CET s.r.l.

MESSAGE

DISPLAY UNITS

SERIES

AMF401 - AMF402
BMF202
EMC202 - EMC402
EMF202 - EMF402
FMC202

Version 1.2

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INDICE

1. INTRODUCTION

CET message display units are diagnostic devices equipped with an alphanumeric display, which shows a series of written information relative to particular situations for the operator.
The information is given under the form of messages, which can have a length up to 80 characters with the possibility to arrange explanatory sub-texts, scrolling messages, flashing messages and other highlighting modes.
All texts are externally programmed in a PC and then transmitted to the device inner memory through the special serial line RS232.

Messages are recalled to the display by applying coded logic commands to determined inputs or using independent inputs.
The text on display can be completed by sending ASCII or BCD characters directly to the device inputs. Although these devices are equipped with a series of "MANUAL" commands for particular situations, they are mainly intended for use with programmable logic units (PLC).

Below we indicate some functions or sectors where CET message display units are particularly suitable:

- information about operating conditions or sequences of a machine with related diagnostics in case of shutdown.
- sequential information about setting-at-work operations with directs display of internal data (variables), if any.
- information concerning maintenance operations.
- troubleshooting sequence.
- sequence information in different languages.

1.1. GENERAL DESCRIPTION OF THE DIFFERENT MODELS

This manual refers to the following models:

FMC202 EMC202 EMC402 EMF202 EMF402 AMF401 AMF402 BMF202

The message display units mentioned above differ only as regards the container (box) size in which they are placed and different types of displays used (fluorescent or LCD).
All devices are equipped with a 24Vdc power supply, therefore they can be used directly with programmable logic units (PLC).
They are also fitted with a removable terminal board, which makes them independent from external support interfaces.
All message display units can be controlled through the serial line RS232 as well as the independent or opportunely coded parallel inputs.
Their common capacity is 512 messages. Mechanical dimensions with terminal boards are given at the end of the manual.

The distinctive features of the different models are reported below.

1.1.1. FMC 202

- SERIES F container (front 48 x 144)
- Liquid crystal display (LCD) with two lines each of 20 characters (40 characters in all), 5 mm character height, LED backlighting.

1.1.2. EMC 202

- SERIES E container (front 72 x 192)
- Liquid crystal display (LCD) with two lines each of 20 characters (40 characters in all), 9 mm character height, LED backlighting.

1.1.3. EMC 402

- SERIES E container (front 72 x 192)
- Liquid crystal display (LCD) with two lines each of 40 characters (80 characters in all) 5 mm character height, LED backlighting.

1.1.4. EMF 202

- SERIES E container (front 72 x 192)
- fluorescent display with 2 lines each of 20 characters; 9 mm character height with high brilliance.

1.1.5. EMF 402

- SERIES E container (front 72 x 192)
- fluorescent display with 2 lines each of 40 characters (80 characters in all); 5 mm character height with high brilliance.

1.1.6. AMF 401

- SERIES A container (front 72 x 192)
- fluorescent display with 1 line of 40 characters; 5 mm character height with high brilliance.

1.1.7. AMF 402

- SERIES A container (front 72 x 288)
- fluorescent display with 2 lines each of 40 characters (80 characters in all); 5 mm character height with high brilliance.

1.1.8. BMF 202

- SERIES B container (front 96 x 288)
- fluorescent display with 2 lines each of 20 characters (40 characters in all); 11 mm character height with high brilliance.

1.2. MAIN FEATURES

- VISUALISATION ON A ALPHANUMERIC FLUORESCENT OR LIQUID CRYSTAL DISPLAY
- HIGH-READABILITY PUNCTIFORM CHARACTER WITH 5 x 7 MATRIX
- COMPLETE ASCII SET AVAILABILITY (128 CHARACTERS)
- SERIAL LINE RS232 ON ALL MODELS
- MESSAGES CAN BE PROGRAMMED EXTERNALLY BY THE MANUFACTURER OR OPERATOR USING A PC APPLICATION SOFTWARE.
- MESSAGE LENGTH UP TO 20 - 40 - 80 CHARACTERS
- TEXT CAPACITY OF 512 MESSAGE (20, 40 OR 80 CHARACTERS)
- DIRECT CONTROL FROM PLC THROUGH MESSAGE RECALL COMMANDS AND FUNCTIONAL COMMANDS

- POSSIBILITY OF ENTERING " VARIABLES " IN THE TEXT (ON DISPLAY) IN ADDRESSED POSITIONS
- POSSIBILITY OF "MANUAL" COMMANDS FOR PARTICULAR FUNCTIONS
- POSSIBILITY OF SERIAL LINE COMMANDS
- POSSIBILITY OF CONNECTION TO A SPECIAL PRINTER
- TERMINAL BOARD WITH REMOVABLE CONNECTORS

1.3. TECHNICAL FEATURES

POWER	stabilised direct current 10 Vdc to 30 Vdc (max 1V ripple)
ABSORPTION	3 W to 5 W approx.
OPERATING TEMPERATURE	- 5 ° C + 55 ° C for fluorescent display units - 0 °C + 45 °C for LCD units
STORAGE TEMPERATURE	- 35 °C + 70 °C
AMBIENT CONDITIONS	R.H. 95% at 40 °C (without condensate)
VISUALISATION	All characters are alphanumeric punctiform type with high brilliance and contrast
MESSAGE NUMBER (CAPACITY)	All devices have a maximum capacity of 512 messages
NUMBER OF VARIABLES THAT CAN BE ENTERED (with external commands)	as many characters as the display length
INPUTS	PRI input for POSITIVE LOGIC or NEGATIVE LOGIC programming
	14 DATA inputs for different functions (see chart)
INPUT SIGNAL LEVEL	Positive logic 0 = 0 Vdc to 6 Vdc 1 = 10.5 Vdc to 30 Vdc Negative logic 0 = OFF from OPEN COLLECTOR (or value equal to positive power supply) 1 = 0 Vdc to 3 Vdc
INPUT POWER SUPPLY	10 Vdc ➔ 30 Vdc
SERIAL INTERFACE	RS232
SERIAL CHARACTERS	All 128 ASCII characters plus main control characters
SERIAL PROTOCOL	1 START Bit, 8 DATA Bits, PARITY NONE, 2 STOP Bits, 19200 BAUD
SERIAL CONNECTIONS	8-pole RJ45 connector
INPUT CONNECTIONS	with removable terminals
EXECUTION	according to the models (see drawings)
ASSEMBLY	recessed mounting, to be fixed using special squares

