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1 Introduction

The VT operator terminal is used for displaying and setting data, and showing the status or alarm messages for the machines or plants controlled by the PLC. The terminal is a versatile and economic solution because it communicates directly with the PLC using the programming connector without requiring any additional hardware.

The operator terminal is programmed using programming software that enables the data to be transferred to the unit's memory.

2 General information on electromagnetic compatibility

Electronic devices are being increasingly used in automated systems. programmable controllers (like the PLC) belong to this category, as do Man-machine-interface systems (eg the Video Terminal), control systems (eg diagnostic panels), interface elements (eg interface boards) and activators (like inverters). Together with this type of electronic apparatus, you find installed classical electro-mechanical devices like counters, 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 caused by inductive coupling between the connection cables.

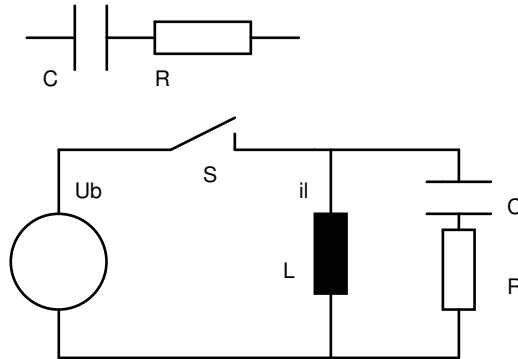
Switching of inductive loads. When an inductive load is switched off, the magnetic energy stored tends to oppose this, discharging a voltage peak down the line which can damage or destroy the control device. Furthermore, the high-frequency component of the voltage peak can cause disturbance caused by 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.

IMPORTANT

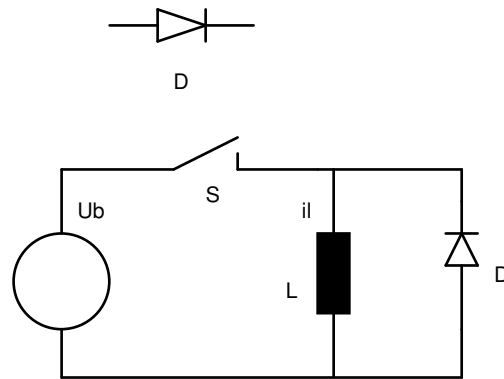
Disturbance must be suppressed at its source whenever possible.

2.1 Disturbance suppression circuit with RC



Advantages	Disadvantages
The residual component has a very low harmonic waveform component.	The best results are obtained by sizing the R/C circuit suitably.
The residual overvoltage can be limited to very low values by optimising 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-energising 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 in AC.
No arc (low energy) on switching contact.	

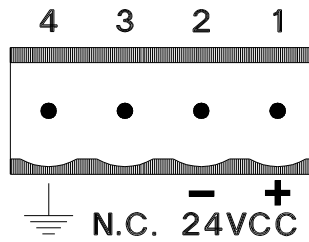
2.2 Disturbance suppression circuit with Diode



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.

3 Power supply

To supply power to the VT use a 24 VDC $\pm 20\%$ - 0.5 A power supply unit.



Power supply 4 pins connector	
1	+L Input for 24V DC power supply.
2	M Input for 0 V power supply.
3	N.C.
4	PE Protective earth.



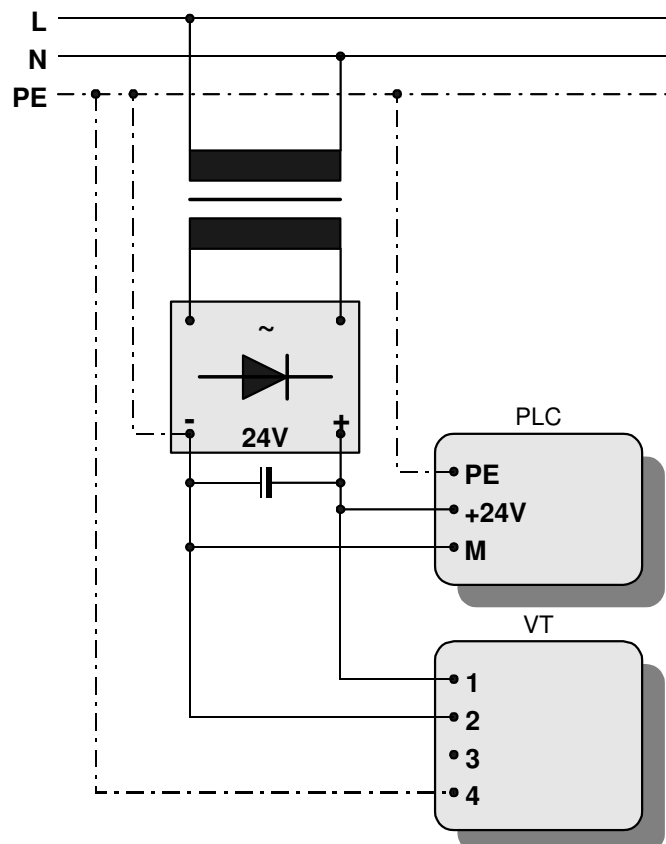
WARNING

Check the connection using the diagrams below

IMPORTANT

Correct earthing is vital.

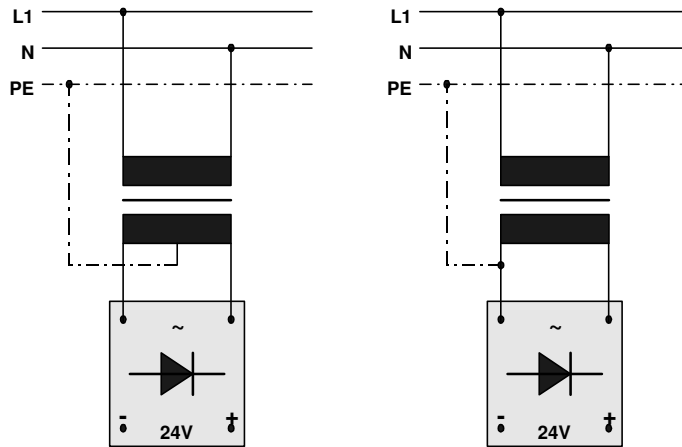
Power supply with 0V (M) to PE



IMPORTANT

These two configurations will seriously damage VT components

Dangerous connections



WARNING

For applications that use the power supply positive connected to PE.

IMPORTANT

The earth of the devices connected to the serial and/or parallel communication ports **MUST** have the same potential as the 0V supply of the VT.
The circulation of current between the 0V supply and the earth of the communication ports could cause damage to certain components of the VT or of the devices connected to it.

4 Troubleshooting procedures

The VT may display a number of operating fault or program error messages during operation. These messages and any actions required are detailed below.

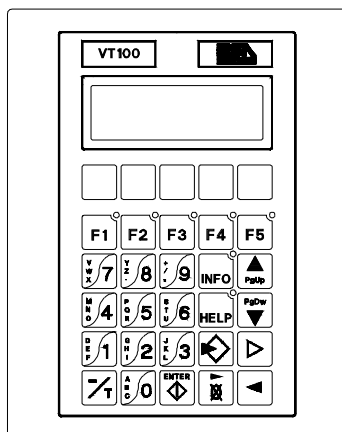
VT	ERROR CODE	CAUSE OF THE PROBLEM	CORRECTIVE ACTION
VT100 VT400	COMMUNICATION BROKEN	Means that the communication between the VT terminal and PLC has been interrupted.	Check all the connections between the terminal and PLC, making sure the cables are correct and in perfect condition.
VT400	SWITCH OFF THE DEVICE	Password entered incorrectly.	Switch off the terminal and then switch it back on again. Enter the correct password.
VT100 VT400	ERROR 001, 002, 003, 004, 005, 006, 007, 008, 009, 010, 011, 012, 017, 019, 020, 021, 026, 028, 029, 030	These are system messages that should not be displayed. If one of these errors appears, compile the project and transfer it again to the terminal. If the error appears again call assistance.	
VT100 VT400	ERROR 013	Register does not exist in PLC.	With Siemens PLC, means that the declared DB is not open up to the declared DW. With other PLCs, means the register set is outside the admissible limits for that PLC.
VT100 VT400	ERROR 014	Configuration program missing. Means that the declaration of the configuration page 000 is missing in the VT program (See description in related section).	Load project and firmware.
VT100 VT400	ERROR 015	Sequence or starting page missing. Means that there is no sequence declaration @F. in the program and that the information exchange word 9 (VT100), 25 (Hex 19 VT400) is 0, so that the VT does not know which page to display.	

VT	ERROR CODE	CAUSE OF THE PROBLEM	CORRECTIVE ACTION
VT100 VT400	ERROR 016	Message not implemented xxxx. Means that a situation has occurred in the PLC in relation to which the VT cannot find the message to display. CASE 1: The VT is in alarm display mode (LED INFO on with fixed light): in the alarm words area the PLC has set one or more bits related to alarm messages NOT programmed in the VT-project at status 1. CASE 2: The VT is in operative pages display mode (LED INFO off or blinking): the page being displayed contains an item of "dynamic text" data addressed to a PLC register that has assumed a value (or bit) for which the corresponding message has NOT been programmed in the VT project.	SOLUTION TO CASE 1: Program the alarm message/s in the VT project, or check that the PLC is NOT activating alarm bits for which no alarm message/s has/have been programmed in the VT project. SOLUTION TO CASE 2: Program the dynamic text in such a way as to add the appropriate texts to ALL the values (or bits) that the associated PLC register can have, or check that the associated PLC register does NOT assume values (or bits) in relation to which no texts have been devised to be displayed.
VT100 VT400	ERROR 018	End of program memory. Means that the limit of the VT memory has been reached during the program transfer from the PG/PC to the VT.	

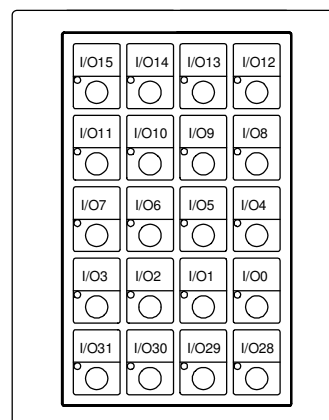
VT	ERROR CODE	CAUSE OF THE PROBLEM	CORRECTIVE ACTION
VT100 VT400	ERROR 022	Protocol or connection error.	Carefully check the connection cables and above all the various earths which need to be connected as recommended for each cable. It is also advisable to check whether there are any sources of disturbance (motors, electromagnetic fields, solenoid valves, etc.) near the route of the cable which connects the VT to the PLC. With a HITACHI CPM E3, this error occurs when you try to set data that is not allowed (M960-991, T/C using 1-HEM protocol).
VT100 VT400	ERROR 023	Length information exchange DB insufficient.	This error can only occur with terminals connected to a Siemens PLC when the declared information exchange DB is not open or open for less than the DW required (minimum 31 + any DW dedicated to the alarms).
VT400	ERROR 024	Page to be printed not present..	Insert an existing print page in word 24 of the data exchange.
VT100 VT400	ERROR 025	Definition of data exchange offset incorrect. This error occurs if an offset is declared in page 0 (@P000) that is "outside" the memory limits of the PLC used.	
VT100 VT400	ERROR 027	Program not present in memory.	Enter the program required by programming the data EEPROM (see "Multiple Programs") in the terminal memory. This error can also occur when you enter the "Program transmission" phase and there is no program in the terminal memory.

VT UNIVERSAL OPERATOR TERMINALS

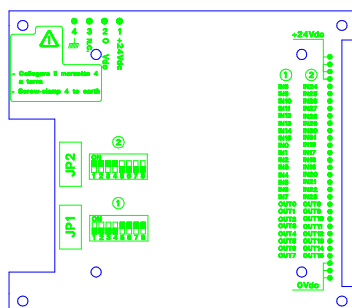
VT100



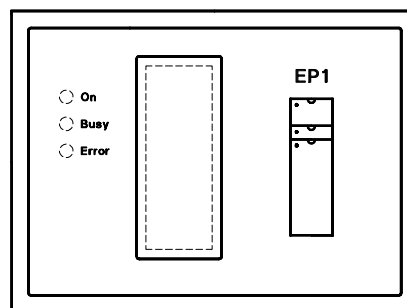
MT1000



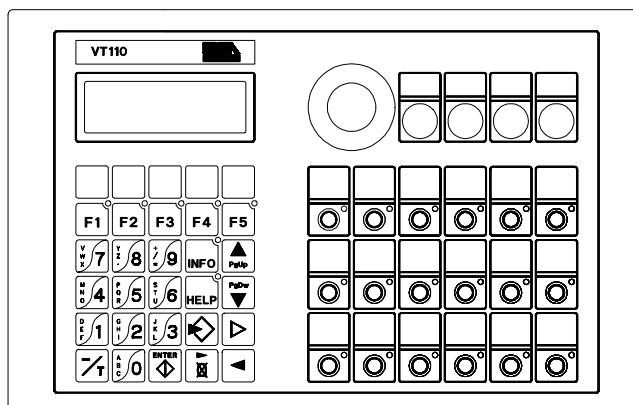
I/O



EP1

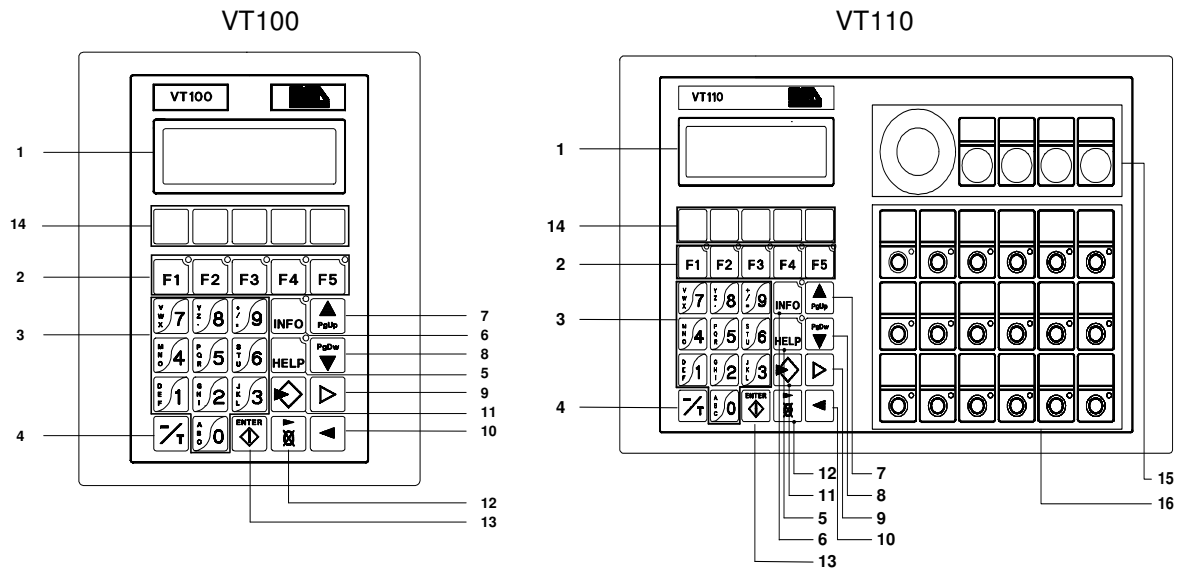


VT110



5 Front and rear panel description

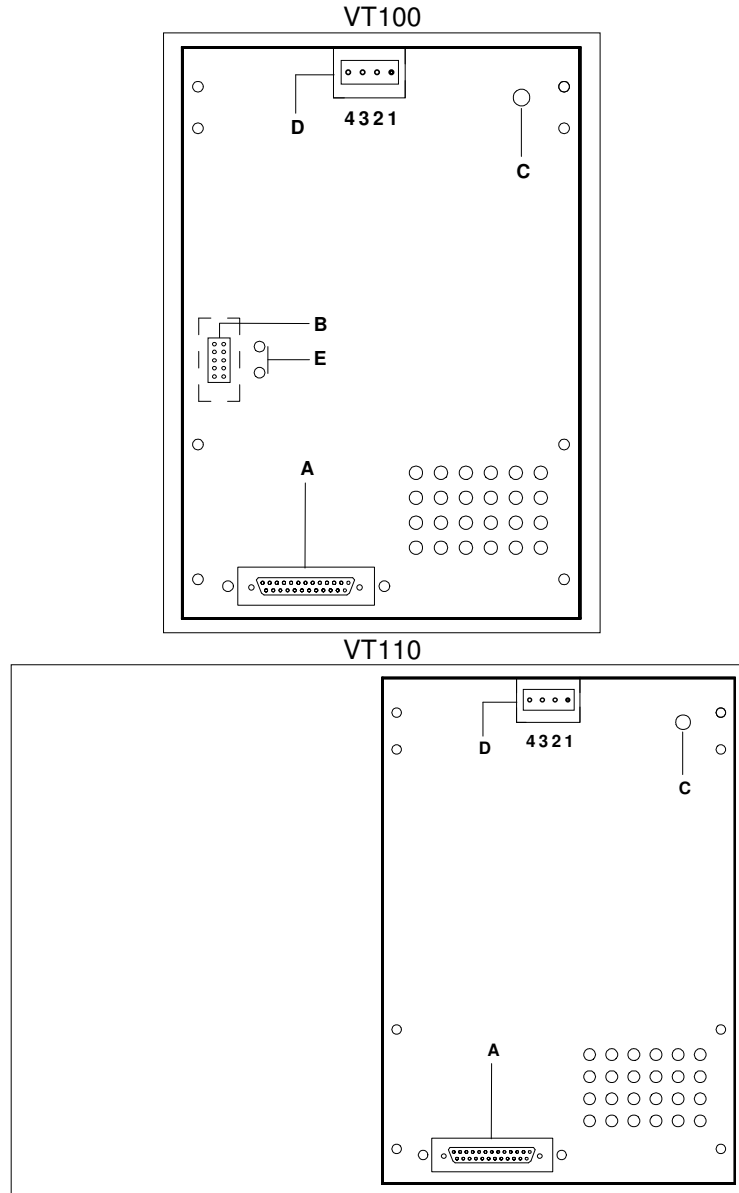
5.1 Front of VT100/VT110



1	LCD display
2	Function keys F1..F5 ###
3	Alphanumeric keys
4	Sign or time variable base
5	Displays alarm sub-message
6	Displays alarm messages
7	Page up or rotates alarms buffer
8	Page down or rotates alarms buffer
9	Field change in setting phase
10	Moves cursor in field selected
11	Enters setting phase
12	Clears datum or moves ASCII datum character
13	Enter. Accepts setting
14	Customised labels for function keys
15	Standard holes for actuators
16	Optional auxiliary keys

