating to driver

After the project has been transferred, the VT can make available information relating to what has been loaded. The information regards:

- Serial ports present
- The name of the driver loaded
- The version of the driver loaded
- Network address of the VT
- Last error to have occurred

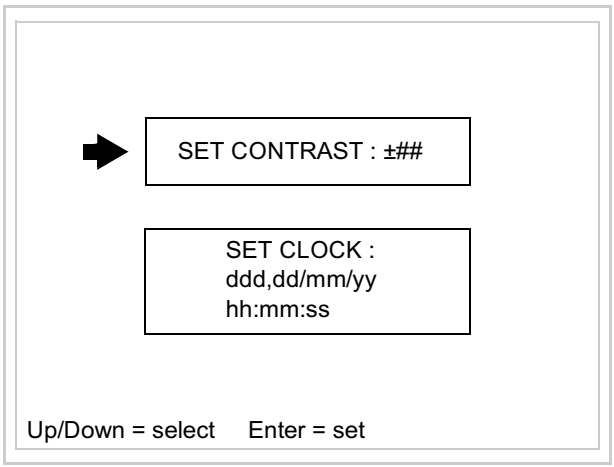
To acquire this information carry out the following operations:

- Be situated in any page of the project
- Press Shift twice; you will see



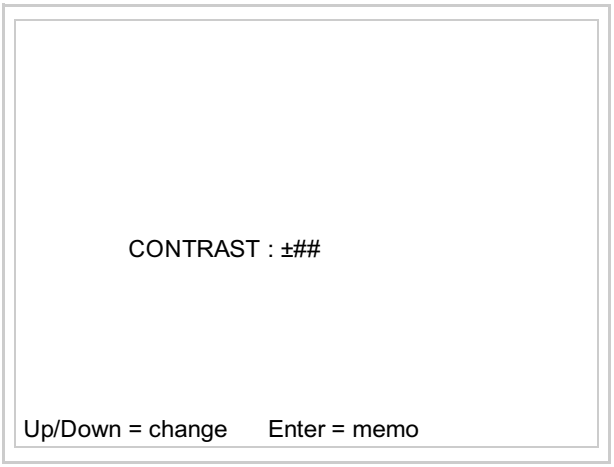
There is one of these pages for each communication port; you can move between the various pages by pressing ►.

If you press Enter while displaying this page you can access the page for setting the clock and the contrast.



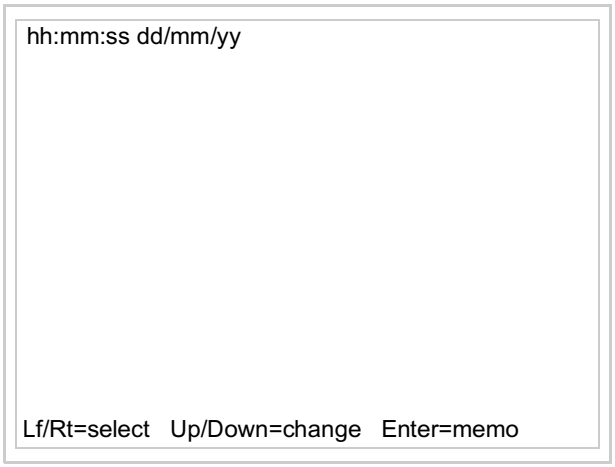
In order to access the contrast setting, use PgUp or PgDn to select the SET

CONTRAST option that is displayed in reverse colors and press Enter; the following mask will appear:



Use PgUp and/or PgDn to effect any variation and Enter for the confirmation.

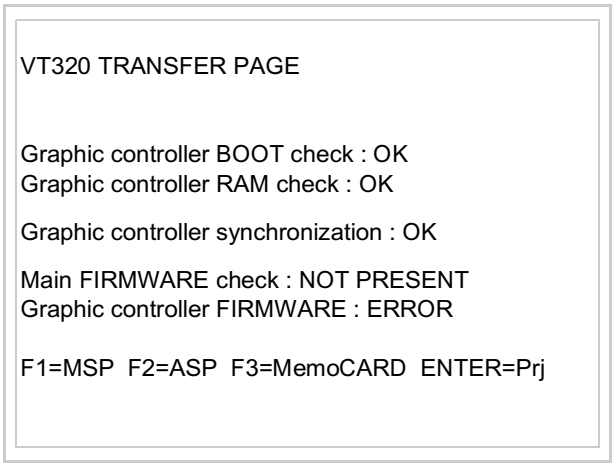
To be able to set the clock use PgUp or PgDn to select the SET CLOCK option that is displayed in reverse colors and press Enter; the following mask will appear:



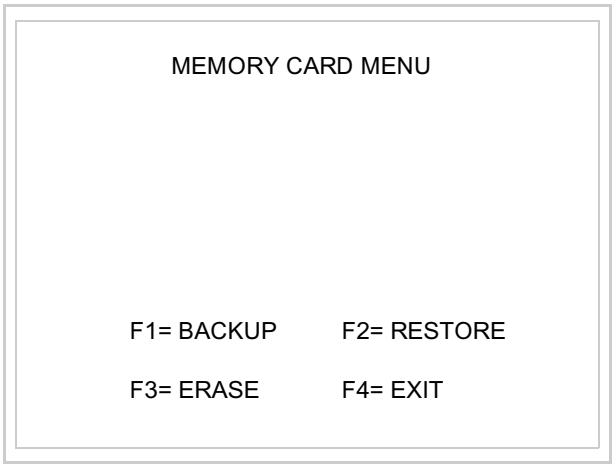
Use ◄ and/or ► to select the field and PgUp and/or PgDn to effect any

variation; use Enter to confirm.

To use the Memory Card either switch on the VT with Enter held down or, if the VT is already on, press shift + Enter together; in both cases it will be necessary to wait a moment before the following mask appears on the VT:



Press ▣ F3=MemoCARD (if the key is not on screen, see Page 11-12); and the following mask will appear:



For the meaning and function of the keys see “Chapter 18 -> Memory card“.

Possible error messages are:

• PR ERR

Problem-> Errors have been detected in the data exchange between the VT and the Device.
Solution-> Check the cable; there may be disturbance.

• COM BROKEN

Problem-> Communication between VT and Device interrupted.
Solution-> Check the serial connection cable.

An error message followed by [*] indicates that the error is not currently present but was and has since disappeared.

Example: COM BROKEN*

When 

is pressed you quit the display of information regarding the driver.

Improving display color quality

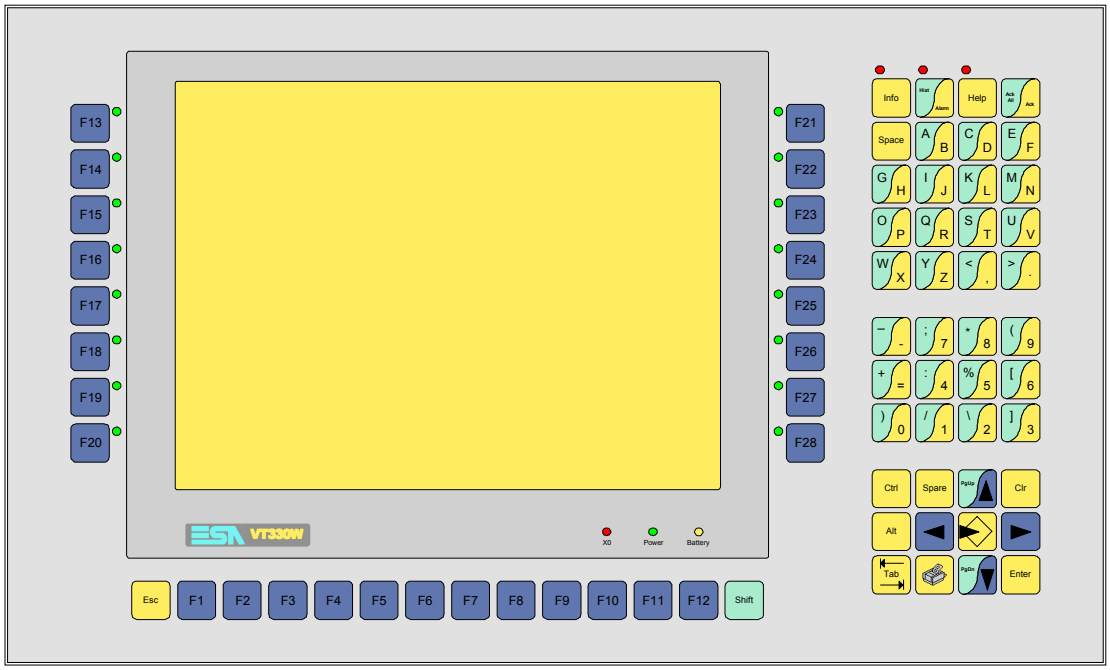
To improve the color quality, adjust the contrast of the display: if the colors are too dark increase the contrast; if, on the other hand, the colors are too light, decrease the contrast.

Adjusting the contrast on the display

To improve the quality of the representation on the display it may be necessary to adjust its contrast. This can be done by going to the page proposed (see Page 11-13) and changing the value (from +63 to -64) in evidence at that moment. Increase the value to darken the display; to lighten it decrease the value.

Chapter 12 Video terminal VT330W

This chapter consists of a total of 18 pages.



Technical characteristics The following table lists the principal technical characteristics of the product in question.

Code of terminal	Characteristics of the terminal			
VT330W APM00				
VT330W APS00				
VT330W APT00				
Display		▼	▼	▼
Type	LCD Monochromatic STN			●
	LCD 256 Colors STN		●	
	LCD 256 Colors TFT	●		
Representational format	Graphic	●	●	●
Resolution [pixels]	640 x 480	●	●	●
Rows by characters	30 x 80 / 15 x 40 / 7 x 20	●	●	●
Display area size [mm]	196 x 148 (10,4”)			●
	211,2 x 158 (10,4”)		●	
	211,2 x 158,4 (10,4”)	●		
Character matrix in text mode [pixels]	8 x16 / 16 x 32 / 32 x 64	●	●	●
Character size [mm] x 1 / x 2 / x 4	2,7 x 5,4 / 5,4 x 10,7 / 10,7 x 21,4	●	●	●
Contrast adjustment	Software	●	●	●
Character sets	Programmable fonts	●	●	●
Backlighting				
Type	Led			
	Lamp CCFL	●	●	●
Standard lamp-life at 25°C [hours]	15000	●	●	●

Code of terminal	Characteristics of the terminal			
VT330W APM00				
VT330W APS00				
VT330W APT00				
Keyboard		▼	▼	▼
Non-customizable function keys	12	●	●	●
Customizable function keys	16	●	●	●
Function key LEDs	16	●	●	●
Alphanumeric keys	27	●	●	●
Operational keys	19	●	●	●
Operational key LEDs	3	●	●	●
Diagnostic LEDs	3	●	●	●
User memory				
Project [Bytes]	640K + 1792K (Text + Graphics)	●	●	●
Data memory [Bytes]	128K (With back-up battery)	●	●	●
Memory Card for backup	8Mb	●	●	●
Memory Card for expansion	4Mb (Only for Graphics)	●	●	●
Interfaces				
MSP (Multi-serial port)	RS232/RS422/RS485/TTY-20mA	●	●	●
ASP (Auxiliary serial port)	RS232/RS485	●	●	●
ASP-8 (Auxiliary serial port)	RS232			
ASP-9 (Auxiliary serial port)	RS232			
LPT parallel port	Centronics	●	●	●
Auxiliary port	Connection of accessories	●	●	●
Accessories				
Connectable accessories	See table ”Chapter 18”	●	●	●
Clock				
Hardware clock	With back-up battery	●	●	●
Networks				
Integrated	Profibus-DP			
	CAN Open (Optoisolated interface)			
Optional	See table ”Chapter 18”	●	●	●
Proprietary networks				
ESA-Net	Network server	●	●	●
	Network client	●	●	●
Technical data				
Power supply	24Vdc (18..32Vdc)			
Power absorbed at 24Vdc	15W			
Protection fuse	Ø5x20mm - 1,25A Quick Blow F			
Protection level	IP65 (front-end)			
Working temperature	0..45°C			
Storage and transportation temperature	-20..+60°C			
Humidity (non-condensing)	<90%			
Weight	4000gr			
Dimensions				
External L x H x D [mm]	435 x 260 x 74			
Cut-out L x H [mm]	403 x 240			
Certification				
Certifications and approvals	CE			

Functions

The following table lists in alphabetical order all the functions of the VT in question.

Table 12.1: Functions and objects realizable with this VT (Part 1 of 3)

Code of terminal		
VT330W *****		
Objects/Functions	**Quantity**	▼
Alarm field		●
Alarm help	1024	●
Alarm history buffer	256	●
Alarm statistics		
Alarms (Total/active simultaneously)	1024/256	●
Arc		●
Backup/Restore		●
Bar data		●
Bit-group-structured dynamic bitmaps		●
Bit-wise password	8bits	●
Buttons		
Circles		●
Command: Change language		●
Command: Clear trend buffer		●
Command: Delete recipe		●
Command: Hardcopy		●
Command: Load recipe from data memory		●
Command: Modify password		●
Command: Next page		
Command: Page help		●
Command: Password login		●
Command: Password logout		●
Command: Previous page		
Command: Print alarm history		●
Command: Printer form feed		●
Command: Quit project		●
Command: Report		●
Command: Restarts reading time-sampled trend		●
Command: Run pipeline		●
Command: Save recipe in data memory		●
Command: Save recipe received from device in buffer		●
Command: Save recipe received from device in data memory		●
Command: Send recipe from video buffer to device		●
Command: Send recipe to device		●
Command: Service page		●
Command: Show alarms history		●
Command: Show page directory		

*) indicative value determined by the dimensions of the project, **) depends on memory available

Table 12.1: Functions and objects realizable with this VT (Part 2 of 3)

Code of terminal		
VT330W *****		
Objects/Functions	**Quantity**	▼
Command: Show project information		●
Command: Show recipe directory		●
Command: Show sequence directory		●
Command: Shows driver status page		
Command: Shows page help		
Command: Shows page with function: PG		
Command: Stops reading time sampled trend		●
Command: Trend reading saved in device		●
Command: Zero number of general pages		●
Date field		●
Day-of-the-week field		●
Dynamic texts: Bit-group-structured dynamic texts	1024*	●
Dynamic texts: Single-bit dynamic texts		●
Dynamic texts: Value-structured dynamic texts		●
E-keys		●
F-keys		●
Free terminal		
Function: Disables key		●
Function: Go to page		
Function: Internal command		●
Function: Invert bit value		●
Function: Macro		●
Function: None		●
Function: Reset bit permanently		●
Function: Reset real-time bit		●
Function: Sequences		●
Function: Sets bit permanently		●
Function: Sets real-time bit		●
Function: Value-structure direct command		●
Global configuration of E-keys		●
Global configuration of F-keys		●
Info-messages (Total/active simultaneously)	1024/256	●
Labels		●
LEDs assigned to sequence		●
Lines		●
Lists of bitmap images		●
Lists of texts		●
Local configuration of E-keys		●
Local configuration of F-keys		●

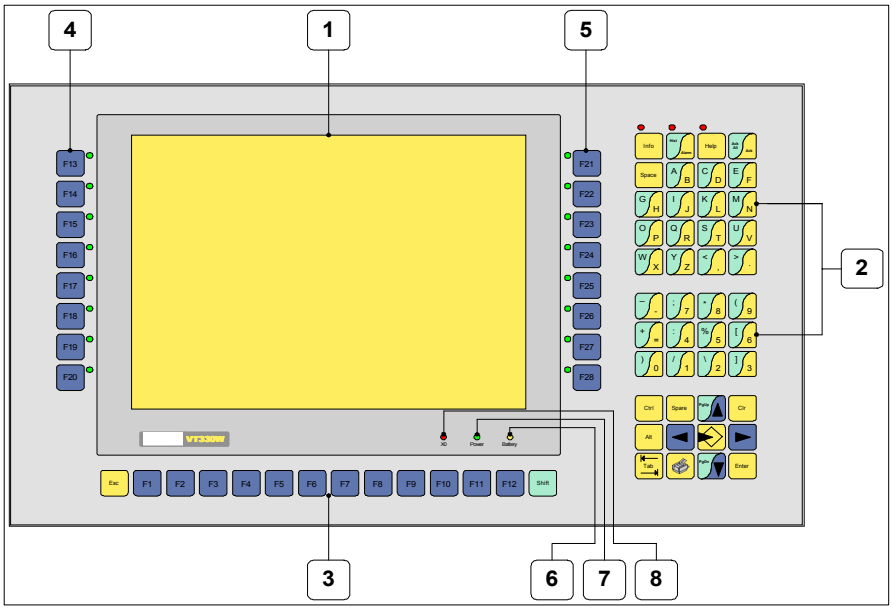
*) indicative value determined by the dimensions of the project, **) depends on memory available

Table 12.1: Functions and objects realizable with this VT (Part 3 of 3)

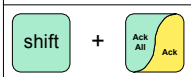
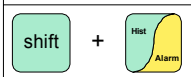
Code of terminal		
VT330W *****		
Objects/Functions	**Quantity**	▼
Macro field		
Message field		●
Message help	1024	●
Multilanguage texts	8 Langs.	●
Page	1024	●
Page help	1024	●
Password	10	●
Pipeline (Numero/Tot byte)	64/512	●
Print		●
Programmable fonts		●
Project images		●
Public variables of ESANET network (Number/Tolat bytes)	128/1024	●
Random sequences		●
Recipe field for recipe structure		●
Recipes (Number of variables per recipe)	1024/512	●
Rectangles		●
Redefinable characters		
Single-bit-structured dynamic bitmaps		●
Start/stop sequences		●
Static bitmaps		●
System messages		●
System variables assigned to recipe structure		●
Time long field		●
Time short field		●
Trends (Trends x page/Channels x trend)	8/8	●
Trends sampled automatically (Memory/Trends/Readings)	4096byte /**/640	●
Trends sampled on command (Memory/Trends/Readings)		●
Value direct command: ADD		●
Value direct command: AND		●
Value direct command: OR		●
Value direct command: SET		●
Value direct command: SUBTRACT		●
Value direct command: XOR		●
Value-structured dynamic bitmaps		●
Variables: Floating Point numerical variablest	128 x pages	●
Variables: Numerical variables (DEC, HEX, BIN, BCD)		●
Variables: String variables (ASCII)		●

*) indicative value determined by the dimensions of the project, **) depends on memory available

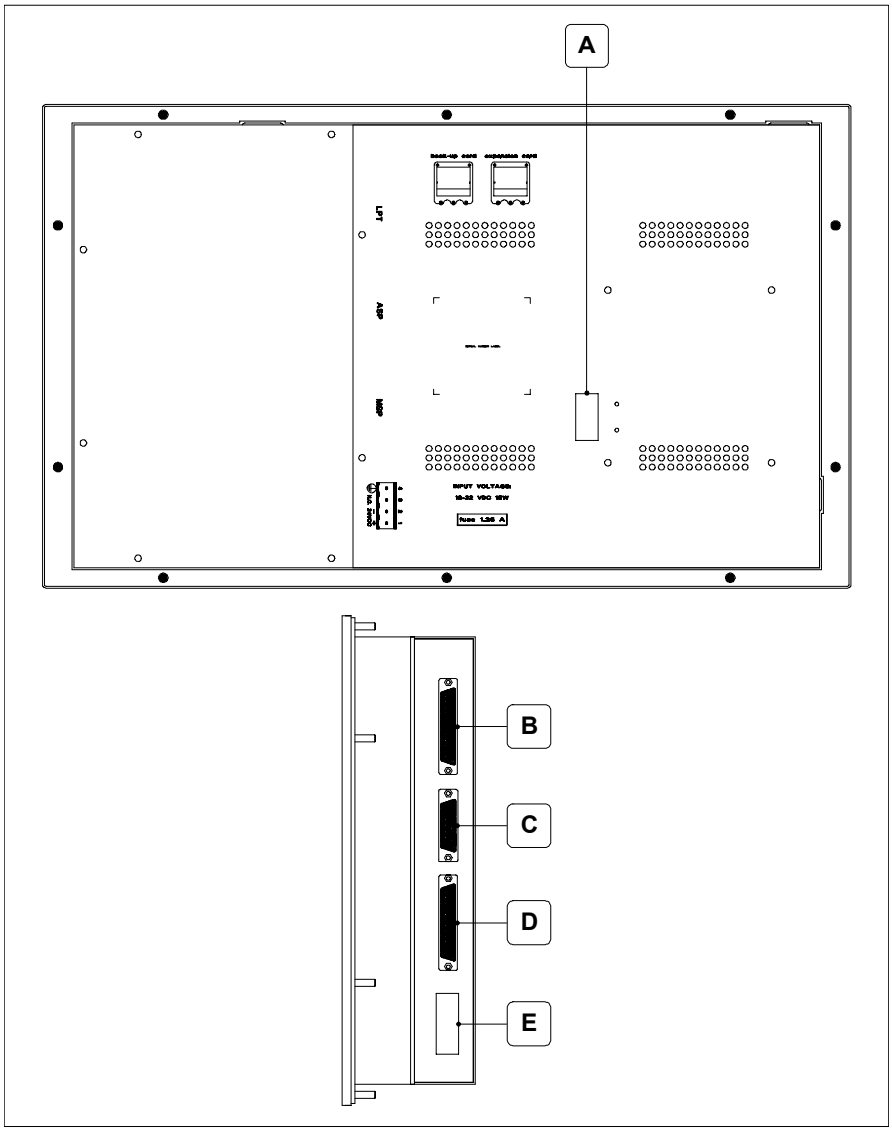
Front view



Key	Function
1	Display
2	Alphanumeric + operative keys
3	F-keys with no LED
4	F-keys with one LED
5	F-keys with one LED
6	X0 LED. Blinks when communication error is detected
7	Power LED. Lights up when power in ON
8	Battery LED. Lights up when the battery has nearly run out
	Starts input
	Confirms setting of data
	Page up When in setting phase, edits dynamic text

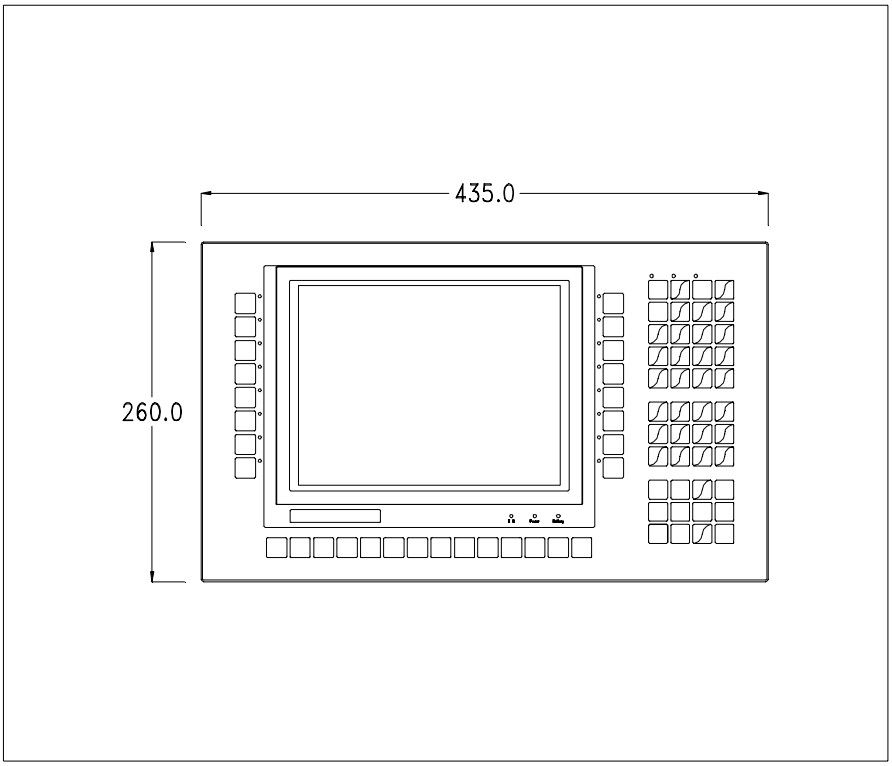
Key	Function
	Page down When in setting phase, edits dynamic text
	Moves the cursor between settable fields When in setting phase, moves cursor to the left of the field
	Moves the cursor between settable fields When in setting phase, moves cursor to the right of the field
	Quits: setting of data, info-messages, sequence directory, communication driver
	Displays info-messages
	Displays ISA alarms
	Displays according to context: information message help, alarm help or page help
	Acknowledgment of ISA alarms on display
	Print the entire display area
	No predefined function
	No predefined function
	No predefined function
	No predefined function
	In setting phase restores the initial value of the field
	Acknowledges all ISA alarms
	Displays the contents of the alarm buffer

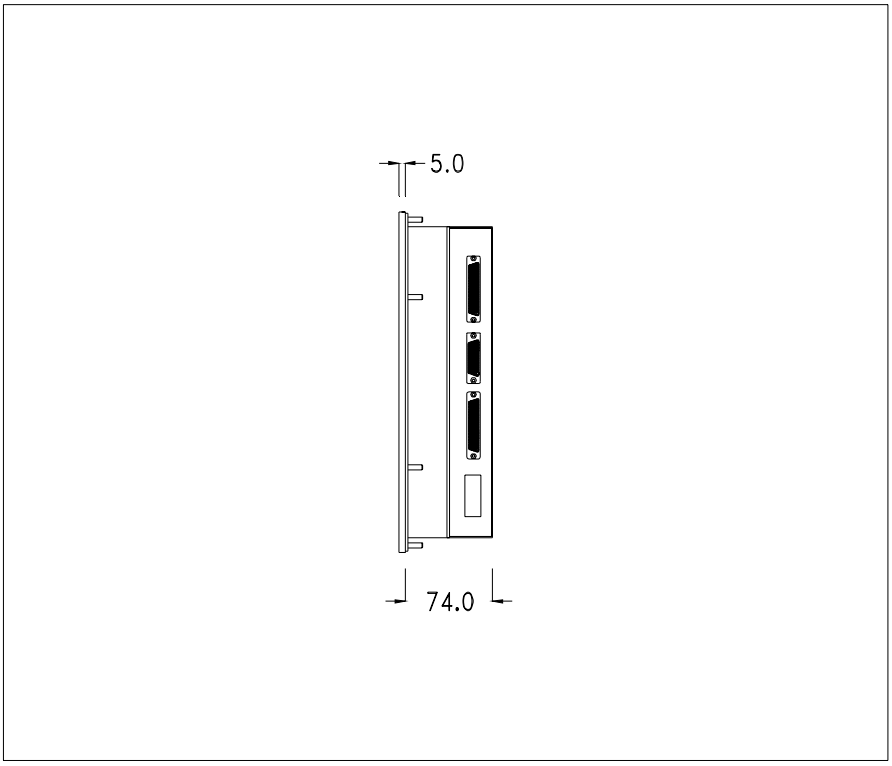
Rear view

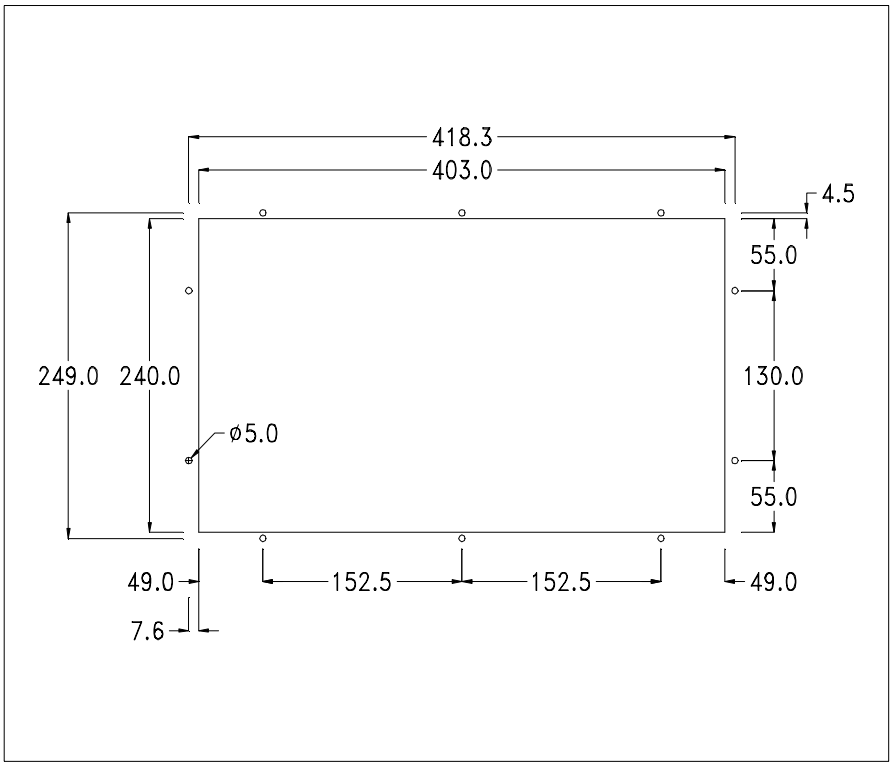


Position	Function
A	Auxiliary port for connecting optional accessories
B	LPT port for connecting printer
C	ASP serial port for communicating with PC or other devices
D	MSP serial port for communicating with PLC/PC
E	Power supply connector

Dimensions and Cut-out







To fix the sealing gasket and secure the VT to the container see “Chapter 16 -> Mounting the terminal within the container“.

Where accessories need to be fixed in or onto the VT terminal, you are advised to do this before securing the VT to its container.

Accessories

Any accessories should be mounted in accordance with the instructions in the relevant chapter (see “Chapter 18 -> Video terminal accessories“).

Transfer PC -> VT

For everything to function properly, the first time the VT operator terminal is switched on it needs to be correctly loaded, that is it needs to have transferred to it:

- Firmware
- Communication driver
- Project

(Given that the transfer of the three files in practice occurs with a single operation, it will be defined as “Project transfer” for the sake of simplicity.)

For this it is essential that the VT be prepared to receive the transfer.

Preparation for reception

The program VTWIN (see Software Manual) must be used for the transfer, but the terminal must be set up to receive. This means carrying out the following steps:

- Check that the VT is off
- Check that there is a serial connection between the PC and the VT
- Switch on the VT; when the message [WAIT FOR BOOT FORCED] is displayed, press Enter, or with the VT on press together Shift + Enter; in either case wait a moment until the following mask appears on the VT

```
VT330W TRANSFER PAGE

Graphic controller BOOT check :      OK
Graphic controller RAM check :       OK
Main BOOT and RAM check :            OK
Graphic controller synchronization : OK
Main FIRMWARE check :                NOT PRESENT
Graphic controller FIRMWARE :        ERROR


F1=MSP  F2=ASP  F3=MemoCARD  ENTER=Prj
```

The function ▣ to press depends on which port you intend to use (MSP or ASP).

The VT is now ready to receive (refer to Software Manual for transfer procedure).

▣ F3=MemoCARD is only enabled when a Memory Card has been inserted in the VT terminal (see Page 12-15).

Information relating to driver

After the project has been transferred, the VT can make available information relating to what has been loaded. The information regards:

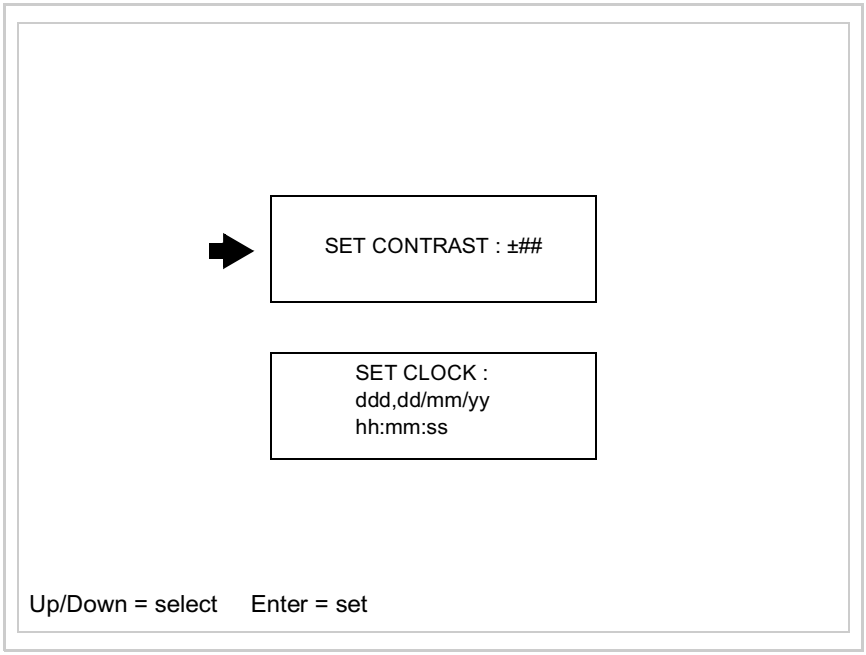
- Serial ports present
- The name of the driver loaded
- The version of the driver loaded
- Network address of the VT
- Last error to have occurred

To acquire this information carry out the following operations:

- Be situated in any page of the project
- Press Shift twice; you will see

There is one of these pages for each communication port; you can move between the various pages by pressing ►.

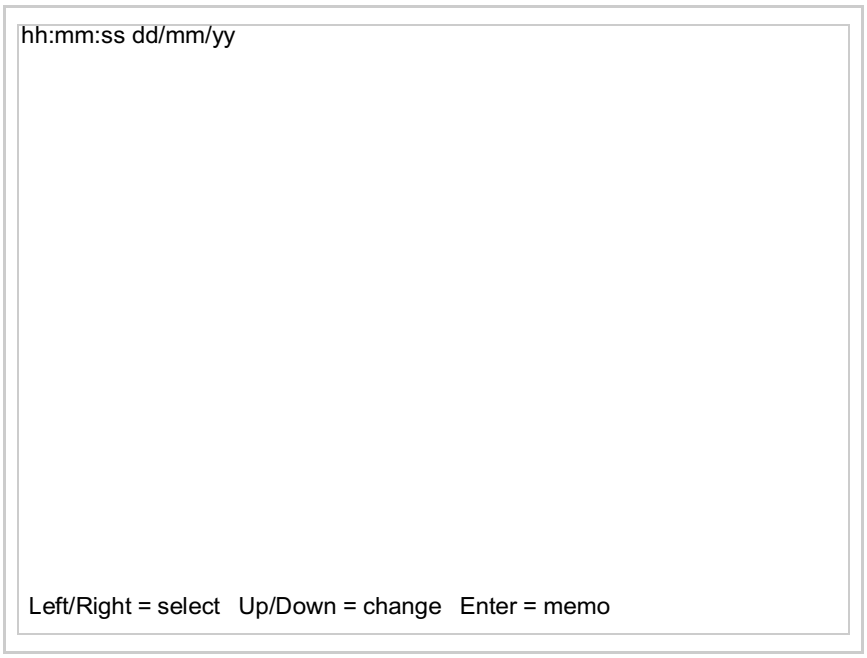
If you press Enter while displaying this page you can access the page for setting the clock and the contrast.



In order to access the contrast setting, use PgUp or PgDn to select the SET CONTRAST option that is displayed in reverse colors and press Enter; the following mask will appear:

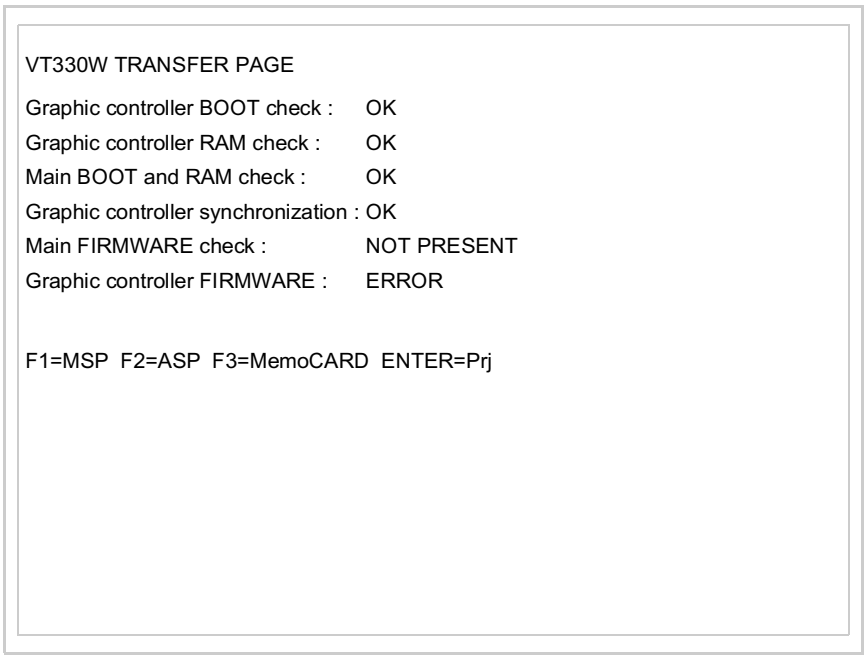
Use PgUp and/or PgDn to effect any variation; use Enter for the confirmation.

To be able to set the clock use PgUp or PgDn to select the SET CLOCK option that is displayed in reverse colors and press Enter; the following mask will appear:

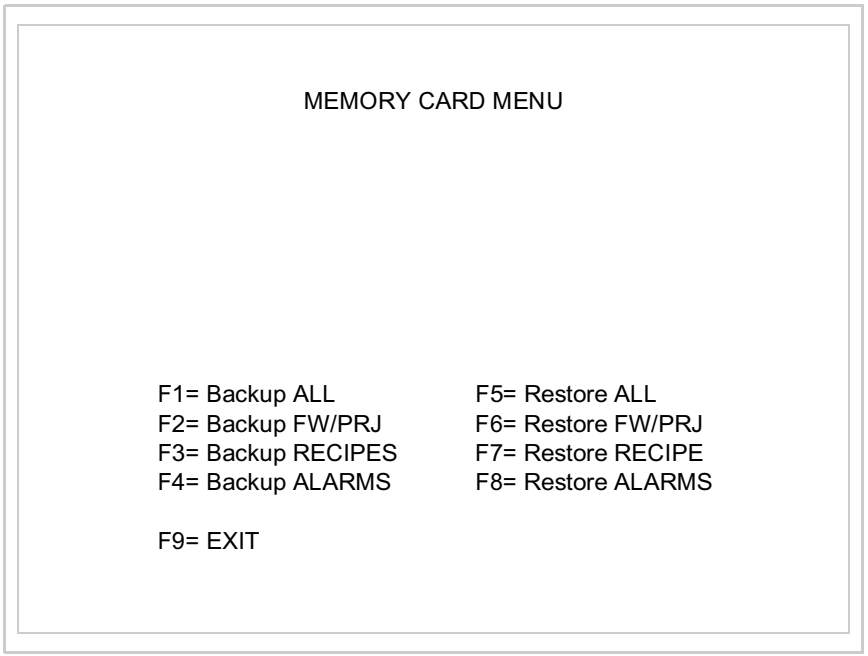


Use ◄ and/or ► to select the field and PgUp and/or PgDn to effect any variation; use Enter to confirm.

To use the Memory Card either switch on the VT with Enter held down or, if the VT is already on, press shift + Enter together; in both cases it will be necessary to wait a moment before the following mask appears on the VT:



Press ▣ F3=MemoCARD (if the key is not on screen, see Page 12-12); the following mask will appear:



For the meaning and function of the keys see “Chapter 18 -> Memory card“.

Possible error messages are:

- PR ERR

  Problem-> Errors have been detected in the data exchange between the VT and the Device.
  Solution-> Check the cable; there may be disturbance.

- COM BROKEN

  Problem-> Communication between VT and Device interrupted.
  Solution-> Check the serial connection cable.

An error message followed by [*] indicates that the error is not currently present but was and has since disappeared.

Example: COM BROKEN*

When Esc is pressed you quit the display of information regarding the driver.

Improving display color quality

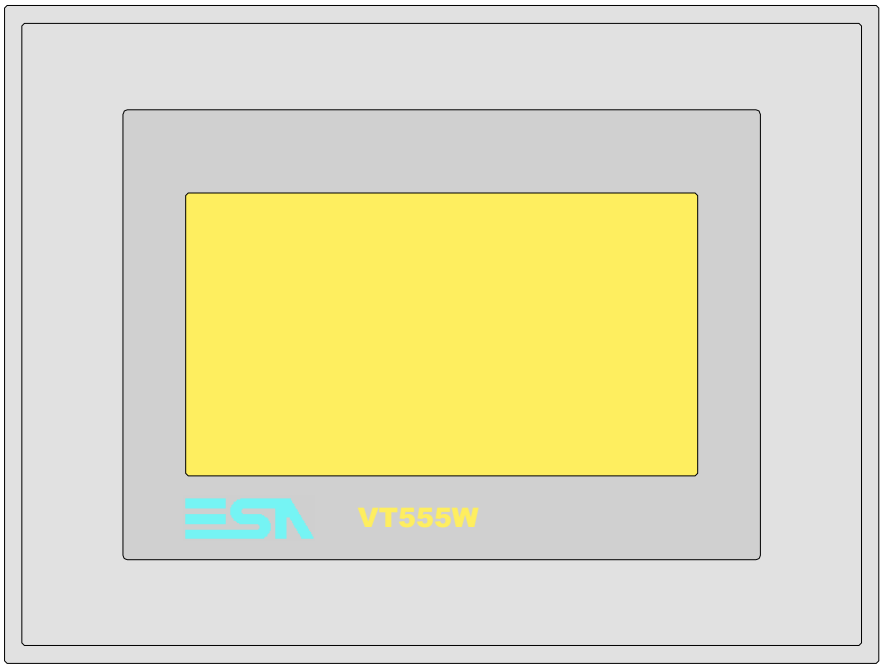
To improve the color quality, adjust the contrast of the display: if the colors are too dark increase the contrast; if, on the other hand, the colors are too light, decrease the contrast.

Adjusting the contrast on the display

To improve the quality of the representation on the display it may be necessary to adjust its contrast. This can be done by going to the page proposed (see Page 12-14) and changing the value (from +63 to -64) in evidence at that moment. Increase the value to darken the display; to lighten it decrease the value.

Chapter 13 Video terminal VT555W

This chapter consists of 18 pages.



Technical characteristics The following table lists the principal technical characteristics of the product in question.

Code of terminal	Characteristics of terminal	VT555W 00000	VT555W A0000	VT555W AP000	VT555W A00DP	VT555W AP0DP	VT555W 000CN
Display		▼	▼	▼	▼	▼	▼
Type	LCD Monochromatic STN	●	●	●	●	●	●
	LCD 16 Colors STN						
	LCD 16 Colors TFT						
Touch screen	Matrix 20 x 8 (Cell:12x16 pixels)	●	●	●	●	●	●
Representational format	Graphic	●	●	●	●	●	●
Resolution [pixels]	240 x 128	●	●	●	●	●	●
Rows by characters	16 x 40 / 8 x 20 / 4 x 10	●	●	●	●	●	●
Display area size [mm]	123 x 68 (5,5”)	●	●	●	●	●	●
Character matrix in text mode [pixels]	6 x 8 / 12 x 16 / 24 x 32	●	●	●	●	●	●
Character size [mm] x 1 / x 2 / x 4	3 x 4 / 6 x 8 / 12 x 16	●	●	●	●	●	●
Contrast adjustment	Software	●	●	●	●	●	●
Character sets	Programmable fonts	●	●	●	●	●	●

Code of terminal	Characteristics of terminal						
VT555W 00000							
VT555W A0000							
VT555W AP000							
VT555W A00DP							
VT555W AP0DP							
VT555W 000CN							
Backlighting		▼	▼	▼	▼	▼	▼
Type	LED						
	CCFL lamp	●	●	●	●	●	●
Standard lamp-life at 25°C [hours]	10000	●	●	●	●	●	●
User memory							
Project [Bytes]	256K + 384K (Text + Graphics)						●
	192K + 384K (Text + Graphics)	●	●	●	●	●	
Data memory [Bytes]	32K (With back-up battery)						●
	128K (With back-up battery)	●	●	●	●	●	
Memory Card for backup	--						
Memory Card for expansion	--						
Interfaces							
MSP (Multi-serial port)	RS232/RS422/RS485/TTY-20mA	●	●	●	●	●	●
ASP (Auxiliary serial port)	RS232/RS485		●	●	●	●	
ASP-8 (Auxiliary serial port)	RS232						
ASP-9 (Auxiliary serial port)	RS232						
LPT parallel port	Centronics		●		●		
Auxiliary port	Connections for accessories						
Accessories							
Connectable accessories	See table ”Chapter 18”	●	●	●	●	●	●
Clock							
Hardware clock	With back-up battery	●	●	●	●	●	●
Networks							
Integrated	Profibus-DP		●	●			
	CAN Open (Optoisolated interface)	●					
Optional	See table ”Chapter 18”	●	●	●	●	●	●
Proprietary networks							
ESA-Net	Network server	●	●	●	●	●	
	Network client	●	●	●	●	●	●
Technical data							
Power supply	24Vdc (18..32Vdc)						
Power absorbed at 24Vdc	15W						
Protection fuse	Ø5x20mm - 800mA Quick Blow F						
Protection level	IP65 (front-end)						
Working temperature	0..50°C						
Storage and transportation temperature	-20..+60°C						
Humidity (non-condensing)	<85%						
Weight	1300gr						
Dimensions							
External L x H x D [mm]	210 x 158 x 54						
Cut-out L x H [mm]	198 x 148						
Certification							
Certifications and approvals	CE						

Functions

The following table lists in alphabetical order all the functions of the VT in question.

Table 13.1: Functions and objects realizable with this VT (Part 1 of 4)

Code of terminal			
VT555W *****			
VT555W ***CN			
Objects/Functions	**Quantity**	▼	▼
Alarm field		●	●
Alarm help	1024	●	●
Alarm history buffer	256	●	●
Alarm statistics			
Alarms (Total/active simultaneously)	1024/256	●	●
Arc		●	●
Backup/Restore		●	●
Bar data		●	●
Bit-group-structured dynamic bitmaps		●	●
Bit-wise password	8bits	●	●
Buttons	160 x page	●	●
Circles		●	●
Command: Change language		●	●
Command: Clear trend buffer		●	●
Command: Delete recipe		●	●
Command: Hardcopy		●	●
Command: Load recipe from data memory		●	●
Command: Modify password		●	●
Command: Next page		●	●
Command: Page help		●	●
Command: Password login		●	●
Command: Password logout		●	●
Command: Previous page		●	●
Command: Print alarm history		●	●
Command: Printer form feed		●	●
Command: Quit project		●	●
Command: Report		●	●
Command: Restarts reading time-sampled trend		●	●
Command: Run pipeline		●	●
Command: Save recipe in data memory		●	●
Command: Save recipe received from device in buffer		●	●
Command: Save recipe received from device in data memory		●	●
Command: Send recipe from video buffer to device		●	●
Command: Send recipe to device		●	●
Command: Service page		●	●
Command: Show alarms history		●	●

*) indicative value determined by the dimensions of the project, **) depends on memory available

Table 13.1: Functions and objects realizable with this VT (Part 2 of 4)

Code of terminal			
VT555W *****			
VT555W ***CN			
Objects/Functions	**Quantity**	▼	▼
Command: Show page directory		●	●
Command: Show project information		●	●
Command: Show recipe directory		●	●
Command: Show sequence directory			
Command: Shows driver status page		●	●
Command: Shows page help		●	●
Command: Shows page with function: PG			
Command: Stops reading time sampled trend		●	●
Command: Trend reading saved in device		●	●
Command: Zero number of general pages		●	●
Date field		●	●
Day-of-the-week field		●	●
Dynamic texts: Bit-group-structured dynamic texts		●	●
Dynamic texts: Single-bit dynamic texts	1024*	●	●
Dynamic texts: Value-structured dynamic texts		●	●
E-keys			
F-keys			
Free terminal			
Function: Disables key			
Function: Go to page		●	●
Function: Internal command		●	●
Function: Invert bit value		●	●
Function: Macro		●	●
Function: None			
Function: Reset bit permanently		●	●
Function: Reset real-time bit		●	●
Function: Sequences			
Function: Sets bit permanently		●	●
Function: Sets real-time bit		●	●
Function: Value-structure direct command		●	●
Global configuration of E-keys			
Global configuration of F-keys			
Info-messages (Total/active simultaneously)	1024/256	●	●
Labels		●	●
LEDs assigned to sequence			
Lines		●	●
Lists of bitmap images		●	●
Lists of texts		●	●

*) indicative value determined by the dimensions of the project, **) depends on memory available

Table 13.1: Functions and objects realizable with this VT (Part 3 of 4)

Code of terminal			
VT555W *****			
VT555W ***CN			
Objects/Functions	**Quantity**	▼	▼
Local configuration of E-keys			
Local configuration of F-keys			
Macro field	24 x pages	●	
Message field		●	●
Message help	1024	●	●
Multilanguage texts	8 Langs.	●	●
Page	1024	●	●
Page help	1024	●	●
Password	10	●	●
Pipeline (Numero/Tot byte)	64/512	●	●
Print		●	●
Programmable fonts		●	●
Project images		●	●
Public variables of ESANET network (Number/Tolat bytes)	128/1024	●	●
Random sequences			
Recipe field for recipe structure		●	●
Recipes (Number of variables per recipe)	1024/256	●	●
Rectangles		●	●
Redefinable characters			
Single-bit-structured dynamic bitmaps		●	●
Start/stop sequences			
Static bitmaps		●	●
System messages		●	●
System variables assigned to recipe structure		●	●
Time long field		●	●
Time short field		●	●
Trends (Trends x page/Channels x trend)	4/4	●	●
Trends sampled automatically (Memory/Trends/Readings)	512byte /**/40	●	●
Trends sampled on command (Memory/Trends/Readings)		●	●
Value direct command: ADD		●	●
Value direct command: AND		●	●
Value direct command: OR		●	●
Value direct command: SET		●	●
Value direct command: SUBTRACT		●	●
Value direct command: XOR		●	●
Value-structured dynamic bitmaps		●	●

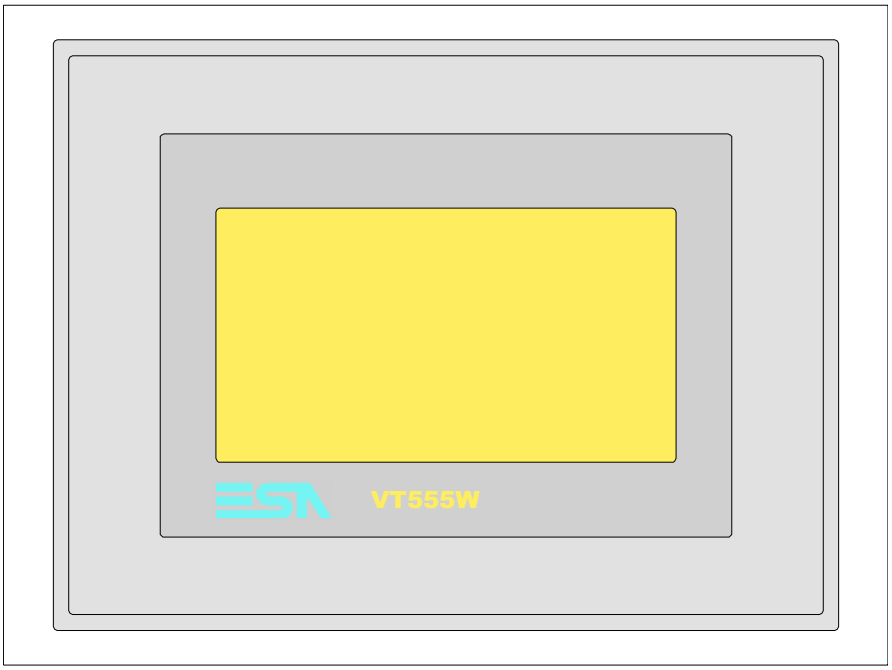
*) indicative value determined by the dimensions of the project, **) depends on memory available

Table 13.1: Functions and objects realizable with this VT (Part 4 of 4)

Code of terminal			
VT555W *****			
VT555W ***CN			
Objects/Functions	**Quantity**	▼	▼
Variables: Floating Point numerical variablest	48 x pages		●
Variables: Numerical variables (DEC, HEX, BIN, BCD)		●	●
Variables: String variables (ASCII)			●

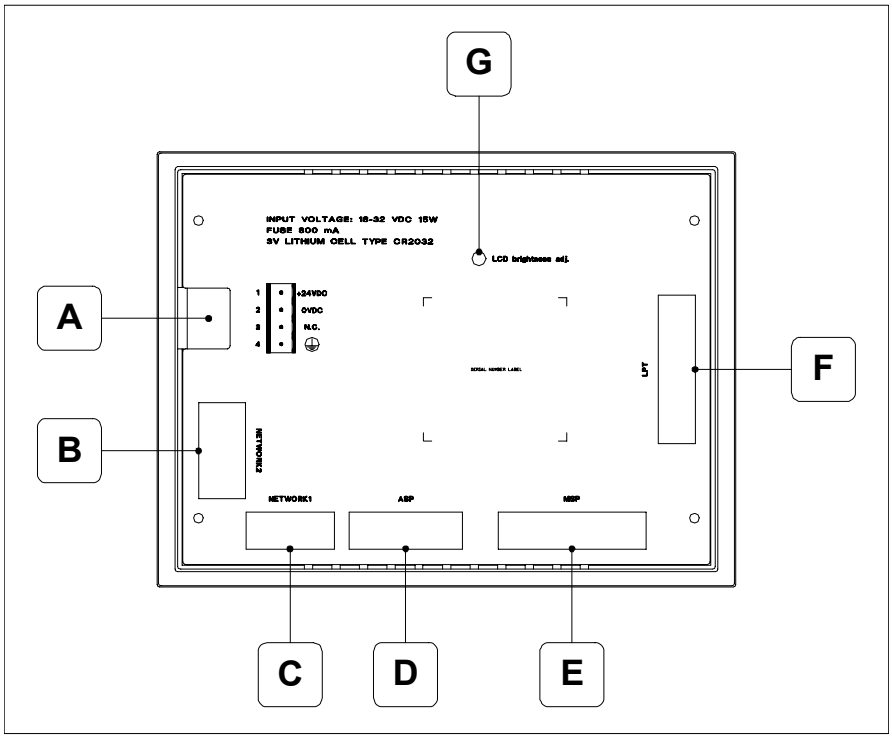
*) indicative value determined by the dimensions of the project, **) depends on memory available

Front view



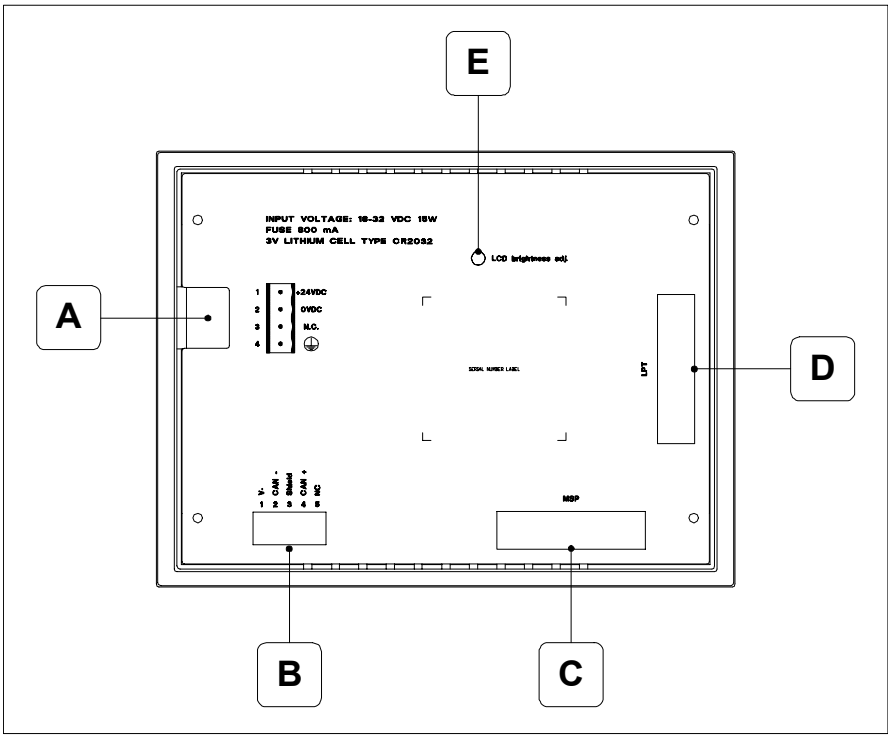
All buttons and signals are defined using the programming software (see Software Manual).

Standard series rear view



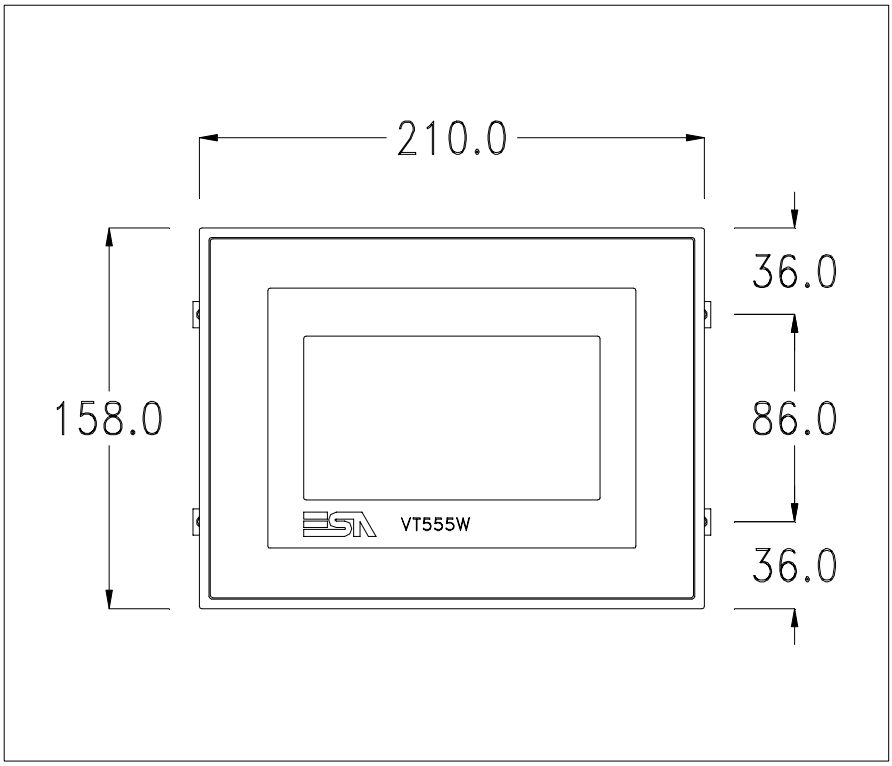
Position	Function
A	Power supply connector
B	NETWORK2 serial port for network communication (Option)
C	NETWORK1 serial port for network communication (Option)
D	ASP serial port for communicating with PC or other devices (Option)
E	MSP serial port for communicating with PLC/PC
F	LPT port for connecting printer (Option)
G	Trimmer for brightness control

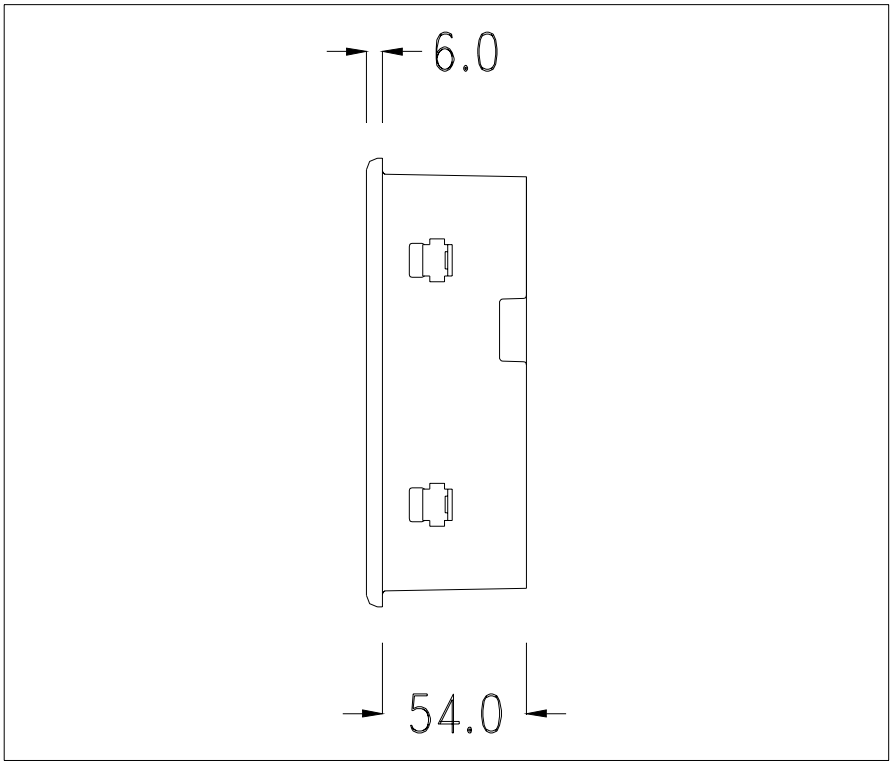
CAN series rear view

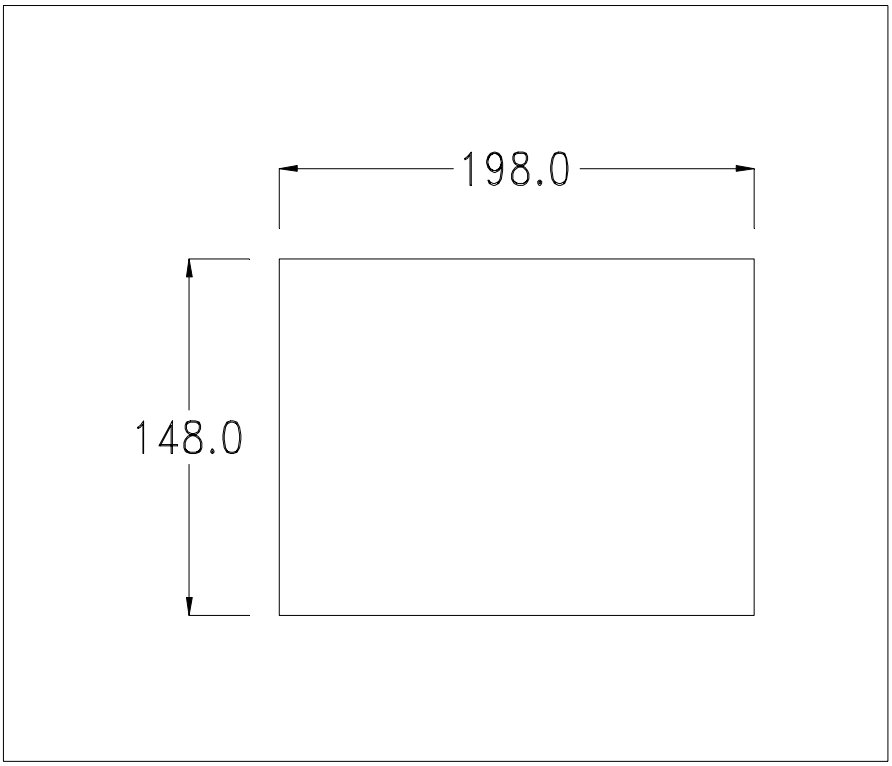


Position	Function
A	Power supply connector
B	CAN serial port
C	MSP serial port for communicating with PLC/PC
D	LPT port for connecting printer (Option)
E	Trimmer for brightness control

Dimensions and Cut-out







To fix the sealing gasket and secure the VT to the container see “Chapter 16 -> Mounting the terminal within the container“.

Where accessories need to be fixed in or onto the VT terminal, you are advised to do this before securing the VT to its container.

Accessories

Any accessories should be mounted in accordance with the instructions in the relevant chapter (see “Chapter 18 -> Video terminal accessories“).

Transfer PC -> VT

For everything to function properly, the first time the VT operator terminal is switched on it needs to be correctly loaded, that is it needs to have transferred to it:

- Firmware
- Communication driver
- Project

(Given that the transfer of the three files in practice occurs with a single operation, it will be defined as “Project transfer” for the sake of simplicity.)

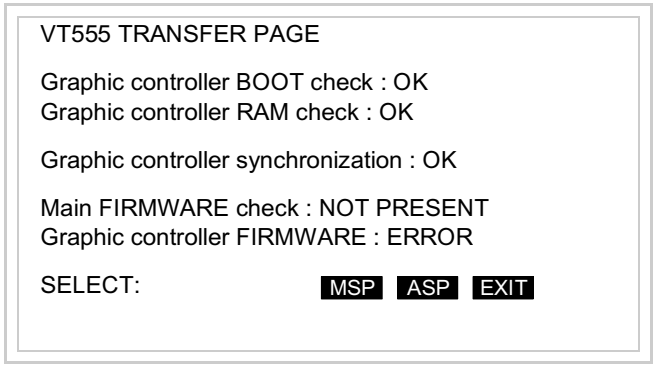
For this it is essential that the VT be prepared to receive the transfer.

Preparation for reception

The program VTWIN (see Software Manual) must be used for the transfer, but the terminal must be set up to receive. This means carrying out the following steps:

- Check that the VT is off
- Check that there is a serial connection between the PC and the VT
- Switch on the VT by pressing simultaneously on two diagonally opposed angles of the screen

and wait a moment, or, using the appropriate button (see Page 13-16), till the VT displays the following mask



The on-screen ▣ to touch depends on which port you intend to use.

The VT is now ready to receive (refer to Software Manual for transfer procedure).

Information relating to driver

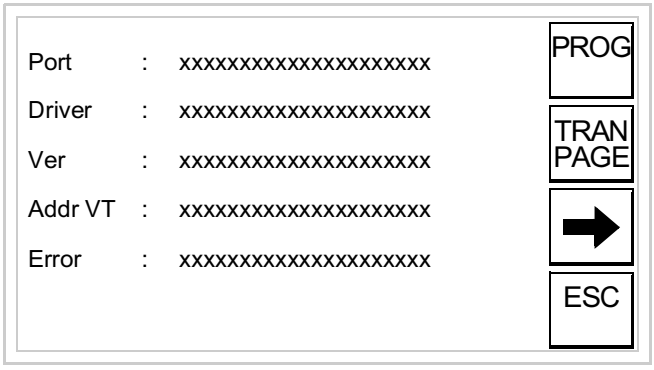
After the project has been transferred, the VT can make available information relating to what has been loaded. The information regards:

- Serial ports present
- The name of the driver loaded
- The version of the driver loaded
- Network address of the VT
- Last error to have occurred

To acquire this information carry out the following operations:

- Be situated in any page of the project
- Press two diagonally opposed angles that are free of any settable objects or buttons (at least one angle must be free)

and there appears the following mask



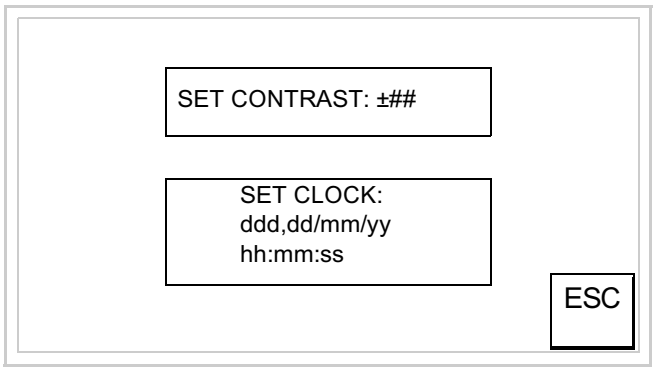
There is one of these pages for each communication port; movement between the various pages is effected by pressing  .

From this page you can:

- Set the clock and the contrast
- Prepare the VT to receive the program

Setting the clock and the contrast:

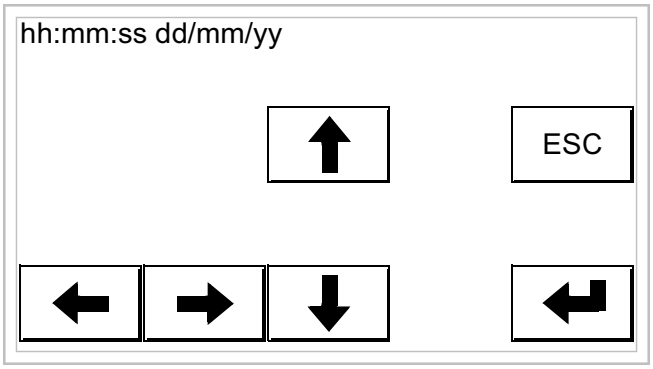
To set the clock and the contrast, while displaying the above illustrated page, press PROG; the following mask appears



To set the contrast touch the words SET CONTRAST on the display; you will see the following mask

Use the arrow ▢▢ for any variation (see “Chapter 21 -> Operation of terminal with touch screen“).

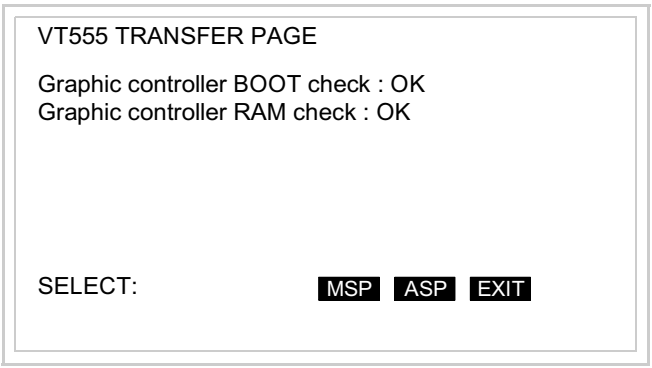
To set the clock touch the words SET CLOCK on the display; the following mask appears



Use the arrow ▢▢ for any variation (see “Chapter 21 -> Operation of terminal with touch screen“).

Prepare the VT to receive the program:

To prepare the VT to receive the program, while displaying the driver information page (see Page 13-14), press TRAN PAGE, and you will see the following mask



Which on-screen ▢ you touch depends on the port you intend using.

The VT is now ready to receive (refer to Software Manual for information on the transfer procedure).
Once you enter this mask, you can quit without transferring only by switching off and switching on the VT again or by pressing the EXIT ▢.

Possible error messages that may be encountered in the driver information page are:

- PR ERR

  Problem-> Errors have been detected in the data exchange between the VT and the Device.
  Solution-> Check the cable; there may be disturbance.

- COM BROKEN

  Problem-> Communication between VT and Device interrupted.
  Solution-> Check the serial connection cable.

An error message followed by [*] indicates that the error is not currently present but was and has since disappeared.

Example: COM BROKEN*

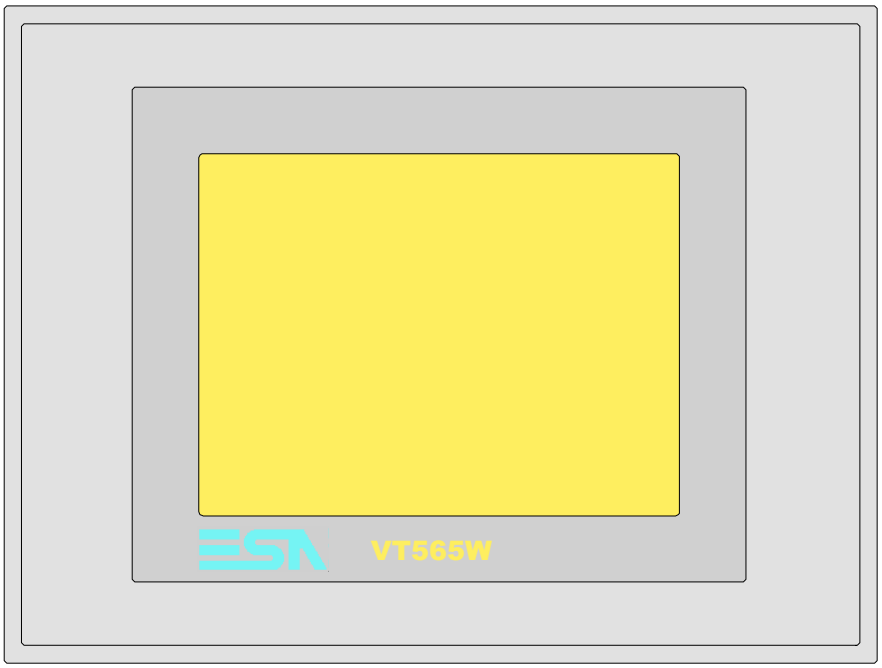
When ESC is pressed you quit the display of information regarding the driver.

Adjusting the contrast on the display

To improve the quality of the representation on the display it may be necessary to adjust its contrast. This can be done by going to the page proposed (see Page 13-15) and changing the value (from +31 to -32) in evidence at that moment. Increase the value to darken the display; to lighten it, decrease the value.

Chapter 14 Video terminal VT565W

This chapter consists of 16 pages.



Technical characteristics The following table lists the principal technical characteristics of the product in question.

Code of terminal	Characteristics of the terminal	VT565W A0000	VT565W AP000	VT565W A0M00	VT565W APM00
Display		▼	▼	▼	▼
Type	LCD Monochromatic STN	●	●		
	LCD 16 Colors STN			●	●
	LCD 16 Colors TFT				
Touch screen	Matrix 20 x 16 (Cell:16x15 pixels)	●	●	●	●
Representational format	Graphic	●	●	●	●
Resolution [pixels]	320 x 240	●	●	●	●
Rows x characters	16 x 40 / 8 x 20 / 4 x 10	●	●	●	●
Display area size [mm]	115,6 x 87 (5,7”)	●	●	●	●
Character matrix in text mode [pixels]	8 x15 / 16 x 30 / 32 x 60	●	●	●	●
Character size [mm] x 1 / x 2 / x 4	2,8 x 5,2 / 5,6 x 10,4 / 11,2 x 20,8	●	●	●	●
Contrast adjustment	Software	●	●	●	●
Character sets	Programmable fonts	●	●	●	●
Backlighting					
Type	LED				
	CCFL lamp	●	●	●	●
Standard lamp-life at 25°C [hours]	15000	●	●	●	●

Code of terminal	Characteristics of the terminal	VT565W A0000	VT565W AP000	VT565W A0M00	VT565W APM00
User memory					
Project [Bytes]	192K + 832K (Text + Graphics)	●	●	●	●
Data memory [Bytes]	256K (With back-up battery)	●	●	●	●
Memory Card for backup	4Mb	●	●	●	●
Memory Card for expansion	--				
Interfaces					
MSP (Multi-serial port)	RS232/RS422/RS485/TTY-20mA	●	●	●	●
ASP (Auxiliary serial port)	RS232/RS485	●	●	●	●
ASP-8 (Auxiliary serial port)	RS232				
ASP-9 (Auxiliary serial port)	RS232				
LPT parallel port	Centronics	●		●	
Auxiliary port	Connections for accessories				
Accessories					
Connectable accessories	See table ”Chapter 18”	●	●	●	●
Clock					
Hardware clock	With back-up battery	●	●	●	●
Networks					
Integrated	Profibus-DP				
	CAN Open (Optoisolated interface)				
Optional	See table ”Chapter 18”	●	●	●	●
Proprietary networks					
ESA-Net	Network server	●	●	●	●
	Network client	●	●	●	●
Technical data					
Power supply	24Vdc (18..32Vdc)				
Power absorbed at 24Vdc	15W				
Protection fuse	Ø5x20mm - 800mA Quick Blow F				
Protection level	IP65 (front-end)				
Working temperature	0..50°C				
Storage and transportation temperature	-20..+60°C				
Humidity (non-condensing)	<90%				
Weight	1300gr				
Dimensions					
External L x H x D [mm]	210 x 158 x 54				
Cut-out L x H [mm]	198 x 148				
Certification					
Certifications and approvals	CE				

Functions

The following table lists in alphabetical order all the functions of the VT in question.

Table 14.1: Functions and objects realizable with this VT (Part 1 of 3)

Code of terminal		
VT565W *****		
Objects/Functions	**Quantity**	▼
Alarm field		●
Alarm help	1024	●
Alarm history buffer	256	●
Alarm statistics		
Alarms (Total/active simultaneously)	1024/256	●
Arc		●
Backup/Restore		●
Bar data		●
Bit-group-structured dynamic bitmaps		●
Bit-wise password	8bits	●
Buttons	320 x page	●
Circles		●
Command: Change language		●
Command: Clear trend buffer		●
Command: Delete recipe		●
Command: Hardcopy		●
Command: Load recipe from data memory		●
Command: Modify password		●
Command: Next page		●
Command: Page help		●
Command: Password login		●
Command: Password logout		●
Command: Previous page		●
Command: Print alarm history		●
Command: Printer form feed		●
Command: Quit project		●
Command: Report		●
Command: Restarts reading time-sampled trend		●
Command: Run pipeline		●
Command: Save recipe in data memory		●
Command: Save recipe received from device in buffer		●
Command: Save recipe received from device in data memory		●
Command: Send recipe from video buffer to device		●
Command: Send recipe to device		●
Command: Service page		●
Command: Show alarms history		●
Command: Show page directory		●

*) indicative value determined by the dimensions of the project, **) depends on memory available

Table 14.1: Functions and objects realizable with this VT (Part 2 of 3)

Code of terminal		
VT565W *****		
Objects/Functions	**Quantity**	▼
Command: Show project information		●
Command: Show recipe directory		●
Command: Show sequence directory		
Command: Shows driver status page		●
Command: Shows page help		●
Command: Shows page with function: PG		
Command: Stops reading time sampled trend		●
Command: Trend reading saved in device		●
Command: Zero number of general pages		●
Date field		●
Day-of-the-week field		●
Dynamic texts: Bit-group-structured dynamic texts	1024*	●
Dynamic texts: Single-bit dynamic texts		●
Dynamic texts: Value-structured dynamic texts		●
E-keys		
F-keys		
Free terminal		
Function: Disables key		
Function: Go to page		●
Function: Internal command		●
Function: Invert bit value		●
Function: Macro		●
Function: None		
Function: Reset bit permanently		●
Function: Reset real-time bit		●
Function: Sequences		
Function: Sets bit permanently		●
Function: Sets real-time bit		●
Function: Value-structure direct command		●
Global configuration of E-keys		
Global configuration of F-keys		
Info-messages (Total/active simultaneously)	1024/256	●
Labels		●
LEDs assigned to sequence		
Lines		●
Lists of bitmap images		●
Lists of texts		●
Local configuration of E-keys		
Local configuration of F-keys		

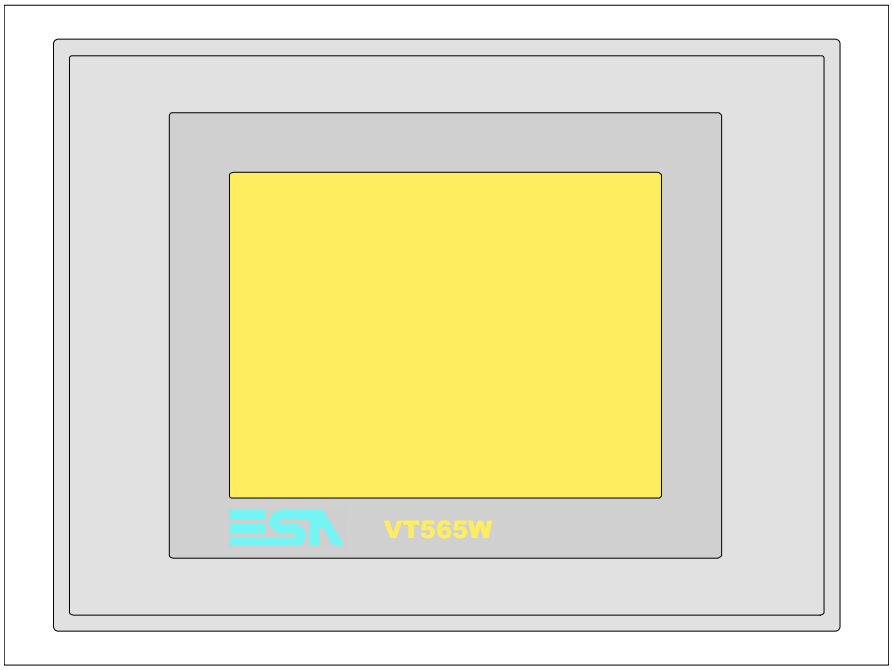
*) indicative value determined by the dimensions of the project, **) depends on memory available

Table 14.1: Functions and objects realizable with this VT (Part 3 of 3)

Code of terminal		
VT565W *****		
Objects/Functions	**Quantity**	▼
Macro field		
Message field		●
Message help	1024	●
Multilanguage texts	8 Langs.	●
Page	1024	●
Page help	1024	●
Password	10	●
Pipeline (Numero/Tot byte)	64/512	●
Print		●
Programmable fonts		●
Project images		●
Public variables of ESANET network (Number/Tolat bytes)	128/1024	●
Random sequences		
Recipe field for recipe structure		●
Recipes (Number of variables per recipe)	2048/512	●
Rectangles		●
Redefinable characters		
Single-bit-structured dynamic bitmaps		●
Start/stop sequences		
Static bitmaps		●
System messages		●
System variables assigned to recipe structure		●
Time long field		●
Time short field		●
Trends (Trends x page/Channels x trend)	4/4	●
Trends sampled automatically (Memory/Trends/Readings)	2048byte /**/320	●
Trends sampled on command (Memory/Trends/Readings)		●
Value direct command: ADD		●
Value direct command: AND		●
Value direct command: OR		●
Value direct command: SET		●
Value direct command: SUBTRACT		●
Value direct command: XOR		●
Value-structured dynamic bitmaps		●
Variables: Floating Point numerical variablest	64 x pages	●
Variables: Numerical variables (DEC, HEX, BIN, BCD)		●
Variables: String variables (ASCII)		●

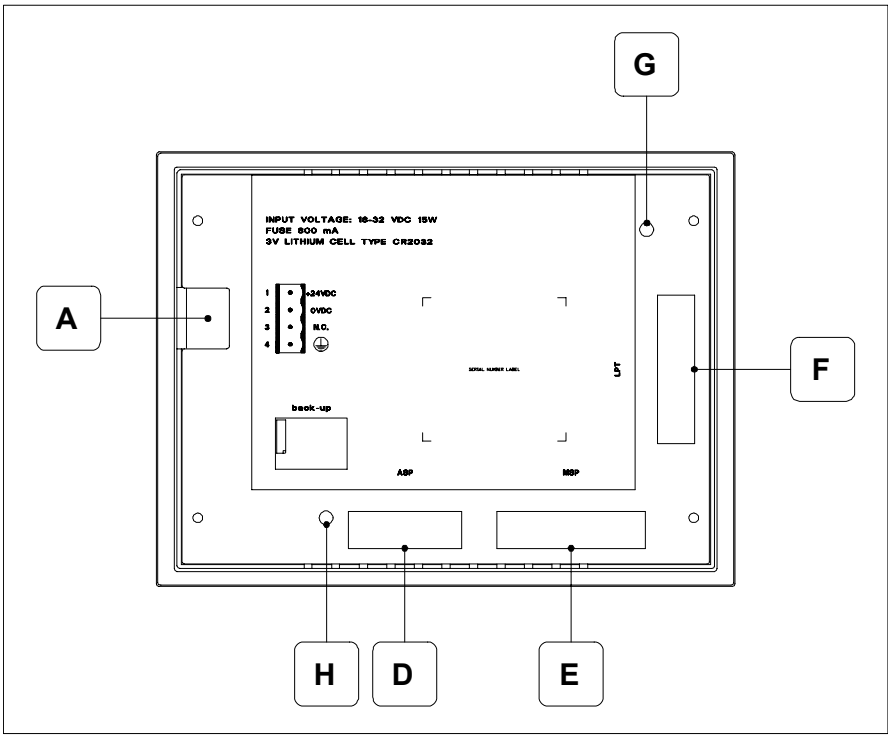
*) indicative value determined by the dimensions of the project, **) depends on memory available

Front view



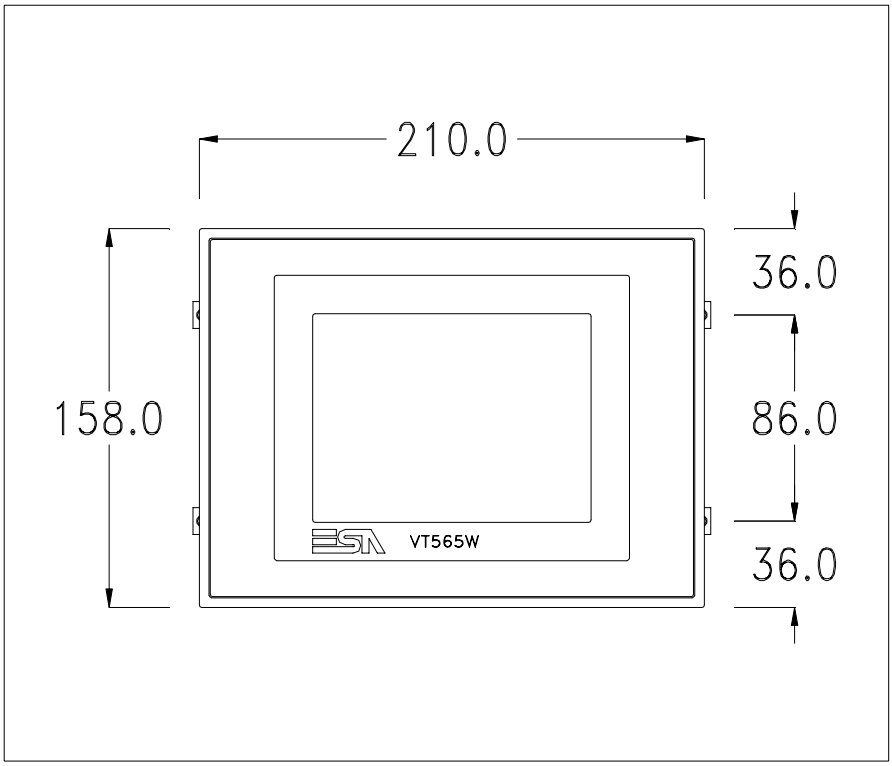
All buttons and signals are defined using the programming software (see Software Manual).