2. FUNCTIONAL DESCRIPTION

2.1. FUNCTIONING AND USE

The functioning of the devices is relatively simple:

- upon power-up, lack of input signals, MESSAGE NO. 0 is displayed.
- the signals to make up the code of the message to be recalled are sent to the display unit input through the PLC; in the presence of a code, the associated message text is brought to the display and replaces the previous one or it is possible to manage the 9 data inputs (D0 to D8) as independent inputs for contacts.
- by sending the appropriate sequence commands through the PLC, it is possible to manage and update directly all or part of determined text areas in the message being displayed by entering the characters required (ASCII or BCD). In this way, you can complete the texts with values (VARIABLES) from the plant, such as voltages, currents, speeds, times, etc.
- different service commands are also available for cancelling variables, messages, and display flashing mode, etc.

2.2. CHART OF COMMANDS

Input signals are divided and managed according to the codes reported in the following chart:

COMMAND	SY	D	C	B	A	D8 D7 D6 D5 D4 D3 D2 D1
TYPE 0	IMP.	0	0	0	0	***Binary message recall + Synchronism***
TYPE 1	IMP.	0	0	0	1	***BCD message recall + Synchronism***
TYPE 2	IMP.	0	0	1	0	***BCD variable***
TYPE 3	IMP.	0	0	1	1	***Address in BCD variable on display***
TYPE 4	IMP.	0	1	0	0	***Address in Binary variable on display***
TYPE 5	IMP.	0	1	0	1	***ASCII variable***
TYPE 6	0	0	1	1	0	***Message recall through independent inputs***
TYPE 7	0	0	1	1	1	***Test manual commands***
TYPE 8	1	0	1	1	1	***Direct Binary message recall***
TYPE 9	IMP.	1	0	0	0	***Not active***
TYPE 10	IMP.	1	0	0	1	***Displayed message print enabling***
TYPE 11	IMP.	1	0	1	0	***Binary sub-message recall***
TYPE 12	IMP.	1	1	0	0	***Message flashing mode enabling***
TYPE 13	IMP.	1	0	1	1	***BCD sub-message recall***
TYPE 14	IMP.	1	1	0	1	***System language change / Bank selection***

Each command is stored upon the variation from 0 to 1 of SY (excluding command types 6, 7 and 8).

2.3. MESSAGE RECALL ON DISPLAY

Each message is associated with a number that identifies the message sequence position in the text composition MEMORY.
Four command types are available to recall a message to the display, as indicated in the previous chart.

2.3.1. Command TYPE 0: Binary message recall + Synchronism

Inputs	**SY**	**D**	**C**	**B**	**A**
Command TYPE 0	**IMP**	**0**	**0**	**0**	**0**

This coding requires entering the message recall number in BINARY code:

D8	D7	D6	D5	D4	D3	D2	D1	D0
2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0

Number in the range 0 to 512

Coding and number are always read at the variation 0 ➔ 1 of synchronism signal SY.

2.3.2. Command TYPE 1: BCD message recall + Synchronism

Inputs	**SY**	**D**	**C**	**B**	**A**
Command TYPE 1	**IMP**	**0**	**0**	**0**	**1**

This coding requires entering the message recall number in BCD code:

D8	D7	D6	D5	D4	D3	D2	D1	D0
2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
3^{rd}	2^{nd}				1^{st}			

3^{rd} DIGIT 2^{nd} DIGIT 1^{st} DIGIT

Number in the range 0 to 199

Coding and number are always read at the variation 0 ➔ 1 of synchronism signal SY; in case of recall using a command type 1 (BCD), up to 199 messages can be recalled.

2.3.3. Command TYPE 6: Message recall through independent inputs

Inputs	**SY**	**D**	**C**	**B**	**A**
Command TYPE 6	**IMP**	**0**	**1**	**1**	**0**

This coding requires entering the message recall number :

D8	D7	D6	D5	D4	D3	D2	D1	D0
9	8	7	6	5	4	3	2	1

Message number in the range 1 to 9

This type of coding enables recalling the first 9 messages to the display, from 1 to 9, programmed and associated to the 9 display unit inputs, from D0 to D8.

The display unit reads the 9 inputs as direct contacts and the closure of each of them causes the associated message to be displayed, The message disappears when the input reopens.
In case of several inputs closing at the same time, the display unit shows the message associated to the lower input from D0 to D8, with priority to D0.

2.3.4. Command TYPE 8: Continuous message recall in BINARY code

Inputs	SY	D	C	B	A
Command TYPE 8	**1**	**0**	**1**	**1**	**1**

This command enables the display unit to use the first 9 inputs in a DIRECT mode with BINARY coding:

D8	D7	D6	D5	D4	D3	D2	D1	D0
2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0

Number in the range 0 to 512

The message associated to the current number is continuously displayed as long as such number is sent to the input. With this configuration, you cannot use any of the commands of TYPES 0 to 7.

2.3.5. Command TYPE 11: Sub-message display in BINARY code

Using this command, you can recall a message to the second display line together with the message that is already displayed at the moment.
This enables two different messages being displayed at the same time. Should one or both messages be longer than 20 characters, the text will automatically scroll from right to left.
To remove the message from the second line, send back the same command recalling message no. 0.
N.B. This command is not implemented in the displays with two 40-character lines.

Inputs	SY	D	C	B	A
Command TYPE 11	**IMP**	**1**	**0**	**1**	**0**

This coding requires entering the message recall number in BCD code:

D8	D7	D6	D5	D4	D3	D2	D1	D0
2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0

Number in the range 0 to 512

Coding and number are always read at the variation 0 ➔ 1 of the synchronism signal SY.