① The Fx keys are customised by slipping a strip of paper or acetate with the words or symbols for the process on it into a slot in the terminal

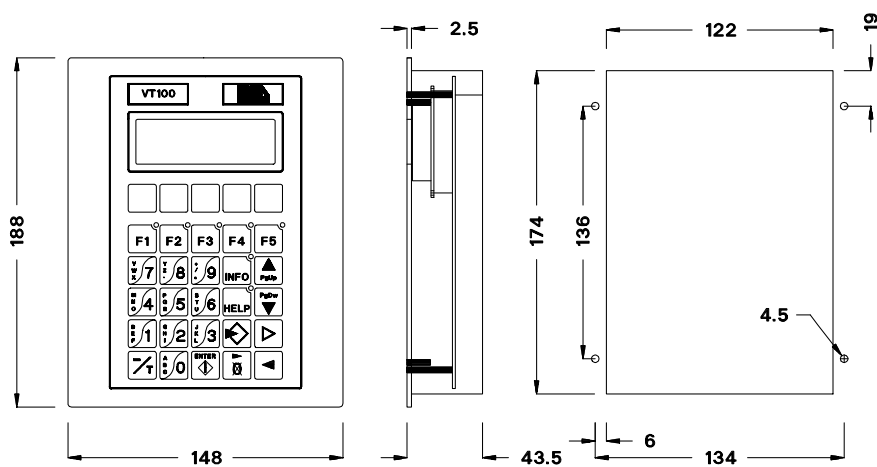
5.2 Rear of VT100/VT110



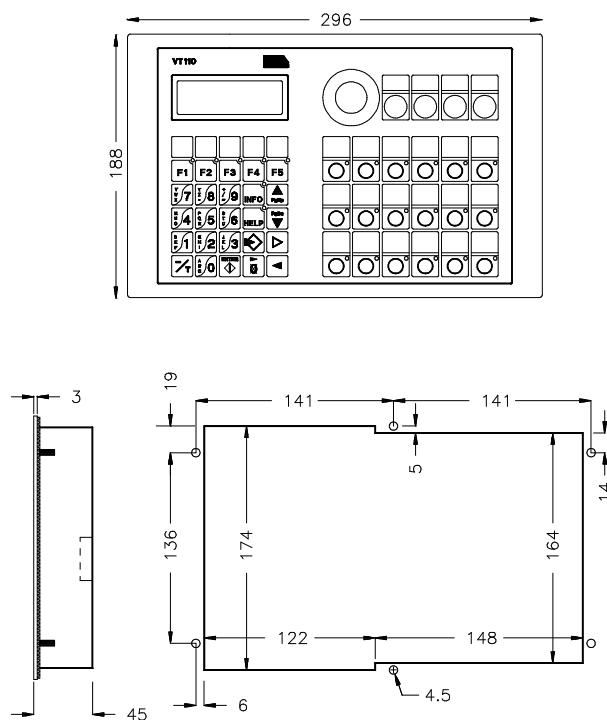
A	Serial port for communication with PLC
B	Connector for auxiliary device
C	Trimmer for adjusting LCD contrast
D	Power supply connector
E	Flatcable fixing holes for auxiliary device

6 Dimension and panel cut-outs

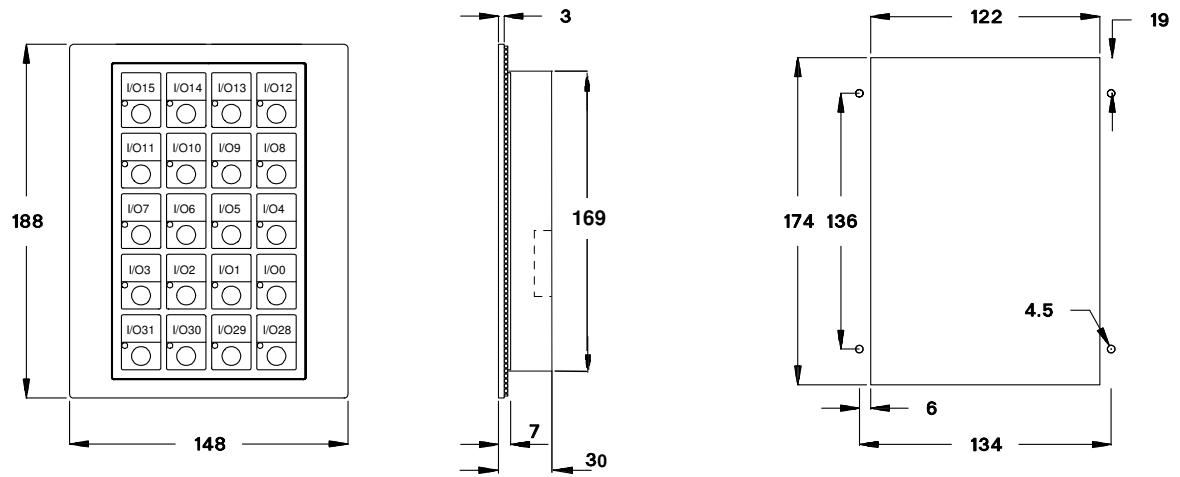
VT100



VT110

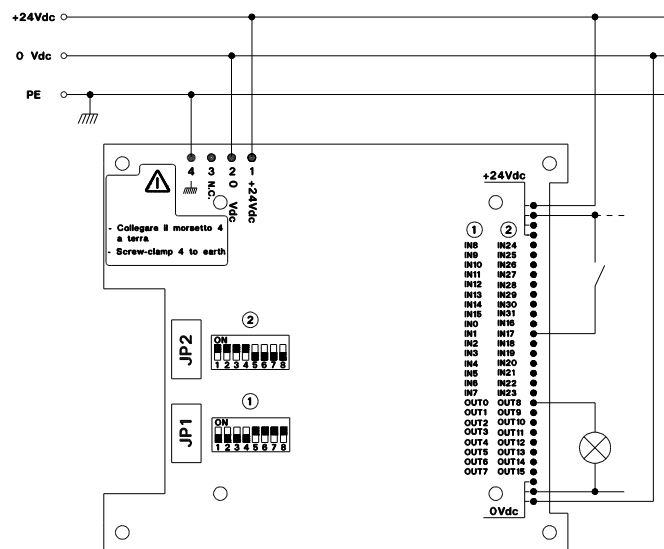


MT1000



7 Input/output module VT100INOUT2 SOURCE

Connections

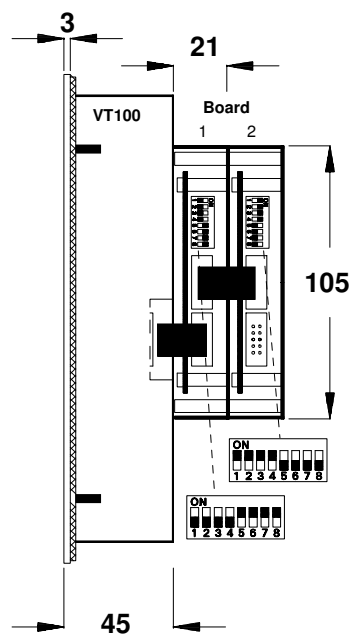


Connection cable to IN / OUT terminals



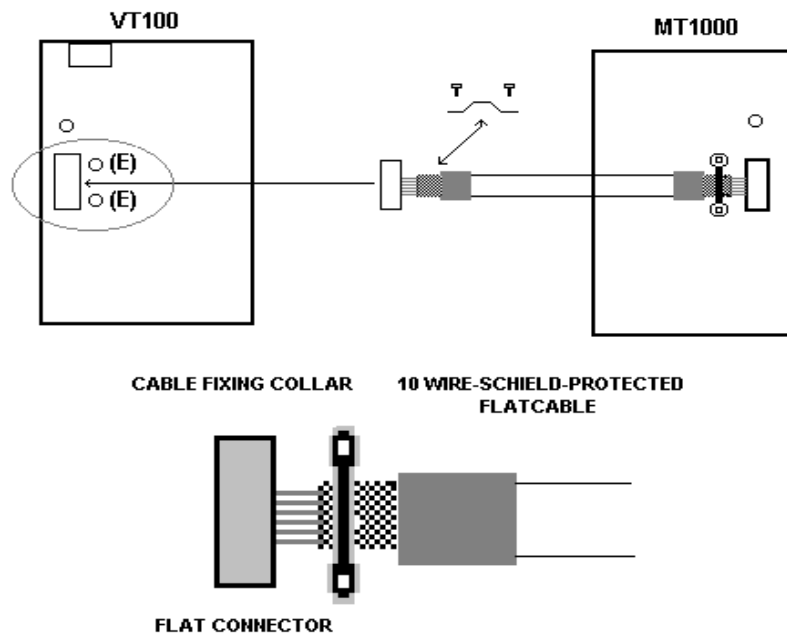
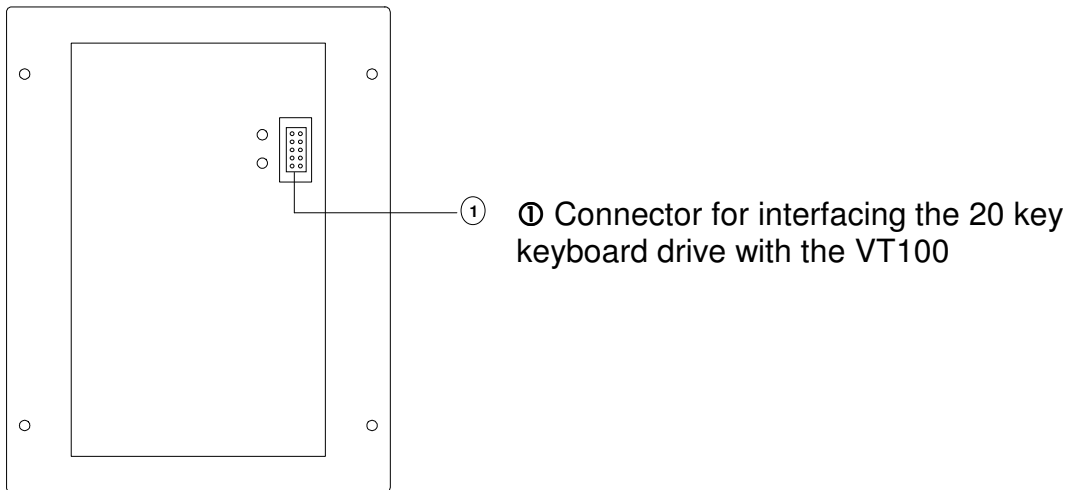
Connection section up to 0.5 mm²
Stripped length 11mm

Mechanical fitting



A maximum of
two VT100INOUT2 can be
connected in series.

8 20 key keyboard drive VT100MT1000



8.1 Connection with VT100

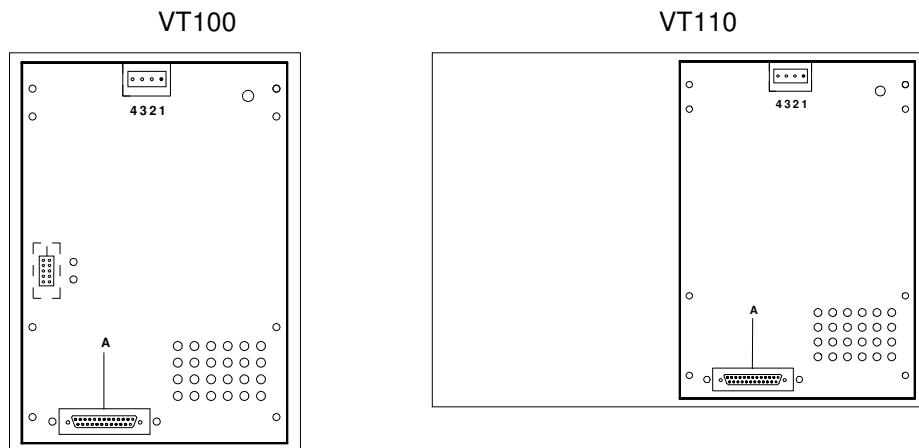
The MT1000 'control keyboard module' is connected directly by means of flat cable to the AUX port of the VT100 operator terminal (maximum length of flat cable 30 cm).

To fix the flatcable, use the cable-fixing collar and clamp this between the two self-threading screws using the holes marked (E).

The cable-fixing collar must clamp the flatcable shield against the rear of the VT cover.

N.B. Self-threading screws must not exceed 8mm in length

9 Com1 serial connection



COM1 (A)
25 pin female

1	Protective GND
2	Tx RS232
3	Rx RS232
4	RTS
5	CTS
6	
7	Signal GND
8	
9	Tx CL +
10	Aux -
11	Tx CL -
12	Tx RS422 -
13	Rx RS422 +
14	+ 20 ma Tx
15	+ 20 ma Rx
16	+ 5 VCC
17	
18	Rx CL -
19	
20	
21	
22	Aux +
23	Tx RS422 +
24	Tx RS422 -
25	Rx CL -

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

IMPORTANT

The earth of the devices connected to the serial and/or parallel communication ports **MUST** have the same potential as the 0V supply of the VT. The circulation of current between the 0V supply and the earth of the communication ports could cause damage to certain components of the VT or of the devices connected to it.

Always:

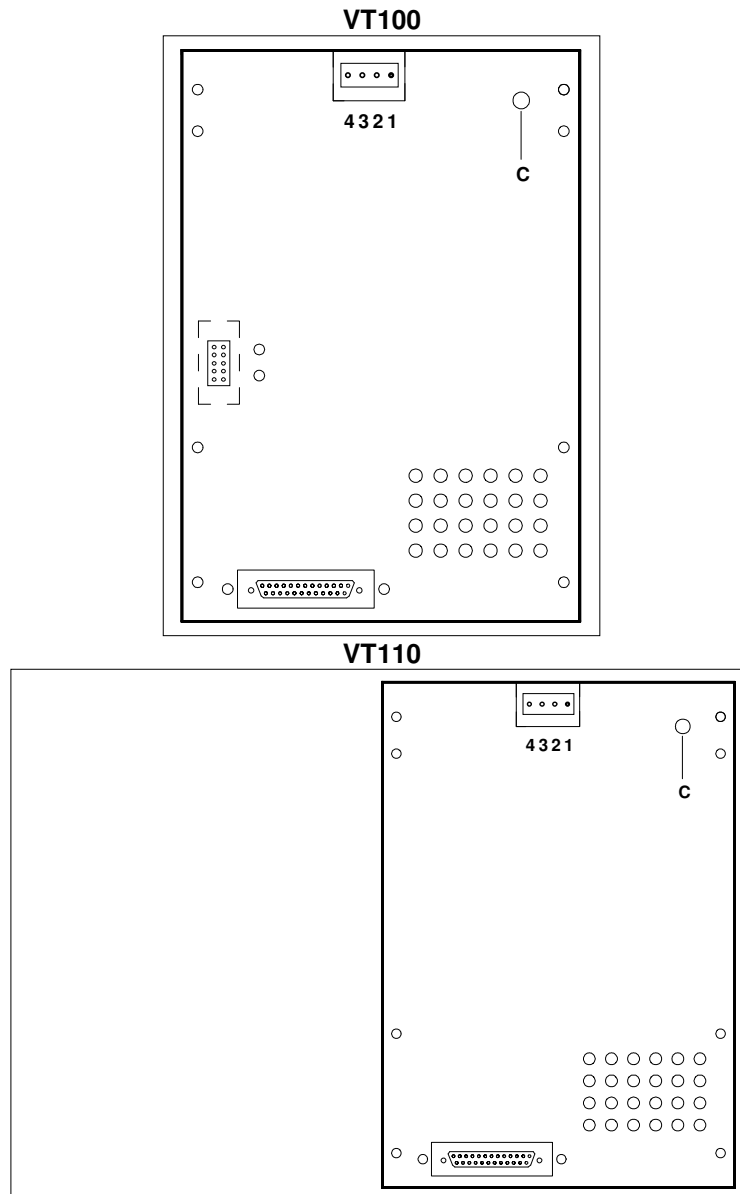
- Find the shortest route
- Lay disturbed cables separately



WARNING

Disconnect the power supply before connecting or disconnecting the communication cables.