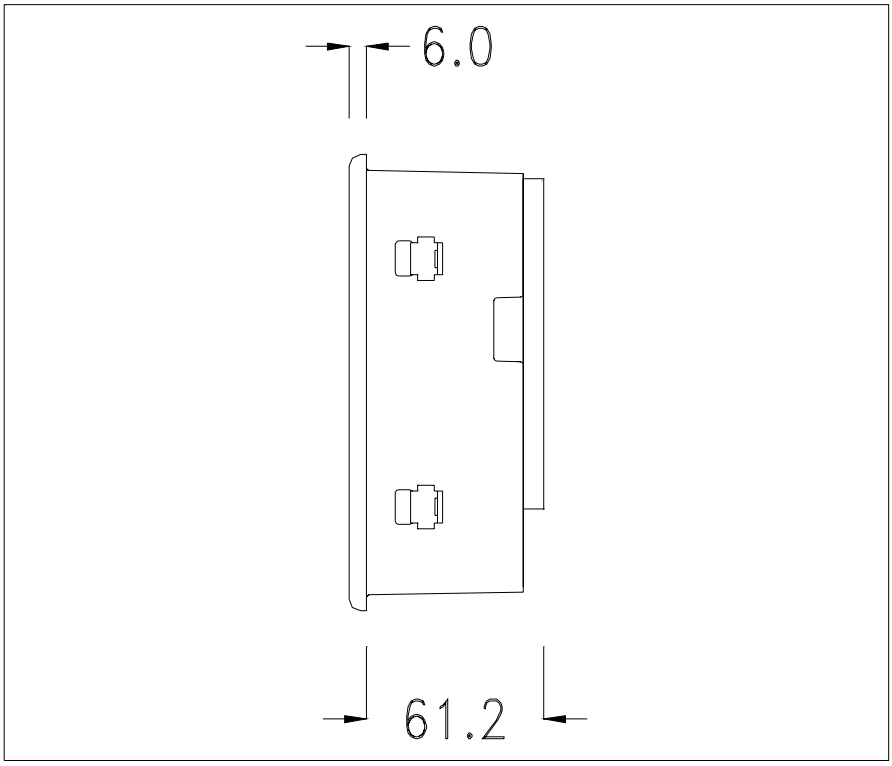
Rear view

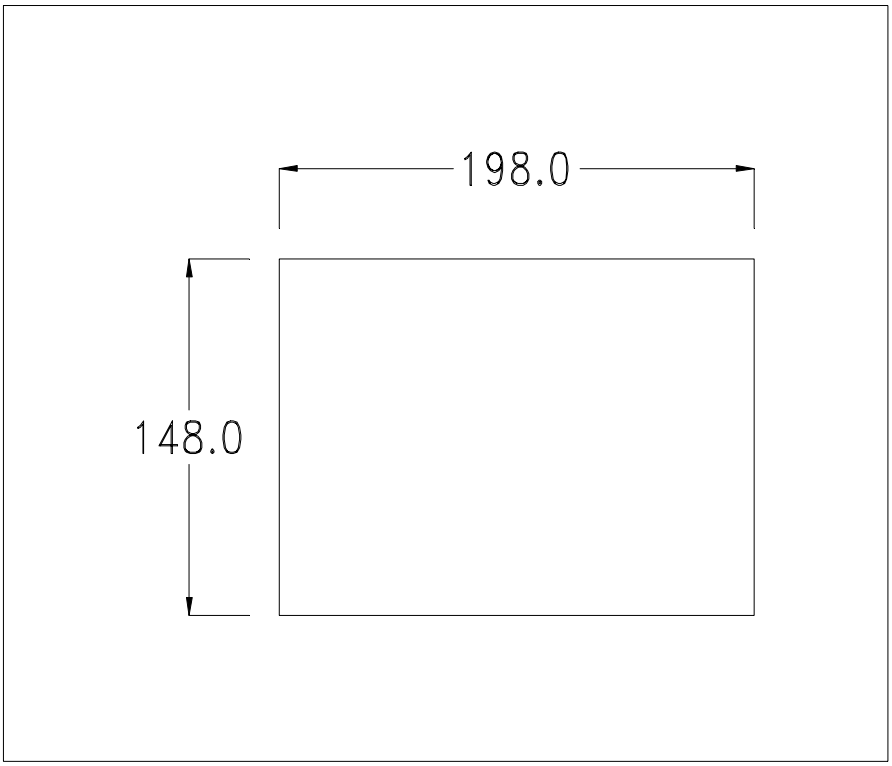


Position	Function
A	Power supply connector
D	ASP serial port for communicating with PC or other devices
E	MSP serial port for communicating with PLC/PC
F	LPT port for connecting printer (Optional)
G	Trimmer for brightness control (B&W)
H	Trimmer for brightness control (Color)

Dimensions and Cut-out







To fix the sealing gasket and secure the VT to the container see “Chapter 16 -> Mounting the terminal within the container“.

Where accessories need to be fixed in or onto the VT terminal, you are advised to do this before securing the VT to its container.

Accessories

Any accessories should be mounted in accordance with the instructions in the relevant chapter (see “Chapter 18 -> Video terminal accessories“).

Transfer PC -> VT

For everything to function properly, the first time the VT operator terminal is switched on it needs to be correctly loaded, that is it needs to have transferred to it:

- Firmware
- Communication driver
- Project

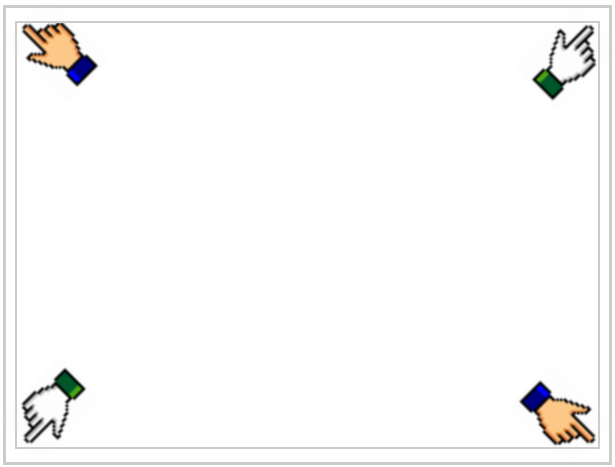
(Given that the transfer of the three files in practice occurs with a single operation, it will be defined as “Project transfer” for the sake of simplicity.)

For this it is essential that the VT be prepared to receive the transfer.

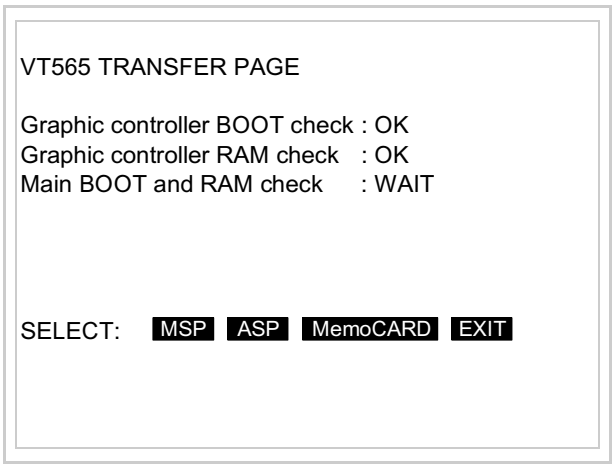
Preparation for reception

The program VTWIN (see Software Manual) must be used for the transfer, but the terminal must be set up to receive. This means carrying out the following steps:

- Check that the VT is off
- Check that there is a serial connection between the PC and the VT
- Switch on the VT by pressing simultaneously on two diagonally opposed angles of the screen



and wait a moment, or, using the appropriate button (see Page 14-14), till the VT displays the following mask



The on-screen ▣ to press depends on the port you intend to use (MSP or ASP). The VT is now ready to receive (see Software Manual for information on the transmission procedure). The ▣ MemoCARD appears if the Memory Card has been inserted in the VT (see Page 14-15).

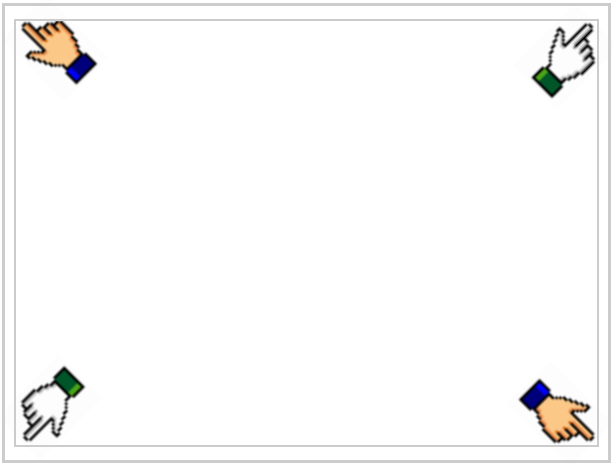
Information relating to driver

After the project has been transferred, the VT can make available information relating to what has been loaded. The information regards:

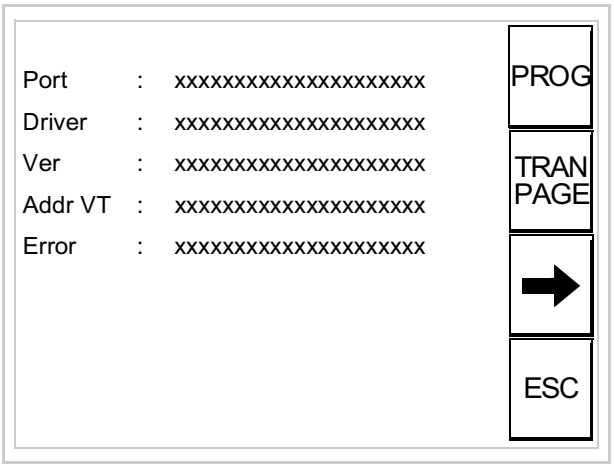
- Serial ports present
- The name of the driver loaded
- The version of the driver loaded
- Network address of the VT
- Last error to have occurred

To acquire this information carry out the following operations:

- Be situated in any page of the project
- Press two diagonally opposed angles that are free of any settable objects or buttons (at least one angle must be free)



and you will see



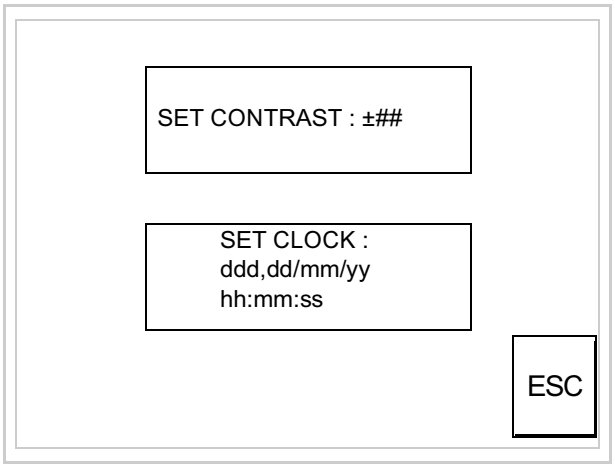
There is one of these pages for each communication port; movement between the various pages is effected by pressing [→].

From this page you can:

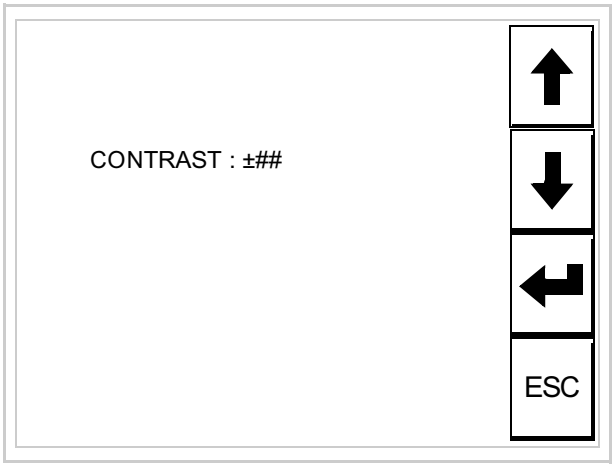
- Set the clock and the contrast
- Prepare the VT to receive the program
- Use the Memory Card

Setting the clock and the contrast:

To set the clock and the contrast, while displaying the above illustrated page, press [PROG]; the following mask appears

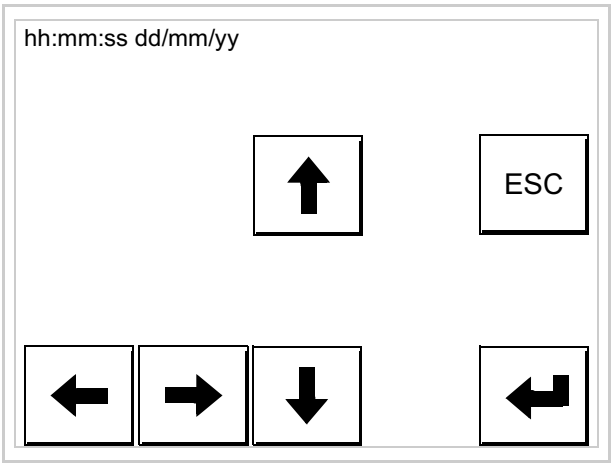


To set the contrast touch the words SET CONTRAST on the display; you will see the following mask



Use the arrow ⧉⧉ for any variation (see “Chapter 21 -> Operation of terminal with touch screen“).

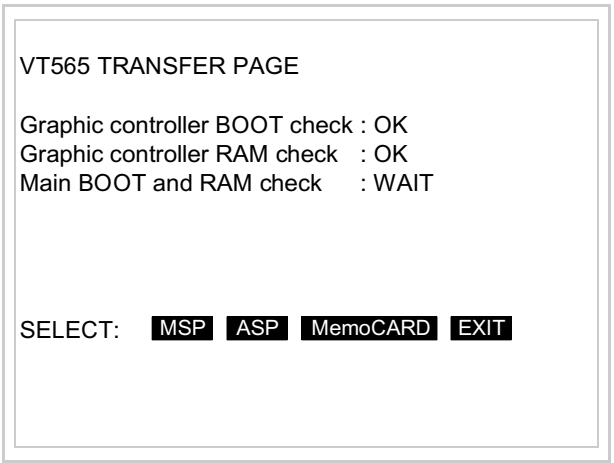
To set the clock touch the words SET CLOCK on the display; the following mask appears



Use the arrow ⧉⧉ for any variation (see “Chapter 21 -> Operation of terminal with touch screen“).

Prepare the VT to receive the program:

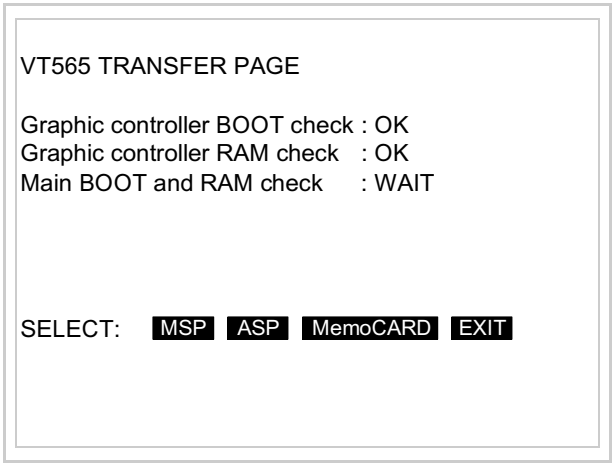
To prepare the VT to receive the program, while displaying the driver information page (see Page 14-12), press TRAN PAGE, and you will see the following mask



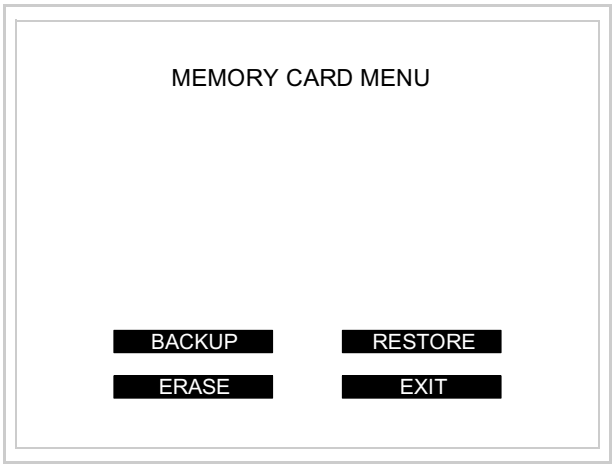
The on-screen ▣ to press depends on the port you intend to use (MSP or ASP). The VT terminal is now ready to receive (consult Software Manual for information on the transmission procedure).

Using the Memory Card:

While displaying the driver information page, press TRAN PAGE and the following mask will appear:



Touch the ▣ MemoCARD on the screen (if the key is not on screen, see Page 14-11) and the following mask will appear:



For the meaning and the functions of the keys see “Chapter 18 -> Memory card“.

Possible error messages that may be encountered in the driver information page are:

- PR ERR

  Problem-> Errors have been detected in the data exchange between the VT and the Device.
  Solution-> Check the cable; there may be disturbance.

- COM BROKEN

  Problem-> Communication between VT and Device interrupted.
  Solution-> Check the serial connection cable.

An error message followed by [*] indicates that the error is not currently present but was and has since disappeared.

Example: COM BROKEN*

When ESC is pressed you quit the display of information regarding the driver.

Improving display color quality

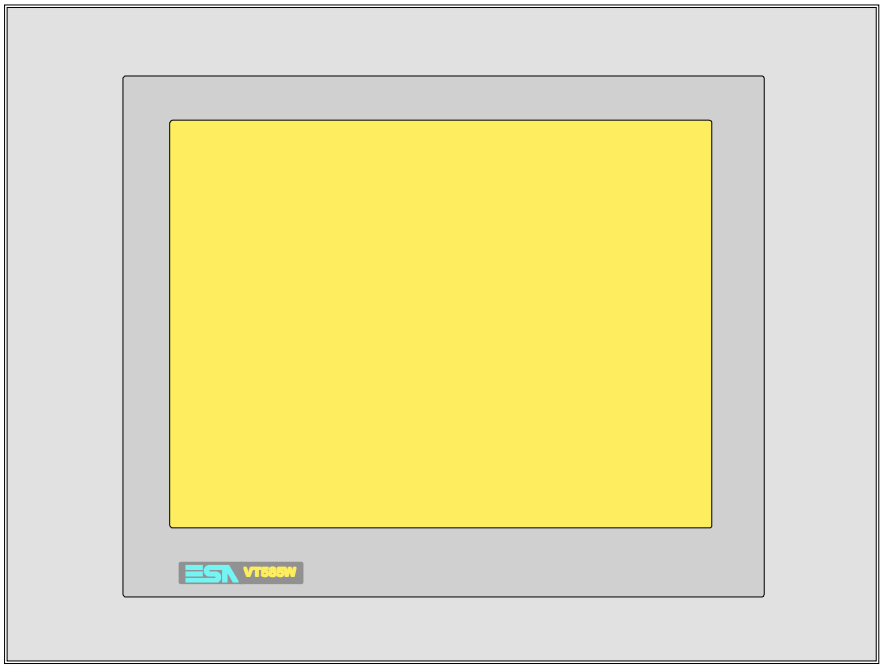
To improve the color quality, adjust the contrast of the display: if the colors are too dark increase the contrast; if, on the other hand, the colors are too light, decrease the contrast.

Adjusting the contrast on the display

To improve the quality of the representation on the display it may be necessary to adjust its contrast. This can be done by going to the page proposed (see Page 14-13) and changing the value (from +63 to -64) in evidence at that moment. Increase the value to darken the display; to lighten it, decrease the value.

Chapter 15 Video terminal VT585W

This chapter consists of 20 pages.



Technical characteristics The following table lists the principal technical characteristics of the product in question.

Code of terminal	Characteristics of the terminal		
VT585W APS00			
VT585W APT00			
Display		▼	▼
Type	LCD Monochromatic STN		
	LCD 256 Colors STN		●
	LCD 256 Colors TFT	●	
Touch screen [cells]	Resistive matrix 40x30 (Cell:16x16 pixels)	●	●
Representational format	Graphic	●	●
Resolution [pixels]	640 x 480	●	●
Rows per character	30 x 80 / 15 x 40 / 7 x 20	●	●
Dimension of visible area [mm]	211,2 x 158 (10,4”)	●	
	211,2 x 158,4 (10,4”)		●
Character matrix in text mode [pixels]	8 x16 / 16 x 32 / 32 x 64	●	●
Character size [mm] x1 / x2 / x4	2,7 x 5,4 / 5,4 x 10,7 / 10,7 x 21,4	●	●
Contrast adjustment	Software	●	●
Character set	Programmable fonts	●	●
Backlighting			
Type	LED		
	CCFL lamp	●	●
Standard lamp-life at 25°C [hours]	15000	●	●

Code of terminal	Characteristics of the terminal	VT585W APS00	VT585W APT00
User memory			
Project [Bytes]	640K + 1792K (Text + Graphic)	●	●
Data memory [Bytes]	128K (With back-up battery)	●	●
Memory Card for backup	8Mb	●	●
Memory Card for expansion	4Mb (Only for graphic type)	●	●
Interfaces			
MSP (Multi-serial port)	RS232/RS422/RS485/TTY-20mA	●	●
ASP (Auxiliary serial port)	RS232/RS485	●	●
ASP-8 (Auxiliary serial port)	RS232		
ASP-9 (Auxiliary serial port)	RS232		
LPT parallel port	Centronics	●	●
Auxiliary port	Connection for accessory devices	●	●
Accessories			
Connectable accessories	See table ”Chapter 18”	●	●
Clock			
Hardware clock	With back-up battery	●	●
Networks			
Integrated	Profibus-DP		
	CAN Open (Optoisolated interface)		
Optional	See table ”Chapter 18”	●	●
Proprietary networks			
ESA-Net	Network server	●	●
	Network client	●	●
Technical data			
Power supply	24Vdc (18..32Vdc)		
Power absorbed at 24Vdc	15W		
Protection fuse	Ø5x20mm - 1,25A Quick Blow F		
Protection level	IP65 (front-end)		
Working temperature	0..50°C		
Storage and transportation temperature	-20..+60°C		
Humidity (non-condensing)	<85%		
Weight	4000gr		
Dimensions			
External L x H x D [mm]	346 x 260 x 74		
Cut-out L x H [mm]	314 x 240		
Certification			
Certifications and approvals	CE		

Functions

The following table lists in alphabetical order all the functions of the VT in question.

Table 15.1: Functions and objects realizable with this VT (Part 1 of 3)

Code of terminal		
VT585W *****		
Objects/Functions	Quantity	▼
Alarm field		●
Alarm help	1024	●
Alarm history buffer	256	●
Alarm statistics		
Alarms (Total/active simultaneously)	1024/256	●
Arc		●
Backup/Restore		●
Bar data		●
Bit-group-structured dynamic bitmaps		●
Bit-wise password	8bits	●
Buttons	320 x page	●
Circles		●
Command: Change language		●
Command: Clear trend buffer		●
Command: Delete recipe		●
Command: Hardcopy		●
Command: Load recipe from data memory		●
Command: Modify password		●
Command: Next page		●
Command: Page help		●
Command: Password login		●
Command: Password logout		●
Command: Previous page		●
Command: Print alarm history		●
Command: Printer form feed		●
Command: Quit project		●
Command: Report		●
Command: Restarts reading time-sampled trend		●
Command: Run pipeline		●
Command: Save recipe in data memory		●
Command: Save recipe received from device in buffer		●
Command: Save recipe received from device in data memory		●
Command: Send recipe from video buffer to device		●
Command: Send recipe to device		●
Command: Service page		●
Command: Show alarms history		●
Command: Show page directory		●

*) indicative value determined by the dimensions of the project, **) depends on memory available

Table 15.1: Functions and objects realizable with this VT (Part 2 of 3)

Code of terminal		
VT585W *****		
Objects/Functions	**Quantity**	▼
Command: Show project information		●
Command: Show recipe directory		●
Command: Show sequence directory		
Command: Shows driver status page		●
Command: Shows page help		●
Command: Shows page with function: PG		
Command: Stops reading time sampled trend		●
Command: Trend reading saved in device		●
Command: Zero number of general pages		●
Date field		●
Day-of-the-week field		●
Dynamic texts: Bit-group-structured dynamic texts	1024*	●
Dynamic texts: Single-bit dynamic texts		●
Dynamic texts: Value-structured dynamic texts		●
E-keys		
F-keys		
Free terminal		
Function: Disables key		
Function: Go to page		●
Function: Internal command		●
Function: Invert bit value		●
Function: Macro		●
Function: None		
Function: Reset bit permanently		●
Function: Reset real-time bit		●
Function: Sequences		
Function: Sets bit permanently		●
Function: Sets real-time bit		●
Function: Value-structure direct command		●
Global configuration of E-keys		
Global configuration of F-keys		
Info-messages (Total/active simultaneously)	1024/256	●
Labels		●
LEDs assigned to sequence		
Lines		●
Lists of bitmap images		●
Lists of texts		●
Local configuration of E-keys		
Local configuration of F-keys		

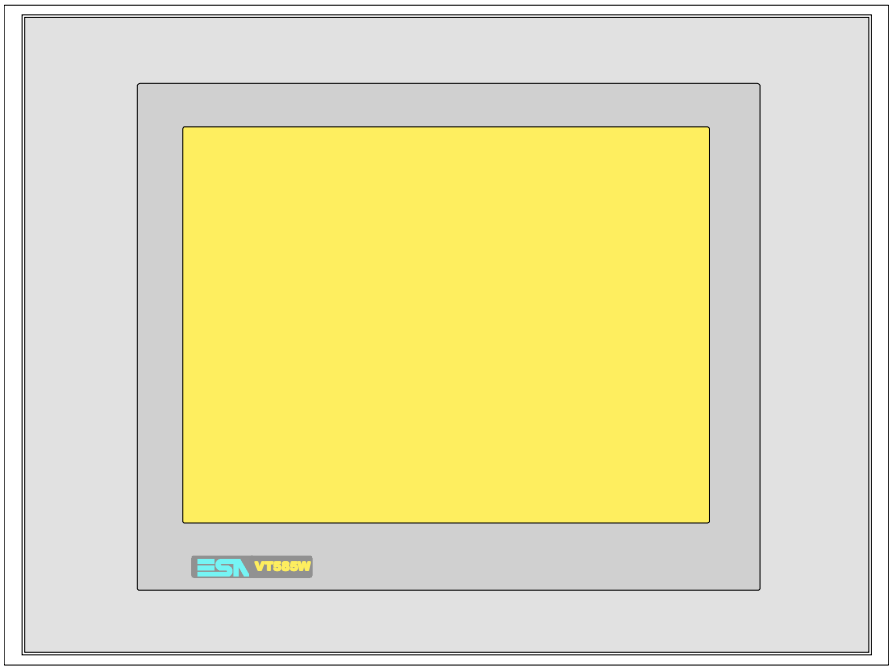
*) indicative value determined by the dimensions of the project, **) depends on memory available

Table 15.1: Functions and objects realizable with this VT (Part 3 of 3)

Code of terminal		
VT585W *****		
Objects/Functions	**Quantity**	▼
Macro field		
Message field		●
Message help	1024	●
Multilanguage texts	8 Langs.	●
Page	1024	●
Page help	1024	●
Password	10	●
Pipeline (Number/Total bytes)	64/512	●
Print		●
Programmable fonts		●
Project images		●
Public variables of ESANET network (Number/Tolat bytes)	128/1024	●
Random sequences		
Recipe field for recipe structure		●
Recipes (Number of variables per recipe)	1024/512	●
Rectangles		●
Redefinable characters		
Single-bit-structured dynamic bitmaps		●
Start/stop sequences		
Static bitmaps		●
System messages		●
System variables assigned to recipe structure		●
Time long field		●
Time short field		●
Trends (Trends x page/Channels x trend)	8/8	●
Trends sampled automatically (Memory/Trends/Readings)	4096byte /**/640	●
Trends sampled on command (Memory/Trends/Readings)		●
Value direct command: ADD		●
Value direct command: AND		●
Value direct command: OR		●
Value direct command: SET		●
Value direct command: SUBTRACT		●
Value direct command: XOR		●
Value-structured dynamic bitmaps		●
Variables: Floating Point numerical variablest	128 x pages	●
Variables: Numerical variables (DEC, HEX, BIN, BCD)		●
Variables: String variables (ASCII)		●

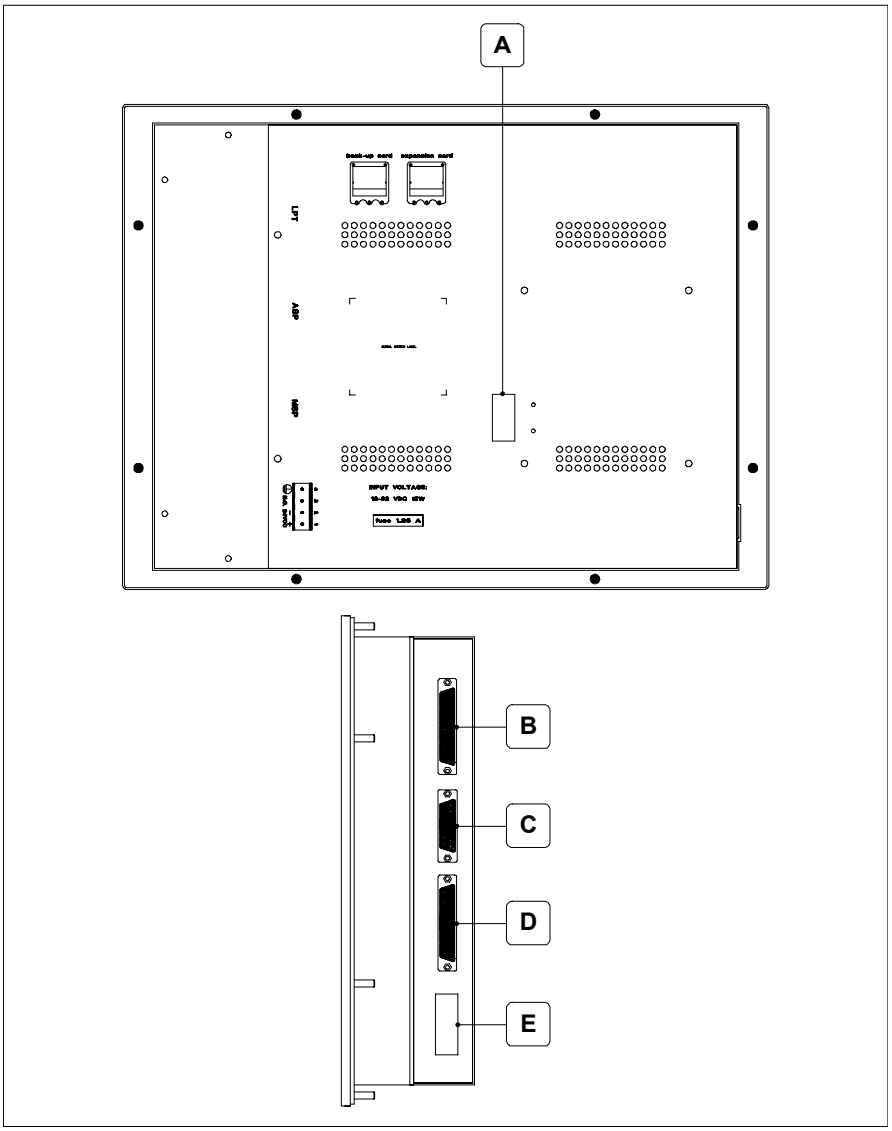
*) indicative value determined by the dimensions of the project, **) depends on memory available

Front view



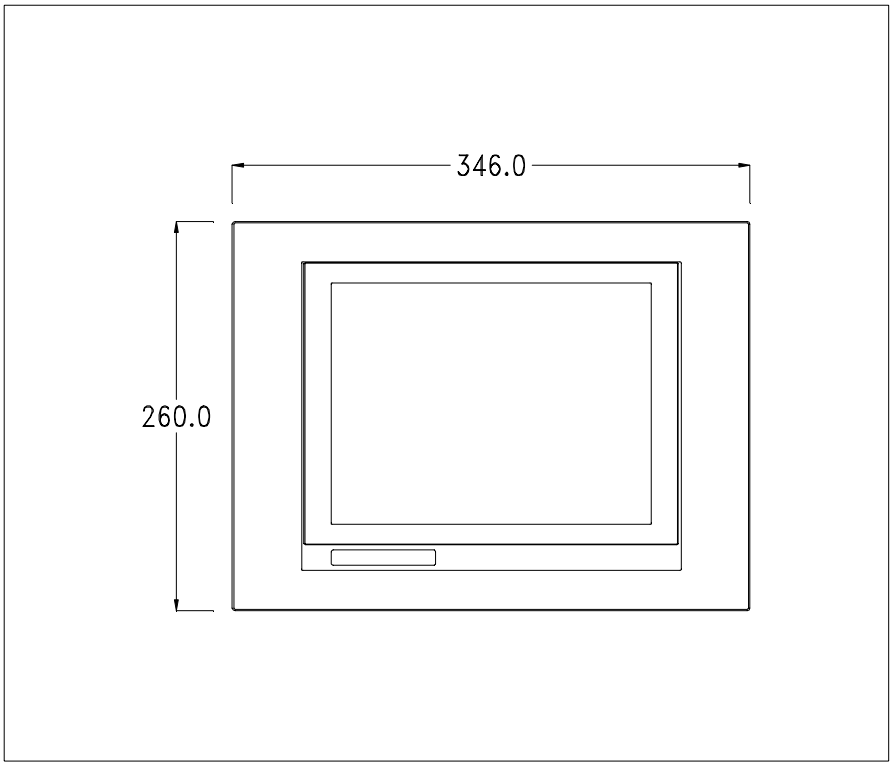
All buttons and signals are defined via the programming software (see Software Manual).

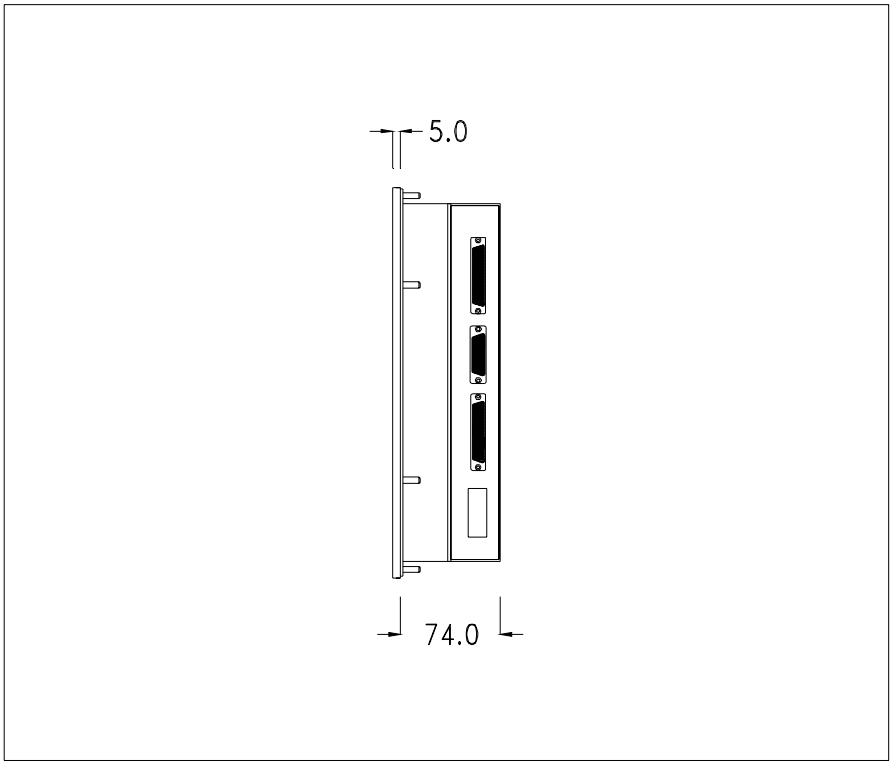
Rear view

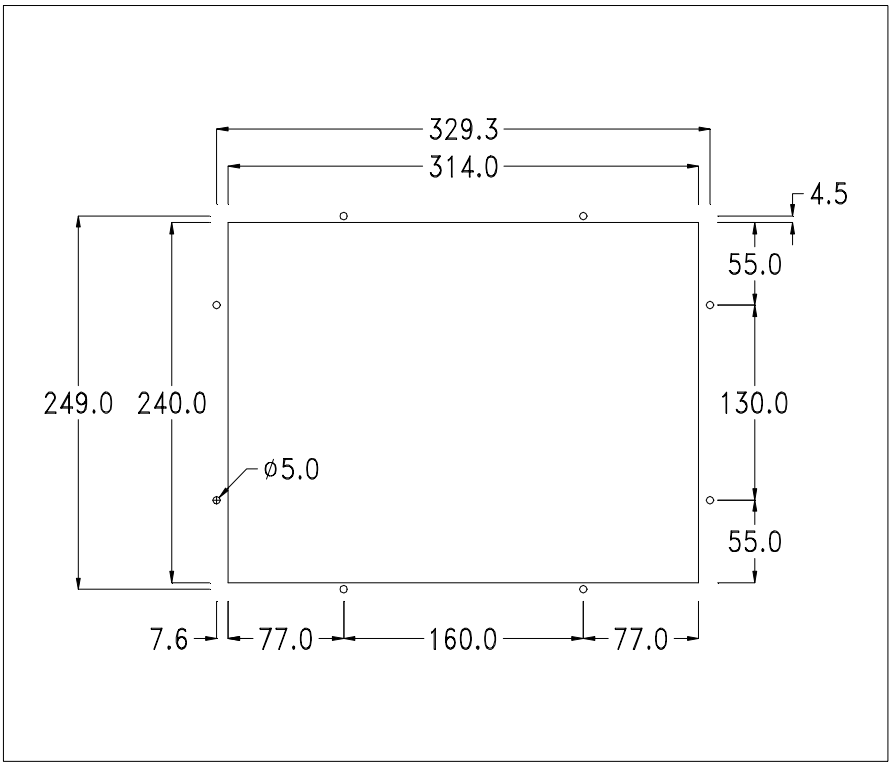


Position	Function
A	Porta ausiliaria per il collegamento degli accessori opzionali
B	Porta LPT per collegamento stampante
C	Porta seriale ASP per la comunicazione con PC o altri dispositivi
D	Porta seriale MSP per la comunicazione con PLC/PC
E	Connettore di alimentazione

Dimensions and Cut-out







To fix the sealing gasket and secure the VT to the container see “Chapter 16 -> Mounting the terminal within the container“.

Where accessories need to be fixed in or onto the VT terminal, you are advised to do this before securing the VT to its container.

Accessories

Any accessories should be mounted in accordance with the instructions in the relevant chapter (see “Chapter 18 -> Video terminal accessories“).

Transfer PC -> VT

For everything to function properly, the first time the VT operator terminal is switched on it needs to be correctly loaded, that is it needs to have transferred to it:

- Firmware
- Communication driver
- Project

(Given that the transfer of the three files in practice occurs with a single operation, it will be defined as “Project transfer” for the sake of simplicity.)

For this it is essential that the VT be prepared to receive the transfer.

Preparation for reception

The programme VTWIN must be used for the transfer (see Software Manual), but the terminal must be prepared for reception.

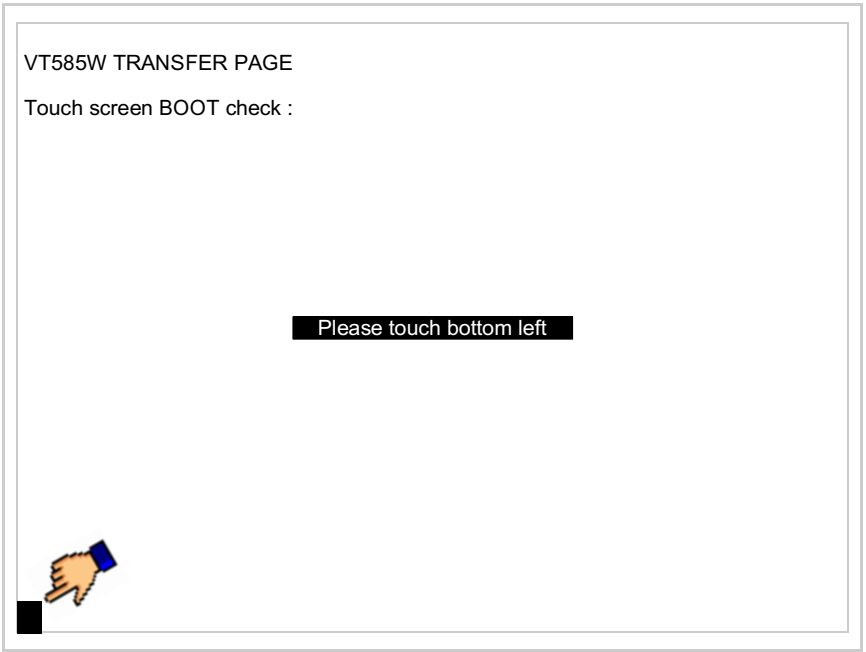
When the VT is switched on it may be that you immediately see a page for calibrating the Touch Screen. This calibration procedure must be carried out with great care because the precision of the definition of the key-areas depends on the calibration.

If calibration is carried out incorrectly or imprecisely, switch off the VT, then switch it on again and repeat the procedure.

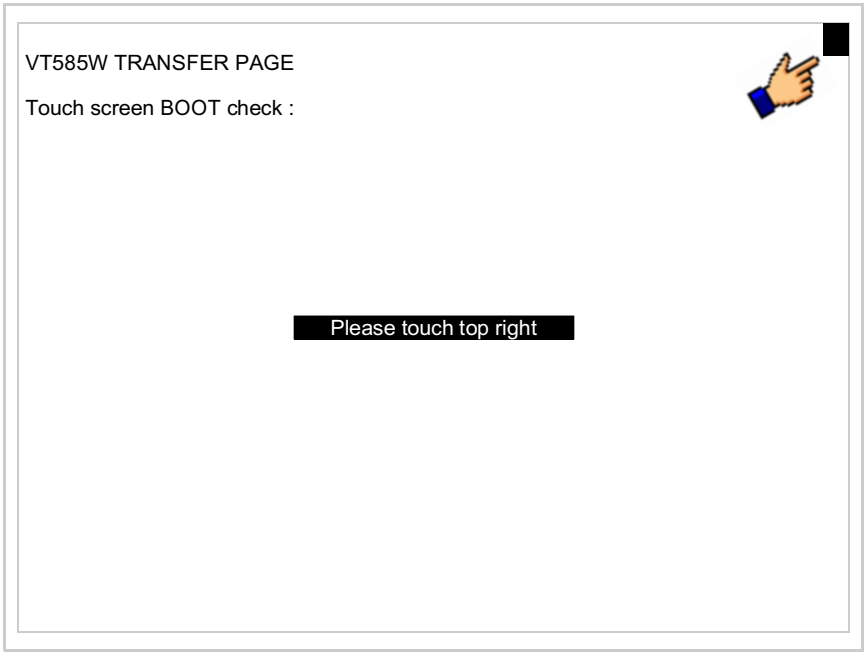
Once the project has been loaded, it is no longer possible to calibrate the Touch Screen.

This means carrying out the following steps:

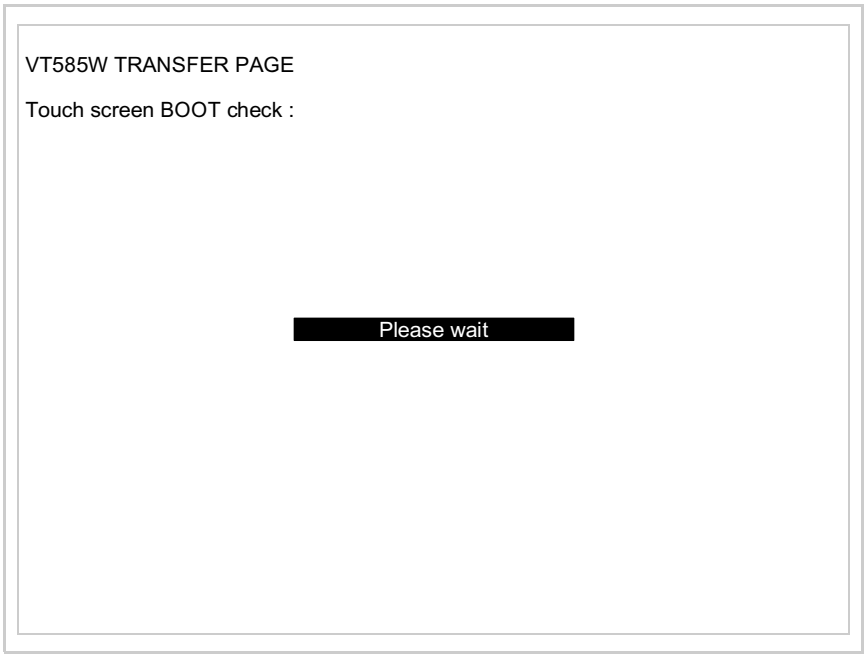
- Check that the VT is off
- Check that there is a serial connection between the PC and the VT
- Switch on the VT; the following mask appears:



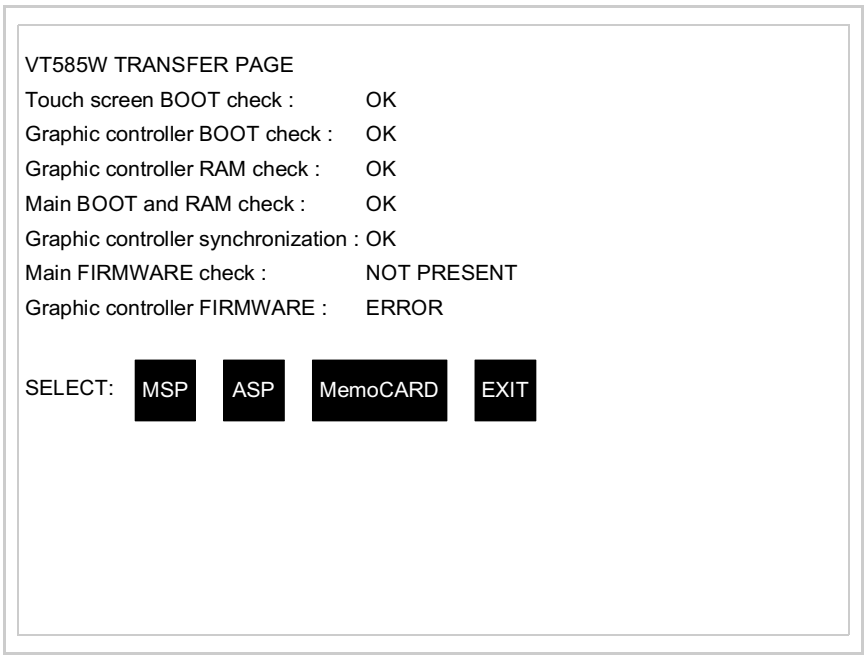
- Touch the corner indicated in the figure; the following page is now displayed:



- Touch the corner indicated in the figure to complete the calibration procedure; the following page is then displayed:



The calibration is now completed; wait a few moments till the following mask appears on the VT (see also Page 15-17)



Depending on which port is to be used (MSP or ASP), touch the appropriate ▣ on the display. The VT is now ready to receive (see Software Manual for transfer procedure). The MemoCARD ▣ will be displayed if the Memory Card is inserted in the VT (see Page 15-17).

Information relating to driver

After the project has been transferred, the VT can make available information relating to what has been loaded. The information regards:

- Serial ports present
- The name of the driver loaded
- The version of the driver loaded
- Network address of the VT
- Last error to have occurred

To acquire this information carry out the following operations:

- Be situated in any page of the project
- Press two diagonally opposed angles that are free of any settable objects or buttons (at least one angle must be free)

and you will see

There is one of these pages for each communication port; movement between the various pages is effected by pressing [→].

From this page you can:

- Set the clock and the contrast
- Prepare the VT to receive the program
- Use the Memory Card

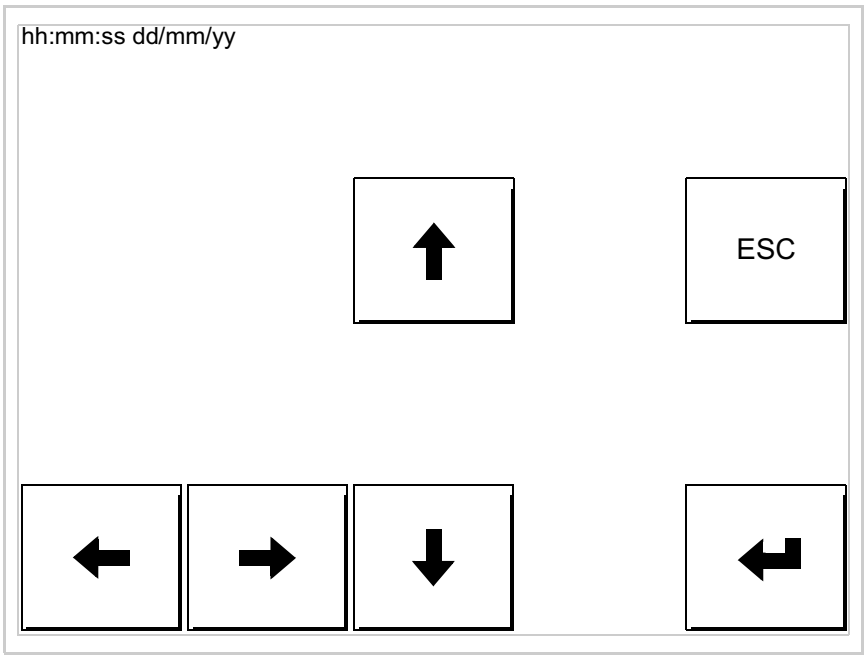
Setting the clock and the contrast:

To set the clock and the contrast, while displaying the above illustrated page, press PROG; the following mask appears

To set the contrast touch the words SET CONTRAST on the display; you will see the following mask

Use the arrow ⧉⧉ for any variation (see “Chapter 21 -> Operation of terminal with touch screen“).

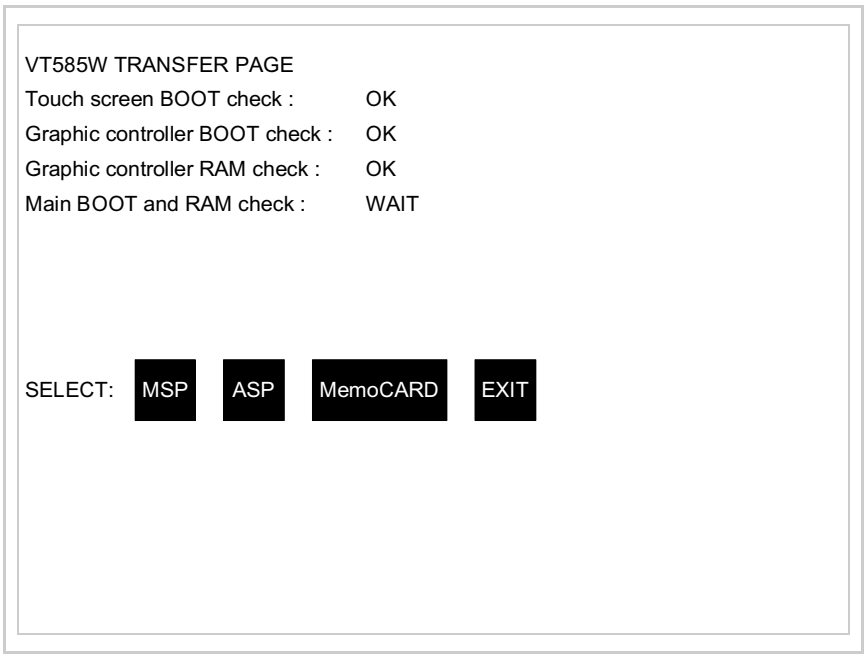
To set the clock touch the words SET CLOCK on the display; the following mask appears



Use the arrow ◻◻ for any variation (see “Chapter 21 -> Operation of terminal with touch screen“).

Prepare the VT to receive the program:

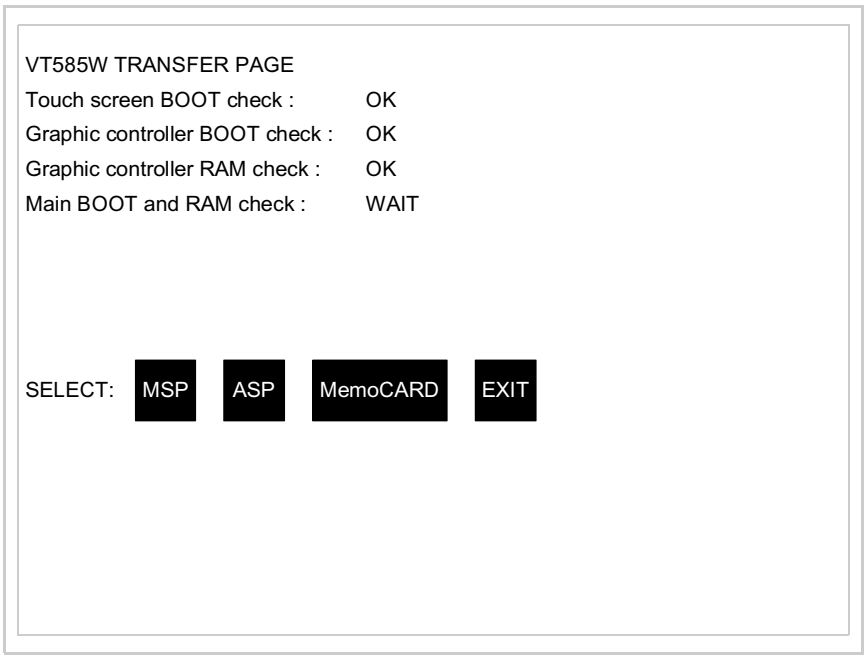
To prepare the VT to receive the program, while displaying the driver information page (see Page 15-13), press TRAN PAGE, and you will see the following mask



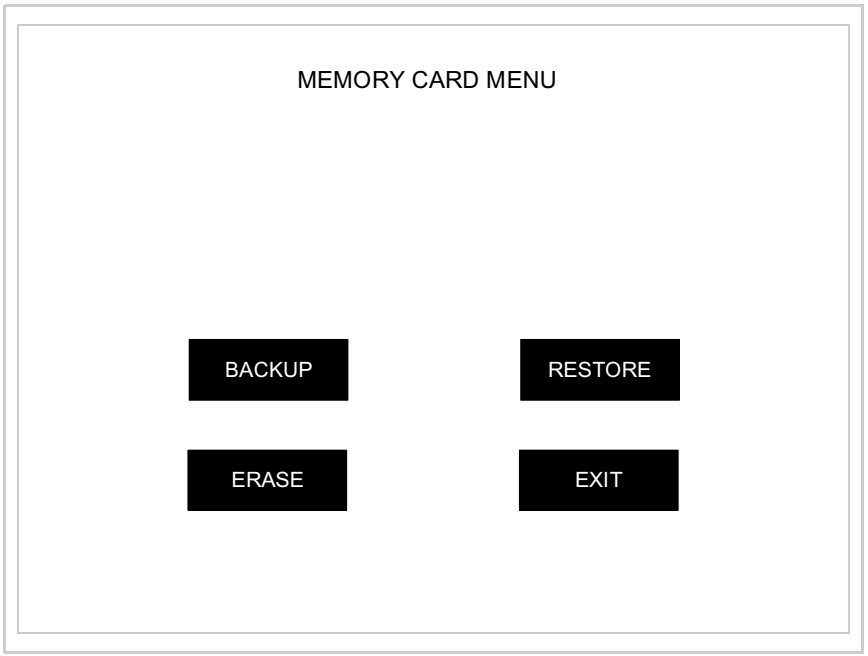
The on-screen ◻ to press depends on the port you intend to use (MSP or ASP). The VT terminal is now ready to receive (consult Software Manual for information on the transmission procedure).

Using the Memory Card:

While displaying the driver information page, press TRAN PAGE and the following mask will appear:



Touch the ▣ MemoCARD on the screen (if the key is not on screen, see Page 15-11) and the following mask will appear:



For the meaning and the functions of the keys see “Chapter 18 -> Memory card“.

Possible error messages that may be encountered in the driver information page are:

- PR ERR

  Problem-> Errors have been detected in the data exchange between the VT and the Device.
  Solution-> Check the cable; there may be disturbance.

- COM BROKEN

  Problem-> Communication between VT and Device interrupted.
  Solution-> Check the serial connection cable.

An error message followed by [*] indicates that the error is not currently present but was and has since disappeared.

Example: COM BROKEN*

When ESC is pressed you quit the display of information regarding the driver.

Improving display color quality

To improve the color quality, adjust the contrast of the display: if the colors are too dark increase the contrast; if, on the other hand, the colors are too light, decrease the contrast.

Adjusting the contrast on the display

To improve the quality of the representation on the display it may be necessary to adjust its contrast. This can be done by going to the page proposed (see Page 15-15) and changing the value (from +63 to -64) in evidence at that moment. Increase the value to darken the display; to lighten it decrease the value.

Chapter 16 Mounting the terminal within the container

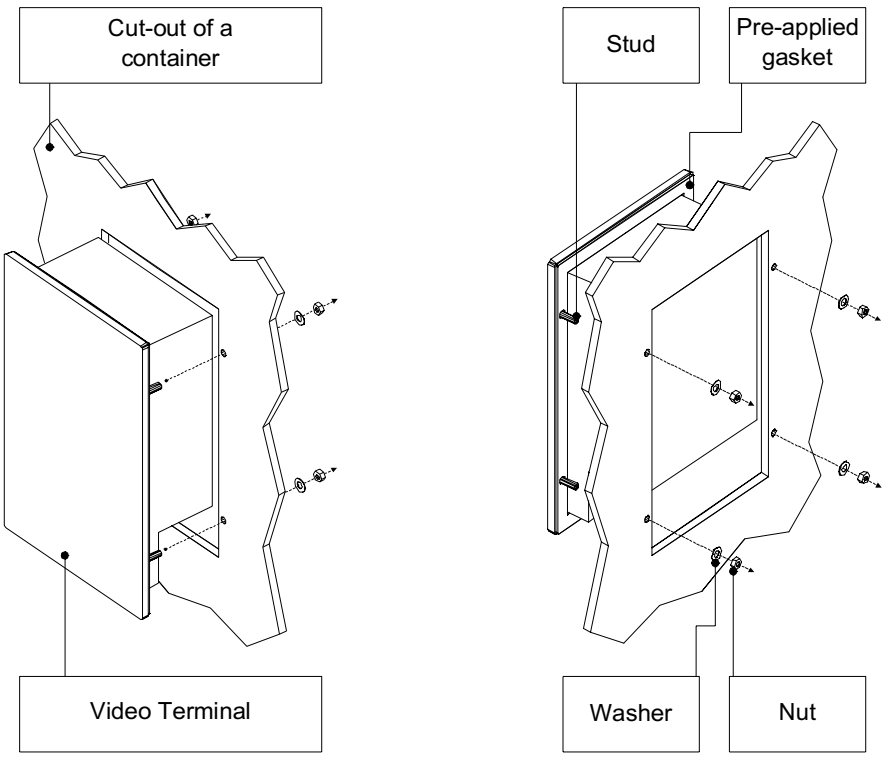
This chapter consists of 6 pages.

The VT comes supplied with the elements necessary for mounting it within the host container and fixing the sealing gasket giving the declared level of IP protection.

There are two kinds of terminal: those with the gasket already in place and the mounting within the container being secured by means of nuts, and those where the gasket is to be fitted in the installation phase and the means of securing are hooks.

Using nuts

The figure below shows the front and back views of a VT inserted in a container. Under the figure is to be found the sequence of operations to be carried out to ensure that the fixing is correct.

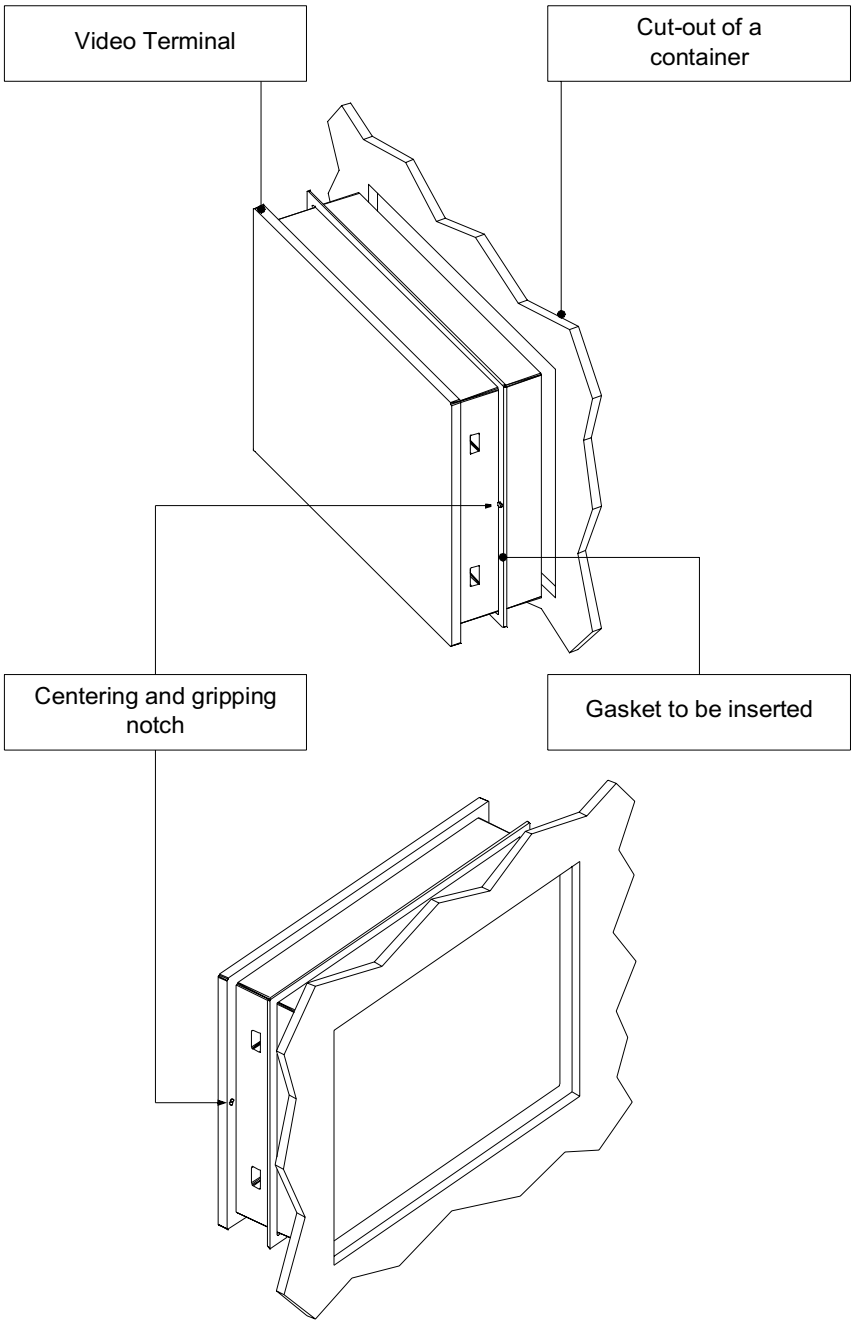


After preparing the container that will host the VT:

- Insert the VT in the cut-out
- Hold the VT against the wall
- Insert first the washer then the nut into the fastener
- Tighten the nuts till the gasket has a firm grip

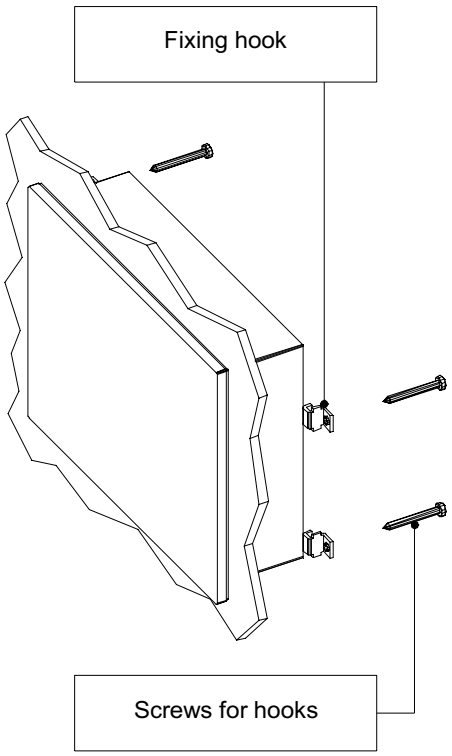
Using hooks

The illustrations appearing below show in front and rear views the sequence of actions for mounting a VT within a container.

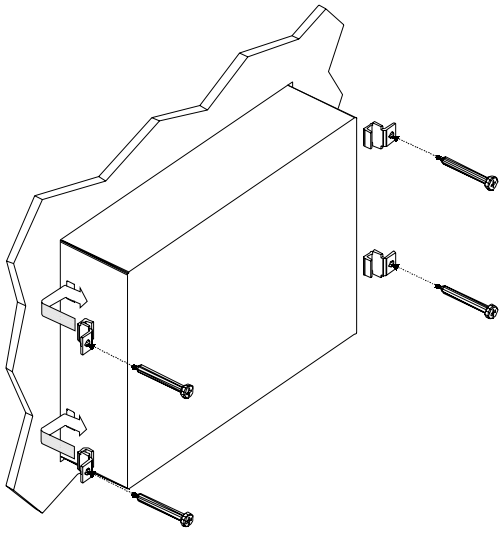


After preparing the container that will host the VT:

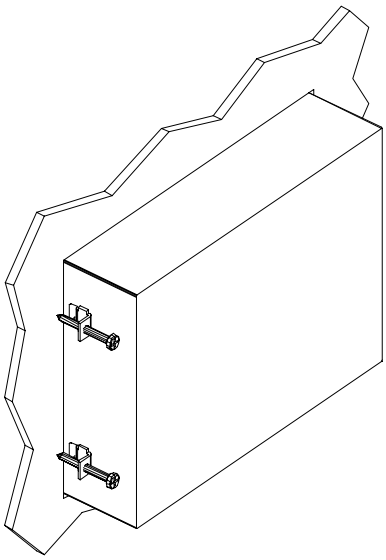
- Insert the gasket in the VT the right way round as indicated by the centering notches



• Prepare the fixing hooks
• Thread the screws into the hook by about 10mm



• Insert the VT and hold it pressed against the container
• Insert the hooks into the slots following the direction indicated by the arrow and tighten the screws as far as they go



View of terminal with correct fixing.

The number and position of the hooks do not influence the fixing procedure. The illustrations are to show the way the hooks work.

Chapter 17 Communication ports

This chapter consists of 10 pages.

All VTs communicate with other devices by means of serial and/or parallel communication ports. We list on the following page the individual ports with the respective type of communication and the function of the connection pins.

General notes

Serial communication is particularly prone to disturbances. To limit the influence of these disturbances it is necessary to use good quality shielded cables.

The table immediately below lists the characteristics of the cable we recommend for serial connection.

Specifications of serial connection cable	
Direct current resistance	Max. 151 Ohm/Km
Capacity coupling	Max. 29pF/m
Shielding	> 80% or total

Particular care should be taken in the choice and lay-out of cables, specially with regard to the VT <-> Device connection serial cable.

Always:
- Find the shortest route
- Lay disturbed cables separately

Disconnect the power supply before connecting or disconnecting the communication cables so as to avoid possible damage to the VT and/or the connected device.

Necessary steps

To have the communication ports (MSP, ASP or ASP-9) functioning properly, certain pins on the VT side need to be jump-connected. Which pins need to be connected depends on which communication standard is to be used (RS232, RS422, RS485 or C.L.TTY-20mA).

Table 17.1: Jumpers to be effected inside the communication cable.

Signal	Pin number			Communication standard									
	MSP	ASP-9	ASP	RS232		RS422		RS485		C.L.a		C.L.p	
RTS OUT	4	7	10		2		2		2		2		2
CTS IN	5	8	11										
IKR OUT (C.L.)	15				1		1		1				
RX+ IN (C.L.)	18												
Signal GND	7				1		1		1		1		
RX- IN (C.L.)	25												
TX- OUT (C.L.)	11												

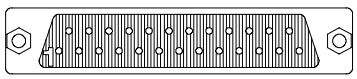
Notes:
1 - Jumpers always to be effected.
2 - Jumpers to be effected only if the corresponding signals are not handled by the device connected to the VT.

C.L.a - Current Loop (Activ VT), C.L.p - Current Loop (Passive VT)

MSP serial port

The MSP (Multi Serial Port) is present on all VTs and is used to connect other devices including the PC used to transfer the project. It consists of a connector (D-Sub 25 pin female) and can communicate using RS232, RS422, RS485 and C.L. (TTY-20mA).

MSP
Multi Serial Port
25 pin female



Pin	Signal	Notes
1	N.C.	Not connected
2	Tx OUT	RS232
3	Rx IN	RS232
4	RTS OUT	RS232
5	CTS IN	RS232
6	N.C.	Not connected
7	Signal GND	Internal reference 0Volt
8	N.C.	Not connected
9	Tx +OUT	C.L. (TTY-20mA) Current loop
10	Tx/Rx -IN/OUT	RS485
11	Tx -OUT	C.L. (TTY-20mA) Current loop
12	Tx -OUT	RS422
13	Rx +IN	RS422
14	IKT OUT	C.L. (TTY-20mA) Current loop
15	IKR OUT	C.L. (TTY-20mA) Current loop
16	+5Vdc (150mA Max.)	**Reserved for Esa**
17	N.C.	Not connected
18	Rx +IN	C.L. (TTY-20mA) Current loop
19	N.C.	Not connected
20	N.C.	Not connected
21	N.C.	Not connected
22	Tx/Rx +IN/OUT	RS485
23	Tx +OUT	RS422
24	Rx -IN	RS422
25	Rx -IN	C.L. (TTY-20mA) Current loop

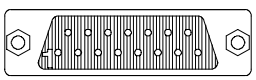
Pin 16 does not provide for commuting any kind of load (coils etc.); an input disturbance at Pin 16 can cause the VT and therefore also the industrial process itself to malfunction.

Strong input disturbances at Pin 16 could damage the VT.

ASP serial port

The ASP (Auxiliary Serial Port) consists of a D-Sub 15 pin female connector and can communicate using RS232 and RS485.

ASP
Auxiliary Serial Port
15 pin female



Pin	Signal	Notes
1	DCD IN	RS232
2	RX IN	RS232
3	TX OUT	RS232
4	DTR OUT	RS232
5	Signal GND	Internal reference 0Volt
6	N.C.	Not connected
7	Signal GND	Internal reference 0Volt
8	Tx/Rx +IN/OUT	RS485
9	DSR IN	RS232
10	RTS OUT	RS232
11	CTS IN	RS232
12	RI IN	RS232
13	+5Vdc (150mA Max.)	**Reserved for Esa**
14	N.C.	Not connected
15	Tx/Rx -IN/OUT	RS485

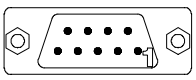
Pin 13 does not provide for commuting any kind of load (coils etc.); an input disturbance at Pin 13 can cause the VT and therefore also the industrial process itself to malfunction.

Strong input disturbances at Pin 13 could damage the VT.

ASP-9 serial port

The ASP-9 serial port (Auxiliary Serial Port) consists of a D-Sub 9 pin male connector and can communicate using RS232.

ASP-9
Auxiliary Serial Port
9 pin male

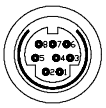


Pin	Signal	Notes
1	DCD IN	--
2	RX IN	--
3	TX OUT	--
4	DTR OUT	--
5	Signal GND	Internal reference 0Volt
6	DSR IN	--
7	RTS OUT	--
8	CTS IN	--
9	RI IN	--

ASP-8 serial port

The ASP-8 (Auxiliary Serial Port) consists of a Minidin 8 pin female connector and can communicate using RS232.

ASP
Auxiliary Serial Port
8 pin female



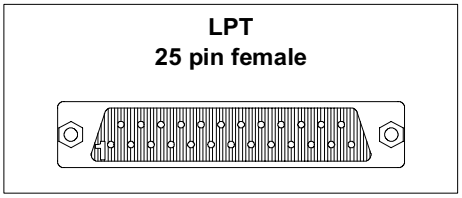
Pin	Signal	Notes
1	RX IN	--
2	TX OUT	--
3	N.C.	Not connected
4	RTS OUT	--
5	CTS IN	--
6	N.C.	Not connected
7	Signal GND	Internal reference 0Volt
8	+5Vdc (150mA Max.)	**Reserved for Esa**

Pin 8 does not provide for commuting any kind of load (coils etc.); an input disturbance at Pin 8 can cause the VT and therefore also the industrial process itself to malfunction.

Strong input disturbances at Pin 8 could damage the VT.

LPT parallel port

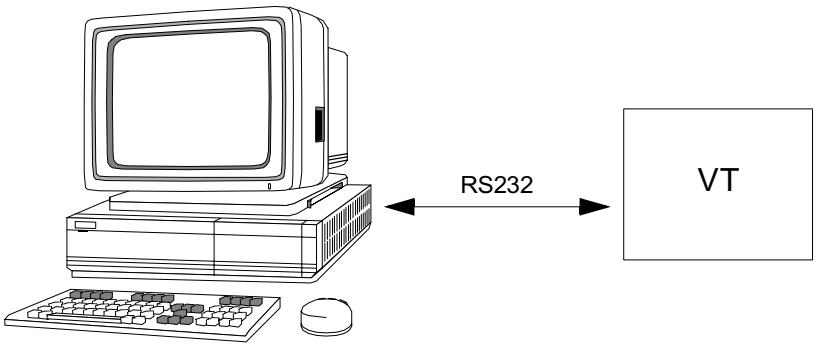
The LPT parallel port consists of a D-Sub 25 pin female connector. It is used to connect directly with the printer.



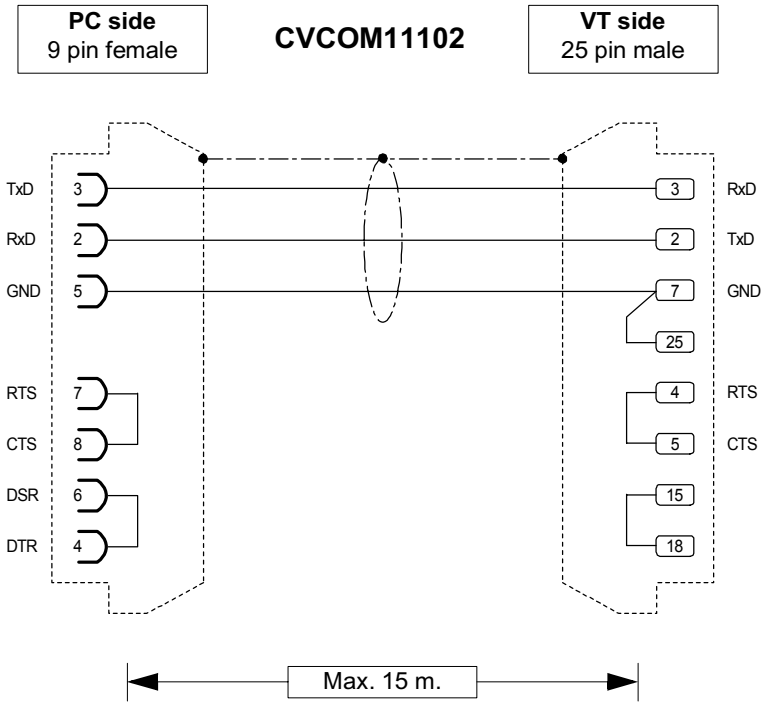
Pin	Signal	Notes
1	Strobe	--
2	PRN Data 0	--
3	PRN Data 1	--
4	PRN Data 2	--
5	PRN Data 3	--
6	PRN Data 4	--
7	PRN Data 5	--
8	PRN Data 6	--
9	PRN Data 7	--
10	N.C.	Not connected
11	PRN Busy	--
12	N.C.	Not connected
13	N.C.	Not connected
14	N.C.	Not connected
15	N.C.	Not connected
16	N.C.	Not connected
17	N.C.	Not connected
18	Signal GND	Internal reference 0Volt
19	Signal GND	Internal reference 0Volt
20	Signal GND	Internal reference 0Volt
21	Signal GND	Internal reference 0Volt
22	Signal GND	Internal reference 0Volt
23	Signal GND	Internal reference 0Volt
24	Signal GND	Internal reference 0Volt
25	Signal GND	Internal reference 0Volt

PC <-> VT connection

To transfer the communication firmware, the communication driver and the project the VT must be connected to the PC (see Software Manual).

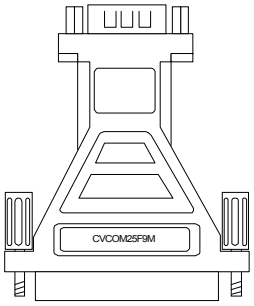


The cable required to make the connection is illustrated below.



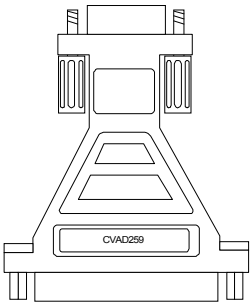
The cable in the above figure, together with the relevant adapters, can be used for all serial port connections of the VT. Below we list the adapters and the combinations necessary for the various connections.

CVCOM25F9M



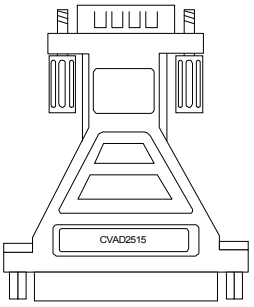
PC side
Adaptor
from 9 to 25 pins

CVAD259



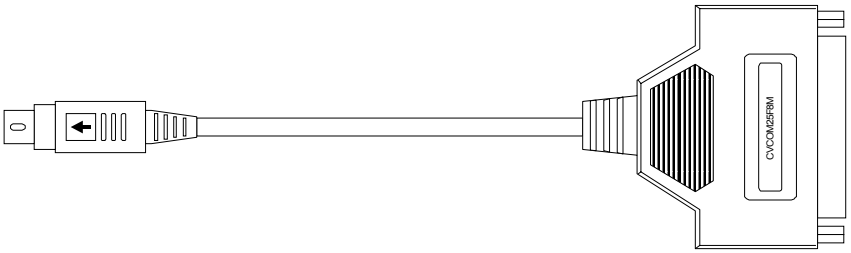
VT side
Adaptor
from 25 to 9 pins

CVAD2515



VT side
Adaptor
from 25 to 15 pins

CVCOM25F8M



VT side
Adaptor
from 25 to 8 pins

The table shows how to combine adaptors and cables connection to the various ports.

Table 17.2: Combination of serial transfer + adapters

PC serial	VT serial	Cable	Adaptor			
		CVCOM 11102	CVCOM 25F9M	CVCOM 25F8M	CVAD259	CVAD2515
9 pins	MSP	●	--	--	--	--
9 pins	ASP	●	--	--	--	●
9 pins	ASP-9	●	--	--	●	--
9 pins	ASP-8	●	--	●	--	--
25 pins	MSP	●	●	--	--	--
25 pins	ASP	●	●	--	--	●
25 pins	ASP-9	●	●	--	●	--
25 pins	ASP-8	●	●	●	--	--

Chapter 18 Video terminal accessories

This chapter consists of 52 pages.

The video terminals are made to take a series of accessories that increase their capacity and/or functionality. This chapter shows how these accessories relate to the various products. The table below shows which terminals will take which accessories.

Table 18.1: Accessories connectable to VT terminals

ACCESSORIES	TERMINALS SUPPORTING THE ACCESSORY												
	VT 50	VT 60	VT 150 W	VT 160 W	VT 170 W	VT 190 W	VT 300 W	VT 310 W	VT 320 W	VT 330 W	VT 555 W	VT 565 W	VT 585 W
Lithium battery 3,6V 1/2AA	--	--	--	--	●	●	--	--	--	--	--	--	--
Lithium button cell battery 3V CR2032	--	--	--	--	--	--	●	●	●	●	●	●	●
Memory Card 4 Mbytes	--	--	--	--	--	--	●[2]	●[2]	●[3]	●[3]	--	●[2]	●[3]
Memory Card 8 Mbytes	--	--	--	--	--	--	--	--	--	●[2]	--	--	●[2]
Memory module 512Kbytes	--	--	--	--	●[1]	●[1]	--	--	--	--	--	--	--
Integrated Interbus-S module	--	--	--	--	●	●	--	--	--	--	--	--	--
Integrated Profibus-DP module	--	--	--	--	●	●	--	--	--	--	--	--	--
RS485 serial module	--	--	--	--	●	●	--	--	--	--	--	--	--
Interbus-S module	●[5]	●	●[5]	●	●	●	●[4-5]	●[4]	●[4]	●[4]	●[5]	●	●[4]
Profibus-DP module	●[5]	●	●[5]	●	●	●	●[4-5]	●[4]	●[4]	●[4]	●[5]	●	●[4]
Adapter for connecting PC to ESANET network	●[5]	●	●[5]	●	●	●	●[5]	●	●	●	●[5]	●	●
Adapter for external CAN network	●[5]	●	●[5]	●	●	●	●[4-5]	●[4]	●[4]	●[4]	●[5]	●	●[4]
Blank keyboard	--	--	●	--	--	--	●	●	●	--	--	--	--
Serial keyboard with 20 keys + LEDs	--	--	●	--	--	--	●	●	●	--	--	--	--

Notes:
1 - Already present on purchase
2 - To be used as backup
3 - To be used as expansion or backup
4 - Can be fixed to back cover
5 - Not applicable in the case of CAN series terminals

-- : not connectable

1/2AA Battery

The function of the battery is both to maintain the contents of the RAM (work recipes) and to keep the internal clock going when there is no power supply.

Battery to be used
Lithium 3.6V ½AA

The battery should be replaced about every 12 months.

- The battery needs to be changed either when the Battery LED (on the VT keyboard) comes on or when indicated by the "Chapter 22 -> Status area for the terminal". Failure to change the battery will lead to the contents of the data memory being lost.
- The battery must be substituted with the VT power off. At this point a high capacity condenser will momentarily preserve the RAM memory information (information is typically retained for 24 hours).

Discarded batteries should be placed in appropriate containers.

Procedure for inserting or substituting the battery:

- Check that the power supply is not connected.
- Take off the hatch covering the battery compartment of the VT (see "Chapter 7 -> Rear view" and/or "Chapter 8 -> Rear view").
- Pull off the black plastic safety-cover that snaps over the battery compartment.
- Insert the new battery checking that the polarities are correct.
- Push the safety-cover back on till it snaps into place.
- Replace the hatch covering the battery compartment of the VT (see "Chapter 7 -> Rear view" and/or "Chapter 8 -> Rear view").
- Reconnect the power supply.

Cell battery

The function of the battery is both to maintain the contents of the RAM (work recipes) and to keep the internal clock going when there is no power supply.

Battery to be used
Lithium 3V cell battery CR2032

The battery should be replaced about every 12 months.

- The battery needs to be changed either when the Battery LED (on the VT keyboard) comes on or when indicated by the "Chapter 22 -> Status area for the terminal". Failure to change the battery will lead to the contents of the data memory being lost.

  In the case of products with a Touch Screen, the running down and/or absence of the battery is not indicated on the screen.