2.3.6. Command TYPE 13: Sub-message display in BCD code

Using this command, you can recall a message to the second display line together with the message that is already displayed at the moment.
This enables two different messages being displayed at the same time. Should one or both messages be longer than 20 characters, the text will automatically scroll from right to left.
To remove the message from the second line, send back the same command recalling message no. 0.
N.B. This command is not implemented in the displays with two 40-character lines.

Inputs	**SY**	**D**	**C**	**B**	**A**
Command TYPE 13	**IMP**	**1**	**1**	**0**	**1**

This coding requires entering the message recall number in BCD code:

D8	D7	D6	D5	D4	D3	D2	D1	D0
2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
3^{rd}	2^{nd}				1^{st}			

3^{rd} DIGIT 2^{nd} DIGIT 1^{st} DIGIT

Number in the range 0 to 199

Coding and number are always read at the variation 0 ➔ 1 of the synchronism signal SY.

2.4. ENTERING VARIABLES IN THE TEXT DISPLAYED

Certain characters can be entered from the PLC into the texts of all messages recalled onto the display to compose a word, sentence or number; such writings are called VARIABLES, as they are continuously varied (updated). Management and, consequently, entering of such VARIABLES in the message display unit is rather sophisticated in order to guarantee the PLC easy and efficient display control.

First of all, it is necessary to identify in advance the positions in the text where the variables are to be entered and leave them free for writing. This can be done for a part of the text or for the whole text that appears on the display.
In any case, variables can only be entered within the display length and no more.
For example, if the display is composed of 40 characters, only 40 positions can be managed as variables.

The commands that are to be transmitted from the PLC to the message display unit and contain the VARIABLE, basically consist in CHARACTER and ADDRESS.
THE ADDRESS (from 0 to n, where n is the text length) represents the position in the text where the letter, symbol or number shall be entered.
THE CHARACTER is the letter, symbol or number if in ASCII code or only the number if in BCD code (from 0 to 9).
Variables are ENTERED through commands TYPE 2 - 3 - 4 - 5.
NOTE: variables in scroll messages are updated only when they are actually displayed; all changes entered when they are not displayed are ignored.

2.4.1. Command TYPE 3: Address in BCD code

Inputs	SY	D	C	B	A
Command TYPE 3	**IMP**	**0**	**0**	**1**	**1**

This code informs the display unit that the first 8 inputs represent the position address (0 to 80) in BCD code where the next variable will be laid.

D8	D7	D6	D5	D4	D3	D2	D1	D0
2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
3^{rd}	2^{nd}				1^{st}			

3^{rd} DIGIT 2^{nd} DIGIT 1^{st} DIGIT

Number in the range 0 to 199

2.4.2. Command TYPE 4: Address in BINARY code

Inputs	SY	D	C	B	A
Command TYPE 4	**IMP**	**0**	**1**	**0**	**0**

This code informs the display unit that the first 8 inputs represent the position address (0 to 80) in BINARY code where the next variable will be laid.

D8	D7	D6	D5	D4	D3	D2	D1	D0
-	-	2^6	2^5	2^4	2^3	2^2	2^1	2^0

Number in BINARY code in the range 0 to 80

Coding and number are always read at the variation 0 ➔ 1 of the synchronism signal SY.

2.4.3. Command TYPE 2: Variable in BCD code

Inputs	SY	D	C	B	A
Command TYPE 2	**IMP**	**0**	**0**	**1**	**0**

This code identifies a BCD variable in the first 4 inputs and a service BINARY value in the second 4 inputs, as shown:

D8	D7	D6	D5	D4	D3	D2	D1	D0
-	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
-					1^{st}			

SERVICE BITS BCD

Number in BCD code in the range 0 to 80

All values are read at the 0 ➔ 1 variation of the synchronism signal SY. Each time, after entering a variable, the indicator (CURSOR) for laying the next variable is automatically increased by one position (if not otherwise commanded).
The 4 Service Bits can be used to enter an OFFSET (value 0 to 13) that the display unit will add to the variable cursor position to lay the variable. In this case, the actual cursor stays in its initial position and increases by 1 relative to that position.

2.4.4. Command TYPE 5: Variable in ASCII code

Inputs	**SY**	**D**	**C**	**B**	**A**
Command TYPE 5	**IMP**	**0**	**1**	**0**	**1**

This coding identifies the presence of a variable ASCII-coded character in the first 9 inputs.

D8	D7	D6	D5	D4	D3	D2	D1	D0
2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0

ASCII character in the range 20H to 7F

Values are taken at the 0 ➔ 1 variation of the synchronism signal SY. The position cursor is automatically increased by one position each time.

2.5. SERVICE COMMANDS

2.5.1. Command TYPE 7: " Manual " operation and associated commands

Inputs	**SY**	**D**	**C**	**B**	**A**
Command TYPE 7	**0**	**0**	**1**	**1**	**1**

This command enables using the first 9 inputs in a " MANUAL " mode for device checking purposes.

Functions accomplished by the inputs are as follows:

INPUT	*FUNCTION*
D0	Return to WAITING MESSAGE visualisation
D1	Move to following MESSAGE (1 step) with temporary visualisation of message NUMBER
D2	Return to previous MESSAGE (1 step) with temporary visualisation of message NUMBER
D3	Not implemented
D4	Message number increase by 50 steps
D5	Message number decrease by 50 steps
D6	Causes software date and version to be displayed

2.5.2. Command TYPE 10: Message Print

Using this message, you can print the message being displayed through the serial line.

Inputs	**SY**	**D**	**C**	**B**	**A**
Command TYPE 10	**IMP**	**1**	**0**	**0**	**1**

Coding and number are always read at the 0 ➔ 1 variation of the synchronism signal SY.

2.5.3. Command TYPE 12: Display flashing mode

Using this command, you can cause the message shown on the display to flash.
This is a Set/Reset type command, i.e. the first time the input is activated, the flashing mode is also activated; the following command deactivates it.

Inputs	**SY**	**D**	**C**	**B**	**A**
Command TYPE 12	**IMP**	**1**	**1**	**0**	**0**

Coding and number are always read at the 0 ➔ 1 variation of the synchronism SY signal.
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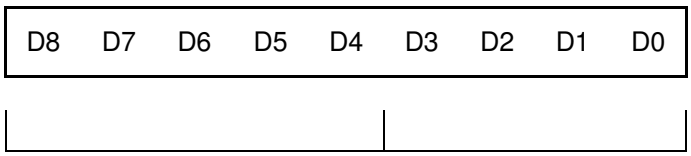
2.5.4. Command TYPE 14: System language selection / Message bank selection.