10 LCD adjustment

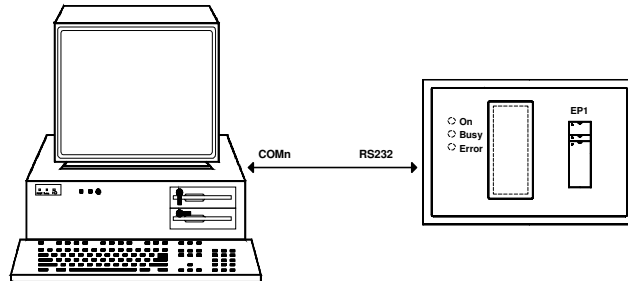


C	LCD contrast control. Adjusts the display for optimum clarity in every situation
----------	--

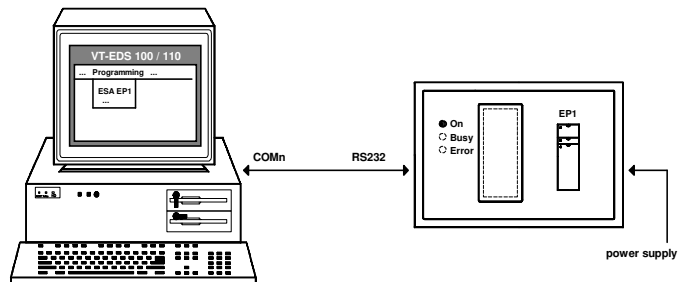
11 Programming the VT

11.1 General operations with non-directly programmable VTs

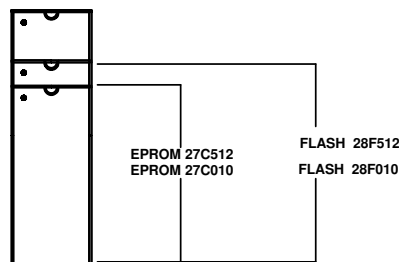
Make sure that the PC and the ESA EP1 programmer are switched off, then make the serial connection between the two



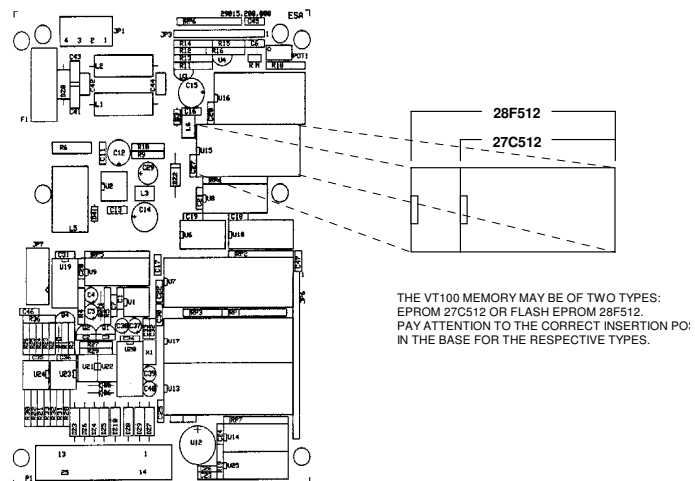
Switch on the PC and connect the power supply unit of the EP1; go into the project management program of the terminal (VT100 - VT110) which you intend to use; the program on PC will show the main selection menu and the green "ON" LED on the EP1 will illuminate.



Insert the memory to be programmed into the housing in the EP1, as shown in the diagram on the cover.

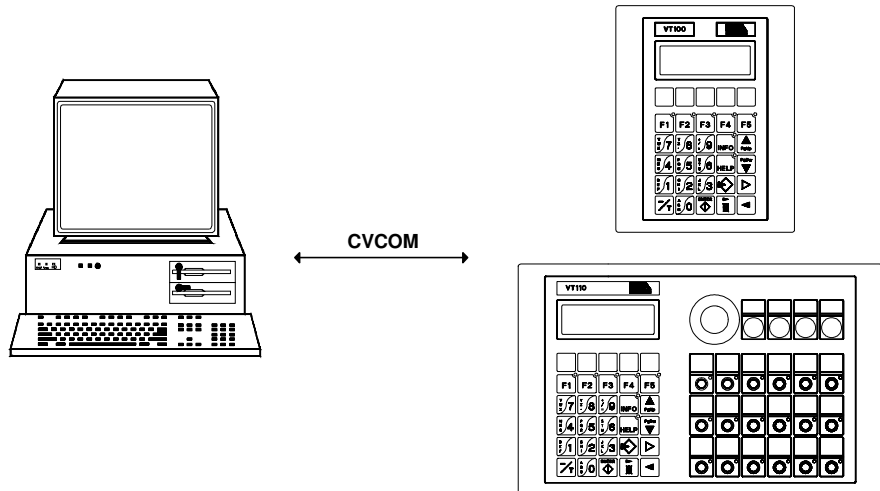


Follow the software package user's instructions to send to the programmer the project or projects which you intend to memorize; during programming operations, the yellow "Busy" LED on the EP1 illuminates, and the PC informs the user on the state of the transfer operations; on completion of operations, the "Busy" led switches off and the PC informs the user that operations are complete; only now is it possible to remove the programmed memory from the housing in the EP1 and insert it in the base of the VT card: remove the back cover of the panel and position as shown in the diagram in the figure.

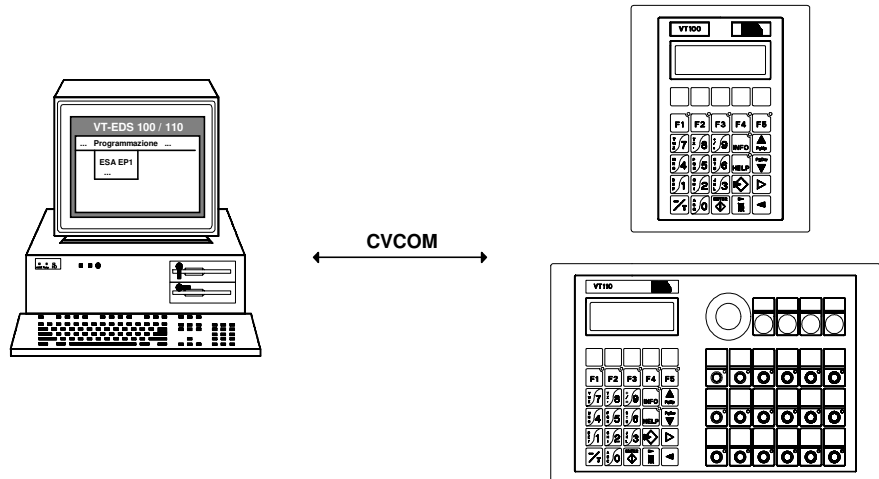


11.2 General operations with directly programmable VTs

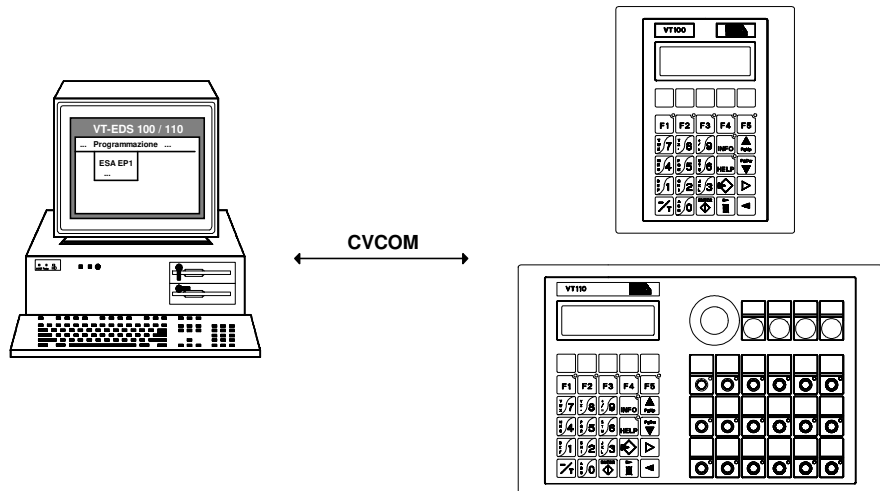
Make sure that the PC and the VT programmer are switched off, then make the serial connection between the two;



Switch on the PC and connect the power supply of the VT; go into the project management program of the terminal (VT100 - VT110) which you intend to use; the program on PC will show the main selection menu.



Follow the software package user's instructions to send to the programmer the project or projects which you intend to memorize; during programming operations, the PC informs the user on the state of the transfer operations; on completion of operations, the PC informs the user that operations are complete.



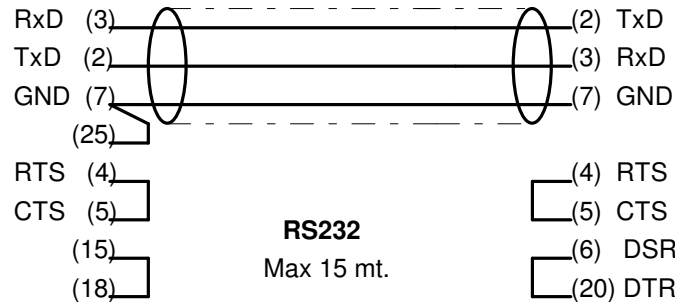
11.2.1 Connection cables VT ⇔ PC

Code : CVCOM11202

VT COM1

Db25 pole male

PC Db25 pole female

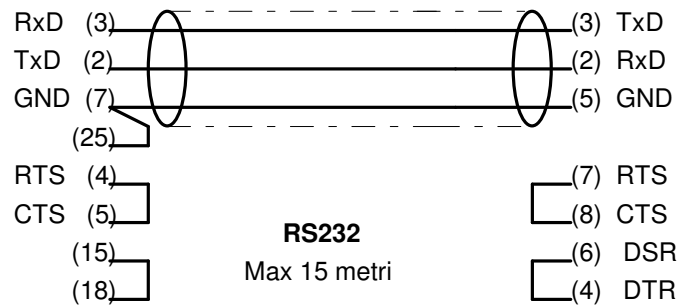


Code : CVCOM11102

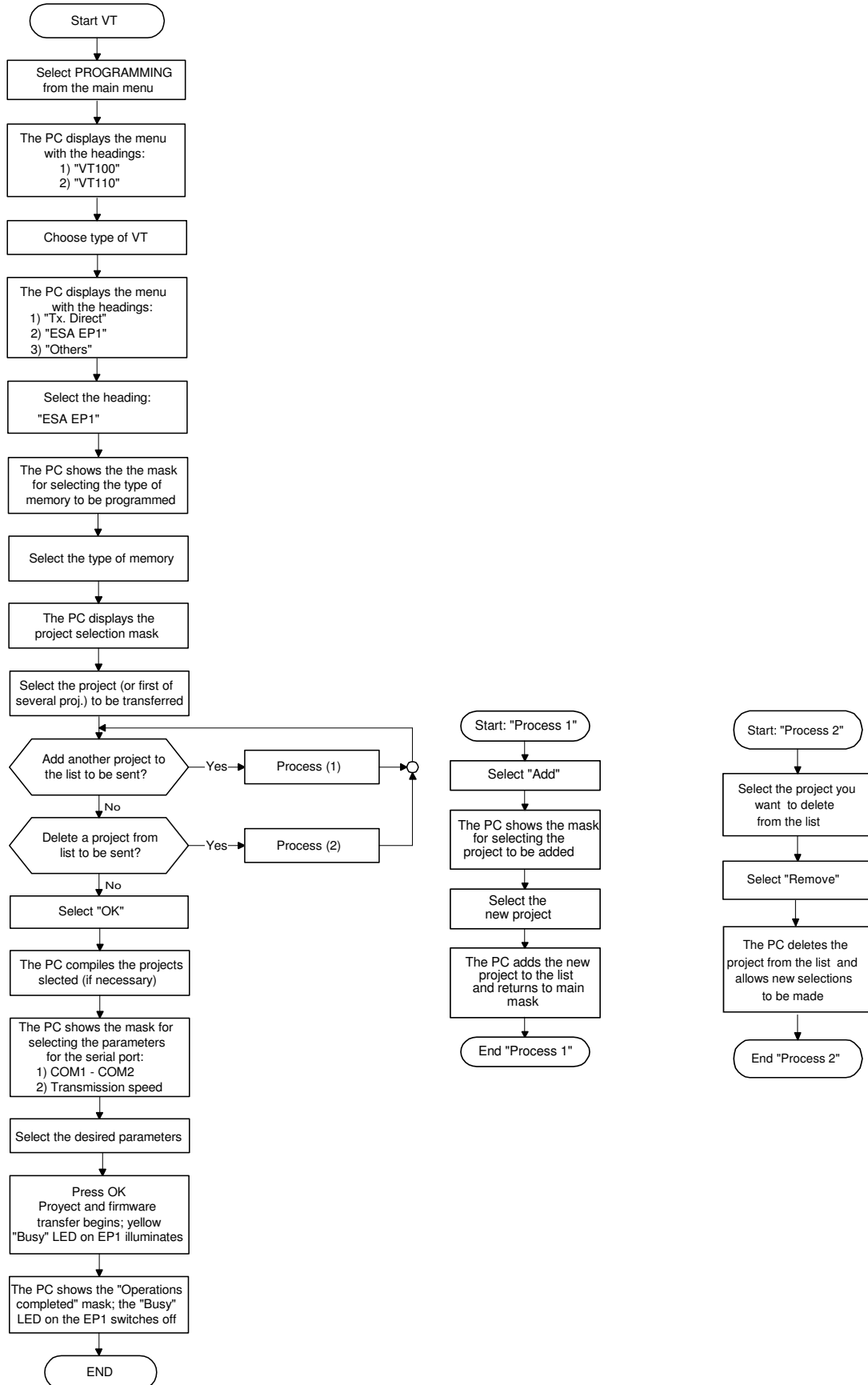
VT COM1

Db 25 pole male

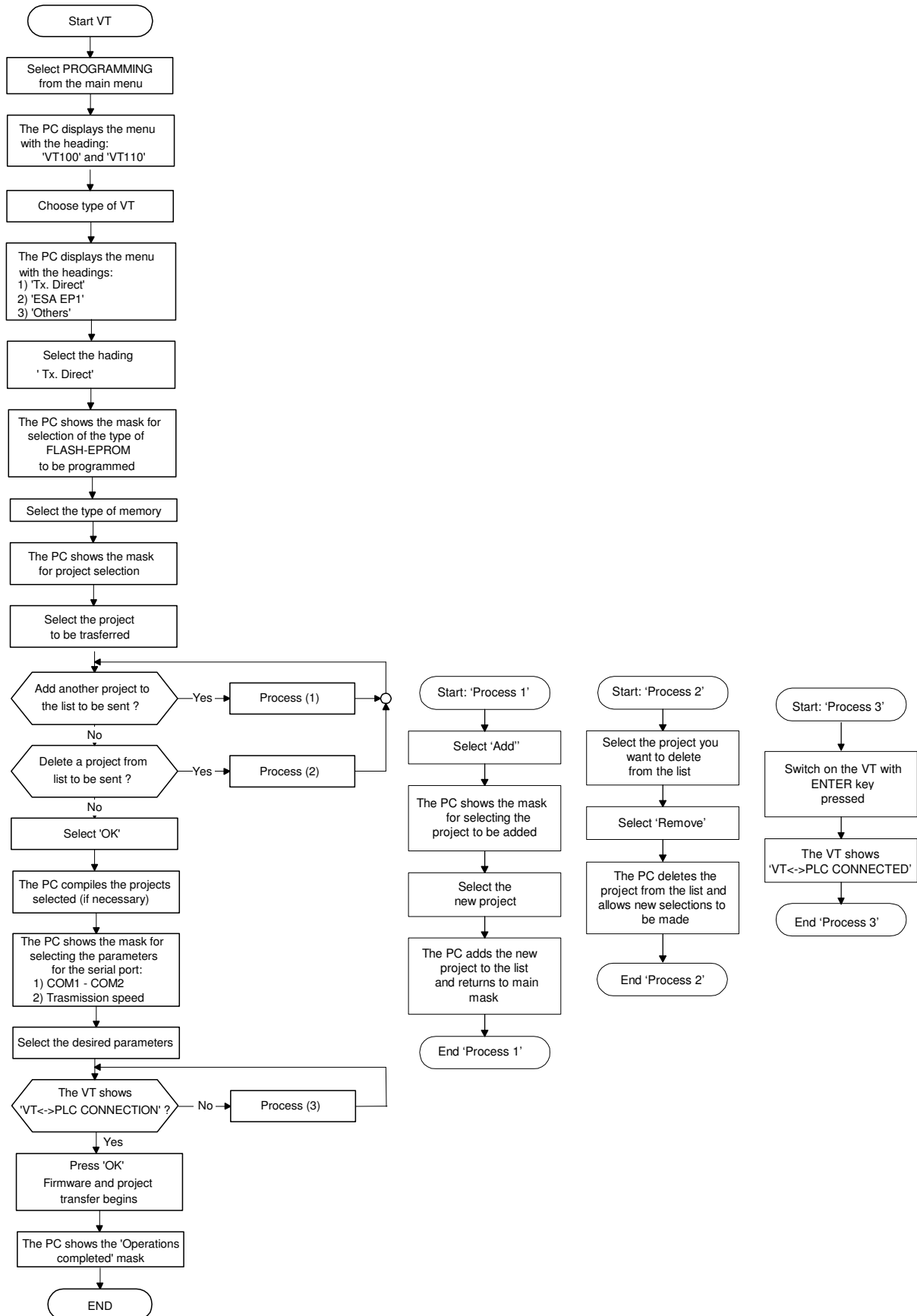
PC Db 9 pole female



11.3 Loading the project into the memory of non-directly programmable VTs

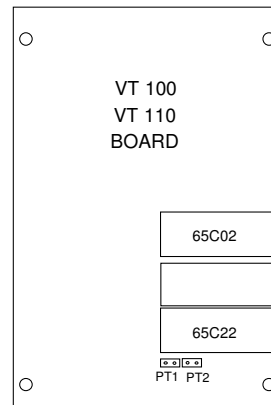
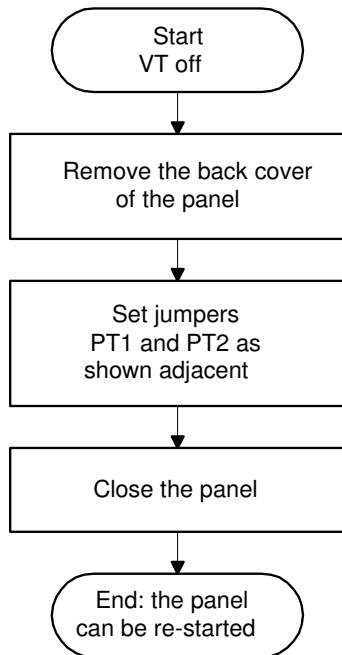


11.4 Loading the project into the memory of directly programmable VTs



12 Multiple programs

Select hardware



PT1	PT2	selection
open	open	first project
closed	open	second project
open	closed	third project
closed	closed	fourth project

Select via software

The PLC writes in data exchange word 6 the value of the project to be used (from 1 to 99: 1 is the first project in the list; 0 is set for a 'via hardware' selection).