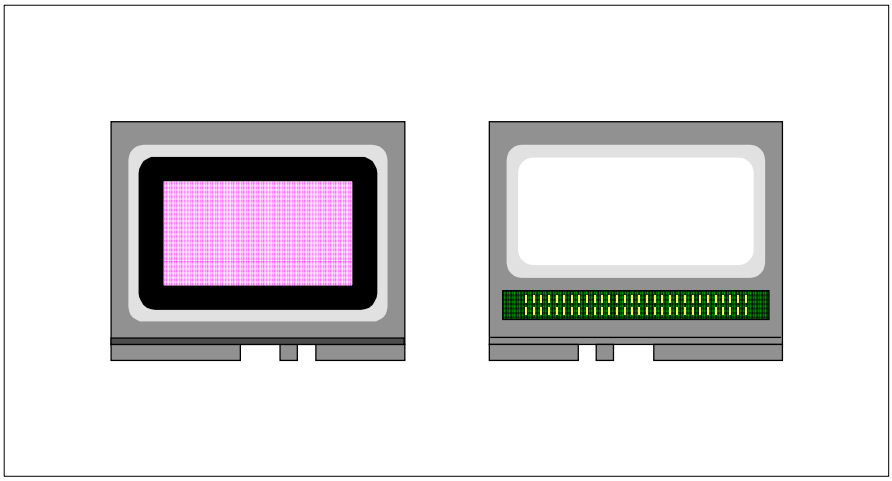
- The battery must be substituted with the VT power off. At this point a high capacity condenser will momentarily preserve the RAM memory information (information is typically retained for 24 hours).

Discarded batteries should be placed in appropriate containers.

Procedure for inserting or substituting the battery:

- Check that the power supply is not connected.
- Take off the hatch covering the battery compartment of the VT.
- Insert the new battery checking that the polarities are correct.
- Replace the hatch covering the battery compartment of the VT.
- Reconnect the power supply.

Memory card



This is a removable device in which you can store the information contained in the VT terminal.

The Memory Card (Flash EPROM type) can be used:

- as a backup for the project and firmware
- to load one or more terminals without using a PC
- to send the end-user updates (without VTWIN)

The types of information that can be stored on the Memory Card are:

- Firmware
- Project
- Recipes
- Alarm history buffer
- Start-up language
- Password

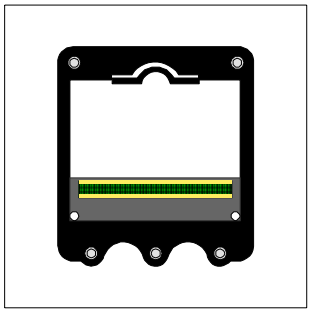
The following table lists the principal technical characteristics of the product in question.

Technical data	
Memory	4Mb or 8Mb

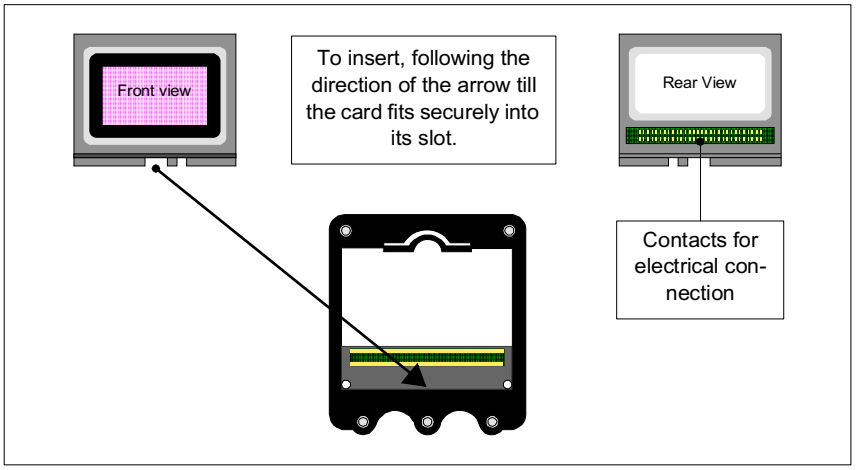
Inserting the memory card into the VT:

Procedure for inserting the card:

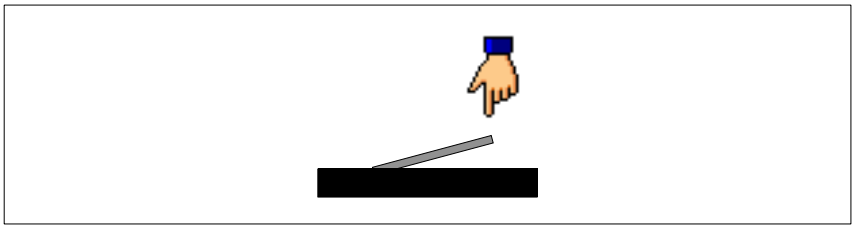
- Check that the VT is not connected to the power supply.
- Remove the back cover.
- Locate the following element.



- Insert the memory card in its housing, checking that it is the right way round.



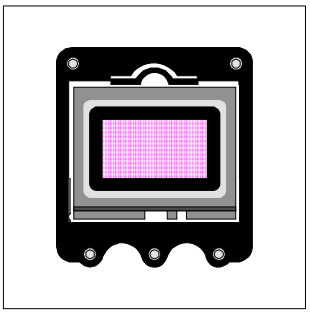
- Once the memory card fits in the groove, press lightly as shown in the figure till you feel it click into place.



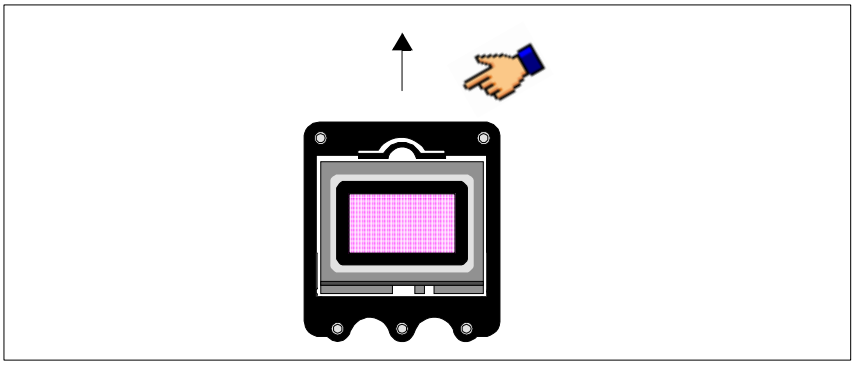
- Replace the back cover of the VT
- Reconnect the VT to the power supply.

Procedure for removing the memory card:

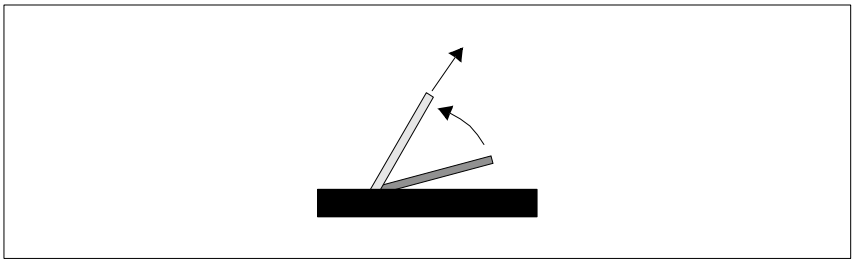
- Check that the VT power supply is disconnected.
- Remove the back cover.
- Locate the following element.



- Press lightly on the fixing tab of the memory card (see figure below) in the direction of the arrow.



- Once the memory card is unhooked (see figure) remove it following the direction of the arrow.



- Replace the back cover on the VT
- Reconnect the power supply to the VT

Using the Memory Card:

To operate the memory card you need to be in an appropriate page containing the menu with the corresponding commands (for how to enter the menu page see the chapter for the product concerned).

The graphic form of the page, the contents of the menus and their meaning depend on the type of terminal being used.

⚠ The functions listed below do NOT require confirmation; press the key and the function will be executed (also in the case of Erase).

The following are the functions available with VT300W, VT310W, VT320W, VT565W and VT585W:

- Erase
- Restore
- Backup
- Exit

Erase:

Makes it possible to erase the Memory Card completely with permanent loss of data on it.

Restore:

Makes it possible to transfer the contents of the Memory Card to the VT terminal.

Backup:

Makes it possible to transfer data from the memory of the VT terminal to the Memory Card.

Exit:

Makes it possible to quit the menu page and return to the previous page.

⚠ It is not possible to partially cancel or write the Memory Card; consequently single items of information (only firmware, only recipes, etc.) can neither be added or deleted.

The following are the functions available with VT330W:

- Backup ALL
- Backup FW/PRJ
- Backup RECIPES
- Backup ALARMS
- Restore ALL
- Restore FW/PRJ
- Restore RECIPES
- Restore ALARMS
- Exit

Backup ALL:

This function allows you to clear the memory card of its data, all its contents being definitively lost, and then to transfer to it all the data contained in VT memory.

Backup FW/PRJ:

This function allows you to clear the relevant section of the memory card of its data, all its contents being definitively lost, and then to transfer to it the project (Start-up language and Password included) and the firmware contained in VT memory.

Backup RECIPES:

This function allows you to clear the relevant section of the memory card of its data, all its contents being definitively lost, and then to transfer to it the recipes contained in VT memory.

Backup ALARMS:

This function allows you to clear the relevant section of the memory card of its data, all its contents being definitively lost, and then to transfer to it the alarm buffer contained in VT memory.

Restore ALL:

This function allows you to transfer the complete content of the memory card to the VT.

Restore FW/PRJ:

This function allows you to transfer the project and the firmware contained in the memory card into the VT.

Restore RECIPES:

This function allows you to transfer the recipes contained in the memory card into the VT.

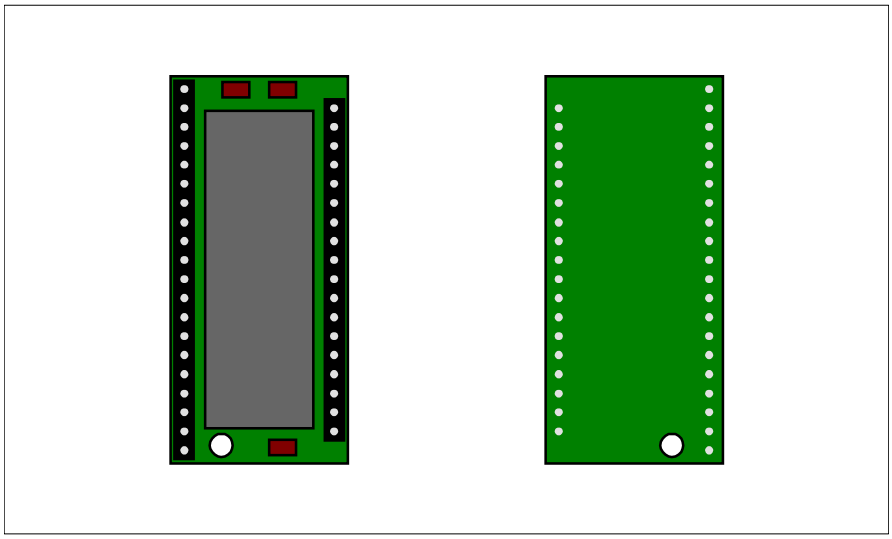
Restore ALARMS:

This function allows you to transfer the alarm buffers contained in the memory card into the VT.

Exit:

Makes it possible to quit the menu page and return to the previous page.

Memory module



This is a removable device capable of saving the VT's firmware and its project.

Although the device is removable, there must be a Memory module in the terminal for it to function.

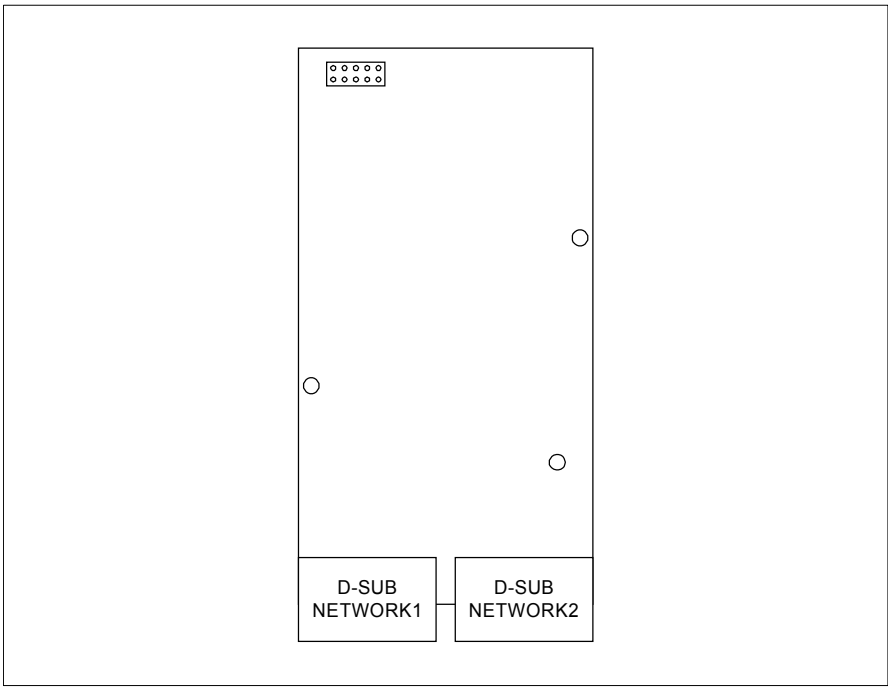
The following table lists the principal technical characteristics of the product under discussion.

Technical data	
Memory	512Kbytes

Substituting the Memory module:

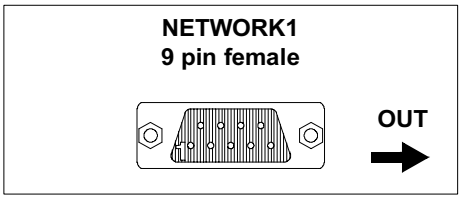
- Check that the VT power supply is not connected.
- Remove the back cover.
- Locate the already existing module.
- Remove this module with great care.
- Insert the new module.
- Replace the back cover.
- Reconnect the power supply.

Integrated Interbus-S module



The integrated module shown above allows you to connect a number of terminals in an Interbus-S network. For more details concerning the network connection of the terminals see “Chapter 19 -> Network connection“.

The NETWORK1 communication port consists of a 9-pin female D-Sub connector.

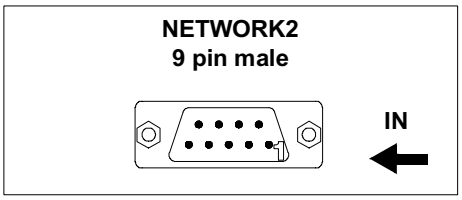


Pin	Signal	Notes
1	DO2	--
2	DI2	--
3	GND	Internal reference 0Volt
4	N.C.	Not connected
5	+5V	**Reserved for Esa**
6	/DO2	--
7	/DI2	--
8	N.C.	Not connected
9	RBST	--

Pin 5 does not provide for commuting any kind of load (coils etc.); an input disturbance at Pin 5 can cause the VT and therefore also the industrial process itself to malfunction.

Strong input disturbances at Pin 5 could damage the VT.

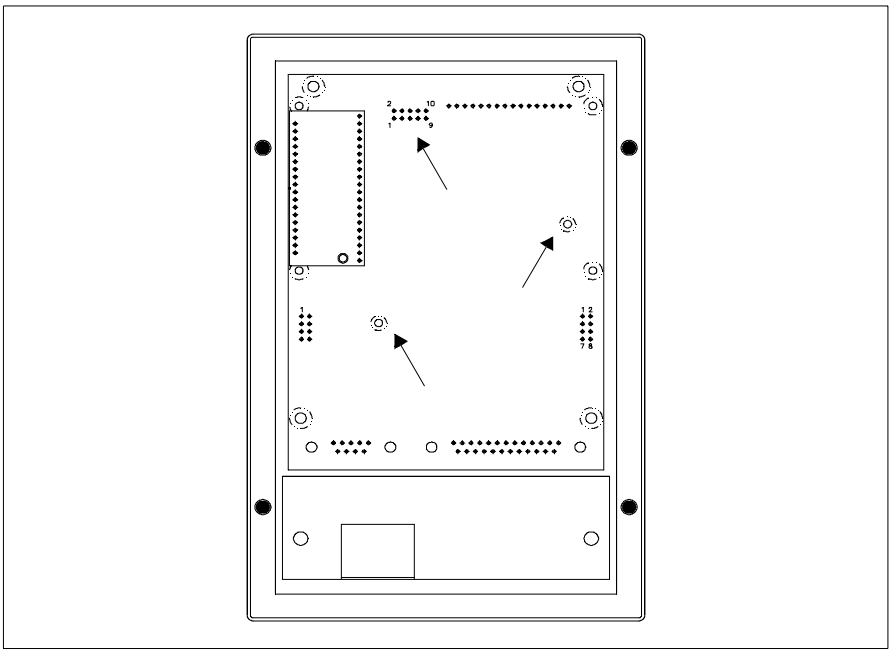
The NETWORK2 communication port consists of a 9-pin male D-Sub connector.



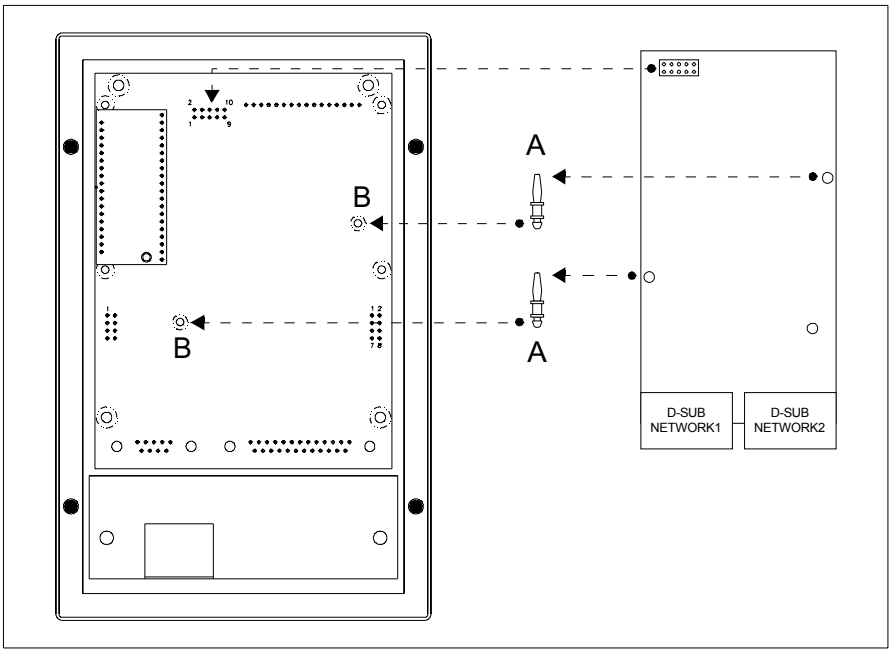
Pin	Signal	Notes
1	DO1	--
2	DI1	--
3	GND	Internal reference 0Volt
4	N.C.	Not connected
5	N.C.	Not connected
6	/DO1	--
7	/DI1	--
8	N.C.	Not connected
9	N.C.	Not connected

Inserting the module in the VT:

- Check that the power supply of the VT is not connected.
- Remove the back cover.
- Locate the elements indicated by the arrow.



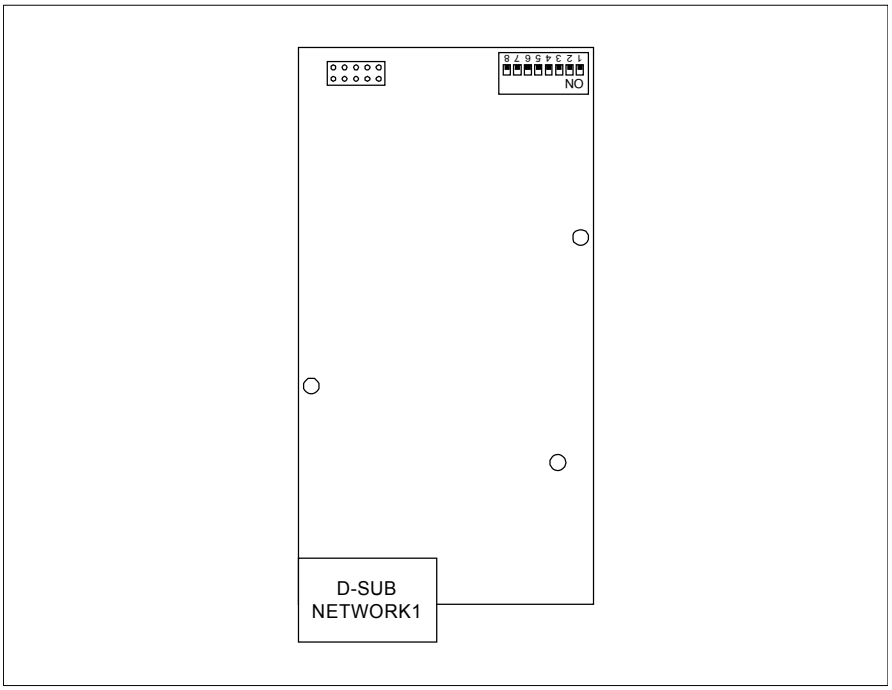
- Insert the spacers (A) into the holes (B), checking the they are the right way round; now insert the module into the terminal.



- Set the network address using the appropriate Dip-Switch (not present on this module).
- Replace the back cover.
- Reconnect the power supply of the VT.

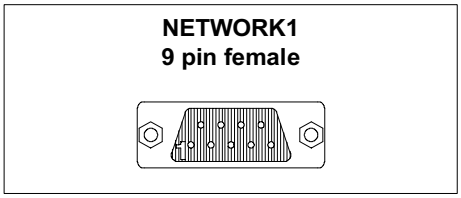
The figures above relate to VT170W; basically the procedure for insertion is the same for all the products in which this type of module can be inserted (see Page 18-2).

Integrated Profibus-DP module



The integrated module shown above enables a number of terminals to be connected in a Profibus-DP network. (For further details on how terminals are connected in the network see “Chapter 19 -> Network connection“.)

The NETWORK1 communication port consists of a 9-pin female D-Sub connector.



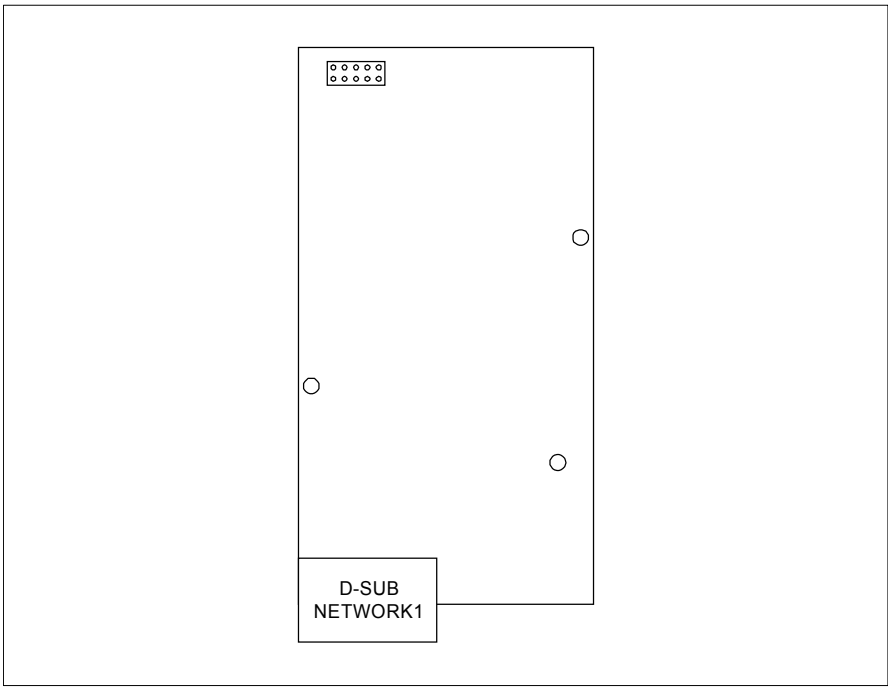
Pin	Signal	Notes
1	Shield	--
2	N.C.	Not connected
3	TxRx485+ Data B	--
4	Repeater-Control-signal RTS	--
5	Signal GND	Internal reference 0Volt
6	P5V	**Reserved for Esa**
7	N.C.	Not connected
8	TxRx485- Data A	--
9	N.C.	Not connected

Pin 6 does not provide for commuting any kind of load (coils etc.); an input disturbance at Pin 6 can cause the VT and therefore also the industrial process itself to malfunction.

Strong input disturbances at Pin 6 could damage the VT.

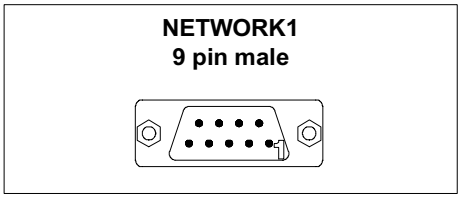
See Page 18-14 for how to insert the module in the VT.

RS485 Serial module



The integrated module shown above allows many terminals to be connected in an ESA-Net network. (For further details regarding the connection of terminals in the network see “Chapter 19 -> Network connection“.)

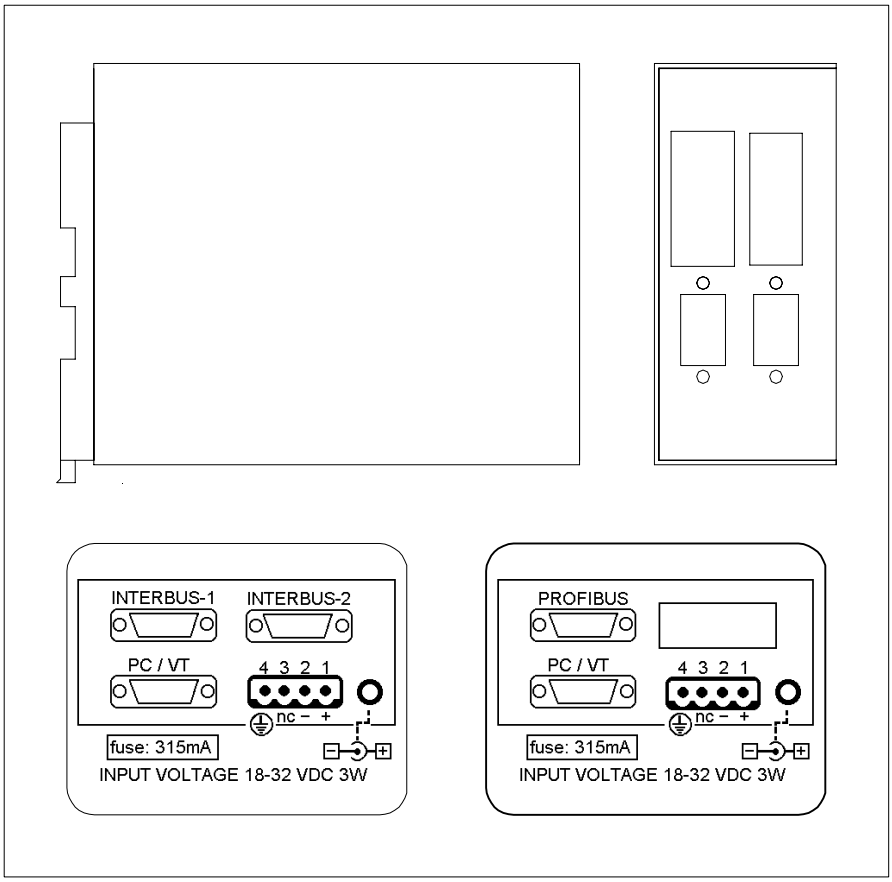
The NETWORK1 communication port consists of a 9-pin male D-Sub connector.



Pin	Signal	Notes
1	N.C.	Not connected
2	N.C.	Not connected
3	Tx/Rx +IN/OUT	RS485
4	N.C.	Not connected
5	Signal GND	Internal reference 0Volt
6	N.C.	Not connected
7	N.C.	Not connected
8	Tx/Rx -IN/OUT	RS485
9	N.C.	Not connected

See Page 18-14 for how to insert the module into the VT.

Interbus-S and Profibus-DP card

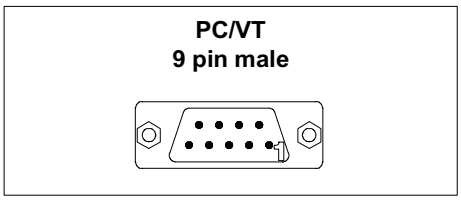


The casing is the same both for the Interbus-S and the Profibus-DP networks; a label is attached to indicate which network is contained.

The table below lists the principal technical characteristics of the product under discussion.

Technical data	
Power supply	24Vdc (18..32Vdc)
Power absorbed at 24Vdc	3W
Protection level	--
Working temperature	0..50°C
Storage and transportation temperature	-20..+60°C
Humidity (non-condensing)	85%
Weight	800gr
Dimensions	
External L x H x D [mm]	48,8 x 107,2 x 139,4
Cut-out L x H [mm]	--

The device incorporates the Interbus-S and Profibus-DP network cards (see Page 18-12 and Page 18-16 for information); it also contains a power supply card with a communication port composed of a 9 pin male D-Sub connector for connecting a PC or VT in RS232.

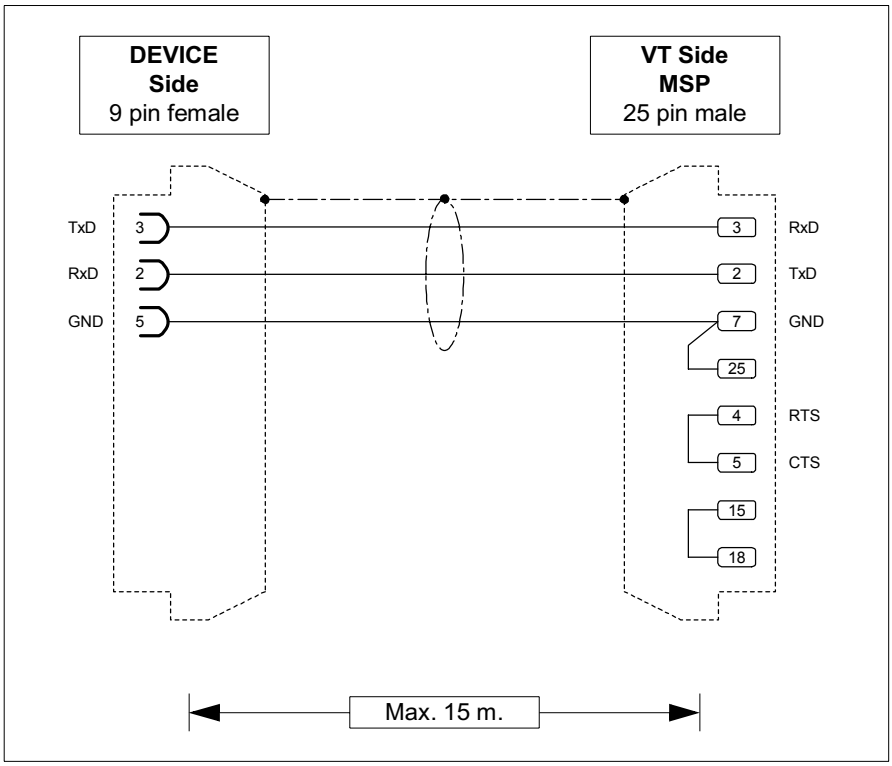


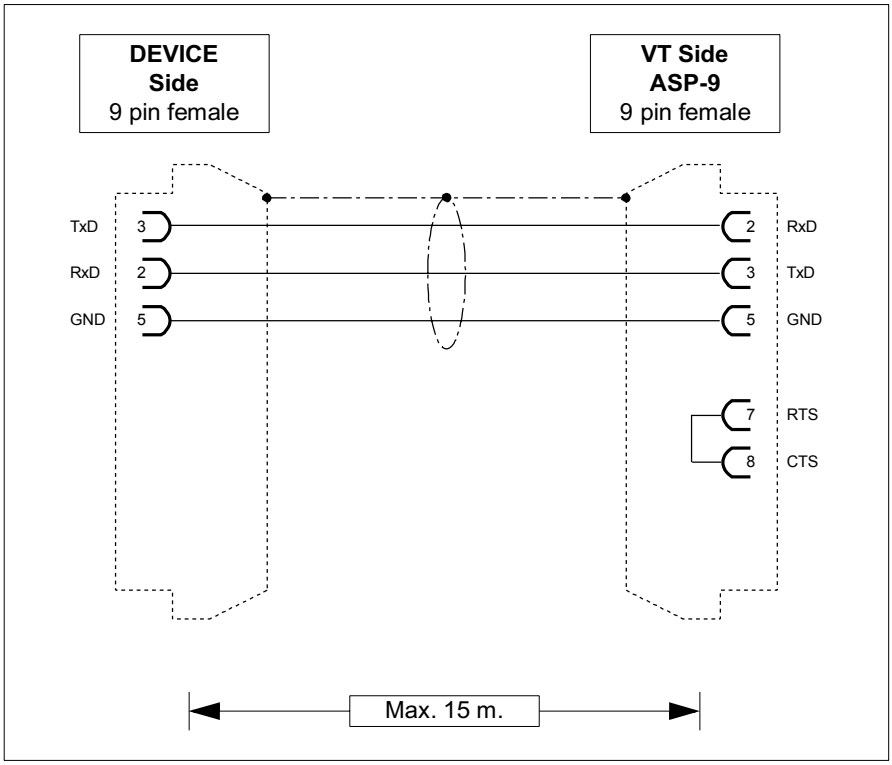
Pin	Signal	Notes
1	N.C.	Not connected
2	RX IN	--
3	TX OUT	--
4	DTR OUT	--
5	Signal GND	Internal reference 0Volt
6	N.C.	Not connected
7	RTS OUT	--
8	N.C.	Not connected
9	N.C.	Not connected

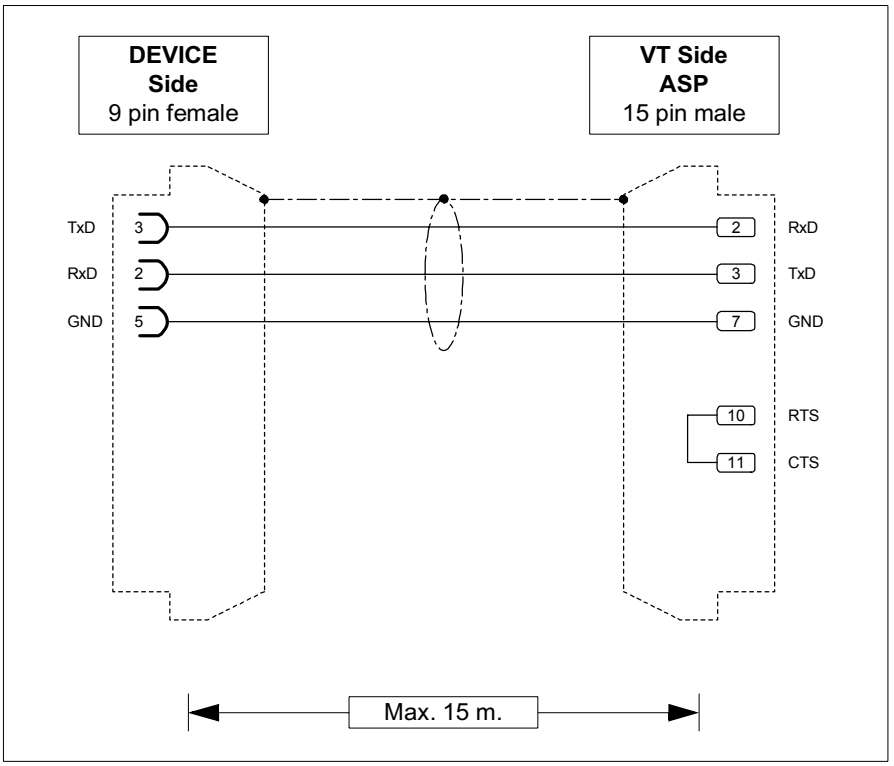
The external power supply for this card can also come via a 4-pin connector or a jack.

See “Chapter 2 -> Power Supply“ **for connecting the power supply.**

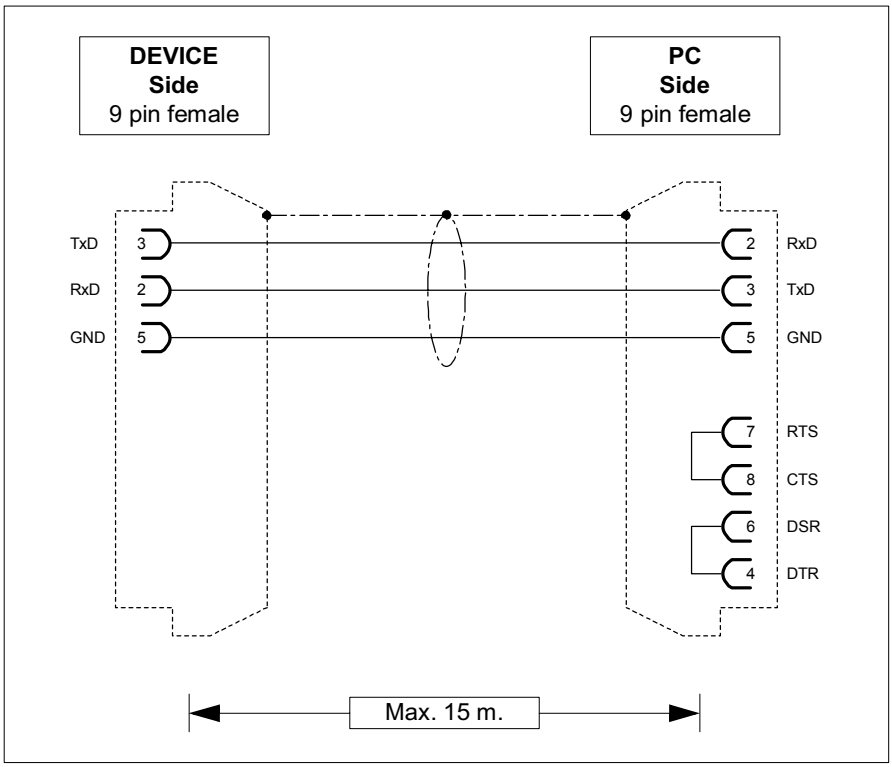
The connection to the VT uses the following cables.

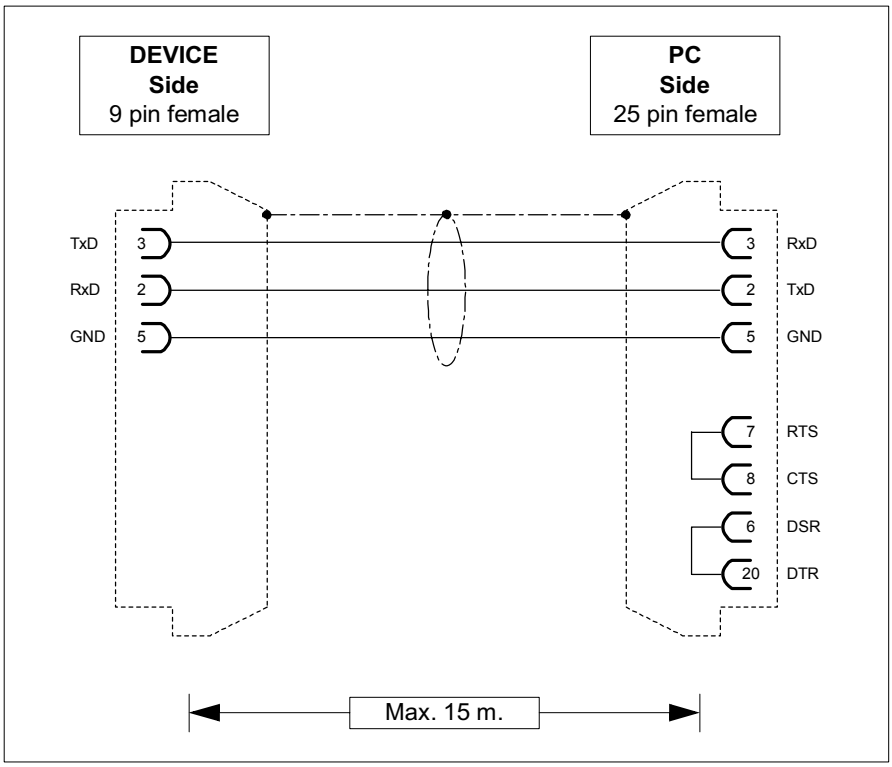

DEVICE
Side
9 pin female
VT Side
MSP
25 pin male
TxD
RxD
GND
3
2
5
3
2
7
25
4
5
15
18
RxD
TxD
GND
RTS
CTS
Max. 15 m.


DEVICE
Side
9 pin female
VT Side
ASP-9
9 pin female
TxD
RxD
GND
3
2
5
2
3
5
7
8
RxD
TxD
GND
RTS
CTS
Max. 15 m.

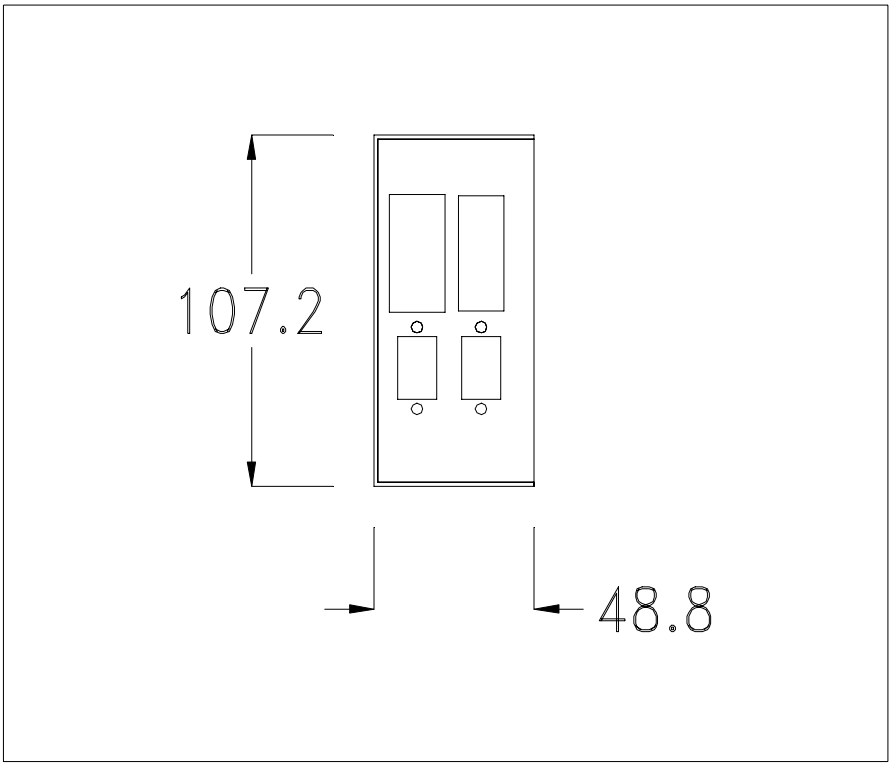

DEVICE
Side
9 pin female
VT Side
ASP
15 pin male
TxD
3
RxD
2
GND
5
2
RxD
3
TxD
7
GND
10
RTS
11
CTS
Max. 15 m.

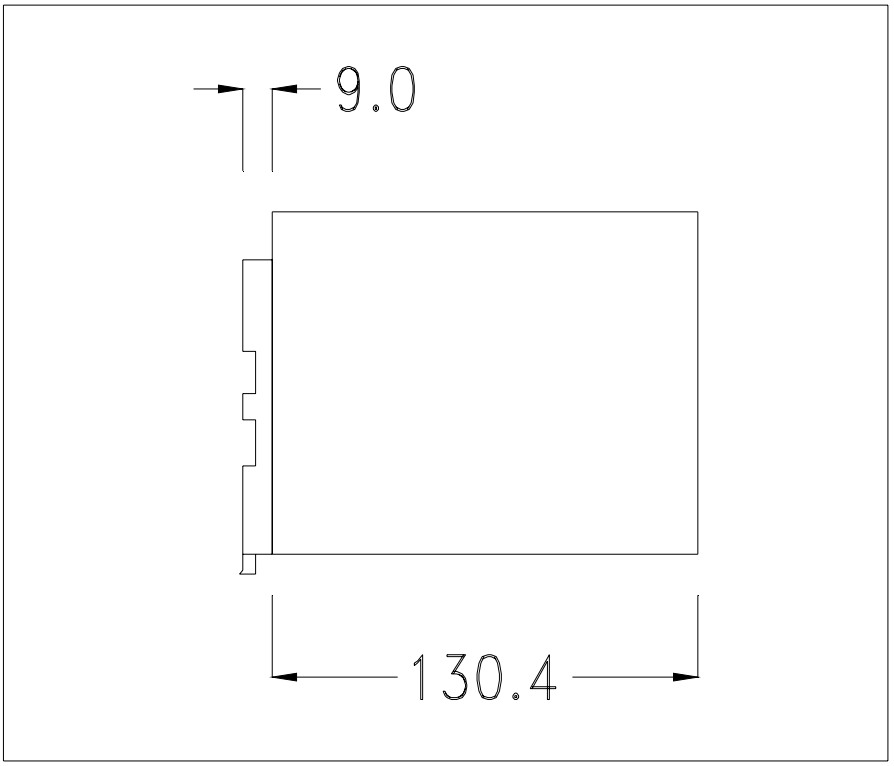
The connection to the PC uses the following cables.





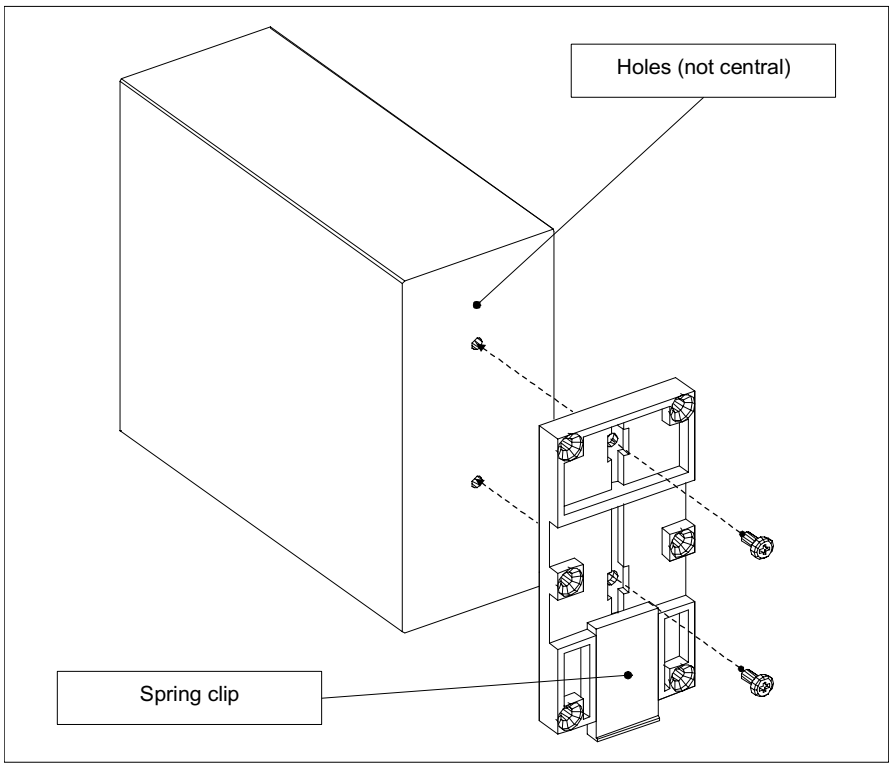
Dimensions:





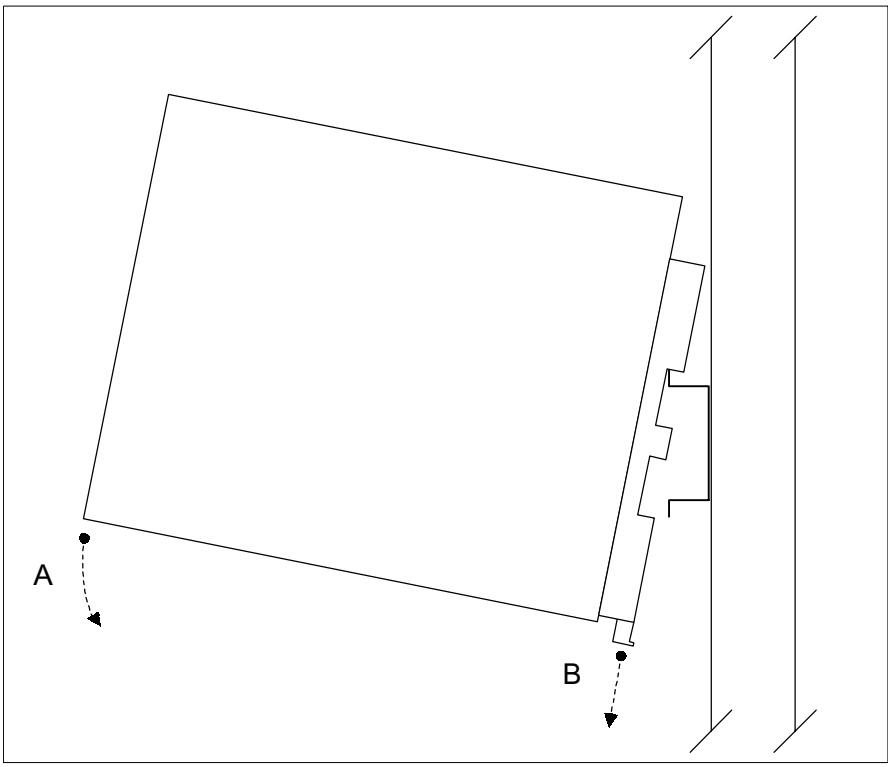
Securing the DIN rail mounting plate:

The device is supplied with a special molded plate for attaching to the DIN rail. The following figure shows how to fit the plate to the device.



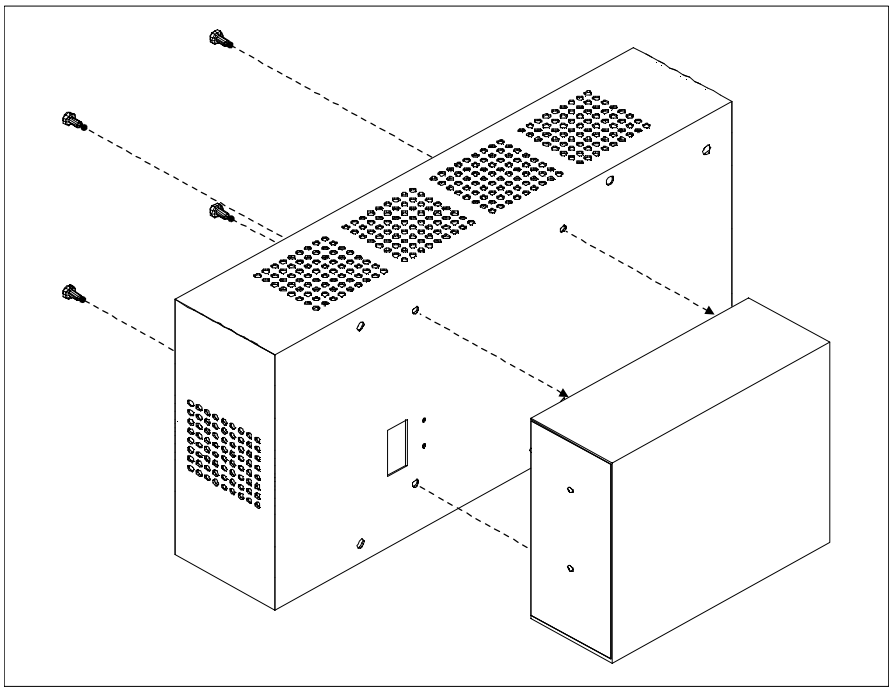
- Locate the two fixing holes.
- Position the device such that the holes are decentered towards the top
- Secure the mounting plate with the screws supplied keeping the spring-clip down.

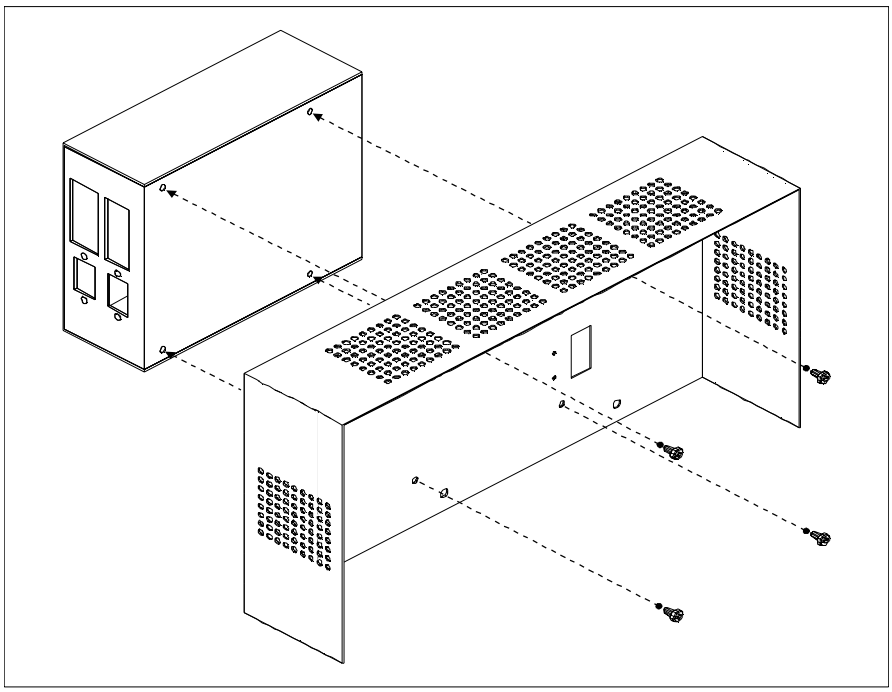
Attaching the device to the DIN rail:



- Once the mounting plate has been attached,
- Hook the upper part of the plate onto the DIN rail.
- Press the device in the direction indicated. (Arrow A)
- To make it easier to hook on, pull the spring-clip in the direction indicated. (Arrow B)

Fixing the device to the back cover:



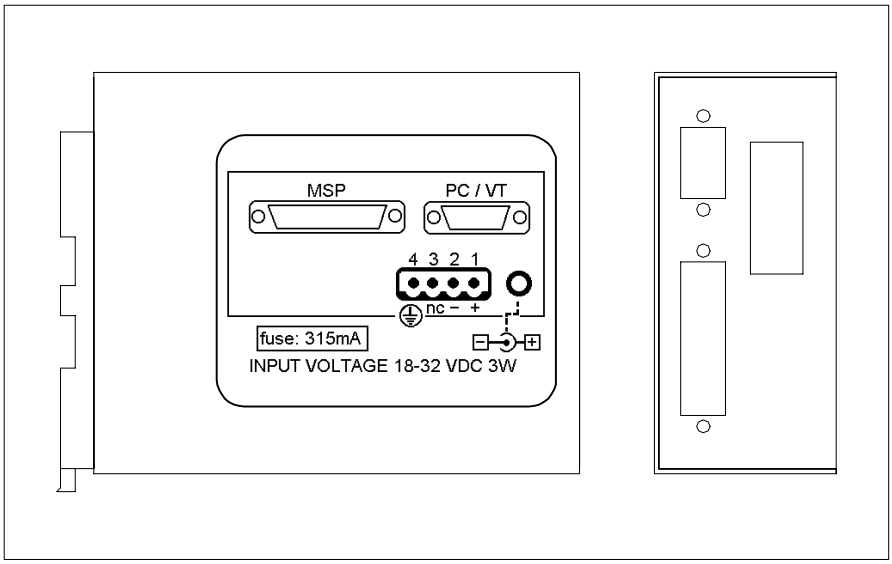


- Check that the VT power supply is not connected.
- Remove the back cover.
- Attach the device as illustrated above using the appropriate screws supplied and making sure the direction is correct.

- Replace the back cover.
- Reconnect the VT power supply.

The above illustrations refer to VT320W; the procedure is basically the same for all those products that can be fixed to the back cover (see Page 18-2).

Adapter for connecting PC to the ESANET network



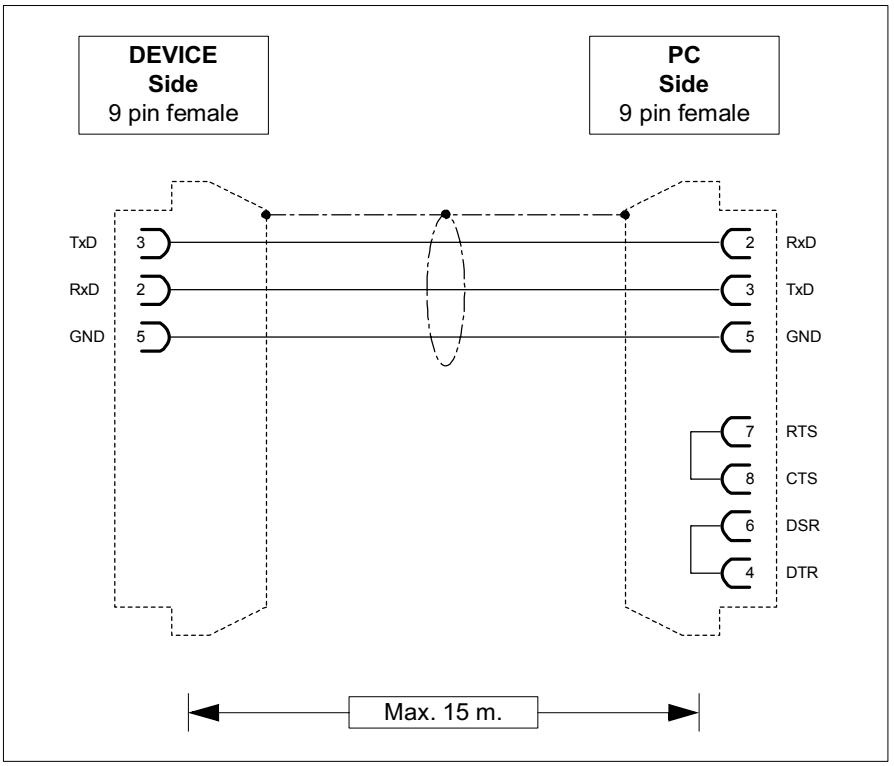
The table below lists the principal technical characteristics of the product under discussion.

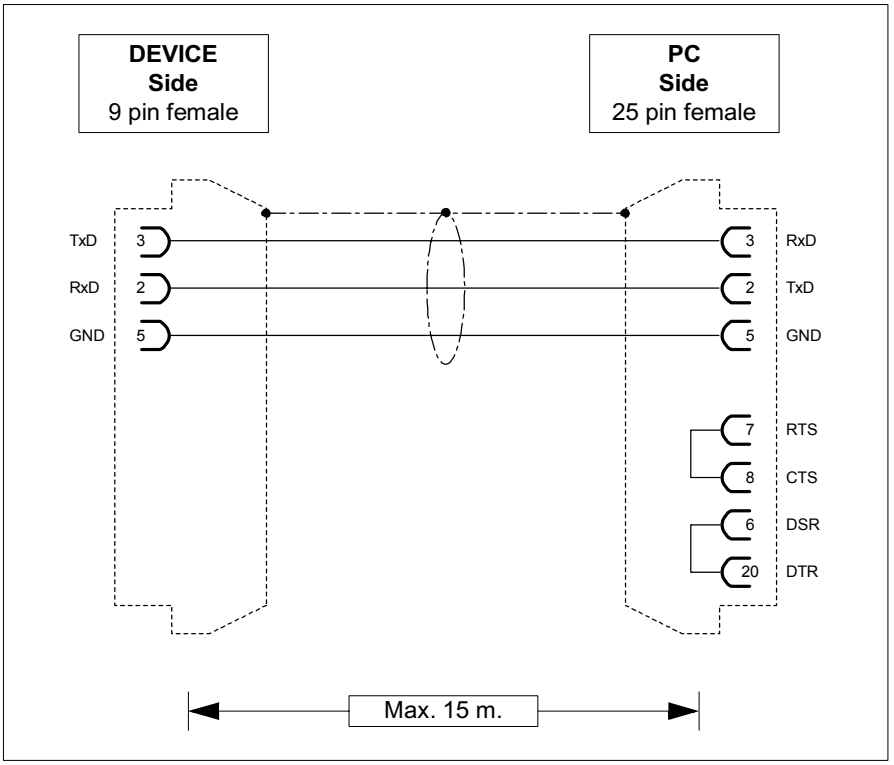
Technical data	
Power supply	24Vdc (18..32Vdc)
Power absorbed at 24Vdc	3W
Protection level	--
Working temperature	0..50°C
Storage and transportation temperature	-20..+60°C
Humidity (non-condensing)	85%
Weight	800gr
Dimensions	
External L x H x D [mm]	48,8 x 107,2 x 139,4
Cut-out L x H [mm]	--

The adapter indicated above makes it possible to connect a device to a PC or several VTs to a PC using the ESANET network. The adapter is equipped with a D-Sub 25 pin female MSP connector (for details see “Chapter 17 -> MSP serial port“) and a D-Sub 9 pin male PC/VT connector (for details see Page 18-19).The external power supply for this card can also come via a 4-pin connector or a jack.

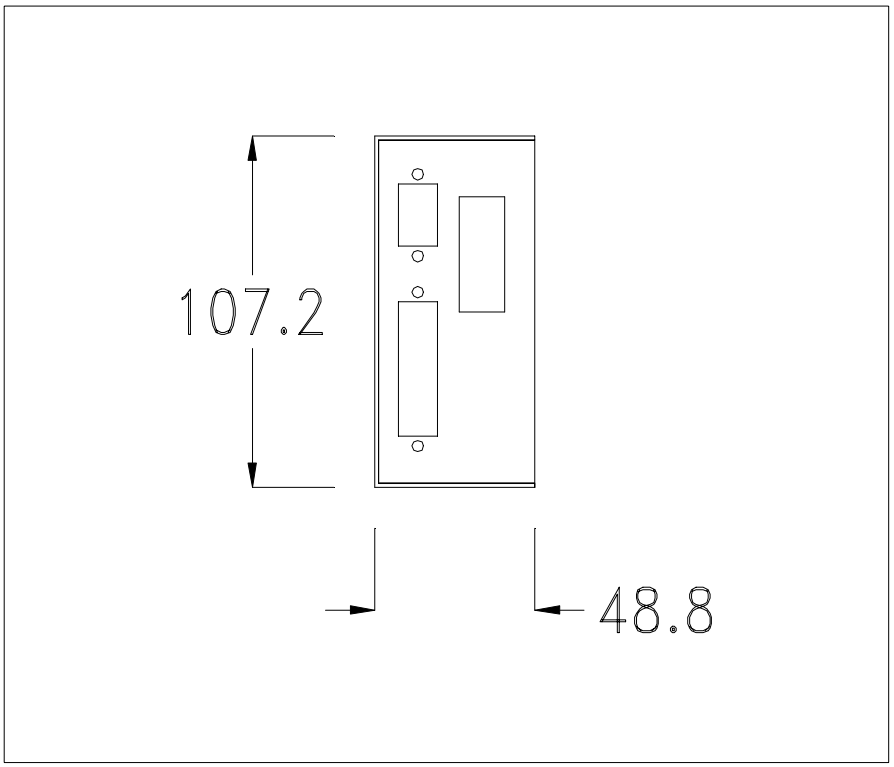
See “Chapter 2 -> Power Supply“ **for connecting the power supply.**

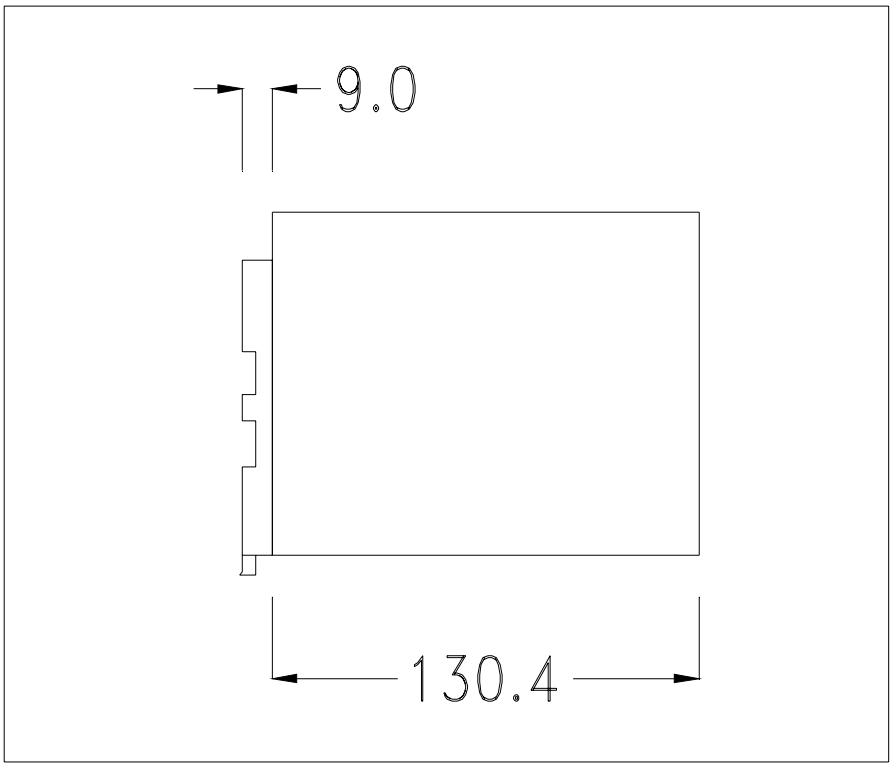
The connection to the PC uses the following cables.


DEVICE
Side
9 pin female
PC
Side
9 pin female
TxD
RxD
GND
3
2
5
2
3
5
RxD
TxD
GND
7
8
6
4
RTS
CTS
DSR
DTR
Max. 15 m.


DEVICE
Side
9 pin female
PC
Side
25 pin female
TxD
RxD
GND
3
2
5
3
2
5
RxD
TxD
GND
7
8
6
20
RTS
CTS
DSR
DTR
Max. 15 m.

Dimensions:

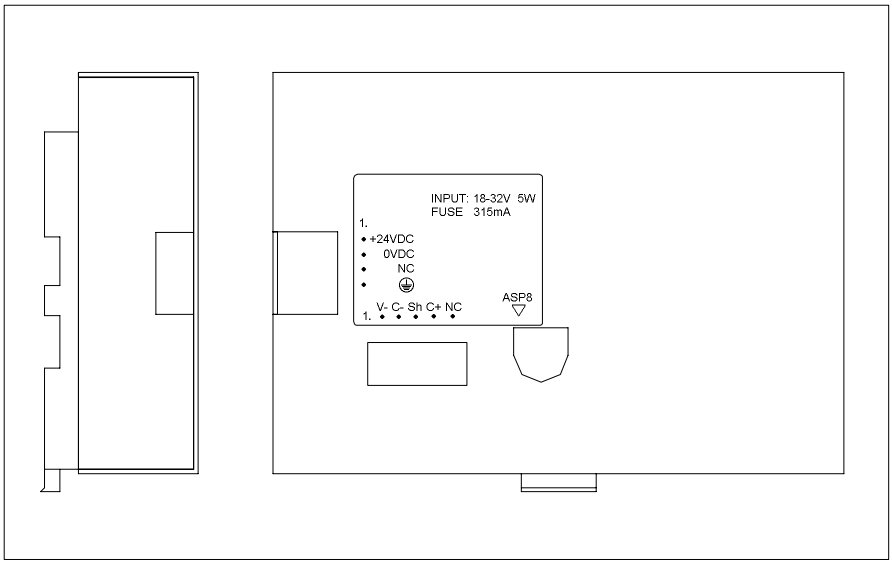




Fixing the device:

Various ways of fixing the device are possible. For details see Page 18-25, Page 18-26 and Page 18-27.

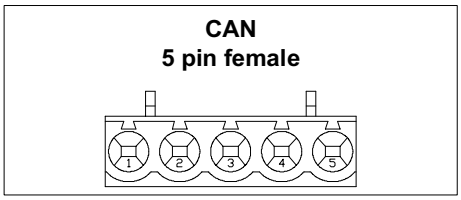
Adapter for external CAN network



The table below lists the principal technical characteristics of the product under discussion.

Technical data	
Power supply	24Vdc (18..32Vdc)
Power absorbed at 24Vdc	5W
Protection level	--
Working temperature	0..50°C
Storage and transportation temperature	-20..+60°C
Humidity (non-condensing)	85%
Weight	580gr
Dimensions	
External L x H x D [mm]	152,4 x 107,2 x 31,7
Cut-out L x H [mm]	--

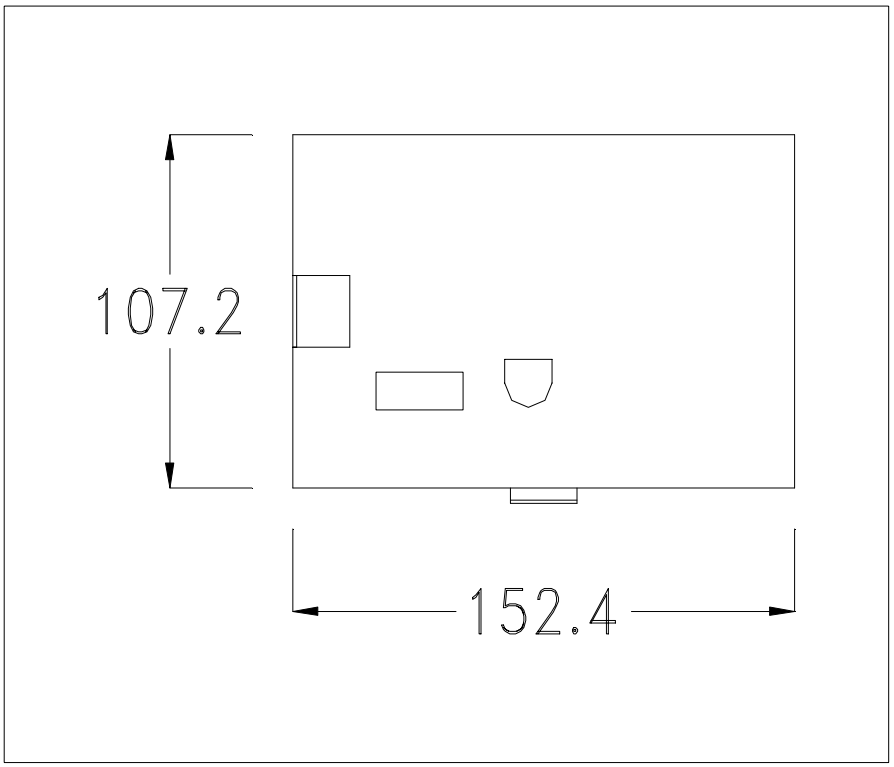
The above adapter makes it possible to connect several terminals in a CAN network. For further details regarding the connect in network of the terminals see “Chapter 19 -> Network connection“. The adapter is equipped with a Minidin 8 pin female ASP-8 connector (for details see “Chapter 17 -> ASP-8 serial port“) and a disconnectable 5 pin female terminal block for connecting the CAN network (optoisolated interface).

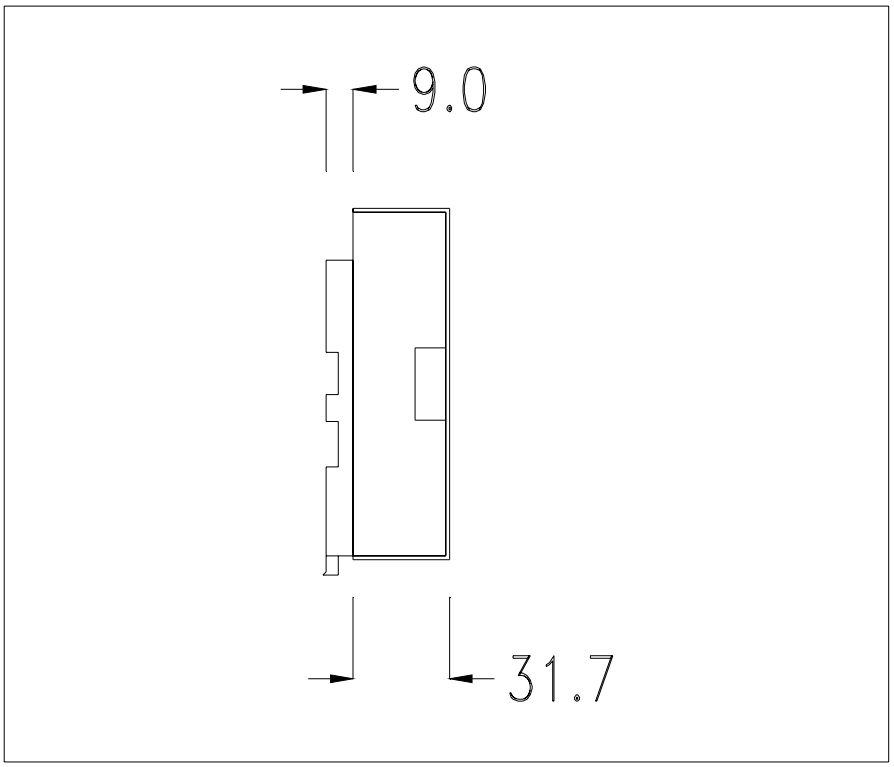


Pin	Signal	Notes
1	V-	--
2	CAN -	--
3	Shield	--
4	CAN +	--
5	N.C.	Not connected

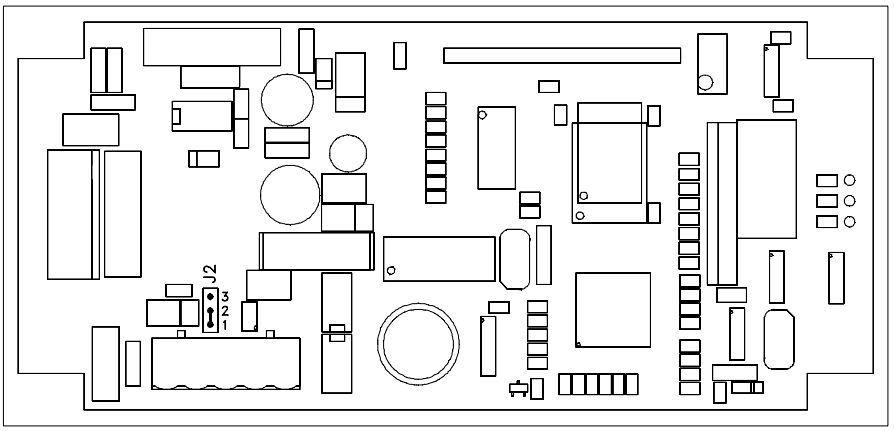
See “Chapter 2 -> Power Supply“ **for connecting the power supply.**

Dimensions:





Termination of CAN line:

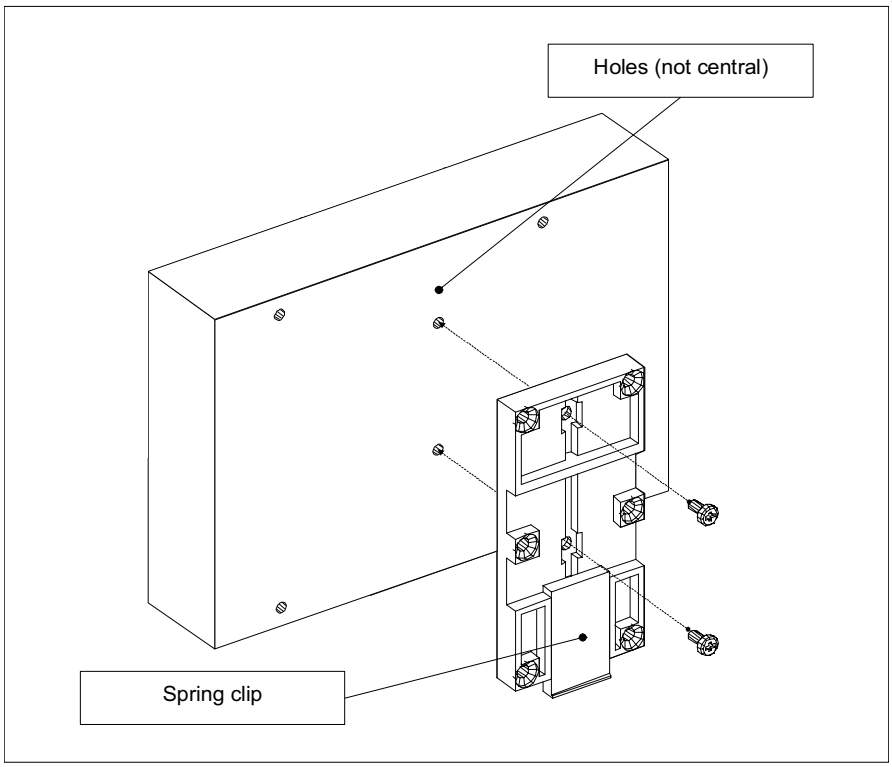


The device in question integrates the termination resistances of the serial line (typically 120 ohms) which can be inserted by means of a jumper (pre-set on 1-2, line not terminated). To activate the termination:

- Make sure the device is not connected to the power supply.
- Remove the cover.
- Identify the jumper unit J2.
- Position the jumper between pins 2 and 3 (line terminated).
- Replace the back cover.
- Reconnect the power supply.

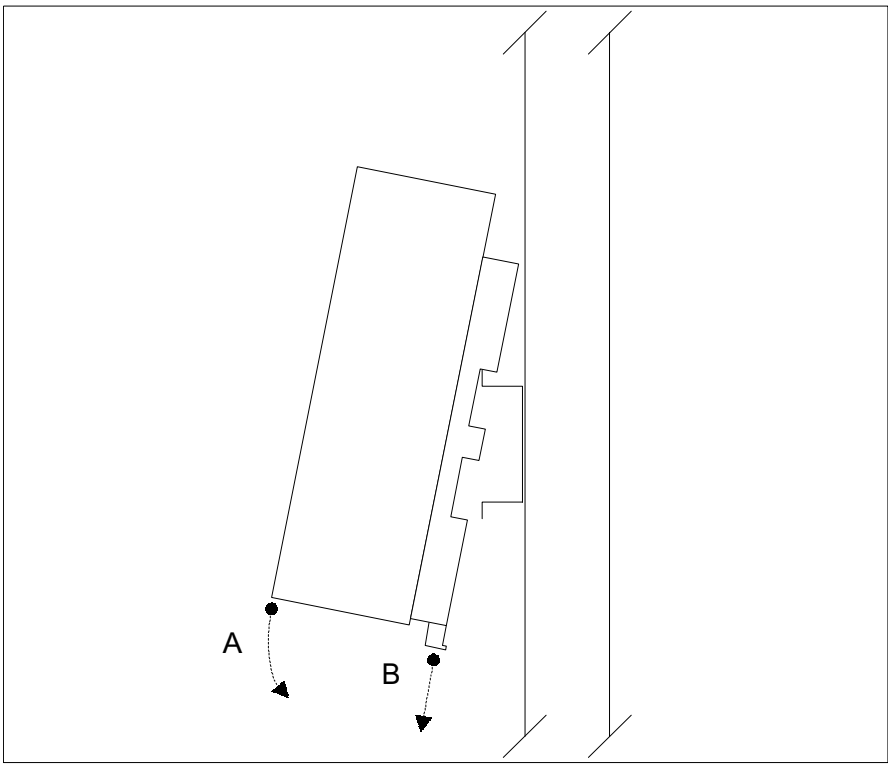
Securing the DIN rail mounting plate:

The device is supplied with a special molded plate for attaching to the DIN rail. The following figure shows how to fit the plate to the device.



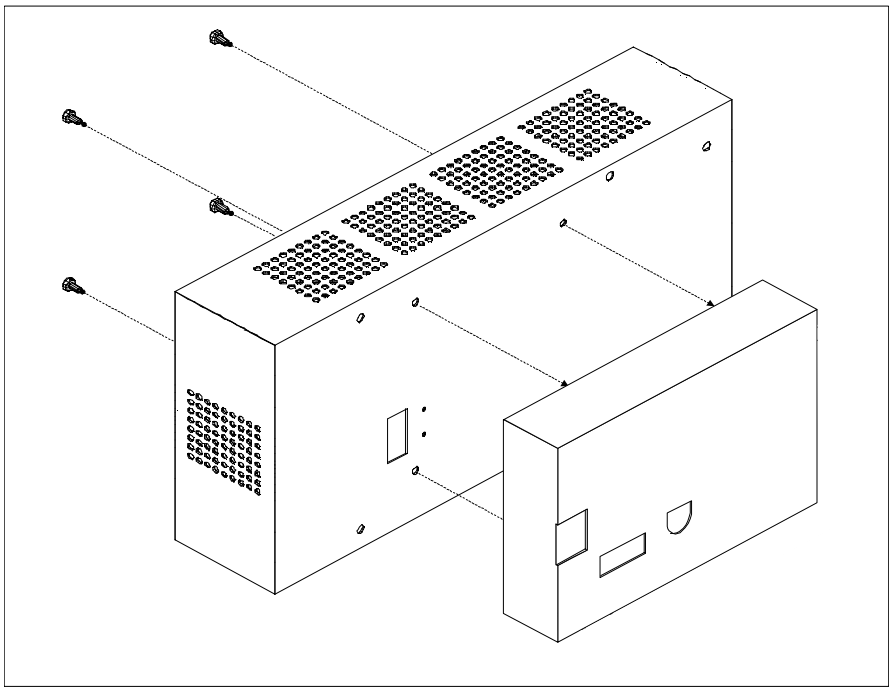
- Locate the two fixing holes.
- Position the device such that the holes are decentered towards the top
- Secure the mounting plate with the screws supplied keeping the spring-clip down.