Inputs	**SY**	**D**	**C**	**B**	**A**
Command TYPE 14	**IMP**	**1**	**1**	**0**	**1**

Using this coding, you can set the system language and message bank you are to work with.
Upon power-up and with the A, B, C and D commands set, the display unit automatically reads the system language and message bank.



The first 4 bits (D0 to D3) select the message bank you are to work with. The bank number is created during programming using the WINTEXT software package.
Desks can be selected as follows:

D0: BANK 1 D1: BANK 2
D2: BANK 3 D3: BANK 4

The next 5 bits (D4 to D8) select the system message language you are to work with, in the following order:

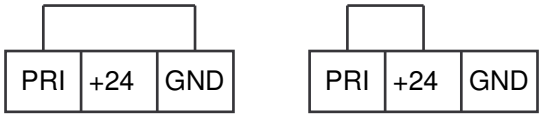
D4: ITA - ITALIAN D5: GB - ENGLISH D6: DE - GERMAN
D7: SPA - SPANISH D8: FRA - FRENCH

Upon power-up, if no bits are set, the instrument reads Bank 0 and Italian as system language.
To change the system language or message bank during operation, activate the synchronism command SY with the coding desired.

3. TECHNICAL DESCRIPTION

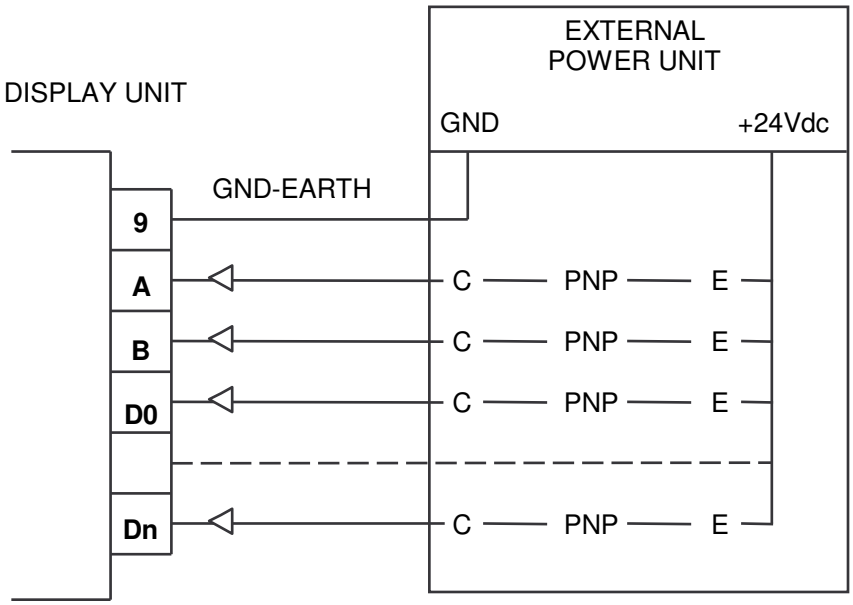
3.1. INPUTS

The device terminal board is provided with 14 signal inputs, which can be used with either POSITIVE LOGIC by programming the PRI input to EARTH or NEGATIVE LOGIC with PRI at +24Vdc.



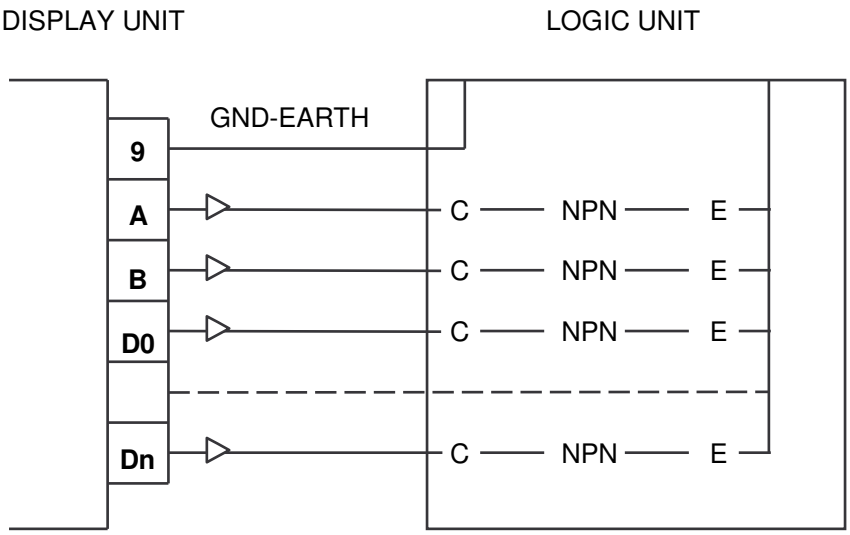
The inputs must be connected as shown in the figure according to the type of logic used (POSITIVE or NEGATIVE).