13 VT-PLC information exchange area

The information exchange area is used to exchange general data between the Terminal and PLC and must be declared in the programming phase..

13.1 Table of common data exchange registers

VT ==> PLC

DEC	HEX	OCT	32b	8b	ABB	CS31 - dir. prot.	Bit 15 .. 8	Bit 7 .. 0
+ 0	+ 0	+ 0	+ 0 H	+ 0 , + 1	+ 0,0	+ 0,0	Bit decoding of numerical keys , - / T , F keys	
+ 1	+ 1	+ 1	+ 0 L	+ 2 , + 3	+ 0,1	+ 0,1	Bit decoding of service keys and groups of keys	
+ 2	+ 2	+ 2	+ 1 H	+ 4 , + 5	+ 1,0	+ 0,2		Page displayed (*)
+ 3	+ 3	+ 3	+ 1 L	+ 6 , + 7	+ 1,1	+ 0,3	A) Description of VT ### PLC exchange bit	
+ 4	+ 4	+ 4	+ 2 H	+ 8 , + 9	+ 2,0	+ 0,4		Sequence active

PLC ==> VT

DEC	HEX	OCT	32b	8b	ABB	CS31 - dir. prot.	Bit 15 .. 8	Bit 7 .. 0
+ 6	+ 6	+ 6	+ 3 H	+ 12,+ 13	+ 3,0	+ 0,6		Project to be executed (VT110)
+ 7	+ 7	+ 7	+ 3 L	+ 14,+ 15	+ 3,1	+ 0,7		Sequence to be displayed (*)
+ 8	+ 8	+ 10	+ 4 H	+ 16,+ 17	+ 4,0	+ 0,8	B) PLC ### VT eschange bit	
+ 9	+ 9	+ 11	+ 4 L	+ 18+ 19	+ 4,1	+ 0,9		Page to be displayed (*)
+ 10	+ A	+ 12	+ 5 H	+ 20,+ 21	+ 5,0	+ ,10	fixed internal LED command	
+ 11	+ B	+ 13	+ 5 L	+ 22,+ 23	+ 5,1	+ ,11	Flashing internal LED command	

(*) With OMRON PLCs these words are read and written in BCD, so that the value present occupies ALL of the word. Conversely, on other PLCs the value only occupies half a word (8 bits) and is written in binary.

13.2 Key decoding

Bit	Word 0 :Bit decoding of ALPHANUMERIC KEYS, - / T , F KEYS
0	" 0 " (ABC)
1	" 1 " (DEF)
2	" 2 " (GHI)
3	" 3 " (JKL)
4	" 4 " (NMO)
5	" 5 " (PQR)
6	" 6 " (STU)
7	" 7 " (VWX)
8	" 8 " (YZ .)
9	" 9 " (+ / =)
10	- / T
11	F1
12	F2
13	F3
14	F4
15	F5

Bit	Word 1 :Bit decoding of SERVICE KEYS, GROUPS OF KEYS
0	Common for service keys
1	Common for numeric keys 0..9, -/T
2	Common for function keys
3	
4	Help
5	Info
6	
7	Any key
8	Clear
9	Enter
10	Change field
11	Left arrow key
12	Introduction
13	Page-Down
14	Page-Up
15	

13.3 Status bit

Bit	Word 3 : Status BIT (A) VT ### PLC
0	Data setting in progress
1	Display of alarm messages in progress
2	Alarm messages present
3	Data writing completed (ENTER after setting)
4	Presence Module MT1000 (0=YES,1=NO)
5	
6	
7	Start of communication (reset carried out)
8	
9	
10	
11	
12	
13	
14	Watchdog
15	REAL TIME key pressed.

Bit	Word 8 : Status BIT (B) PLC ### VT
0	Alarm messages display ON/OFF
1	Confirmation data writing completed
2	BEEP command
3	Disables BEEP when keys pressed
4	
5	
6	
7	Confirmation PLC <===> VT communication restored
8	
9	Key 1 protection (data type 1) ON/OFF
10	Key 2 protection (data type 2) ON/OFF
11	Automatic alarm rotation ON/OFF
12	
13	
14	
15	

13.4 Exchange bit for leds

Bit	Word 10 : Fixed internal LEDs command (Hex A) (priority over flashing)
0	
1	LED F1
2	LED F2
3	LED F3
4	LED F4
5	LED F5
6	
7	LED "INFO"
8	LED "HELP"
9	
10	
11	
12	
13	
14	
15	

Bit	Word 11 : Flashing internal LEDs command (Hex A)
0	
1	LED F1
2	LED F2
3	LED F3
4	LED F4
5	LED F5
6	
7	LED "INFO"
8	LED "HELP"
9	
10	
11	
12	
13	
14	
15	

13.5 Table of register for Input/Output

VT ==> PLC

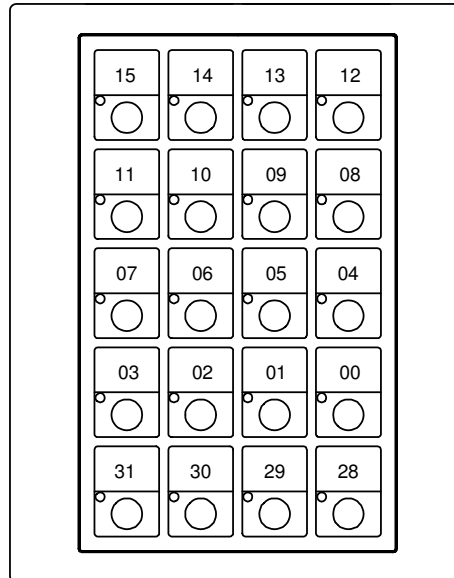
DEC	HEX	OCT	32b	8b	ABB	CS31 - dir. prot.	Register contents
+ 0	+ 0	+ 0	+ 0 H	+ 0 , + 1	+ 0,0	+ 0,0	Keys (or inputs) 0 ... 15
+ 1	+ 1	+ 1	+ 0 L	+ 2 , + 3	+ 0,1	+ 0,1	Keys (or inputs) 16 ... 31

PLC ==> VT

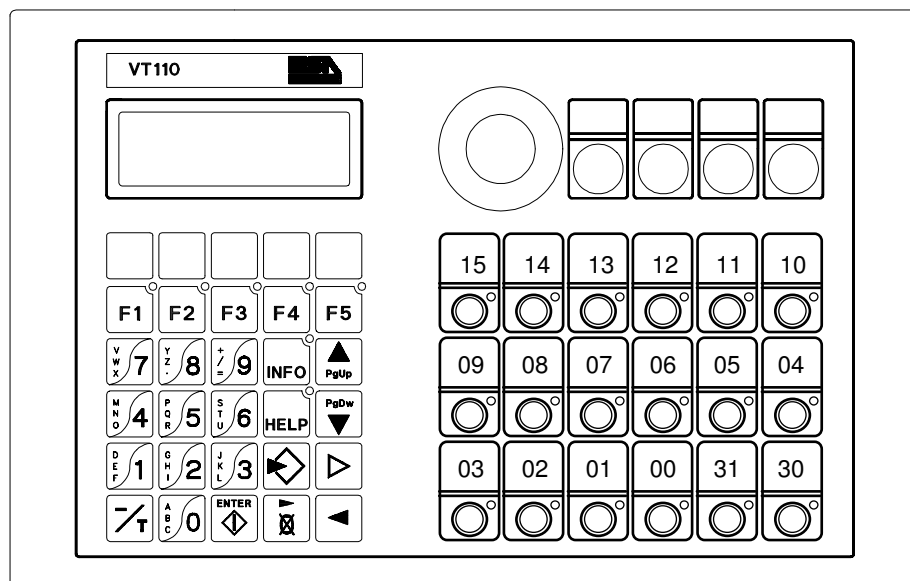
DEC	HEX	OCT	32b	8b	ABB	CS31 - dir. prot.	Register contents
+ 2	+ 2	+ 2	+ 1 H	+ 4 , + 5	+ 1,0	+ 0,2	Fixed LEDs (or outputs) 0 ... 15
+ 3	+ 3	+ 3	+ 1 L	+ 6 , + 7	+ 1,1	+ 0,3	Fixed LEDs (or outputs) 16 ... 31
+ 4	+ 4	+ 4	+ 2 H	+ 8 , + 9	+ 2,0	+ 0,4	Flashing LEDs (or outputs) 0 ... 15
+ 5	+ 5	+ 5	+ 2 L	+ 10 , + 11	+ 2,1	+ 0,5	Flashing LEDs (or outputs) 16 ... 31

See the figures below with reference to the association between number and key or between number and LED specified in the table:

MT1000



VT110



13.6 Word table for alarms

DEC	HEX	OCT	32b	8b	ABB	CS31 - dir. prot.	Register contents
+ 0	+ 0	+ 0	+ 0 H	+ 0 , + 1	+ 0,0	+ 0,0	Bit 0 = message 0; bit 1 = message 1; ... bit 15 = message 15
+ 1	+ 1	+ 1	+ 0 L	+ 2 , + 3	+ 0,1	+ 0,1	Bit 0 = message 16; bit 1 = message 17; ... bit 15 = message 31
+ 2	+ 2	+ 2	+ 1 H	+ 4 , + 5	+ 1,0	+ 0,2	Bit 0 = message 32; bit 1 = message 33; ... bit 15 = message 47
+ 3	+ 3	+ 3	+ 1 L	+ 6 , + 7	+ 1,1	+ 0,3	Bit 0 = message 48; bit 1 = message 49; ... bit 15 = message 63
+ 4	+ 4	+ 4	+ 2 H	+ 8 , + 9	+ 2,0	+ 0,4	Bit 0 = message 64; bit 1 = message 65; ... bit 15 = message 79
+ 5	+ 5	+ 5	+ 2 L	+ 10, + 11	+ 2,1	+ 0,5	Bit 0 = message 80; bit 1 = message 81; ... bit 15 = message 95
+ 6	+ 6	+ 6	+ 3 H	+ 12, + 13	+ 3,0	+ 0,6	Bit 0 = message 96; bit 1 = message 97; ... bit 15 = message 111
+ 7	+ 7	+ 7	+ 3 L	+ 14, + 15	+ 3,1	+ 0,7	Bit 0 = message 112; bit 1 = message 113; ... bit 15 = message 127

14 Products list

VT100	DISPLAY LCD 4 x 20
VT1001SE000	- TEXT MEMORY 32KBYTE EPROM - 1 SERIAL PORT
VT1001SF000	- TEXT MEMORY 32KBYTE FLASH-EPROM - 1 SERIAL PORT
VT1001SP000	- TEXT MEMORY 32KBYTE FLASH-EPROM - 1 SERIAL PORT
VT1001SPP00	- TEXT MEMORY 96KBYTE FLASH-EPROM - 1 SERIAL PORT
VT100MT1000	- SERIAL KEYBOARD MODULE - 20 CUSTOMISABLE KEYS WITH LEDS
VT100MT2000	- BLIND KEYBOARD MODULE
VT100INOUT2	- 16 INPUT / 8 OUTPUT BOARD

VT110	DISPLAY LCD 4 x 20
VT1101SE000	- TEXT MEMORY 32KBYTE EPROM - 1 SERIAL PORT
VT1101SEE00	- TEXT MEMORY 96KBYTE EPROM - 1 SERIAL PORT
VT1101SF000	- TEXT MEMORY 32KBYTE FLASH-EPROM - 1 SERIAL PORT
VT1101SFF00	- TEXT MEMORY 96KBYTE FLASH-EPROM - 1 SERIAL PORT
VT1101SP000	- TEXT MEMORY 32KBYTE FLASH-EPROM - 1 SERIAL PORT
VT1101SPP00	- TEXT MEMORY 96KBYTE FLASH-EPROM - 1 SERIAL PORT

IMPORTANT

The ESA-EP1 programmer will not be available after 1/1/97.

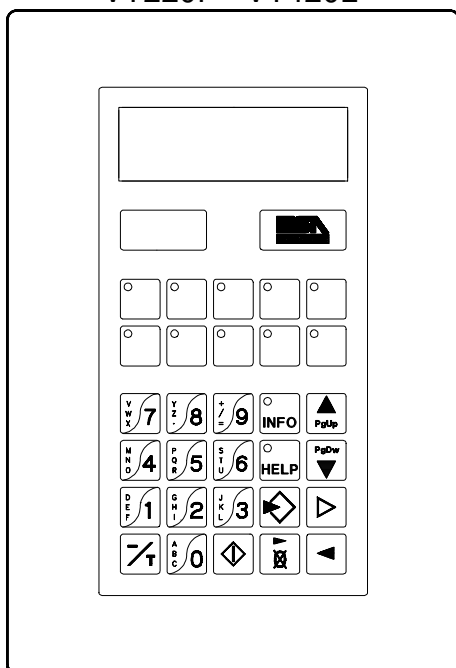
15 Specifications

	VT1001SE000	VT1101SE000 / VT1101SEE00	VT100MT1000
	VT1001SF000	VT1101SF000 / VT1101SFF00	
	VT1001SP000 / VT1001SPP00	VT1101SP000 / VT1101SPP00	
Power supply	24VDC $\pm$ 20%	24VDC $\pm$ 20%	
LCD display Lines x Characteres	4 x 20	4 x 20	
Backlighting	Leds	Leds	
Function keys	5	5	20
Function LEDs	7	7	20
Customised command keys		18	
Command keys LEDs		18	
Keys totals	25	43	20
Text memory	32K EPROM	32K / 96K EPROM	
Text memory	32K FLASH - EPROM	32K / 96K FLASH - EPROM	
Text memory	32K / 96K FLASH - EPROM	32K / 96KFLASH - EPROM	
COM1 serial port	RS232/422/485 C.L. 20mA	RS232/422/485 C.L. 20mA	
Consumption	2.5 W	2.5 W	
Operating temperature	0...+50°C	0...+50°C	
Storage temperature	-20...+70°C	-20...+70°C	
Front panel protection	IP65	IP65	IP65
Weight Kg.	0.5	0.9	0.2

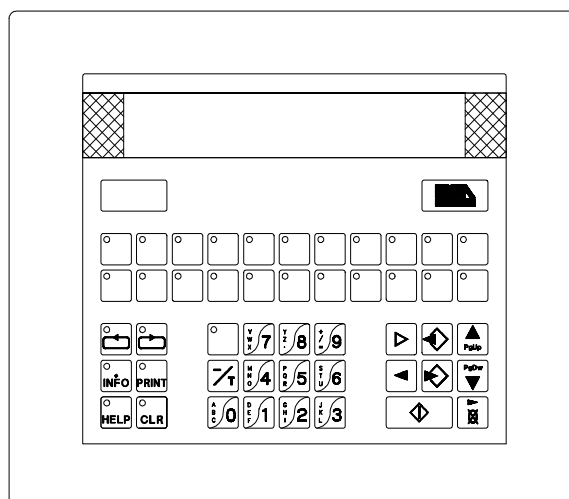
	VT100INOUT2
Number of inputs	16
Potential separation	no
Input current for signal "1" (typ.)	11mA (a 24V)
Number of outputs	8
Potential separation	si
Up supply voltage nominal value	DC 24V $\pm$ 10%
Output current for signal "1" up to 25°C	8x80 mA
up to 50°C	8X60 mA
Lamp load max.	8x2 W
Short circuit protection	elettronica
Overall loadability up to 25°C	100%
up to 50°C	80%
Signal level at outputs segnale "0" max.	0V
segnale "1" min.	Up -1.5V
Weight Kg.	0.2