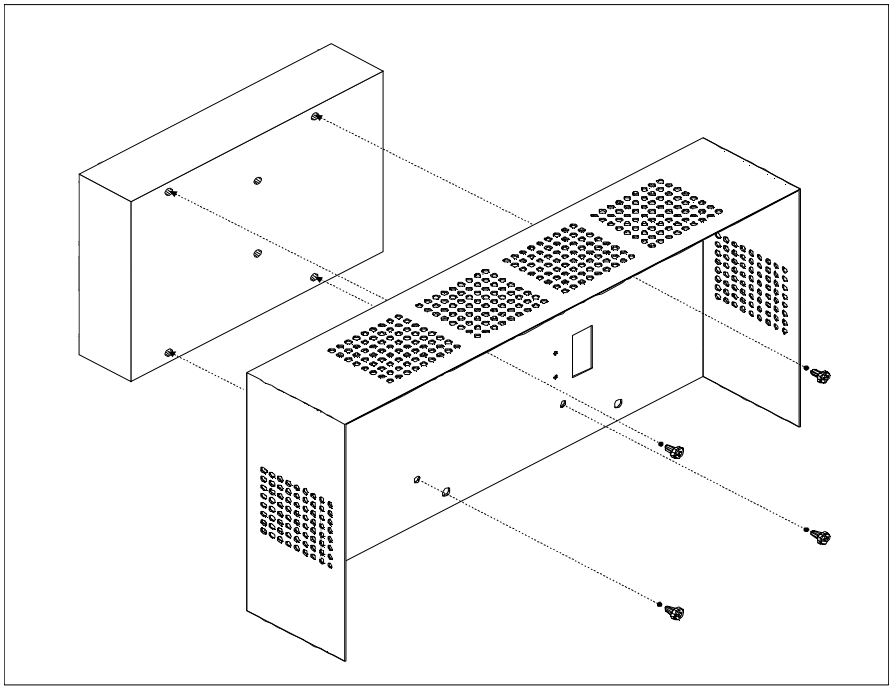
Attaching the device to the DIN rail:



- Once the mounting plate has been attached,
- Hook the upper part of the plate onto the DIN rail.
- Press the device in the direction indicated. (Arrow A)
- To make it easier to hook on, pull the spring-clip in the direction indicated. (Arrow B)

Fixing the device to the back cover:



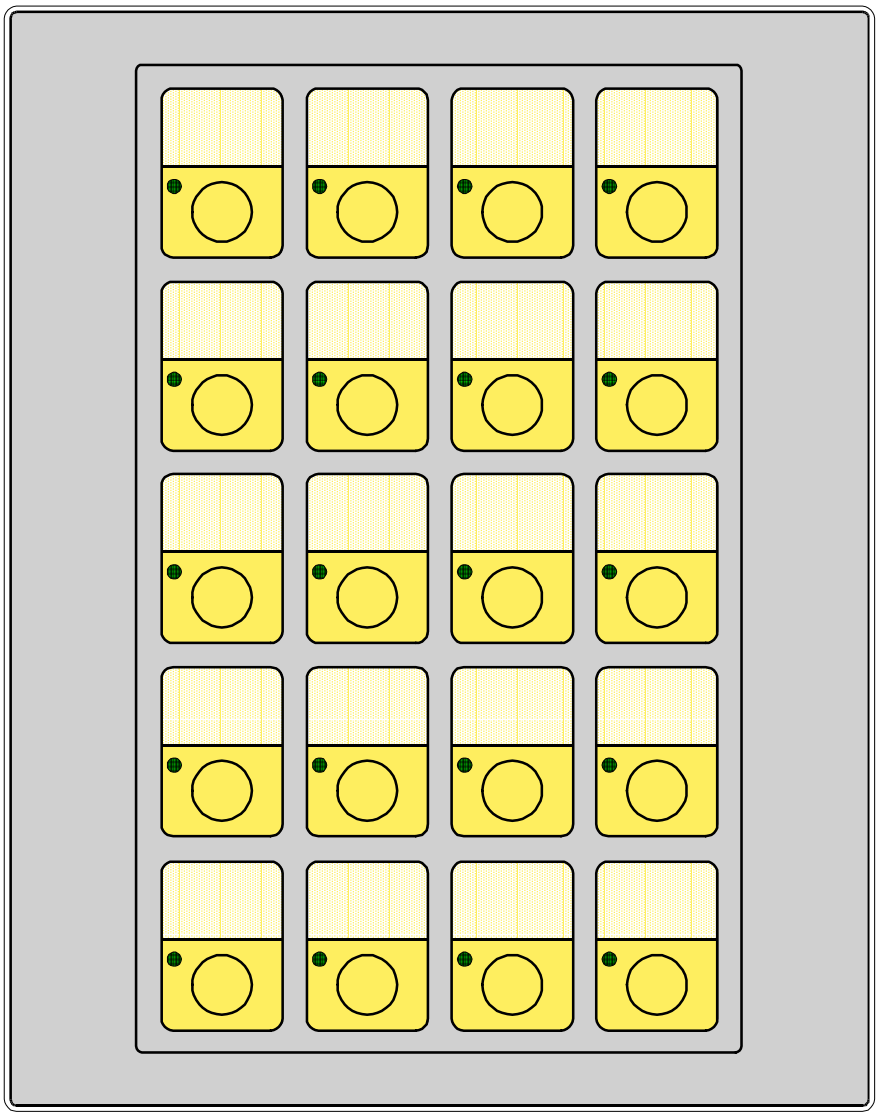


- Check that the VT power supply is not connected.
- Remove the back cover.
- Attach the device as illustrated above using the appropriate screws supplied and making sure the direction is correct.

- Replace the back cover.
- Reconnect the VT power supply.

The above illustrations refer to VT320W; the procedure is basically the same for all those products that can be fixed to the back cover (see Page 18-2).

20 key serial keyboard

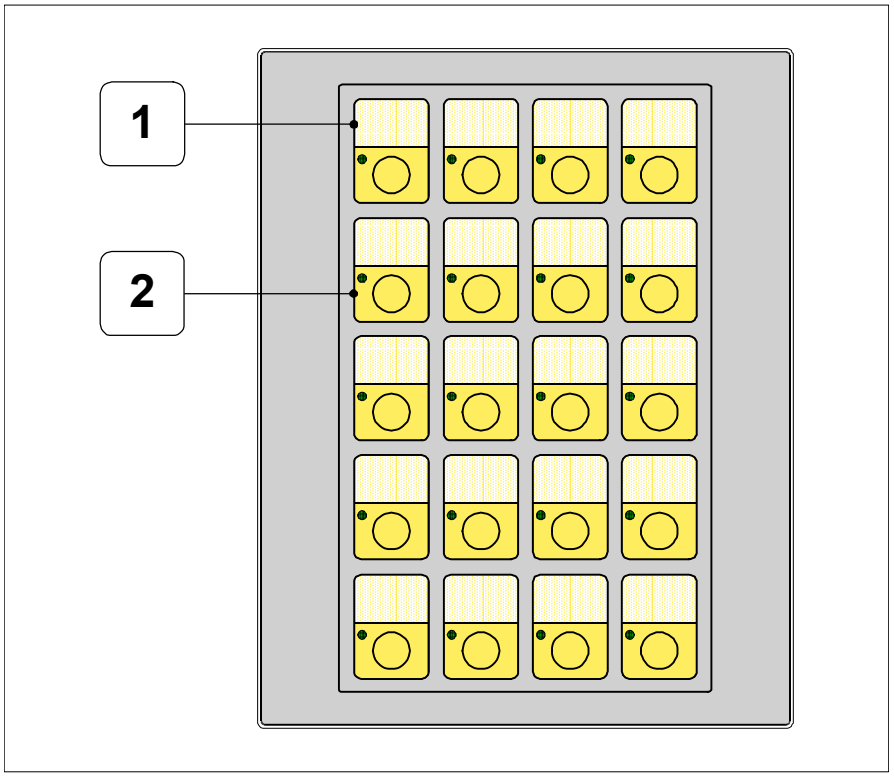


The following table lists the principal technical characteristics of the product in question.

Keyboard	
Non-customizable function keys	--
Customizable function keys	20
Function key LEDs	20
Alphanumeric keys	--
Operational keys	--
Operational key LEDs	--
Diagnostic LEDs	--

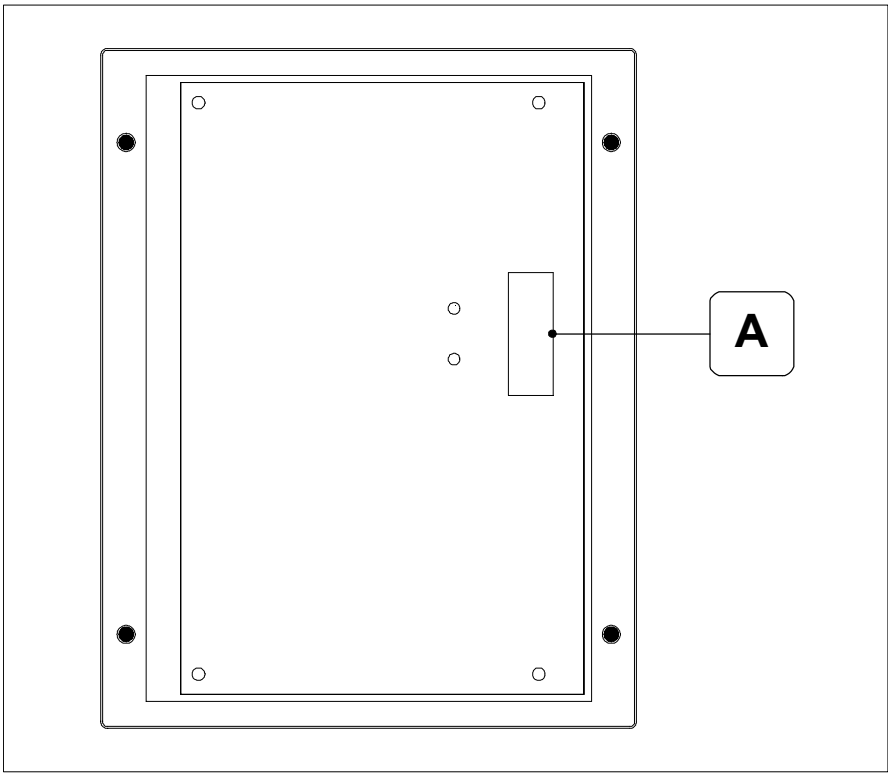
Technical data	
Power supply	--
Power absorbed at 24Vdc	--
Protection level	IP65 (front-end)
Working temperature	0..50°C
Storage and transportation temperature	-20..+60°C
Humidity (non-condensing)	85%
Weight	550gr
Dimensions	
External L x H x D [mm]	148 x188 x 27
Cut-out L x H [mm]	114 x 174

Front view:



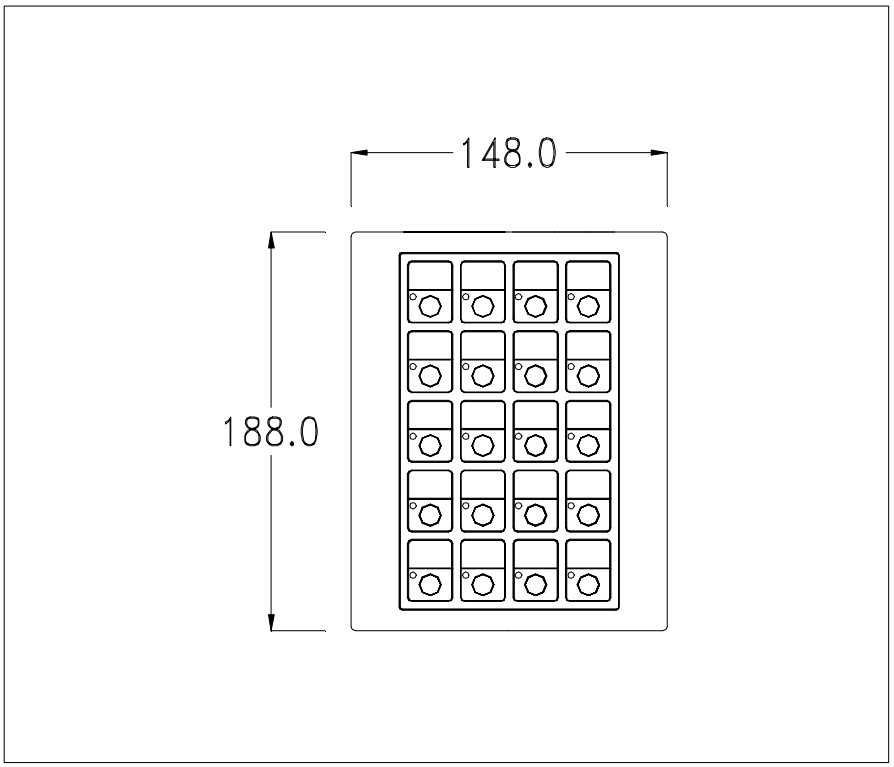
Key	Function
1	Labels for customizing F-keys
2	F-keys

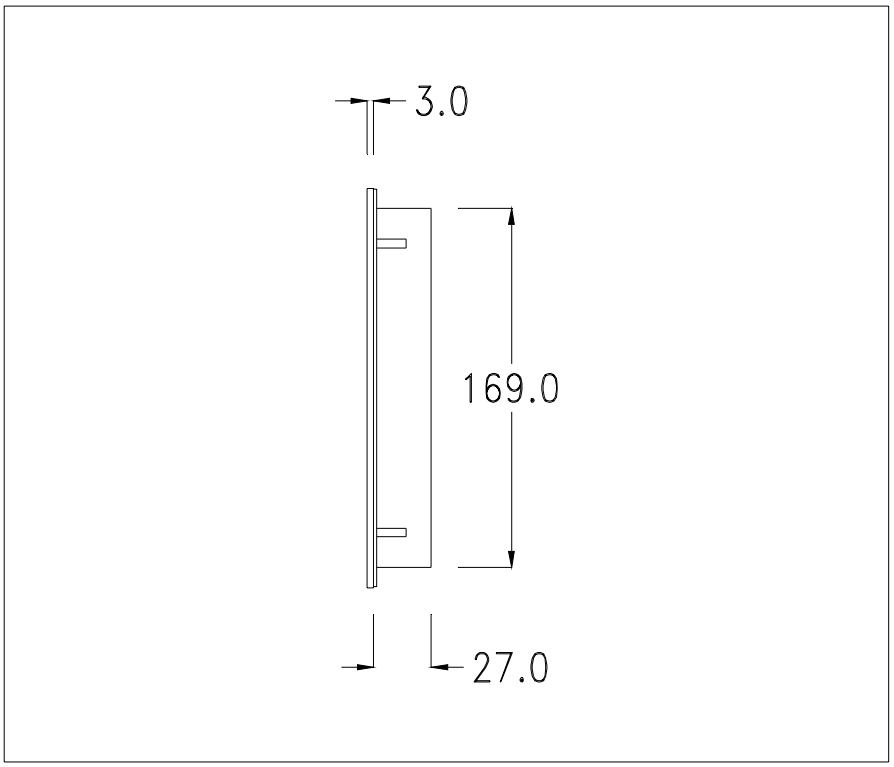
Rear view:

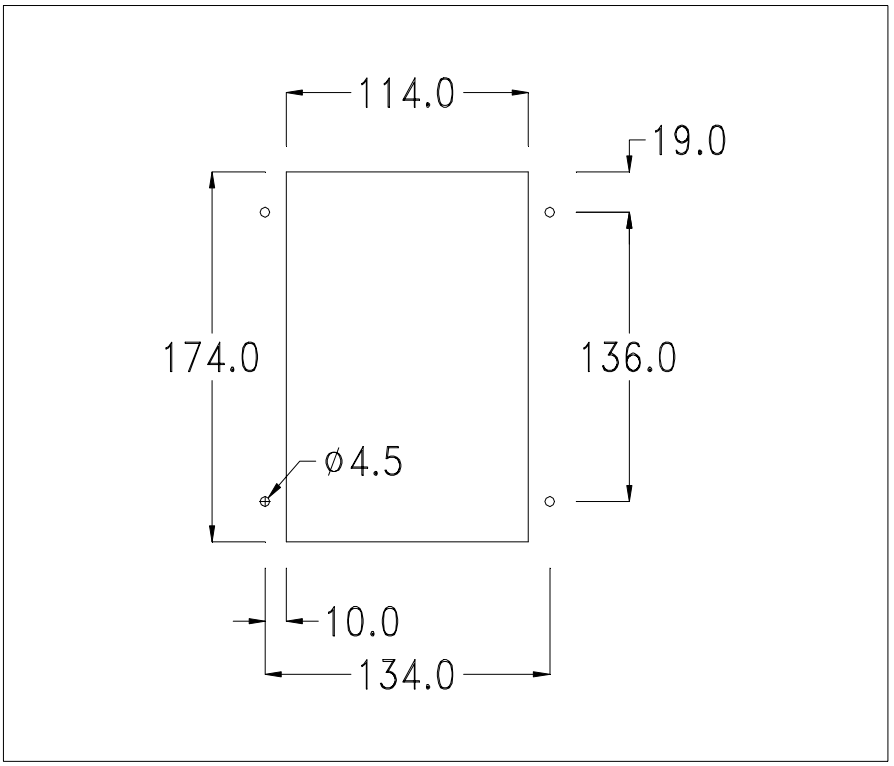


Position	Function
A	Point for connecting to VT by means of a shielded flat cable (Max. length 300mm)

Dimensions and Cut-out:







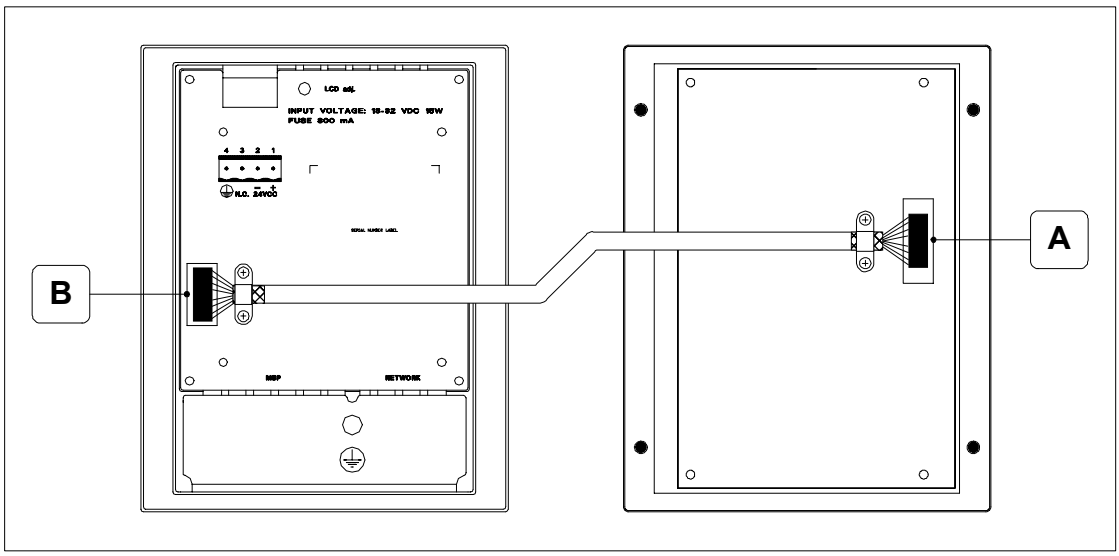
To fix the sealing gasket and secure the VT to the container see “Chapter 16 -> Mounting the terminal within the container“.

Connection with cable:

The serial keyboard accessory is connected directly to the auxiliary port (see “Chapter 5 -> Standard series rear view“) of VT150W by means of a shielded flat cable, no external power being necessary. The maximum length of the cable is 300 mm.

The explanation of the connection method applies to all terminals with this accessory (See Page 18-2).

Care must be exercised in making these connections: using the accessories provided and following the wiring instructions set out below.



When supplied the cable will already be fixed to the keyboard at point A, leaving point B to be connected at the other end.

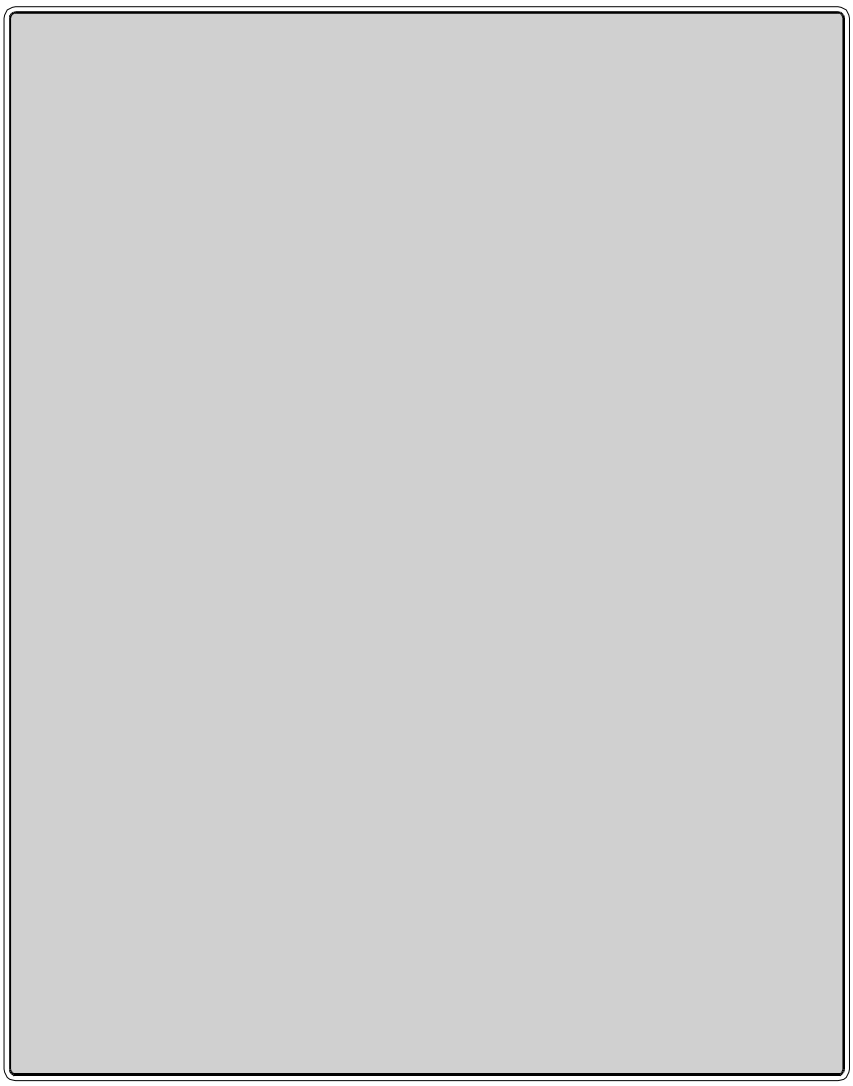
Procedure for connecting to point B:

- Check that the power supply is not connected.
- Take off the back cover of the VT (see “Chapter 5 -> Standard series rear view“).
- Open the pre-cut for mounting the connector on the cover by pressing in the metal plate and remove it (see “Chapter 5 -> Standard series rear view“ point B).
- Replace the back cover of the VT.
- Insert the cable connector into the VT (see “Chapter 5 -> Standard series rear view“ point B).
- Secure the cable to the VT by means of the collar and screws provided.

It is essential that the metal collar pressing on the shield of the connecting cable make direct contact with the metal cover of the VT. If this does not happen, there could be problems due to disturbances deriving from the work environment.

• Reconnect the power supply to the VT.

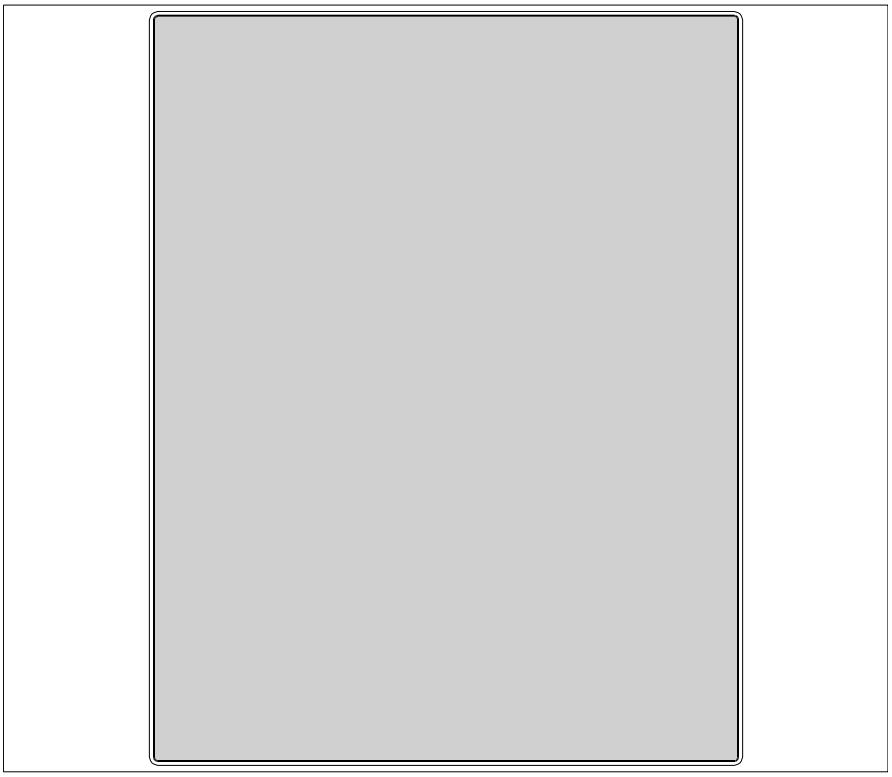
Blank keyboard



The following table lists the principal technical characteristics of the product in question.

Technical data	
Power supply	--
Power absorbed at 24Vdc	--
Protection level	IP65 (front-end)
Working temperature	0..50°C
Storage and transportation temperature	-20..+60°C
Humidity (non-condensing)	85%
Weight	100gr
Dimensions	
External L x H x D [mm]	148 x188
Cut-out L x H [mm]	114 x 174

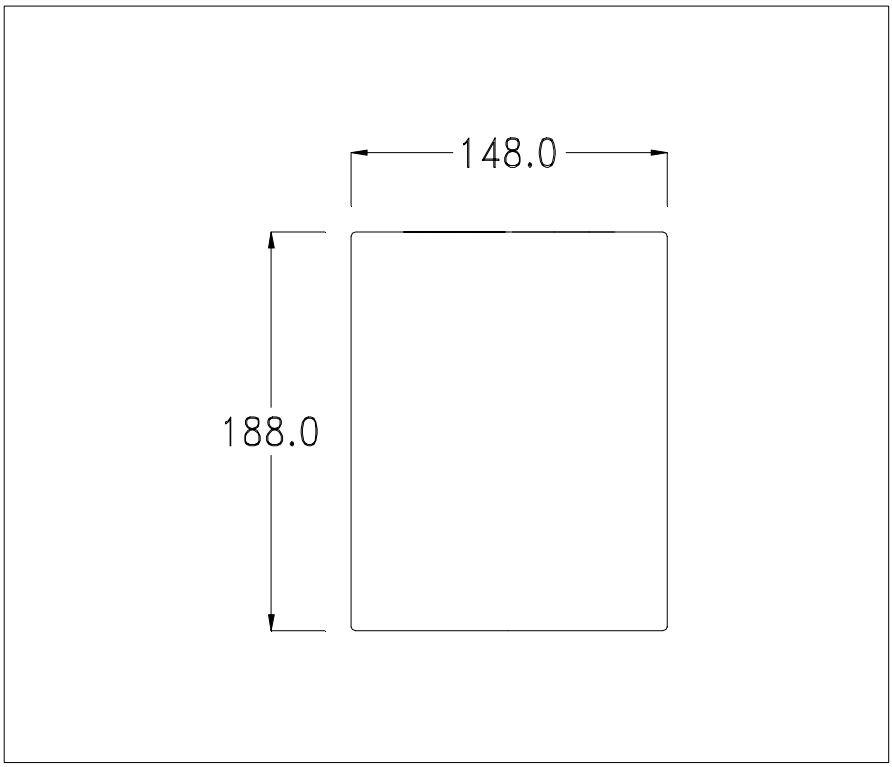
Front view:

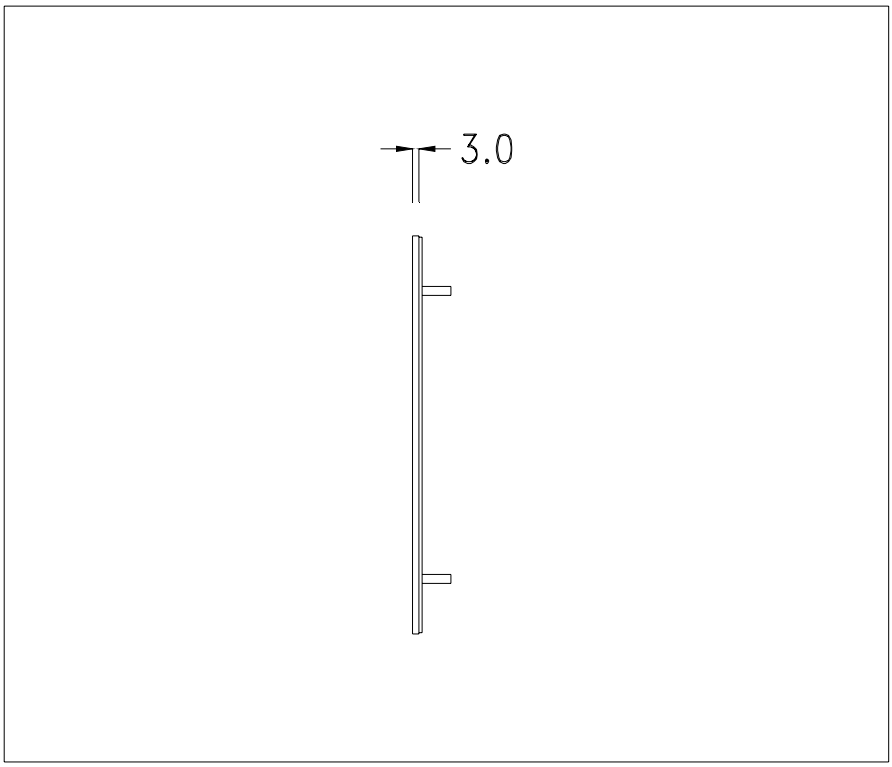


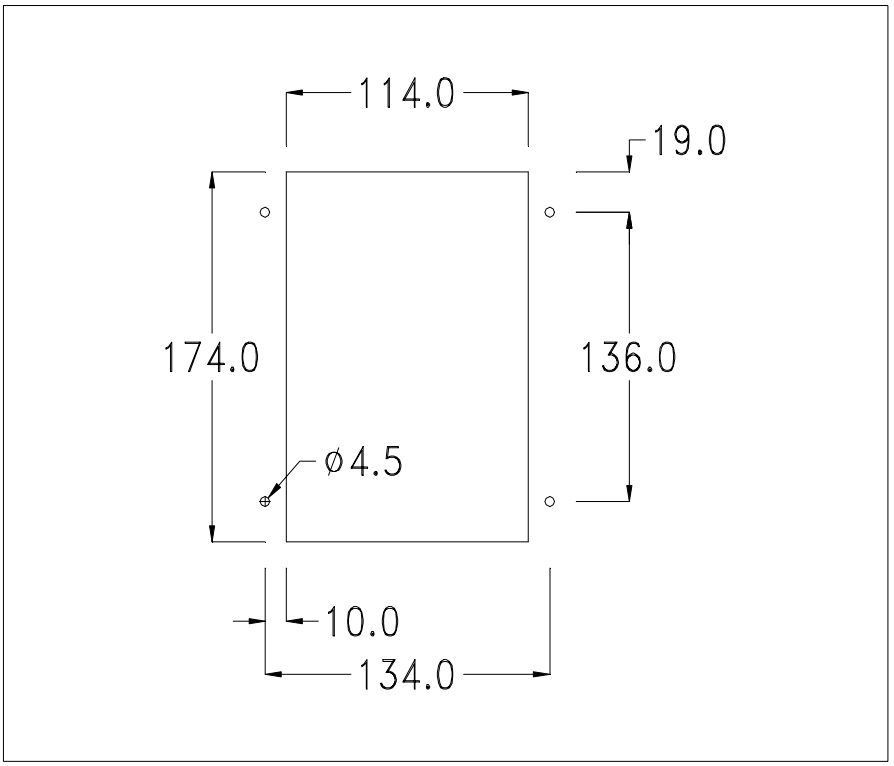
The blank keyboard has no keys.

This accessory allows the user to fit and wire buttons. Any kind of key-pad can be used.

Dimensions and Cut-out:







To fix the sealing gasket and secure the VT to the container see “Chapter 16 -> Mounting the terminal within the container“.

Chapter 19 Network connection

This chapter consists of 20 pages.

VT terminals can be connected, using the appropriate optional cards, integrated or external, in a network with other devices. The networks available are Profibus-DP, Interbus-S, ESA-Net and CAN.

Profibus-DP

A VT equipped with a network card can be connected within a Profibus-DP network as a slave (a passive station that can only transmit data after receiving a request from an active station). The PLCs and the network configurator, on the other hand, are masters (active network stations able to transmit information without receiving a request).

There are two types of Profibus-DP: one named ESA Profile and the other Standard Profile. The major differences between them relate to the I/O area and the FB for the data exchange, in that the Standard Profile has no FB.

A network can contain more than one master and more than one slave, while there can only be one configurator.

The slave address of the VT must coincide with the network configuration.

It can be set using VTWIN if using a VT with an integrated network card, or by means of a Dip-Switch if using a VT with a supplementary network card.

The VT can work at a maximum speed of 12 Mbaud and it automatically assumes the speed of the network as determined by the network master.

Table 19.1: Setting of VT network address.

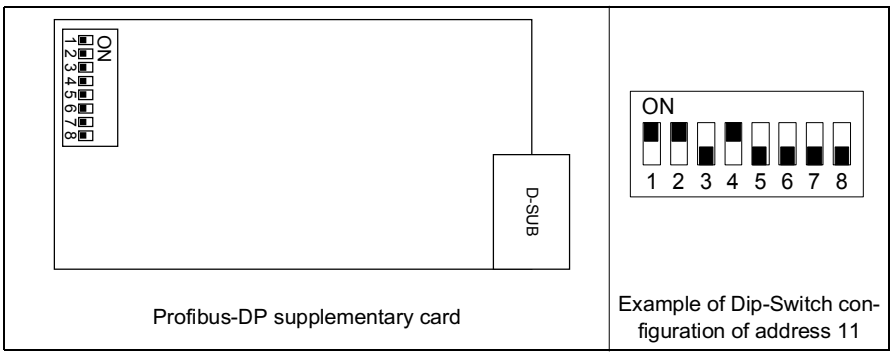


Table 19.2: Meaning of the Dip-Switches

Dip-Switch	Binary value
1	1
2	2
3	4
4	8

Dip-Switch	Binary value
5	16
6	32
7	64
8	128

Profibus-DP (ESA profile): VT operation

The slave VTs are seen as dedicated areas of memory in the PLC's I/O area, by means of which the PLC and VT exchange data.
The size of the I/O area of each VT participating in the network is defined by the user with a 4 to 16 word limit.
Note that the greater are the dimensions of the I/O area the faster the handling of the information, though this also means a greater effort on the part of the CPU of the PLC and thus an increase in the scanning time.

Profibus-DP (ESA profile): Configuration software

There are 4 types of software that play a part in configuring the network:

- VTWIN
- FB
- File with extension GSD
- Configuration software for network master

These types of software require parameters that coincide.

VTWIN:

The parameters that must be set in the VTWIN project of every terminal connected in the network are:

- Size (in words of the I/O area)
- Timeout for testing the connection between the VT and PLC.
- Address of terminal.

FB:

This is a program supplied by ESA to be loaded into the PLC. This program is used to check the network parameters set and the data exchange. It varies according to the type of PLC (make and model).
Besides the parameters which we have just seen in VTWIN, the incoming FB requires other information related to the PLC that will be hosting it.
This information is contained in a text file on the disk entitled "VT-PROFIBUS Installation SW".

File with extension GSD (dedicated to ESA profile):

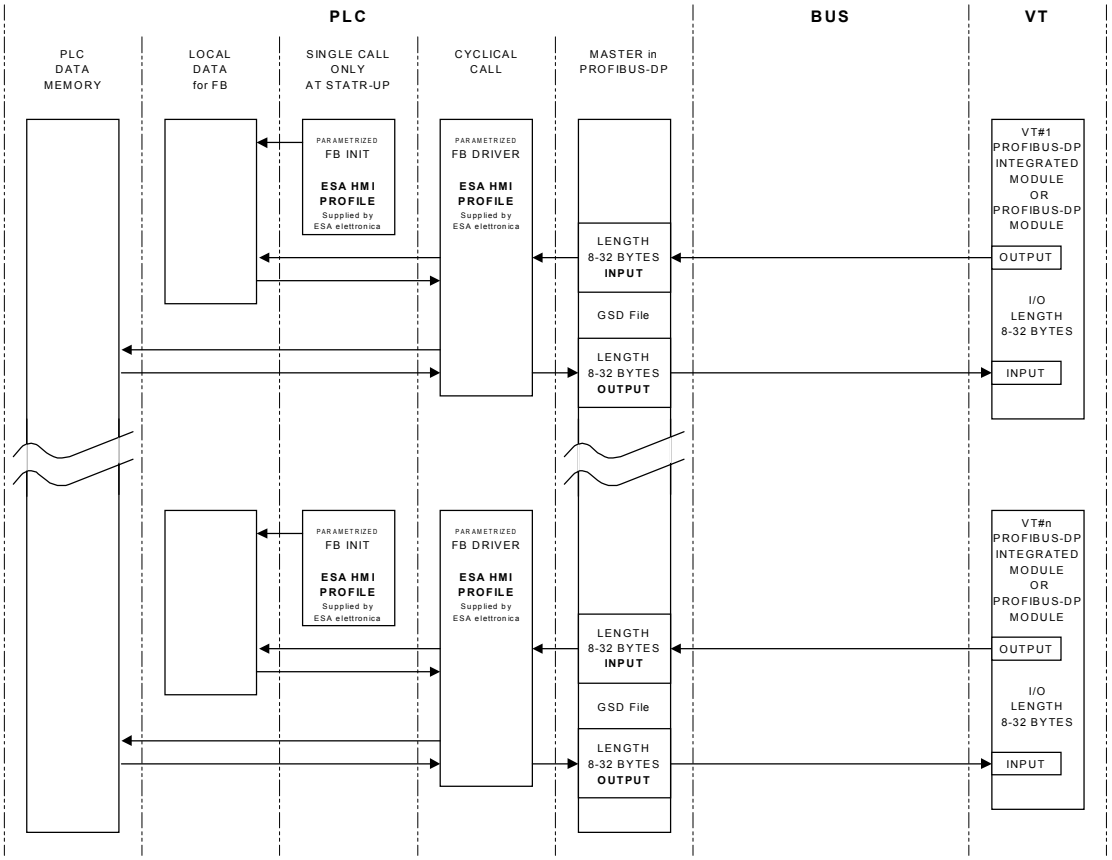
This file is supplied by ESA; it allows the configuration software of the network master to recognize the VT.

Network master configuration software:

This software is supplied by the producer of the network master.

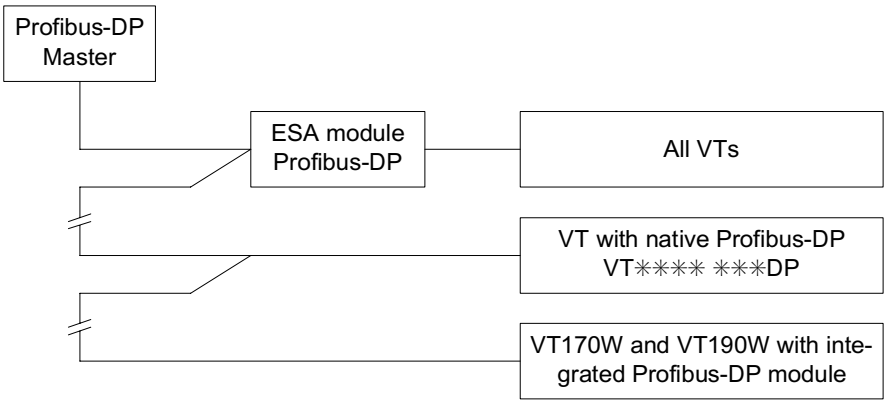
Profibus-DP (ESA profile): Logical diagram

Below is a logical diagram of the VT <-> Profibus-DP (ESA profile) connections. The diagram indicates how and at what level the FBs supplied by ESA interact with the system. The FB INIT takes care of the initial configuration of the system (input and output areas, keys area, etc.), while the FB DRIVER takes care of the data exchange between the PLC memory and the VTs, and viceversa. The number of FB calls within the PLC must be equal to the number of VTs connected in the system.



Profibus-DP (ESA profile): Physical diagram

The following figure represents the physical form of the VT <-> Profibus-DP connection.



Profibus-DP (Standard): VT operation

The slave VTs are seen as dedicated areas of memory in the PLC's I/O area, by means of which the PLC and VT exchange data.
The size of the I/O area of each VT participating in the network is defined by the user with a 4 to 64 word limit.
Note that the greater are the dimensions of the I/O area the faster the handling of the information, though this also means a greater effort on the part of the cpu of the PLC and thus an increase in the scanning time.

Profibus-DP (Standard): Configuration software

There are 3 types of software that play a part in configuring the network:

- VTWIN
- File with extension GSD
- Configuration software for network master

These types of software require parameters that coincide.

VTWIN:

The parameters that must be set in the VTWIN project of every terminal connected in the network are:

- Size (in words of the I/O area)
- Timeout for testing the connection between the VT and PLC.
- Address of terminal.

File with extension GSD (dedicated to Standard profile):

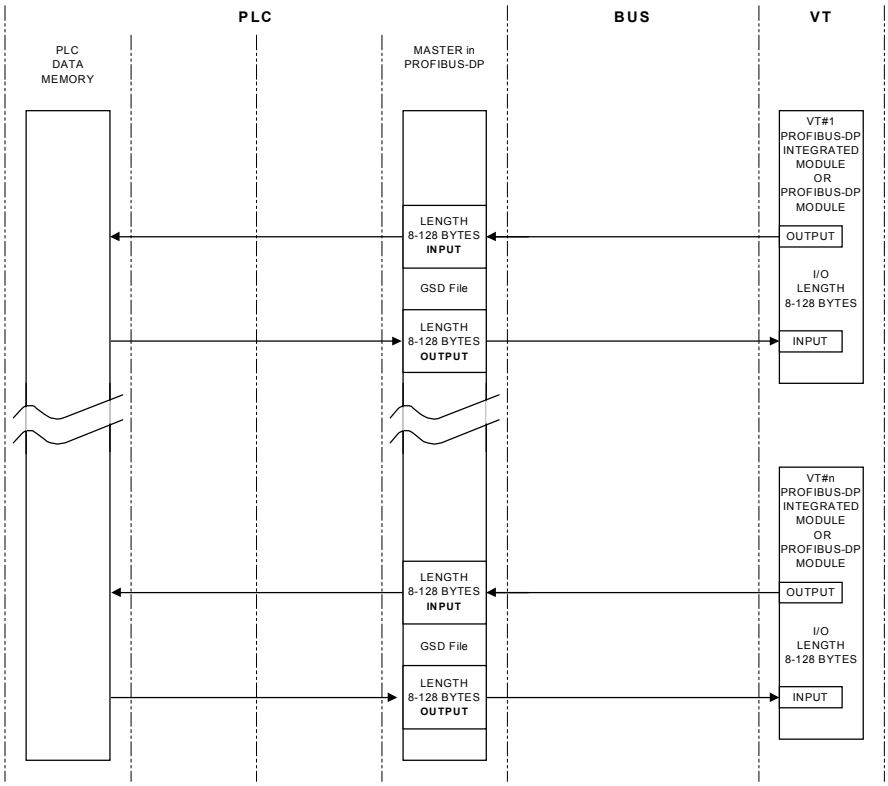
This file is supplied by ESA; it allows the configuration software of the network master to recognize the VT.

Network master configuration software:

This software is supplied by the producer of the network master.

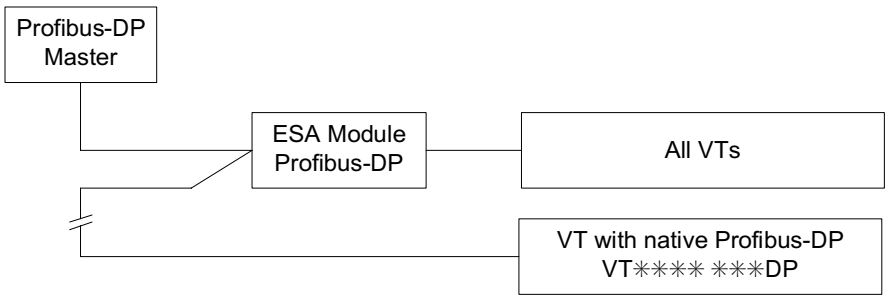
Profibus-DP (Standard): Logical diagram

Below is a logical diagram of the VT <-> Profibus-DP (Standard) connections.



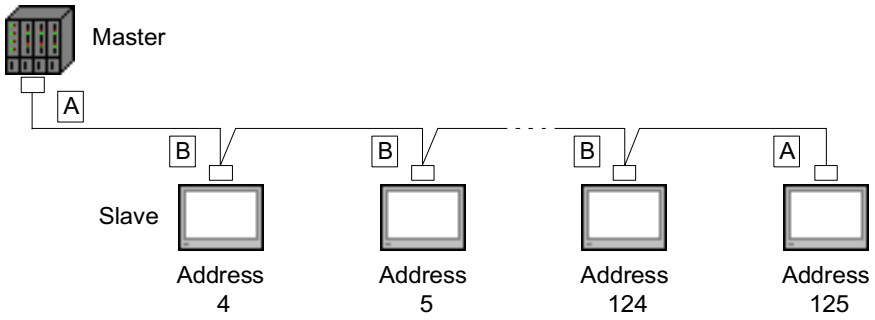
Profibus-DP (Standard): Physical diagram

Below is a physical diagram of the VT <-> Profibus-DP connections.

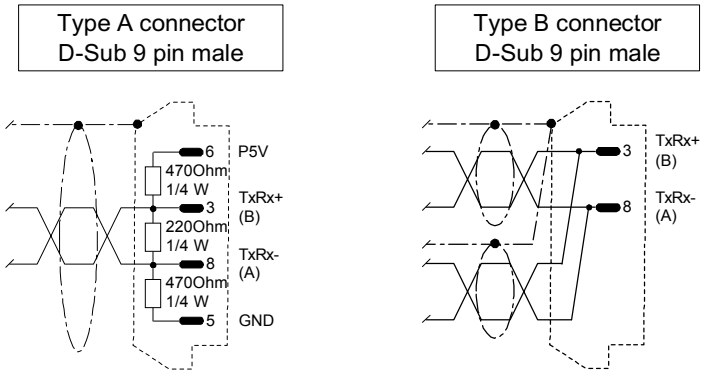


Profibus-DP: Connection

Below is a diagram of the connections of devices in Profibus-DP network.



As can be seen from the above diagram the connections for devices at either end of the line (A) are different from the internally positioned ones (B). Indeed, the connectors at A have inside them the termination resistances of the line. There follow the types of connection existing within the connectors.



Use the materials listed in the table below when making connection cables.

Table 19.3: Cables

Maker/Distributor	Type	Web
Belden	3079A PROFIBUS Cable	www.belden.com
Siemens	Simatic Net Profibus FC6X91 830-0E11 10	www.siemens.com
Intercond	1DR 22X 02R	www.intercond.com
	1DR 22X 02P	

For further details contact the retailer and/orvisit the appropriate WEB site.

Table 19.4: Connectors.

Maker/Distributor	Type	Web
Siemens	6ES7972-0BA10-0XA0	www.siemens.com
	6ES7972-0BB10-0XA0	
	6ES7972-0BA40-0XA0	
	6ES7972-0BB40-0XA0	
	6GK1500-0EA00	
Erni	103 648	www.erni.com
	103 658	
	103 663	
	103 649	
	103 659	
	104 329	
	104 577	
	104 322	

For further details contact the retailer and/orvisit the appropriate WEB site.

Interbus-S

A VT equipped with a network card can be connected within a network as a slave (a passive station that can only transmit data after receiving a request from an active station). The master communication card, generally inserted in a PLC station, transmits and recieves information from the slaves. There can be more than one slave connected to a single master in a network.

Interbus-S: VT operation

The slave VTs are seen as dedicated areas of memory in the PLC's I/O area, by means of which the PLC and VT exchange data.
The size of the I/O area of each VT participating in the network is 4 words.

Interbus-S: Configuration software

There are 3 types of software that play a part in configuring the network:

- VTWIN
- FB
- Configuration software for network master

These types of software require parameters that coincide.

VTWIN:

The parameters that must be set in the VTWIN project of every terminal connected in the network are:

- Timeout for testing the connection between the VT and PLC.

FB:

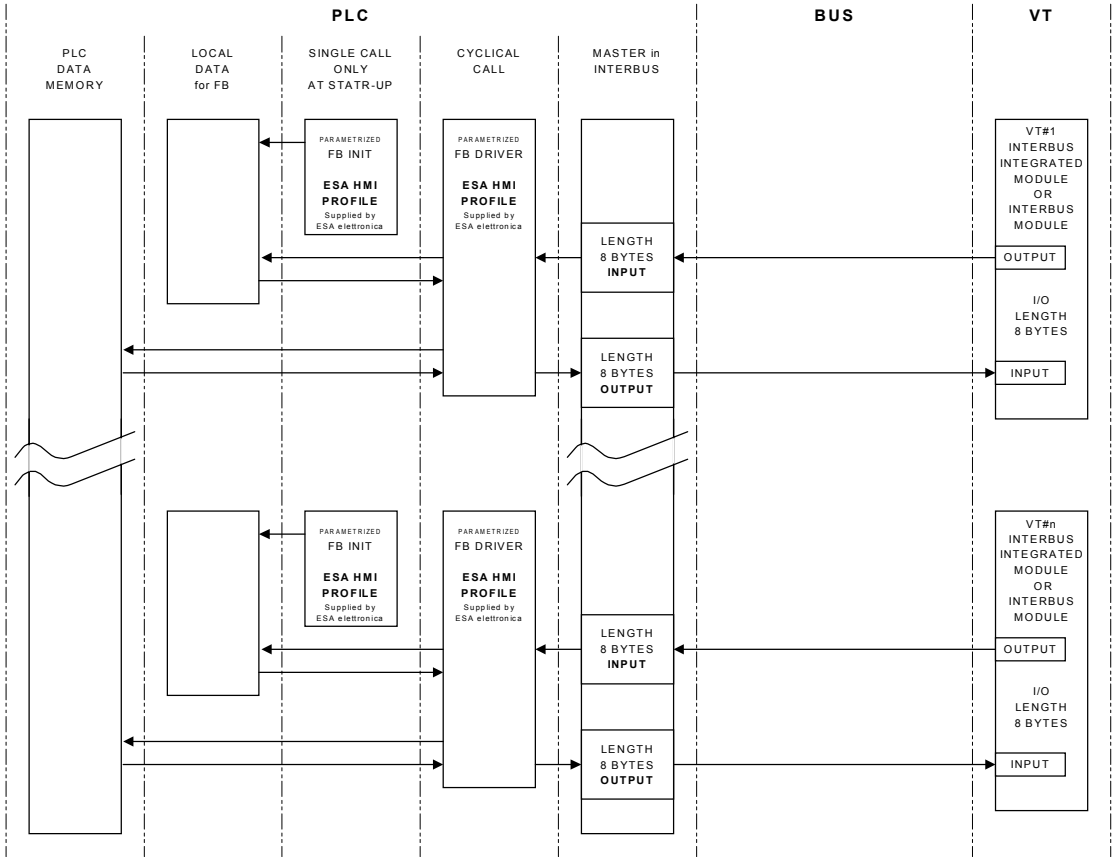
This is a program supplied by ESA to be loaded into the PLC. This program is used to check the network parameters set and the data exchange. It varies according to the type of PLC (make and model). Besides the parameters which we have just seen in VTWIN, the incoming FB requires other information related to the PLC that will be hosting it. This information is contained in a text file on the disk entitled "VT-INTERBUS Installation SW".

Network master configuration software:

This software is supplied by the producer of the network master.

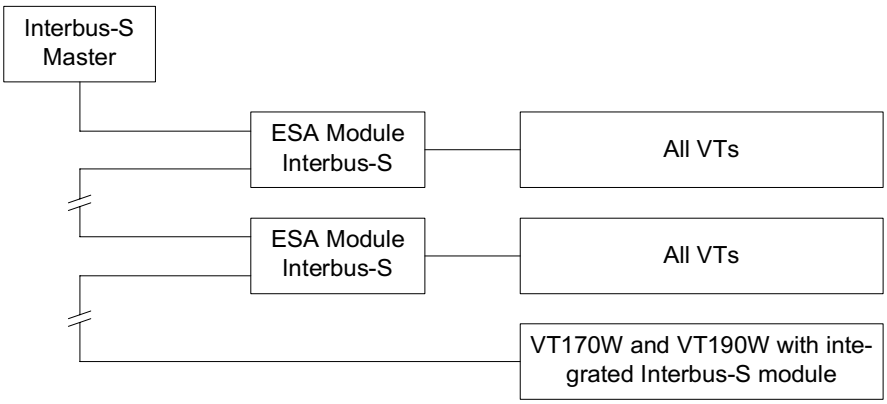
Interbus-S: Logical diagram

Below is a logical diagram of the VT <-> Interbus-S connections. The diagram indicates how and at what level the FBs supplied by ESA interact with the system. The FB INIT takes care of the initial configuration of the system (input and output areas, keys area, etc.), while the FB DRIVER takes care of the data exchange between the PLC memory and the VTs, and viceversa. The number of FB calls within the PLC must be equal to the number of VTs connected in the system.



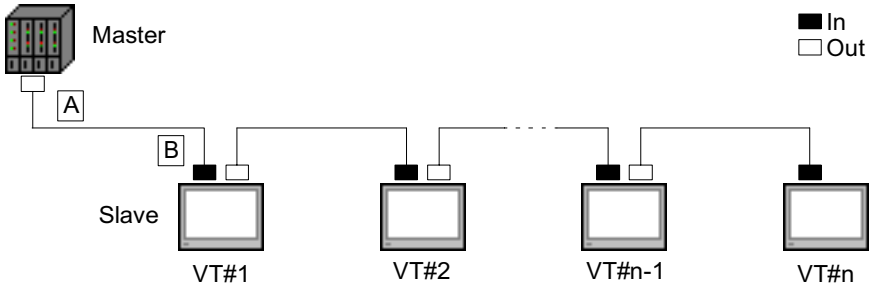
Interbus-S: Physical diagram

Below is a physical diagram of the VT <-> Interbus-S connections.



Interbus-S: Connection

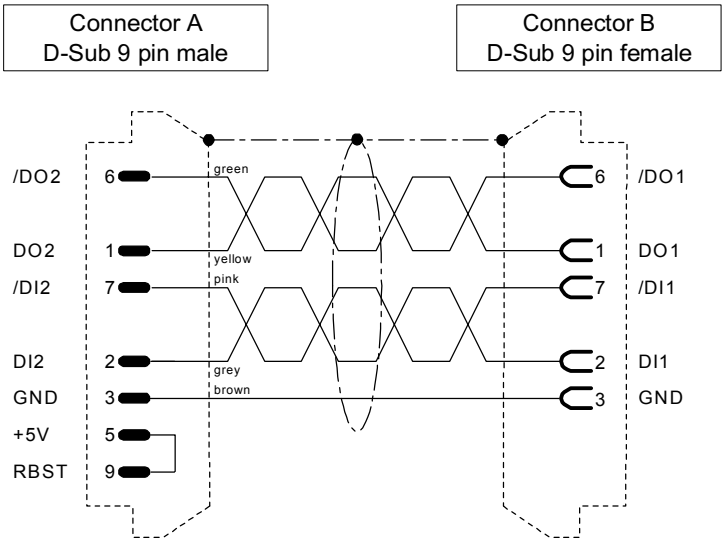
Below is a diagram of the connections between the VTs and the devices in Interbus-S network.



Parameter n stands for the maximum number of terminals that can be connected in the network, which depends on the size of the memory available in the master device for the input and output of process data. Each VT connected occupies 64 bits for the data input area and 64 bits for the process data output; thus

$$n = \frac{\text{I/O area of master device}}{64 \text{ bit}}$$

Below we list the connection cables required.



Use the materials listed in the table below when making connection cables.

Table 19.5: Cables

Maker/Distributor	Type	Web
Belden	3120A INTERBUS Cable	www.belden.com
Phoenix	27 18 28 0	www.phoenixcontact.com

For further details contact the retailer and/orvisit the appropriate WEB site.

Table 19.6: Connectors.

Maker/Distributor	Type	Web
Phoenix	27 58 47 3	www.phoenixcontact.com
	27 58 48 6	
Erni	103 650	www.erni.com
	103 651	
	103 660	
	103 661	
	104 319	

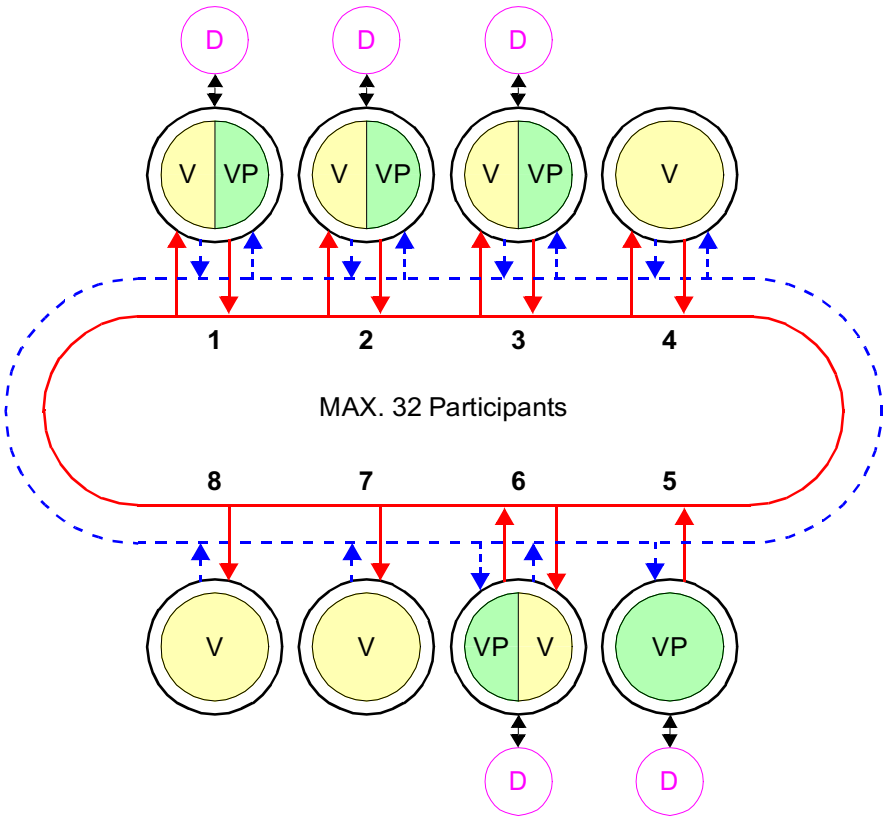
For further details contact the retailer and/orvisit the appropriate WEB site.

ESA-Net

All VT terminals can be connected in an ESA-Net network as *Network Clients* or as *Network Servers* (see technical characteristics of individual terminals). The network Client can only ask other terminals in the network for information (variables); while the network Server makes information (variables) available to other terminals in the network.

ESA-Net: VT operation

To help clarify the concept of ESA-Net, we offer the data-flow diagram below showing how a terminal assumes the function of client, server and server/client.



In the ESA-Net network the server terminal is the one that makes all or some of the variables available to the other terminals; these variables are called *Public Variables*. The client terminal is the one that uses the public variables made available by the server terminal. The terminal that uses public variables and, in its turn, makes others available is known as the server/client. Generally, the client terminal has no device of any kind connected.

The example in the figure shows eight terminals connected, of which:

1 -> Server/Client -> V/VP -> Device
2 -> Server/Client -> V/VP -> Device
3 -> Server/Client -> V/VP -> Device
4 -> Client -> V
5 -> Server -> VP -> Device
6 -> Server/Client -> V/VP -> Device
7 -> Client -> V
8 -> Client -> V

The area colored green (VP) represents the public variables, the area colored yellow (V) represents the variables; the device is indicated schematically in violet (D). The two central rings, one represented by a continuous red line indicates the VT's response to a request (the dotted lined traced in blue indicates the request for information.

A network can have more than one server, more than one client and more than one server/clients, the total being 32 terminals.

The network participants must each have a different address; the address of the terminal is configured using the VTWIN (see Software Manual).

A terminal can connected to the network either using the communication standard RS485 and the MSP and ASP (default) serial ports or, alternatively, using an RS485 serial module (optional) - (see "Chapter 18 -> Video terminal accessories").

In the interests of avoiding problems we recommend choosing an ESANET network connection port according to the following criteria: 1° - Field network, 2° - ASP and 3° - MSP.

The VT can operate at a speed of from 38400 to 187500Baud; all participants in the network must be set to the same transmission speed.

ESA-Net: Connecting the terminals

Since serial communications are highly subject to disturbances, the following advice should be followed to reduce as much as possible such problems:

- It is absolutely necessary to use a fully shielded twisted serial cable, with a pair of conductors having a minimum section of 0.22 mm² and a characteristic impedance of 120 Ohms.
- It is absolutely necessary to use a fully shielded connector.
- The 120 Ohm resistances must be placed exclusively at the physical extremes of the ESA-NET network.
- The shield of the cable must be soldered or mechanically connected to

the metal shells of the connectors that are connected subsequently to the VTs in the network.

The VT serial connection cables must be laid in separate raceways from the power supply cables.

The VT serial connection cables must be laid in separate raceways from the power cables and from all the devices that may, in general, be sources of disturbance (servo drives, inverters, etc...).

The following page carries an example of an ESA-NET connection; as can be seen, the cable has termination resistances.

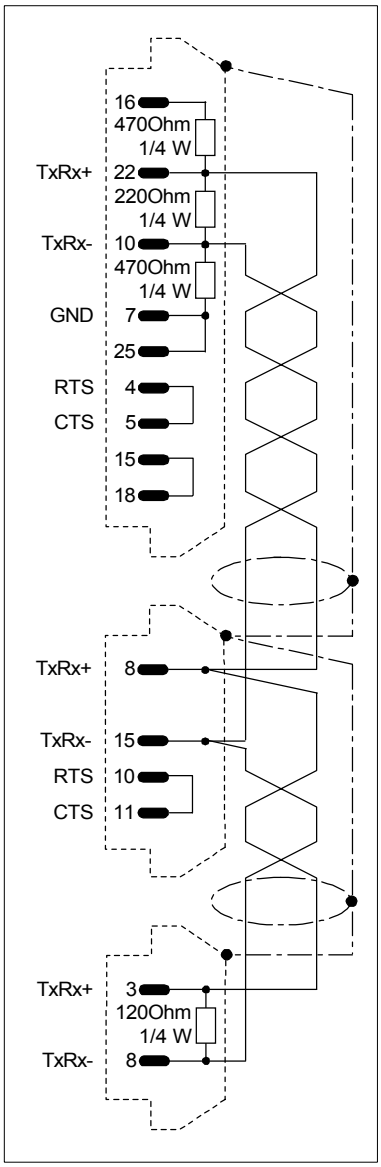
These resistances must be put on the first and last connectors of the line.

The VT connected in the network with a connector incorporating three resistances must never be switched off while the other participants in the network are still on. Should this happen, the effect of the resistances will be negated and there is a possibility that communication errors will occur.

VT1 connection using
25 pin **MSP**

VT2 connection using
15 pin **ASP**

Connection using
9 pin
RS485 serial module
(For this option see “Chapter 18 -> RS485 Serial module“)



ESA-Net: Configuration software

There is only 1 type of software used in configuring this network:

- VTWIN

This software requires that you set parameters that coincide one with the other.

VTWIN:

The parameters that need to be set in the VTWIN project of each terminal connected in the network are:

- Terminal’s network address

CAN

VT terminals equipped with the appropriate interface can be connected in a network with other devices by means of a CAN (Controller Area Network) protocol.

CAN terminals correspond to CIA DS 102 Version 2.0 (CAN Physical Layer for Industrial Applications) specifications.

The CAN network differs from other types of network in its low cost, high level performance in difficult electrical conditions, exceptional ability to respond in real time and operational simplicity.

This type of network has a master/slave structure. The master device takes care of initializing and configuring the slave stations, and further with controlling the communication state of the devices in the network. The slave devices are concerned exclusively with exchange of information. To be able to communicate, the slave devices must be initialized (operational state) and parameterized by the master device.

The VT can work at a speed ranging from 10kbit/s to 1000kbit/s.

CAN: VT functioning in CAN network

The VTs communicate with the devices using logical channels to which there correspond virtual communication lines which are independent of one another and definible using certain parameters.

Logical channels can be of one of two types:

- SDO (Service data object)
- PDO (Process data object)

SDO channels concern themselves with the exchange of parameters for setting, configuring and other information regarding the setting of the device. PDO channels, on the other hand, concern themselves exclusively with exchanging information related to the process underway.

PDO channels have priority over SDO channels.

It is possible to define the identifiers and lines of communication for all SDOs and PDOs by using the TX and RX parameters; admissible values run from 1 to 65535.

The network participants must each have a different address; the address of the terminal is configured using VTWIN (see Software Manual).

CAN: Configuration software

There is only one type of software that can effect the configuration of this network:

- VTWIN

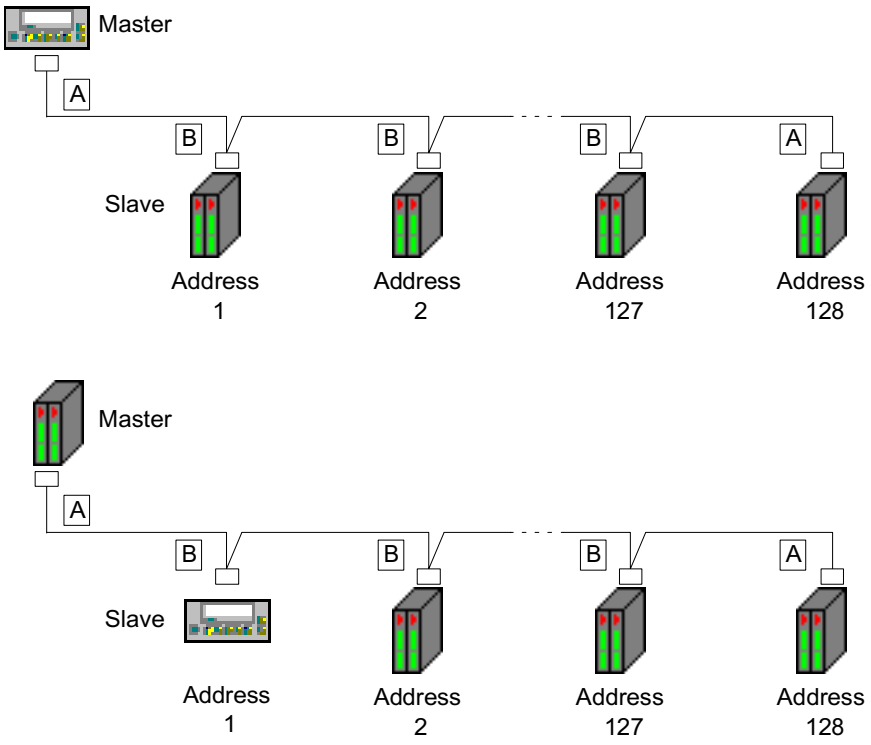
This software requires the setting of parameters that coincide with one another.

The parameters that have to be set in the VTWIN project of every terminal connected in the network are:

- Network address of the terminal.
- SDO
- PDO

CAN: Connection

The figure below shows the connection of VT with devices in a CAN network, in a master VT and slave formation.



Theoretically the network admits 128 devices, but the real limit depends on how many logical channels are activated. The maximum number of channels is 64 SDO and 64 PDO.

Example:

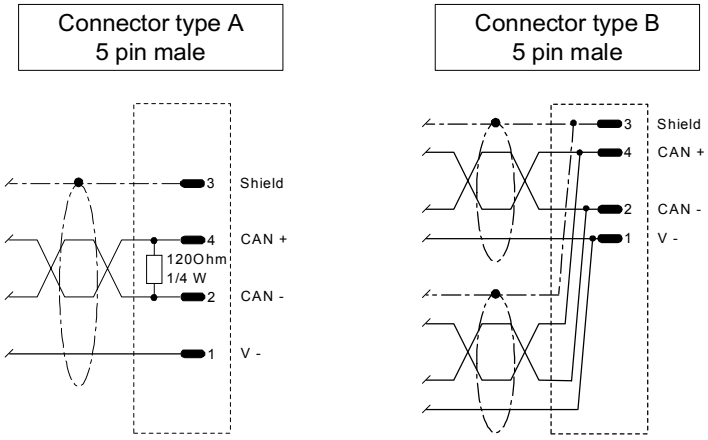
Suppose each devices possess 2 SDOs and 3 PDOs. If all are activated, the maximum number of the devices that can be connected is 21, i.e. the overall number of channels admissible divided by the number of PDO channels for each device (because the PDO channels, being more numerous, determine the limit).

$$\text{Max. participants} = \frac{\text{Max. of channels allowed}}{\text{Channels activated}} = \frac{64}{3}$$

As can be seen from the figure above, the connections for the devices at the ends of the line (A) are different from the internal ones (B). Indeed, the A connectors require cabling with a termination resistance for the line.

The VT terminals are already internally equipped with a termination resistance, so in the first case (VT master) the resistance on the connector can be omitted by using an integrated resistance. (See “Chapter 18 -> Termination of CAN line:“).

There follow diagrams of the types of connection made by the connectors.



Chapter 20 Operation of terminal with keyboard

This chapter consists of 26 pages.

The contents of this chapter apply to all the VT terminals of the same family that have a keyboard. As the ⊡⊡ of the various models differ in certain details, the following explanations will indicate, for each ⊡, the respective model.

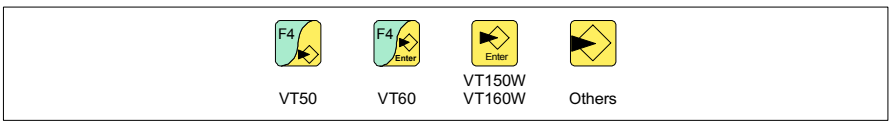
The way a key functions changes according to the type of field to be varied.

⚠ **Throughout the present chapter, when referring to the number of rows and the number of characters that can be used in the terminal, we assume native fonts are being used; when Windows-based fonts are used (in the case of graphics ternminals only), the equivalent screen area in pixels should be considered (see Software Manual** "Chapter 6 -> Project language"**).**

Changing value of variable field

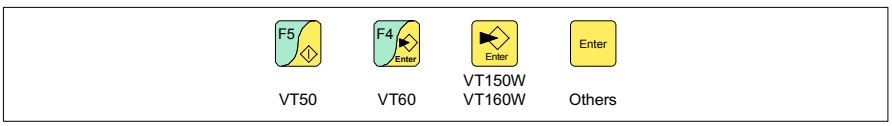
To be able to carry out a change in any editable variable field, the cursor must first be positioned over the field involved by using

and then pressing

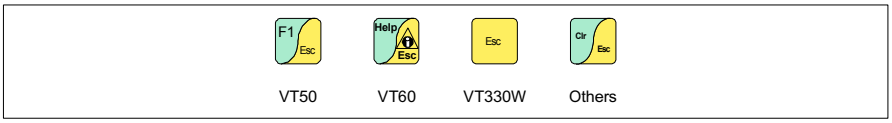


which enables the introduction of the new value.

The edit mode can be quit in two ways: either by saving after completing the input of a value and pressing



or at any given moment without saving by pressing



or automatically when the "Input timeout" (see Software Manual) elapses.

The VT offers the following ways of changing a field:

- Total change
- Partial change

Total change

This is the default mode adopted by the VT when enabling a change in a field: numerical and alphanumeric fields behave differently.

Numerical fields:

> The cursor flashes on the rightmost digit of the field. When the first digit is introduced the rest of the field goes to zero, while the successive introductions make the digits shift to the left.

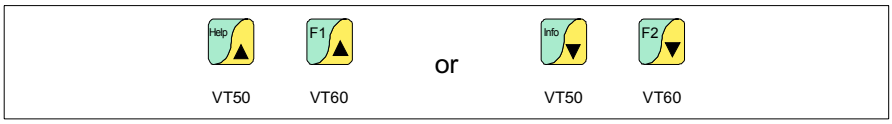
Alphanumeric field (ASCII):

> The cursor flashes on the leftmost digit of the field. When the new string is introduced sequentially the cursor moves one character to the right.

Partial change

With the edit mode enabled, pressing

and then inputting a digit or character or pressing



enables the change of only that digit or character pointed to by the cursor; to change the adjacent digits or characters the cursor must be positioned manually (the figure above applies only to VT50 and VT60).

Examples of varying fields

The examples below are offered to clarify how this works. For the sake of simplicity we have chosen a single product, VT170W, but conceptually what is said applies to all VTs, irrespective of what is written on the ▢▢.

Changing the value of a decimal numerical field:

> The following example demonstrates the variation (total change) of field 1 from 9999 to -1234.

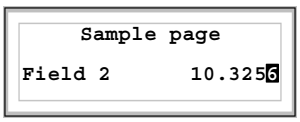
Edit mode is enabled and the cursor flashes on the rightmost digit of the data (least significant digit).

Press DEF 1 to enter the first digit of the new value; the field assumes the value 1.

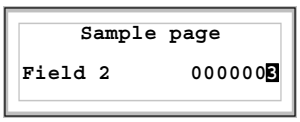
Press GHI 2 JKL 3 MNO 4 to complete the new value; press . ± Space to attribute a sign and Enter to confirm the change.

Changing the value of a floating point numerical field:

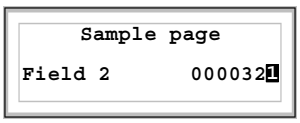
The procedure for changing a floating point numerical field is as for a decimal numerical field, except that a decimal point can be inserted anywhere in the field. The following example shows a variation (total change) in field 2 from 10.3256 to 321.65.



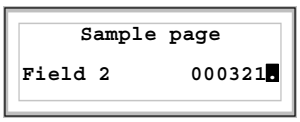
Edit mode is enabled and the cursor flashes on the rightmost digit of the data (least significant digit).



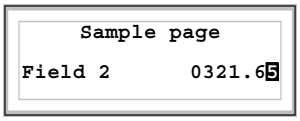
Press JKL 3 to enter the first digit of the new value; the field assumes the value 3.



Press GHI 2 DEF 1 to complete the whole numbers in the field.



Press shift + . ± Space to introduce the decimal point.



Press STU 6 PQR 5 to complete the introduction of the new value.
Press Enter to confirm the change.

Changing the value of a hexadecimal numerical field:

A hexadecimal digit can assume not only numerical values from 0 to 9 but also the letters A-B-C-D-E-F; thus for this type of field the numerical □□ 0 and 1 can be used to enter the letters A-B-C and D-E-F respectively by pressing the same key □ more than once. All the other □□ from 2 to 9 have only a numerical significance. The following example illustrates the variation (total change mode) of field 3 from 1A3F to B23C.

Edit mode is enabled and the cursor flashes on the rightmost digit of the data (least significant digit).

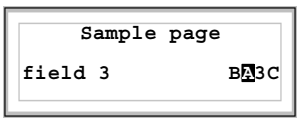
Press ABC 0 three times to enter the first digit of the new value; the field assumes in sequence the values 0, A and B.

Press GHI 2 JKL 3, then press ABC 0 4 times to complete the new value;
Press Enter to confirm the change.

The following example illustrates the variation (partial change) of field 3 from B23C to BABA.

Edit mode is enabled and the cursor flashes on the rightmost digit of the data (least significant digit).

Position the cursor on the second digit by pressing twice ◄.



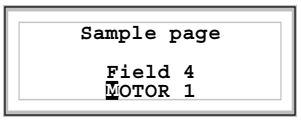
press ABC 0 twice to change the digit to the value A.

Position the cursor on the third digit by pressing ► and press ABC 0 three times to change the digit to the value B.

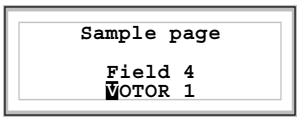
Position the cursor on the last digit by pressing ►; press ABC 0 twice to change the digit to the value A. Press Enter to confirm the change.

Changing the value of an alphanumeric (ASCII) numerical field:

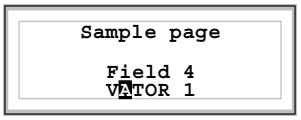
The following example illustrates the changing of field 4 from MOTOR 1 to VALVE 3.5.



Edit mode is enabled and the cursor flashes on the leftmost digit.

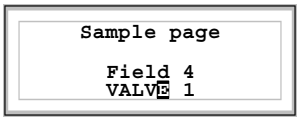


Press VWX 7 once to enter the first character of the new value.

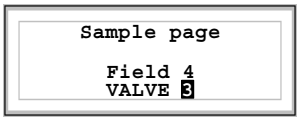


The cursor's movement by one character to the right happens automatically if the same ▢ is not pressed within a second or if a different alphanumeric ▢ is pressed; it is always possible to reposition it by pressing ◄ or ►.

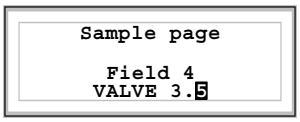
Entering [A] as the second character will cause the cursor to move automatically.



Press 3 3 times, 7 once and 1 twice to complete word VALVE.



Press ± Space to leave a space in the field and then 3 4 times.



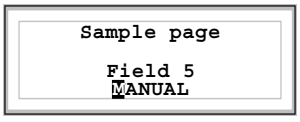
Press shift + ± Space to enter the character [.]; press 5 4 times to complete the new value; press Enter to confirm the change.

Changing the value of a dynamic text field:

The following example illustrates the variation of field 5 that can assume 4 different states to which the following 4 symbolic texts correspond: SETUP, STOP, MANUAL, AUTOMATIC.
Let us assume that SETUP is the starting value and MANUAL the final one.

Edit mode is enabled and the cursor flashes on the leftmost digit.

The first time PgUp is pressed the field assumes the value STOP.



The next time PgUp is pressed the field assumes the desired value, that is MANUAL. Press Enter to confirm the change.

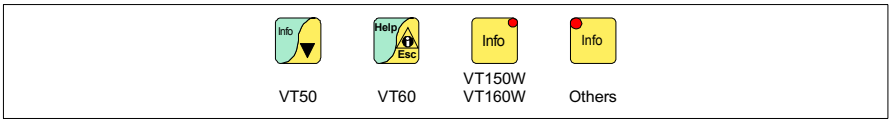
Displaying messages

The VT can display three types of message: *Information messages*, *ISA-1A Alarms* (in the case of terminals accepting them) and *Help messages* (HELP pages). The information and alarm messages can only be displayed if, using VTWIN, the programmer has already prepared the list of messages assigned to areas of memory in the device.

Which type of message is used is at the discretion of the programmer.

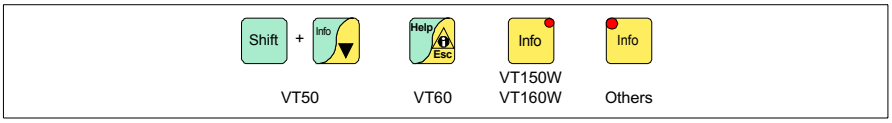
Information messages

When an event occurs which has an information message assigned to it the LEDs of the following keys start flashing:



Terminals VT50 and VT60 do not have LEDs, so there is no way of understanding when an information message is present. You are advised to define the priority of the messages with regard to the page using the *Exchange area* "Chapter 22 -> Command area" **(see also Software Manual).**

Information messages can be seen only when the event triggering them is still present. When you press



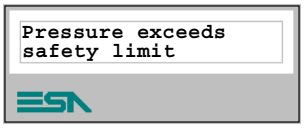
you enter display mode, indicated by a fixed LED light (where terminals have them), which is so structured as to allow one page for each message, that page have the following format (formats vary according to the type of VT).
The VT can provide an automatic sequential display of information messages on command from the device (see "Chapter 22 -> Command area").

VT50 info-messages

Format:

- Two rows of 20 characters for the text of the message.

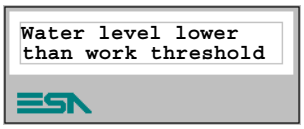
Example with two messages.



First message

When you press 

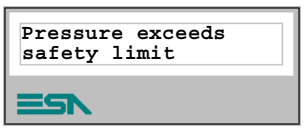
the next message is displayed



Second message

When you press 

the first message is displayed again:



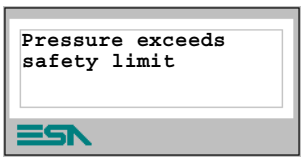
First message

VT60 info-messages

Format:

- Four rows of 20 characters for the text of the message.

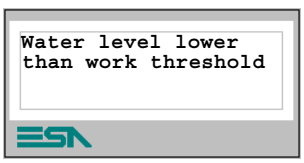
Example with two messages.



First message

When you press 

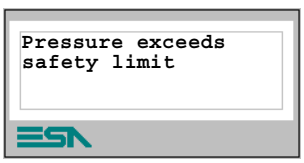
the next message is displayed:



Second message

When you press 

the first message is displayed again.



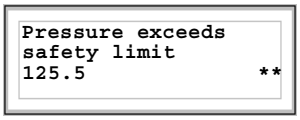
First message

VT150W - VT160W info-messages

Format:

- Two rows of 20 characters for the text of the message.
- One row for any data field (which in that particular situation could indicate a safety or warning limit value).
- The first display is indicated by two characters [**] on the far right of the third line of the display. These symbols are not present if the message appeared when the display mode for information messages was accessed on a previous occasion.

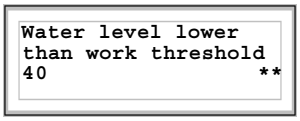
Example with two messages.



First message

When you press 

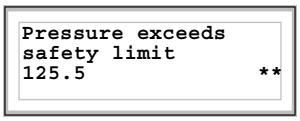
the next message is displayed:



Second message

When you press 

the first message is displayed again:



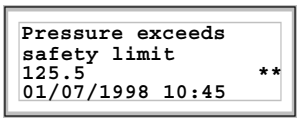
First message

VT170W info-messages

Format:

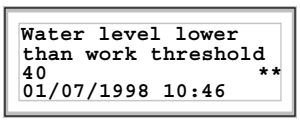
- Two rows of 20 characters for the text of the message.
- One row for any data field (which in that particular situation could indicate a safety or warning limit value).
- One row for the date and time the signal occurred.
- The first display is indicated by two characters [**] on the far right of the third line of the display. These symbols are not present if the message appeared when the display mode for information messages was accessed on a previous occasion.

Example with two messages.



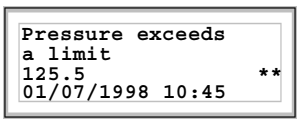
First message

When you press  the next message is displayed:



Second message

When you press  the first message is displayed again:



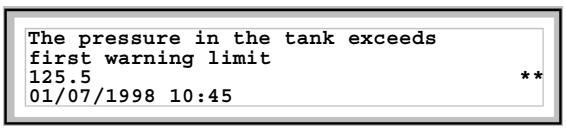
First message

VT190W info-messages

Format:

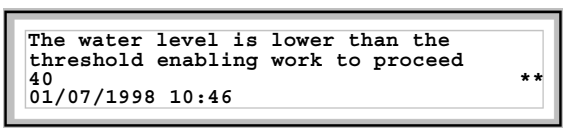
- Two rows of 40 characters for the text of the message.
- One row for any data field (which in that particular situation could indicate a safety or warning limit value).
- One row for the date and time the signal occurred.
- The first display is indicated by two characters [**] on the far right of the third line of the display. These symbols are not present if the message appeared the last time the display mode for information messages was accessed.

Example with two messages.



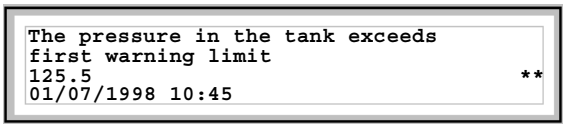
First message

When you press  the next message is displayed:



Second message

When you press  the first message is displayed again:



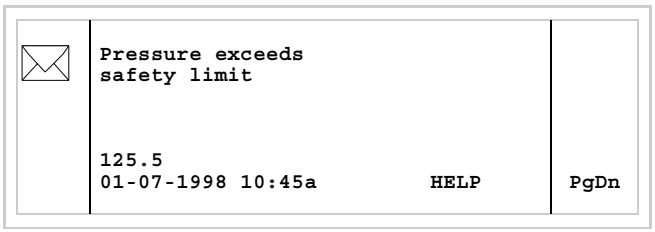
First message

VT300W - VT310W - VT320W info-messages

Format:

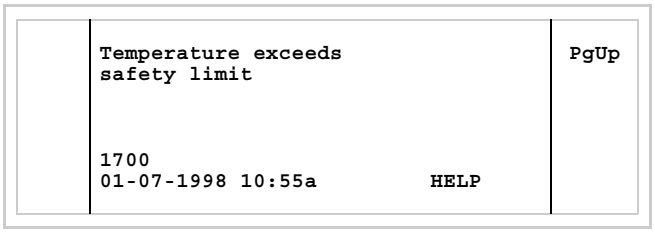
- Five rows of 30 characters with character height of X1 or two rows of 15 with character height of X2 for the text of the message (VT300W - VT310W).
- Five rows of 36 characters with character height of X1 or two rows of 18 with character height of X2 for the text of the message (VT320W).
- One row for any data field (which in that particular situation could indicate a safety or warning limit value).
- One row for the date and time the signal occurred.
- The first display is indicated by a closed envelope [✉] at the top left of the display. This symbol is not present if the message appeared the last time the display mode for information messages was accessed.

Example with two messages (VT310W).



First message

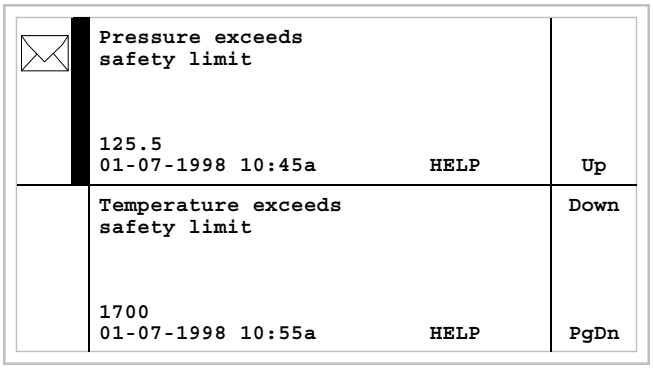
When you press  +  the second page containing the second message appears. NB: having already appeared before, this message is not accompanied by a closed envelope:



Second message

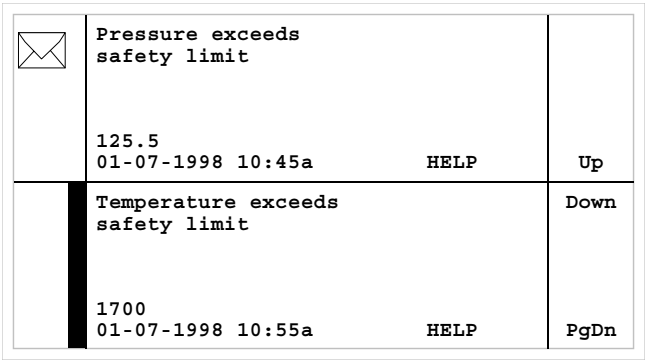
When you press  +  the previous page is displayed again.