3.1.1. Using inputs in POSITIVE logic



C = Collector E = Emitter

3.1.2. Using inputs in NEGATIVE logic

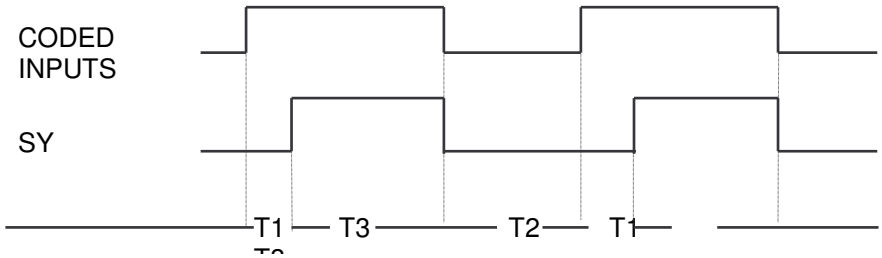


C = Collector E = Emitter

3.1.3. Input command timing

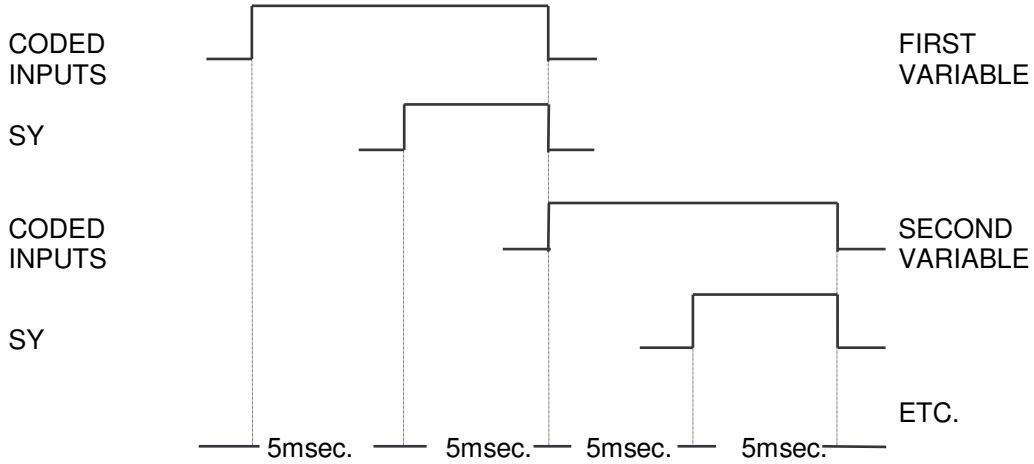
Generally, in order to be read, each device input should remain in stable conditions for at least 5 msec.

Coded commands that are stored at the positive variation (from 0 to 1) of the synchronism signal SY, should respect the following minimum time conditions.



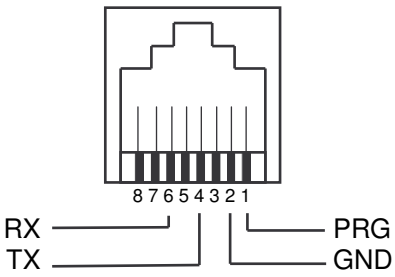
T1 minimum: 1 millisecond T2 minimum: 3 milliseconds T3 minimum: 3 milliseconds

For fast VARIABLE updating from the PLC, we recommend using the following sequence type:



3.2. SERIAL LINE

All models are equipped with a RS232 serial line with fixed protocol:
1 START Bit, 8 DATA Bits, Parity NONE, 2 STOP Bits with transmission speed of 19200 BAUD (except transmission to printer which is executed at a speed of 1200 BAUD).
The physical connection is carried out using a 9-pole female cup connector as shown in the figure:



The following functions can be performed through the serial line:

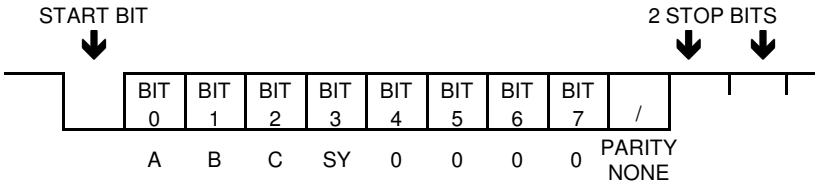
- PROGRAMME RECEPTION FROM PC
- COMMAND RECEPTION
- PROGRAMME TRANSMISSION TO PC
- PROGRAMME TRANSMISSION TO ANOTHER MESSAGE DISPLAY UNIT
- TRANSMISSION TO PRINTER

Using the appropriate SERVICE commands, it is possible to control the PRINTER ST 40 directly to obtain printer listings of the messages displayed.
The message display units can also be totally managed (controlled) through serial line commands instead of parallel inputs.

3.2.1. Serial line commands

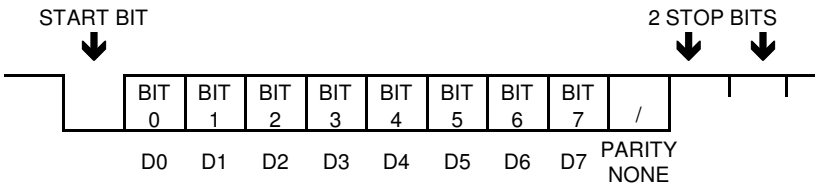
The serial line command generator device (PC or PLC LOGIC UNIT) should make a 2-byte string of data using the chart of commands for commands TYPE 0 - 1 - 2 - 3 - 4 - 5 - 6 -10 - 11 - 12 -13 and 14.

Composition of 1st string byte:



The sequence of the bytes transmitted reflects exactly the same sequence as parallel commands.

Composition of the 2nd string byte:



The two bytes must be transmitted consecutively with a maximum delay of 3 seconds from one another.
The sequence of the bytes transmitted reflects exactly the same sequence as parallel commands.

4. PROGRAMMING THE DEVICES

All message display units of this series can be programmed exclusively through the serial line using a personal computer. The message display units must be powered during programming.

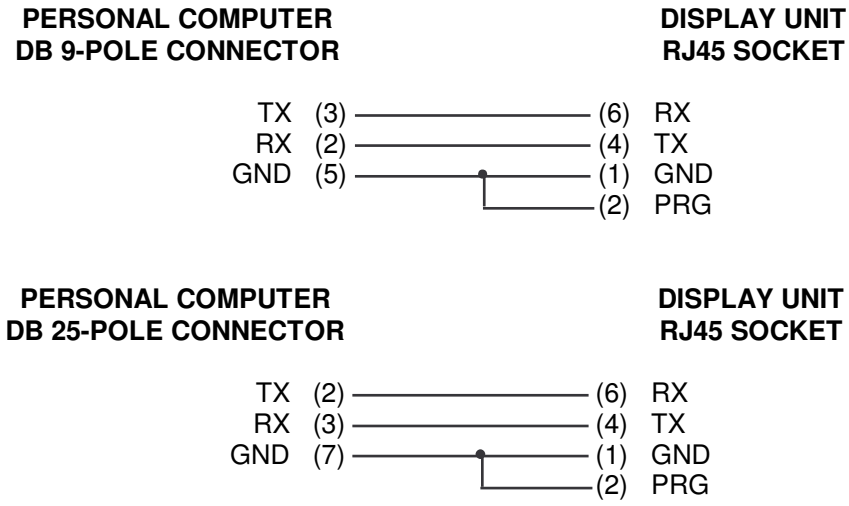
4.1. PROGRAMMING USING A PERSONAL COMPUTER