VT UNIVERSAL OPERATOR TERMINALS

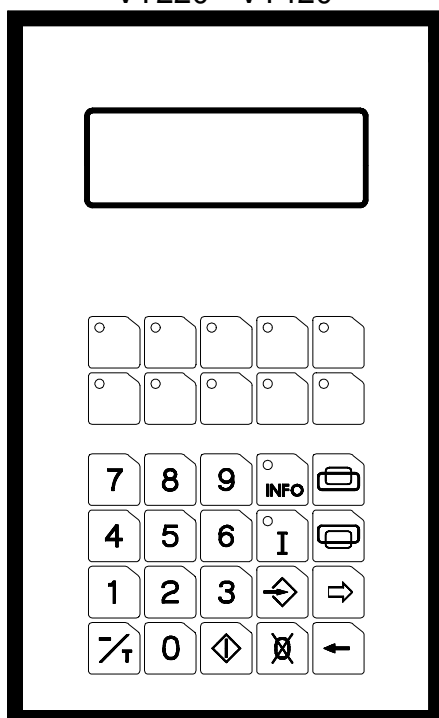
VT220F - VT420L



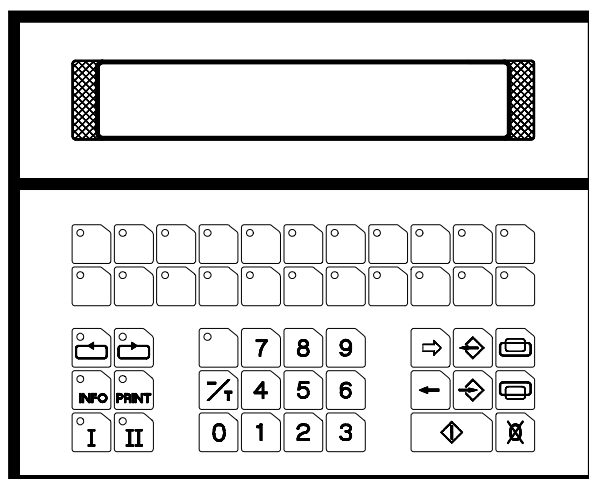
VT240F - VT440L



VT220 - VT420



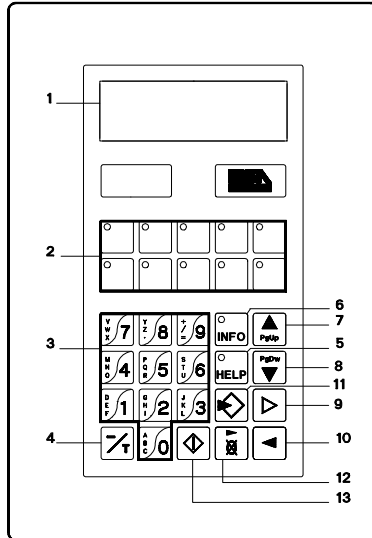
VT240 - VT440



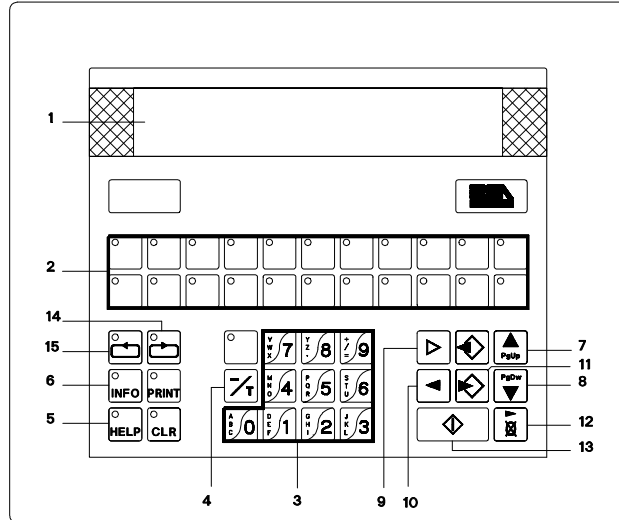
16 Front and rear panel description

16.1 Front of VT2x0/4x0

VT220 - VT420



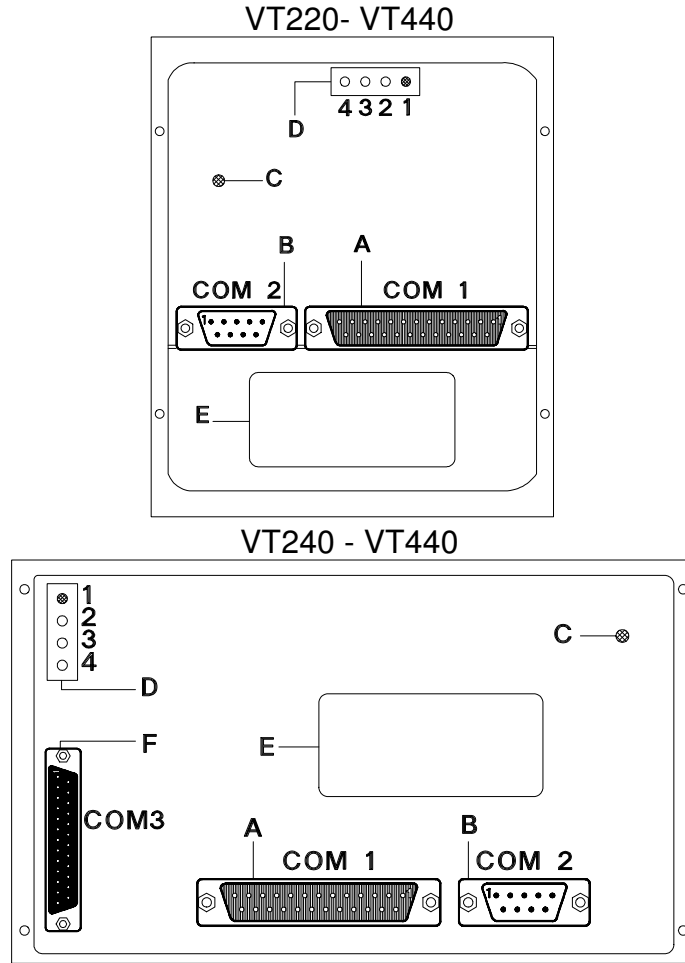
VT240 - VT440



1	VF or LCD display
2	Function keys F1 - F22 ①
3	Alphanumeric keys
4	Sign or time variable base
5	Displays alarm sub-message
6	Displays alarm messages
7	Page up or scroll alarms buffer
8	Page down or scroll alarms buffer
9	Field change in setting phase
10	Moves cursor in field selected
11	Input. Enters setting phase
12	Clears datum or moves ASCII datum character
13	Enter. Accepts setting
14	Rotates alarms buffer
15	Rotates alarms buffer
PRINT	available
CLR	available
EMPTY	available
EMISSION	available

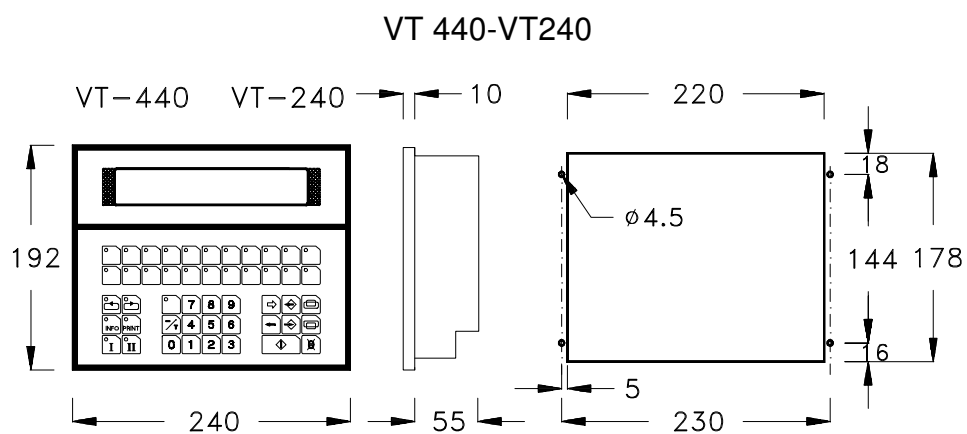
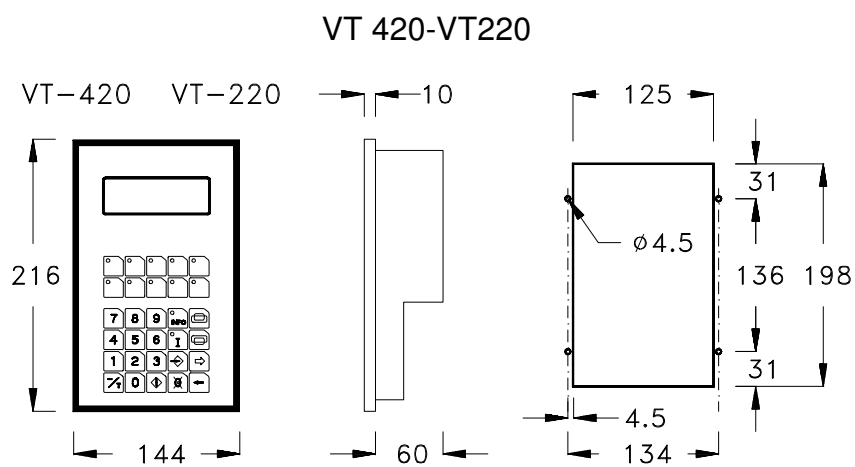
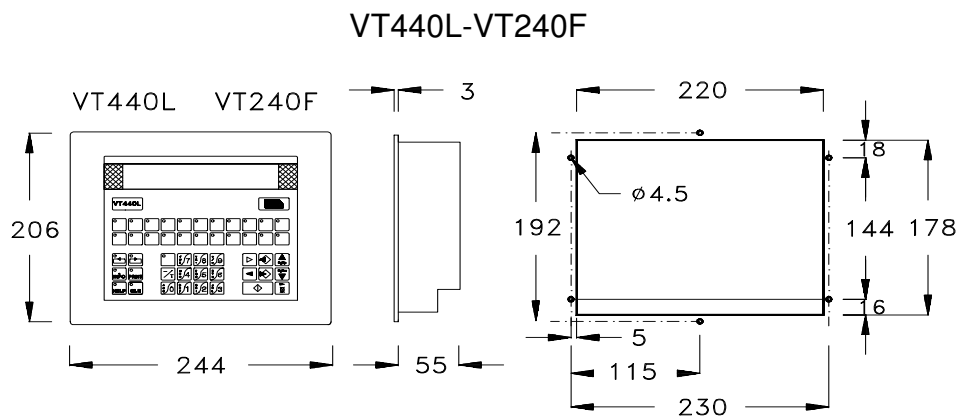
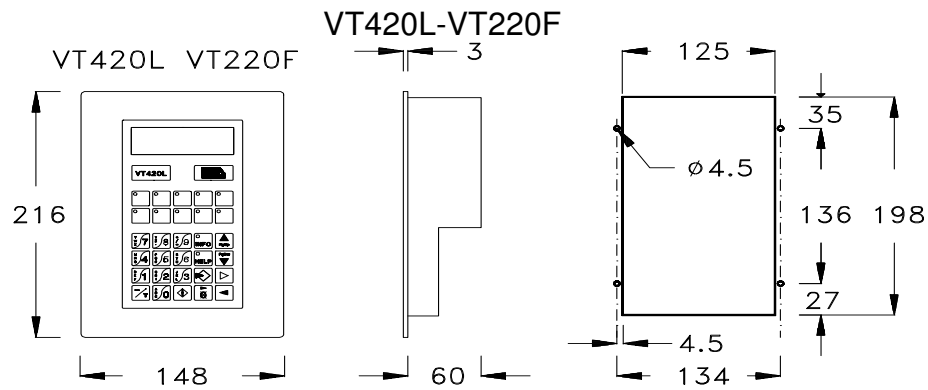
①The Fx keys are customised by slipping a strip of paper or acetate with the words or symbols for the process on it into a slot in the terminal..

16.2 Rear of VT2x0/4x0

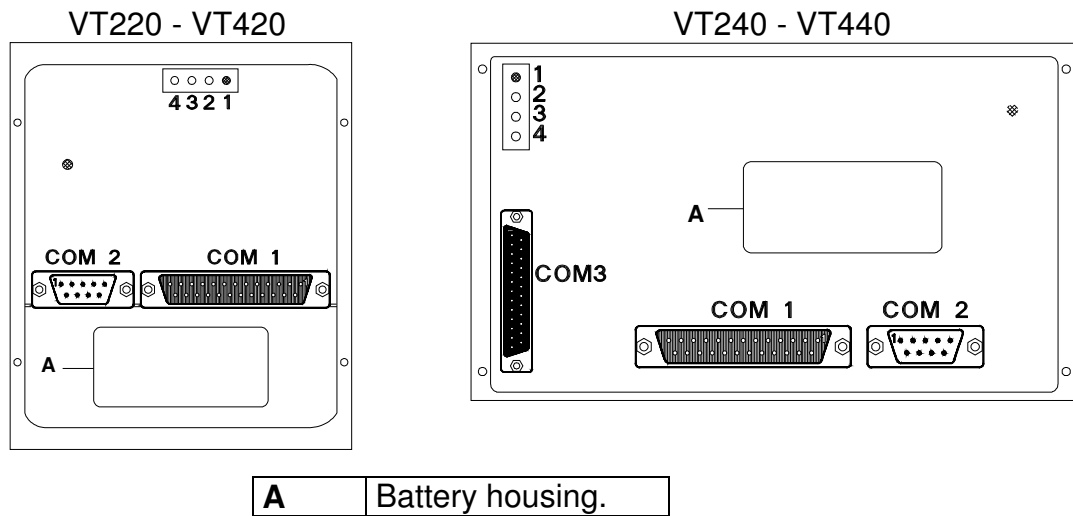


A	Serial port for communication with PLC
B	Serial port for printer or PC
C	Trimmer for adjusting LCD contrast
D	Power supply connector
E	Battery compartment
F	Parallel port for printer

17 Dimension and panel cut-outs



18 Fitting the battery



The batteries are used to power the internal clock (12 microamps at a temperature of 25 °C). The batteries have a life of over 12 months. At the moment of purchase there is no battery in the VT, thus inserting it is a matter for the client.

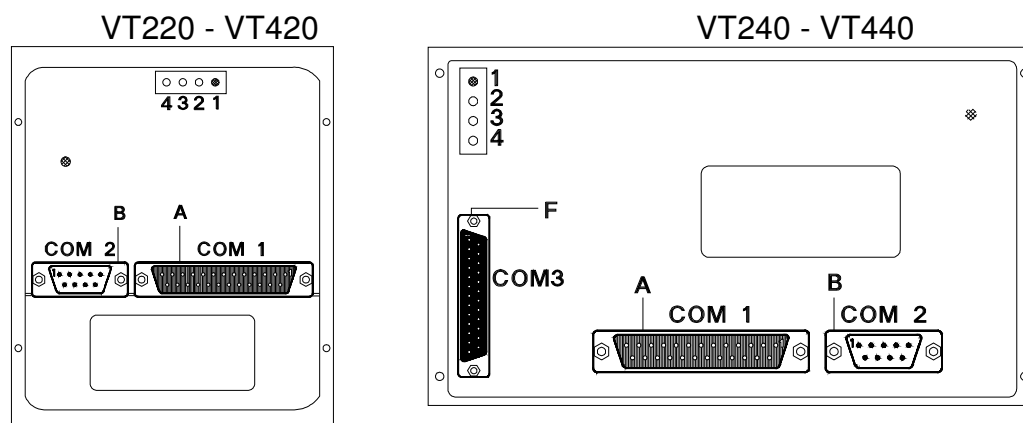
Batteries to be used:

Dimension
3 MN 1500, LR6, SIZE AA 1.5 Volt alkaline batteries

IMPORTANT

Dispose of batteries responsibly.

19 VT communication ports



A) COM 1 25 pin female	B) COM 2 9 pin male	F) COM 3 25 pin female
1 Protective GND	1 TxRx RS485 -	1 Strobe
2 Tx RS232	2 Rx RS232	2 D0
3 Rx RS232	3 Tx RS232	3 D1
4 RTS	4 DTR RS232	4 D2
5 CTS	5 Signal GND	5 D3
6	6 TxRx RS485 +	6 D4
7 Signal GND	7 RTS	7 D5
8	8 CTS	8 D6
9 Tx CL +	9 DCD RS232	9 D7
10 Aux -		10
11 Tx CL -		11 Busy
12 Tx RS422 -		12
13 Rx RS422 +		13
14 + 20 ma Tx		14
15 + 20 ma Rx		15
16 + 5 VCC		16
17		17
18 Rx CL +		18 Signal GND
19		19 Signal GND
20		20 Signal GND
21		21 Signal GND
22 Aux +		22 Signal GND
23 Tx RS422 +		23 Signal GND
24 Tx RS422 -		24 Signal GND
25 Rx CL -		25 Signal GND

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

IMPORTANT

The earth of the devices connected to the serial and/or parallel communication ports **MUST** have the same potential as the 0V supply of the VT.
The circulation of current between the 0V supply and the earth of the communication ports could cause damage to certain components of the VT or of the devices connected to it.

Always:

- Find the shortest route
- Lay disturbed cables separately

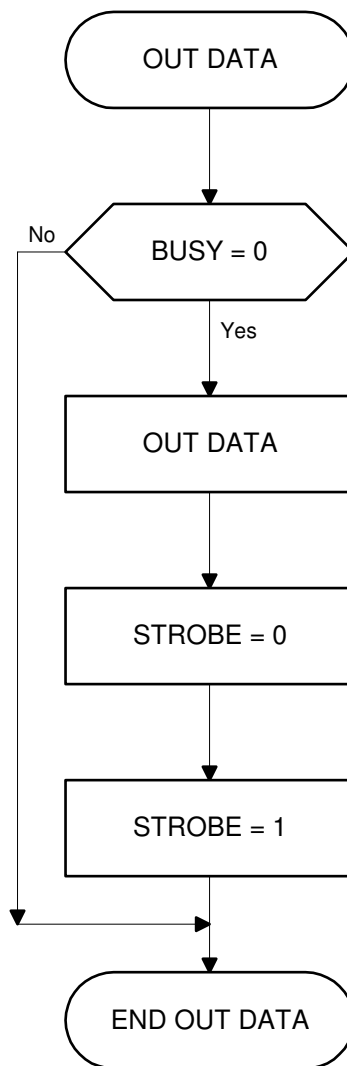


WARNING

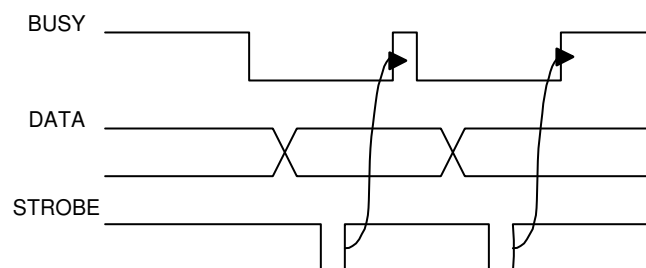
Disconnect the power supply before connecting or disconnecting the communication cables.