Example with three messages (VT310W and VT320W).



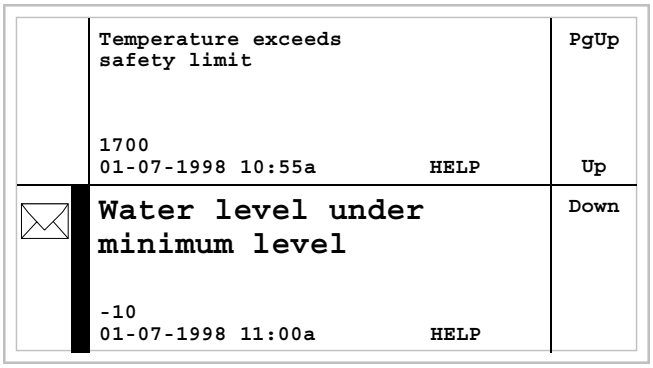
When you press 

you select the second message displayed as the current message (the black bar indicates message has been selected). NB: having already appeared before, this message is not accompanied by a closed envelope:

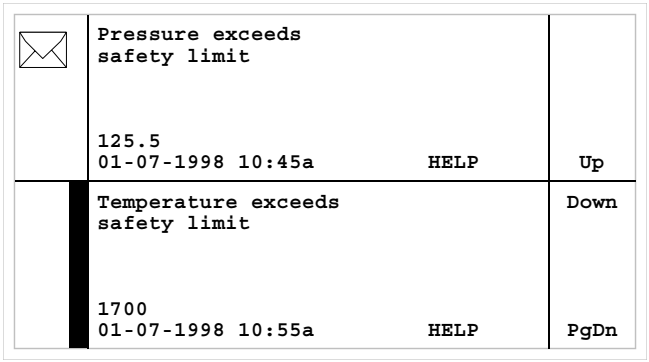


When you press 

again you select the third message displayed as the current message:

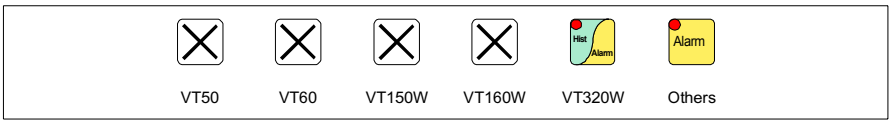


When you press shift + PgUp the previous page appears containing the first and second messages:

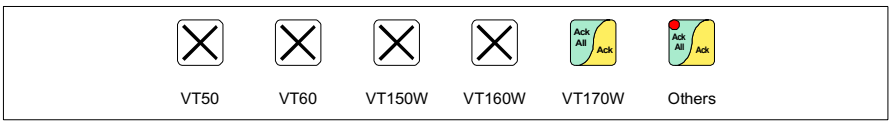


ISA-1A alarms

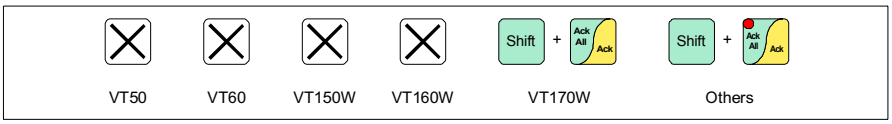
When an event occurs to which an alarm has been assigned, the following LEDs begin to flash:



ISA alarms are displayed from the time when the event triggering the alarm occurs (Event in) until there is an individual acknowledgment operation using



or the global acknowledgment operation using

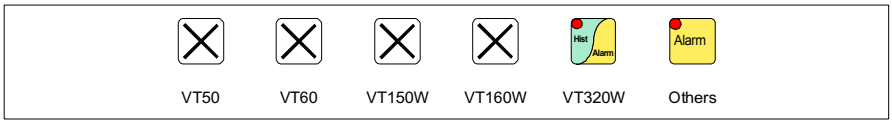


(Event acknowledged) and the triggering event is no longer present (Event out).

By “acknowledgment” we mean the confirmation on the part of the plant or machine operator of having taken note of the alarm message.

For further details on how *ISA-1A Alarms* work see Software Manual.

When you press



you enter display mode, signaled by the fixed light LED of that ▣ coming on, where the first page has the format set out below (the format changes according to the type of VT).

When you press 

again you enter the second page whose format is set out below (valid only for VT170W and VT190W).

The VT can provide an automatic sequential display of information messages on command from the device (see "Chapter 22 -> Command area").

VT170W alarms

The first page has the following format:

- Numerical identification of the ISA-1A alarm.
- Two rows of 20 characters for the text of the message.
- One row for any data field (which in that particular situation could indicate a safety or warning limit value).
- Indication in the bottom right-hand corner of the display of:
  - Event appeared but not acknowledged; indicated by [!]
  - Event appeared, present and acknowledged; indicated by [*]
  - Event disappeared and not acknowledged; indicated by[#]

The second page has the following format:

- Numerical identification of the ISA-1A alarm.
- One row starting with the character [**>**] for the date and time of the appearance of the event (Event appears).
- One row starting with:
  - the character [**#**] for the date and time of the Event acknowledged but still present.
  - the character [**<**] for the date and time of the Event disappeared but not acknowledged.

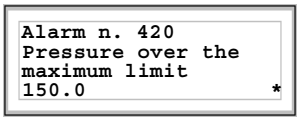
Example with two alarms.

```
Alarm n. 420
Pressure over the
maximum limit
150.0                !
```

First page of the first alarm

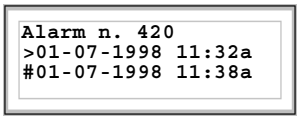
The character [!] indicates that the alarm has not yet been acknowledged.

The acknowledgment operation, pressing Ack All Ack, changes the character signalling the status of the event to [*]:



First page of the first alarm

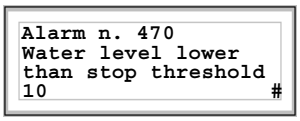
When you press Alarm the second page appears:



Second page of the first alarm

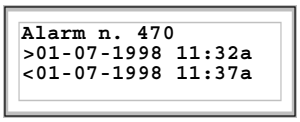
When you press Alarm or Clr Esc the first page is appears again; by pressing Clr Esc again you quit display mode for the ISA-1A alarms.

If, while displaying the first page of the alarm, you pressing PgDn, the next alarm message appears:



First page of the second alarm

When you press Alarm the second page appears:



Second page of the second alarm

The character [<] followed by the date and time, indicates that the event triggering the alarm disappeared before the acknowledgment operation.

VT190W alarms

The first page has the following format:

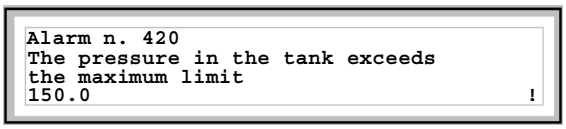
- Numerical identification of the ISA-1A alarm.
- Two rows of 40 characters for the text of the message.
- One row for any data field (which in that particular situation could indicate a safety or warning limit value).
- Indication in the bottom right-hand corner of the display of:

- Event in but not acknowledged; indicated by [!]
- Event in, present and acknowledged; indicated by [*]
- Event out and not acknowledged; indicated by[#]

The second page has the following format:

- Numerical identification of the ISA-1A alarm.
- One row starting with the character [**>**] for the date and time of the appearance of the event (Event in).
- One row starting with:
  - the character [**#**] for the date and time of the Event acknowledged but still present.
  - the character [**<**] for the date and time of the Event out but not acknowledged.

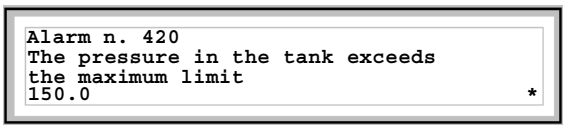
Example with two alarms.



First page of the first alarm

Il character [!] indicates that the alarm has not yet been acknowledged; this is emphasized by the LED of 

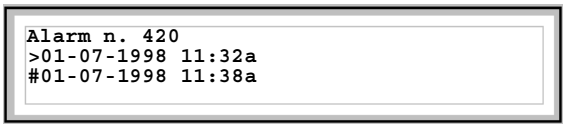
flashing; by pressing this key, the alarm is acknowledged and the character indicating the status of the event changes to [*] and the LED goes out.



First page of the first alarm

When you press 

the second page appears:



Second page of the first alarr

When you press 

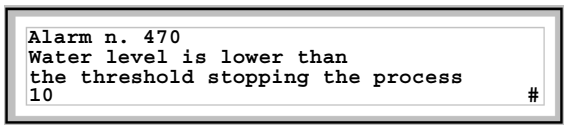
or 

, the first page appears again; by pressing 

again you quit display mode of the ISA-1A alarms.

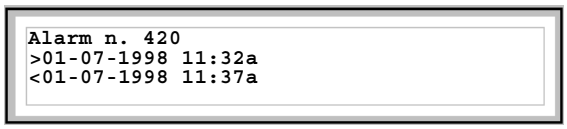
If, while displaying the first page of the alarm, you press 

, the next alarm message appears



First page of the second aları

When you press Alarm the second page appears:



Second page of the second alarm

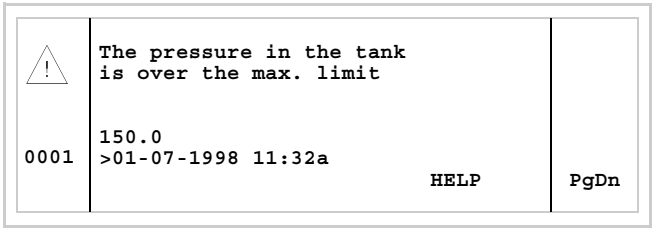
The character [<] followed by the date and time, indicates that the event triggering the alarm disappeared before the acknowledgment operation.

VT300W - VT310W - VT320W alarms

The page has the following format:

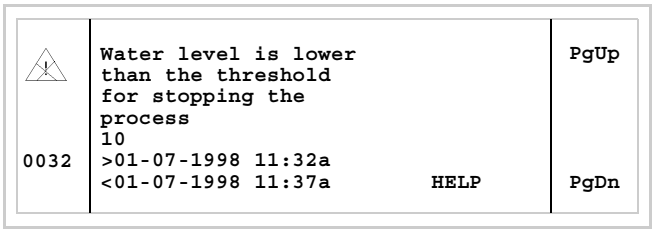
- Numerical identification of the ISA-1A alarm.
- Four rows of 30 characters with character height of X1 or two rows of 15 with character height of X2 for the text of the message (VT300 - VT310W).
- Four rows of 36 characters with character height of X1 or two rows of 18 with character height of X2 for the text of the message (VT320W).
- One row for any data field (which in that particular situation could indicate a safety or warning limit value).
- One row starting with the character **[>]** for the date and time of the appearance of the event.
- One row starting with:
  - the character **[#]** for the date and time of the Event acknowledged but still present.
  - the character **[<]** for the date and time of the Event out but not acknowledged.
- Symbols indicating status of the alarm
  - Event in but not acknowledged [⚠]
  - Event appeared, present and acknowledged [⚠]
  - Event out and not acknowledged [⚠]

Example with three alarms (VT300W).



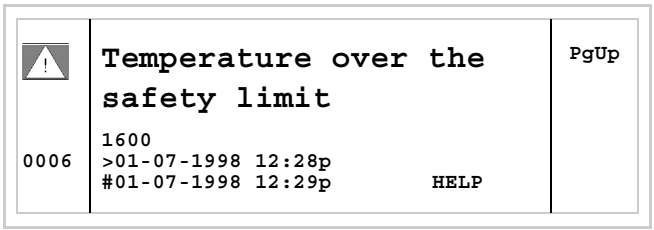
First alarm

When you press shift + PgDn the second page appears containing the second alarm. Note that the second alarm is accompanied by the character [<] followed by the date and time, indicating that the event triggering the alarm disappeared before the acknowledgment operation. All this is also emphasized by the appropriate symbol.



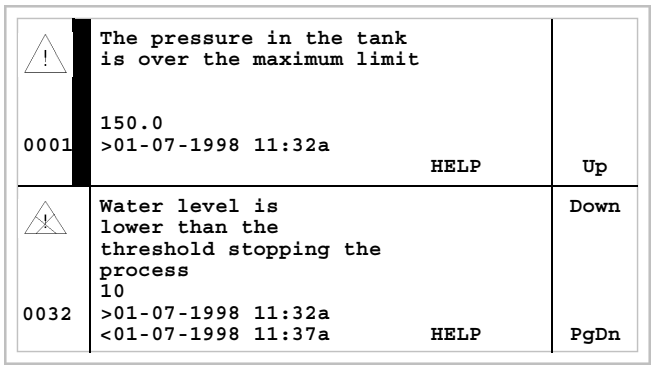
Second alarm

When you press shift + PgDn the next page appears containing the third alarm. Note that the second alarm is accompanied by the character [#] followed by the date and time, indicating that the event triggering the alarm is present and acknowledged. All this is also emphasized by the appropriate symbol.



Third alarm

When you press shift + PgUp the previous page appears again.
Example with three alarms (VT310W and VT320W).

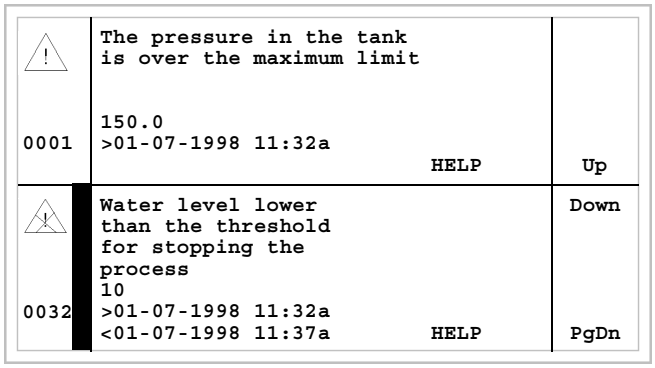


First alarm

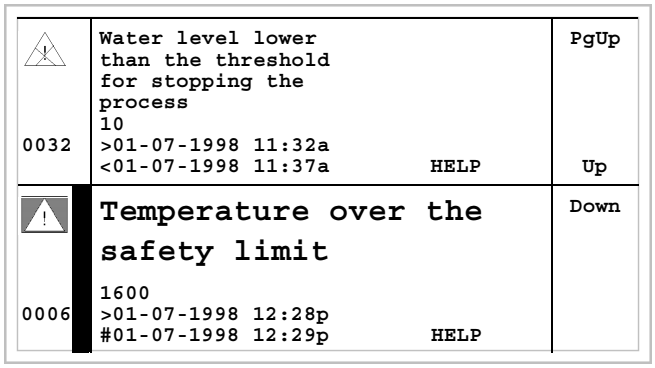
Second alarm

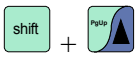
When you press PgDn you select the second alarm as the current alarm. Note that the second alarm is accompanied by the character [<] followed by the

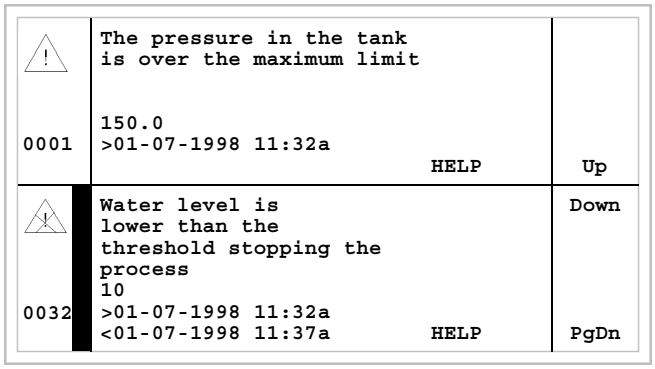
date and time, indicating that the event triggering the alarm disappeared before the acknowledgment operation. All this is also emphasized by the appropriate symbol.



When you press  again you select the third alarm as the current alarm.

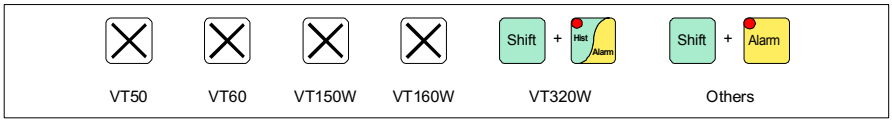


When you press  the previous page appears containing the first and second alarms. Note that the second alarm is accompanied by the character [#] followed by the date and time, indicating that the event triggering the alarm is present and acknowledged. All this is also emphasized by the appropriate symbol.



ISA-1A alarm history buffer

When an event occurs to which an alarm has been assigned the terminal registers it chronologically in an area of the internal memory called the *Alarm history buffer*. If, while displaying the first page of the alarm, you press Enter, or at any point



you enter display mode, signaled by the fixed light LED of that ▣ coming on.

When you press Alarm again you enter the second page whose format is set out below (valid only for VT170W and VT190W).

The VT can provide an automatic sequential display of information messages on command from the device (see “Chapter 22 -> Command area“).

The buffer of the *Alarm history* can be emptied (the elimination of all the messages registered) only by means of a command from the device (see “Chapter 22 -> Command area“).

Once the buffer is full, new alarms are no longer registered. You are advised to consult the chapter *Status area of the VT* “Chapter 22 -> Status area for the terminal“ **(see also Software Manual) to be able to tell when the buffer is full.**

The format is similar to that of the alarms except that a character [H] is added in front of the number of the alarm (see the formats of the various products).

VT170W history buffer

Example with two alarms.

```
H - Alarm n. 420
Pressure over the
maximum limit
150.0
```

First page of history buffer of the first alarm

When you press Alarm the second page appears:

```
H - Alarm n. 420
>01-07-1998 11:32a
#01-07-1998 11:38a
<01-07-1998 11:52a
```

Second page of history buffer of the first alarm

When you press Alarm or Clr Esc the first page appears again; by pressing Clr Esc again you quit the display mode for the history buffer.

If, while displaying the first page of the history buffer, you press PgDn the next message is displayed:

```
H - Alarm n. 470
Water level lower
than stop threshold
10
```

First page of history buffer of the second alarm

When you press Alarm the second page appears:

```
H - Alarm n. 470
>01-07-1998 11:32a
#01-07-1998 11:47a
<01-07-1998 11:37a
```

Second page of the second alarm

VT190W history buffer

Example with two alarms.

```
H - Alarm n. 420
Pressure in the tank exceeds
the maximum limit
150.0
```

First page of the history buffe of the first alarm

When you press Alarm the second page appears:

```
H - Alarm n. 420
>01-07-1998 11:32a
#01-07-1998 11:38a
<01-07-1998 11:52a
```

Second page of the history buffer of the first alarm

When you press Alarm or Clr Esc the first page is appears again; by pressing Clr Esc again you quit display mode of the history buffer.

If, while displaying the first page, you press PgDn, the next history buffer is displayed:

```
H - Alarm n. 470
Water level lower than
threshold stopping process
10
```

First page of the history buffe of the second alarm

When you press Alarm the second page appears:

```
H - Alarm n. 470
>01-07-1998 11:32a
#01-07-1998 11:47a
<01-07-1998 11:37a
```

Second page of the history buffer of the second alarm

VT300W - VT310W - VT320W history buffer

Example with three alarms VT300W.

```
H
0001
        Pressure in the tank
        over maximum limit


        150.0
        >01-07-1998 11:32a
        <01-07-1998 11:33a
        #01-07-1998 11:55a
```

First alarm

When you press shift + PgDn the next page appears containing the following alarm:

```
H
0032
        Water level is
        lower than the
        threshold stopping
        the process
        10
        >01-07-1998 11:32a
        <01-07-1998 11:37a
        #01-07-1998 11:40a
                                PgUp


                                PgDn
```

Second alarm

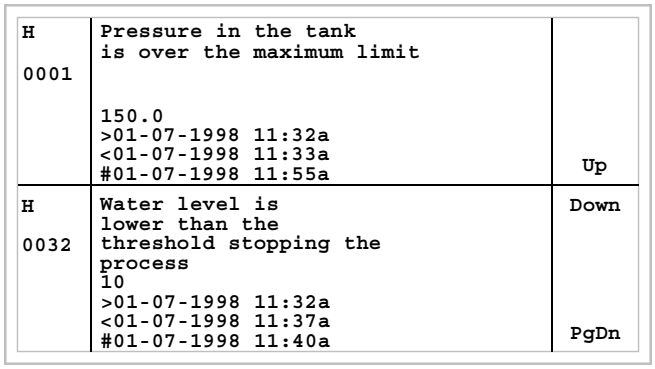
When you press shift + PgDn the next page appears containing the following alarm:

```
H
0006
        Temperature over the
        safety limit
        1600
        >01-07-1998 12:28p
        <01-07-1998 12:29p
        #01-07-1998 12:29p
                                PgUp
```

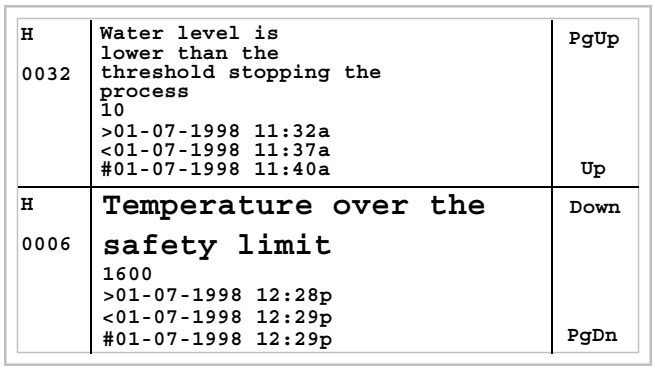
Third alarm

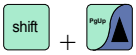
When you press shift + PgUp the previous page appears again. When you press Esc you quit display mode of the history buffer.

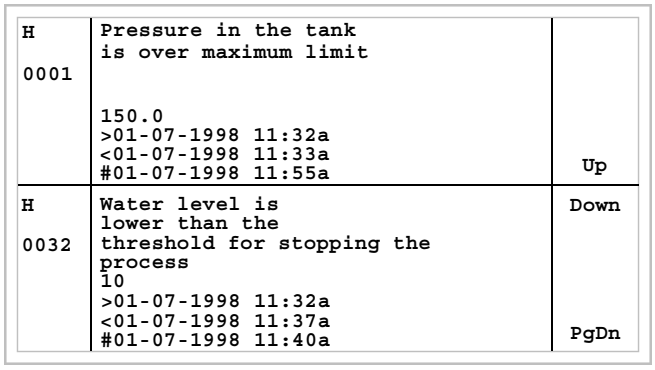
Example of three alarms VT310W and VT320W.



When you press  you select the third alarm as the current alarm:



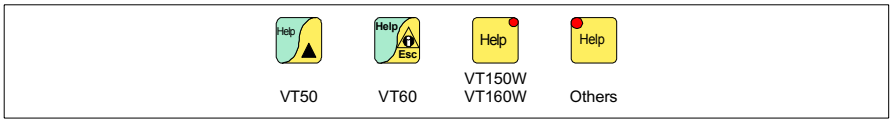
When you press  the previous page now appears containing the first and second alarms:



When you press  you quit display mode for the history buffer.

Help messages

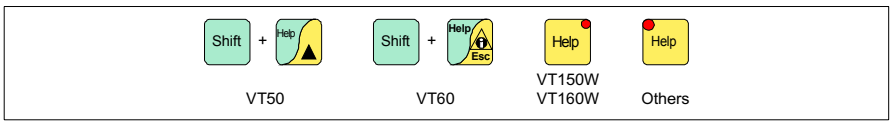
When there is a help message the LED of the following keys flashes



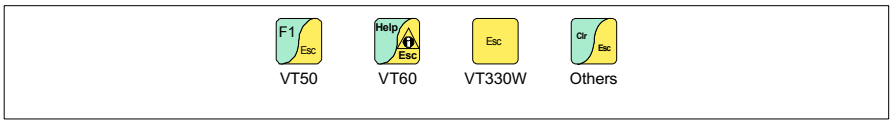
Terminals VT50 and VT60 have no LEDs, so there is no way of knowing when a help message is present.

Help messages can be assigned to project pages, to information messages and to ISA alarms, giving additional information relevant to the operation underway. Help messages have no particular format and can be freely created by the programmer using the entire screen.

When you press



you enter display mode, indicated by the fixed light of the LED (in the case of those terminals that have it). When you press



you quit display mode for help messages and return to the previous display mode.

Chapter 21 Operation of terminal with touch screen

This chapter consists of 28 pages.

The contents of this chapter apply to all the VT terminals of the same family that have a touch screen.

⚠ **Throughout the present chapter, when referring to the number of rows and the number of characters that can be used in the terminal, we assume native fonts are being used; when Windows-based fonts are used (in the case of graphics ternminals only), the equivalent screen area in pixels should be considered (see Software Manual** "Chapter 6 -> Project language"**).**

Changing value of variable field

To be able to carry out a change in any editable variable field you must touch the chosen field on the display and a page appears offering the ▢▢ needed to modify the field.

The edit mode is quit by pressing the appropriate ▢▢ (see "Table 21.1, Chapter 21 -> Keys displayed used for settings .") after setting the value, or automatically when the "input timeout" (see Software Manual) elapses, whereby the variation is quit.

Table 21.1: Keys displayed used for settings (Part 1 of 2).

Keys	Function
↑	The function assumed depends on the type of field to be set. Increases/decreases the value, the digit, the character.
↓	The function assumed depends on the type of field to be set. Increases/decreases the value, the digit, the character.
→	The function assumed depends on the type of field to be set. Increases/decreases the value. Allows you to move between digits or characters of the field.
←	The function assumed depends on the type of field to be set. Increases/decreases the value. Allows you to move between digits or characters of the field
↵	Confirms the setting of a field. (For the sake of simplicity called Enter)
ESC	Quits the setting of a field.
+/-	Changes the sign when the field permits.
.	Inserts the decimal point when the field permits.
0..9/a	Numerical and alphanumeric keys.

Table 21.1: Keys displayed used for settings (Part 2 of 2).

Keys	Function
SHIFT	In the case of an alphanumeric key allows the letter to be inserted.

The VT offers the following ways of changing a field:

- Total change
- Partial change

Total change

This is the default mode adopted by the VT when enabling a change in a numerical field.

Numerical fields:

The cursor flashes on the rightmost digit of the field. When the first digit is introduced the rest of the field goes to zero, while the successive introductions make the digits shift to the left.

Partial change

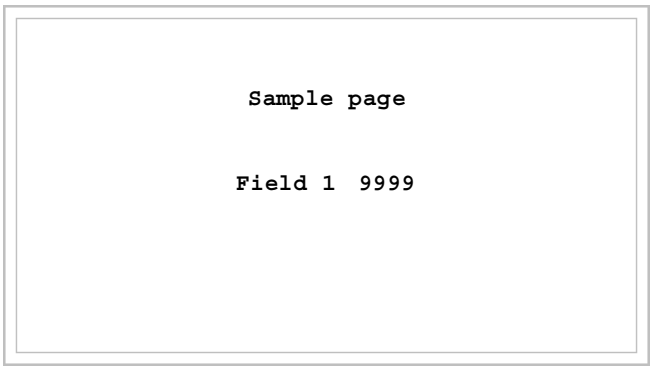
With the edit mode enabled, the change of the individual digit or character being pointed to by the cursor is enabled by pressing the arrow ◻◻ and then entering a digit, or by means of increasing the character (see "Table 21.1, Chapter 21 -> Keys displayed used for settings ."). To change the adjacent digits or characters the cursor has to be positioned manually.

Examples of varying fields

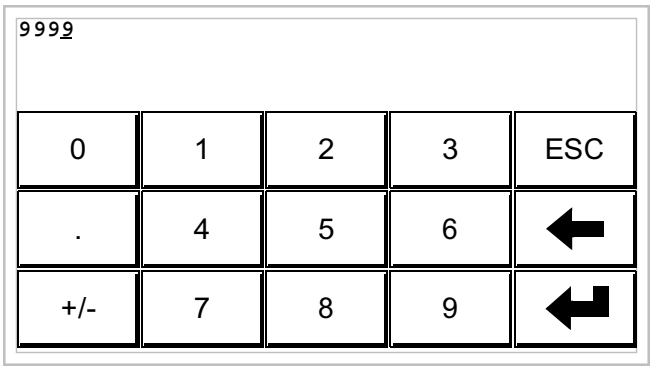
The examples below are offered to clarify how this works. For the sake of simplicity we have chosen a single product, VT555W, but conceptually what is said applies to all the products of the same family.

Changing the value of a decimal numerical field:

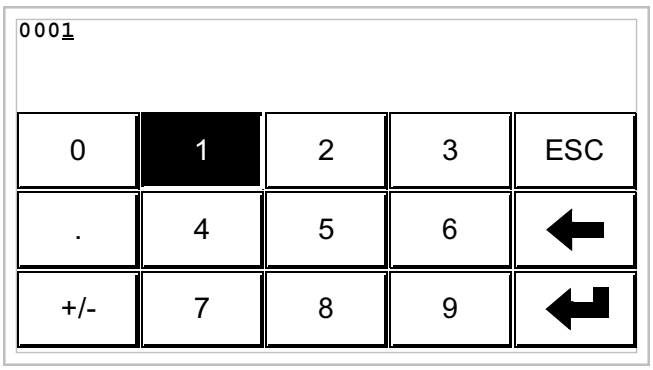
The following example demonstrates the variation (total change) of field 1 from 9999 to -1234.



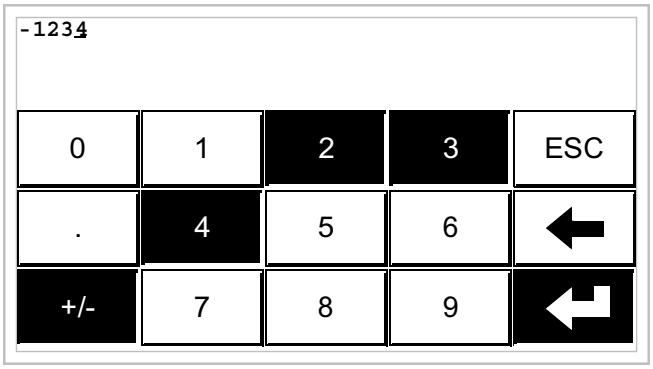
Touch the display field [9999]



Edit mode is enabled; the cursor moves to the right-most digit of the data (least significant digit).



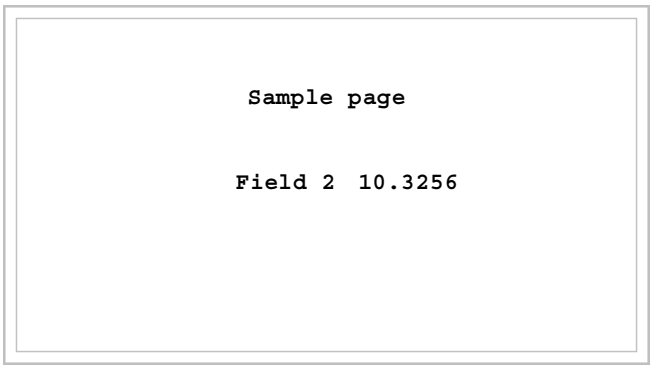
Press the ▣ [1] to enter the first digit of the new value; the field assumes the value 1.



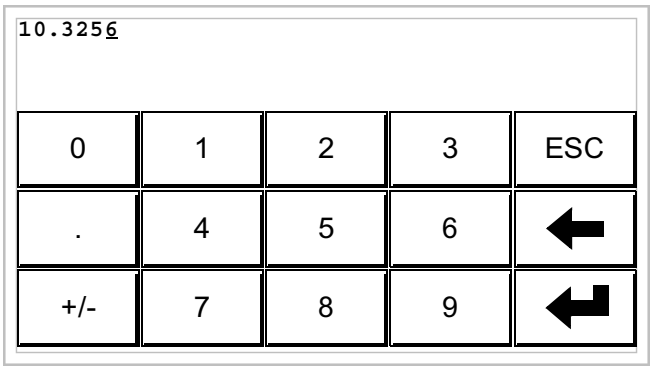
Press [2] [3] [4] to complete the entering of the new value; press [+/-] to attribute a sign and Enter to confirm.

Changing the value of a floating point numerical field:

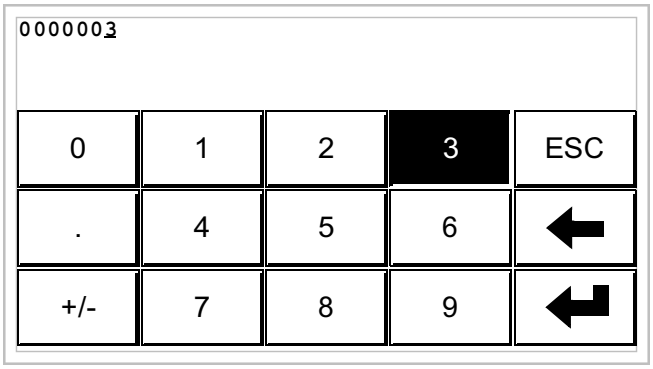
The procedure for changing a floating point numerical field is as for a decimal numerical field, except that a decimal point can be inserted anywhere in the field. The following example shows a variation (total change) in field 2 from 10.3256 to 321.65.



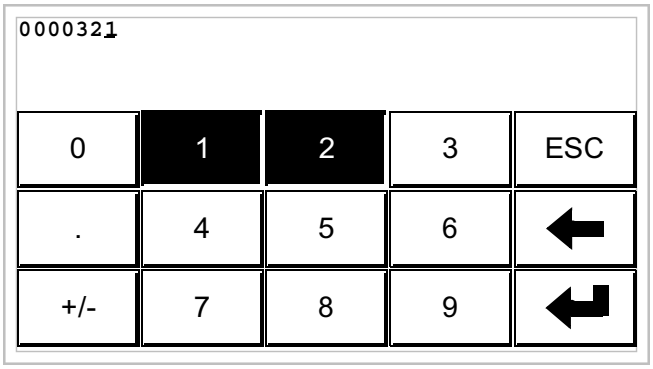
Touch the display field [10.3256]



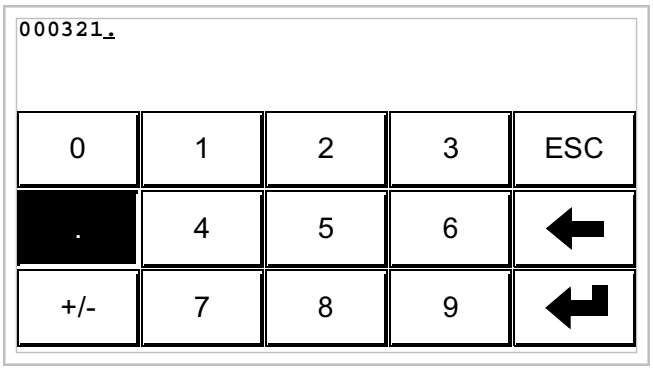
Edit mode is enabled; the cursor moves to the right-most digit of the data (least significant digit).



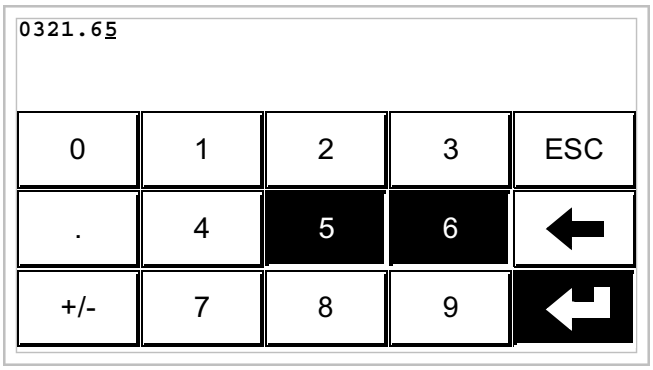
Press the ▣ [3] to enter the first digit of the new value; the field assumes the value 3.



Press [2] and then [1] to complete the whole field.



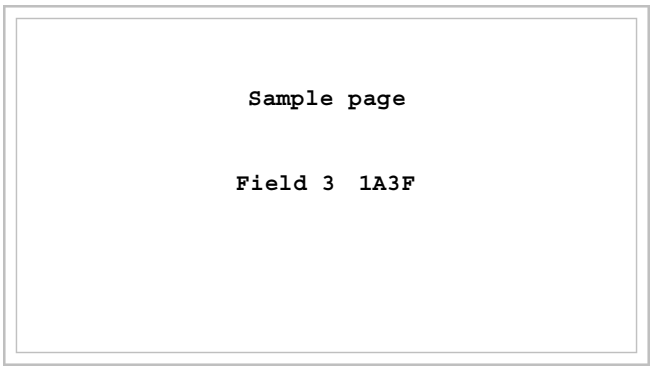
Press [.] to insert the decimal point.



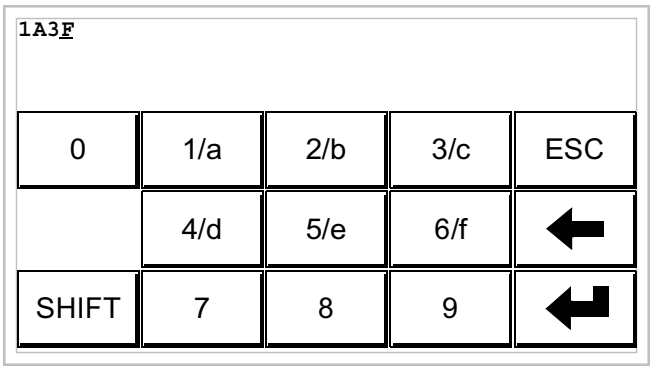
Press [6] and then [5] to complete the entering of the new value; press Enter to confirm the variation.

Changing the value of a hexadecimal numerical field:

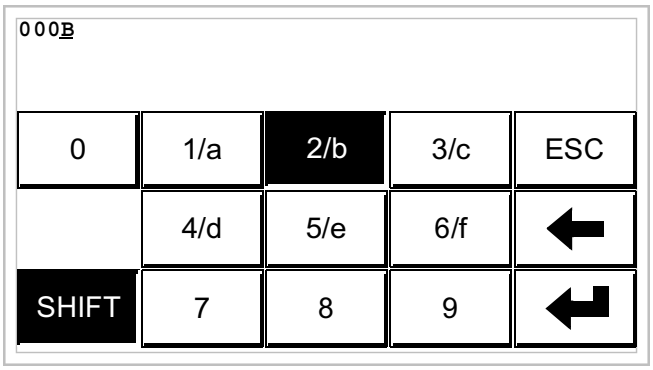
A hexadecimal digit can assume not only numerical values from 0 to 9 but also the letters A-B-C-D-E-F; thus for this type of field the numerical □□ 0 and 1 can be used to enter the letters A-B-C and D-E-F respectively by pressing the same key □ more than once. All the other □□ from 2 to 9 have only a numerical significance. The following example illustrates the variation (total change mode) of field 3 from 1A3F to B23C.



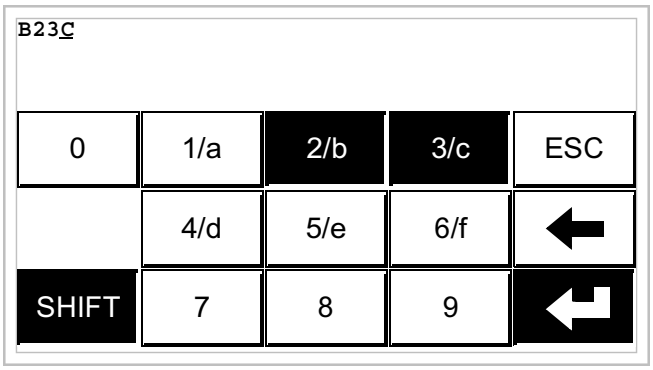
Touch the display field [1A3F]



Edit mode is enabled; the cursor moves to the rightmost digit of the data (least significant digit).



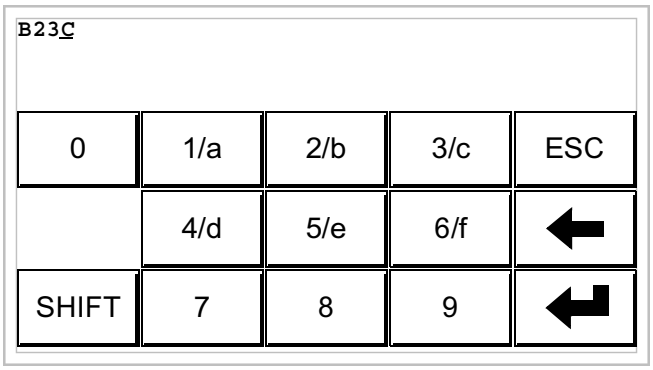
Press [SHIFT] + [2/b] to enter the first digit of the new value.



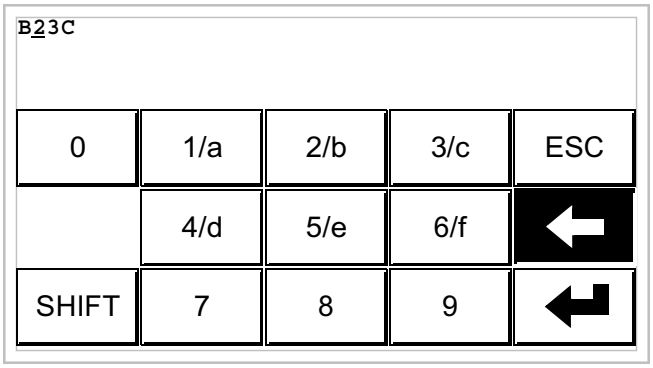
Press [2/b] [3/c] and [SHIFT] + [3/c] to complete the entering of the new value; press Enter to confirm.

The following example shows the variation (partial change) of Field 3 from B23C to BABA.

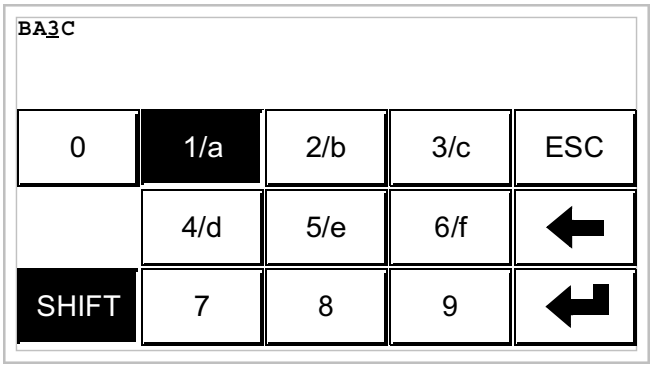
Touch the display field [B23C]



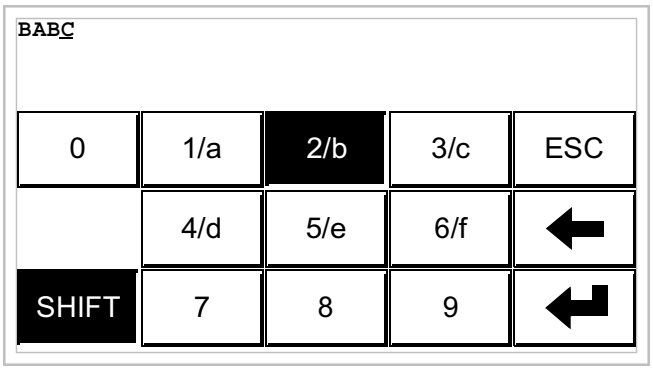
Edit mode is enabled; the cursor moves to the right-most digit of the data (least significant digit).



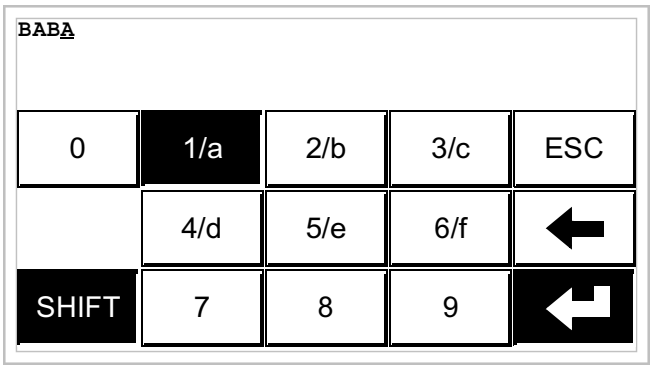
Position the cursor on the second digit by pressing the ▣ [<-] twice.



Press [SHIFT] + [1/a] to enter the digit of the new value.



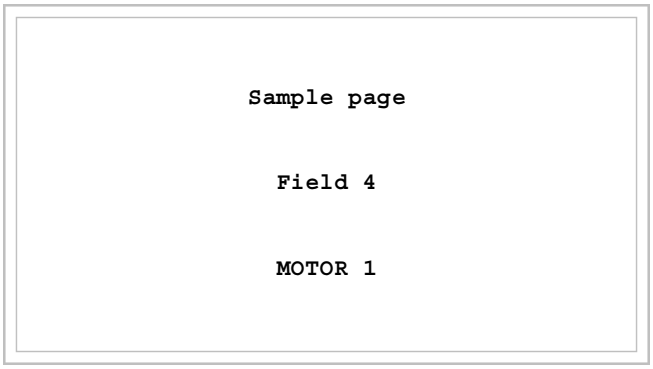
Press [SHIFT] + [2/b] to enter the third digit of the new value.



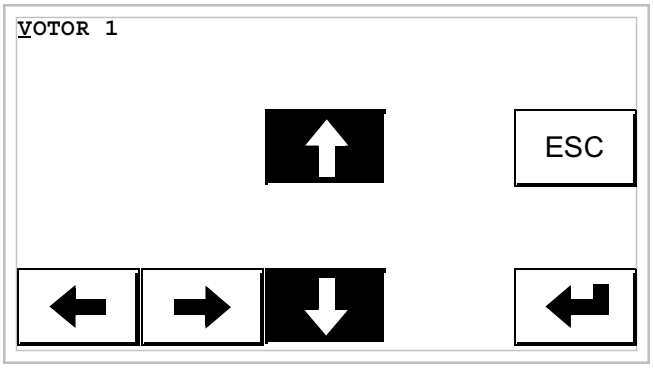
Press [SHIFT] + [1/a] to enter the last digit of the new value; press Enter to confirm the value.

Varying the value of alphanumeric (ASCII) field:

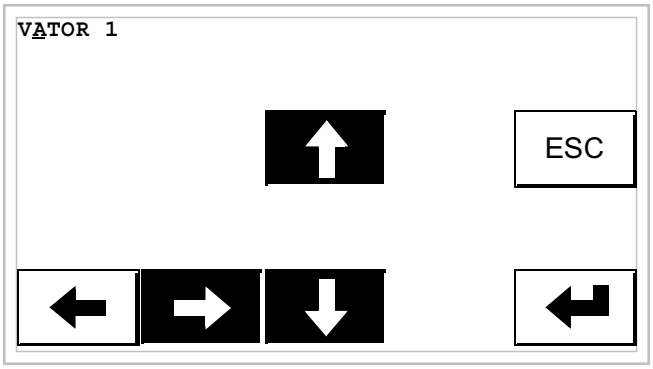
The following example shows the changing of Field 4 from MOTOR 1 to VALVE 3.5.



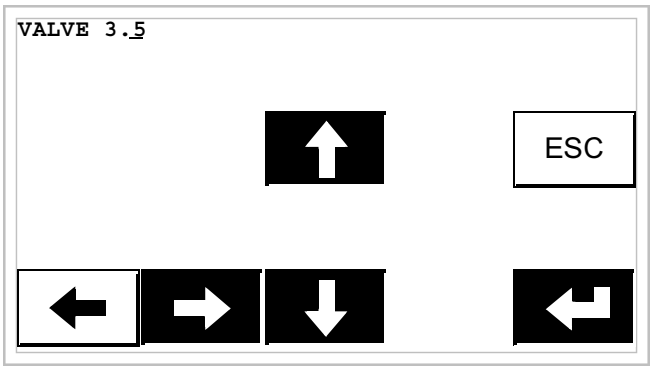
Touch the display field [MOTOR 1]



Press [▲] or [▼] to poll all the characters of the table of the font assigned (see Software Manual); halt at the character [V].



Press [->] to move to the next character, then press [▲] or [▼] to poll all the characters until reaching the character [A].

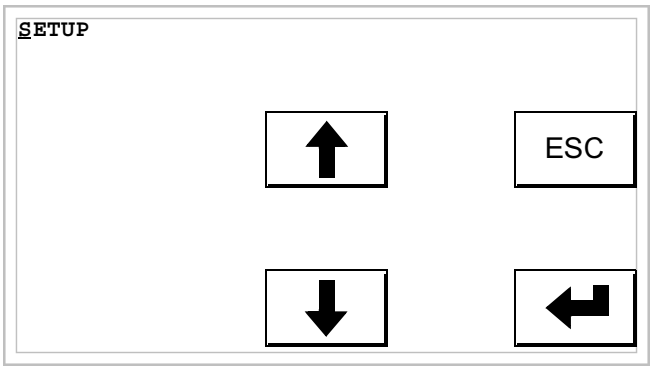


Repeat the operations until the word is finished; press Enter to confirm.

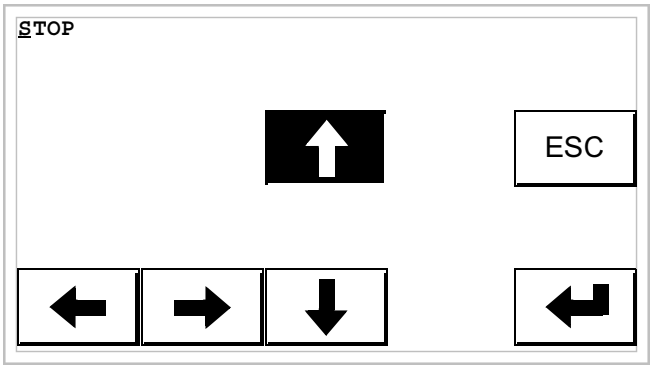
Changing the value of a dynamic text field:

The following example illustrates the variation of field 5 that can assume 4 different states to which the following 4 symbolic texts correspond: SETUP, STOP, MANUAL, AUTOMATIC.
Let us assume that SETUP is the starting value and MANUAL the final one.

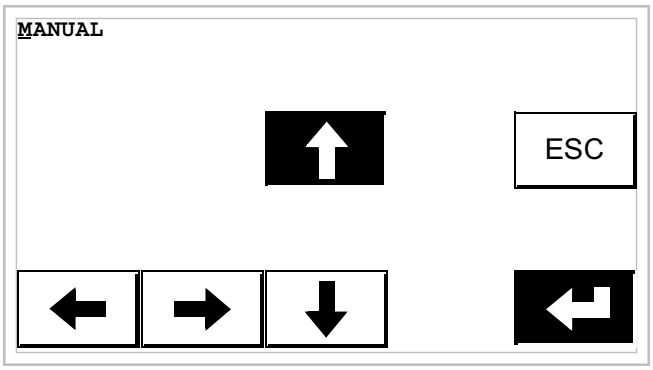
Touch the display field [SETUP]



Edit mode is enabled; the cursor moves to the leftmost digit of the data.



The first time [▲] is pressed the field assumes the value STOP.



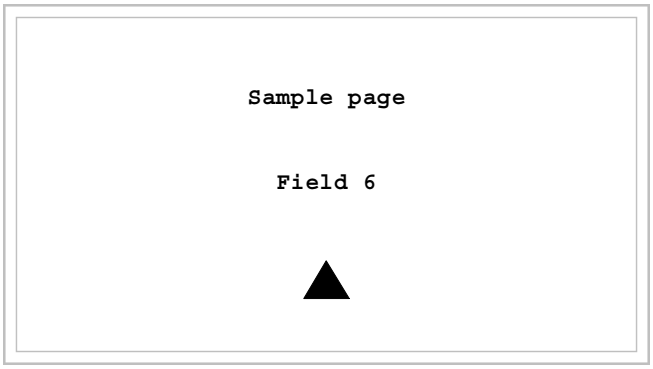
The next time [▲] is pressed the field assumes the value MANUAL; press Enter to confirm.

Changing the value of a symbolic field:

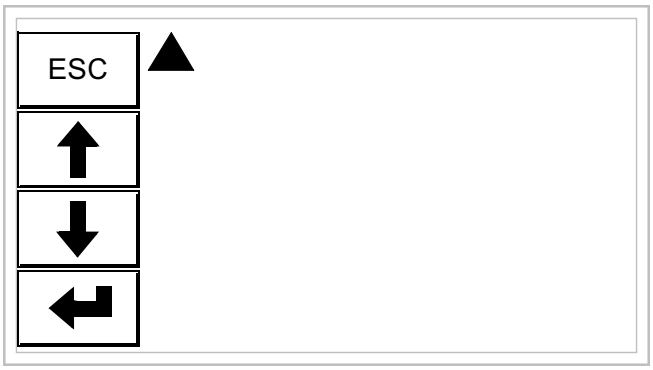
The following example shows the variation of Field 6 that can assume 4 different states to which are assigned the following 4 images:

▲ ▶ ▼ ◀

Let us assume as a starting value ▲ and as a final value ▼

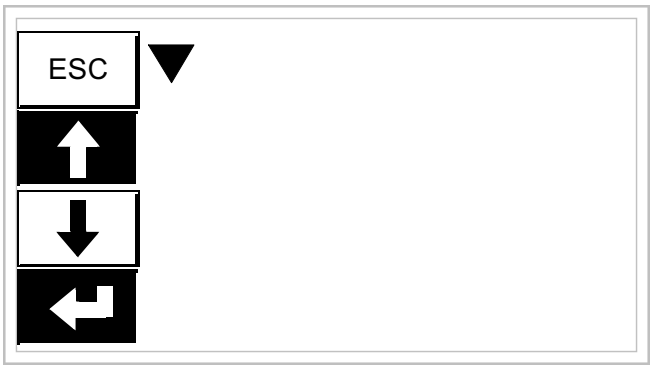


Touch the display field [▲]



Edit mode is enabled.

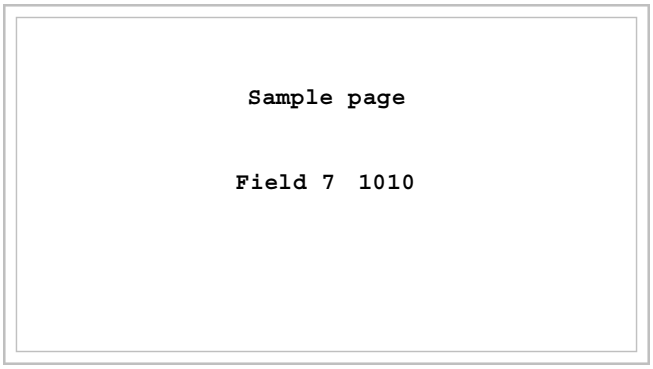
The first time [▲] is pressed the field assumes the value ▶.



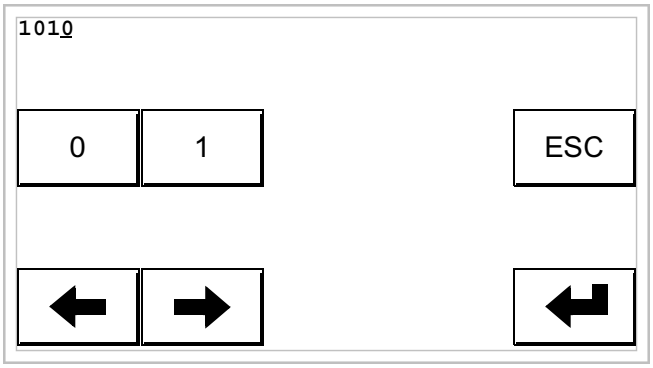
The next time [▲] is pressed the field assumes the value ▼; press Enter to confirm.

Varying the value of a binary field:

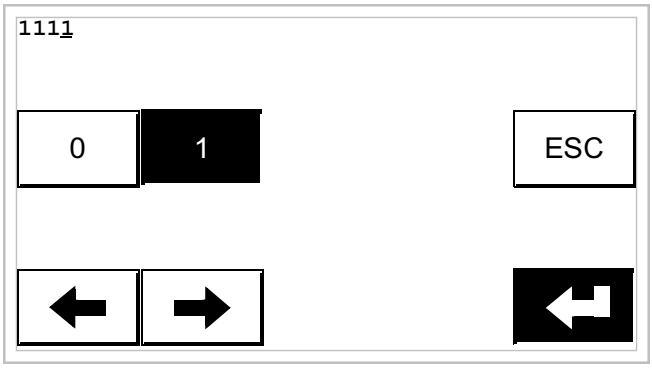
The following example illustrates the variation (total change) of Field 7 from 1010 to 1111.



Touch the display field [1010]



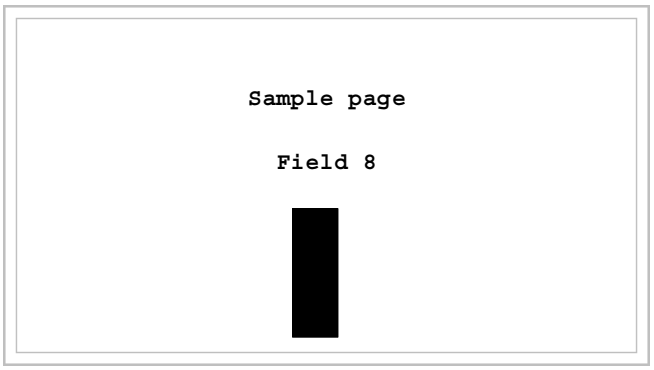
Edit mode is enabled; the cursor moves to the right-most digit of the data (least significant digit).



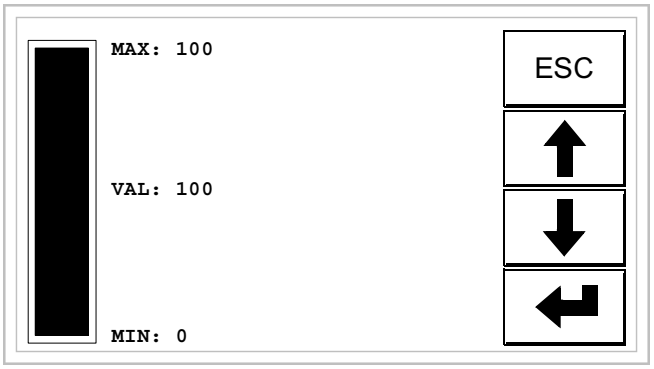
Press [1] 4 times to enter the new value; press Enter to confirm.

Changing the value of a bar data:

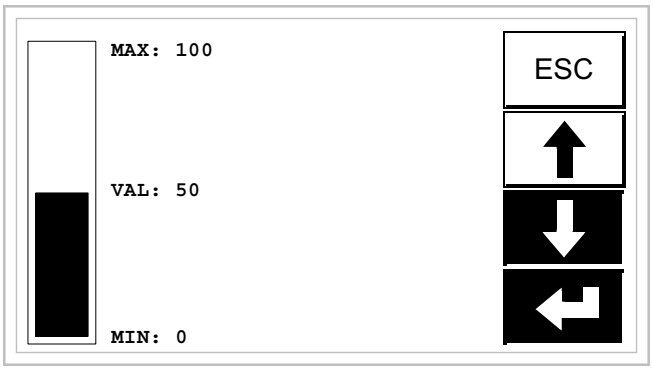
The following example illustrates the variation of Field 8 that is to be changed from a value of 100 to a value of 50.



Touch the display field [BAR]



Edit mode is enabled.



Press [↓] to vary the value; take it to 50; press Enter to confirm.

Displaying messages

The VT can display three types of message: *Information messages*, *ISA-1A Alarms* (in the case of terminals accepting them) and *Help messages* (HELP pages). The information and alarm messages can only be displayed if, using VTWIN, the programmer has already prepared the list of messages assigned to areas of memory in the device.

Which type of message is used is at the discretion of the programmer.

Information messages

When an event occurs which has an information message assigned to it the display shows

Note that the symbol is a triangle containing the character [i].

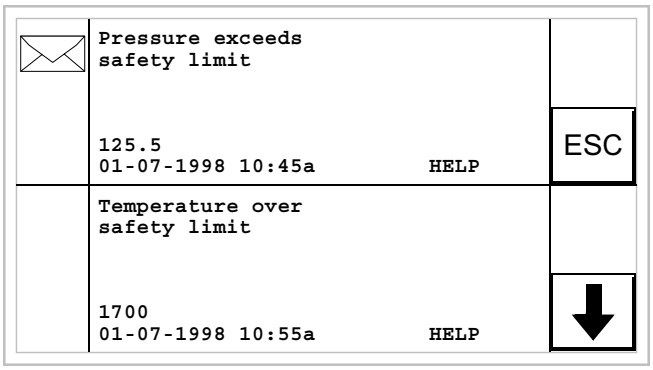
Information messages are only displayable so long as the event triggering them is present. When the above symbol is touched on the screen you enter display mode, where there is a page containing two messages with the following format (the format changes according to the VT).

VT555W - VT565W info-messages

Format:

- Five rows of 30 characters with character height of X1 or two rows of 15 with character height of X2 for the text of the message.
- One row for any data field (which in that particular situation could indicate a safety or warning limit value).
- One row for the date and time the signal occurred.
- The first display is indicated by a closed envelope [✉] at the top left of the display. This symbol is not present if the message appeared the last time the display mode for information messages was accessed.

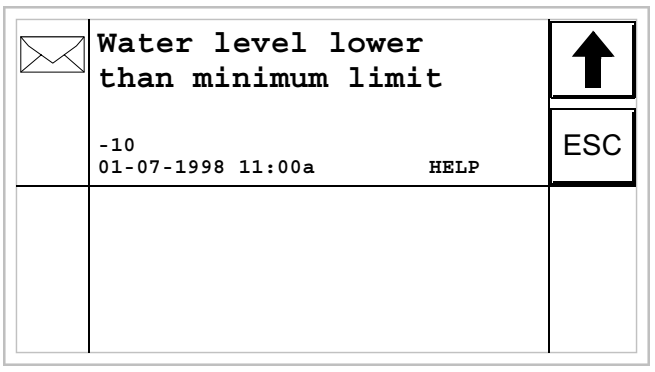
Example with three messages:



First message

Second message

By pressing [▼] the next page containing the third message appears. NB: having already appeared before, this second message is not accompanied by a closed envelope.



Third message

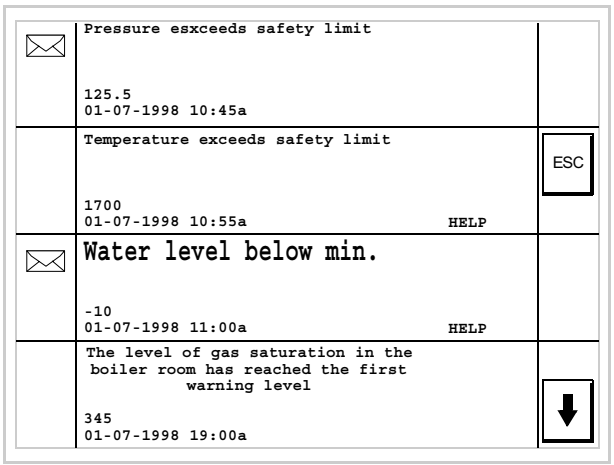
By pressing [▲] the previous page returns containing the first and second messages.

VT585W info-messages

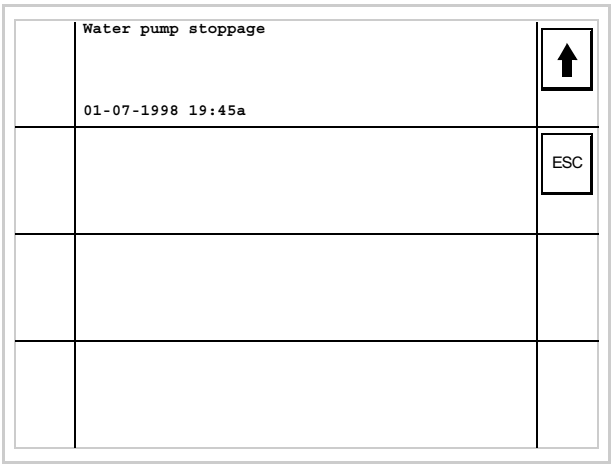
Format:

- Four rows of 70 characters x1 high or two rows of 35 characters of double height (x2) for the text of the message.
- One row for any data field (which in that particular situation could indicate a safety or warning limit value).
- One row for the date and time the signal occured.
- The first display is indicated by a closed envelope [✉] at the top left of the display. This symbol is not present if the message appeared the last time the display mode for information messages was accessed.

Example with five messages:



By pressing [↓] the next page containing the fifth message appears.

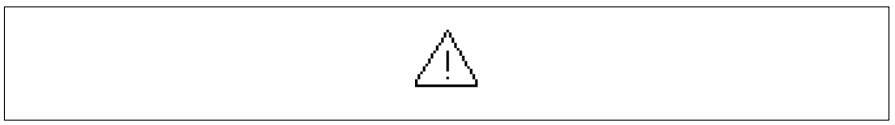


Fifth message

By pressing [▲] the previous page returns containing the first four messages.

ISA-1A alarms

When an event occurs to which an alarm has been assigned the screen shows.



Note that the symbol is a triangle containing the character [i].

ISA alarms are displayed from the time when the event triggering the alarm occurs (Event in) until there is an individual acknowledgment operation - touching the symbol on the screen related to the alarm to be acknowledged (Event acknowledged) - and the triggering event is no longer present (Event out).

By “acknowledgment” we mean the confirmation on the part of the plant or machine operator of having taken note of the alarm message.

For further details on how *ISA-1A Alarms* work see Software Manual.

When the symbol on the screen is touched you enter display mode, where each page contains up to two alarms whose format is set out below.

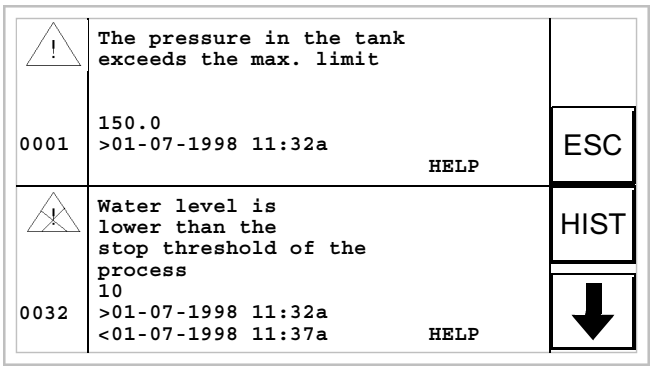
The VT can provide an automatic sequential display of information messages on command from the device (see “Chapter 22 -> Command area“).

VT555W - VT565W alarms

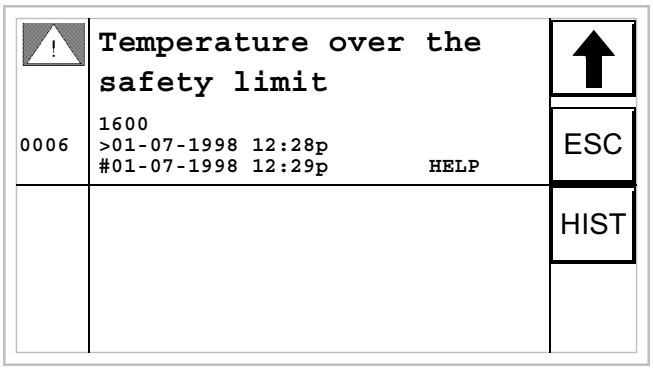
The page has the following format:

- Numerical identification of the ISA-1A alarm.
- Four rows of 30 characters with character height of X1 or two rows of 15 with character height of X2 for the text of the message.
- One row for any data field (which in that particular situation could indicate a safety or warning limit value).
- One row starting with the character [**>**] for the date and time of the appearance of the event (Event in).
- One row starting with:
  - the character [**#**] for the date and time of the Event acknowledged but still present.
  - the character [**<**] for the date and time of the Event out but not acknowledged.
- Graphic indication of the status of the alarm:
  - Event in and not acknowledged [⚠]
  - Event in, present and acknowledged [⚠]
  - Event out and not acknowledged. [⚠]

Examples with three alarms:



When you press [⬇] the next page appears containing the third alarm. Note that the second alarm is accompanied by the character [<] followed by the date and time, indicating that the event triggering the alarm disappeared before the acknowledgment operation. All this is also emphasized by the appropriate symbol.



Third alarm

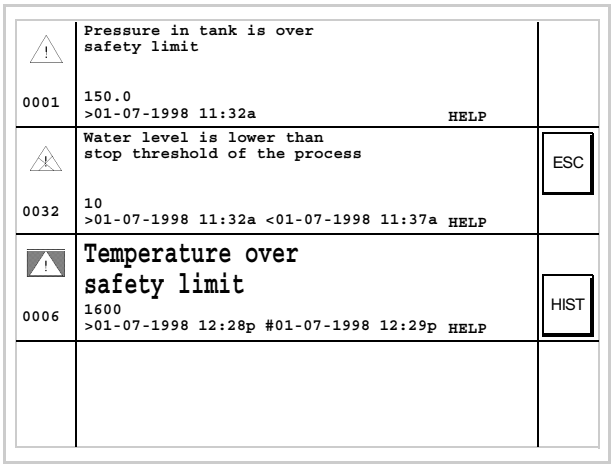
When you press ↑↓ the first page appears. Note that the third alarm is accompanied by the character [**#**] followed by the date and time, indicating that the event triggering the alarm is present and acknowledged. All this is also emphasized by the appropriate symbol.

VT585W alarms

The page has the following format:

- Numeric identification of the ISA-1A alarm.
- Four rows of 70 characters of x1 dimension or alternatively two rows of 35 double-size (x2) characters for the message text.
- One row for any data field (which in that particular situation could indicate a safety or warning limit value).
- One row starting with the character [**>**] for the date and time of the appearance of the event (Event in).
- One row starting with:
  - the character [**#**] for the date and time of the Event acknowledged but still present.
  - the character [**<**] for the date and time of the Event out but not acknowledged.
- Graphic indication of the status of the alarm:
  - Event in and not acknowledged [⚠]
  - Event in, present and acknowledged [⚠]
  - Event out and not acknowledged. [⚠]

Example with five alarms:



Note that the second alarm is accompanied by the character [<] followed by the date and time, indicating that the triggering event of the alarm disappeared before being acknowledged. The situation as a whole is highlighted by the appropriate alarm status symbol. Third alarm is accompanied by the character [#] followed by the date and time, indicating that the triggering event of the alarm is present and has been acknowledged. The situation as a whole is highlighted by the appropriate alarm status symbol.

ISA-1A alarm history buffer

When an event occurs to which an alarm has been assigned the terminal registers it chronologically in an area of the internal memory called the *Alarm history buffer*. If, while displaying the alarm page, you touch the ▣ HIST on the screen, you access the history buffer.

The VT can provide an automatic sequential display of information messages on command from the device (see “Chapter 22 -> Command area“).

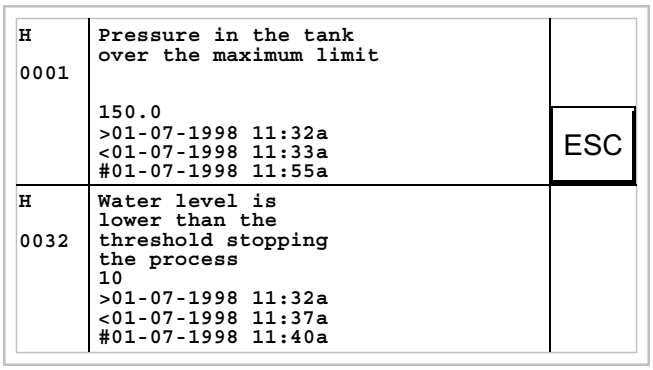
The buffer of the *Alarm history* can be emptied (the elimination of all the messages registered) only by means of a command from the device (see “Chapter 22 -> Command area“).

Once the buffer is full, new alarms are no longer registered. You are advised to consult the chapter *Status area of the VT* “Chapter 22 -> Status area for the terminal“ **(see also Software Manual) to be able to tell when the buffer is full.**

The format is similar to that of the alarms except that a character [H] is added in front of the number of the alarm (see the formats of the various products).

VT555W - VT565W history buffer

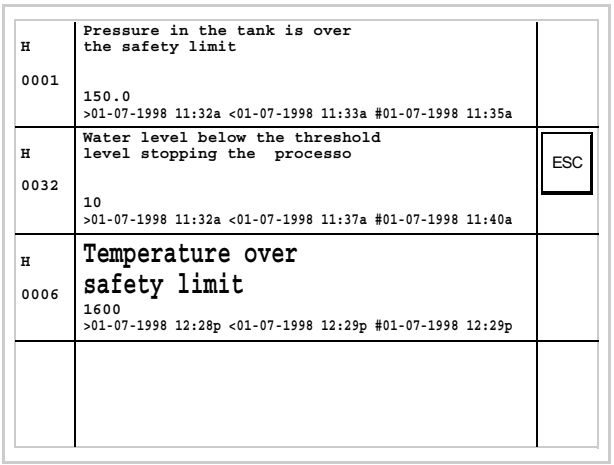
Example with two alarms.



When ESC is pressed you return to the display mode for alarms.

VT585W history buffer

Example with three alarms.



By pressing the ESC you return to the alarm display.

Help messages

Help messages can be assigned to project pages, to information messages and to ISA alarms, giving additional information relevant to the operation underway. Help messages have no particular format and can be freely created by the programmer using the entire screen.

To explain the way the help messages work, it is necessary to divide them into two categories: on the one hand messages related to alarms and to information messages, on the other hand help messages related to pages.

Help and information messages relating to alarms

If, when you are in a context of displaying alarms or information messages, there is a help message present, the word HELP appears. If you touch the alarm or the message accompanying the word HELP the help messaage is displayed. Touching the ▣ ESC on the screen takes you back to the previous screenful.

The length of the message can be:

- VT555W -> up to 34 (characters) x 16 (rows)
- VT565W -> up to 34 (characters) x 16 (rows)
- VT585W -> up to 74 (characters) x 16 (rows)

Help messages relating to project pages

As far as project pages are concerned, it is the programmer's responsibility to insert the ▣ necessary to access the help page (see Software Manual). If this is not done, there will be no way of telling if the page contains a help message.

The length of the message can be:

- VT555W -> up to 40 (characters) x 16 (rows)
- VT565W -> up to 40 (characters) x 16 (rows)
- VT585W -> up to 80 (characters) x 16 (rows)

Chapter 22 Data exchange area

This chapter consists of 50 pages.

By *Communication* we mean the exchange of information that occurs between the VT and the device connected to it. Information can be exchanged using *Variables* or *Exchange Areas* (see Software Manual for more detailed explanation).

The *Exchange Areas* are divided into:

- Area for Messages:
  - Information messages
  - Alarms
- Status Areas:
  - Status area for the terminal
  - Status area for internal LEDs
  - Status area for external LEDs
  - Status area for recipes
  - Status area for internal keys
  - Status area for external keys
  - Status area for internal keys (Real Time)
  - Status area for external keys (Real Time)
  - Status area for printer
  - Trend status area
  - Command response area
- Command Areas
  - Command area external LEDs (fixed light)
  - Command area external LEDs (blinking light)
  - Command area internal red LEDs (fixed light)
  - Command area internal red LEDs (blinking light)
  - Command area internal green LEDs (fixed light)
  - Command area internal green LEDs (blinking light)
  - Area for Commands

As the *Area for Messages* does not depend on the type of VT, but is completely configurable using VTWIN, it will no longer be mentioned in this chapter.

For the detailed meaning of the various areas see Software Manual.

Status area for the terminal

The significance of this area depends on the type of VT used:
- With a keyboard
- With a touch screen.

This area consists of 4 fixed words (numbered from 0 to 3).

- With a keyboard:

NO. OF WORD	NAME OF WORD
0	STATUS WORD
1	SEQUENCE IDENTIFIER
2	PAGE IDENTIFIER
3	FIELD IDENTIFIER

- With a touch screen:

NO. OF WORD	NAME OF WORD
0	STATUS WORD
1	--
2	PAGE IDENTIFIER
3	CONTEXT IDENTIFIER

-- : not used

The tables appearing below refer to VTs with a keyboard.

- 22.1: Meaning of bits of Word 0 - Status word
- 22.2: Meaning of value contained in the Word 1 - Sequence Identifier
- 22.3: Meaning of value contained in the Word 2 - Page Identifier
- 22.4: Meaning of value contained in the Word 3 - Field Identifier

The tables appearing below refer to VTs with a touch screen.

- 22.5: Meaning of bits of Word 0 - Status word
- 22.6: Meaning of value contained in the Word 1
- 22.7: Meaning of value contained in the Word 2 - Page Identifier
- 22.8: Meaning of value contained in the Word 3 - Context Identifier

Table 22.1: Meaning of bits of Word 0 - Status word

WORD 0 MEANING OF THE BIT	BIT NUMBER																
	VT 50	VT 60	VT 150 W	VT 160 W	VT 170 W	VT 190 W	VT 300 W	VT 310 W	VT 320 W	VT 330 W							
WATCHDOG Always at Status1	0	0	0	0	0	0	0	0	0	0							
EDIT MODE Status 1 when il terminal is in mode for changing fields	1	1	1	1	1	1	1	1	1	1							
MESSAGES PRESENT Status 1 so long as there is a message to display	2	2	2	2	--	--	--	--	--	--							
MESSAGE PENDING Status 1 so long as there is a message “in” but not yet consulted	3	3	3	3	--	--	--	--	--	--							
ISA ALARM MESSAGES PRESENT Status 1 so long as there is an alarm message to display	--	--	--	--	2	2	2	2	2	2							
ISA ALARM MESSAGES PENDING Status 1 so long as there is an ISA alarm “in” but not yet acknowledged	--	--	--	--	3	3	3	3	3	3							
COMMAND NOT VALID Status 1 when the last command sent by the device has not been carried out	4	4	4	4	4	4	4	4	4	4							
ALARM HISTORY BUFFER 80% FULL Status 1 when the alarm history buffer is 80% full and therefore close to saturation	--	--	--	--	5	5	5	5	5	5							
ALARM HISTORY BUFFER FULL Status 1 when the alarm history buffer is full and can hold no more alarms	--	--	--	--	6	6	6	6	6	6							
MACRO FUNCTION ACTIVE Status 1 when the VT is processing a macro function	--	--	7	7	7	7	7	7	7	7							
BATTERY FLAT Status 1 when the battery is near its minimum level for maintaining the data in the RAM memory	--	--	--	--	8	8	8	8	8	8							

-- : not present

Table 22.2: Meaning of value contained in the Word 1 - Sequence Identifier

WORD 1 MEANING OF THE VALUE	USED																
	VT 50	VT 60	VT 150 W	VT 160 W	VT 170 W	VT 190 W	VT 300 W	VT 310 W	VT 320 W	VT 330 W							
SEQUENCE IDENTIFIER Contains a value other than zero if in Project Page context, but contains zero if in any other context	●	●	●	●	●	●	●	●	●	●							

Table 22.3: Meaning of value contained in the Word 2 - Page Identifier

WORD 2 MEANING OF THE VALUE	USED / VALUE CONTAINED																
	VT 50	VT 60	VT 150 W	VT 160 W	VT 170 W	VT 190 W	VT 300 W	VT 310 W	VT 320 W	VT 330 W							
NUMBER OF PAGE BEING DISPLAYED In Project Page context contains the value of the page being displayed, while contains the identifying value of the context if in another contact (Word 1 = 0)	●	●	●	●	●	●	●	●	●	●							
INFORMATION MESSAGES	0	0	0	0	0	0	0	0	0	0							
SEQUENCE DIRECTORY	1	1	1	1	1	1	1	1	1	1							
PAGE DIRECTORY	--	--	--	--	--	--	--	--	--	--							
DRIVER SERVICE PAGES	2	2	2	2	2	2	2	2	2	2							
HELP MESSAGES FOR PROJECT PAGES	--	--	3	3	3	3	3	3	3	3							
HELP MESSAGES FOR ISA ALARMS	--	--	--	--	4	4	4	4	4	4							
ISA ALARMS	--	--	--	--	5	5	5	5	5	5							
RECIPE DIRECTORY	--	--	--	--	6	6	6	6	6	6							
HELP MESSAGES FOR INFORMATION MESSAGES	--	--	7	7	7	7	7	7	7	7							
ALARM HISTORY BUFFER	--	--	--	--	8	8	8	8	8	8							
PROJECT INFORMATION	3	3	--	--	9	9	--	--	--	--							
SETTING CLOCK	--	--	--	--	10	10	--	--	--	--							
SYSTEM MESSAGES ASSIGNED TO RECIPES	--	--	--	--	11	11	--	--	--	--							
SYSTEM MESSAGES ASSIGNED TO PASSWORDS	--	--	--	--	12	12	--	--	--	--							

-- : not present

Table 22.4: Meaning of value contained in the Word 3 - Field Identifier

WORD 3 MEANING OF THE VALUE	USED																
	VT 50	VT 60	VT 150 W	VT 160 W	VT 170 W	VT 190 W	VT 300 W	VT 310 W	VT 320 W	VT 330 W							
POSITION OF THE CURSOR Contains a value identifying the field where the cursor is located when in Project Page context, while containing 0 if in any other context	●	●	●	●	●	●	●	●	●	●							

Table 22.5: Meaning of bits of Word 0 - Status word

WORD 0 MEANING OF THE BIT	BIT NUMBER																	
	VT 555 W	VT 565 W	VT 585 W															
WATCHDOG Always at Status1	0	0	0															
EDIT MODE Status 1 when il terminal is in mode for changing fields	1	1	1															
MESSAGES PRESENT Status 1 so long as there is a message to display	--	--	--															
MESSAGE PENDING Status 1 so long as there is a message “in” but not yet consulted	--	--	--															
ISA ALARM MESSAGES PRESENT Status 1 so long as there is an alarm message to display	2	2	2															
ISA ALARM MESSAGES PENDING Status 1 so long as there is an ISA alarm “in” but not yet acknowledged	3	3	3															
COMMAND NOT VALID Status 1 when the last command sent by the device has not been carried out	4	4	4															
ALARM HISTORY BUFFER 80% FULL Status 1 when the alarm history buffer is 80% full and therefore close to saturation	5	5	5															
ALARM HISTORY BUFFER FULL Status 1 when the alarm history buffer is full and can hold no more alarms	6	6	6															
MACRO FUNCTION ACTIVE Status 1 when the VT is processing a macro function	7	7	7															
BATTERY FLAT Status 1 when the battery is near its minimum level for maintaining the data in the RAM memory	8	8	8															

-- : not present

Table 22.6: Meaning of value contained in the Word 1

WORD 1 MEANING OF THE VALUE	USED																	
	VT 555 W	VT 565 W	VT 585 W															
--	--	--	--															

-- : not used

Table 22.7: Meaning of value contained in the Word 2 - Page Identifier

WORD 2 MEANING OF THE VALUE	USED																
	VT 555 W	VT 565 W	VT 585 W														
NUMBER OF PAGE BEING DISPLAYED Contains a value other than zero if in Project Page context, but contains zero if in any other context	●	●	●														

Table 22.8: Meaning of value contained in the Word 3 - Context Identifier

WORD 3 MEANING OF THE VALUE	USED / VALUE CONTAINED																
	VT 555 W	VT 565 W	VT 585 W														
CONTEXT IDENTIFIER Contains the identifying value of the context if the context is not Project Page (Word 2 = 0)	●	●	●														
INFORMATION MESSAGES	0	0	0														
SEQUENCE DIRECTORY	--	--	--														
PAGE DIRECTORY	1	1	1														
DRIVER SERVICE PAGES	2	2	2														
HELP MESSAGES FOR PROJECT PAGES	3	3	3														
HELP MESSAGES FOR ISA ALARMS	4	4	4														
ISA ALARMS	5	5	5														
RECIPE DIRECTORY	6	6	6														
HELP MESSAGES FOR INFORMATION MESSAGES	7	7	7														
ALARM HISTORY BUFFER	8	8	8														
PROJECT INFORMATION	--	--	--														
SETTING CLOCK	--	--	--														
SYSTEM MESSAGES ASSIGNED TO RECIPES	--	--	--														
SYSTEM MESSAGES ASSIGNED TO PASSWORDS	--	--	--														

-- : not present

Status area for internal LEDs

This area consists of a maximum of 4 words (numbered from 0 to 3).