It is necessary to use the special software package named WINTEXT, which, by means of guided logic menus, allows the generation of all necessary messages.
To execute programme transfer, the serial lines of the personal computer and message display unit should be connected as shown in the figure.
The PC to display unit cable connection should be done when the display unit is not powered.
Once both devices are connected and powered, the display unit shows the message “PROGRAMMAZIONE ATTESA” (AWAITING PROGRAMMING); as soon as the transmission starts from the PC, automatically the display unit changes to the message “RICEZIONE IN CORSO” (RECEPTION IN PROGRESS) and the PC software starts sending.
Upon transmission completion, the display unit shows the message “RICEZIONE OK” (RECEPTION OK). If reception was unsuccessful or incomplete, the display shows “RICEZIONE NON OK” (RECEPTION NOT OK). In this case, check the cable and transmission speed.
N.B. Make sure that the display unit and PC power supplies are unipotential, i.e. have the same grounding reference (for the display unit this is the external power unit), since potential differences damage the serial ports.

4.2. PROGRAMMED MEMORY ARCHIVES

All text programmes resident in the display units can be resent to a personal computer fitted with the WINTEXT software, to be filed or changed.
To execute programme transfer, the serial lines of the personal computer and message display unit should be connected as shown in the figure.
The PC to display unit cable connection should be done when the display unit is not powered.
Gain access to "RICEZIONE" (RECEPTION) in the personal computer; the words “TRASMISSIONE IN CORSO” (TRANSMISSION IN PROGRESS) automatically appear in the display unit display while the words “RICEZIONE IN CORSO” (RECEPTION IN PROGRESS) will appear on the PC.
Upon transmission completion, the PC will show the message “RICEZIONE OK” (RECEPTION OK) will appear. If transmission was unsuccessful or incomplete, the PC shows “RICEZIONE NON OK” (RECEPTION NOT OK). In this case, check the cable and transmission speed.
N.B. Make sure that the display unit and PC power supplies are unipotential, i.e. have the same grounding reference (for the display unit this is the external power unit), since potential differences damage the serial ports.

4.3. PC – TO – DISPLAY UNIT CONNECTION



5. ACCESSORIES

5.1. PRINTER ST40

CET message display units can control the special printer " ST40 " through the serial line RS232. This printer is a panel printer housed in a DIN 144 x 144 box and complete with a multi-voltage mains power unit. Printing is impact dot-matrix type and on 40 columns using standard paper.
The paper roll is contained in a suitable inside compartment, which can be accessed after opening the front door.
This printer provides listings of the message texts displayed.
The front panel is fitted with a power LED and a paper feed/self-test button.

5.1.1. Technical features

POWER SUPPLY	24 - 110 - 220 Vac + 10% - 15%
FREQUENCY	50 -> 60 Hz
ABSORPTION	6VA
OPERATING TEMPERATURE	0 °C + 50 °C
AMBIENT CONDITIONS	R.H. 95% at 40 °C (without condensate)
RELIABILITY (MCBF)	500,000 lines
INK RIBBON	cartridge type
RIBBON CAPACITY	200,000 characters
PAPER FEATURES	width: 69.5 ± 0.5 mm thickness 0.07mm max. roll diameter: 50 mm
PAPER FORWARD SPEED	0.4 lines / sec.
WRITING SPEED	0.4 lines / sec.
CHARACTER SIZE	normal 2.4x1.3mm (40c/l); double width 2.4x2.6mm (20c/l); double height 4.8x1.3mm (40c/l); expanded 4.8 x 2.6mm (20c/l)
CHARACTER AVAILABILITY	96 ASCII characters
INTERFACE	serial RS232
SERIAL PROTOCOL	1 start bit, 8 data bits, parity none, 2 stop bits - 1200 baud
EXECUTION	DIN 144 X 144
CONNECTIONS	with removable terminals and connectors
ASSEMBLY	recessed mounting, to be fixed with special squares

5.1.2. Installation

- PRINTER: connect the power cable to printer and the RS232 interface special connection cable between printer and message display unit.

- INK CARTRIDGE: the printer is normally supplied complete with an ink cartridge and paper roll already installed. The ink cartridge will print approximately 10,000 lines with 20 characters per line, keeping writing perfectly clear for reading throughout.
The ink cartridge is very easy to replace observing the following steps:

1) remove paper; usually the ink cartridge is replaced together with the paper roll; if for any particular reasons it is necessary to replace only the cartridge and not the paper roll, then you should cut the paper.
2) take out the used cartridge by pushing the left end at the point marked with the word "PUSH ".
3) insert the new cartridge applying a slight pressure.

After cartridge insertion, the ribbon might not be perfectly settled, in this case, it is sufficient that the printer feeds the paper on a few times.

- PAPER ROLL INSTALLATION: the insertion of a new paper roll should be carried out with printer on and with the front panel open. The operation sequence is the following:

1) remove the written paper roll.
2) bring paper from the new roll to the printing mechanism opening.
3) press the paper feed button until paper comes out of the printing mechanism.
4) insert the new roll in its compartment and close the panel.

The printer ST40 prints on standard paper, easy to find on the market.
Paper specifications are listed in the chapter "TECHNICAL FEATURES ".
It is also possible to order paper from CET.

- SELF-TEST: the printer ST40 can easily carry out a self-test to check printer status.
To run the self-test, switch on the printer while keeping the paper feed button pressed.
The self-test consists in printing 6 lines using the 4 different writing formats supported by the printer ST40.
We recommend to always carry out at least one self-test upon printer installation to check printer condition and familiarise with the writing formats supported by the printer ST40.