19.1 Parallel interface

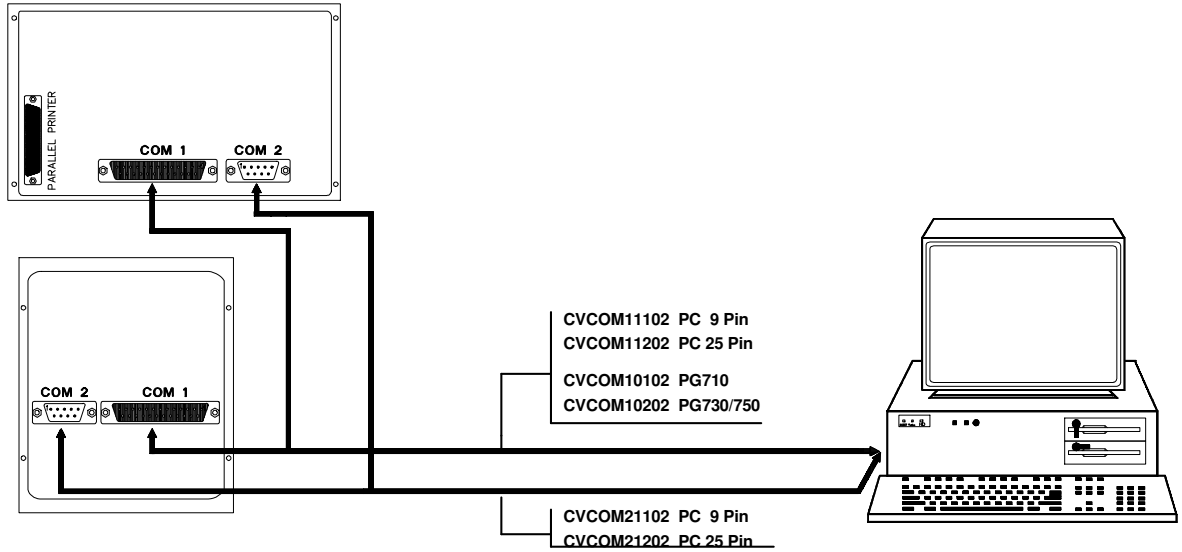
Signal management on VT parallel port.



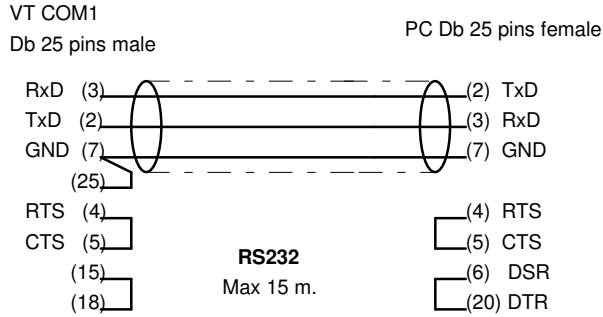
Time-phase diagram



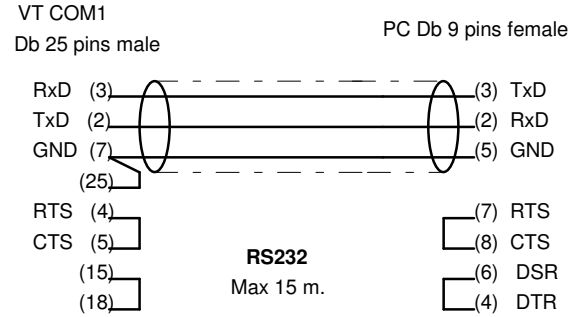
20 Connection cables VT ⇔ PC



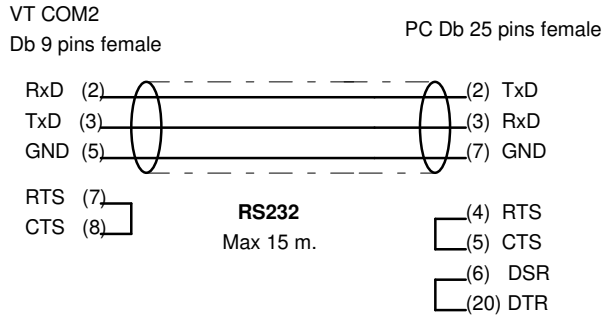
Code : CVCOM11202



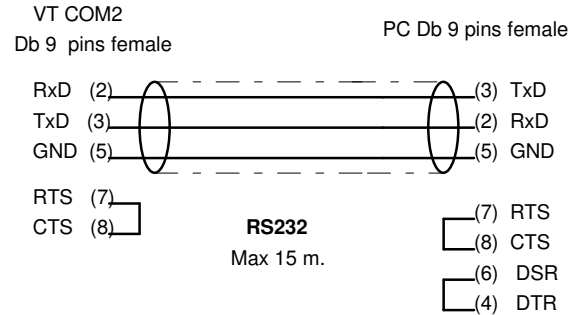
Code : CVCOM11102



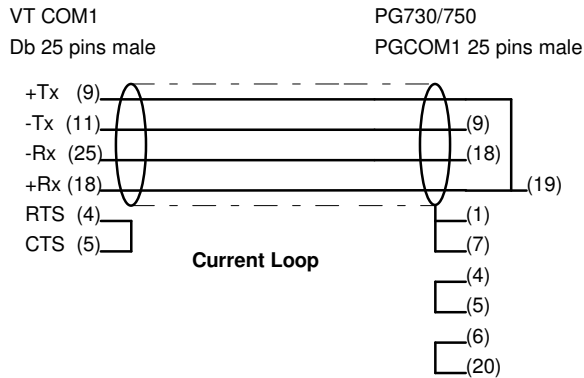
Code : CVCOM21202



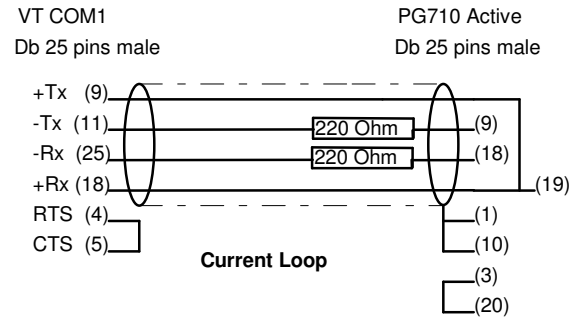
Code : CVCOM21102



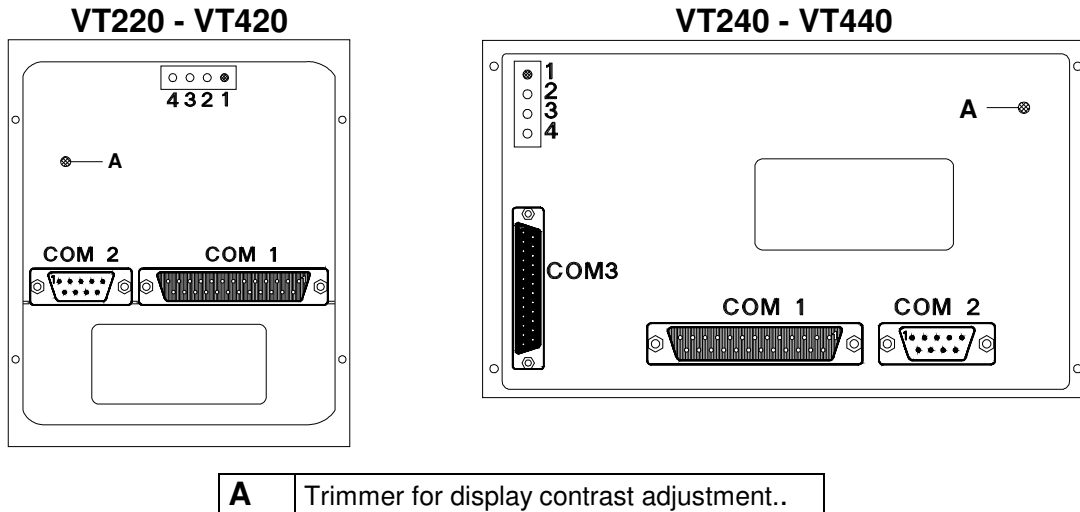
Code : CVCOM10202



Code : CVCOM10102



21 Brightness and contrast adjustment

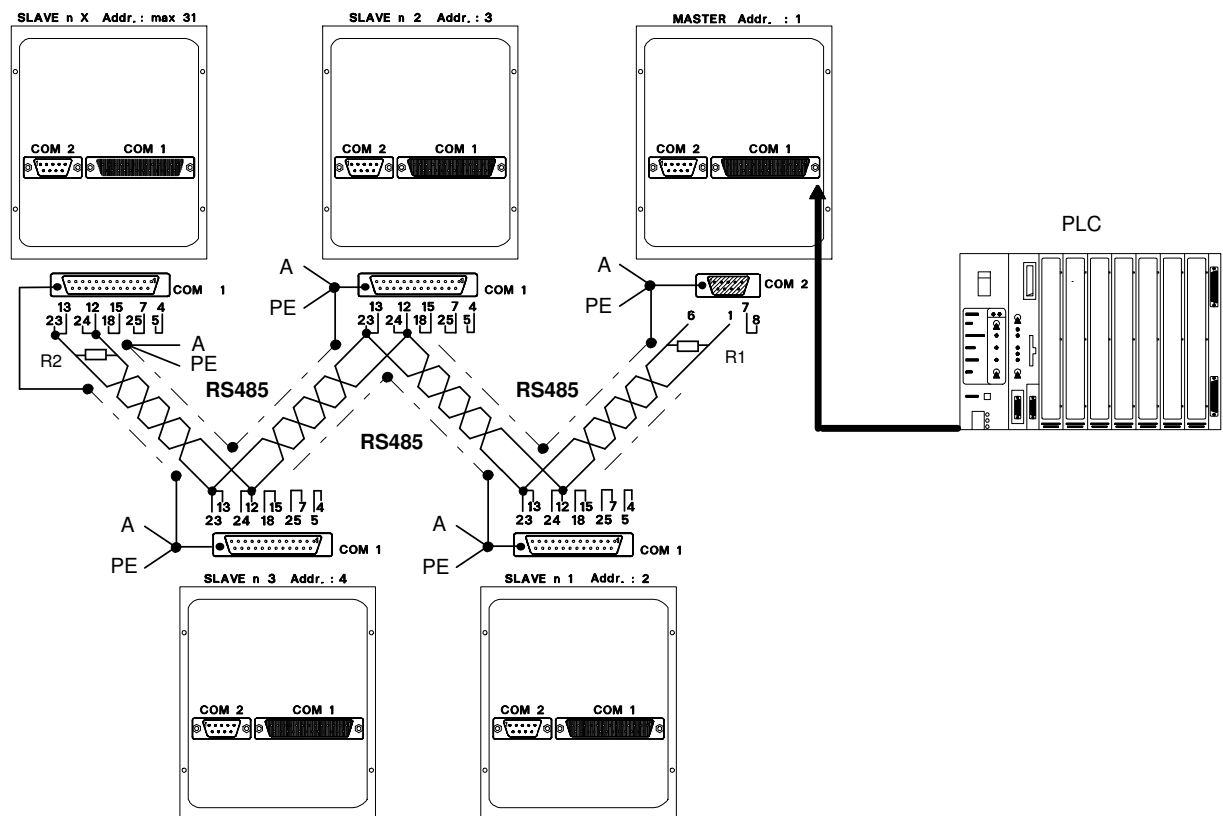


Contrast can only be adjusted by means of the trimmer (A) via the special hole situated on the rear cover of the VT. Adjusts the display for optimum clarity in every situation

22 Connecting the VT in multidrop

The Multidrop system enables several terminals to be connected to a single PLC. The system comprises a MASTER terminal connected directly to the PLC and up to a maximum of 31 SLAVE terminals connected to the MASTER. The tasks of the MASTER terminal are to dialogue with the PLC for itself and for the SLAVES.

Every terminal connected in the network must have its own ADDRESS. The address of the MASTER is always 1, while that of the slaves can be from 2 to 31. There MUST NEVER BE two terminals with the same address in the network. The slaves connected in the network must be assigned progressive addresses starting from 2 up to the maximum number of terminals. The master carries out the data exchange starting from slave No. 2 and finishing with the max. slave declared. If the addresses are not consecutive or one of the slaves is off, the master passes on to the next one after a 100 msec timeout. Each terminal connected in a Multidrop network introduces a delay of approximately 500 msec. A network of 5 terminals will therefore have a total scanning time of approximately $500 \text{ msec} \times 5 = 2.5 \text{ secs}$.



A = to conductive cover of the serial connector

PE = to earth potential

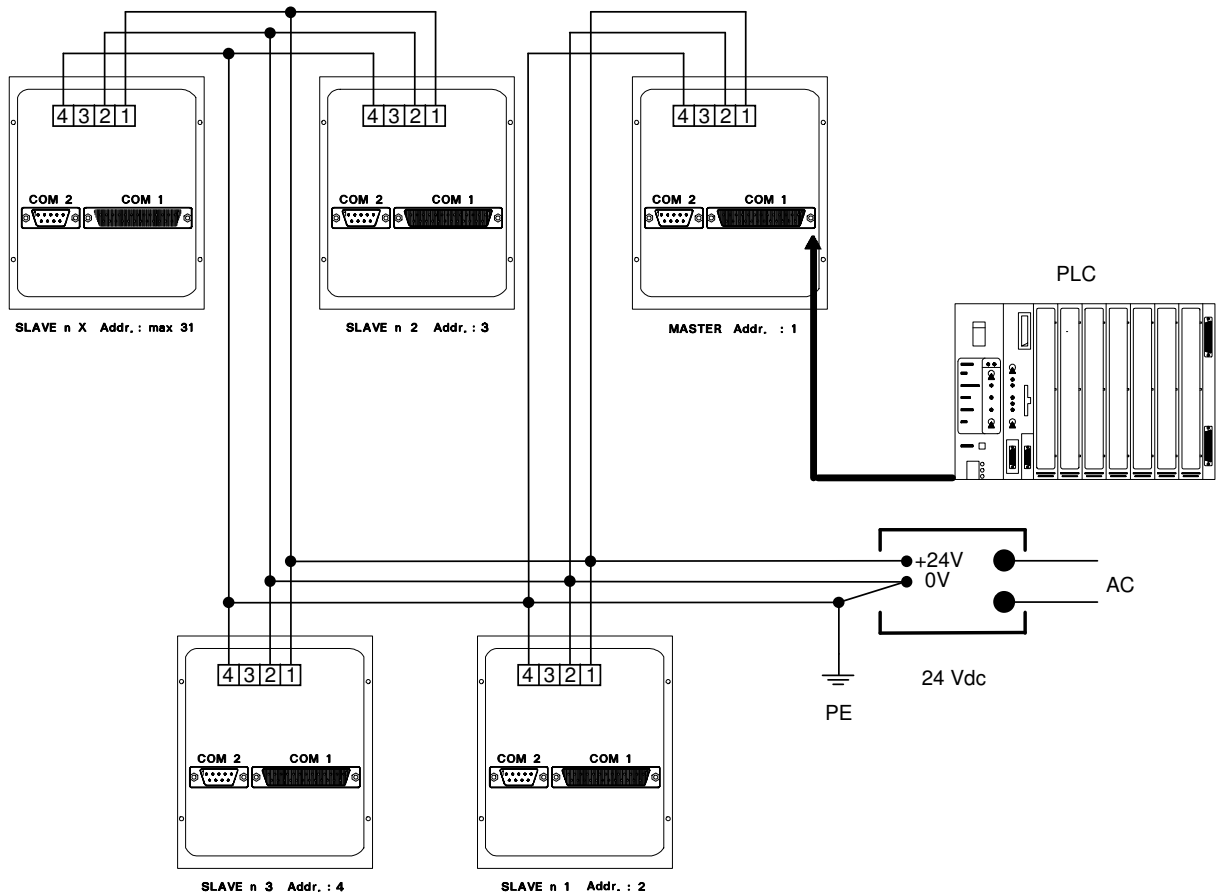
R1, R2 = 220 Ohm 1/4 W

The resistors **R1** and **R2** are positioned at the extremes of the multidrop network. For exceptional network lengths, the value of **R1** and **R2** can be lowered as far as **150 Ohm**. The covers of the serial connectors must be made of **metal** or **conductive plastic** !!! The earth connections must be set at the **same potential** !!!

Hata! Bilinmeyen anahtar değışkeni.

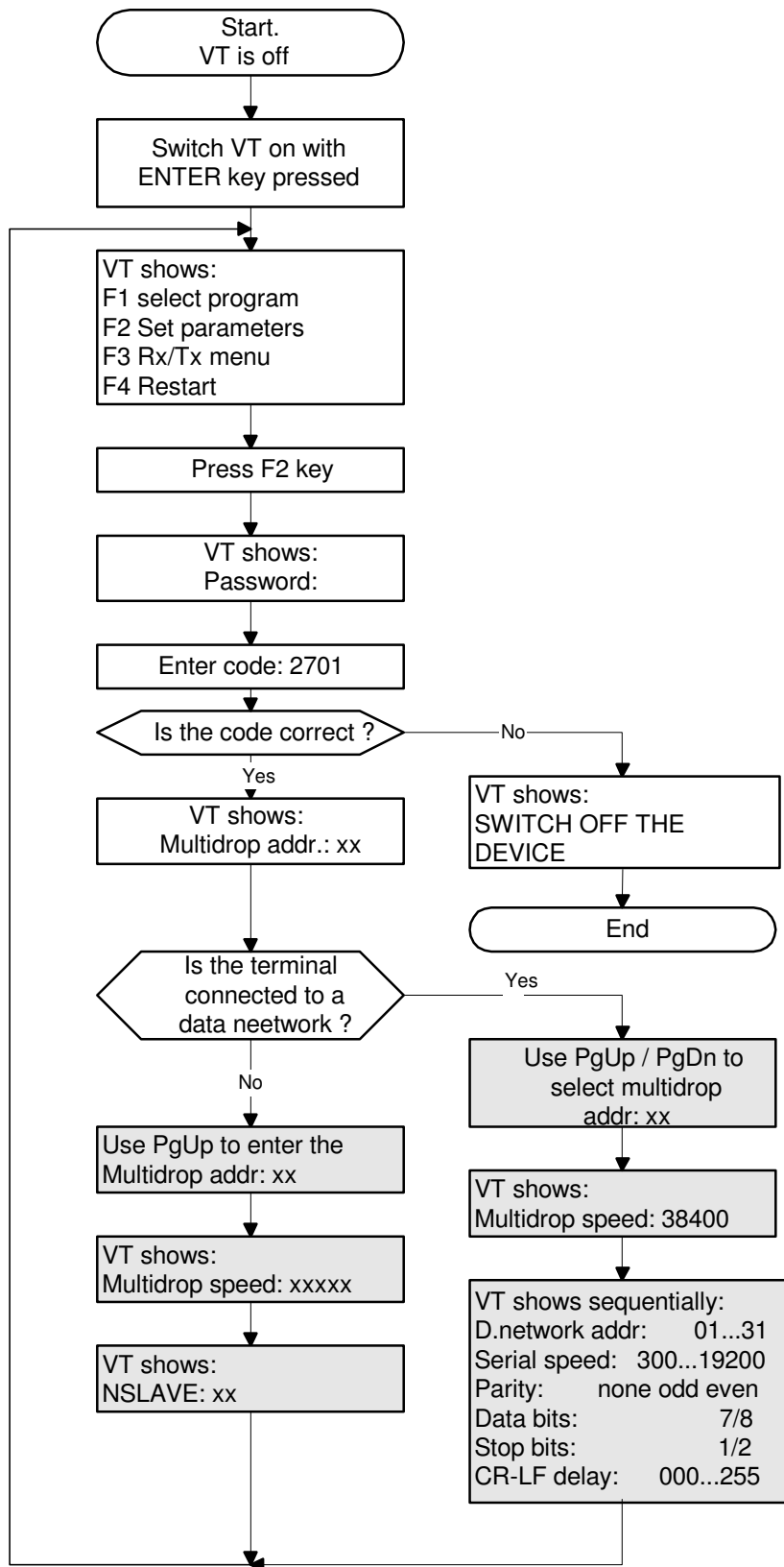
It is absolutely necessary to use for the serial connection a twisted cable with **TOTAL shielding !!!**

22.1 Power supply for terminals in multidrop network



The power supply cable needed for the terminals in the MULTIDROP must be layed in **SEPARATE** from the one used for the serial connections. Both the power and the serial connection cables must be layed in appropriate conduits, in any event, **separately** from the power wiring and from any equipment that is of a type that could act as a source of disturbance (d.c. converter, inverters etc.).