NO. OF WORD	NAME OF WORD
0	STATUS WORD for GREEN LEDS
1	STATUS WORD for GREEN LEDS
2	STATUS WORD for RED LEDS
3	STATUS WORD for RED LEDS

Table 22.9: Meaning of the Bits of the Status Word for the Green LEDs

WORD 0 NUMBER OF THE BIT	MEANING OF THE BIT																
	VT 50	VT 60	VT 150 W	VT 160 W	VT 170 W	VT 190 W	VT 300 W	VT 310 W	VT 320 W	VT 330 W	VT 555 W	VT 565 W	VT 585 W				
0	--	--	F1	F1	F1	F1	F1	F1	F1	--	--	--	--				
1	--	--	F2	F2	F2	F2	F2	F2	F2	--	--	--	--				
2	--	--	F3	F3	F3	F3	F3	F3	F3	--	--	--	--				
3	--	--	F4	F4	F4	F4	F4	F4	F4	--	--	--	--				
4	--	--	F5	F5	F5	F5	F5	F5	F5	--	--	--	--				
5	--	--	--	--	F6	F6	F6	F6	F6	--	--	--	--				
6	--	--	--	--	F7	F7	F7	F7	F7	--	--	--	--				
7	--	--	--	--	F8	F8	F8	F8	F8	--	--	--	--				
8	--	--	--	--	F9	F9	F9	F9	F9	--	--	--	--				
9	--	--	--	--	F10	F10	F10	F10	F10	--	--	--	--				
10	--	--	--	--	F11	F11	F11	F11	F11	--	--	--	--				
11	--	--	--	--	F12	F12	F12	F12	F12	--	--	--	--				
12	--	--	--	--	--	F13	F13	F13	F13	F13	--	--	--				
13	--	--	--	--	--	F14	F14	F14	F14	F14	--	--	--				
14	--	--	--	--	--	F15	F15	F15	F15	F15	--	--	--				
15	--	--	--	--	--	F16	F16	F16	F16	F16	--	--	--				

-- : not present

Table 22.10: Meaning of the Bits of the Status Word for Green LEDs

WORD 1 NUMBER OF THE BIT	MEANING OF THE BIT															
	VT 50	VT 60	VT 150 W	VT 160 W	VT 170 W	VT 190 W	VT 300 W	VT 310 W	VT 320 W	VT 330 W	VT 555 W	VT 565 W	VT 585 W			
0	--	--	--	--	--	F17	F17	F17	F17	F17	--	--	--			
1	--	--	--	--	--	F18	F18	F18	F18	F18	--	--	--			
2	--	--	--	--	--	F19	F19	F19	F19	F19	--	--	--			
3	--	--	--	--	--	F20	F20	F20	F20	F20	--	--	--			
4	--	--	--	--	--	F21	F21	F21	F21	F21	--	--	--			
5	--	--	--	--	--	F22	F22	--	F22	F22	--	--	--			
6	--	--	--	--	--	F23	F23	--	F23	F23	--	--	--			
7	--	--	--	--	--	F24	F24	--	F24	F24	--	--	--			
8	--	--	--	--	--	--	--	--	F25	F25	--	--	--			
9	--	--	--	--	--	--	--	--	F26	F26	--	--	--			
10	--	--	--	--	--	--	--	--	F27	F27	--	--	--			
11	--	--	--	--	--	--	--	--	F28	F28	--	--	--			
12	--	--	--	--	--	--	--	--	--	--	--	--	--			
13	--	--	--	--	--	--	--	--	--	--	--	--	--			
14	--	--	--	--	--	--	--	--	--	--	--	--	--			
15	--	--	--	--	--	--	--	--	--	--	--	--	--			

-- : not present

Table 22.11: Meaning of the Bits of the Status Word for Red LEDs

WORD 2 NUMBER OF THE BIT	MEANING OF THE BIT																
	VT 50	VT 60	VT 150 W	VT 160 W	VT 170 W	VT 190 W	VT 300 W	VT 310 W	VT 320 W	VT 330 W	VT 555 W	VT 565 W	VT 585 W				
0	--	--	--	--	F1	F1	F1	F1	F1	--	--	--	--				
1	--	--	--	--	F2	F2	F2	F2	F2	--	--	--	--				
2	--	--	--	--	F3	F3	F3	F3	F3	--	--	--	--				
3	--	--	--	--	F4	F4	F4	F4	F4	--	--	--	--				
4	--	--	--	--	F5	F5	F5	F5	F5	--	--	--	--				
5	--	--	--	--	F6	F6	F6	F6	F6	--	--	--	--				
6	--	--	--	--	F7	F7	F7	F7	F7	--	--	--	--				
7	--	--	--	--	F8	F8	F8	F8	F8	--	--	--	--				
8	--	--	--	--	F9	F9	F9	F9	F9	--	--	--	--				
9	--	--	--	--	F10	F10	F10	F10	F10	--	--	--	--				
10	--	--	--	--	F11	F11	F11	F11	F11	--	--	--	--				
11	--	--	--	--	F12	F12	F12	--	F12	--	--	--	--				
12	--	--	--	--	--	F13	F13	--	F13	--	--	--	--				
13	--	--	--	--	--	F14	F14	--	F14	--	--	--	--				
14	--	--	--	--	--	F15	F15	--	F15	--	--	--	--				
15	--	--	--	--	--	F16	F16	--	F16	--	--	--	--				

-- : not present

Table 22.12: Meaning of the Bits of the Status Word for Red LEDs

WORD 3 NUMBER OF THE BIT	MEANING OF THE BIT															
	VT 50	VT 60	VT 150 W	VT 160 W	VT 170 W	VT 190 W	VT 300 W	VT 310 W	VT 320 W	VT 330 W	VT 555 W	VT 565 W	VT 585 W				
0	--	--	--	--	--	F17	F17	--	F17	--	--	--	--				
1	--	--	--	--	--	F18	F18	--	F18	--	--	--	--				
2	--	--	--	--	--	F19	F19	--	--	--	--	--	--				
3	--	--	--	--	--	F20	F20	--	--	--	--	--	--				
4	--	--	--	--	--	F21	F21	--	--	--	--	--	--				
5	--	--	--	--	--	F22	F22	--	--	--	--	--	--				
6	--	--	--	--	--	--	--	--	--	--	--	--	--				
7	--	--	--	--	--	--	--	--	--	--	--	--	--				
8	--	--	--	--	--	--	--	--	--	--	--	--	--				
9	--	--	--	--	--	--	--	--	--	--	--	--	--				
10	--	--	--	--	--	--	--	--	--	--	--	--	--				
11	--	--	--	--	--	--	--	--	--	--	--	--	--				
12	--	--	--	--	--	--	--	--	--	--	--	--	--				
13	--	--	--	--	--	--	--	--	--	--	--	--	--				
14	--	--	--	--	--	--	--	--	--	--	--	--	--				
15	--	--	--	--	--	--	--	--	--	--	--	--	--				

-- : not present

Status area for external LEDs

This area consists of 2 fixed words (numbered from 0 to 1).

NO. OF WORD	NAME OF WORD
0	STATUS WORD
1	STATUS WORD

Table 22.13: Meaning of the Bits of the Status Word for External LEDs

WORD 0 MEANING OF THE BIT	NUMBER OF THE BIT								
	VT150W + VT100MT1000	VT160W	VT300W - VT310W - VT320W + VT100MT1000						
E1	0	0	0						
E2	1	1	1						
E3	2	2	2						
E4	3	3	3						
E5	4	4	4						
E6	5	5	5						
E7	6	6	6						
E8	7	7	7						
E9	8	8	8						
E10	9	9	9						
E11	10	10	10						
E12	11	11	11						
E13	12	12	12						
E14	13	13	13						
E15	14	14	14						
E16	15	15	15						

-- : not present

Table 22.14: Meaning of the Bits of the Status Word for External LEDs

WORD 1 MEANING OF THE BIT	NUMBER OF THE BIT								
	VT150W + VT100MT1000	VT160W	VT300W - VT310W - VT320W + VT100MT1000						
E17	0	0	0						
E18	1	1	1						
E19	2	–	2						
E20	3	–	3						
E21	–	–	–						
E22	–	–	–						
E23	–	–	–						
E24	–	–	–						
E25	–	–	–						
E26	–	–	–						
E27	–	–	–						
E28	–	–	–						
E29	–	–	–						
E30	–	–	–						
E31	–	–	–						
E32	–	–	–						

– : not present

Status area for recipes

This area consists of 1 word (numbered 0).

NO. OF WORD	NAME OF WORD
0	STATUS WORD for RECIPES

Table 22.15: Meaning of the Bits of the Status Word for Recipes

WORD 0 MEANING OF THE BIT	NUMBER OF THE BIT															
	VT 50	VT 60	VT 150 W	VT 160 W	VT 170 W	VT 190 W	VT 300 W	VT 310 W	VT 320 W	VT 330 W	VT 555 W	VT 565 W	VT 585 W				
TIMEOUT FOR RECIPE TRANSFER Status 1 when the terminal does not respond in the expected time	--	--	--	--	13	13	13	13	13	13	13	13	13				
TRANSFER OVER Status 1 when the terminal has sent all the relevant data	--	--	--	--	14	14	14	14	14	14	14	14	14				
TRANSFER REQUEST Status 1 when the terminal wants to start to transfer	--	--	--	--	15	15	15	15	15	15	15	15	15				

-- : not present

Status area for internal keys

This area consists of a maximum of 6 words (numbered from 0 to 5).

NO. OF WORD	NAME OF WORD
0	OPERATIVE KEYS STATUS
1	OPERATIVE KEYS STATUS
2	OPERATIVE KEYS STATUS
3	OPERATIVE KEYS STATUS
4	FUNCTION KEYS STATUS
5	FUNCTION KEYS STATUS

The keys enclosed in a box with a bold border put the related bit at 1 when pressed with 

.

The above is valid for VT50 and VT60. In the case of other terminals the bits relating to the function keys are always the same. The bit of the SHIFT key must also be tested (Word 0 - Bit 15).

The bit relating to the 

key is set at 1 only if pressed at the same time as another key (e.g. 

+ 

).

The Handshake bit is put at 1 by the VT each time one or more keys are pressed; the device can put it at 0 in order to find out when the VT is going to write.

Table 22.16: Meaning of the Bits of the Status Word for Internal Keys

BIT	WORD 0													
	Shift	VT50	VT60	VT150W	VT160W	VT170W	VT190W	VT300W	VT310W	VT320W	VT330W			
0		HAND SHAKE	HAND SHAKE	HAND SHAKE	HAND SHAKE	HAND SHAKE	HAND SHAKE	HAND SHAKE	HAND SHAKE	HAND SHAKE	HAND SHAKE			
1		F1 Esc	Help Esc	Clr Esc	Clr Esc	Clr Esc	Clr Esc	Clr Esc	Clr Esc	Clr Esc	Esc			
2		F2 ◀	--	◀	◀	◀	◀	◀	◀	◀	◀			
3		F3 ▶	F3 ▶	▶	▶	▶	▶	▶	▶	▶	▶			
4		F4	F4 Enter	Enter	Enter									
5		F5	F4 Enter	--	--	Enter	Enter	Enter	Enter	Enter	Enter			
6		Info ▼	F2 ▼	PgDn	PgDn	PgDn	PgDn	PgDn	PgDn	PgDn	PgDn			
7		Help ▲	F1 ▲	PgUp	PgUp	PgUp	PgUp	PgUp	PgUp	PgUp	PgUp			
8		F1 Esc	F1 ▲	Help	Help	Info	Info	Info	Info	Info	Info			
9		F2 ◀	F2 ▼	Info	Info	Help	Help	Help	Help	Help	Help			
10		F3 ▶	F3 ▶	--	--	Alarm	Alarm	Alarm	Alarm	Hist Alarm	Hist Alarm			
11		F4	F4 Enter	--	--	Ack All Ack	Ack All Ack	Ack All Ack	Ack All Ack	Ack All Ack	Ack All Ack			
12		F5	--	· ± Space	· ± Space	· ± Space	· ± Space	· ± Space	· ± Space	· ± Space	Space			
13		Help ▲	Help Esc	--	--									
14		Info ▼	Help Esc	--	--	--	--	Spare	Spare	--	Clr			
15		--	--	shift	shift	shift	shift	shift	shift	shift	Shift			

-- : not used

Table 22.17: Meaning of the Bits of the Status Word for Internal Keys

BIT	WORD 1												
	Shift	VT50	VT60	VT150W	VT160W	VT170W	VT190W	VT300W	VT310W	VT320W	VT330W		
0		n.p.	n.p.	A B C 0	A B C 0	A B C 0	A B C 0	A B C 0	A B C 0	A B C 0	Ctrl		
1		n.p.	n.p.	D E F 1	D E F 1	D E F 1	D E F 1	D E F 1	D E F 1	D E F 1	Alt		
2		n.p.	n.p.	G H I 2	G H I 2	G H I 2	G H I 2	G H I 2	G H I 2	G H I 2	← Tab →		
3		n.p.	n.p.	J K L 3	J K L 3	J K L 3	J K L 3	J K L 3	J K L 3	J K L 3	Spare		
4		n.p.	n.p.	M N O 4	M N O 4	M N O 4	M N O 4	M N O 4	M N O 4	M N O 4	< ,		
5		n.p.	n.p.	P Q R 5	P Q R 5	P Q R 5	P Q R 5	P Q R 5	P Q R 5	P Q R 5	> .		
6		n.p.	n.p.	S T U 6	S T U 6	S T U 6	S T U 6	S T U 6	S T U 6	S T U 6	_ -		
7		n.p.	n.p.	V W X 7	V W X 7	V W X 7	V W X 7	V W X 7	V W X 7	V W X 7	+ =		
8		n.p.	n.p.	Y Z - 8	Y Z - 8	Y Z - 8	Y Z - 8	Y Z - 8	Y Z - 8	Y Z - 8	--		
9		n.p.	n.p.	+ / = 9	+ / = 9	+ / = 9	+ / = 9	+ / = 9	+ / = 9	+ / = 9	--		
10		n.p.	n.p.	--	--	--	--	--	--	--	--		
11		n.p.	n.p.	--	--	--	--	--	--	--	--		
12		n.p.	n.p.	--	--	--	--	--	--	--	--		
13		n.p.	n.p.	--	--	--	--	--	--	--	--		
14		n.p.	n.p.	--	--	--	--	--	--	--	--		
15		n.p.	n.p.	--	--	--	--	--	--	--	--		

-- : not used n.p. : not present

Table 22.18: Meaning of the Bits of the Status Word for Internal Keys

BIT	WORD 2													
	Shift	VT50	VT60	VT150W	VT160W	VT170W	VT190W	VT300W	VT310W	VT320W	VT330W			
0		n.p.	n.p.	F6 F1	F6 F1	F1	F1	F1	F1	F1	) 0			
1		n.p.	n.p.	F7 F2	F7 F2	F2	F2	F2	F2	F2	/ 1			
2		n.p.	n.p.	F8 F3	F8 F3	F3	F3	F3	F3	F3	\ 2			
3		n.p.	n.p.	F9 F4	F9 F4	F4	F4	F4	F4	F4	] 3			
4		n.p.	n.p.	F10 F5	F10 F5	F5	F5	F5	F5	F5	: 4			
5		n.p.	n.p.	--	--	F6	F6	F6	F6	F6	% 5			
6		n.p.	n.p.	--	--	F7	F7	F7	F7	F7	[6			
7		n.p.	n.p.	--	--	F8	F8	F8	F8	F8	; 7			
8		n.p.	n.p.	--	--	F9	F9	F9	F9	F9	* 8			
9		n.p.	n.p.	--	--	F10	F10	F10	F10	F10	(9			
10		n.p.	n.p.	--	--	F11	F11	F11	F11	F11	--			
11		n.p.	n.p.	--	--	F12	F12	F12	F12	F12	--			
12		n.p.	n.p.	--	--	--	F13	F13	F13	F13	--			
13		n.p.	n.p.	--	--	--	F14	F14	F14	F14	--			
14		n.p.	n.p.	--	--	--	F15	F15	F15	F15	--			
15		n.p.	n.p.	--	--	--	F16	F16	F16	F16	--			

-- : not used n.p. : not present

Table 22.19: Meaning of the Bits of the Status Word for Internal Keys

BIT	WORD 3													
	Shift	VT50	VT60	VT150W	VT160W	VT170W	VT190W	VT300W	VT310W	VT320W	VT330W			
0		n.p.	n.p.	n.p.	n.p.	n.p.	F17	F17	F17	F17	A B			
1		n.p.	n.p.	n.p.	n.p.	n.p.	F18	F18	F18	F18	C D			
2		n.p.	n.p.	n.p.	n.p.	n.p.	F19	F19	F19	F19	E F			
3		n.p.	n.p.	n.p.	n.p.	n.p.	F20	F20	F20	F20	G H			
4		n.p.	n.p.	n.p.	n.p.	n.p.	F21	F21	F21	F21	I J			
5		n.p.	n.p.	n.p.	n.p.	n.p.	F22	F22	--	F22	K L			
6		n.p.	n.p.	n.p.	n.p.	n.p.	F23	F23	--	F23	M N			
7		n.p.	n.p.	n.p.	n.p.	n.p.	F24	F24	--	F24	O P			
8		n.p.	n.p.	n.p.	n.p.	n.p.	--	--	--	F25	Q R			
9		n.p.	n.p.	n.p.	n.p.	n.p.	--	--	--	F26	S T			
10		n.p.	n.p.	n.p.	n.p.	n.p.	--	--	--	F27	U V			
11		n.p.	n.p.	n.p.	n.p.	n.p.	--	--	--	F28	W X			
12		n.p.	n.p.	n.p.	n.p.	n.p.	--	--	--	--	Y Z			
13		n.p.	n.p.	n.p.	n.p.	n.p.	--	--	--	--	--			
14		n.p.	n.p.	n.p.	n.p.	n.p.	--	--	--	--	--			
15		n.p.	n.p.	n.p.	n.p.	n.p.	--	--	--	--	--			

-- : not used n.p. : not present

Table 22.20: Meaning of the Bits of the Status Word for Internal Keys

BIT	WORD 4												
	Shift	VT50	VT60	VT150W	VT160W	VT170W	VT190W	VT300W	VT310W	VT320W	VT330W		
0		n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	F1		
1		n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	F2		
2		n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	F3		
3		n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	F4		
4		n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	F5		
5		n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	F6		
6		n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	F7		
7		n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	F8		
8		n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	F9		
9		n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	F10		
10		n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	F11		
11		n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	F12		
12		n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	F13		
13		n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	F14		
14		n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	F15		
15		n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	F16		

-- : not used n.p. : not present

Table 22.21: Meaning of the Bits of the Status Word for Internal Keys

BIT	WORD 5													
	Shift	VT50	VT60	VT150W	VT160W	VT170W	VT190W	VT300W	VT310W	VT320W	VT330W			
0		n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	F17			
1		n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	F18			
2		n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	F19			
3		n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	F20			
4		n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	F21			
5		n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	F22			
6		n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	F23			
7		n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	F24			
8		n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	F25			
9		n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	F26			
10		n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	F27			
11		n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	F28			
12		n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	--			
13		n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	--			
14		n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	--			
15		n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	--			

-- : not used n.p. : not present

Status area for external keys

This area consists of a maximum of 2 words (numbered from 0 to 1).

NO. OF WORD	NAME OF WORD
0	STATUS WORD for EXTERNAL KEYS
1	STATUS WORD for EXTERNAL KEYS

Table 22.22: Meaning of the Bits of the Status Word for External Keys

WORD 0 MEANING OF BIT	NUMBER OF THE BIT								
	VT150W + VT100MT1000	VT160W	VT300W - VT310W - VT320W + VT100MT1000						
E1	0	0	0						
E2	1	1	1						
E3	2	2	2						
E4	3	3	3						
E5	4	4	4						
E6	5	5	5						
E7	6	6	6						
E8	7	7	7						
E9	8	8	8						
E10	9	9	9						
E11	10	10	10						
E12	11	11	11						
E13	12	12	12						
E14	13	13	13						
E15	14	14	14						
E16	15	15	15						

-- : not present

Table 22.23: Meaning of the Bits of the Status Word for External Keys

WORD 1 MEANING OF BIT	NUMBER OF THE BIT								
	VT150W + VT100MT1000	VT160W	VT300W - VT310W - VT320W + VT100MT1000						
E17	0	0	0						
E18	1	1	1						
E19	2	–	2						
E20	3	–	3						
E21	–	–	–						
E22	–	–	–						
E23	–	–	–						
E24	–	–	–						
E25	–	–	–						
E26	–	–	–						
E27	–	–	–						
E28	–	–	–						
E29	–	–	–						
E30	–	–	–						
E31	–	–	–						
E32	–	–	–						

– : not present

Status area for internal keys (Real Time)

This area consists of a maximum of 6 words (numbered from 0 to 5).

WORD NUMBER	NAME OF WORD
0	OPERATIVE KEYS STATUS (Real Time)
1	OPERATIVE KEYS STATUS (Real Time)
2	OPERATIVE KEYS STATUS (Real Time)
3	OPERATIVE KEYS STATUS (Real Time)
4	FUNCTION KEYS STATUS (Real Time)
5	FUNCTION KEYS STATUS (Real Time)

The keys surrounded by a bold border set the corresponding bit at 1 when pressed together with Shift.

The above is valid for VT50 and VT60. In the case of other terminals the bits relating to the function keys are always the same. The bit of the SHIFT key must also be tested (Word 0 - Bit 15).

The bit relating to the Shift key is set at 1 only if pressed at the same time as another key (e.g. Shift + Clr Esc).

The Handshake bit is set at 1 by the VT whenever one or more keys are pressed; it is set at 0 when no key is pressed.

For details concerning these Status words, see Page 22-15.

Status area for external keys (Real Time)

This area consists of a maximum of 2 words (numbered from 0 to 1).

WORD NUMBER	NAME OF WORD
0	STATUS WORD FOR EXTERN. KEYS (Real Time)
1	STATUS WORD FOR EXTERN. KEYS (Real Time)

For details concerning these Status words, see Page 22-22.

Status area for printer

This area consists of 2 words (numbered from 0 to 1).

NO. OF WORD	NAME OF WORD
0	STATUS WORD for ASP
1	STATUS WORD for LPT

Table 22.24: Meaning of the Bits of the Status Word for ASP

WORD 0 MEANING OF THE BIT	NUMBER OF THE BIT																
	VT 50	VT 60	VT 150 W	VT 160 W	VT 170 W	VT 190 W	VT 300 W	VT 310 W	VT 320 W	VT 330 W	VT 555 W	VT 565 W	VT 585 W				
STAMPANTE NOT ON LINE Status 1 when one of the bits from 3 to 8 is set at 1.	n.p.	n.p.	n.p.	n.p.	0	0	0	0	0	0	0	0	0				
TIMEOUT Status 1 when the printer is OFFLINE, not connected, lacks paper or when there is any communication problem follow the command to print.	n.p.	n.p.	n.p.	n.p.	1	1	1	1	1	1	1	1	1				
--	n.p.	n.p.	n.p.	n.p.	--	--	--	--	--	--	--	--	--				
REPORT PRINTING IN PROGRESS Status 1 as long as the function lasts	n.p.	n.p.	n.p.	n.p.	3	3	3	3	3	3	3	3	3				
DIRECT PRINTING OF THE INFORMATION MESSAGE IN PROGRESS Status 1 as long as the function lasts	n.p.	n.p.	n.p.	n.p.	4	4	4	4	4	4	4	4	4				
DIRECT PRINTING OF THE ISA ALARME IN PROGRESS Status 1 as long as the function lasts	n.p.	n.p.	n.p.	n.p.	5	5	5	5	5	5	5	5	5				
PRINTING OF ALARM HISTORY BUFFER IN PROGRESS Status 1 as long as the function lasts	n.p.	n.p.	n.p.	n.p.	6	6	6	6	6	6	6	6	6				
HARDCOPY IN PROGRESS Status 1 as long as the function lasts	n.p.	n.p.	n.p.	n.p.	7	7	7	7	7	7	7	7	7				
FORM-FEED IN PROGRESS Status 1 as long as the function lasts	n.p.	n.p.	n.p.	n.p.	8	8	8	8	8	8	8	8	8				

-- : non used

n.p. : not present

Table 22.25: Meaning of the Bits of the Status Word for LPT

WORD 1 MEANING OF THE BIT	NUMBER OF THE BIT																
	VT 50	VT 60	VT 150 W	VT 160 W	VT 170 W	VT 190 W	VT 300 W	VT 310 W	VT 320 W	VT 330 W	VT 555 W	VT 565 W	VT 585 W				
PRINTER NOT ON LINE Status 1 when one of the bits from 3 to 8 is set at 1.	n.p.	n.p.	n.p.	n.p.	0	0	0	0	0	0	0	0	0				
TIMEOUT Status 1 when the printer is OFFLINE, not connected, lacks paper or when there is any communication problem follow the command to print.	n.p.	n.p.	n.p.	n.p.	1	1	1	1	1	1	1	1	1				
--	n.p.	n.p.	n.p.	n.p.	--	--	--	--	--	--	--	--	--				
REPORT PRINTING IN PROGRESS Status 1 as long as the function lasts	n.p.	n.p.	n.p.	n.p.	3	3	3	3	3	3	3	3	3				
DIRECT PRINTING OF THE INFORMATION MESSAGE IN PROGRESS Status 1 as long as the function lasts	n.p.	n.p.	n.p.	n.p.	4	4	4	4	4	4	4	4	4				
DIRECT PRINTING OF THE ISA ALARME IN PROGRESS Status 1 as long as the function lasts	n.p.	n.p.	n.p.	n.p.	5	5	5	5	5	5	5	5	5				
PRINTING OF ALARM HISTORY BUFFER IN PROGRESS Status 1 as long as the function lasts	n.p.	n.p.	n.p.	n.p.	6	6	6	6	6	6	6	6	6				
HARDCOPY IN PROGRESS Status 1 as long as the function lasts	n.p.	n.p.	n.p.	n.p.	7	7	7	7	7	7	7	7	7				
FORM-FEED IN PROGRESS Status 1 as long as the function lasts	n.p.	n.p.	n.p.	n.p.	8	8	8	8	8	8	8	8	8				

-- : non used

n.p. : not present

Status area for trends

This area consists of 1 word.

WORD NUMBER	NAME OF WORD
0	TREND STATUS WORD

Table 22.26: Meaning of bits of Trend Status Word

WORD 0 MEANING OF BIT	NUMBER OF THE BIT																
	VT 50	VT 60	VT 150 W	VT 160 W	VT 170 W	VT 190 W	VT 300 W	VT 310 W	VT 320 W	VT 330 W	VT 555 W	VT 565 W	VT 585 W				
TREND NUMBER 1 BUFFER FULL Status 1when the buffer is full.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	0	0	0	0	0	0	0				
TREND NUMBER 2 BUFFER FULL Status 1when the buffer is full.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	1	1	1	1	1	1	1				
TREND NUMBER 3 BUFFER FULL Status 1when the buffer is full.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	2	2	2	2	2	2	2				
TREND NUMBER 4 BUFFER FULL Status 1when the buffer is full.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	3	3	3	3	3	3	3				
TREND NUMBER 5 BUFFER FULL Status 1when the buffer is full.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	4	4	4	4	4	4	4				
TREND NUMBER 6 BUFFER FULL Status 1when the buffer is full.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	5	5	5	5	5	5	5				
TREND NUMBER 7 BUFFER FULL Status 1when the buffer is full.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	6	6	6	6	6	6	6				
TREND NUMBER 8 BUFFER FULL Status 1when the buffer is full.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	7	7	7	7	7	7	7				
TREND NUMBER 9 BUFFER FULL Status 1when the buffer is full.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	8	8	8	8	8	8	8				
TREND NUMBER 10 BUFFER FULL Status 1when the buffer is full.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	9	9	9	9	9	9	9				
TREND NUMBER 11 BUFFER FULL Status 1when the buffer is full.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	10	10	10	10	10	10	10				
TREND NUMBER 12 BUFFER FULL Status 1when the buffer is full.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	11	11	11	11	11	11	11				
TREND NUMBER 13 BUFFER FULL Status 1when the buffer is full.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	12	12	12	12	12	12	12				
TREND NUMBER 14 BUFFER FULL Status 1when the buffer is full.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	13	13	13	13	13	13	13				
TREND NUMBER 15 BUFFER FULL Status 1when the buffer is full.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	14	14	14	14	14	14	14				
TREND NUMBER 16 BUFFER FULL Status 1when the buffer is full.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	15	15	15	15	15	15	15				

-- : not used

n.p. : not present

Command response area

This area consists of 4 fixed words (numbered from 0 to 3).

NO. OF WORD	NAME OF WORD
0	COMMAND
1	PARAMETER 1
2	PARAMETER 2
3	PARAMETER 3

Below are listed commands with their responses:

COMMAND 14:	Reads current time	
Word	Value/Meaning	
0	14	
1	HH -> Hours in BCD	MM -> Minutes in BCD
2	SS -> Seconds in BCD	Not used
3	Not used	

COMMAND 15:	Reads current date	
Word	Value/Meaning	
0	15	
1	GG -> Day in BCD	MMM -> Month in BCD
2	AAAA -> Year in BCD	
3	DOW -> Day of the week (0=Sunday)	Not Used

For examples of the use of this area see Software Manual.

Command area external LEDs (fixed light)

This area consists of 2 fixed words (numbered from 0 to 1).

WORD NUMBER	NAME OF WORD
0	WORD COMMANDING EXTERNAL LEDS
1	WORD COMMANDING EXTERNAL LEDS

Table 22.27: Meaning of Bits of Word Commanding External LEDs (fixed light)

WORD 0 MEANING OF BIT	BIT NUMBER							
	VT150W + VT100MT1000	VT160W	VT300W - VT310W - VT320W + VT100MT1000					
E1	0	0	0					
E2	1	1	1					
E3	2	2	2					
E4	3	3	3					
E5	4	4	4					
E6	5	5	5					
E7	6	6	6					
E8	7	7	7					
E9	8	8	8					
E10	9	9	9					
E11	10	10	10					
E12	11	11	11					
E13	12	12	12					
E14	13	13	13					
E15	14	14	14					
E16	15	15	15					

-- : not present

Table 22.28: Meaning of Bits of Word Commanding External LEDs (fixed light)

WORD 1 MEANING OF BIT	BIT NUMBER								
	VT150W + VT100MT1000	VT160W	VT300W - VT310W - VT320W + VT100MT1000						
E17	0	0	0						
E18	1	1	1						
E19	2	--	2						
E20	3	--	3						
E21	--	--	--						
E22	--	--	--						
E23	--	--	--						
E24	--	--	--						
E25	--	--	--						
E26	--	--	--						
E27	--	--	--						
E28	--	--	--						
E29	--	--	--						
E30	--	--	--						
E31	--	--	--						
E32	--	--	--						

-- : not present

Command area external LEDs (blinking light)

This area consists of 2 fixed words (numbered from 0 to 1).

NO. OF WORD	NAME OF WORD
0	WORD COMMANDING EXTERNAL LEDS
1	WORD COMMANDING EXTERNAL LEDS

For details concerning status words, see Page 22-29.

Command area internal red LEDs (fixed light)

This area consists of up to 2 words (numbered from 0 to 1).

WORD NUMBER	NAME OF WORD
0	WORD COMMANDING RED LEDS
1	WORD COMMANDING RED LEDS

Table 22.29: Meaning of Bits of Word Commanding internal red LEDs (fixed light)

WORD 0 BIT NUMBER	MEANING OF BIT															
	VT 50	VT 60	VT 150 W	VT 160 W	VT 170 W	VT 190 W	VT 300 W	VT 310 W	VT 320 W	VT 330 W	VT 555 W	VT 565 W	VT 585 W			
0	--	--	--	--	F1	F1	F1	F1	F1	--	--	--	--			
1	--	--	--	--	F2	F2	F2	F2	F2	--	--	--	--			
2	--	--	--	--	F3	F3	F3	F3	F3	--	--	--	--			
3	--	--	--	--	F4	F4	F4	F4	F4	--	--	--	--			
4	--	--	--	--	F5	F5	F5	F5	F5	--	--	--	--			
5	--	--	--	--	F6	F6	F6	F6	F6	--	--	--	--			
6	--	--	--	--	F7	F7	F7	F7	F7	--	--	--	--			
7	--	--	--	--	F8	F8	F8	F8	F8	--	--	--	--			
8	--	--	--	--	F9	F9	F9	F9	F9	--	--	--	--			
9	--	--	--	--	F10	F10	F10	F10	F10	--	--	--	--			
10	--	--	--	--	F11	F11	F11	F11	F11	--	--	--	--			
11	--	--	--	--	F12	F12	F12	--	F12	--	--	--	--			
12	--	--	--	--	--	F13	F13	--	F13	--	--	--	--			
13	--	--	--	--	--	F14	F14	--	F14	--	--	--	--			
14	--	--	--	--	--	F15	F15	--	F15	--	--	--	--			
15	--	--	--	--	--	F16	F16	--	F16	--	--	--	--			

-- : not present

Table 22.30: Meaning of Bits of Word Commanding internal red LEDs (fixed light)

WORD 1 BIT NUMBER	MEANING OF BIT																
	VT 50	VT 60	VT 150 W	VT 160 W	VT 170 W	VT 190 W	VT 300 W	VT 310 W	VT 320 W	VT 330 W	VT 555 W	VT 565 W	VT 585 W				
0	--	--	--	--	--	F17	F17	--	F17	--	--	--	--				
1	--	--	--	--	--	F18	F18	--	F18	--	--	--	--				
2	--	--	--	--	--	F19	F19	--	--	--	--	--	--				
3	--	--	--	--	--	F20	F20	--	--	--	--	--	--				
4	--	--	--	--	--	F21	F21	--	--	--	--	--	--				
5	--	--	--	--	--	F22	F22	--	--	--	--	--	--				
6	--	--	--	--	--	--	--	--	--	--	--	--	--				
7	--	--	--	--	--	--	--	--	--	--	--	--	--				
8	--	--	--	--	--	--	--	--	--	--	--	--	--				
9	--	--	--	--	--	--	--	--	--	--	--	--	--				
10	--	--	--	--	--	--	--	--	--	--	--	--	--				
11	--	--	--	--	--	--	--	--	--	--	--	--	--				
12	--	--	--	--	--	--	--	--	--	--	--	--	--				
13	--	--	--	--	--	--	--	--	--	--	--	--	--				
14	--	--	--	--	--	--	--	--	--	--	--	--	--				
15	--	--	--	--	--	--	--	--	--	--	--	--	--				

-- : not present

Command area internal red LEDs (blinking light)

This area consists of up to 2 words (numbered from 0 to 1).

NO. OF WORD	NAME OF WORD
0	WORD COMMANDING RED LEDS
1	WORD COMMANDING RED LEDS

For details concerning status words, see Pages 22-28.

Command area internal green LEDs (fixed light)

This area consists of up to 2 words (numbered from 0 to 1).

NO. OF WORD	NAME OF WORD
0	WORD COMMANDING GREEN LEDS
1	WORD COMMANDING GREEN LEDS

Table 22.31: Meaning of Bits of Word Commanding internal green LEDs (fixed light)

WORD 0 BIT NUMBER	MEANING OF BIT															
	VT 50	VT 60	VT 150 W	VT 160 W	VT 170 W	VT 190 W	VT 300 W	VT 310 W	VT 320 W	VT 330 W	VT 555 W	VT 565 W	VT 585 W			
0	--	--	F1	F1	F1	F1	F1	F1	F1	--	--	--	--				
1	--	--	F2	F2	F2	F2	F2	F2	F2	--	--	--	--				
2	--	--	F3	F3	F3	F3	F3	F3	F3	--	--	--	--				
3	--	--	F4	F4	F4	F4	F4	F4	F4	--	--	--	--				
4	--	--	F5	F5	F5	F5	F5	F5	F5	--	--	--	--				
5	--	--	--	--	F6	F6	F6	F6	F6	--	--	--	--				
6	--	--	--	--	F7	F7	F7	F7	F7	--	--	--	--				
7	--	--	--	--	F8	F8	F8	F8	F8	--	--	--	--				
8	--	--	--	--	F9	F9	F9	F9	F9	--	--	--	--				
9	--	--	--	--	F10	F10	F10	F10	F10	--	--	--	--				
10	--	--	--	--	F11	F11	F11	F11	F11	--	--	--	--				
11	--	--	--	--	F12	F12	F12	F12	F12	--	--	--	--				
12	--	--	--	--	--	F13	F13	F13	F13	F13	--	--	--				
13	--	--	--	--	--	F14	F14	F14	F14	F14	--	--	--				
14	--	--	--	--	--	F15	F15	F15	F15	F15	--	--	--				
15	--	--	--	--	--	F16	F16	F16	F16	F16	--	--	--				

-- : not present

Table 22.32: Meaning of Bits of Word Commanding internal green LEDs (fixed light)

WORD 1 BIT NUMBER	MEANING OF BIT																
	VT 50	VT 60	VT 150 W	VT 160 W	VT 170 W	VT 190 W	VT 300 W	VT 310 W	VT 320 W	VT 330 W	VT 555 W	VT 565 W	VT 585 W				
0	--	--	--	--	--	F17	F17	F17	F17	F17	--	--	--				
1	--	--	--	--	--	F18	F18	F18	F18	F18	--	--	--				
2	--	--	--	--	--	F19	F19	F19	F19	F19	--	--	--				
3	--	--	--	--	--	F20	F20	F20	F20	F20	--	--	--				
4	--	--	--	--	--	F21	F21	F21	F21	F21	--	--	--				
5	--	--	--	--	--	F22	F22	--	F22	F22	--	--	--				
6	--	--	--	--	--	F23	F23	--	F23	F23	--	--	--				
7	--	--	--	--	--	F24	F24	--	F24	F24	--	--	--				
8	--	--	--	--	--	--	--	--	F25	F25	--	--	--				
9	--	--	--	--	--	--	--	--	F26	F26	--	--	--				
10	--	--	--	--	--	--	--	--	F27	F27	--	--	--				
11	--	--	--	--	--	--	--	--	F28	F28	--	--	--				
12	--	--	--	--	--	--	--	--	--	--	--	--	--				
13	--	--	--	--	--	--	--	--	--	--	--	--	--				
14	--	--	--	--	--	--	--	--	--	--	--	--	--				
15	--	--	--	--	--	--	--	--	--	--	--	--	--				

-- : not present

Command area internal green LEDs (blinking light)

This area consists of up to 2 words (numbered from 0 to 1).

NO. OF WORD	NAME OF WORD
0	WORD COMMANDING GREEN LEDS
1	WORD COMMANDING GREEN LEDS

For details concerning status words, see Page 22-33.

Command area

This area consists of 4 fixed words (numbered from 0 to 3).

NO. OF WORD	NAME OF WORD
0	COMMAND
1	PARAMETER 1
2	PARAMETER 2
3	PARAMETER 3

Table 22.33: List of commands available

COMMAND CODE		PARAMS.			DESCRIPTION	VT 50	VT 60	VT 150 W	VT 160 W	VT 170 W	VT 190 W	VT 300 W	VT 310 W	VT 320 W	VT 330 W	VT 555 W	VT 565 W	VT 585 W				
		1	2	3																		
01	--	●	●	●	Forces sequence	●	●	●	●	●	●	●	●	●	●							
02	--	●	●	--	Forces page	●	●	●	●	●	●	●	●	●	●	●	●	●				
03	--	●	--	--	Forces current field	●	●	●	●	●	●	●	●	●	●	--	--	--				
04	--	●	--	--	Bit-structured protection mask	●	●	●	●	●	●	●	●	●	●	●	●	●				
05	--	●	--	--	Forces system context	●	●	●	●	●	●	●	●	●	●	●	●	●				
06	--	●	--	--	Sets autoscroll for messages	●	●	●	●	--	--	--	--	--	--	--	--	--				
07	--	●	--	--	Sets current language	●	●	●	●	●	●	●	●	●	●	●	●	●				
08	--	●	--	--	Priority of messages	●	●	●	●	--	--	--	--	--	--	--	--	--				
09	--	●	--	--	Operation of messages	●	●	●	●	●	●	●	●	●	●	●	●	●				
10	--	●	--	--	Sets autoscroll time for information messages	●	●	●	●	●	●	●	●	●	●	●	●	●				
11	--	●	--	--	Sets autoscroll time for ISA alarms	--	--	--	--	●	●	●	●	●	●	●	●	●				
12	--	●	--	--	Sets maximum time after which the lamp switches off	--	--	--	--	--	--	--	●	●	●	●	●	●				
13	--	●	--	--	Sets the maximum idle time for keys in edit mode	--	--	--	--	●	●	●	●	●	●	●	●	●				
14	r	--	--	--	Reads current time	--	--	--	--	●	●	●	●	●	●	●	●	●				
15	r	--	--	--	Reads current date	--	--	--	--	●	●	●	●	●	●	●	●	●				
16	--	●	--	--	Sets the clock	--	--	--	--	●	●	●	●	●	●	●	●	●				
17	--	●	--	--	Sets current date	--	--	--	--	●	●	●	●	●	●	●	●	●				
18	--	●	--	--	Reads trend from device buffer	--	--	--	--	--	--	●	●	●	●	●	●	●				

-- : not present r : response

Table 22.33: List of commands available

COMMAND CODE		PARAMS. 1	PARAMS. 2	PARAMS. 3	DESCRIPTION	VT 50	VT 60	VT 150 W	VT 160 W	VT 170 W	VT 190 W	VT 300 W	VT 310 W	VT 320 W	VT 330 W	VT 555 W	VT 565 W	VT 585 W				
19	--	●	--	--	Emptying alarm history buffer	--	--	--	--	●	●	●	●	●	●	●	●	●				
20	--	●	●	--	Synchronization of recipe transfer	--	--	--	--	●	●	●	●	●	●	●	●	●				
21	--	●	●	--	Request for a recipe	--	--	--	--	●	●	●	●	●	●	●	●	●				
22	--	●	●	--	Send recipe to VT without overwriting	--	--	--	--	●	●	●	●	●	●	●	●	●				
23	--	●	●	--	Send recipe to VT overwriting	--	--	--	--	●	●	●	●	●	●	●	●	●				
24	--	●	●	--	Command: internal green LEDs	--	--	●	●	●	●	●	●	●	●	--	--	--				
25	--	●	●	--	Command: flashing of internal green LEDs	--	--	●	●	●	●	●	●	●	●	--	--	--				
26	--	●	●	--	Command: read and write pipe-line	--	--	--	--	--	●	●	●	●	●	●	●	●				
27	--	●	--	--	Deletes trend from VT buffer	--	--	--	--	--	--	●	●	●	●	●	●	●				
28	--	●	--	--	Reads trend on command	--	--	--	--	--	--	●	●	●	●	●	●	●				
29	--	●	●	--	Stop trend	--	--	--	--	--	--	●	●	●	●	●	●	●				
30	--	●	●	--	Start trend	--	--	--	--	--	--	●	●	●	●	●	●	●				
31	--	●	●	--	Command: internal red LEDs	--	--	--	--	●	●	●	●	●	--	--	--	--				
32	--	●	●	--	Command: flashing of internal red LEDs	--	--	--	--	●	●	●	●	●	--	--	--	--				
33	--	●	●	--	Command: external LEDs	--	--	●	●	--	--	●	●	●	--	--	--	--				
34	--	●	●	--	Command: flashing of external LEDs	--	--	●	●	--	--	●	●	●	--	--	--	--				
35	--	●	●	--	Report printing	--	--	--	--	●	●	●	●	●	●	●	●	●				
36	--	●	●	--	Printing of the ISA alarms history buffer	--	--	--	--	●	●	●	●	●	●	●	●	●				
37	--	●	--	--	Hardcopy	--	--	--	--	●	●	--	--	--	--	--	--	--				
38	--	●	--	--	Form-feed	--	--	--	--	●	●	●	●	●	●	●	●	●				
39	--	●	--	--	Zeroes number of print pages	--	--	--	--	●	●	●	●	●	●	●	●	●				
40	--	●	●	--	Command makes internal green LEDs light up flashing	--	--	●	●	●	●	●	●	●	●	--	--	--				
41	--	●	●	--	Command makes internal red LEDs light up flashing	--	--	--	--	●	●	●	●	●	--	--	--	--				

-- : not present r : response

Table 22.33: List of commands available

COMMAND CODE		PARAMS.			DESCRIPTION	VT 50	VT 60	VT 150 W	VT 160 W	VT 170 W	VT 190 W	VT 300 W	VT 310 W	VT 320 W	VT 330 W	VT 555 W	VT 565 W	VT 585 W				
		1	2	3																		
42	--	●	●	--	Command makes external LEDs light up flashing	--	--	●	●	--	--	●	●	●	--	--	--	--				
43	--	--	--	--	Acknowledgment of all alarms together	--	--	--	--	●	●	●	●	●	●	●	●	●				
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				

-- : not present r : response

We list below the commands in detail; unless otherwise indicated all the parameter values are expressed in binary.

COMMAND 01:	Forces sequence
Word	**Value/Meaning**
0	1
1	**Sequence identifier** Indicates the number of the sequence that must be displayed. If the value is zero the current sequence is restored; this serves to quit a system page and restore the project page context.
2	**Page identifier** Indicates the page number of the sequence that must be displayed. If the value is zero or a value that is not valid, the first page of the sequence is displayed.
3	**Page control** The parameter has 2 identifiers, one for each byte. The high byte (more significant) contains the CURRENT FIELD, that is, the field in the page on which the cursor must be positioned. If the value is zero or a value that is not valid, the current field is the first in the page. The low byte (less significant) contains the BIT-STRUCTURED PROTECTION MASK to be used to protect the fields.

COMMAND 02:	Forces page
Word	**Value/Meaning**
0	2
1	**Page identifier** Indicates the page number of the sequence that must be displayed. If the value is zero or a value that is not valid, the first page of the sequence is displayed.
2	**Page control** The parameter has 2 identifiers, one for each byte. The high byte (more significant) contains the CURRENT FIELD, that is, the field in the page on which the cursor must be positioned. If the value is zero or a value that is not valid, the current field is the first in the page. The low byte (less significant) contains the BIT-STRUCTURED PROTECTION MASK to be used to protect the fields.
3	**Not used**

COMMAND 03:	Forces current field
Word	**Value/Meaning**
0	**3**
1	**Page control** The parameter has 2 identifiers, one for each byte. The high byte (more significant) contains the CURRENT FIELD, that is, the field in the page on which the cursor must be positioned. If the value is zero or a value that is not valid, the current field is the first in the page. The low byte (less significant) contains the BIT-STRUCTURED PROTECTION MASK to be used to protect the fields.
2	**Not used**
3	**Not used**

COMMAND 04:	Forces bit-structured protection mask
Word	**Value/Meaning**
0	**4**
1	**Bit-structured mask** Uses the 8 bits of the low byte (least significant). logic state “1” activates the protection that stops the field being varied.
2	**Not used**
3	**Not used**

COMMAND 05:	Forces system context	
Word	**Value/Meaning**	
0	**5**	
1	**Context identifier** Indicates which context to set. Possible contexts are:	
	VT50/60	
	0	INFORMATION MESSAGES
	1	SEQUENCE DIRECTORY (PAGES*)
	2	DRIVER
	3	HELP FOR PROJECT PAGES
	4	PROJECT INFORMATION
	VT150/160/170/190/300/310/320/330/555/565/585	
	0	INFORMATION MESSAGES
	1	SEQUENCE DIRECTORY (PAGES*)
	2	DRIVER
	3	HELP FOR PROJECT PAGES
	4	HELP FOR ISA ALARMS
	5	ISA ALARMS
	6	RECIPE DIRECTORY
	7	HELP FOR INFORMATION MESSASGES
	8	ALARM HISTORY
	9	PROJECT INFORMATION
	10	SET CLOCK
	11	SYSTEM MESSAGES ASSIGNED TO RECIPES
	12	SYSTEM MESSAGES ASSIGNED TO PASSWORDS
2	**Not used**	
3	**Not used**	

(*) Only for VT555W

COMMAND 06:	Sets autoscroll for messages
Word	**Value/Meaning**
0	**6**
1	**Setting autoscroll** Logic state “1” or other than zero activates the function. Logic state “0” deactivates the function.
2	**Not used**
3	**Not used**

COMMAND 07:	Sets current language
Word	**Value/Meaning**
0	**7**
1	**Language identifier** The number of the new current language depends on the way the project is set.
2	**Not used**
3	**Not used**

COMMAND 08:	Set the priority for messages
Word	**Value/Meaning**
0	**8**
1	**Setting priority for messages** Logic state “1” or other than zero activates the function. Logic state “0” deactivates the function.
2	**Not used**
3	**Not used**

COMMAND 09:	Operation of messages	
Word	**Value/Meaning**	
0	**9**	
1	**Bit command** Contains activation/deactivation bits of functions as described below:	
	VT50/60	
	0	OFF/ON INFORMATION MESSAGE AUTOSCROLL
	1	OFF/ON PRIORITY TO INFORMATION MESSAGES
	VT150/160	
	0	--
	1	--
	2	OFF/ON BUZZER WHEN KEY IS PRESSED
	3	--
	4	OFF/ON CONTINUOUS BUZZER
	5	OFF/ON INFORMATION MESSAGE AUTOSCROLL
	6	OFF/ON PRIORITY TO DISPLAY OF INFORMATION MESSAGES
	7	OFF/ON INTERMITTENT BUZZER IN PRESENCE OF INFORMATION MESSAGE
	VT170/190/300/310/320/330/555/565/585	
	0	OFF/ON ISA ALARMS AUTOSCROLL
	1	OFF/ON PRIORITY TO DISPLAY OF ISA ALARMS
	2	OFF/ON BUZZER WHEN KEY IS PRESSED (AT A TOUCH*)
	3	OFF/ON INTERMITTENT BUZZER IN PRESENCE OF INFORMATION MESSAGE
	4	OFF/ON CONTINUOUS BUZZER
	5	OFF/ON INFORMATION MESSAGE AUTOSCROLL
2	--	
3	--	

(*) Only in the case of Touch Screen

COMMAND 10:	Set time for autoscroll of INFORMATION MESSAGES
Word	**Value/Meaning**
0	**10**
1	**Time of autoscroll** Value in secs. (1-60) indicating time to elapse before display of next INFORMATION MESSAGE page.
2	**Not used**
3	**Not used**

COMMAND 11:	Set time for autoscroll of alarm messages
Word	**Value/Meaning**
0	**11**
1	**Time of autoscroll** Value in secs. (1-60) indicating time to elapse before display of next ALARM MESSAGE page.
2	**Not used**
3	**Not used**

COMMAND 12:	Set time for after which lamp switches off
Word	Value/Meaning
0	**12** Makes it possible to set the idle time of the terminal after which the display lamp switches off. By idle time we mean no pressing of the keys for a certain time. In the case of touch screens, it means no pressing of touch screen buttons/keys.
1	**Waiting time** Value in minutes (1-30) indicating the time to pass before the display lamp goes off; the value 0 deactivates the function.
2	**Not used**
3	**Not used**

COMMAND 13:	Set idle time-out for keys in edit mode
Word	Value/Meaning
0	**13** Sets the time after which you pass automatically from edit to display mode following the last key-touch.
1	**Idle time** Value in minutes from 1 to 30 A value equal to zero disables this function.
2	**Not used**
3	**Not used**

COMMAND 14:	Reads current time
Word	Value/Meaning
0	**14** Copies time read by internal clock into response function area.
1	**Not used**
2	**Not used**
3	**Not used**

COMMAND 15:	Reads current date
Word	Value/Meaning
0	**15**
1	**Not used**
2	**Not used**
3	**Not used**

COMMAND 16:	Sets current time	
Word	Value/Meaning	
0	**16** Updates terminal clock with values sent by device.	
1	**HH -> Hours in BCD**	**MM -> Minutes in BCD**
2	**SS -> Seconds in BCD**	**Not used**
3	**Not used**	

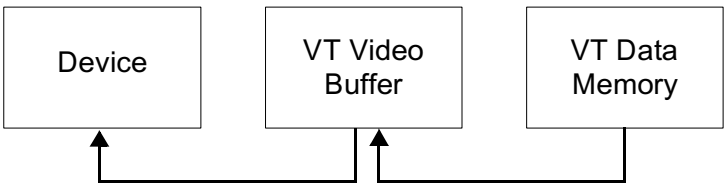
COMMAND 17:	Sets current date	
Word	Value/Meaning	
0	**17**	
1	**GG -> Day in BCD**	**MMM -> Month in BCD**
2	**AAAA -> Year in BCD**	
3	**DOW -> Day of the week (0=Sunday)**	**Not Used**

COMMAND 18 :	Read trend from device buffer
Word	Value/Meaning
0	**18** Acquires the samples in the buffer of the device as a block.
1	**Number of the buffer**
2	**Not used**
3	**Not used**

COMMAND 19:	Empty ISA alarms history buffer
Word	**Value/Meaning**
0	**19** Makes it possible to eliminate all records of ISA alarms from history buffer.
1	**Not used**
2	**Not used**
3	**Not used**

COMMAND 20:	Synchronization of recipe transfer
Word	**Value/Meaning**
0	**20** Makes it possible to tell the device that a recipe transfer is to start. The device must respond to the VT before transmission can begin.
1	**Bit commands** Contains the response bits to the RECIPE STATUS AREA 13 TIMEOUT confirms to the VT timeout of transmission 14 ENDTX confirms to the VT end of transmission 15 STARTTX confirms to the VT beginning of transmission
2	**Not used**
3	**Not used**

COMMAND 21:	Request for a recipe	
Word	**Value/Meaning**	
0	**21** Sends the VT request to transfer a recipe to its memory. Parameters 1 and 2 contain the 4-character code (name) of the recipe. Logic state “0” of bit 4 of VT STATUS word (in VT STATUS AREA) indicates that the code requested is present in the data memory of the VT, while logic state “1” indicates the absence of the code. With the code present transmission starts in SYNCHRONIZED or UNSYNCHRONIZED mode as determined by the project.	
1	**Character 1**	**Character 2**
2	**Character 3**	**Character 4**
3	**Not Used**	



COMMAND 22:	Sends recipe to VT without overwriting	
Word	**Value/Meaning**	
0	**22** Makes it possible to send the VT a recipe with a new code for it to be saved in the data memory only if code is absent. Parameters 1 and 2 contain the 4-character code (name) of the recipe. Logic state “0” of bit 4 of VT STATUS word (in VT STATUS AREA) indicates that the code requested is present in the data memory of the VT, while logic state “1” indicates the absence of the code. With the code absent the VT starts transmitting and then saving the data.	
1	**Character 1**	**Character 2**
2	**Character 3**	**Character 4**
3	**Not Used**	

The recipe code in the VT must be 4 characters long

COMMAND 23:	Sends recipe to the VT by overwriting	
Word	**Value/Meaning**	
0	**23** Makes it possible to send the VT a recipe with a news code to save it in the data memory without checking the existence of the code. Parameters 1 and 2 contain the 4-character code (name) of the recipe. Logic state “1” of bit 4 of VT STATUS word (in VT STATUS AREA) indicates that the command was carried out correctly, while logic state “0” indicates an incorrect command.	
1	**Character 1**	**Character 2**
2	**Character 3**	**Character 4**
3	**Not Used**	

The recipe code in the VT must be 4 characters long

COMMAND 24:	Command: internal green LEDs								
Word	**Value/Meaning**								
0	**24** Makes it possible to switch on and off the green LEDs internal to the VT and corresponding to the bits of the words of parameters 1 and 2.								
1	**BIT**	**TYPE of VT**							
		150	160	170	190	300	310	320	330
	0	F1	F1	F1	F1	F1	F1	F1	--
	1	F2	F2	F2	F2	F2	F2	F2	--
	2	F3	F3	F3	F3	F3	F3	F3	--
	3	F4	F4	F4	F4	F4	F4	F4	--
	4	F5	F5	F5	F5	F5	F5	F5	--
	5	--	--	F6	F6	F6	F6	F6	--
	6	--	--	F7	F7	F7	F7	F7	--
	7	--	--	F8	F8	F8	F8	F8	--
	8	--	--	F9	F9	F9	F9	F9	--
	9	--	--	F10	F10	F10	F10	F10	--
	10	--	--	F11	F11	F11	F11	F11	--
	11	--	--	F12	F12	F12	F12	F12	--
	12	--	--	--	F13	F13	F13	F13	F13
	13	--	--	--	F14	F14	F14	F14	F14
	14	--	--	--	F15	F15	F15	F15	F15
	15	--	--	--	F16	F16	F16	F16	F16
2	**BIT**	**TYPE of VT**							
		150	160	170	190	300	310	320	330
	0	--	--	--	F17	F17	F17	F17	F17
	1	--	--	--	F18	F18	F18	F18	F18
	2	--	--	--	F19	F19	F19	F19	F19
	3	--	--	--	F20	F20	F20	F20	F20
	4	--	--	--	F21	F21	F21	F21	F21
	5	--	--	--	F22	F22	--	F22	F22
	6	--	--	--	F23	F23	--	F23	F23
	7	--	--	--	F24	F24	--	F24	F24
	8	--	--	--	--	--	--	F25	F25
	9	--	--	--	--	--	--	F26	F26
	10	--	--	--	--	--	--	F27	F27
	11	--	--	--	--	--	--	F28	F28
	12	--	--	--	--	--	--	--	--
	13	--	--	--	--	--	--	--	--
	14	--	--	--	--	--	--	--	--
	15	--	--	--	--	--	--	--	--
3	**Not Used**								

-- : not used

COMMAND 25:	Command: flashing internal green LEDs
Word	**Value/Meaning**
0	**25** Makes it possible to activate or deactivate the flashing of the green LEDs internal to VT and corresponding to the bits of the words of parameters 1 and 2. The LED must previously have been switched on using the command 24

1	**BIT**	**TYPE of VT**								
		150	160	170	190	300	310	320	330	
	0	F1	F1	F1	F1	F1	F1	F1	--	
	1	F2	F2	F2	F2	F2	F2	F2	--	
	2	F3	F3	F3	F3	F3	F3	F3	--	
	3	F4	F4	F4	F4	F4	F4	F4	--	
	4	F5	F5	F5	F5	F5	F5	F5	--	
	5	--	--	F6	F6	F6	F6	F6	--	
	6	--	--	F7	F7	F7	F7	F7	--	
	7	--	--	F8	F8	F8	F8	F8	--	
	8	--	--	F9	F9	F9	F9	F9	--	
	9	--	--	F10	F10	F10	F10	F10	--	
	10	--	--	F11	F11	F11	F11	F11	--	
	11	--	--	F12	F12	F12	F12	F12	--	
	12	--	--	--	F13	F13	F13	F13	F13	
	13	--	--	--	F14	F14	F14	F14	F14	
	14	--	--	--	F15	F15	F15	F15	F15	
	15	--	--	--	F16	F16	F16	F16	F16	

2	**BIT**	**TYPE of VT**								
		150	160	170	190	300	310	320	330	
	0	--	--	--	F17	F17	F17	F17	F17	
	1	--	--	--	F18	F18	F18	F18	F18	
	2	--	--	--	F19	F19	F19	F19	F19	
	3	--	--	--	F20	F20	F20	F20	F20	
	4	--	--	--	F21	F21	F21	F21	F21	
	5	--	--	--	F22	F22	--	F22	F22	
	6	--	--	--	F23	F23	--	F23	F23	
	7	--	--	--	F24	F24	--	F24	F24	
	8	--	--	--	--	--	--	F25	F25	
	9	--	--	--	--	--	--	F26	F26	
	10	--	--	--	--	--	--	F27	F27	
	11	--	--	--	--	--	--	F28	F28	
	12	--	--	--	--	--	--	F17	--	
	13	--	--	--	--	--	--	F18	--	
	14	--	--	--	--	--	--	F19	--	
	15	--	--	--	--	--	--	F20	--	

3	**Not Used**

-- : not used

COMMAND 26 :	Read and write pipeline
Word	**Value/Meaning**
0	**26** Reads and writes the pipeline specified.
1	**Number of the pipeline**
2	**Not used**
3	**Not used**

COMMAND 27 :	Delete trend from VT buffer
Word	**Value/Meaning**
0	**27** Deletes the readings in the VT buffer.
1	**Number of the buffer**
2	**Not used**
3	**Not used**

COMMAND 28 :	Read trend on command
Word	**Value/Meaning**
0	**28** With each command sent acquires a reading from the buffer of the device.
1	**Number of the buffer**
2	**Not used**
3	**Not used**

COMMAND 29 :	Stop trend
Word	**Value/Meaning**
0	**29** Stops the reading of the channel corresponding to the trend buffer defined in parameter 1. The command only applies to trends in Single Automatic Sampling mode.
1	**Buffer number**
2	**Not used**
3	**Not used**

COMMAND 30 :	Start trend
Word	**Value/Meaning**
0	**30** Starts the reading of the channel corresponding to the trend buffer defined in parameter 1. The command only applies to trends in Single Automatic Sampling mode.
1	**Buffer number**
2	**Not used**
3	**Not used**

COMMAND 31:	Command: internal red LEDs								
Word	**Value/Meaning**								
0	**31** Makes it possible to switch on and off the red LEDs internal to the VT and corresponding to the bits of the words of parameters 1 and 2.								
1	**BIT**	**TYPE of VT**								
		170	190	300	310	320	330			
	0	F1	F1	F1	F1	F1	--			
	1	F2	F2	F2	F2	F2	--			
	2	F3	F3	F3	F3	F3	--			
	3	F4	F4	F4	F4	F4	--			
	4	F5	F5	F5	F5	F5	--			
	5	F6	F6	F6	F6	F6	--			
	6	F7	F7	F7	F7	F7	--			
	7	F8	F8	F8	F8	F8	--			
	8	F9	F9	F9	F9	F9	--			
	9	F10	F10	F10	F10	F10	--			
	10	F11	F11	F11	F11	F11	--			
	11	F12	F12	F12	--	F12	--			
	12	--	F13	F13	--	F13	--			
	13	--	F14	F14	--	F14	--			
	14	--	F15	F15	--	F15	--			
	15	--	F16	F16	--	F16	--			
2	**BIT**	**TYPE of VT**								
		170	190	300	310	320	330			
	0	--	F17	F17	--	F17	--			
	1	--	F18	F18	--	F18	--			
	2	--	F19	F19	--	--	--			
	3	--	F20	F20	--	--	--			
	4	--	F21	F21	--	--	--			
	5	--	F22	F22	--	--	--			
	6	--	--		--	--	--			
	7	--	--		--	--	--			
	8	--	--	--	--	--	--			
	9	--	--	--	--	--	--			
	10	--	--	--	--	--	--			
	11	--	--	--	--	--	--			
	12	--	--	--	--	--	--			
	13	--	--	--	--	--	--			
	14	--	--	--	--	--	--			
	15	--	--	--	--	--	--			
3	**Not Used**								

-- : not used

COMMAND 32:	Command: flashing of internal red LEDs								
Word	**Value/Meaning**								
0	**32** Makes it possible to activate or deactivate the flashing of the red LEDs internal to VT and corresponding to the bits of the words of parameters 1 and 2. The LED must previously have been switched on using the command 31								
1	**BIT**	**TYPE of VT**								
		170	190	300	310	320	330			
	0	F1	F1	F1	F1	F1	--			
	1	F2	F2	F2	F2	F2	--			
	2	F3	F3	F3	F3	F3	--			
	3	F4	F4	F4	F4	F4	--			
	4	F5	F5	F5	F5	F5	--			
	5	F6	F6	F6	F6	F6	--			
	6	F7	F7	F7	F7	F7	--			
	7	F8	F8	F8	F8	F8	--			
	8	F9	F9	F9	F9	F9	--			
	9	F10	F10	F10	F10	F10	--			
	10	F11	F11	F11	F11	F11	--			
	11	F12	F12	F12	--	F12	--			
	12	--	F13	F13	--	F13	--			
	13	--	F14	F14	--	F14	--			
	14	--	F15	F15	--	F15	--			
	15	--	F16	F16	--	F16	--			
2	**BIT**	**TYPE of VT**								
		170	190	300	310	320	330			
	0	--	F17	F17	--	F17	--			
	1	--	F18	F18	--	F18	--			
	2	--	F19	F19	--	--	--			
	3	--	F20	F20	--	--	--			
	4	--	F21	F21	--	--	--			
	5	--	F22	F22	--	--	--			
	6	--	--		--	--	--			
	7	--	--		--	--	--			
	8	--	--	--	--	--	--			
	9	--	--	--	--	--	--			
	10	--	--	--	--	--	--			
	11	--	--	--	--	--	--			
	12	--	--	--	--	--	--			
	13	--	--	--	--	--	--			
	14	--	--	--	--	--	--			
	15	--	--	--	--	--	--			
3	**Not Used**								

-- : Not used

COMAND 33 :	Command: external LEDs										
Word	**Value/Meaning**										
0	**33** Makes it possible to switch on and off the LEDs external to the VT and corresponding to the bits of the words of parameters 1 and 2.										
1	**BIT**	**TYPE of VT**									
		150 + VT100MT1000	160	300-310-320 + VT100MT1000							
	0	E1	E1	E1							
	1	E2	E2	E2							
	2	E3	E3	E3							
	3	E4	E4	E4							
	4	E5	E5	E5							
	5	E6	E6	E6							
	6	E7	E7	E7							
	7	E8	E8	E8							
	8	E9	E9	E9							
	9	E10	E10	E10							
	10	E11	E11	E11							
	11	E12	E12	E12							
	12	E13	E13	E13							
	13	E14	E14	E14							
	14	E15	E15	E15							
	15	E16	E16	E16							
2	**BIT**	**TYPE of VT**									
		150 + VT100MT1000	160	300-310-320 + VT100MT1000							
	0	E17	E17	E17							
	1	E18	E18	E18							
	2	E19	--	E19							
	3	E20	--	E20							
	4	--	--	--							
	5	--	--	--							
	6	--	--	--							
	7	--	--	--							
	8	--	--	--							
	9	--	--	--							
	10	--	--	--							
	11	--	--	--							
	12	--	--	--							
	13	--	--	--							
	14	--	--	--							
	15	--	--	--							
3	**Not Used**										

-- : not used

COMMAND 34:	**Command: flashing of external LEDs**									
Word	**Value/Meaning**									
0	**34** Makes it possible to activate or deactivate the LEDs internal to VT and corresponding to the bits of the words of parameters 1 and 2. The LED must previously have been switched on using the command 33									
1	**BIT**	**TYPE of VT**								
		150 + VT100MT1000	160	300-310-320 + VT100MT1000						
	0	E1	E1	E1						
	1	E2	E2	E2						
	2	E3	E3	E3						
	3	E4	E4	E4						
	4	E5	E5	E5						
	5	E6	E6	E6						
	6	E7	E7	E7						
	7	E8	E8	E8						
	8	E9	E9	E9						
	9	E10	E10	E10						
	10	E11	E11	E11						
	11	E12	E12	E12						
	12	E13	E13	E13						
	13	E14	E14	E14						
	14	E15	E15	E15						
	15	E16	E16	E16						
2	**BIT**	**TYPE of VT**								
		150 + VT100MT1000	160	300-310-320 + VT100MT1000						
	0	E17	E17	E17						
	1	E18	E18	E18						
	2	E19	--	E19						
	3	E20	--	E20						
	4	--	--	--						
	5	--	--	--						
	6	--	--	--						
	7	--	--	--						
	8	--	--	--						
	9	--	--	--						
	10	--	--	--						
	11	--	--	--						
	12	--	--	--						
	13	--	--	--						
	14	--	--	--						
	15	--	--	--						
3	**Not Used**									

-- : not used

COMMAND 35:	Prints report
Word	**Value/Meaning**
0	**35** Makes it possible to print the report indicated numerically in parameter 1.
1	**Number of the report to print**
2	**Not used**
3	**Not used**

COMMAND 36:	Print ISA alarms history buffer
Word	**Value/Meaning**
0	**36** Makes it possible to print the ISA alarm message history buffer
1	**Not used**
2	**Not used**
3	**Not used**

COMMAND 37:	Hardcopy
Word	**Value/Meaning**
0	**37** Makes it possible to reproduce the page being displayed on the printer
1	**Print mode** 0 TEXT MODE
2	**Not used**
3	**Not used**

COMMAND 38:	Form-Feed
Word	**Value/Meaning**
0	**38** Makes it possible to send the printer the command feed the sheet.
1	**Choice of VT port for communication with printer** 0 ASP 15 LPT
2	**Not used**
3	**Not used**

COMMAND 39:	Reset print sheet counter to zero
Word	**Value/Meaning**
0	**39** Makes it possible to reset print sheet counter to zero and therefore start from sheet 1 again.
1	**Not used**
2	**Not used**
3	**Not used**

COMMAND 40 :	Command makes internal green LEDs light up flashing
Word	**Value/Meaning**
0	**40** **Lights up internal green VT LEDs** corresponding to the bits of the words of parameters 1 and 2, uniting in a single command both commands 24 and 25.
1	**See Command 24 or 25**
2	**See Command 24 or 25**
3	**Not used**

COMMAND 41 :	Command makes internal red LEDs light up flashing
Word	**Value/Meaning**
0	**41** Lights up red internal VT LEDs corresponding to the bits of the words of parameters 1 and 2, uniting in a single command both commands 31 and 32.
1	**See Command 31 o 32**
2	**See Command 31 o 32**
3	**Not used**

COMMAND 42 :	Command makes internal LEDs light up flashing
Word	**Value/Meaning**
0	**42** Lights up internal VT LEDs corresponding to the bits of the words of parameters 1 and 2, uniting in a single command both commands 33 and 34.
1	**See Command 33 or 34**
2	**See Command 33 or 34**
3	**Not used**

COMMAND 43 :	Acknowledgement of all alarms together
Word	**Value/Meaning**
0	**43** Tacita tutti gli allarmi presenti.
1	**Not used**
2	**Not used**
3	**Not used**

Chapter 23 Communication protocols

This chapter consists of 2 pages.

Our VT terminals can be connected to most devices on the market, thanks to specially designed communication protocols that act as an interface between the VT and the Device.

List of protocols

A list exists showing which devices the VT can communicate with and including further technical information that may be useful to the programmer.

This list is included on the cd-rom VTWIN KIT.

Chapter 24 Free terminal protocol

This chapter consists of 12 pages.

Our VT terminals can be connected with the majority of devices on the market, but, given the considerable number and variety of these devices, it may happen that one is incompatible. To meet the needs of those using an incompatible device, we have created a special driver called *Free terminal*.

Free terminal protocol

The operator terminal has a type of driver called *Free terminal* that makes it possible to communicate with any type of intelligent device not supported by the standard drivers supplied. This driver requires that the device manage the VT terminal in all its functions; this happens by sending control characters that the VT interprets and then sending characters to be displayed. When a ▢ is pressed, the VT sends the device the value of that ▢ such that the device recognizes and, if necessary, uses it.

The free terminal protocol also allows you to create a network of up to 31 terminals (01 -> 31); the connection must be made using serial RS485 (see "Chapter 19 -> Network connection").

To transfer the driver to the VT, the terminal must be set up for reception (see "Setting up for reception" of the various terminals) before proceeding to transfer (see Software Manual).

Once the transfer has been completed the VT displays the following page

```
VT-50 TERMINAL Vx.xx
READY
```

All the examples quoted in this chapter refer to VT50.

This means that the transfer has been effected properly and that the VT is ready to communicate with the device.

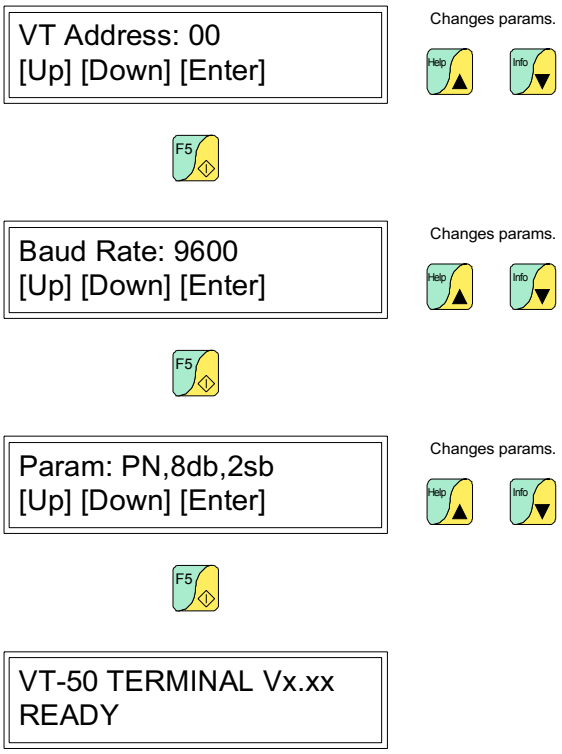
The transfer of the free terminal automatically sets the serial communication parameters with pre-established values:

VT address -> 00
Speed -> 9600 Baud
Parity -> N
Data bits -> 8
Stop bits -> 2

The above page remains in vision so long as the device connected does not command it to be canceled and takes over control. The connecting cable is the same as that used for the transfer (see "Chapter 17 -> PC <-> VT connection").

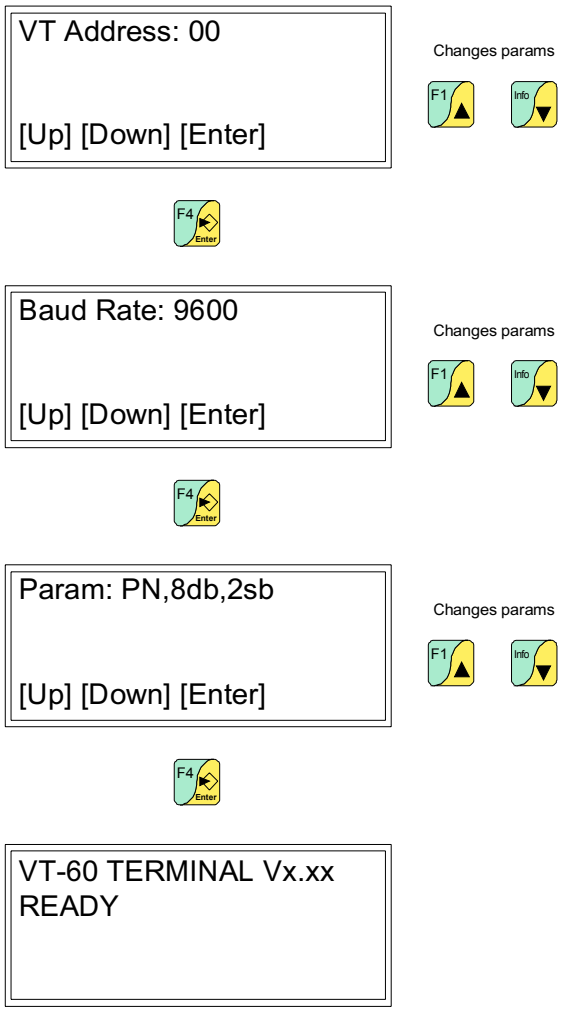
Editing parameters for VT50

These values can be changed by pressing F1 Esc + F5; the screen shows:



Editing parameters for VT60

These values can be changed by pressing F1 Esc + F5; the screen shows:



Free terminal control characters

The VT uses a set of characters that, sent correctly, function as *a command* and enable the VT to carry out certain operations.

For the *command* to be recognized as such it must be preceded by the control character <ESC> and followed by the control character <EOT>.

The tables below list the control characters to be used and the commands.

Table 24.1: Control characters of Free Terminal

Character	Code		Meaning	Effect
	Decimal	Ascii		
<BS>	8		Back Space	Takes the cursor one space back on the same line, cancelling the character
<CR>	13		Carriage Return	Takes the cursor to the beginning of the following line
<LF>	10		Line Feed	Takes the cursor to the next line leaving it in the same position
<ESC>	27		Escape	Signals the beginning of a command
<EOT>	4		End Of Text	Signals the end of a command

If sent several times in succession the character <EOT> can be used to un-block the VT terminal in the event that the sending of erroneous commands has destabilized the terminal.

Table 24.2: Command characters (Part 1 of 2)

Command	Parameters	Effect
<ESC>Y<EOT>	--	Checks the connection between VT and device. If the connection is right the terminal replies with the string OK.
<ESC>C<EOT>	--	Clears display, taking the cursor to position 0,0 (top left-hand angle).
<ESC>Ayyxx<EOT>	yy = 0....1 xx = 0....19	Takes the cursor to the co-ordinates yy,xx.
<ESC>Bss<EOT>	ss = 00 ->Off 01 ->Blinking (Default)	Changes the status of the cursor: off/blinking.
<ESC>Fddxx<EOT>	dd = 00 -> Up 01 -> Right 02 -> Down 03 -> Left xx = No. of moves	Moves the cursor relatively with regard to the current position.

Table 24.2: Command characters (Part 2 of 2)

Command	Parameters	Effect
<ESC>Z<EOT>	--	Clears display, taking the cursor to position 0,0 (top left-hand angle). (Equivalent of command C)
<ESC>Pbbpp<EOT>	bb = 00 -> 300 01 -> 600 02 -> 1200 03 -> 2400 04 -> 4800 05 -> 9600 (Default) 06 -> 19200 07 -> 38400 08 -> 57600 09 -> 115200 pp = 00 -> EVEN, 7, 1 01 -> EVEN, 7, 2 02 -> EVEN, 8, 1 03 -> EVEN, 8, 2 04 -> ODD, 7, 1 05 -> ODD, 7, 2 06 -> ODD, 8, 1 07 -> ODD, 8, 2 08 -> NONE, 7, 1 09 -> NONE, 7, 2 10 -> NONE, 8, 1 11 -> NONE, 8, 2 (Default)	Setting serial communication parameters.

When you use the command <ESC>Pbbpp<EOT> to configure the serial port with parameters different from the current ones, you must also reconfigure the device connected with the same values as the VT, otherwise it will not be possible to communicate. When the communication port is configured by commands rather than a keyboard, this configuration does not remain resident in the VT.

Key codes for VT50

As already mentioned, when the ▢▢ are pressed the VT sends a hexadecimal code to the connected device. The table below lists the association between code and ▢.

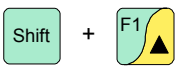
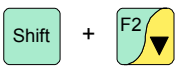
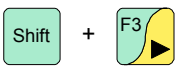
Table 24.3: Association between keys and hexadecimal codes

Key	Hexadecimal code
F1 Esc	09
F2 ◀	04
F3 ▶	02
F4	0B
F5	0D
Help ▲	01
Info ▼	03
Shift + F1 Esc	14
Shift + F2 ◀	15
Shift + F3 ▶	16
Shift + F4	17
Shift + F5	18
Shift + Help ▲	12
Shift + Info ▼	10

Key codes for VT60

As already mentioned, when the □□ are pressed the VT sends a hexadecimal code to the connected device. The table below lists the association between code and □.

Table 24.4: Association between keys and hexadecimal codes

Key	Hexadecimal code
	01
	03
	02
	0D
	09
	14
	15
	16
	17
	12

Free terminal in Network

Using the *Free terminal* protocol the VT can be connected in a RS485 linked network to enable a master device to show information to or request information from the various connected terminals.

Each connected terminal in this network must have been loaded with the *Free terminal* protocol and must have a different network address from any of the other addresses in the network (01 -> 31). If the address is 00, the terminal is not considered to be a participant in the network.

To change the network address see Page 24-3.

Once the terminal has been connected to the network (with an address other than 00) and switched on, the VT terminal's behavior is different from that seen in the previous paragraphs. The VT will not respond to any command unless it has been addressed. Addressing a terminal means that from that moment on the master device will communicate exclusively with that ter-

minal. Let us imagine the rotating selector with 31 positions from 0 to 31, the position of the selector indicates which terminal to communicate with.

After being addressed, the terminal will respond to all commands, as if it were directly connected to the device, the other will ignore any instruction passing through the network.

Even the sending of □□ by the VT is different: when a □ is pressed, its hexadecimal code is no longer sent automatically to the device, but is stored in a buffer (Max 64 □□) that the master device must ask. These keys are then not sent altogether but one □ at a time.

For example, of the VT buffer contained 3 □□ 

, 

and 

, then the VT would respond to the first request with "0301" (3 □□ in the buffer, the first having the code 01Hex). The response to the second request would be "0203" (2 □□, code 03Hex); the response to the third request would be "0102" (1 □, code 09Hex). In order to communicate that there are no keys in its buffer, the VT will respond to any further request with "0000".

There follows a list of permissible commands.

Table 24.5: Command characters with terminal in network.

Command	Parameters	Effect
<ESC>Ixx<EOT>	xx = 01....31	Addresses a terminal to communicate with
<ESC>T<EOT>	xx = Number of keys in buffer yy = Hex. code of key sent	Asks VT for keys from its internal buffer. The VT's response is xxyy in Ascii format.
<ESC>Dkkmm<EOT>	kk = 00 ->Never sends any key (Default) 01 ->Transmits the key only when the VT is addressed or when it has the address 00 mm = 00 -> Always saves the key in the VT's internal buffer (Default) 01 ->Saves the key in the VT's internal buffer only when the VT is addressed	Modifies the mode of saving and sending keys of a VT within the network.

Example of handling

Let us suppose we have a VT50 that has to display the text “GOOD MORNING OPERATOR” centered on the display and, when 

is pressed is canceled and replaced by the word “READY” justified top left.

There are various ways of proceeding, each leading to the same result; what follows is just one example.

Prepare the VT50 for communication by using *Free Terminal*. To do this, transfer the appropriate driver (see Page 24-2) and set the various communication parameters (see Page 24-3). Once the settings have been completed the following page appears

```
VT-50 TERMINAL Vx.xx
READY
```

First check that the VT communicates with the device. Send the following string.

<ESC>Y<EOT>

If communication has been correctly established, the VT responds with the following message.

<OK>

At this point the device must interpret the response and control begins.

First cancel the display. Send the following string.

<ESC>C<EOT>

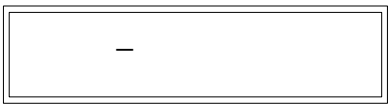
The display is cleared and the cursor goes automatically to the top left corner with the 0,0 (y,x) co-ordinate.

```
_
```

Position the cursor at co-ordinate 0,5 (y,x). Send the following string.

<ESC>A0005<EOT>

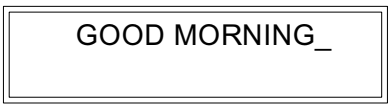
Now the display looks like this:



Send the first part of the text to be displayed “GOOD MORNING”. Send the following string.

GOOD MORNING

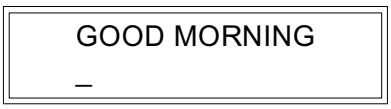
The display now shows



Position the cursor on the co-ordinate 1,5 (y,x). Send the following string.

<ESC>A0105<EOT>

The display now shows



Send the rest of the text to be displayed: “OPERATOR”. Send the following string.

OPERATOR

The display now shows

At this point the device must be set up to control the keys when pressed; when 

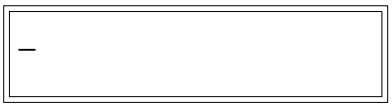
is pressed the VT responds with the following character.

<CR>

The device must interpret and send the string for canceling the text. Send the following string.

<ESC>C<EOT>

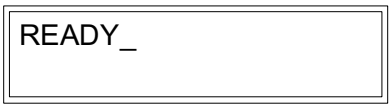
The display is now cleared and the cursor positioned automatically in the top left corner with the coordinate 0,0 (y,x)



Now send the text to be displayed “READY”. Send the following string.

READY

The display now shows



The above represents only a simple example of how to use the *Free Terminal*.

Chapter 25 Connection cables

This chapter consists of 88 pages.

This chapter consists of 88 pages.

This chapter consists of 88 pages.

All VTs communicate with other devices using serial port communication. In this chapter you will find information on all the cables used to connect with various devices together with their order codes.

Those cables marked NOT CODED are not supplied by ESA elettronica but listed here nonetheless to make it easier for the user to make them.

General notes

Serial communications are highly susceptible to disturbances, so, in order to limit as much as possible the influence of these disturbances good quality shielded cables must be used.

The table below lists the characteristics of the cable to be used for serial connection.

Specifications of serial connection cable	
Direct current resistance	Max. 151 Ohm/Km
Capacity coupling	Max. 29pF/m
Shielding	> 80% or total

Particular care should be taken in the choice and lay-out of cables, specially with regard to the VT <-> Device connection serial cable.