5.1.3. Printer – to – display unit connection

DISPLAY UNIT RJ45 8-POLE CONNECTOR			ST40 DB 9-POLE FEMALE CONNECTOR	
GND	(1)	———	(1)	EARTH
TX	(4)	———	(4)	RX
CTS	(5)	———	(5)	BUSY OUT

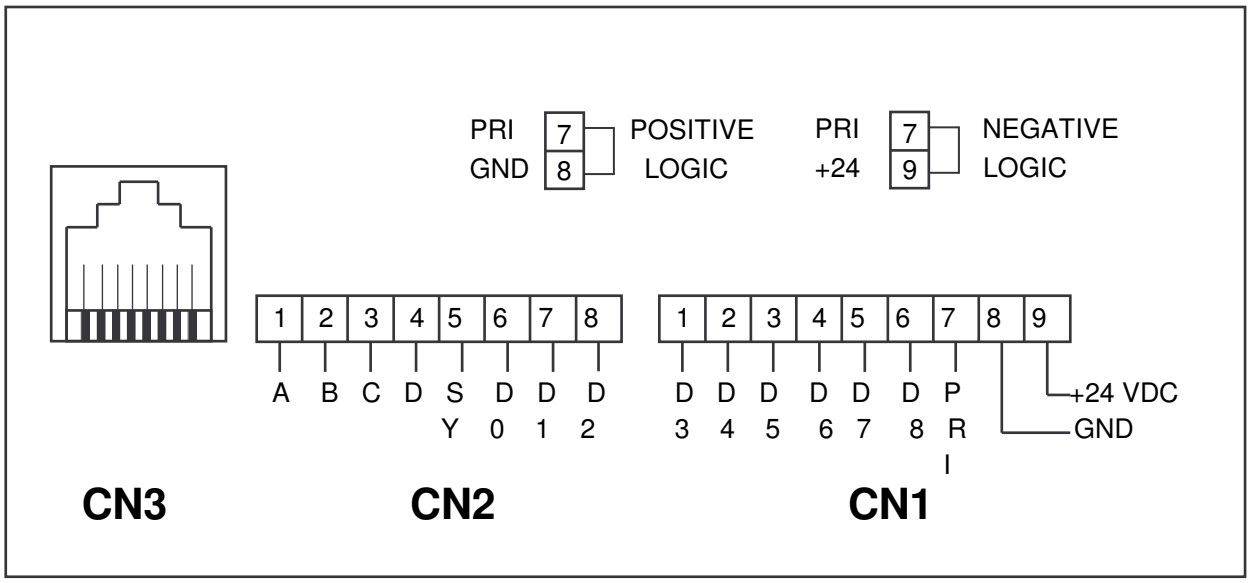
5.2. USING THE "WINTEXT" SOFTWARE PROGRAMME FOR MESSAGE DISPLAYS

To programme CET message display units, it is necessary to use the special software package "WINTEXT" supplied by CET. A broad and accurate operational description is available in the software in-line HELP file. For use with the message display units, select the device to be programmed in the list prompted by the software menu.