22.2 Selecting the VT parameters in multidrop

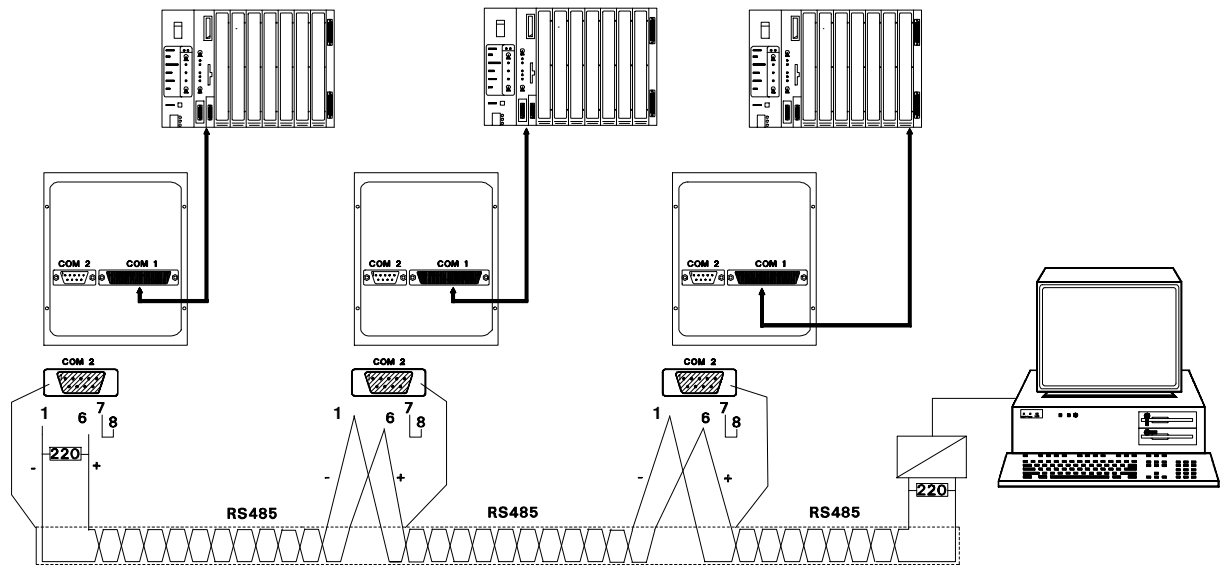


None of these parameters needs to be specified for the data network operations. Thus, they must be entered if the COM2 is used for MULTIDROP.

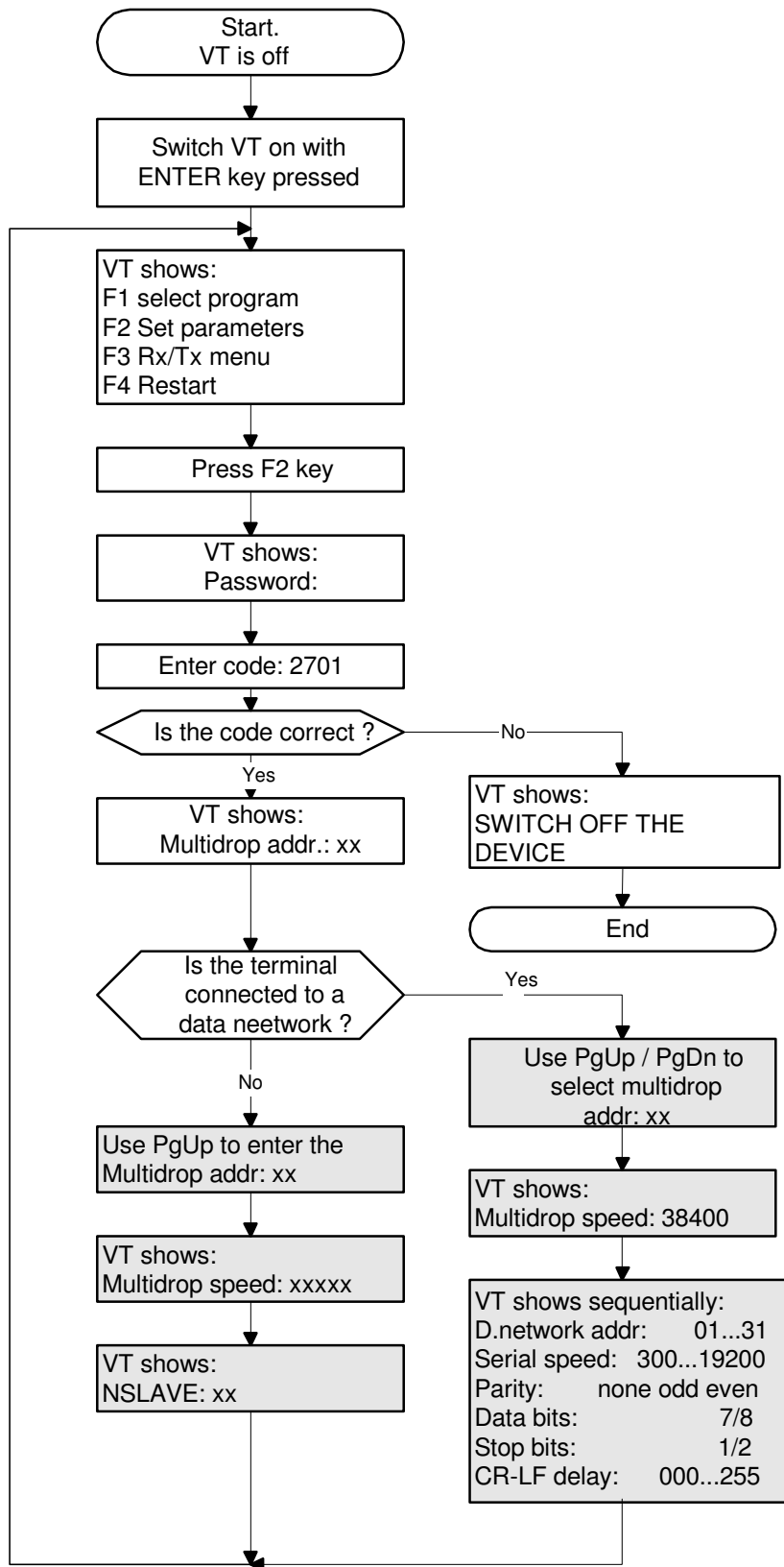
23 Connecting the VT in a data collection network

The data collection function is used to exchange information between the PC and PLC using a network of VT terminals. This network comprises up to a maximum of 31 terminals plus the PC providing the master function. Each terminal is connected to a PLC using the serial port of the terminal and operates in the normal way. The data collection is transparent to the normal operation of the VT with the PLC and functions using the serial port of the terminal which is not used for the connection with the PLC. The PC can REQUEST or TRANSFER data to any of the terminals in the network using the data collection protocol. The dialogue between the PC and the terminals in the network is carried out using an RS485 serial line at a speed which can vary between 300 and 19200 baud. Every terminal connected in the network must have its own ADDRESS. There MUST NEVER BE two terminals with the same address in the network. Valid address number from 1 to 31 inc.

The printing functions cannot be used when the data collection function is being used, even on a VTx40 with a parallel port.



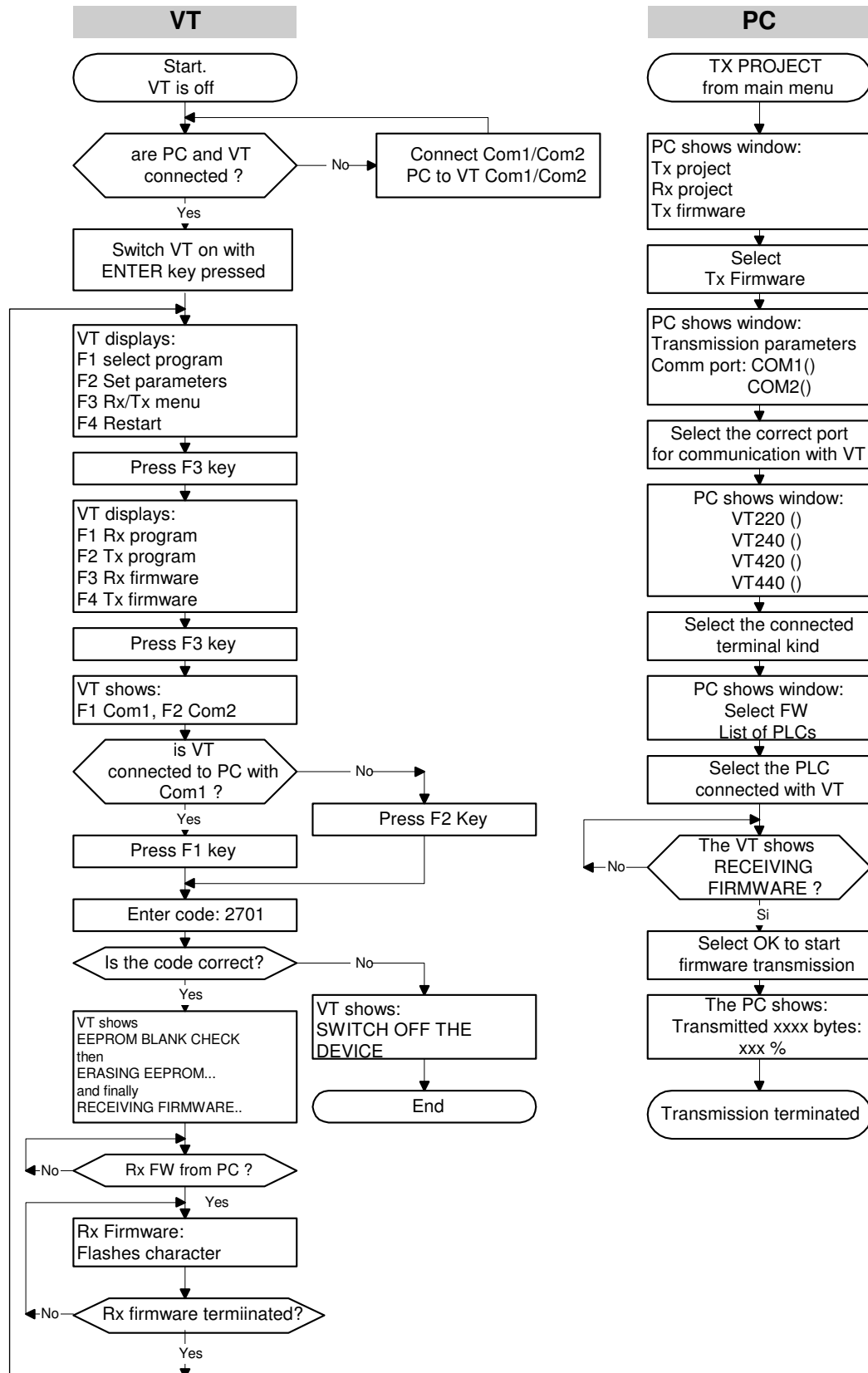
23.1 Selecting the VT parameters in a data collection network



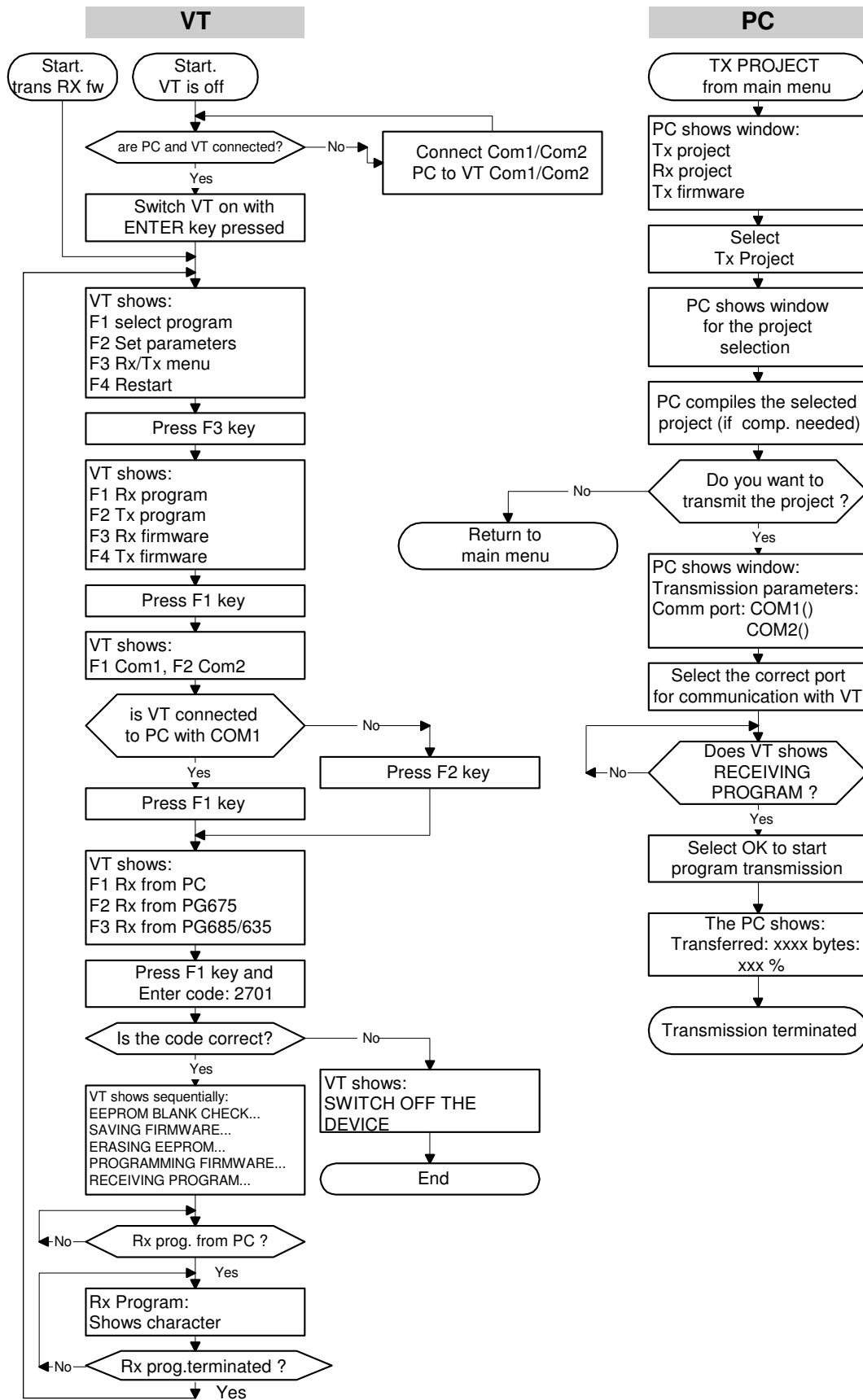
None of these parameters needs to be specified for the data network operations. Thus, they must be entered if the COM2 is used for MULTIDROP.

24 Programming the VT

24.1 Loading the plc driver in the VT

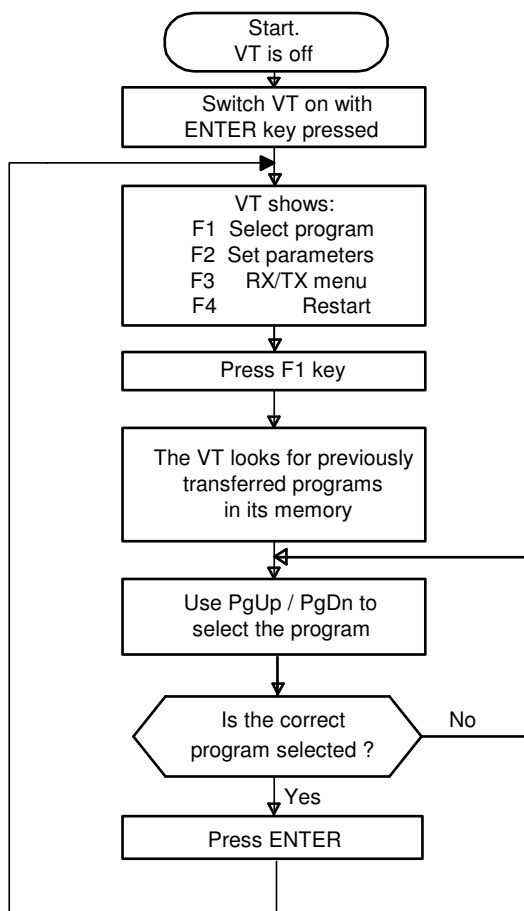


24.2 Loading the display page in the VT



25 The multiple programs

The VT can store up to 90 user programs in its memory. This makes it possible to have the same program in several languages, for example, or to have complete separate programs that carry out different tasks.