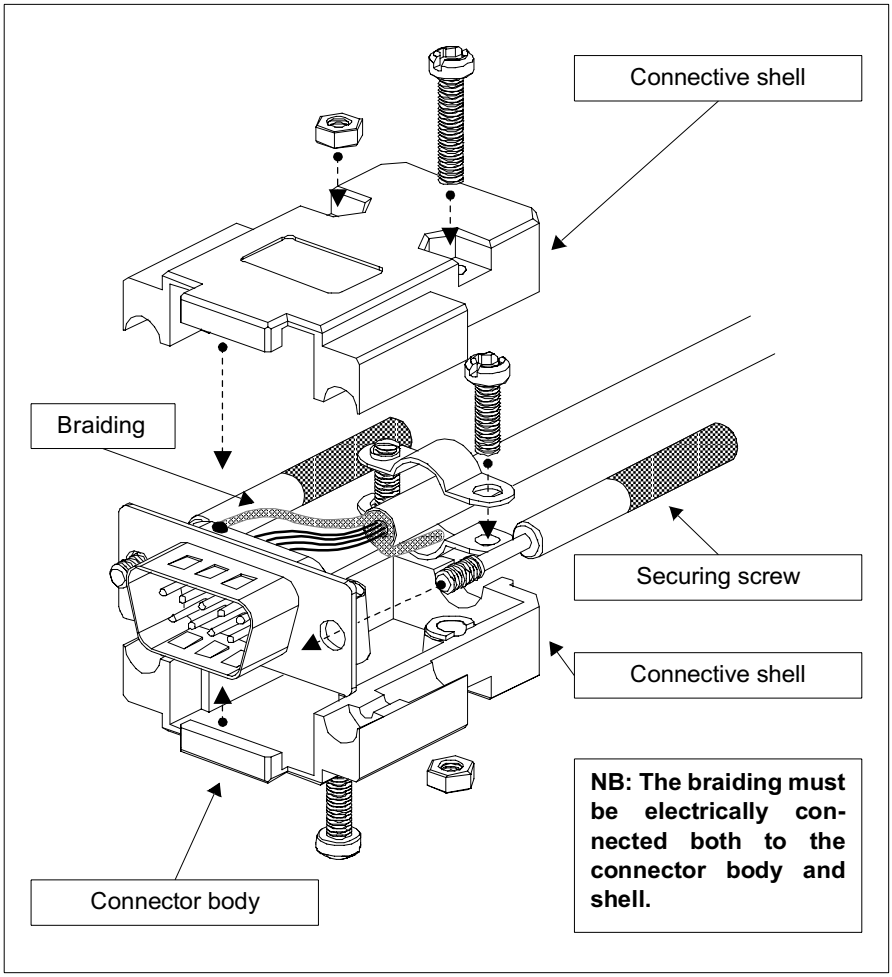
Always:
- Find the shortest route
- Lay disturbed cables separately

Disconnect the power supply before connecting or disconnecting the communication cables so as to avoid possible damage to the VT and/or the connected device.

Connecting the cable shield

It is essential for the interface cables between the VT and the Device be correctly shielded in order to ensure that serial communication occurs free from all types of external interference. For this reason all the cables listed in this manual absolutely must be shielded cables and the “D-sub” connectors both on the VT side and the Device side must have metal or conductive plastic shells.

The diagram below shows the correct way of connecting the shield.



The interface cable braiding must be electrically connected both to the shell and the body of the connector at both ends of the cable.

If the connection operation cannot be carried out at the Device side due to the particular type of serial connector, the braiding will have to be taken outside the connector and connected to the earth terminal.

This operation must also be carried out if the body of the Device’s serial connector, although of a standard type, is not electrically connected to the

earth terminal of the PLC itself.

Note that in this situation the shield must still be connected both to the shell and the body of the connector.

Certain cable diagrams show the pin connections of the shield signals on the Device side: in these cases, not only does the above apply but the shield must also be connected to them.
In any event the shield must never be connected on the VT side (pin 1).

Earth potentials obtained from DIN guides, structural elements of the machines, electrical cabinet doors etc. are not admissible and it is a good idea to avoid unipotential earth bars which receive earth connections from loads such as inverters, drives, stepper motors and, generally speaking, any type of load which could be a source of strong disturbance.

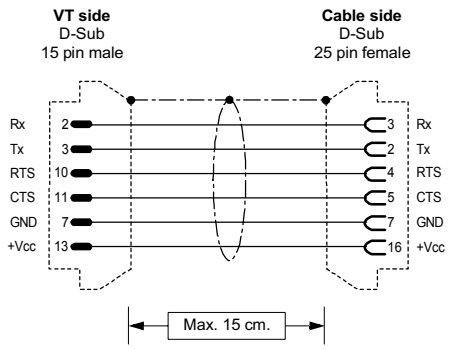
The Device-VT serial communication cable must be single piece. Terminal-type joins and PLUG+SOCKET arrangements are inadmissible. Should the installation system in question necessitate that breaks be made (although this is inadvisable) it will be ABSOLUTELY necessary to implement the following:

- **Use D-SUB (Db9, Db15 o DB25) connectors with metal or conductive plastic shells.**
- **Connect the serial cable shield in accordance with the instructions on this page.**
- **Limit the number of breaks to those absolutely unavoidable.**

Failure to observe these instructions could prejudice the compatibility of the VT-PLC system with the EMC standards currently in force.

MSP<->ASP conversion

The cables referred to in this chapter are designed to be connected to the MSP port of the VT terminal; if you need to use a coded on the ASP port, it will be necessary to use the adapters listed below.

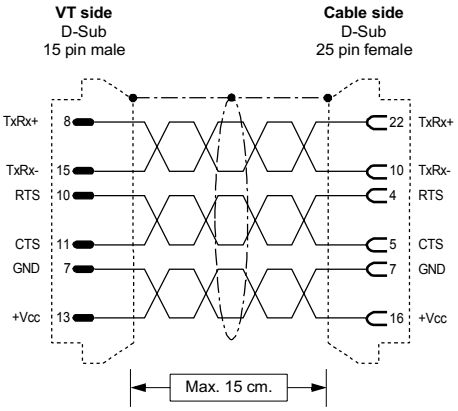


Order code:
NOT CODED

Conversion from MSP to ASP

(RS232)

(See“Chapter 25 -> Connecting the cable shield“)

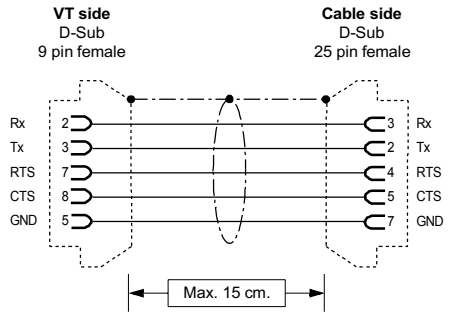


Order code:
NOT CODED

Conversion from MSP to ASP

(RS485)

(See “Chapter 25 -> Connecting the cable shield“)



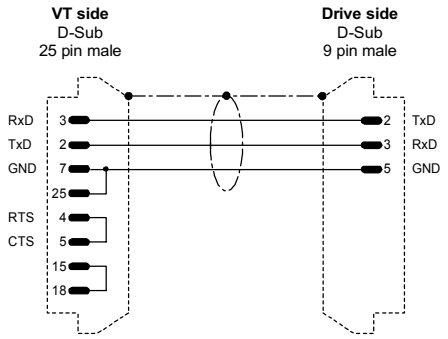
Order code:
NOT CODED

Conversion from MSP to ASP-9

(RS232)

(See“Chapter 25 -> Connecting the cable shield“)

ABB DRIVE



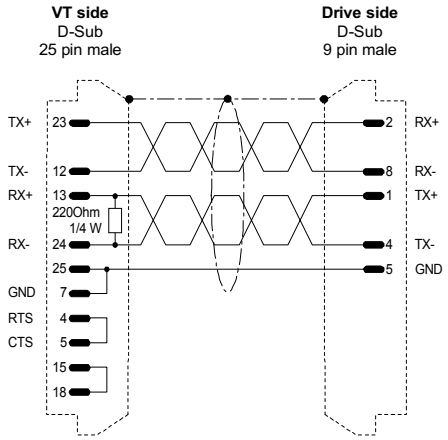
Order code:
NOT CODED

INDAX - TRIAX - PENTAX

(RS232)

NOTE: The length of the cable must not exceed 3 meters with a transmission speed of 38400 Baud.

(See “Chapter 25 -> Connecting the cable shield“)

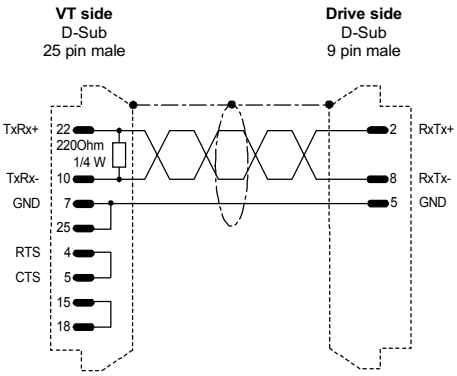


Order code:
NOT CODED

INDAX - TRIAX - PENTAX

(RS422)

(See “Chapter 25 -> Connecting the cable shield“)

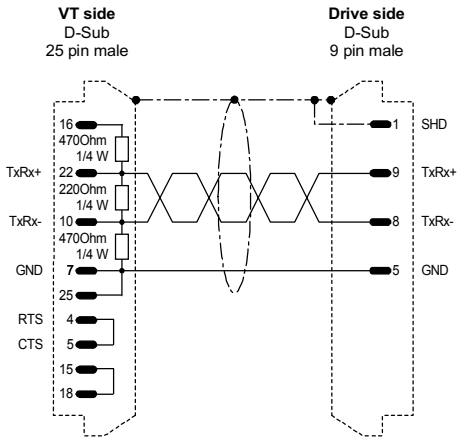


Order code:
NOT CODED

INDAX - TRIAX - PENTAX

(RS485)

(See “Chapter 25 -> Connecting the cable shield“)



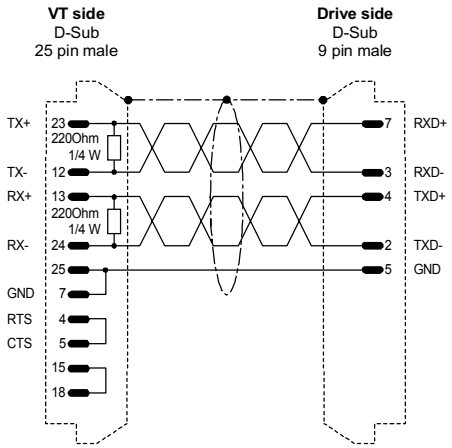
Order code:
NOT CODED

BIVECTOR Series 300

(RS485)

(See “Chapter 25 -> Connecting the cable shield“)

ALLEN-BRADLEY DRIVE



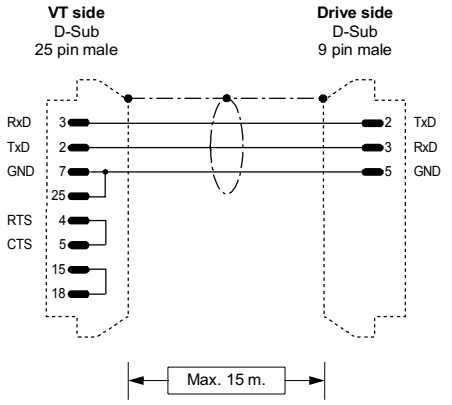
Order code:
NOT CODED

IMC S CLASS

(RS422)

ATTENTION!!! Valid only for MSP

(See “Chapter 25 -> Connecting the cable shield“)



Order code:
NOT CODED

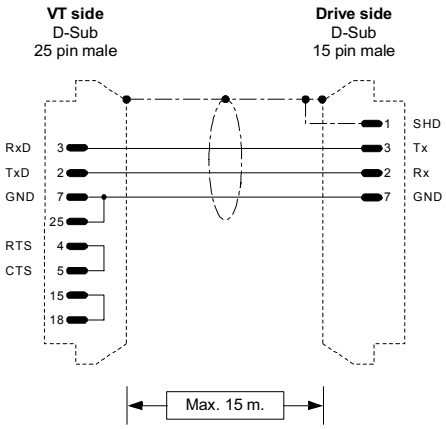
IMC S CLASS

(RS232)

ATTENTION!!! Valid only for MSP

(See “Chapter 25 -> Connecting the cable shield“)

ATLAS COPCO DRIVE



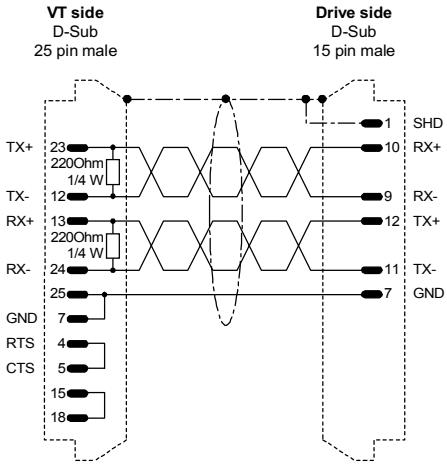
Order code:
NOT CODED

Series DMC

(RS232)

N.B.: On the device set protocol **Computer Mode** with the aid of **ATLAS DMC User's manual**.

(See "Chapter 25 -> Connecting the cable shield")



Order code:
NOT CODED

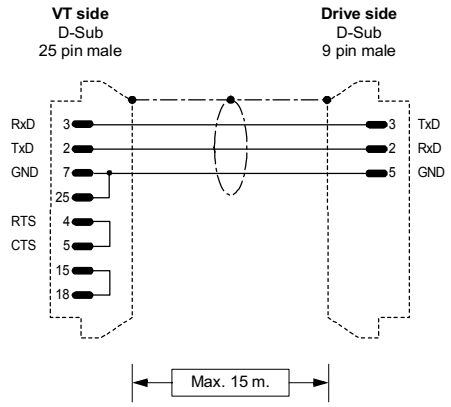
Series DMC

(RS422)

N.B.: On the device set protocol **Computer Mode** with the aid of **ATLAS DMC User's manual**.

(See "Chapter 25 -> Connecting the cable shield")

CONTROL TECHNIQUES DRIVE



Order code:
NOT CODED

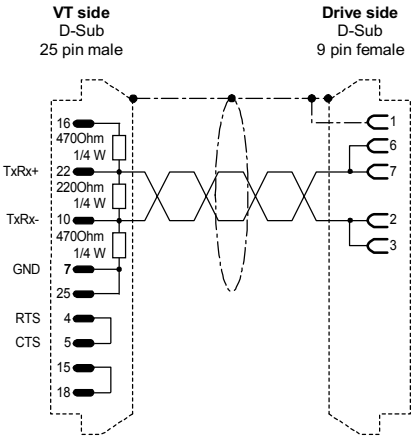
Unidrive 1-4 SK1

(RS232)

Communication card UD71 required

Set parameter 0.32 = ANSI2

(See “Chapter 25 -> Connecting the cable shield“)



Order code:
NOT CODED

Unidrive 1-4 PL1

(RS485)

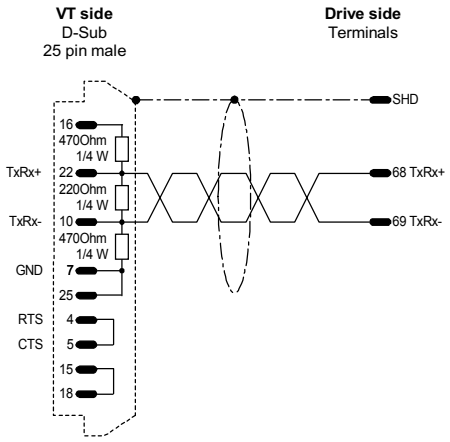
Communication card UD71 or UD70 required

UD71:
Set parameter 0.32 = ANSI2

UD70:
Set parameter 17.06 = 5 (ANSI2)
Set parameter 17.05 = (Serial address)
Set parameter 17.07 = (Baud rate)

(See “Chapter 25 -> Connecting the cable shield“)

DANFOSS DRIVE



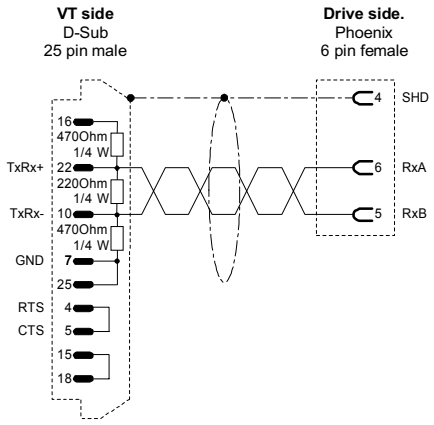
Order code:
NOT CODED

VLT2800

(RS485)

(See “Chapter 25 -> Connecting the cable shield“)

EUROTHERM DRIVE



Order code:
NOT CODED

Series 605

(RS485)

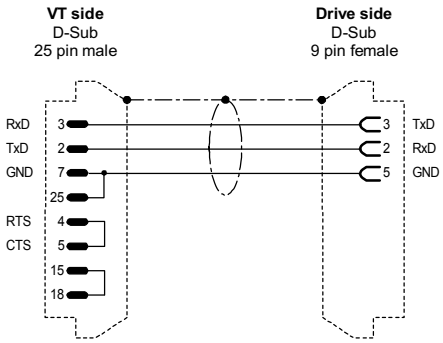
Requires 584SV/605 communication card

WARNING!!! For Hardware configuration refer to manual “RS485 Communication Interface - HA463560 Issue 1” remembering that the Dip-Switch SW1 DIP2 must ber set at 1.

For Software configuration refer to the same manual, remembering that the protocol DBUS RTU must be selected.

(See “Chapter 25 -> Connecting the cable shield“)

EVER DRIVE



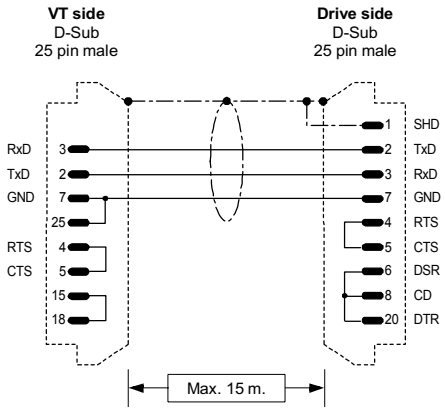
Order code:
NOT CODED

Ever MPP14-01

(RS232)

(See “Chapter 25 -> Connecting the cable shield“)

FANUC ROBOTICS DRIVE



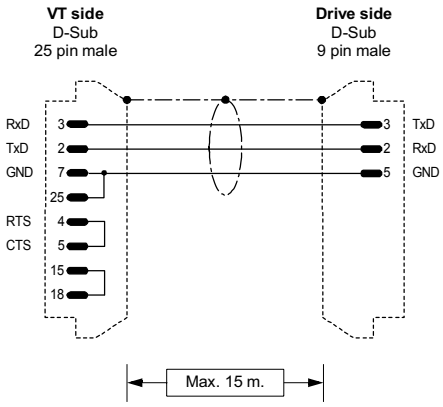
Order code:
NOT CODED

R-J controllers

(RS232)

(See “Chapter 25 -> Connecting the cable shield“)

FAGOR DRIVE



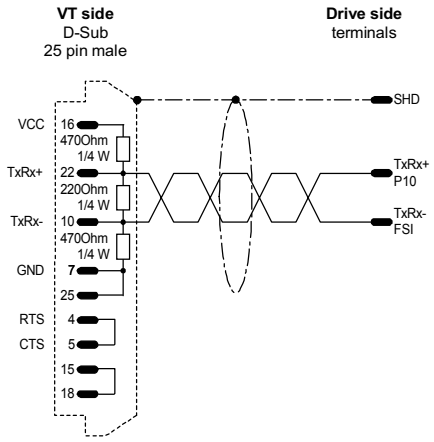
Order code:
NOT CODED

DNC PROTOCOL

(RS232)

(See “Chapter 25 -> Connecting the cable shield“)

GE DRIVE



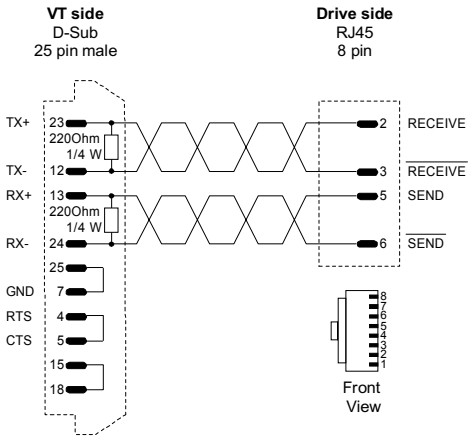
Order code:
NOT CODED

VAT-23D

(RS485)

(See “Chapter 25 -> Connecting the cable shield“)

HITACHI DRIVE



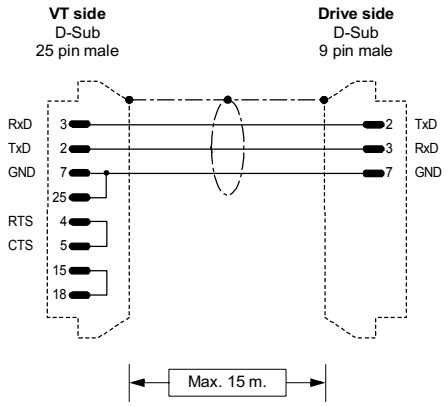
Order code:
NOT CODED

L-100

(RS422)

(See“Chapter 25 -> Connecting the cable shield“)

KEB DRIVE

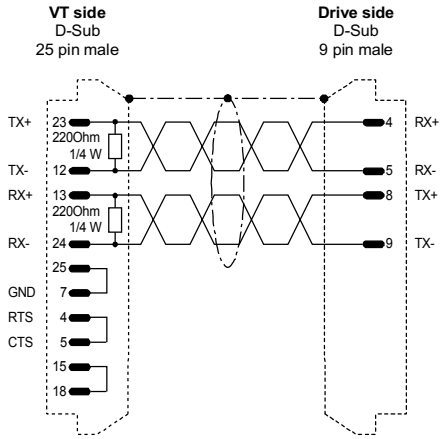


Order code:
NOT CODED

Combivert F4C - F4S

(RS232)

(See “Chapter 25 -> Connecting the cable shield“)

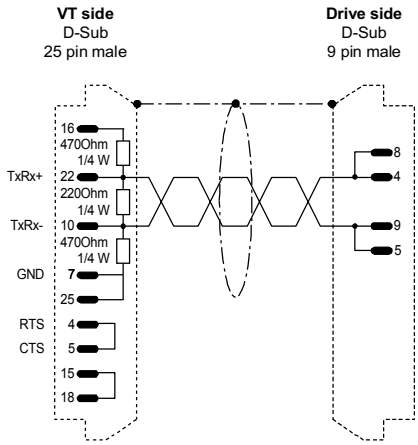


Order code:
NOT CODED

Combivert F4C - F4S

(RS422)

(See “Chapter 25 -> Connecting the cable shield“)



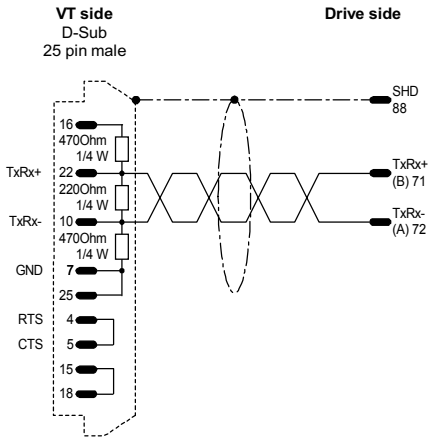
Order code:
NOT CODED

Combivert F4C - F4S

(RS485)

(See “Chapter 25 -> Connecting the cable shield“)

LENZE DRIVE

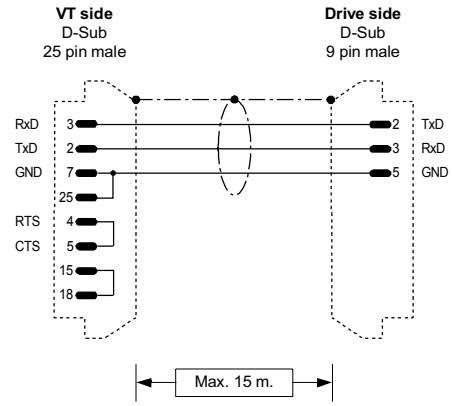


Order code:
NOT CODED

Series 82x

(RS485)

(See “Chapter 25 -> Connecting the cable shield“)



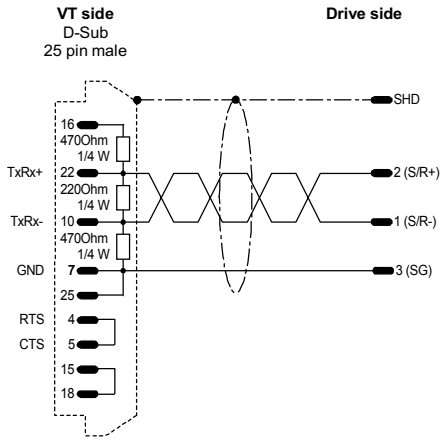
Order code:
NOT CODED

Series 82x

(RS232)

(See “Chapter 25 -> Connecting the cable shield“)

OMRON DRIVE



Order code:
NOT CODED

3G3EV

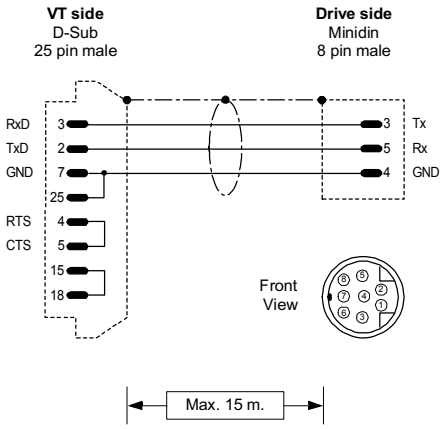
Card PJVOP485 required

(RS485)

MODBUS RTU STANDARD PROTOCOL

See “Chapter 25 -> Connecting the cable shield“)

PANASONIC DRIVE



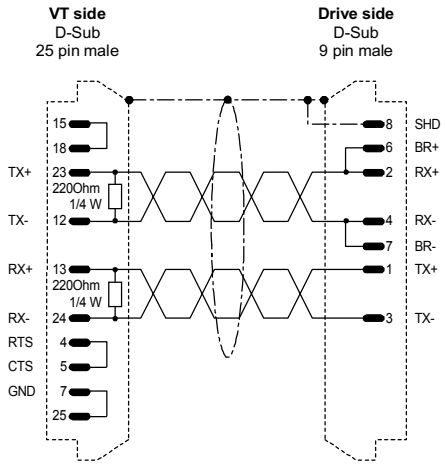
Order code:
NOT CODED

MSS*XP Series

(RS232)

See “Chapter 25 -> Connecting the cable shield“)

S.B.C. DRIVE



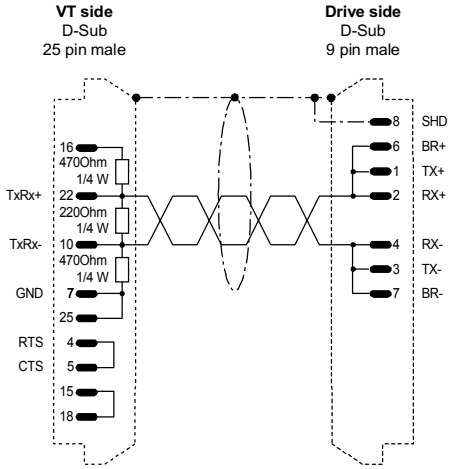
Order code:
NOT CODED

HPD 2 - 5 - 8 - 16

(RS422)

Device address: 0...31

(See “Chapter 25 -> Connecting the cable shield“)



Order code:
NOT CODED

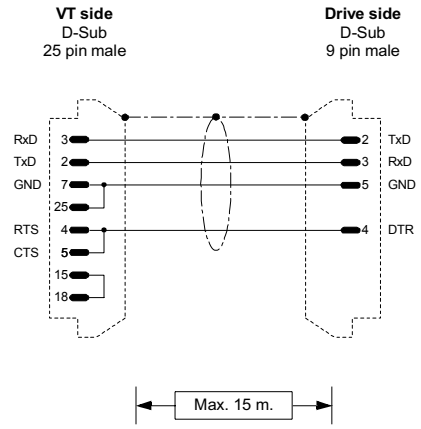
HPD 2 - 5 - 8 - 16

(RS485)

Device address: 0...31

(See “Chapter 25 -> Connecting the cable shield“)

SEW-EURODRIVE DRIVE



Order code:
NOT CODED

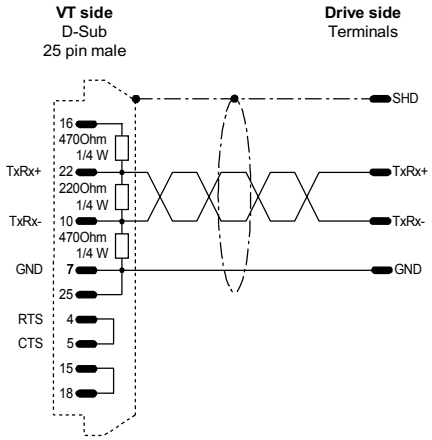
MOVIDYN

(RS232)

Communication card SEW-EURODRIVE USS21A required

N.B: Not valid for terminals VT50 and VT60.

(See “Chapter 25 -> Connecting the cable shield“)



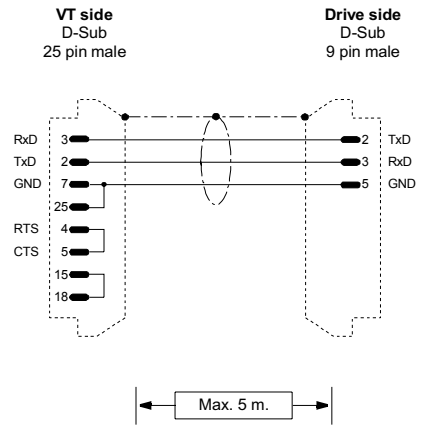
Order code:
NOT CODED

MOVIDYN

(RS485)

Communication card SEW-EURODRIVE USS21A required

(See “Chapter 25 -> Connecting the cable shield“)



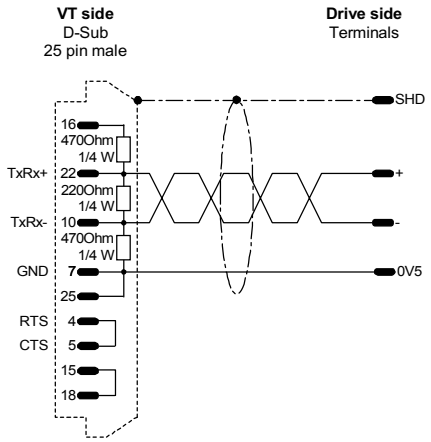
Order code:
NOT CODED

MOVITRAC - MOVIDRIVE

(RS232)

Communication card SEW-EURODRIVE USS21A required

(See “Chapter 25 -> Connecting the cable shield“)



Order code:
NOT CODED

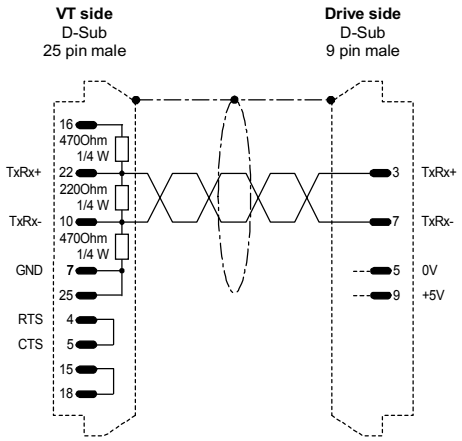
MOVITRAC - MOVIDRIVE

(RS485)

Communication card SEW-EURODRIVE USS21A required

(See “Chapter 25 -> Connecting the cable shield“)

SIEI DRIVE



Order code:
NOT CODED

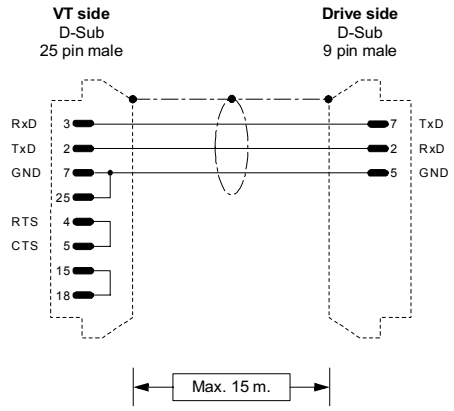
SLINK 3

(RS485)

WARNING!!!
If the jumpers S18 and S19 on the regulator card are in position A (serial line galvanically isolated from the regulator section), pin 5 and 9 must be connected to the power unit.

(See “Chapter 25 -> Connecting the cable shield“)

SIEMENS DRIVE

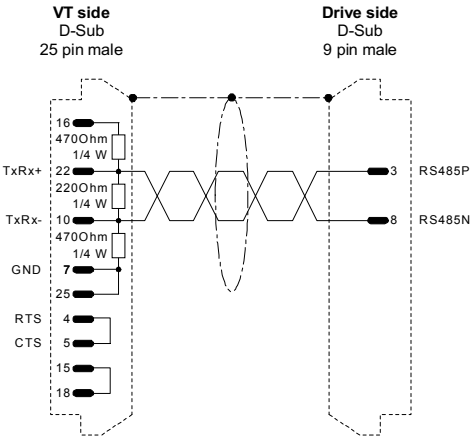


Order code:
NOT CODED

SIMOVERT

(RS232)

(See “Chapter 25 -> Connecting the cable shield“)



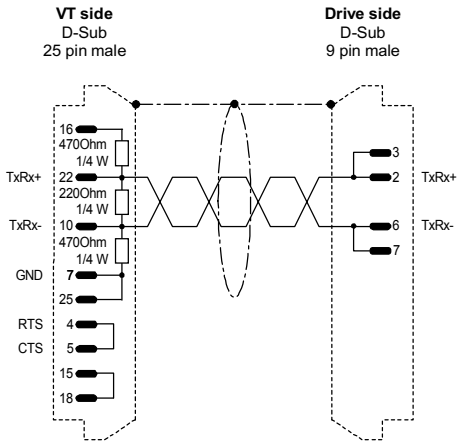
Order code:
NOT CODED

SIMOVERT

(RS485)

(See “Chapter 25 -> Connecting the cable shield“)

TDE MACNO DRIVE



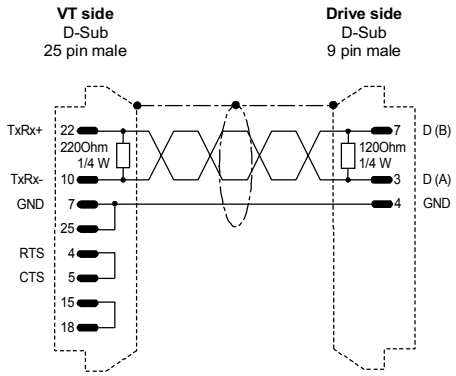
Order code:
NOT CODED

DMBL Series

(RS485)

(See “Chapter 25 -> Connecting the cable shield“)

TELEMECANIQUE DRIVE



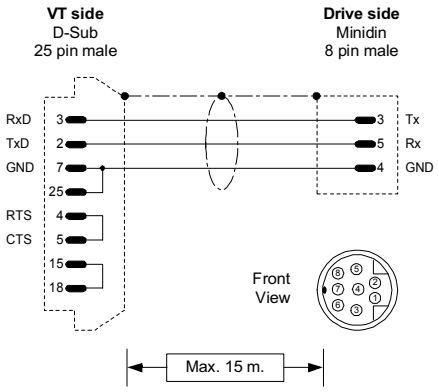
Order code:
NOT CODED

ALTIVAR 58

(RS485)

(See “Chapter 25 -> Connecting the cable shield“)

TRIO MOTION DRIVE

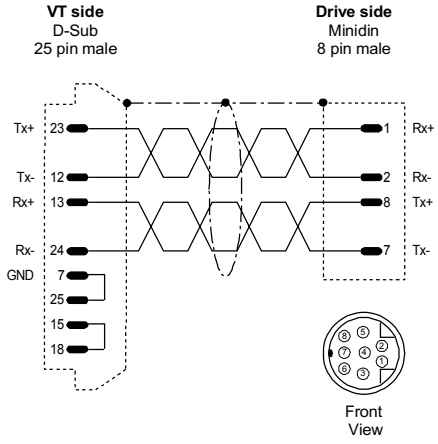


Order code:
NOT CODED

TRIO MOTION Modbus

(RS232)

(See “Chapter 25 -> Connecting the cable shield“)



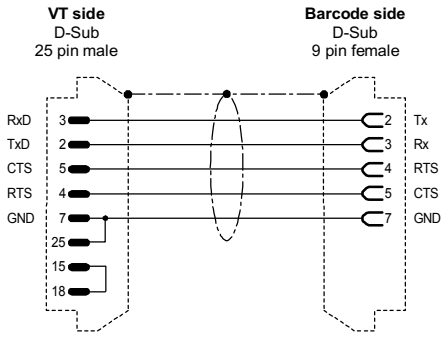
Order code:
NOT CODED

TRIO MOTION Modbus

(RS422)

(See “Chapter 25 -> Connecting the cable shield“)

DATALOGIC BARCODE READER



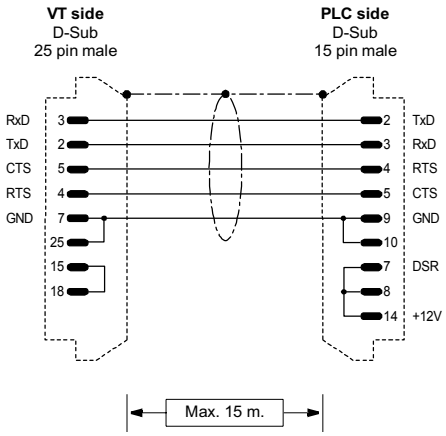
Order code:
NOT CODED

DL-910

(RS232)

(See “Chapter 25 -> Connecting the cable shield“)

ABB PLC

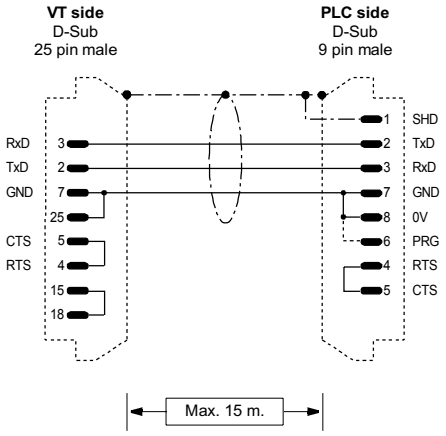


Order code:
CVPLC03102

T200 (KP60)

(RS232)

(See “Chapter 25 -> Connecting the cable shield“)



Order code:
CVPLC14102

CS31 (KR31 / KT31 / KR91 / KT92 / KT93)
T200 (KP62)

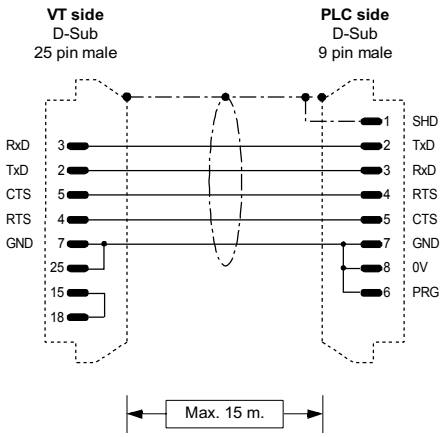
(RS232)

This note only applies to protocol of CS31 series 90 (non direct).
Once the VT has been connected to and disconnected from the CS31, the PLC remains in MONITOR mode and the programming software no longer functions properly. To get the PLC back to normal functioning, use the programming S/W to access the “PLC commun.2" menu and select the "3 terminal emulation" option and press the "CTRL" and "W" keys together. At the end the PLC responds by offering the prompt sign ">".

NOTE ON DIRECT PROTOCOL: You can select the communication speed of 19200 Baud in the PLC by connecting pins #6, #7 and #8 (see fig.). This speed is handled by CS31 only if the library module **CE 19_2COM1is loaded.**

NOTE: the cable supplied by ESA does not have the connection represented by the dotted line.

(See “Chapter 25 -> Connecting the cable shield“)



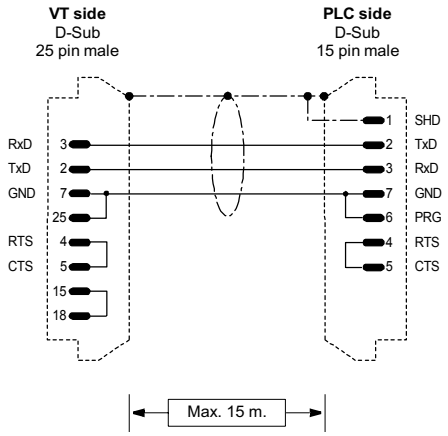
Order code:
CVPLC14202

CS31 (KR31 / KT31)

(RS232)

MODBUS RTU STANDARD PROTOCOL

(See “Chapter 25 -> Connecting the cable shield“)



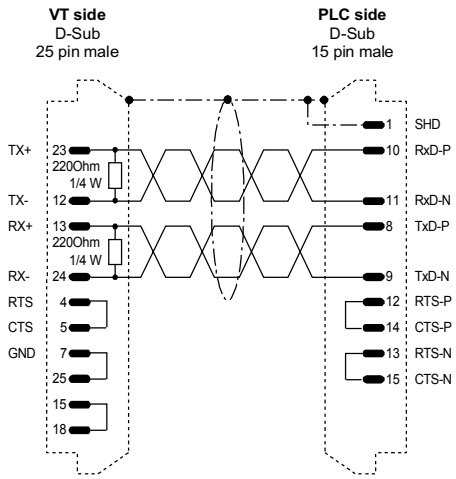
Order code:
CVPLC14302

CS31 (07KP92 R101)
MODBUS RTU Communication module, COM3 and COM4 ports

(RS232)

STANDARD MODBUS RTU PROTOCOL

(See “Chapter 25 -> Connecting the cable shield“)



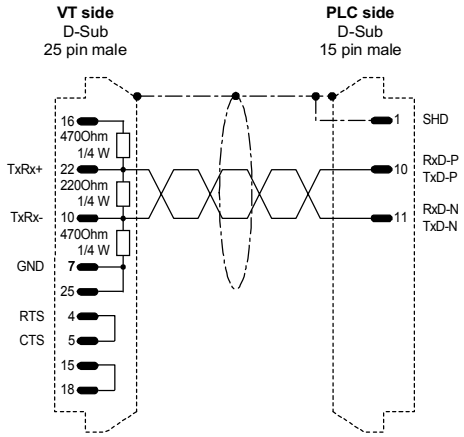
Order code:
CVPLC14402

CS31 (07KP92 R101)
MODBUS RTU Communication module, COM3 and COM4 ports

(RS422)

STANDARD MODBUS RTU PROTOCOL

(See “Chapter 25 -> Connecting the cable shield“)



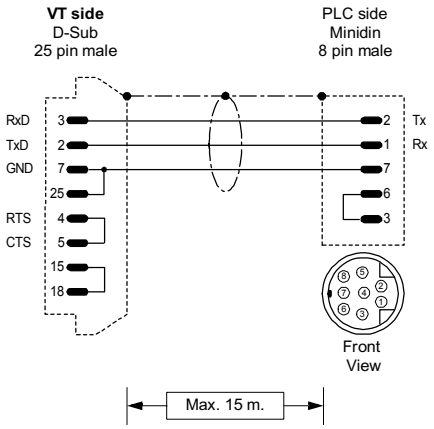
Order code:
CVPLC14502

CS31 (07KP92 R101)
MODBUS RTU Communication module, COM3 and COM4 ports

(RS485)

STANDARD MODBUS RTU PROTOCOL

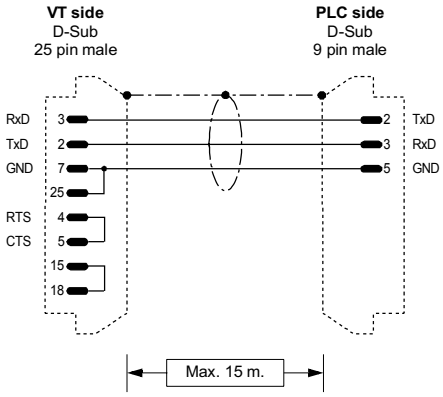
(See “Chapter 25 -> Connecting the cable shield“)



Order code:
CVPLC14602

CS31 Series 40&50

(See “Chapter 25 -> Connecting the cable shield“)

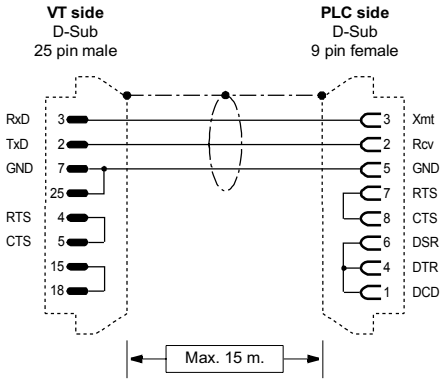


Order code:
CVPLC21202

AC70

(RS232)

(See “Chapter 25 -> Connecting the cable shield“)



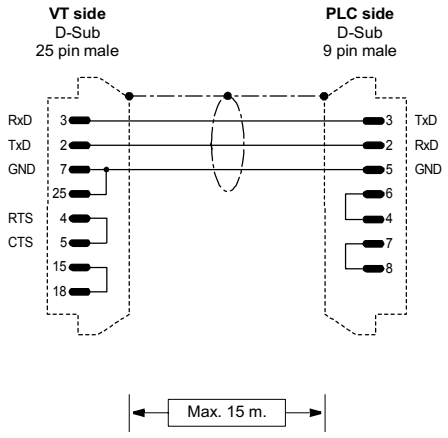
Order code:
CVPLC06402

AC450

(RS232)

(See “Chapter 25 -> Connecting the cable shield“)

AEG MODICON PLC

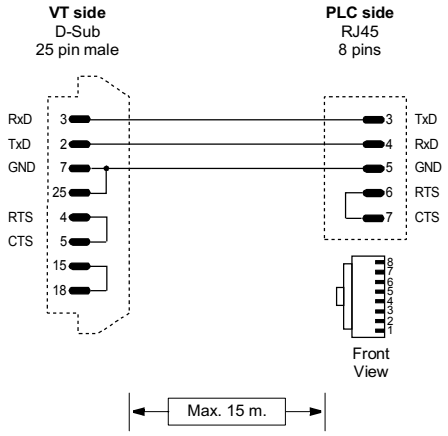


Order code:
CVPLC17102

COMPACT, A120, A250
Port 1 - Port 2

(RS232)

(See “Chapter 25 -> Connecting the cable shield“)



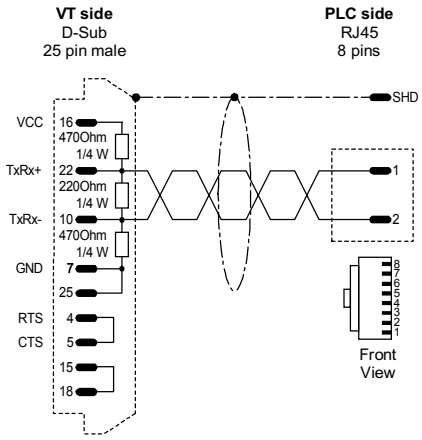
Order code:
CVPLC17202

MICRO

(RS232)

(See “Chapter 25 -> Connecting the cable shield“)

ALLEN-BRADLEY PLC



Order code:
CVPLC07112

SLC 500 CPU 5/02 5/03

(RS485)

Address of VT : 1...31
Address of PLC : 1...31

Screen side SLC500 connected to earth terminal of PLC power unit

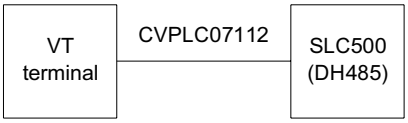
WARNING !!!
See warnings regarding VT <-> SLC500 connection.

N.B: Open Integer file for at least two elements

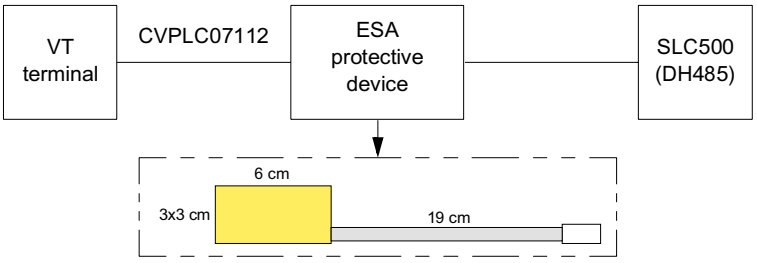
Example:
N7:0
N7:1

(See "Chapter 25 -> Connecting the cable shield")

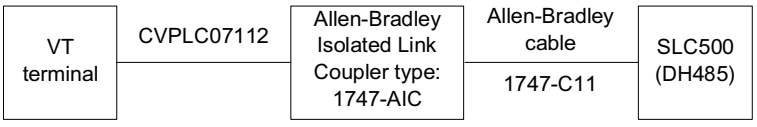
CONNECTION TO BE AVOIDED!!! Avoid connections like that shown in the figure below. The DH485 (data highway) port of CPUs 5/02 - 5/03 is not protected against peaks caused by outside disturbances; these could lead to serial port DH485 of SLC500 being damaged.

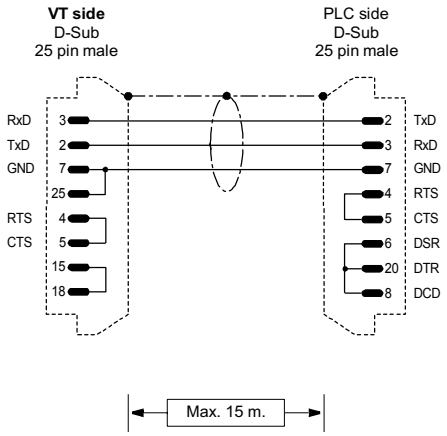


Below are listed those types of connection that are recommended.



Order code for device: CVPLC07502





Order code:
CVPLC07202

PLC 5 /11/20/30/40/40L/60/60L

(RS232)

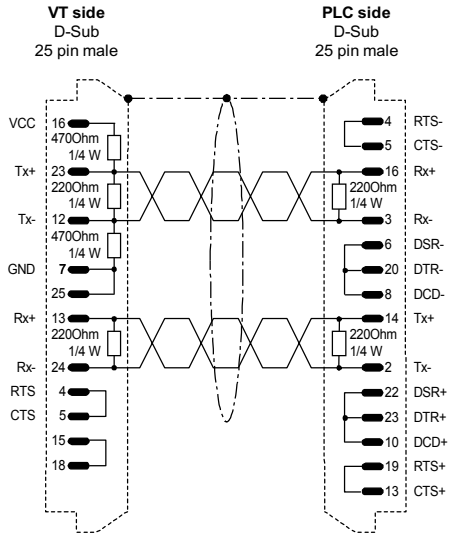
"CH0" SERIAL PORT SET

Channel 0	: SYSTEM (Point-to-point)
Diag. File	: 0
Remote Mode Change	: DISABLED
Baud Rate	: 19.2K
Stop Bits	: 1
Parity	: NONE
Control Line	: NO HANDSHAKING
Duplicate Detect	: OFF
ACK Timeout (20 ms.)	: 50
Error Detect	: BCC
NAK Receive	: 3
DF1 ENQS	: 3

N.B: Open Integer file for at least two elements

Example:
N7:0
N7:1

(See “Chapter 25 -> Connecting the cable shield“)



Order code:
CVPLC07302

PLC 5 /11/20/30/40/40L/60/60L

(RS422)

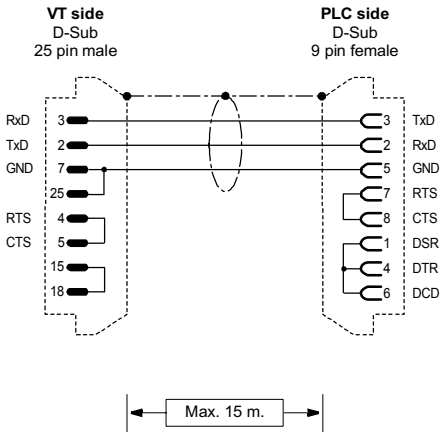
"CH0" SERIAL PORT SET

Channel 0	: SYSTEM (Point-to-point)
Diag. File	: 0
Remote Mode Change	: DISABLED
Baud Rate	: 19.2K
Stop Bits	: 1
Parity	: NONE
Control Line	: NO HANDSHAKING
Duplicate Detect	: OFF
ACK Timeout (20 ms.)	: 50
Error Detect	: BCC
NAK Receive	: 3
DF1 ENQS	: 3

N.B: Open Integer file for at least two elements

Example:
N7:0
N7:1

(See “Chapter 25 -> Connecting the cable shield“)



Order code:
CVPLC07402

SLC 500 CPU 5/03 5/04

(RS232)

"CH0" SERIAL PORT SET
DF1 full duplex mode

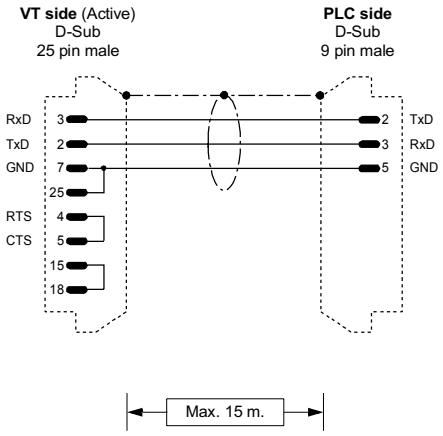
Baud rate	: 19200
Duplicate Detect	: DISABLED
ACK timeout	: 50
Parity	: NONE
Control Line	: NO HANDSHAKING
Error detect	: BCC
NAK retries	: 3
ENQ retries	: 3
Embedded responses	: ENABLED

N.B: Open Integer file for at least two elements

Example:
N7:0
N7:1

N.B. Programming SW necessary for Allen-Bradley V4.00 and all after

(See “Chapter 25 -> Connecting the cable shield“)



Order code:
CVPLC07602

MICROLOGIX CPU1000 and 1500

(RS232)

MICROLOGIX SERIAL PORT SET
DF1 full duplex mode (MICRO)

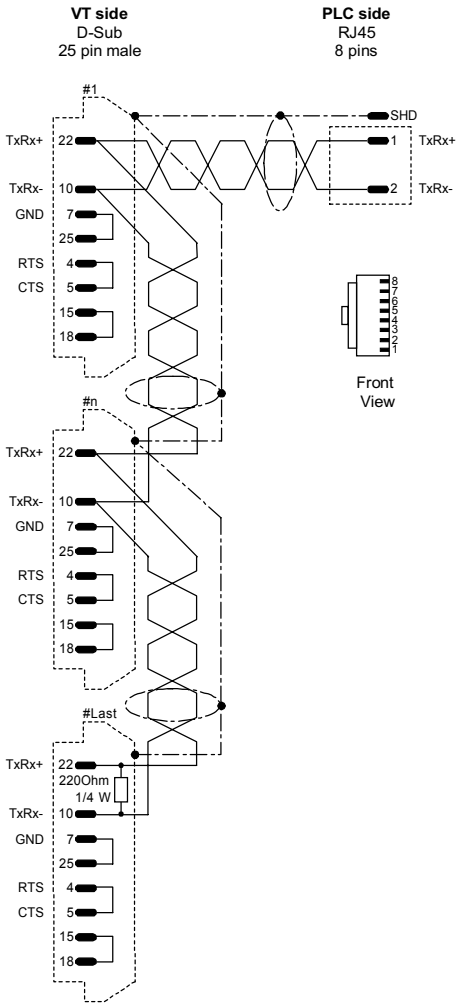
Baud rate	: 9600
ACK timeout	: 50
Parity	: NONE
Error detect	: CRC
NAK retries	: 3
ENQ retries	: 3

N.B: Open Integer file for at least two elements

Example:
N7:0
N7:1

The Db 9 pin male connector must be connected to the A-B 1761-CBL-PM02, SER, A cable of the MICROLOGIX PLC.

(See “Chapter 25 -> Connecting the cable shield“)



Order code:
NOT CODED

SLC 500 CPU 5/02 5/03
(RS485)

Cable valid for several VTs connected to a single PLC.

Address of VT : 1...31
Address of PLC : 1...31

N.B: Open Integer file for at least two elements

Example:
N7:0
N7:1

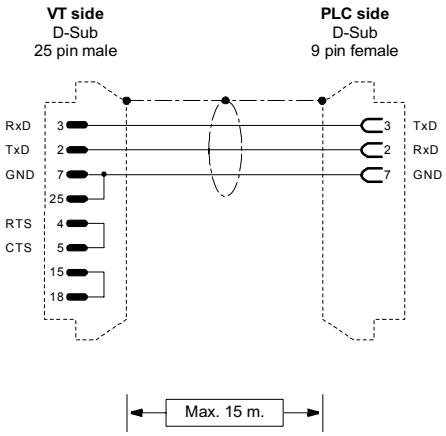
NOTE:
If using the 1747 AIC module, use the cable without the RJ45 connector employing the terminals.

1 -> 5 (A)
2 -> 4 (B)
GND -> 2 (SHLD)

(See “Chapter 25 -> Connecting the cable shield“)

Example of the construction of a cable for connecting several VTs to a single PLC.

BOSCH PLC



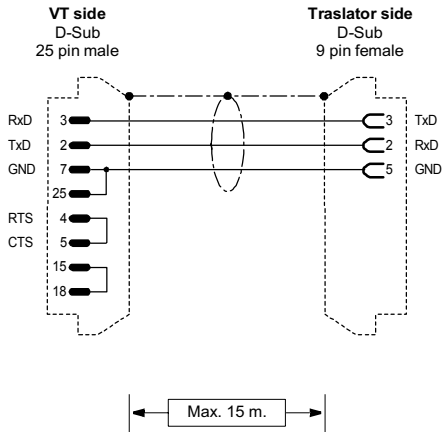
Order code:
CVPLC24102

CL150

(RS232)

(See “Chapter 25 -> Connecting the cable shield“)

CROUZET RPX PLC



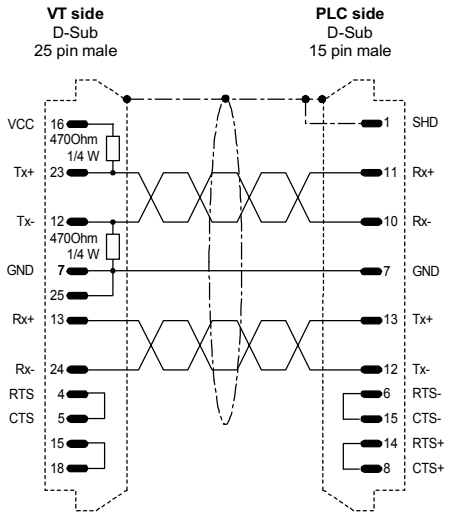
Order code:
CVPLC20102

RPX 10 - 20 - 30
Using CROUZET 88 750 309 translator

(RS232)

(See “Chapter 25 -> Connecting the cable shield“)

GE FANUC PLC

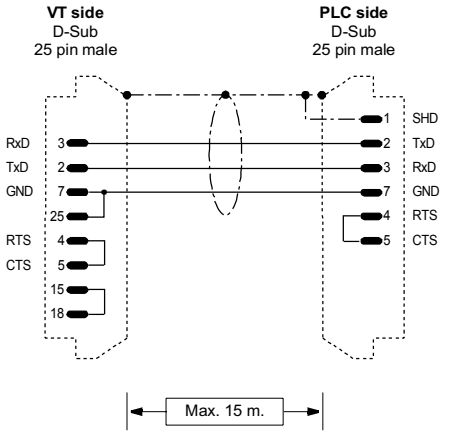


Order code:
CVPLC09102

Series 90 and 90 MICRO
directly in the CPU programming connector

(RS422)

(See “Chapter 25 -> Connecting the cable shield“)



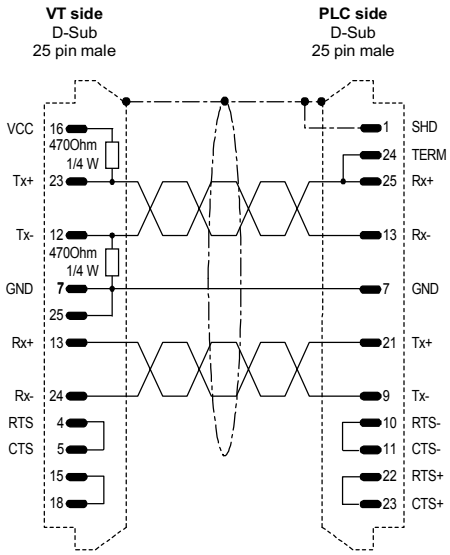
Order code:
CVPLC09202

Series 90
Using GE FANUC CMM311 interface port 1 - port 2

(RS232)

CONFIGURATION OF CMM311:
SNP only
SNP Enable : Yes
SNP Mode : Slave
Interface : RS232 (port1 / port2)
Data Rate : 19200
Timeout : Long
Parity : Odd
Stop bits : 1
Flow control : None
TurnA delay : None

(See “Chapter 25 -> Connecting the cable shield“)



Order code:
CVPLC09302

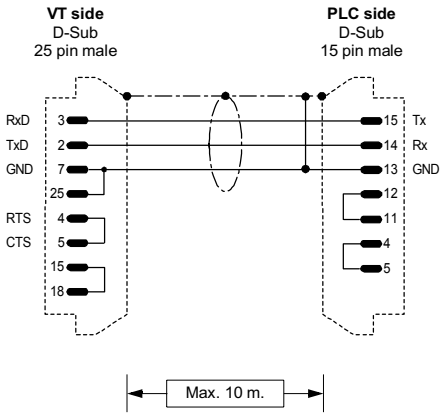
Series 90
Using GE FANUC CMM311 interface

(RS422)

CONFIGURATION OF CMM311:
SNP only
SNP Enable : Yes
SNP Mode : Slave
Interface : RS422 (solo port2)
Data Rate : 19200
Timeout : Long
Parity : Odd
Stop bits : 1
Flow control : None
TurnA delay : None

(See “Chapter 25 -> Connecting the cable shield“)

GEFRAN PLC



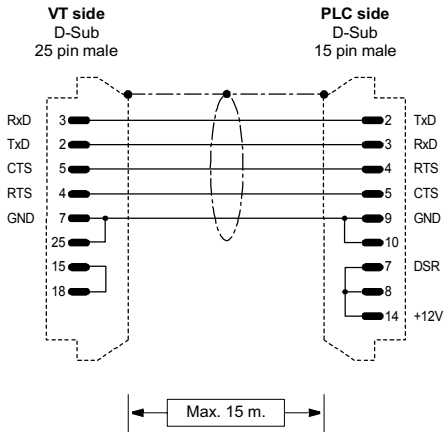
Order code:
CVPLC23102

Series MPS-NS

(RS232)

(See “Chapter 25 -> Connecting the cable shield“)

HITACHI PLC

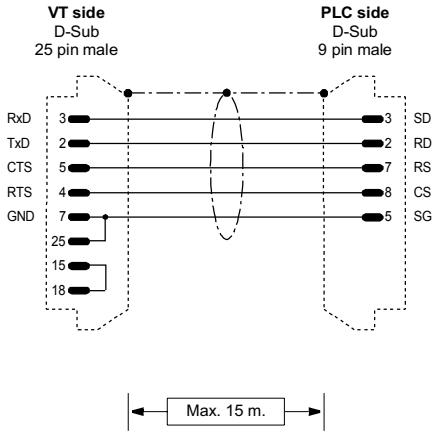


Order code:
CVPLC03102

Series H, 02H

(RS232)

(See “Chapter 25 -> Connecting the cable shield“)



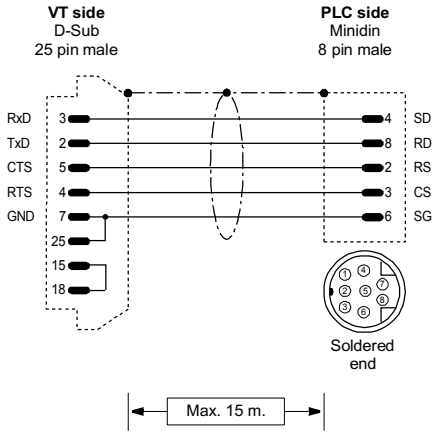
Order code:
CVPLC03202

Series EM CPU CPM - E3

(RS232)

WARNING!!
Switch ext. to COM2
Switch n2 int. to ON

(See “Chapter 25 -> Connecting the cable shield“)



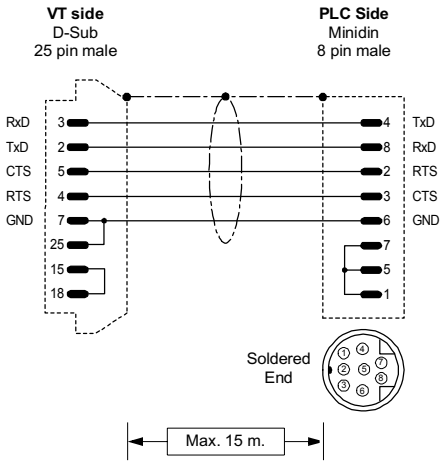
Order code:
CVPLC03302

Series EC

(RS232)

WARNING!!
Switch ext. to COM2
Areas T, C (time, counters) read only

(See “Chapter 25 -> Connecting the cable shield“)



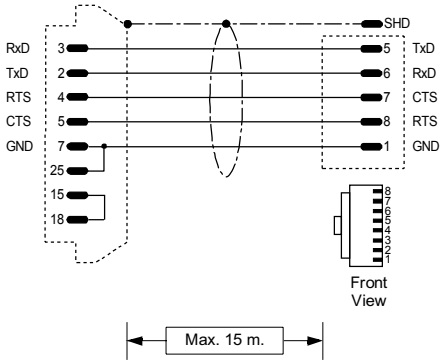
Order code:
CVPLC03402

Series H CPU22-02 HC

(RS232)

COM2

(See “Chapter 25 -> Connecting the cable shield“)



Order code:
CVPLC03502

Series EH150

(RS232)

NOTE:
127 PLCs connectable in Hitachi network with 2 Links (0-63 stations per Link).

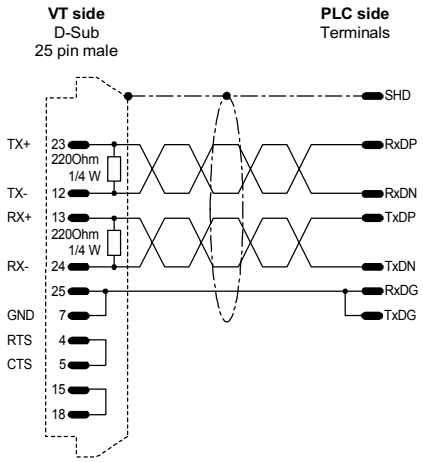
LUMP:

Parameter	Default	Values	Notes
L	FF	01,02 or FF	Address of Link number.
U	FF	00-63 or FF	Address of network node (as indicated by the network card rotary switches).
M	00	00-63	Address of network node with connection using COMM-H additional serial cards.
P	00	00-63	Address of network node with connection using COMM-H additional serial cards.

TM:

Parameter	Default	Values	Notes
TM	4	4-F	Timeout for the reply to an enquiry.

(See “Chapter 25 -> Connecting the cable shield“)



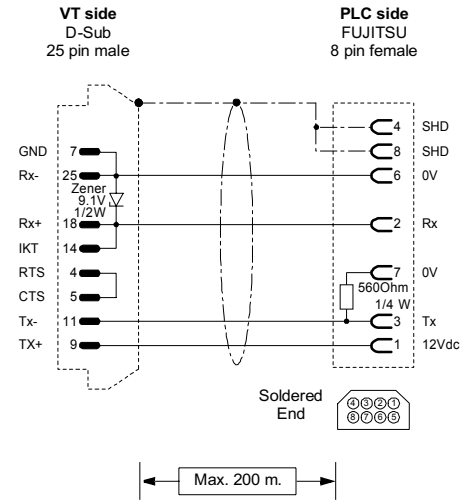
Order code:
CVPLC03602

COMM H

(RS422)

(See “Chapter 25 -> Connecting the cable shield“)

IDEC IZUMI PLC

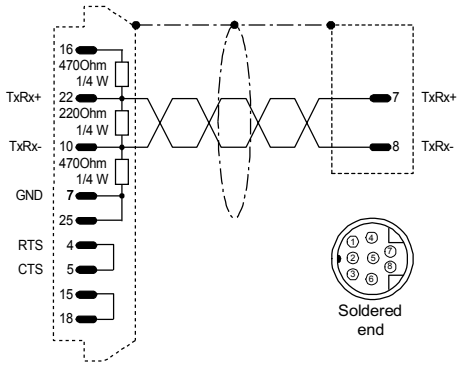


Order code:
CVPLC19102

CPU FA2 - FA2J - FA3 - FA3S
In the CPU programming connector (Programmer's Port).

(Current loop).

(See “Chapter 25 -> Connecting the cable shield“)

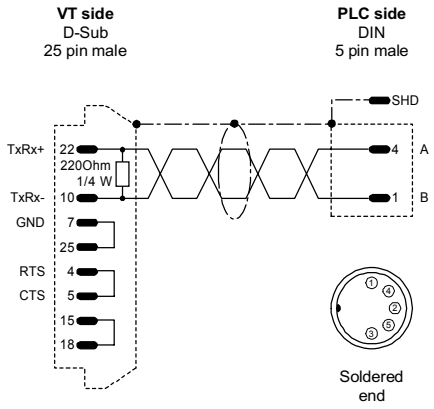


Order code:
CVPLC19302

IZUMI Micro3

(See “Chapter 25 -> Connecting the cable shield“)

KLÖCKNER MOELLER PLC



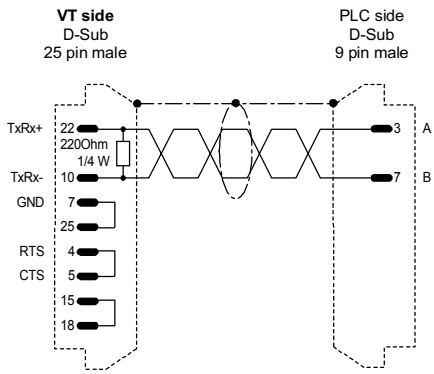
Order code:
CVPLC12112

PS306

(RS485)

N.B. Make sure that the two insertion jumpers of the interface termination resistances located in the RS485 hatch (visible on the front part of the PLC) are hooked up (see PLC manual).

(See “Chapter 25 -> Connecting the cable shield“)



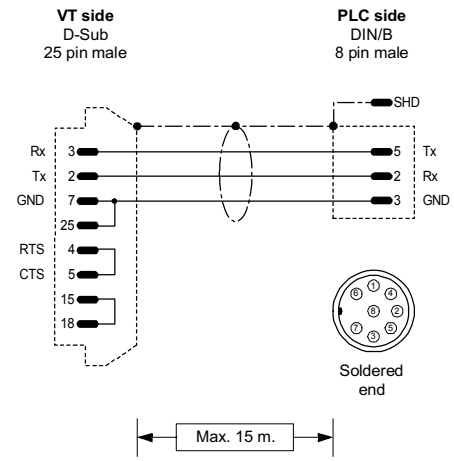
Order code:
CVPLC12212

PS316/PS416-CPU400

(RS485)

N.B. Make sure that the two insertion jumpers of the interface termination resistances located in the RS485 hatch (visible on the front part of the PLC) are hooked up (see PLC manual).

(See “Chapter 25 -> Connecting the cable shield“)

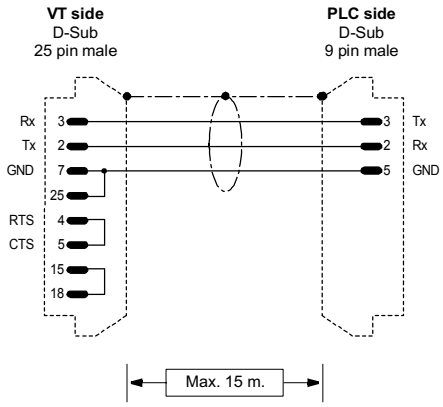


Order code:
CVPLC12302

PS4-201-MM1
PS4-341-MM1

(RS232)

(See “Chapter 25 -> Connecting the cable shield“)



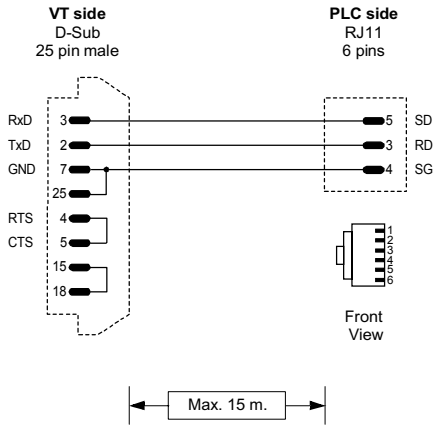
Order code:
CVPLC12402

PS416-CPU400

(RS232)

(See “Chapter 25 -> Connecting the cable shield“)

KEYENCE PLC

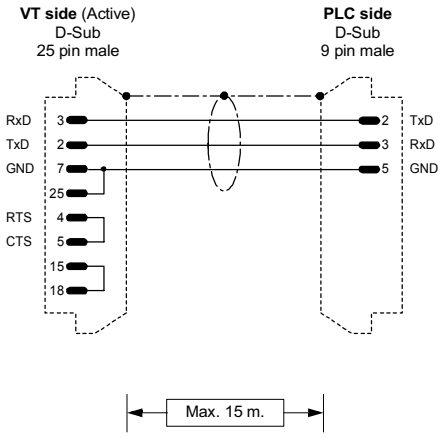


Order code:
CVPLC15102

Series KV10-16-24-40

(RS232)

KUHNKE PLC



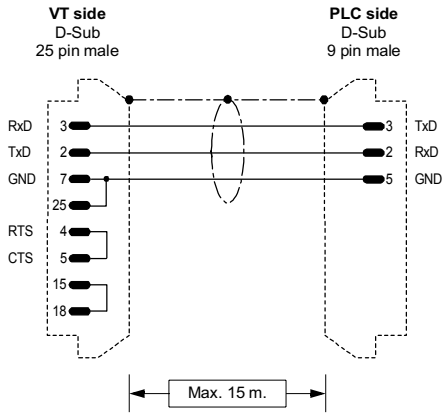
Order code:
CVPLC07602

KUBES

(RS232)

(See “Chapter 25 -> Connecting the cable shield“)

LG PLC

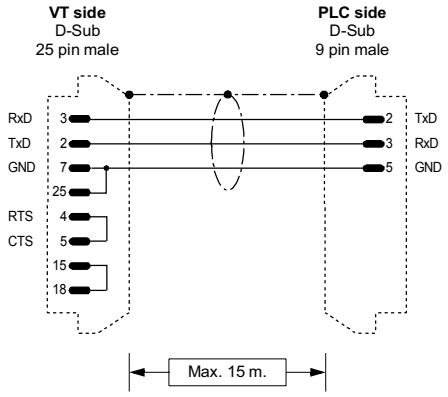


Order code:
CVPLC21102

K30 / K500 /K1000

(RS232)

(See “Chapter 25 -> Connecting the cable shield“)



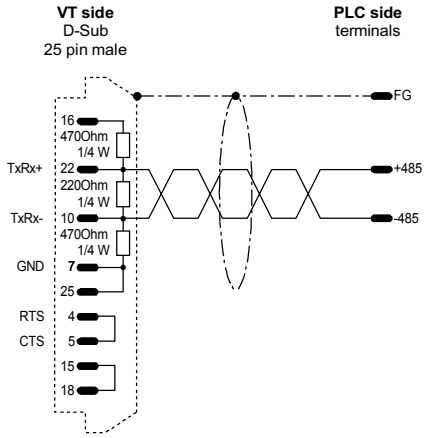
Order code:
CVPLC21202

K10

(RS232)

The 9 pin male Db must be connected to the GOLDSTAR cable of the K10 PLC.

(See “Chapter 25 -> Connecting the cable shield“)



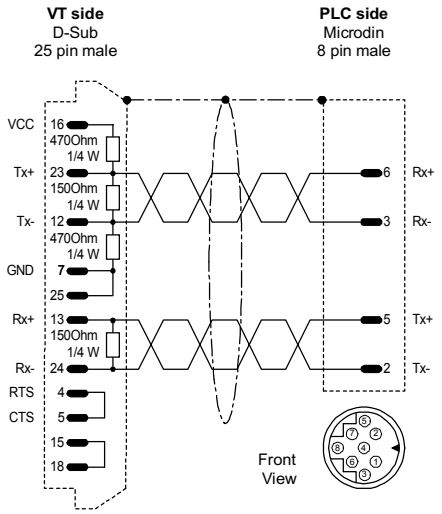
Order code:
CVPLC21302

Series MK

(RS485)

(See “Chapter 25 -> Connecting the cable shield“)

MATSUSHITA-NAIS PLC



Order code:
CVPLC16102

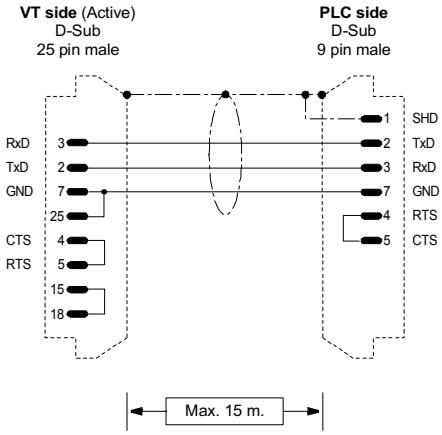
Series FP-1
Directly in the CPU programming connector

(RS422)

NOTA:
If you wish to use the AFP1523 cable it will be necessary to create an adaptor cable that on the VT side uses a 25 pin male D-Sub with the pins arranged as in the figure, on the PLC side a 15 pin male D-Sub connector that must be wired as follows:

Microdin -> D-Sub
6 Rx+ -> 15
3 Rx- -> 7
5 Tx+ -> 14
2 Tx - -> 12

(See “Chapter 25 -> Connecting the cable shield“)



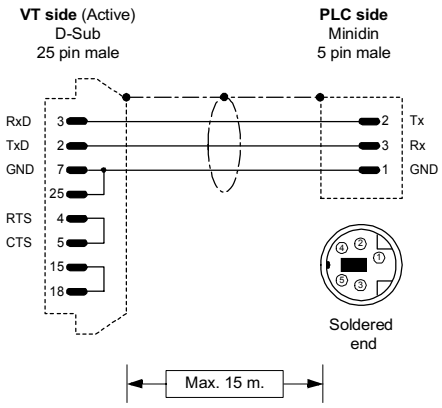
Order code:
CVPLC16202

Series FP-1 / FP-M
Using the optional serial interface of the PLC

(RS232)

RS232C: RS232C SERIAL PORT SET
Port Selection : COMPTR LNK
RS232C Send Form
Data Length : 8 BIT
Parity CHK : WITH, ODD
Stop Bit : 1 BIT
Terminator : CR
Header : NO STX
RS232C Baudrate : 1(9600 bps)
RS232C Modem
Connection : DISABLED
Computer Link Station
number (1-32) : 1

(See “Chapter 25 -> Connecting the cable shield“)

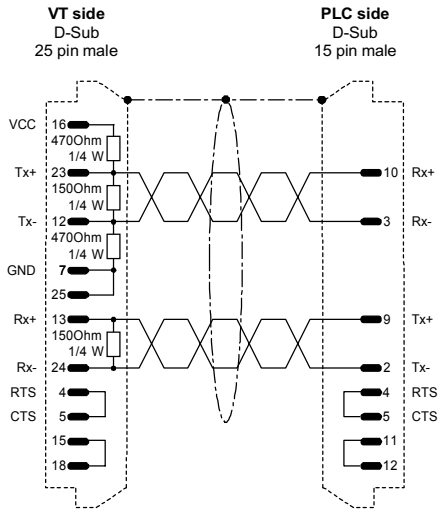


Order code:
CVPLC16302

Series FP-M/FP-0
In the programming connector of the CPU (Programmer's Port).

(RS-232)

(See “Chapter 25 -> Connecting the cable shield“)



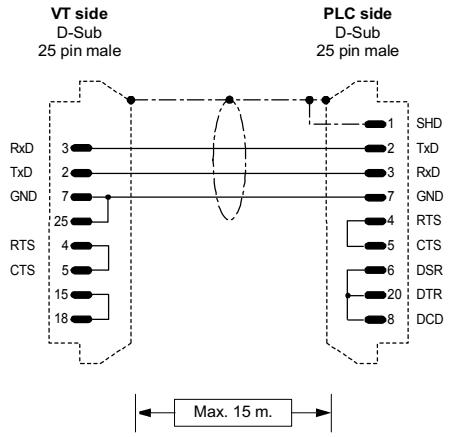
Order code:
CVPLC16402

Series FP-3
Direct in the programming connector of the CPU

(RS422)

(See “Chapter 25 -> Connecting the cable shield“)

MITSUBISHI PLC



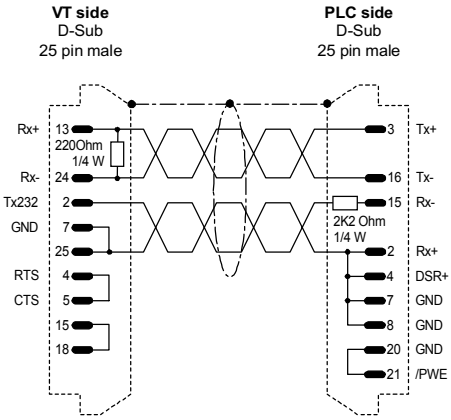
Order code:
CVPLC05102

Series Fx
Using Computer-Link

(RS232)

Jump-connect the **LG** and **GF** terminals on the PLC terminal block

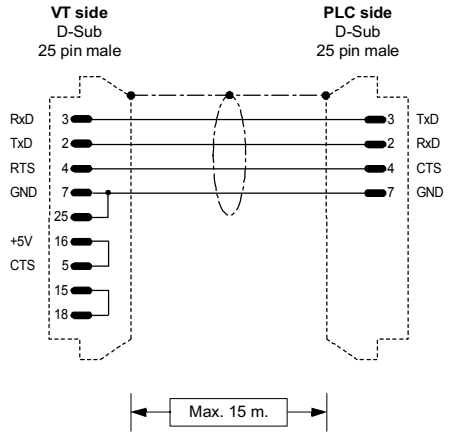
(See “Chapter 25 -> Connecting the cable shield“)



Order code:
CVPLC05202

Series Fx

(See “Chapter 25 -> Connecting the cable shield“)

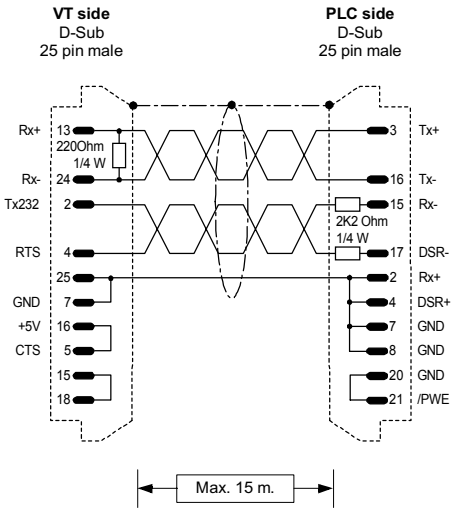


Order code:
CVPLC05302

Series A
(CPU port)
Using the MITSUBISHI SC-05 converter for long distances

Jump-connect the **LG** and **GF** terminals on the PLC terminal block

(See “Chapter 25 -> Connecting the cable shield“)



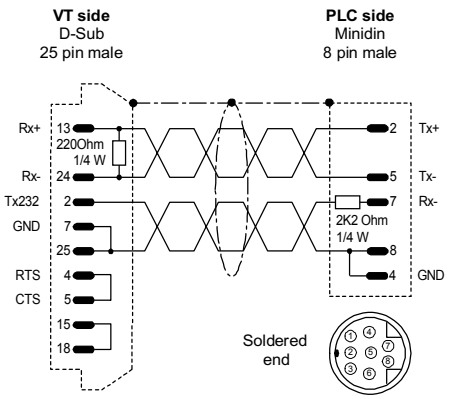
Order code:
CVPLC05402

Series A

(RS232)
Directly in the CPU programming connector

Jump-connect the **LG** and **GF** terminals on the PLC terminal block

(See “Chapter 25 -> Connecting the cable shield“)



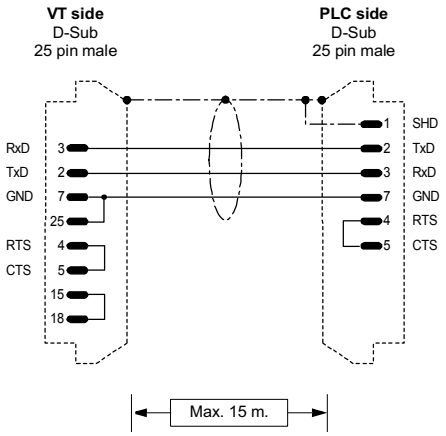
Order code:
CVPLC05502

Series Fx0 - Fx0 N - Fx2 N
Directly in the CPU programming connector

(RS-232)

(See “Chapter 25 -> Connecting the cable shield“)

OMRON PLC



Order code:
CVPLC02102

Using interface 3G2A6-LK201-EV1 and OMRON series H C200H-LK201

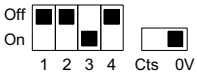
(RS232)

Jump-connect the **GR** and **LG** terminals on the PLC terminal block

(See "Chapter 25 -> Connecting the cable shield")

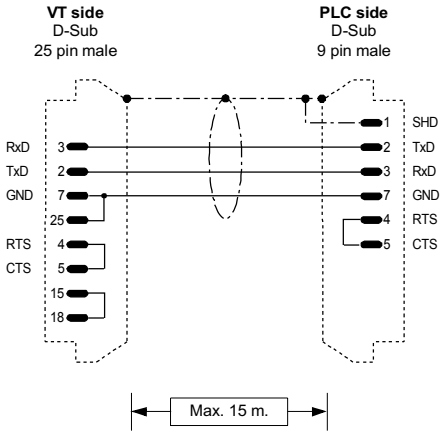
JUMPER SETTINGS C200H-LK201

Rear-fend jumpers



Front-end switches

SW1 [0] SW2 [0]
SW3 [5] SW4 [2]



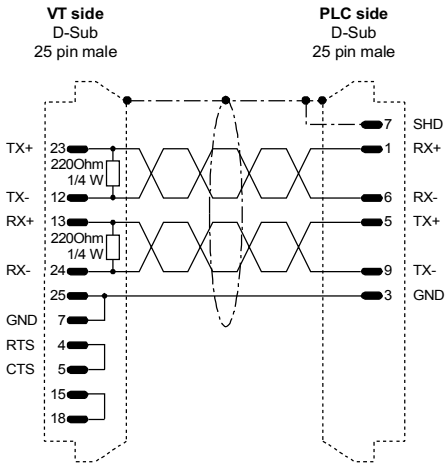
Order code:
CVPLC02202

Series H
Compact family C20H / C28H C40H / C60H

(RS232)

Jump-connect the **GR** and **LG** terminals on the PLC terminal block

(See "Chapter 25 -> Connecting the cable shield")



Order code:
CVPLC02302

Series H C200H using interface LK202

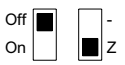
(RS422)

Jump-connect the **GR** and **LG** terminals on the PLC terminal block

(See "Chapter 25 -> Connecting the cable shield")

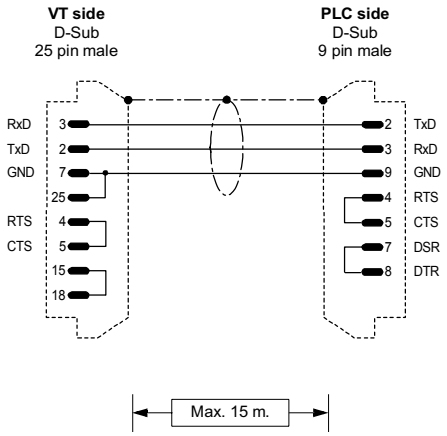
JUMPER SETTINGS C200H-LK201

Rear-end jumpers



Front-end switches

SW1 [0] SW2 [0]
SW3 [5] SW4 [2]



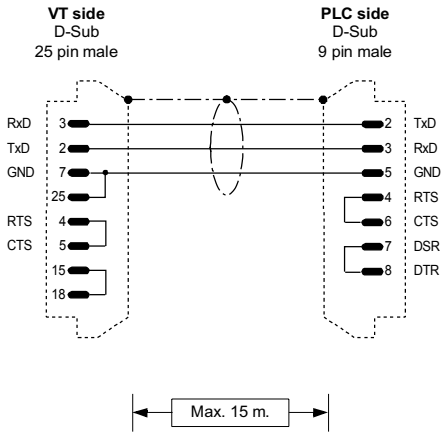
Order code:
CVPLC02402

Series H
Series CS1
CQM1 CPU 21-E and above
CVM1 and C200HS/ HE/HG/HX (integrated serial)

(RS232)

Jump-connect the **GR** and **LG** terminals on the PLC terminal block

(See “Chapter 25 -> Connecting the cable shield“)



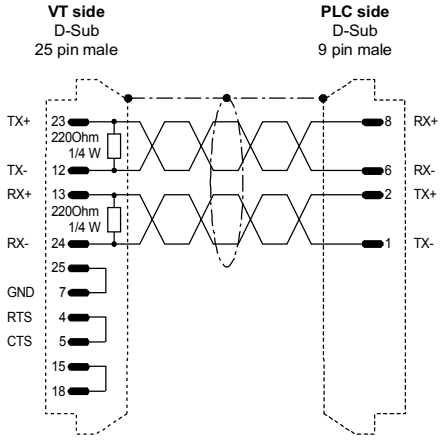
Order code:
CVPLC02502

Series H
CQM1 Using interface CQM1-CIF02

(RS232)

Jump-connect the **LG** and **GF** terminals on the PLC terminal block

(See “Chapter 25 -> Connecting the cable shield“)



Order code:
CVPLC02602

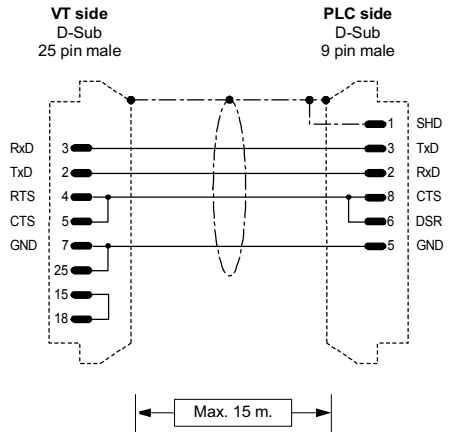
CVM1

(RS422)

Jump-connect the **LG** and **GF** terminals on the PLC terminal block

(See “Chapter 25 -> Connecting the cable shield“)

SAIA PLC

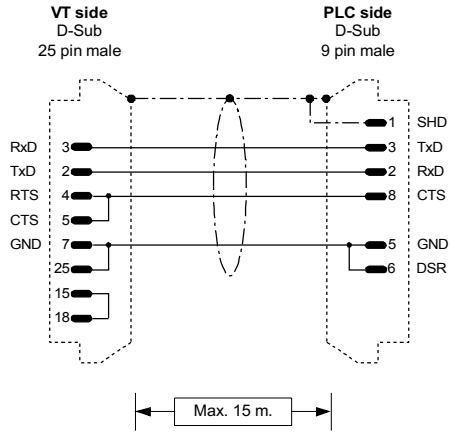


Order code:
CVPLC04102

Series PCD2 / 4
in the programming connector of the CPU (PGU port)

(RS232)

(See “Chapter 25 -> Connecting the cable shield“)



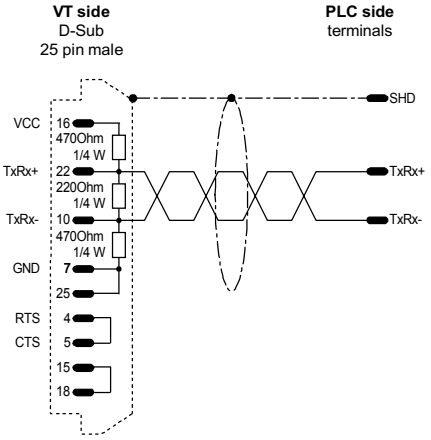
Order code:
CVPLC04202

S-BUS series PCD1 / 2 / 4
in the programming connector of the CPU (PGU port)

(RS232)

PLC Address: 0...255

(See “Chapter 25 -> Connecting the cable shield“)



Order code:
NOT CODED

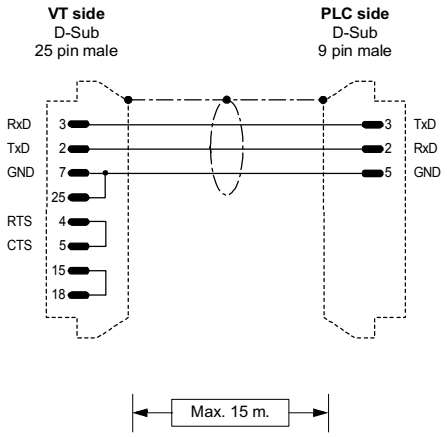
S-BUS series PCD1 / 2 / 4
Connection to terminal block

(RS485)

PLC address: 0...255

SASI 1 (1=first interf., 2=second interf., etc.)
999
;TEXT 999 “UART:9600,0,0,0;MODE:SS1; DIAG:F260,R500"

(See “Chapter 25 -> Connecting the cable shield“)



Order code:
NOT CODED

PCD2 / 4
in the programming connector of the CPU (PGU port) with port initialization

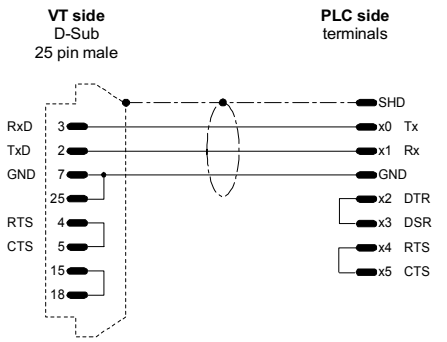
(RS232)

This connection is useful in the event that the PLC does not go in RUN with the VT terminal connected. In this case, you also need to initialize the PGU port with the instructions:

SASI 0
999
; TEXT 999 "UART:9600,7,E,1;MODE:SD0; DIAG:F260,R500"

In this way, if you send the PLC in RUN using the SAIA utility S/W, the ERROR light switches on, but this is normal. To switch the light off, just remove the instruction **"SASI 0"** when the PLC is connected with the utility S/W.

(See “Chapter 25 -> Connecting the cable shield“)



Order code:
NOT CODED

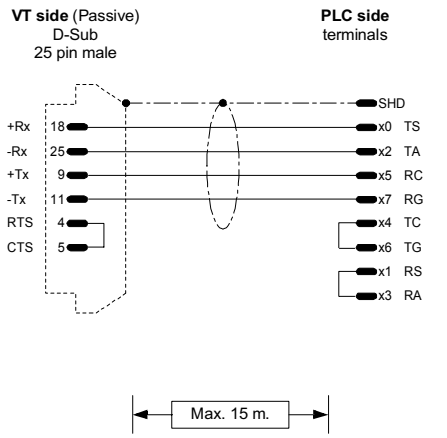
Additional PCD4 interface to BUS

(RS232)

NB: To make the terminal function with the additional interface of the SAIA PCD PLC, the following setting must be observed:

SASI 1 (1=first interf., 2=second interf., etc.)
999
;TEXT 999
"UART:9600,7,E,1;MODE:SD0;DIAG:F260,R500;RBUF:255;TBUF:255"

(See “Chapter 25 -> Connecting the cable shield“)



Order code:
NOT CODED

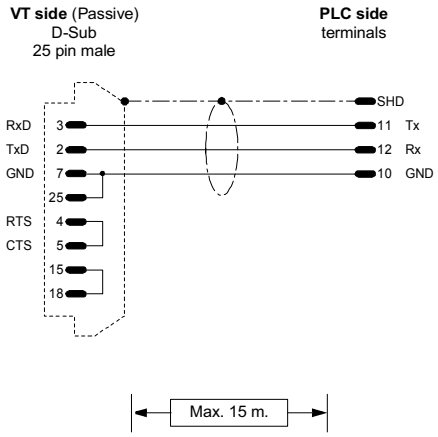
Additional PCD4 interface to BUS

(Current loop)

NB: To make the terminal function with the additional interface of the SAIA PCD PLC, the following setting must be observed:

SASI 1 (1=first interf., 2=second interf., etc.)
999
;TEXT 999
"UART:9600,7,E,1;MODE:SD0;DIAG:F260,R500;RBUF:255;TBUF:255"

(See “Chapter 25 -> Connecting the cable shield“)



Order code:
NOT CODED

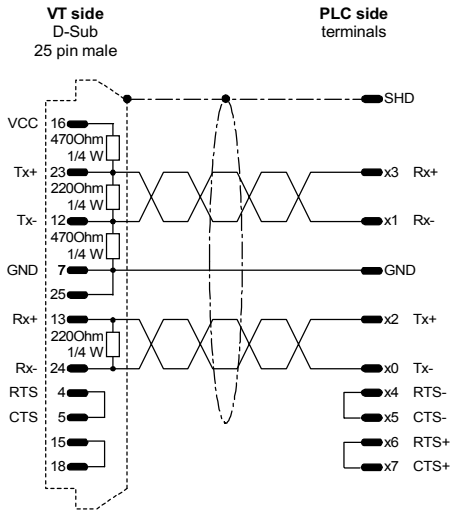
PCD2 serial interface 1 module PCD7/F120

(RS232)

NB: To make the terminal function with the additional interface of the SAIA PCD PLC, the following setting must be observed:

SASI 1 (1=first interf., 2=second interf., etc.)
999
;TEXT 999
"UART:9600,7,E,1;MODE:SD0;DIAG:F260,R500;RBUF:255;TBUF:255"

(See “Chapter 25 -> Connecting the cable shield“)



Order code:
NOT CODED

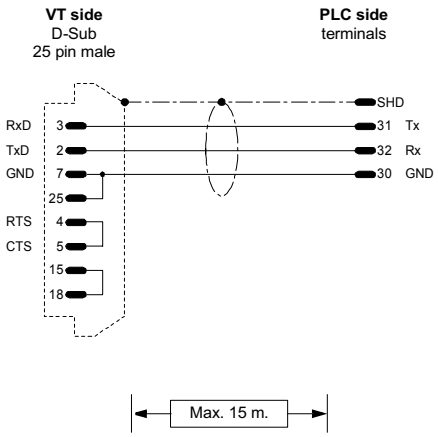
Additional PCD4 interface to BUS module BUS C130

(RS422)

NB: To make the terminal function with the additional interface of the SAIA PCD PLC, the following setting must be observed:

SASI 1 (1=first interf., 2=second interf., etc.)
999
;TEXT 999
"UART:9600,7,E,1;MODE:SD0;DIAG:F260,R500;RBUF:255;TBUF:255"

(See “Chapter 25 -> Connecting the cable shield“)



Order code:
NOT CODED

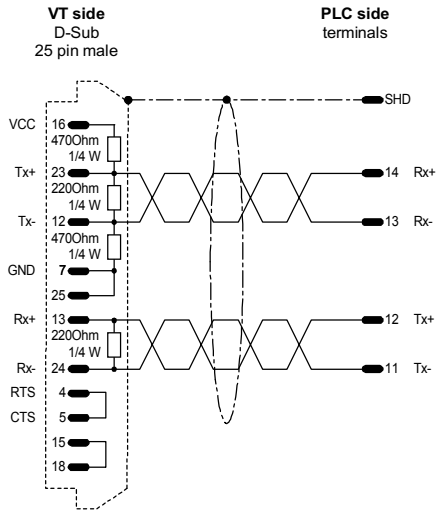
PCD2 serial interface 2 module PCD2/F520

(RS232)

NB: To make the terminal function with the additional interface of the SAIA PCD PLC, the following setting must be observed:

SASI 1 (1=first interf., 2=second interf., etc.)
999
;TEXT 999
"UART:9600,7,E,1;MODE:SD0;DIAG:F260,R500;RBUF:255;TBUF:255"

(See “Chapter 25 -> Connecting the cable shield“)



Order code:
NOT CODED

PCD2 serial interface 1 module PCD7/F110

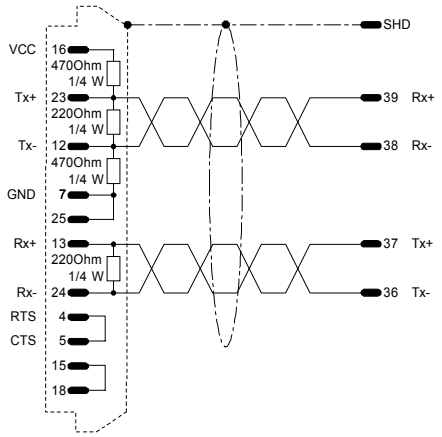
(RS422)

B: To make the terminal function with the additional interface of the SAIA PCD PLC, the following setting must be observed:

SASI 1 (1=first interf., 2=second interf., etc.)
999
;TEXT 999
"UART:9600,7,E,1;MODE:SD0;DIAG:F260,R500;RBUF:255;TBUF:255"

NB: Insert the interface termination resistances (See SAIA manual).

(See “Chapter 25 -> Connecting the cable shield“)



Order code:
NOT CODED

PCD2 serial interface 3 module PCD2/F520

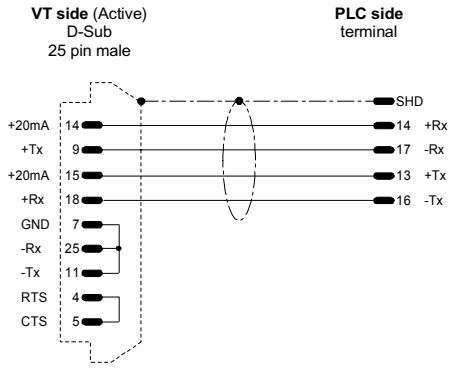
(RS422)

B: To make the terminal function with the additional interface of the SAIA PCD PLC, the following setting must be observed:

SASI 1 (1=first interf., 2=second interf., etc.)
999
;TEXT 999
"UART:9600,7,E,1;MODE:SD0;DIAG:F260,R500;RBUF:255;TBUF:255"

NB: Insert the interface termination resistances (See SAIA manual).

(See “Chapter 25 -> Connecting the cable shield“)



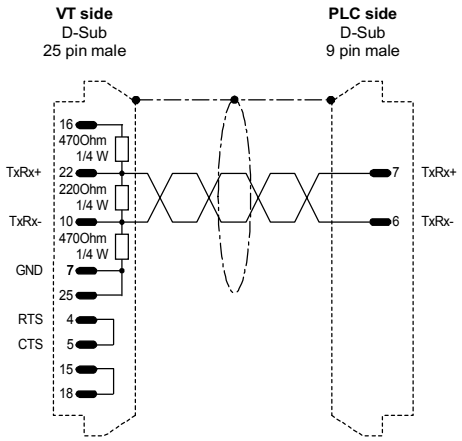
Order code:
NOT CODED

PCD2 interface to module TTY - 20mA (PCD7/F130)

(Current loop)

(See “Chapter 25 -> Connecting the cable shield“)

SAMSUNG PLC



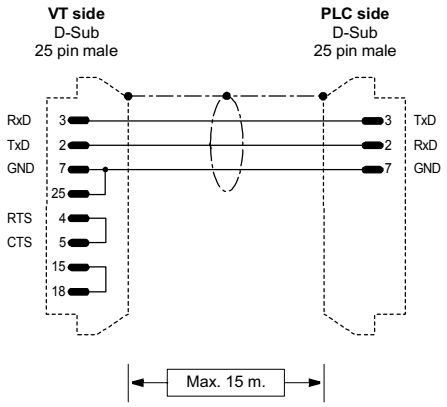
Order code:
CVPLC22202

BRAIN SPC-10

(RS485)

(See “Chapter 25 -> Connecting the cable shield“)

SATT CONTROL PLC



Order code:
CVPLC18102

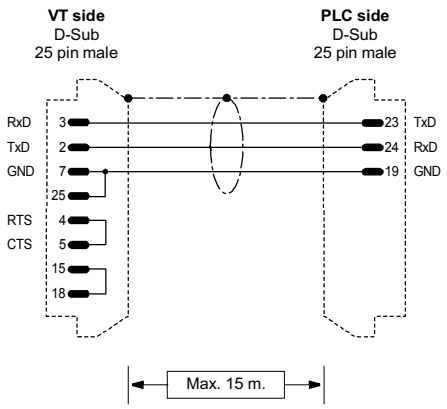
Series 31-90

(RS232)

PLC serial port configuration:

Channel Configuration no.:	B
COMLI:	C
Master / Slave (M / S):	S
Identity (1..247):	1
ASCII / Binary (A / B):	B
Baudrate (110...19200):	9600
Number of data bits:	8
Number of stop bits:	1
Parity (O / E / N):	O
Error counters to register (RX/N):	N
Number of ACIA-errors:	12
Number of BCC-errors:	8
Number of other errors:	4

(See “Chapter 25 -> Connecting the cable shield“)



Order code:
CVPLC18202

Series 115

(RS232)

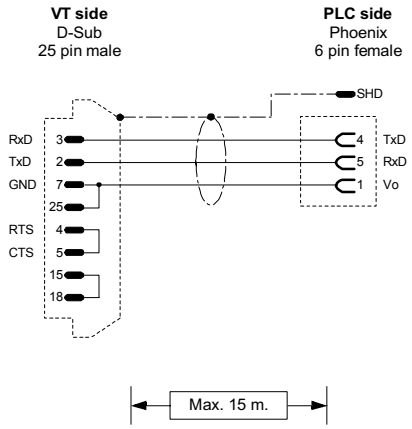
Connection to VDU-port.
Possible connection also to PLC PRINTER-port.
In this case configure the COMLI 1-port as CHA2 with the appropriate software programming utility of the PLC

CPLC serial port configuration:

Channel Configuration no.:	B
COMLI:	C
Master / Slave (M / S):	S
Identity (1..247):	1
ASCII / Binary (A / B):	B
Baudrate (110...19200):	9600
Number of data bits:	8
Number of stop bits:	1
Parity (O / E / N):	O
Error counters to register (RX/N):	N
Number of ACIA-errors:	12
Number of BCC-errors:	8
Number of other errors:	4

(See “Chapter 25 -> Connecting the cable shield“)

SCHLEICHER PLC

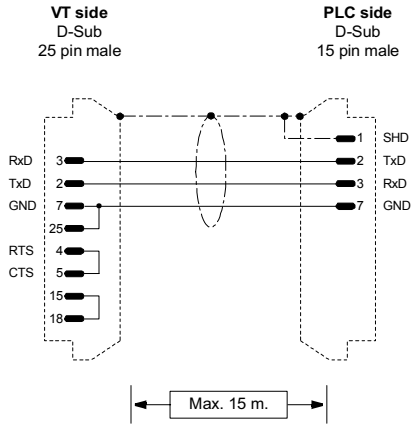


Order code:
CVPLC08102

CPU-10, CPU20 serial interface COM2

(RS232)

(See “Chapter 25 -> Connecting the cable shield“)



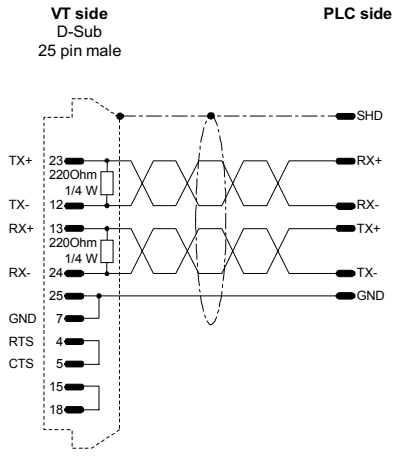
Order code:
CVPLC08202

Series F
Connection PGU

(RS232)

N.B: Declare in the PLC program the type of port used.

(See “Chapter 25 -> Connecting the cable shield“)



Order code:
CVPLC08302

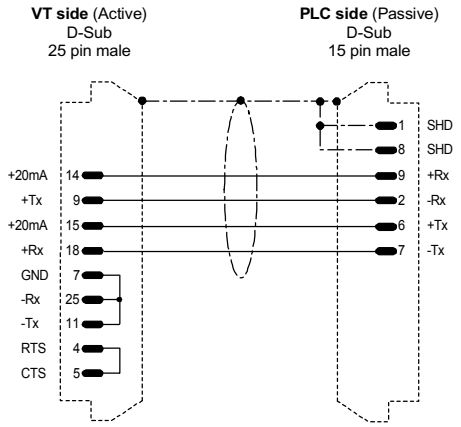
Series F
Connection FCS

(RS422)

N.B: Declare in the PLC program the type of port used.

(See “Chapter 25 -> Connecting the cable shield“)

SIEMENS PLC

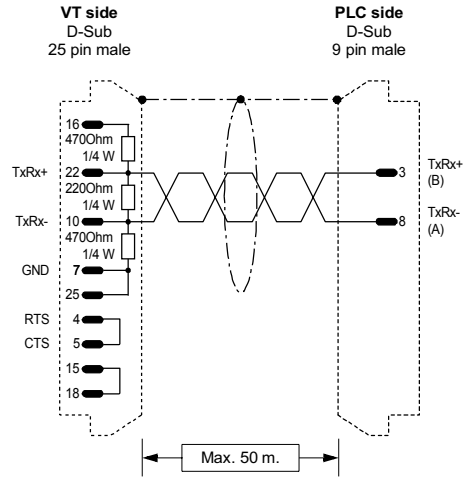


Order code:
CVPLC01202

SIMATIC S5
CPU 90...135
FAP CPU 944 / 945

(Current loop - CPU programming port)

(See “Chapter 25 -> Connecting the cable shield“)



Order code:
CVPLC01402

SIMATIC S7

(RS485)

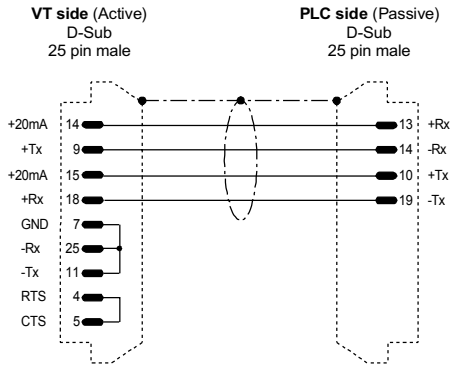
SIMATIC S7 200
Address of CPU = 1 - 126

SIMATIC S7 300, S7 400 MPI
Address of VT: 1...31
Address of PLC: 1...31

To have simultaneous communication between the PLC S7 programming package and the VT, it is advisable to use the SIEMENS 6ES7972-OBB20-OXAO passing connector.

N.B.: Max. 50m without repeater

(See “Chapter 25 -> Connecting the cable shield“)

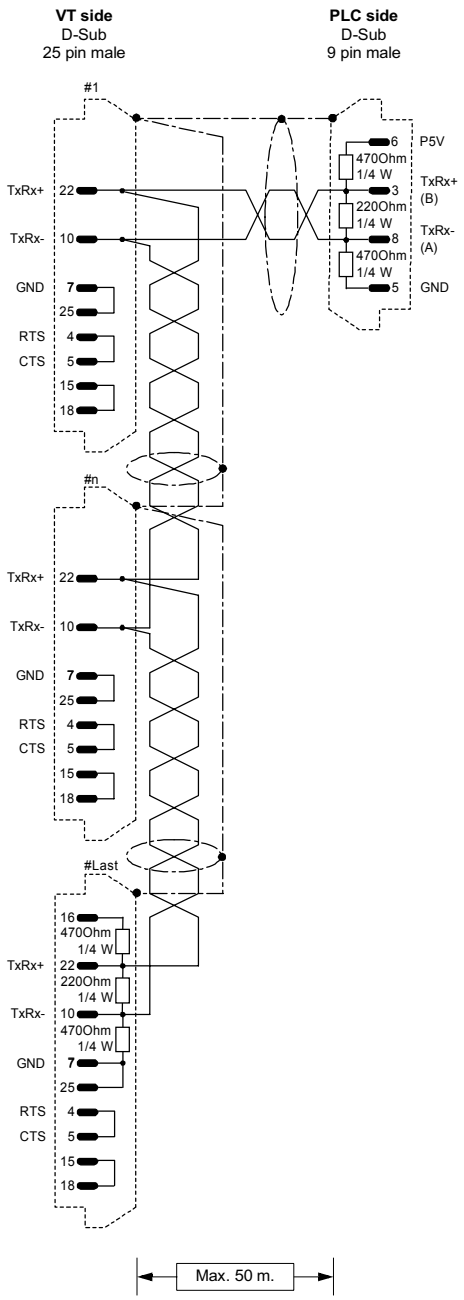


Order code:
CVPLC01502

SIMATIC S5
FAP CPU 928B
module TTY 6ES5 752-0AA12

(Current loop)

(See “Chapter 25 -> Connecting the cable shield“)



Order code:
NOT CODED

SIMATIC S7

(RS485)

SIMATIC S7 200
Address of CPU = 1 - 126

SIMATIC S7 300, S7 400 MPI
Address of VT: 1...31
Address of PLC: 1...31

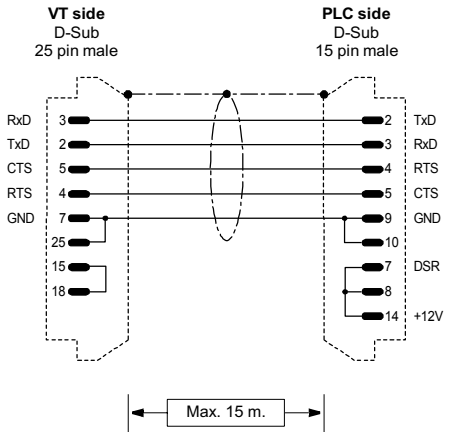
Instead of using a 9 pin connector and integrating the resistances, the following Siemens connectors can be used with resistances already integrated and insertable with a sliding switch:
SIEMENS 6ES7972-0BA10-0XA0
SIEMENS 6ES7972-0BA40-0XA0
SIEMENS 6GK1500-0EA00

For simultaneous communication between the programming package, the PLC S7 and the VT, you are advised to use the following Siemens passing connectors with resistances already integrated and insertable with a sliding switch:
SIEMENS 6ES7972-0BB10-0XA0
SIEMENS 6ES7972-0BB40-0XA0

N.B.: Maximum length without repeater - 50m.

(See “Chapter 25 -> Connecting the cable shield“)

SPRECHER+SCHUH PLC

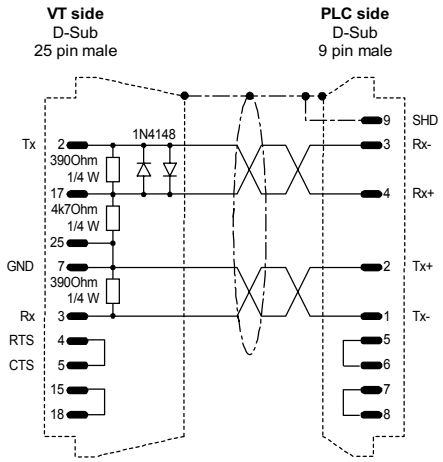


Order code:
CVPLC03102

(RS232)

(See “Chapter 25 -> Connecting the cable shield“)

SQUARE-D PLC

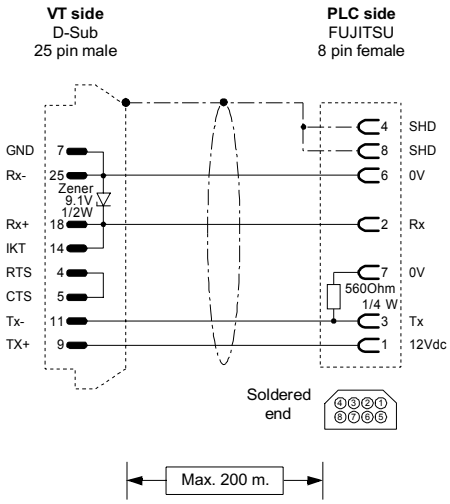


Order code:
CVPLC13102

Series 400, 500, 600

(RS422)

(See “Chapter 25 -> Connecting the cable shield“)



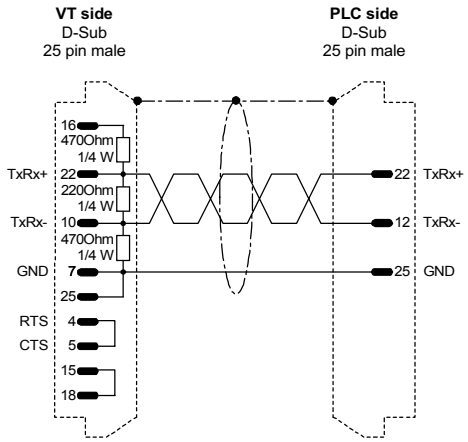
Order code:
CVPLC19102

Series 50
In the CPU programming connector
(Programmer's Port).

(Current loop).

(See “Chapter 25 -> Connecting the cable shield“)

TELEMECANIQUE PLC



Order code:
CVPLC11002

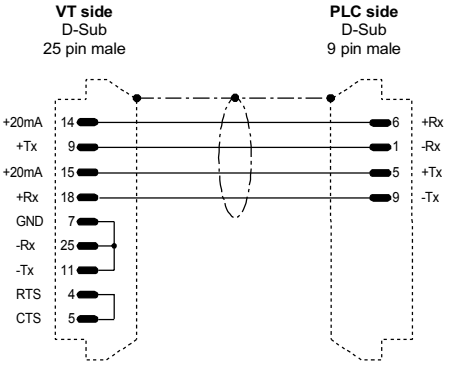
TSX47 UNITELWAY module TSXSCM21
Port Ch.1

(RS485)

Point to point connection.

Address of VT: 4...31
Address of PLC (N): 0, 4...31
Address of PLC module: 0...254

(See “Chapter 25 -> Connecting the cable shield“)

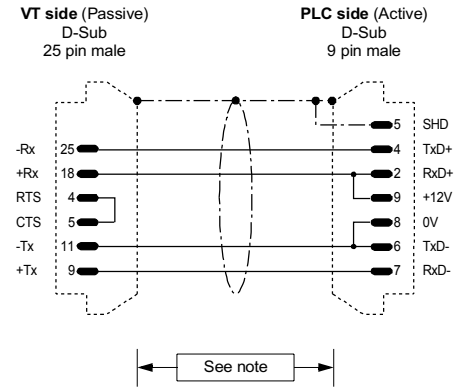


Order code:
CVPLC11102

TSX17/20 using CVPLC1Q102 translator

(Current loop)

(See “Chapter 25 -> Connecting the cable shield“)



Order code:
CVPLC11202

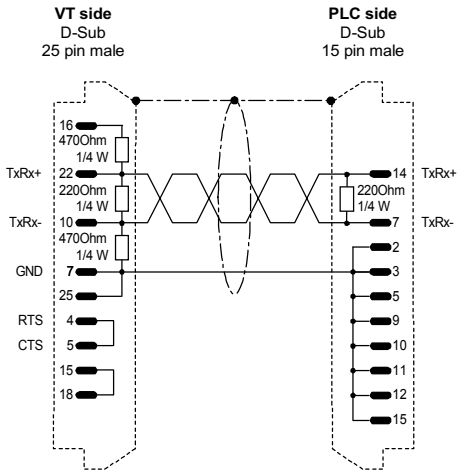
TSX47 - 67 - 87

(Current loop)

NOTE: The max length of the cable depends on which version of the Telemecanique CPU hardware is being used. With versions of hardware coded lower than V3 (E.g. CPU 47/11, 47/20) the length of the cable is limited to 3 meters given that the serial port of the CPU is not optoisolated !!! In this case, whenever you need to create a cable longer than 3 meters, it is advisable the employ a Telemecanique device like XBT Z 9011 or 9012 to guarantee the galvanic isolation of the serial line. Failure to adopt such a device can cause damage to the CPU’s serial port !!!

If the CPU is of a hardware version coded higher than V3 (E.g.. CPU 47/411, 47/425 etc.) the max length of the cable relates to the particular characteristics of the interface in Current loop (max 1000 meters) even without employing the optoisolating device mentioned above, in so far as the CPUs have an internal circuitry created to guarantee the optoisolation of the line.

(See “Chapter 25 -> Connecting the cable shield“)



Order code:
CVPLC11602

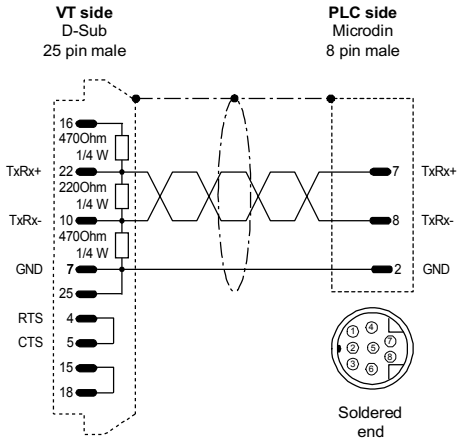
TSX17 UNITELWAY

(RS485)

Point to point connection.

Address of VT: 4...31
Address of PLC (N): 0
Address of PLC module: 254

(See “Chapter 25 -> Connecting the cable shield“)



Order code:
CVPLC11702

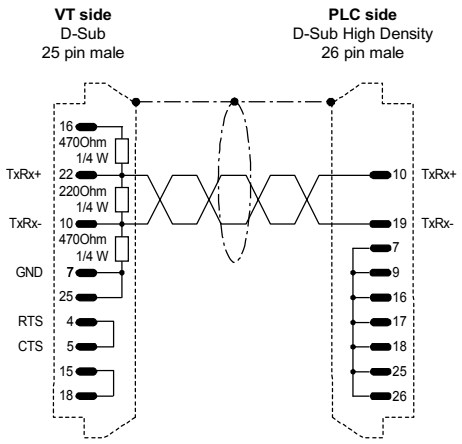
TSX07 / 37 UNITELWAY

(RS485)

Point to point connection.

Address of VT: 4...31
Address of PLC (N): 0
Address of PLC module: 254

(See “Chapter 25 -> Connecting the cable shield“)



Order code:
CVPLC11802

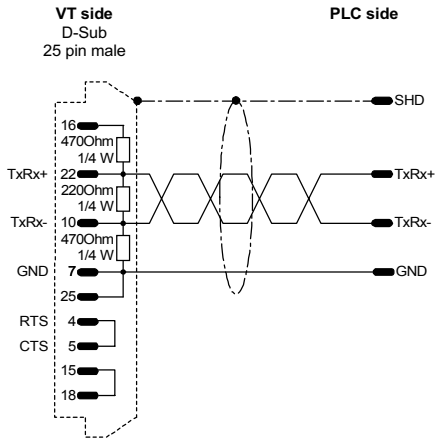
TSX47 UNITELWAY
UNITELWAY port

(RS485)

Point to point connection.

Address of VT: 4...31
Address of PLC (N): 0
Address of PLC module: 254

(See “Chapter 25 -> Connecting the cable shield“)



Order code:
NOT CODED

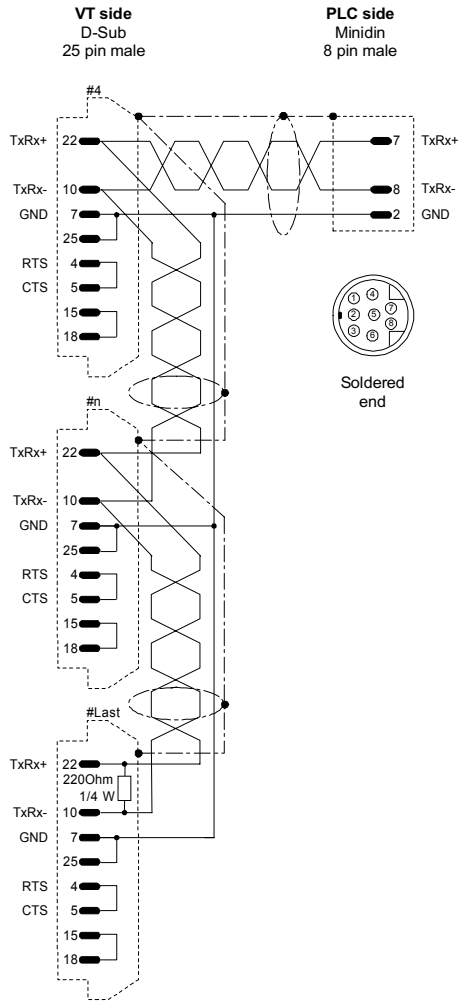
TSX47 UNITELWAY

(RS485)

Point to point connection.

Address of VT: 4...31
Address of PLC (N): 0
Address of PLC module: 254

(See “Chapter 25 -> Connecting the cable shield“)



Order code:
NOT CODED

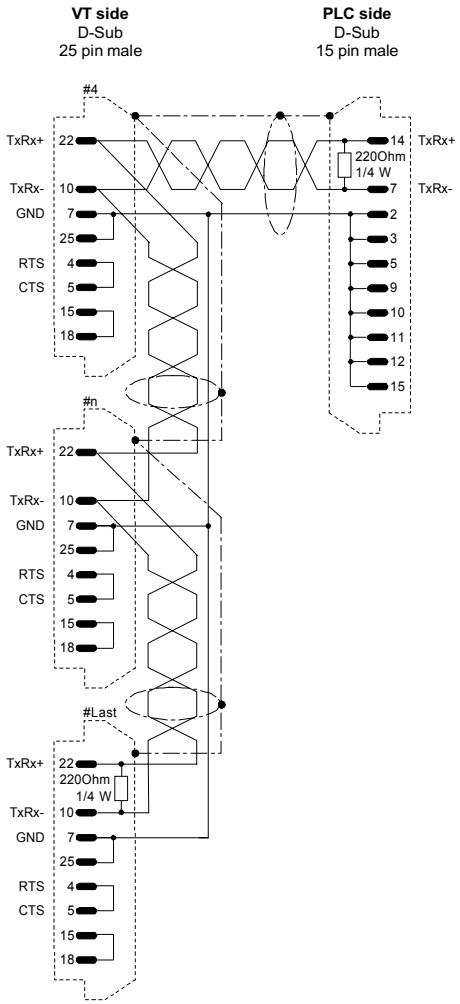
TSX07 / 37 UNITELWAY

(RS485)

Cable valid for several VTs connected to a single Master PLC.

Address of VT: 4...31
Address of PLC (N): 0
Address of PLC module: 254

(See “Chapter 25 -> Connecting the cable shield“)



Order code:
NOT CODED

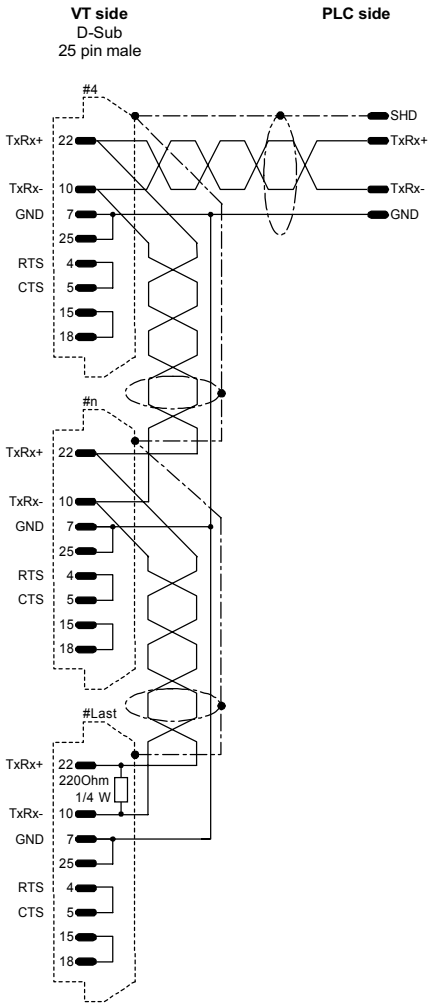
TSX17 UNITELWAY

(RS485)

Cable valid for several VTs connected to a single Master PLC.

Address of VT: 4...31
Address of PLC (N): 0
Address of PLC module: 254

(See “Chapter 25 -> Connecting the cable shield“)



Order code:
NOT CODED

TSX07 ... 87 UNITELWAY

(RS485)

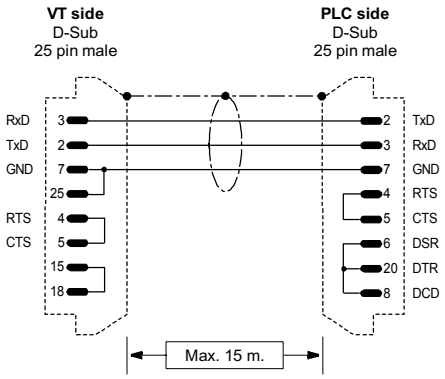
Address of VT: 4...31
Address of PLC (N): 0, 4...31
Address of PLC module: 0...254

To have more than one PLC in the network, one PLC must be configured as network Master and the others as Slaves.
To be able to configure a PLC as a Slave it is necessary that:

- In the case of PLCs TSX07 and TSX37 use programming software to parametrize the PLC as Slave, assigning the chosen address and jump-connecting pins 2 and 6 on the connector connecting to the network.
- In the case of PLCs TSX17, TSX47, TSX67 and TSX87 refer to the PLC manual to see which pins to jump-connect on the network connector to assign the chosen Slave address.

(See “Chapter 25 -> Connecting the cable shield“)

TEXAS INSTRUMENTS PLC



Order code:
CVPLC06102

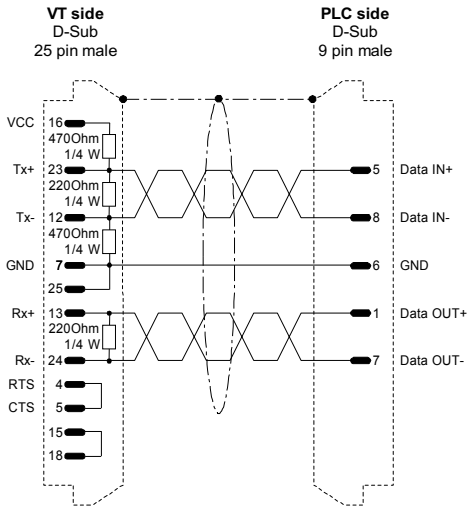
Series 400 CPU 435
Series 500 CPU 520 - 530
Series 505 CPU 525 - 535

(RS232)

NB : In the case of CPU 435, set the protocol in ASCII mode (AUX function of TISOFT version 1.2 and upwards).

Connection with module DCM (405 series)

(See “Chapter 25 -> Connecting the cable shield“)



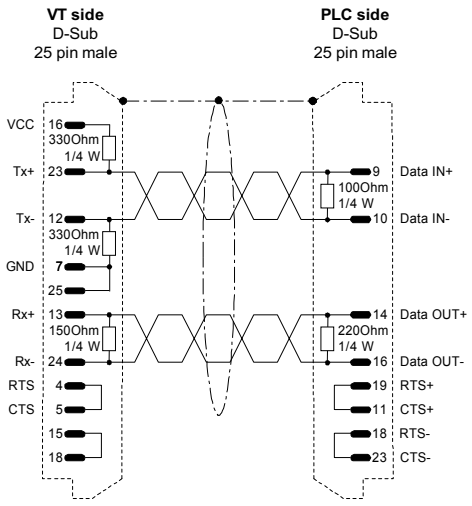
Order code:
CVPLC06202

Series 500 CPU 520 - 530
Series 505 CPU 525 - 535 - 545 (*)

(RS422)

(*) Valid only in the case of CPU 545 with hardware version 545-1101. In the case of CPU 545 with hardware version coded higher, see **CVPLC06502 cable**.

(See “Chapter 25 -> Connecting the cable shield“)



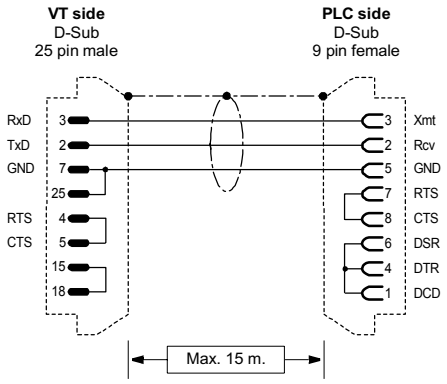
Order code:
CVPLC06302

Series 400 CPU 435

(RS422)

NB: Set the protocol in ASCII mode (AUX function of TISOFT from version 1.2 upwards).

(See “Chapter 25 -> Connecting the cable shield“)



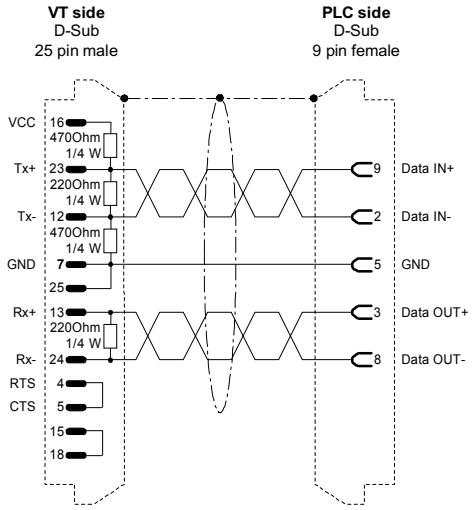
Order code:
CVPLC06402

Series 505 CPU 545 - 555

(RS232)

NB: In the case of CPU 555, if connected to port 2, remove the jumper between pins 7 and 8 on the PLC side.

(See “Chapter 25 -> Connecting the cable shield“)



Order code:
CVPLC06502

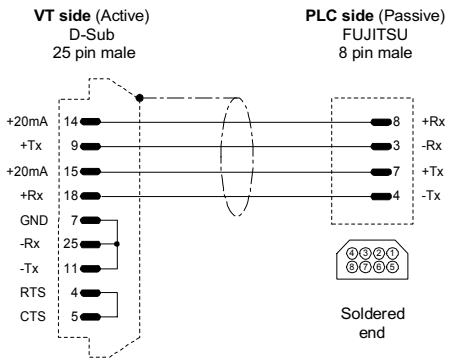
Series 505 CPU 545 (*) - 555

(RS422)

(*) Valid only in the case of CPU 545 with hardware versions 545-1102, 545-1103 and 545-1104. In the case of CPU 545 with lower hardware version see cable **CVPLC06202**.

(See “Chapter 25 -> Connecting the cable shield“)

TOSHIBA PLC

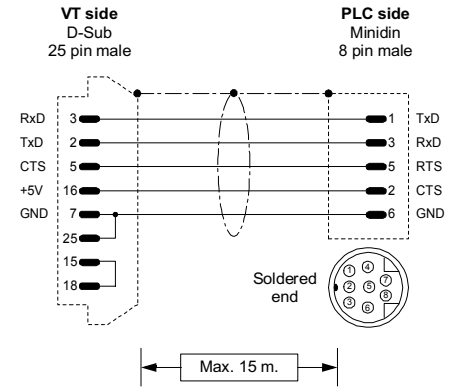


Order code:
CVPLC10102

(EX 100) CPU M20 - M40
In the CPU programming connector
(Programmer's Port).

(Current loop).

(See “Chapter 25 -> Connecting the cable shield“)

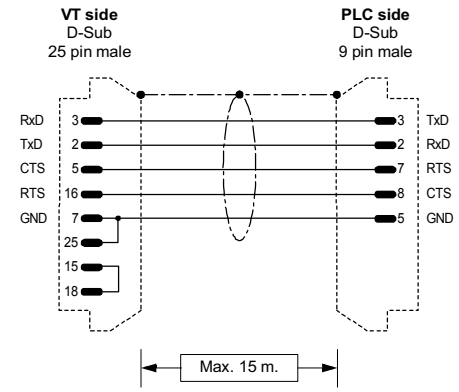


Order code:
CVPLC10212

Series T1

(RS232)

(See “Chapter 25 -> Connecting the cable shield“)



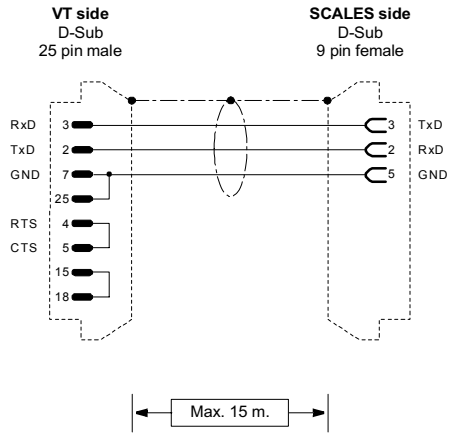
Order code:
CVPLC10222

Series T2/T3

(RS232)

(See “Chapter 25 -> Connecting the cable shield“)

HBM BALANCE SCALES

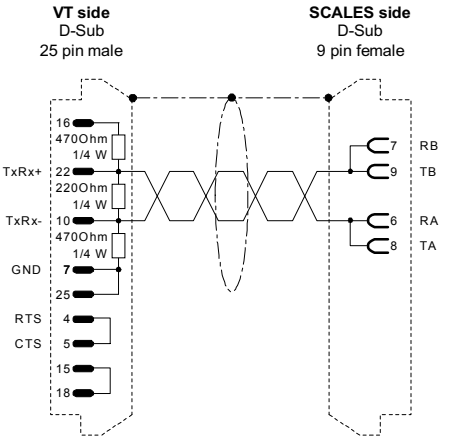


Order code:
NOT CODED

WE2110

(RS232)

(See “Chapter 25 -> Connecting the cable shield“)



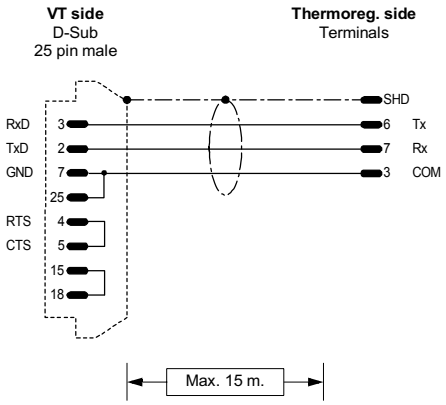
Order code:
NOT CODED

WE2110

(RS485)

(See “Chapter 25 -> Connecting the cable shield“)

ASCON THERMOREGULATOR



Order code:
NOT CODED

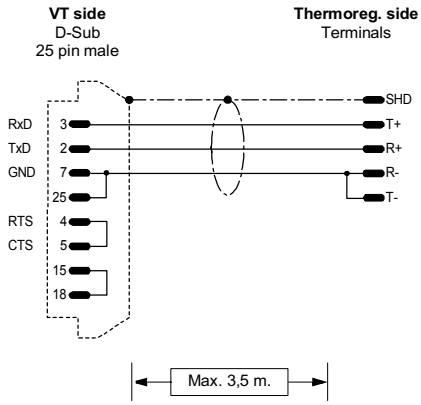
XS-XP-XN-XC-XT-XF

(RS232)

Connection with module ASCON ALS/3/232

(See “Chapter 25 -> Connecting the cable shield“)

GEFRAN THERMOREGULATOR

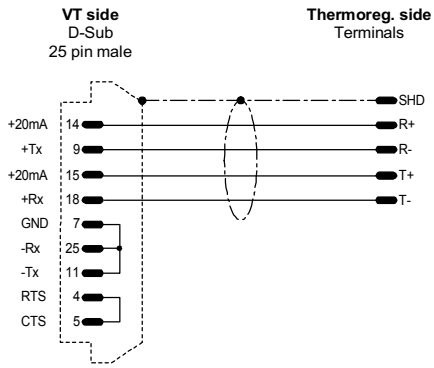


Order code:
NOT CODED

800/1600/1800

(RS232)

(See “Chapter 25 -> Connecting the cable shield“)

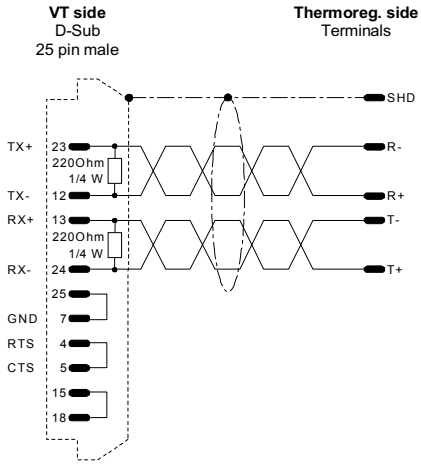


Order code:
NOT CODED

800/1600/1800

(Current loop)

(See “Chapter 25 -> Connecting the cable shield“)

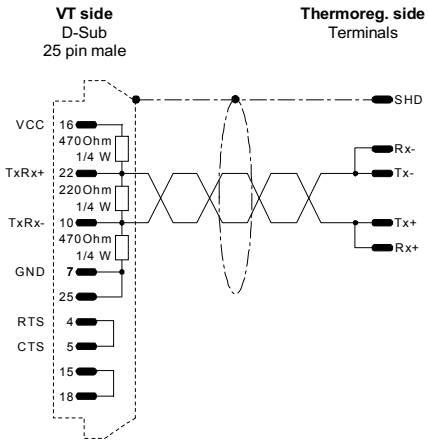


Order code:
NOT CODED

800/1600/1800

(RS422)

(See “Chapter 25 -> Connecting the cable shield“)



Order code:
NOT CODED

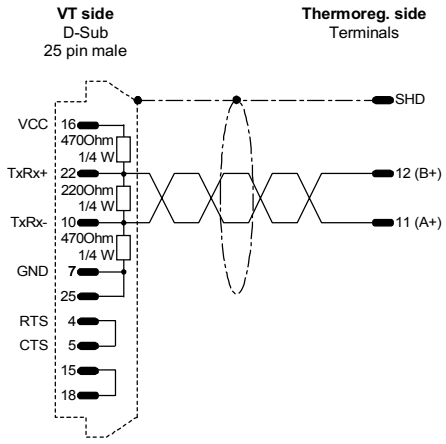
800/1600/1800

(RS485)

Only applies to protocol of Modbus (Ser.p = 1)

(See “Chapter 25 -> Connecting the cable shield“)

HENGSTLER THERMOREGULATOR



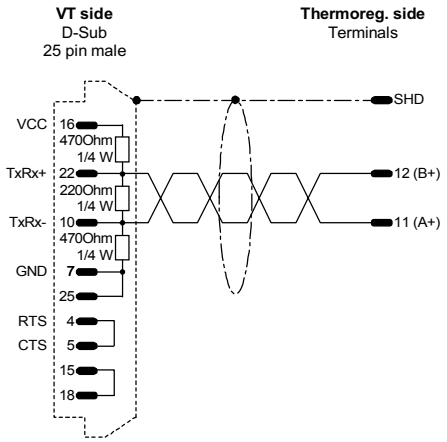
Order code:
NOT CODED

901/906

(RS485)

(See “Chapter 25 -> Connecting the cable shield“)

WEST THERMOREGULATOR

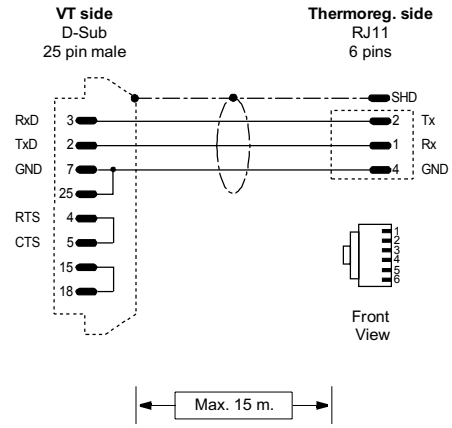


Order code:
NOT CODED

6100/6600

(RS485)

(See “Chapter 25 -> Connecting the cable shield“)

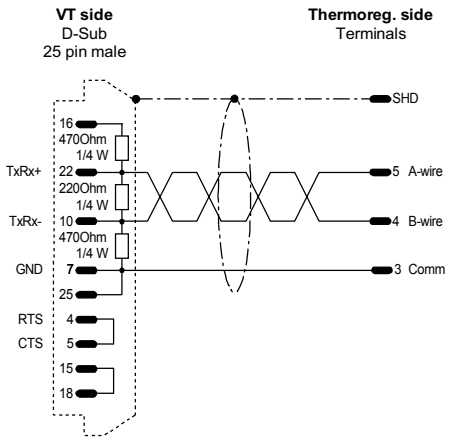


Order code:
NOT CODED

MLC9000 Intrabus

(RS232)

(See “Chapter 25 -> Connecting the cable shield“)



Order code:
NOT CODED

MLC9000 Modbus

(RS485)

(See “Chapter 25 -> Connecting the cable shield“)

Cable information summary

The table below lists all the cables mentioned in the chapter together with their order codes and a description of the type of device with which it can be used.

Table 25.1: Cable information list (Part 1 of 3)

Producer	Code	Description	RS
ABB	CVPLC03102	T200 (KP60)	232
	CVPLC14102	CS31 / T200 (KP62)	232
	CVPLC14202	CS31 (KR31 / KT31) RTU MODBUS PROTOCOL	232
	CVPLC14302	CS31 (07KP92 R101) RTU MODBUS PROTOCOL	232
	CVPLC14402	CS31 (07KP92 R101) RTU MODBUS PROTOCOL	422
	CVPLC14502	CS31 (07KP92 R101) RTU MODBUS PROTOCOL	485
	CVPLC14602	CS31 (Series 40 & 50)	232
	CVPLC21202	AC70	232
	CVPLC06402	AC450	232
AEG MODICON	CVPLC17102	COMPACT / A120 / A250	232
	CVPLC17202	MICRO	232
ALLEN-BRADLEY	CVPLC07112	SLC500	485
	CVPLC07202	PLC5	232
	CVPLC07302	PLC5	422
	CVPLC07402	SLC500 CPU 5/03 5/04	232
	CVPLC07502	Protection device for DH485	485
	CVPLC07602	MICROLOGIX CPU1000 and 1500	232
BOSCH	CVPLC24102	CL150	232
CROUZET	CVPLC20102	RPX 10-20-30	232
GE FANUC	CVPLC09102	CPU 90-30	422
	CVPLC09202	CMM311 PORT1	232
	CVPLC09302	CMM311 PORT2	422
GEFRAN	CVPLC23102	Series MPS-NS	232
LG	CVPLC21102	K30 - K500 - K1000	232
	CVPLC21202	K10	232
	CVPLC21302	Series MK	485
HITACHI	CVPLC03102	H, 02H	232
	CVPLC03202	EM CPU CPM - E3	232
	CVPLC03302	EC	232
	CVPLC03402	H, CPU22-02HC	232
	CVPLC03502	Series EH150	232
	CVPLC03602	COMM H	422
IDEC IZUMI	CVPLC19102	FA2-FA2J-FA3-FA3S	C.L.
	CVPLC19302	Series MICRO 3	485

C.L.: Current loop

Table 25.1: Cable information list (Part 2 of 3)

Producer	Code	Description	RS
KLÖCKNER MOELLER	CVPLC12112	PS306	485
	CVPLC12212	PS316 / PS416-CPU400	485
	CVPLC12302	PS4-201-MM1 / PS4-341-MM1	232
	CVPLC12402	PS416-CPU400	232
KEYENCE	CVPLC15102	KV10-16-24-40	232
KUHNKE	CVPLC07602	KUBES	232
MATSUSHITA-NAIS	CVPLC16102	FP	422
	CVPLC16202	FP	232
	CVPLC16302	FP-M / FP-0	232
	CVPLC16402	FP-3	422
MITSUBISHI	CVPLC05102	Series FX	232
	CVPLC05202	Series FX	232
	CVPLC05302	MITSUBISHI SC-05 adaptor	232
	CVPLC05402	Series A	232
	CVPLC05502	Series Fx0 - Fx0 N - Fx2 N	232
OMRON	CVPLC02102	C200H LK201 3G2A6 LK201 EV1	232
	CVPLC02202	C20-28-40H	232
	CVPLC02302	C200H LK202	422
	CVPLC02402	CQM1 - CVM1 - Series CS1	232
	CVPLC02502	CQM1CIF02	232
	CVPLC02602	CVM1	422
SAIA	CVPLC04102	CPU PCD2/4	232
	CVPLC04202	S-BUS CPU PCD1/2/4	232
SAMSUNG	CVPLC22202	SPC-10	485
SATT CONTROL	CVPLC18102	Series 31 - 90	232
	CVPLC18202	Series 115	232
SCHLEICHER	CVPLC08102	CPU-10 / CPU-20 COM2	232
	CVPLC08202	Series F connection PGU	232
	CVPLC08302	Series F connection FCS	422
SIEMENS	CVPLC01202	S5 AG90 ... 135 FAP S5 944/945	C.L.
	CVPLC01402	S7 200/300/400	485
	CVPLC01502	FAP S5 928B	C.L.
SPRECHER+SCHUH	CVPLC03102	SPRECHER + SCHUH	232
SQUARE-D	CVPLC13102	Series 400 / 500 / 600	422
	CVPLC19102	Series 50	C.L.
TELEMECANIQUE	CVPLC1Q102	Adaptor PLC TSX17 RS485 - C.L. **(Supplied by ESA)**	C.L.
	CVPLC11002	TSX47 UNITELWAY module TSXSCM21	485
	CVPLC11102	CVPLC1Q102	C.L.

C.L.: Current loop

Table 25.1: Cable information list (Part 3 of 3)

Producer	Code	Description	RS
	CVPLC11202	TSX47-67-87	C.L.
	CVPLC11602	TSX17 UNITELWAY	485
	CVPLC11702	TSX07/37 UNITELWAY	485
	CVPLC11802	TSX47 UNITELWAY	485
TEXAS INSTRUMENTS	CVPLC06102	Series 405-500	232
	CVPLC06202	Series 500-505	422
	CVPLC06302	TI435	422
	CVPLC06402	Series 505 CPU 545 - 555 PORT 1	232
	CVPLC06502	Series 505 CPU 555 PORT 2	422
TOSHIBA	CVPLC10102	M20-40-EX	C.L.
	CVPLC10112	Series T1	232
	CVPLC10222	Series T2/T3	232

C.L.: Current loop

Chapter 26 Resistance to chemical substances

This chapter consists of 8 pages.

All our VTs are built to withstand the effects of the more common chemical substances encountered in industrial and non-industrial environments. Each element of the VT that could be exposed to these substances (epoxy coating, keyboard membrane, screen surface, touch screen and gaskets), is tested to determine its degree of resistence.

The type of test is not the same for each component but changes according to the testing authority. Below is an example of a test (carried out by Alcatel Bell).

The test procedure was as follows:

A 2 cm ball of cotton wool was immersed in the test substance and then placed on the keyboard. Two cotton wool balls with different substances were placed separately on each keyboard; this was then put in a Petri dish and kept at a temperature of 25°C for an hour; after this, the keyboard was washed in water and dried.

The keyboard was observed and the results classified as follows:

- A - No visible deterioration
- B - Very slight deterioration
- C - Some deterioration
- D - Gross damage visible

The substances not appearing in the table were not tested, so there is no information regarding their effect.

Chemical substances

The table shown below lists all the substances used for the test with their various results.

The table must nevertheless be considered an approximate guide regard chemical substances: no tests have been carried out on a completely assembled terminal.

Table 26.1: Chemical resistance data sheet (Part 1 of 5)

Substance		Parts of the VT						Resistance
		Epoxy powder coating [3]	Matt keyboard surface [2]	Transparent keyboard surface [1]	Touch screen [2]	Protective-glass	Gaskets	
1,1,1-Trichlorethylene	NS	--	>24h	--	>24h	--	--	☺
Acetaldehyde	NS	--	>24h	--	>24h	--	--	☺
Acetic acid	10%	3Y	--	--	--	--	--	☺
	20%	3Y	--	--	--	--	--	☺
	<50%	--	>24h	--	>24h	--	--	☺
Acetone	NS	O	>24h	--	>24h	>8h	F	😐
Acetyl	NS	--	--	--	--	--	E	😐
Acid solutions	LC	--	--	--	--	--	E	☺
	HC	--	--	--	--	--	F	😐
Ajax	NS	--	>24h[4]	--	>24h[4]	--	--	☺
Aliphatic hydrocarbons	NS	--	>24h	--	>24h	--	--	☺
Alkaline solutions	LC	--	--	--	--	--	E	☺
	HC	--	--	--	--	--	F	😐
Ammonia	NS	--	--	--	--	--	E	☺
	<2%	--	>24h	--	>24h	--	--	☺
	5%	--	--	--	--	>24h	--	☺
	10%	3Y	--	--	--	--	--	☺
	35%	3Y	--	--	--	--	--	☺
Ariel	NS	--	>24h[4]	--	>24h[4]	--	--	☺
Benzene	NS	S	--	A	>24h	--	--	😐
Benzylalcohol	NS	--	O	--	O	--	--	☹
Bichromate	NS	--	--	--	>24h	--	--	☺
Blown castor oil	NS	--	--	--	>24h	--	--	☺
Carbon dioxide	NS	--	--	--	--	--	E	☺
Castor oil	NS	--	>24h	--	>24h	--	--	☺
Caustic soda	<2%	--	>24h	--	>24h	--	--	☺
	10%	--	--	--	--	>24h	--	☺
	50%	--	--	B	--	--	--	😐
Caustic solution	CO	--	O	--	O	--	--	☹
Chloric acid	NS	--	--	A	--	--	--	☺
Chlorine	NS	--	--	--	--	--	G	☹

Legend:
A - No visible degradation, B - Very slight degradation, C - Slight degradation, D - Damage visible or gross, E - Unlimited use, F - Limitated use, G - Use inadvisable, S - The surface melts, X - The surface blisters, O - The surface is destroyed, CO - Concentrated, HC - High concentration, LC - Low concentration, SA - Saturated, NS - Not specified, h - Hour(s), M - Month(s), Y- Year(s), ☺ - All the elements tested resist all the substances, 😐 - At least one of the elements tested may be damaged by the substances in question, ☹ - All the elements tested may be damaged by the substances in question

Notes:
1 - According to Alcatel Bell tests, 2 - According to DIN42115 Parts 2, 3 standards - According to raw material producers, 4 - Tested at 50°C

Table 26.1: Chemical resistance data sheet (Part 2 of 5)

Substance		Parts of the VT						Resistance
		Epoxy powder coating [3]	Matt keyboard surface [2]	Transparent keyboard surface [1]	Touch screen [2]	Protective-glass	Gaskets	
Chromic acid	10%	6M	--	--	--	--	--	😐
	20%	6M	--	--	--	--	--	😐
Citric acid	5%	3Y	--	--	--	--	--	☺
Coca Cola	NS	--	--	A	--	--	--	☺
Cooking salt solution	NS	--	--	--	--	--	E	☺
Copper sulphate	10%	3Y	--	--	--	--	--	☺
Crude oil	NS	3Y	--	--	--	--	--	☺
Cutting oil	NS	--	>24h	--	>24h	--	--	☺
Cyclohexanol	NS	--	>24h	--	>24h	--	--	☺
Detergent	NS	--	--	A	--	--	--	☺
Diesel fuel	NS	--	>24h	A	>24h	--	--	☺
Diethyle ether	NS	--	>24h	--	>24h	--	--	☺
Dioxan	NS	--	>24h	--	>24h	--	--	☺
Domestos	NS	--	>24h[4]	--	>24h[4]	--	--	☺
Downey	NS	--	>24h[4]	--	>24h[4]	--	--	☺
Edible oil	NS	3Y	--	--	--	--	--	☺
Ethanol	NS	--	--	A	>24h	>24h	E	☺
	96%	3Y	--	--	--	--	--	☺
Ethanol denat.	NS	1M	--	--	--	--	--	😐
Ethylacetate	NS	--	>24h	--	>24h	--	--	☺
Ethylene glycol	NS	O	--	A	--	--	--	😐
Fantastic	NS	--	>24h[4]	--	>24h[4]	--	--	☺
Formaldehyde	NS	--	--	A	--	--	--	☺
	35Vol.	3Y	--	--	--	--	--	☺
	37%	--	>24h	--	--	--	--	☺
	42%	--	>24h	--	--	--	--	☺
Formic acid	5%	3Y	--	--	--	--	--	☺
	10%	3Y	--	--	--	--	--	☺
	<50%	--	>24h	--	>24h	--	--	☺
Formula 409	NS	--	>24h[4]	--	>24h[4]	--	--	☺
Gasoline/petrol	NS	3Y	--	A	>24h	>24h	F	😐
Glacial acetic acid	NS	--	--	--	<1h	--	--	😐
Glycerine	NS	--	>24h	--	>24h	--	E	☺

Legend:
A - No visible degradation, B - Very slight degradation, C - Slight degradation, D - Damage visible or gross, E - Unlimited use, F - Limitated use, G - Use inadvisable, S - The surface melts, X - The surface blisters, O - The surface is destroyed, CO - Concentrated, HC - High concentration, LC - Low concentration, SA - Saturated, NS - Not specified, h - Hour(s), M - Month(s), Y- Year(s), ☺ - All the elements tested resist all the substances, 😐 - At least one of the elements tested may be damaged by the substances in question, ☹ - All the elements tested may be damaged by the substances in question

Notes:
1 - According to Alcatel Bell tests, 2 - According to DIN42115 Parts 2, 3 standards - According to raw material producers, 4 - Tested at 50°C

Table 26.1: Chemical resistance data sheet (Part 3 of 5)

Substance		Parts of the VT						Resistance
		Epoxy powder coating [3]	Matt keyboard surface [2]	Transparent keyboard surface [1]	Touch screen [2]	Protective-glass	Gaskets	
Glycol	NS	--	--	--	--	--	E	☺
Grape juice	NS	--	>24h[4]	--	>24h[4]	--	--	☺
Gumption	NS	--	>24h[4]	--	>24h[4]	--	--	☺
High pressure steam (at >100°C)	NS	--	O	--	O	--	G	☹
Hydraulic fluids	NS	--	--	--	--	--	F	😐
Hydrochloric acid	<10%	--	>24h	--	>24h	--	G	😐
	10%	3Y	--	--	--	--	--	☺
	20%	3Y	--	--	--	--	--	☺
Hydrogen peroxide	<25%	--	--	--	>24h	--	--	☺
	30%	--	--	A	--	--	--	☺
	40Vol	6M	--	--	--	--	--	😐
Isopropanol	NS	S	>24h	A	>24h	--	--	😐
Jet Dry	NS	--	>24h[4]	--	>24h[4]	--	--	☺
Lactic acid	5%	3Y	--	--	--	--	--	☺
Lemon juice	NS	--	B[4]	--	B[4]	--	--	😐
Lenor	NS	--	>24h[4]	--	>24h[4]	--	--	☺
Linseed oil	NS	3Y	>24h	--	>24h	--	--	☺
Liquid allum	NS	--	--	--	--	--	E	☺
Methane	NS	--	--	--	--	--	F	😐
Methanol	NS	--	>24h	A	>24h	--	F	😐
Methyl ethyl ketone	NS	--	>24h	--	>24h	--	--	☺
Methylene Chloride	NS	1M	O	--	O	--	G	☹
Milk	NS	--	>24h[4]	--	>24h[4]	--	--	☺
Mineral acids	CO	--	O	--	O	--	--	☹
Mineral oil 0-180	NS	--	--	A	--	--	E	☺
Mustard	NS	--	>24h[4]	--	>24h[4]	--	--	☺
n-Butanol	NS	S	--	--	--	--	--	😐
Nitrate of ammonia	SA	3Y	--	--	--	--	--	☺
Nitric acid	<10%	--	>24h	D	>24h	--	G	😐
	10%	3Y	--	--	--	--	--	☺
	20%	3Y	--	--	--	--	--	☺
	50%	1M	--	--	--	--	--	😐
Nitrocellulose solvents	NS	--	--	--	--	--	G	☹

Legend:
A - No visible degradation, B - Very slight degradation, C - Slight degradation, D - Damage visible or gross, E - Unlimited use, F - Limitated use, G - Use inadvisable, S - The surface melts, X - The surface blisters, O - The surface is destroyed, CO - Concentrated, HC - High concentration, LC - Low concentration, SA - Saturated, NS - Not specified, h - Hour(s), M - Month(s), Y- Year(s), ☺ - All the elements tested resist all the substances, 😐 - At least one of the elements tested may be damaged by the substances in question, ☹ - All the elements tested may be damaged by the substances in question

Notes:
1 - According to Alcatel Bell tests, 2 - According to DIN42115 Parts 2, 3 standards - According to raw material producers, 4 - Tested at 50°C

Table 26.1: Chemical resistance data sheet (Part 4 of 5)

Substance		Parts of the VT						Resistance
		Epoxy powder coating [3]	Matt keyboard surface [2]	Transparent key-board surface [1]	Touch screen [2]	Protective-glass	Gaskets	
Oil	NS	--	--	--	--	--	E	☺
Oleic acid	NS	3Y	--	--	--	--	--	☺
Paraffin oil	NS	3Y	>24h	--	>24h	--	--	☺
Perchloroethylene	NS	--	--	--	>24h	--	G	😐
Persil	NS	--	>24h[4]	--	>24h[4]	--	--	☺
Phosphoric acid	10%	3Y	--	--	--	--	--	☺
	20%	3Y	--	--	--	--	--	☺
	50%	3Y	--	--	--	--	--	☺
	<30%	--	>24h	--	>24h	--	--	☺
Photographic chemicals	NS	--	--	--	--	--	E	☺
Potassium carbonate	NS	--	>24h	--	>24h	--	--	☺
Potassium ferrocyanide	NS	--	>24h	--	>24h	--	--	☺
Potassium hydroxide	10%	3Y	--	--	--	--	--	☺
	20%	3Y	--	--	--	--	--	☺
Sea water	NS	--	--	--	--	--	E	☺
Sebacic acid	SA	3Y	--	--	--	--	--	☺
Silicon oil	NS	--	--	--	>24h	--	E	☺
	NS	--	--	--	--	--	E	☺
Skydrol	NS	6M	--	--	--	--	--	😐
Sodium carbonate	SA	--	>24h	--		--	--	☺
Sodium chloride	3%	3Y	--	--	--	--	--	☺
Sodium hydroxide	20%	3Y	--	--	--	--	--	☺
Sodium hypochloride	NS	--	>24h	--	--	--	--	☺
	10%	6M	>24h	--	--	--	--	😐
	<20%	--	--	--	>24h	--	--	☺
Softner	NS	--	>24h	--	>24h	--	--	☺
Sulphuric acid	10%	3Y	--	--	>24h	>24h	--	☺
	28%	3Y	--	A	--	--	--	☺
	50%	6M	--	--	--	--	--	😐
	CO	--	--	--	--	--	G	☹
Tartaric acid	SA	3Y	--	--	--	--	--	☺
Teepol	NS	3Y	--	--	--	--	--	☺
Toluene	NS	3Y	>24h	A	>24h	--	G	😐

Legend:
A - No visible degradation, B - Very slight degradation, C - Slight degradation, D - Damage visible or gross, E - Unlimited use, F - Limitated use, G - Use inadvisable, S - The surface melts, X - The surface blisters, O - The surface is destroyed, CO - Concentrated, HC - High concentration, LC - Low concentration, SA - Saturated, NS - Not specified, h - Hour(s), M - Month(s), Y- Year(s), ☺ - All the elements tested resist all the substances, 😐 - At least one of the elements tested may be damaged by the substances in question, ☹ - All the elements tested may be damaged by the substances in question

Notes:
1 - According to Alcatel Bell tests, 2 - According to DIN42115 Parts 2, 3 standards - According to raw material producers, 4 - Tested at 50°C

Table 26.1: Chemical resistance data sheet (Part 5 of 5)

Substance		Parts of the VT						Resistance
		Epoxy powder coating [3]	Matt keyboard surface [2]	Transparent keyboard surface [1]	Touch screen [2]	Protective-glass	Gaskets	
Tomato juice	NS	--	B[4]	--	B[4]	--	--	😐
Tomato sauce	NS	--	B[4]	--	B[4]	--	--	😐
Top Job	NS	--	>24h[4]	--	>24h[4]	--	--	☺
Trichloroethylene	NS	S	--	--	>24h	--	G	😐
Turpentine oil	NS	--	>24h	--	--	--	F	😐
Turpentine substitute	NS	3Y	--	--	--	--	--	☺
	NS	--	--	--	>24h	--	--	☺
Vaselline	NS	--	--	--	--	--	F	😐
Vim	NS	--	>24h[4]	--	>24h[4]	--	--	☺
Vinegar	NS	--	--	D	--	--	--	☹
Vortex	NS	--	>24h[4]	--	>24h[4]	--	--	☺
Washing powders	NS	--	>24h	--	>24h	--	E	☺
Water	NS	--	>24h	--	--	--	E	☺
White spirit	NS	3Y	--	A	--	--	--	☺
Windex	NS	--	>24h[4]	--	>24h[4]	--	--	☺
Wisk	NS	--	>24h[4]	--	>24h[4]	--	--	☺
Xilene	NS	1Y	>24h	--	>24h	--	--	☺

Legend:
A - No visible degradation, B - Very slight degradation, C - Slight degradation, D - Damage visible or gross, E - Unlimited use, F - Limitated use, G - Use inadvisable, S - The surface melts, X - The surface blisters, O - The surface is destroyed, CO - Concentrated, HC - High concentration, LC - Low concentration, SA - Saturated, NS - Not specified, h - Hour(s), M - Month(s), Y- Year(s), ☺ - All the elements tested resist all the substances, 😐 - At least one of the elements tested may be damaged by the substances in question, ☹ - All the elements tested may be damaged by the substances in question

Notes:
1 - According to Alcatel Bell tests, 2 - According to DIN42115 Parts 2, 3 standards - According to raw material producers, 4 - Tested at 50°C

Cleaning the VT

For cleaning the VT we recommend Denaturalised Ethyl Alcohol. Should this be insufficient for removing the impurity making it necessary to use other products, consult the tables above.

Chapter 27 Technical support

This chapter consists of a total of 6 pages.

Problems related to the use of ESA VT terminals should be referred to our Customer Care service. The department is contactable on week days in office hours.

National Customer Care

The National Customer Care service can be contacted by:

Telephone:++44 (0) 1203 386550

Fax: ++44 (0) 1203 386551

E-Mail: esahmi@esauk.ltd.uk

Web site: http://www.esahmi.it

National Product Returns

If it is necessary to return the VT terminal for repair:

- Contact our National Customer Care service to authorize the return.
- Fill in all parts of the form to accompany the product.

Our National Customer Care service will supply all the necessary information for returning an item.

!!! IMPORTANT NOTE !!!

ESA (UK) LIMITED will accept:

- goods carriage free / freight prepaid (transport at customer's cost).
- goods carriage forward / freight collect (transport paid by ESA) **only with the prior authorization of the company**.

ESA (UK) LIMITED will reject:

- any returned goods carriage forward where there has been no prior authorization.

It is not necessary to send connectors, cables and accessories (unless they are thought to be linked to the problem indicated).

Thank you for your kind co-operation.

ESA (UK) LIMITED, 12 YORK GATE, LONDON NW1 4QS (UK)
Tel. ++44 (0) 1203 386550 Fax ++44 (0) 1203 386551 V.A.T. N. GB695601118

REPAIRS RETURN FORM

NOTE: Please complete form in BLOCK CAPITALS.

Returned goods code: .....

Product: ..... **S/N:** □□-□□-□□□□□

Customer details (must be filled in)

Compiled by: .....

Company : .....

Full address : .....

.....

Tel. no. : ..... Fax: .....

Contact person (where different from above)

Name : .....

Tel. no. : ..... Fax: .....

Information regarding problem (must be filled in)

Device connected: .....

Detailed description of the problem and the circumstances under which it occurs:

.....

.....

.....

.....

.....

.....

.....

Notes: .....

.....

.....

Customer Care worker contacted: .....

Date of compilation: ...../...../..... Signature: .....

International Customer Care

The International Customer Care service can be contacted by:

Telephone:++39-031757400

Fax: ++39-031751777

E-Mail: esahotln@esahmi.it

Web site: http://www.esahmi.it

International Product Returns

Should it be necessary to return the VT terminal for repair:

- Contact our International Customer Care service to authorize the return.
- Fill in all parts of the form to accompany the product.

Our International Customer Care service will supply all the necessary information for returning a an item.

!!! IMPORTANT NOTE !!!

ESA elettronica S.p.A. will accept:

- goods carriage free / freight prepaid (transport at customer's cost).
- goods carriage forward / freight collect (transport paid by ESA) **only with the prior authorization of the company**.

ESA elettronica S.p.A. will reject:

- any returned goods carriage forward where there has been no prior authorization.

It is not necessary to send connectors, cables and accessories (unless they are thought to be linked to the problem indicated).

Thank you for your kind co-operation.

ESA elettronica S.p.A. Via Padre Masciadri, 4/A - 22066 Mariano C.se (Co) ITALY
Tel. ++39-031757400 Fax ++39-031751777 C.F. 12508520157 P.IVA IT 02422110136

REPAIRS RETURN FORM

NOTE: Please complete form in BLOCK CAPITALS.

Returned goods code: .....

Product: ..... **S/N:** □□-□□-□□□□□

Customer details (must be filled in)

Compiled by: .....

Company : .....

Full address : ..... Post Code: .....

Town : ..... County: .....

Tel. no. : ..... Fax: .....

Contact person (where different from above)

Name : .....

Tel. no. : ..... Fax: .....

Information regarding problem (must be filled in)

Device connected: .....

Detailed description of the problem and the circumstances under which it occurs:

.....

.....

.....

.....

.....

.....

.....

Notes: .....

.....

.....

Customer Care worker contacted: .....

Date of compilation: ...../...../..... Signature: .....