26 VT-PLC information exchange area

The information exchange area is used to exchange general data between the Terminal and PLC and must be declared in the programming phase..

26.1 Table of common data exchange registers

VT==>PLC

DEC	HEX	OCT	32b	8b	ABB	CS31-dir.prot	bit 15 . . 8	bit 7 . . 0
+ 0	+ 0	+ 0	+ 0 H	+ 0 , + 1	+ 0,0	+ 0,0		Hexadecimal value of key pressed
+ 1	+ 1	+ 1	+ 0 L	+ 2 , + 3	+ 0,1	+ 0,1	D1) Service key bit	decoding
+ 2	+ 2	+ 2	+ 1 H	+ 4 , + 5	+ 1,0	+ 0,2	D2) Numeric key bit	decoding
+ 3	+ 3	+ 3	+ 1 L	+ 6 , + 7	+ 1,1	+ 0,3	D3) F1 - .F15 key bit	Decoding
+ 4	+ 4	+ 4	+ 2 H	+ 8 , + 9	+ 2,0	+ 0,4	D4) Common key and F16-F22	key and key group bit decoding
+ 5	+ 5	+ 5	+ 2 L	+ 10,+ 11	+ 2,1	+ 0,5	N.B.: Not for SAIA PCD	Last page displayed with [C] (*)
+ 6	+ 6	+ 6	+ 3 H	+ 12,+ 13	+ 3,0	+ 0,6		Page displayed (*)
+ 7	+ 7	+ 7	+ 3 L	+ 14,+ 15	+ 3,1	+ 0,7	A) Status	bit
+ 8	+ 8	+ 10	+ 4 H	+ 16,+ 17	+ 4,0	+ 0,8	B) Status	bit
+ 9	+ 9	+ 11	+ 4 L	+ 18,+ 19	+ 4,1	+ 0,9	N.U.	HOURS
+ 10	+ A	+ 12	+ 5 H	+ 20,+ 21	+ 5,0	+ ,10	Minutes	Seconds
+ 11	+ B	+ 13	+ 5 L	+ 22,+ 23	+ 5,1	+ ,11	Day	Month
+ 12	+ C	+ 14	+ 6 H	+ 24,+ 25	+ 6,0	+ ,12	Year	Day of the week
+ 13	+ D	+ 15	+ 6 L	+ 26,+ 27	+ 6,1	+ ,13		Active sequence
+ 14	+ E	+ 16	+ 7 H	+ 28,+ 29	+ 7,0	+ ,14	N.B.: Only for SAIA PCD >>	Last page displayed with [C]
+ 15	+ F	+ 17	+ 7 L	+ 30,+ 31	+ 7,1	+ ,15	No. of Alarms H	displayed L (*)

PLC==>VT

DEC	HEX	OCT	32b	8b	ABB	CS31-dir.pro t	bit 15 . . 8	bit 7 . . 0
+ 18	+ 12	+ 22	+ 9 H	+36+37	+9,0	+ 1,2		Sequence to be displayed (*)
+ 19	+ 13	+ 23	+ 9 L	+38+39	+9,1	+ 1,3		Page in sequence (*)
+ 20	+ 14	+ 24	+10H	+40+41	+10,0	+ 1,4	Offset I print alarm message word	Offset last print alarm message word
+ 21	+ 15	+ 25	+10L	+42+43	+10,1	+ 1,5	Offset I display alarm message word	Offset last display alarm message word
+ 22	+ 16	+ 26	+11H	+44+45	+11,0	+ 1,6	C) Status	bit
+ 23	+ 17	+ 27	+11L	+46+47	+11,1	+ 1,7	N.U.	N.U.
+ 24	+ 18	+ 30	+12H	+48,+49	+12,0	+ 1,8		Page to be printed (*)
+ 25	+ 19	+ 31	+12L	+50,+51	+12,1	+ 1,9		Page to be displayed (*)
+ 26	+ 1A	+ 32	+13H	+52,+53	+13,0	+1,10	Command for fixed	light LED F1 - F15
+ 27	+ 1B	+ 33	+13L	+54,+55	+13,1	+ 1,11	Command for fixed light	auxiliary LEDs F16 - F22
+ 28	+ 1C	+ 34	+14H	+56,+57	+14,0	+ 1,12	Command for flashing light	LEDs F1 - F15
+ 29	+ 1D	+ 35	+14L	+58,+59	+14,1	+ 1,13	Command for F16 - F22 and	flashing light auxiliary LEDs

PLC==>VT (for alarms)

DEC	HEX	OCT	32b	8b	ABB	CS31-prot.dir	bit 15 . . 0
+30	+1E	+36	+15	+60	+15,0	+1,14	Display and/or printing alarm messages check bit..
.....							
+93	+5D	+135	+46	+187	+46,1	+5,13	"

(*)With OMRON PLCs these words are read and written in BCD, so that the value present occupies ALL of the word.
Conversely, on other PLCs the value only occupies half a word (8 bits) and is written in binary.

26.2 Key decoding

Bit	Word 1 : SERVICE KEY bit decoding
0	Clear
1	Enter
2	Change Field
3	Left arrow
4	Introduction
5	Emission (VTx40 only)
6	Page-Down
7	Page-Up
8	Help
9	Clr (VTx40 only)
10	Info
11	Print (VTx40 only)
12	Rotate alarm messages left (VTx40 only)
13	Rotate alarm messages right (VTx40 only)
14	
15	

Bit	Word 2 : ALPHANUMERIC KEY bit decoding
0	" 0 " (ABC)
1	" 1 " (DEF)
2	" 2 " (GHI)
3	" 3 " (JKL)
4	" 4 " (NMO)
5	" 5 " (PQR)
6	" 6 " (STU)
7	" 7 " (VWX)
8	" 8 " (YZ .)
9	" 9 " (+ / =)
10	- / T
11	Empty (VTx40 only)
12	
13	
14	
15	

Bit	Word 3 : FUNCTION KEY F1 - F15 bit decoding
0	
1	F1
2	F2
3	F3
4	F4
5	F5
6	F6
7	F7
8	F8
9	F9
10	F10
11	F11 (VTx40 only)
12	F12 (VTx40 only)
13	F13 (VTx40 only)
14	F14 (VTx40 only)
15	F15 (VTx40 only)

Bit	Word 4 : FUNCTION KEY F16 - F22 and KEY GROUP bit decoding
0	Common for service keys BITS 0-7
1	Common for service keys BITS 8-13
2	Common for numeric keys 0-9 and -/T
3	Common for function keys
4	
5	
6	
7	Any KEY
8	F16 (VTx40 only)
9	F17 (VTx40 only)
10	F18 (VTx40 only)
11	F19 (VTx40 only)
12	F20 (VTx40 only)
13	F21 (VTx40 only)
14	F22 (VTx40 only)
15	

26.3 Status bit

Bit	Word 7 : Status BIT (A) VT >> PLC
0	Data setting in progress
1	Display of alarm messages in progress
2	Alarm messages present
3	Data writing completed (ENTER after setting)
4	Hardcopy terminated
5	Printing of alarms buffer terminated
6	Printing of page terminated
7	Start of communication (reset carried out)
8	Printer timeout
9	Alarm messages buffer full
10	
11	
12	
13	
14	
15	REAL TIME key pressed.

Bit	Word 22 : Status BIT (C) PLC >> VT
0	Alarm messages display ON/OFF
1	Confirmation data writing completed
2	BEEP command
3	Disables BEEP when keys pressed
4	Hardcopy display command
5	Print alarms buffer command
6	
7	Confirmation PLC <===> VT communication restored
8	
9	Key 1 protection (data type 1) ON/OFF
10	Key 2 protection (data type 2) ON/OFF
11	Automatic alarm rotation
12	
13	
14	
15	

26.4 Exchange bit for leds

Bit	Word 26 : Command for continuous light LEDs F1-F15 (Hex 1A) (priority over flashing)
0	
1	LED F1
2	LED F2
3	LED F3
4	LED F4
5	LED F5
6	LED F6
7	LED F7
8	LED F8
9	LED F9
10	LED F10
11	LED F11 (VTx40 only)
12	LED F12 (VTx40 only)
13	LED F13 (VTx40 only)
14	LED F14 (VTx40 only)
15	LED F15 (VTx40 only)

Bit	Word 27 :Command for continuous light F16-F22 and auxiliary LEDs (Hex 1B) (priority over flashing)
0	LED F16 (VTx40 only)
1	LED F17 (VTx40 only)
2	LED F18 (VTx40 only)
3	LED F19 (VTx40 only)
4	LED F20 (VTx40 only)
5	LED F21 (VTx40 only)
6	LED F22 (VTx40 only)
7	LED "INFO"
8	LED "Help"
9	LED "Clr" (VTx40 only)
10	LED "PRINT" (VTx40 only)
11	LED Message rotation left (VTx40 only)
12	LED Message rotation right (VTx40 only)
13	LED Empty
14	
15	

Bit	Word 28 : Command for flashing light LEDs F1-F15 (Hex 1C)
0	
1	LED F1
2	LED F2
3	LED F3
4	LED F4
5	LED F5
6	LED F6
7	LED F7
8	LED F8
9	LED F9
10	LED F10
11	LED F11 (VTx40 only)
12	LED F12 (VTx40 only)
13	LED F13 (VTx40 only)
14	LED F14 (VTx40 only)
15	LED F15 (VTx40 only)

Bit	Word 29 : Command for flashing light F16-F22 and auxiliary LEDs (Hex 1D)
0	LED F16 (VTx40 only)
1	LED F17 (VTx40 only)
2	LED F18 (VTx40 only)
3	LED F19 (VTx40 only)
4	LED F20 (VTx40 only)
5	LED F21 (VTx40 only)
6	LED F22 (VTx40 only)
7	LED "INFO"
8	LED "Help"
9	LED "Clr" (VTx40 only)
10	LED "PRINT" (VTx40 only)
11	LED Message rotation left (VTx40 only)
12	LED Message rotation right (VTx40 only)
13	LED Empty
14	
15	

27 Products list

VT220	ALUMINIUM FRAME VFD 2 x 20
VT2201SF000	- TEST MEMORY 32KBYTE FLASH-EPROM - 1 SERIAL PORT
VT2202SF000	- TEST MEMORY 32KBYTE FLASH-EPROM - 2 SERIAL PORTS
VT2202SFF00	- TEST MEMORY 96KBYTE FLASH-EPROM - 2 SERIAL PORTS

VT220	PLATE VFD 2 x 20
VT220F1SF000	- TEST MEMORY 32KBYTE FLASH-EPROM - 1 SERIAL PORT
VT220F2SF000	- TEST MEMORY 32KBYTE FLASH-EPROM - 2 SERIAL PORTS
VT220F2SFF00	- TEST MEMORY 96KBYTE FLASH-EPROM - 2 SERIAL PORTS

VT240	ALUMINIUM FRAME VFD 2 x 40
VT2401SF000	- TEST MEMORY 32KBYTE FLASH-EPROM - 1 SERIAL PORT
VT2401SF0P0	- TEST MEMORY 32KBYTE FLASH-EPROM - 1 SERIAL-1 PARALLEL PORT
VT2402SF000	- TEST MEMORY 96KBYTE FLASH-EPROM - 2 SERIAL PORTS
VT2402SF0P0	- TEST MEMORY 96KBYTE FLASH-EPROM - 2 SERIAL - 1 PARALLEL PORT

VT240	PLATE VFD 2 x 40
VT240F1SF000	- TEST MEMORY 32KBYTE FLASH-EPROM - 1 SERIAL PORT
VT240F1SF0P0	- TEST MEMORY 32KBYTE FLASH-EPROM - 1 SERIAL - 1 PARALLEL PORT
VT240F2SF000	- TEST MEMORY 96KBYTE FLASH-EPROM - 2 SERIAL PORTS
VT240F2SF0P0	- TEST MEMORY 96KBYTE FLASH-EPROM - 2 SERIAL - 1 PARALLEL PORT

VT420	ALUMINIUM FRAME LCD 4 x 20
VT4201SF000	- TEST MEMORY 32KBYTE FLASH-EPROM - 1 SERIAL PORT
VT4201SF0S0	- TEST MEMORY 96KBYTE FLASH-EPROM - 1 SERIAL PORT - 1 SERIAL FOR PRINTER
VT4202SF000	- TEST MEMORY 32KBYTE FLASH-EPROM - 2 SERIAL PORTS
VT4202SFF00	- TEST MEMORY 96KBYTE FLASH-EPROM - 2 SERIAL PORTS

VT420	PLATE LCD 4 x 20
VT420L1SF000	- TEST MEMORY 32KBYTE FLASH-EPROM - 1 SERIAL PORT
VT420L1SF0S0	- TEST MEMORY 96KBYTE FLASH-EPROM - 1SERIAL -1 SERIAL FOR PRINTER
VT420L2SF000	- TEST MEMORY 32KBYTE FLASH-EPROM - 2 SERIAL PORTS
VT420L2SFF00	- TEST MEMORY 96KBYTE FLASH-EPROM - 2 SERIAL PORTS

VT440	ALUMINIUM FRAME LCD 4 x 40
VT4401SF000	- TEST MEMORY 32KBYTE FLASH-EPROM - 1 SERIAL
VT4401SF0P0	- TEST MEMORY 32KBYTE FLASH-EPROM - 1 SERIAL - 1 PARALLEL PORT
VT4402SF000	- TEST MEMORY 96KBYTE FLASH-EPROM - 2 SERIAL PORTS
VT4402SF0P0	- TEST MEMORY 96KBYTE FLASH-EPROM - 2 SERIAL - 1 PARALLEL PORT

VT440	PLATE LCD 4 x 40
VT440L1SF000	- TEST MEMORY 32KBYTE FLASH-EPROM - 1 SERIAL
VT440L1SF0P0	- TEST MEMORY 32KBYTE FLASH-EPROM - 1 SERIAL - 1 PARALLEL PORT
VT440L2SF000	- TEST MEMORY 96KBYTE FLASH-EPROM - 2 SERIAL PORTS
VT440L2SF0P0	- TEST MEMORY 96KBYTE FLASH-EPROM - 2 SERIAL - 1 PARALLEL PORT

28 Specifications

	VT220 1S	VT220 2S	VT240 1S	VT240 2S
	VT220F 1S	VT220F 2S	VT240F 1S	VT240F 2S
	VT420 1S	VT420 2S	VT440 1S	VT440 2S
	VT420L 1S	VT420L 2S	VT440L 1S	VT440L 2S
Power supply	24VDC $\pm$ 20%	24VDC $\pm$ 20%	24VDC $\pm$ 20%	24VDC $\pm$ 20%
VFD Display Lines x Characters	2 x 20	2 x 20	2 x 40	2 x 40
LCD Display Lines x Characters	4 x 20	4 x 20	4 x 40	4 x 40
Backlighting	Leds			
Customised Function Keys	10	10	22	22
Function LEDs	12	12	29	29
Total Keys	30	30	48	48
Test Memory FLASH-EPROM	32 K	32 K / 96 K	32 K	96K
Serial Port COM 1	RS232 / 422 / 485 / C.L. 20ma			
Serial Port COM 2	NO	RS232 / 485	NO	RS232 / 485
Parallel Port	NO	NO	YES	YES
Data and Alarms Printout	NO	YES	SI	YES
PLC-PC Data Transfer	NO	YES	NO	YES
Calendar Clock (with battery fitted)	YES	YES	YES	YES
Buffered Memory for Alarms (with battery fitted)	NO	FIFO register (512 Messages)		

Consumption	2.5 W	2.5 W	5 W	5 W
Operating Temperature	0 ... +50 °C	0 ... +50 °C	0 ... +50 °C	0 ... +50 °C
Storage Temperature	-20 ... +70°C	-20 ... +70°C	-20 ... +70°C	-20 ... +70°C
Front Panel Protection	IP 65	IP 65	IP 65	IP 65
Weight Kg.	0.8	0.8	1.2	1.2

DISTURBANCE RESISTANCE				
Power Supply IEC 801-4	2KV	2KV	2KV	2KV
Power Supply IEC 801-5	1KV	1KV	1KV	1KV
Serial ports IEC 801-4	2KV	2KV	2KV	2KV
Electrostatic discharges IEC 801-2	8KV	8KV	8KV	8KV

29 Customer service

In the event of problems relating to our terminals, please contact our Customer Services Department. The Department is open on working days only during normal office hours.

Should it be necessary to return the terminal for repair, please state:

- name/style of company;
- product code;
- serial number;
- detailed description of the problem and the conditions in which it manifests itself;
- person to be contacted should further information be required;
- other relevant information.

The form below is set out to avoid unnecessary delay. Please return it with the terminal to be repaired.

IMPORTANT

ESA will accept: • goods (carriage paid by client).
• goods (carriage paid by ESA only with prior authorization).
ESA will not accept: • costs of return of any goods without prior authorization.

Connectors, cables and other accessories need not be returned (unless related to the problem).

Thank you for your collaboration.

✂-----

ESA elettronica s.r.l.

Via Padre Masciadri, 4/A - 22066 Mariano C.se (Co) - Tel. 031/757400 - Fax 031/751777



REPAIR RETURNS DOCUMENT

Company name:

Model:.....

Previous repair: YES NO

PLC used:

Serial no - -

Date:/...../.....

Detailed description of the problem and related conditions:

.....

.....

.....

.....

.....

.....

Note:.....

.....

.....

Person to be contacted for further information: Tel:...../.....