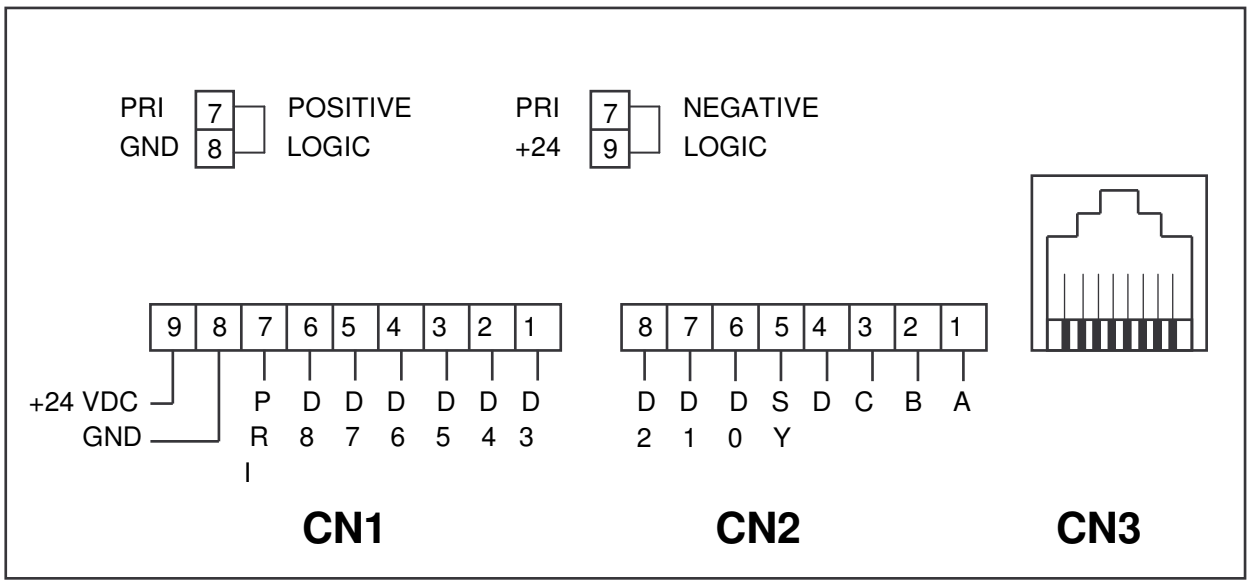
6. TERMINAL AND MECHANICAL DIMENSIONS

6.1. TERMINAL CONNECTION DIAGRAMS

6.1.1. Connections and terminals for FMC202 - AMF401 - AMF402

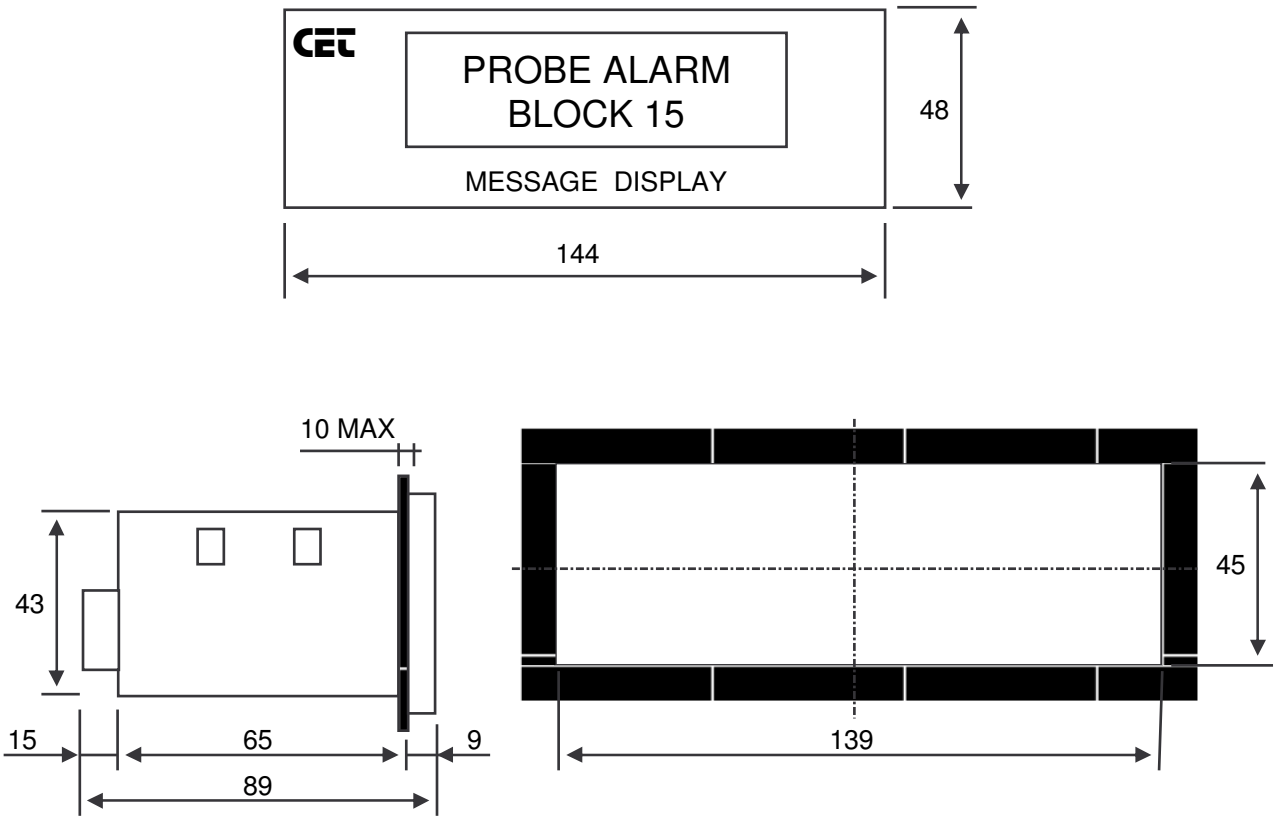


6.1.2. Collections and terminals for EMC202 - EMC402 - EMF202 - EMF402 - BMF202

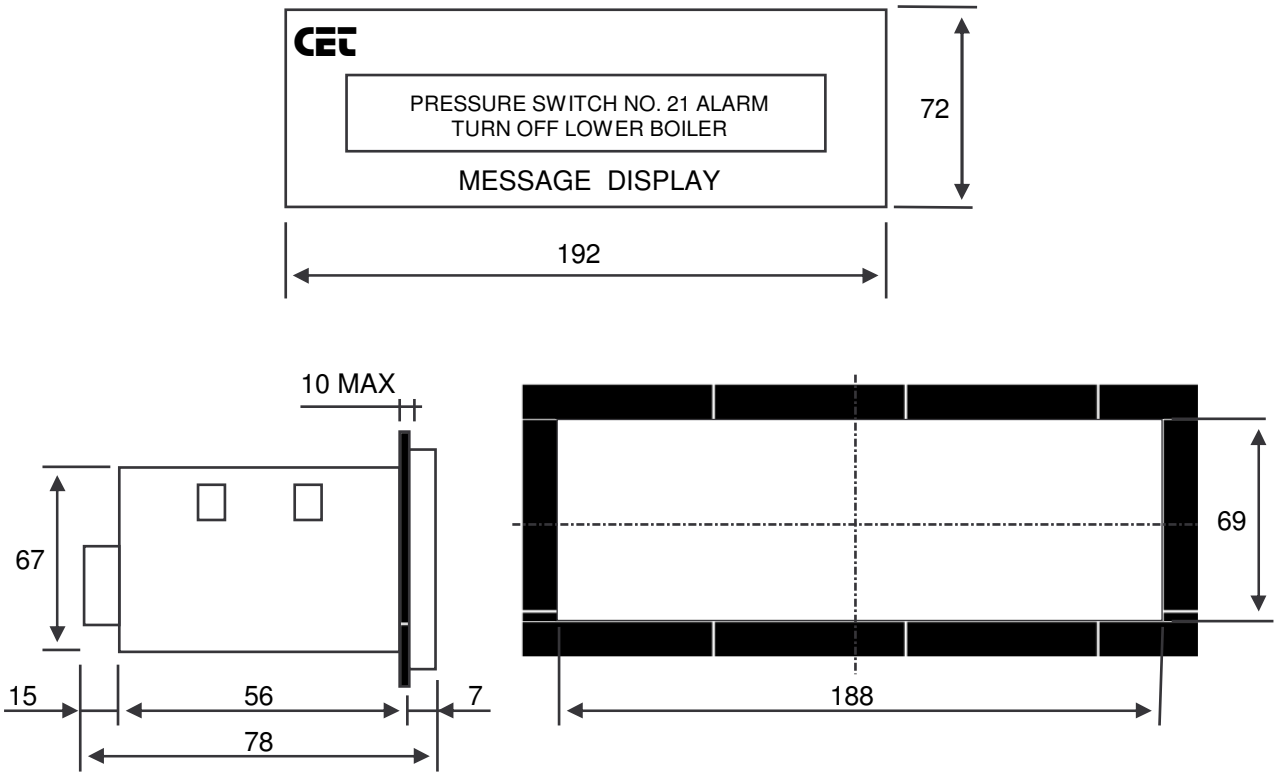


6.2. OVERALL DIMENSIONS

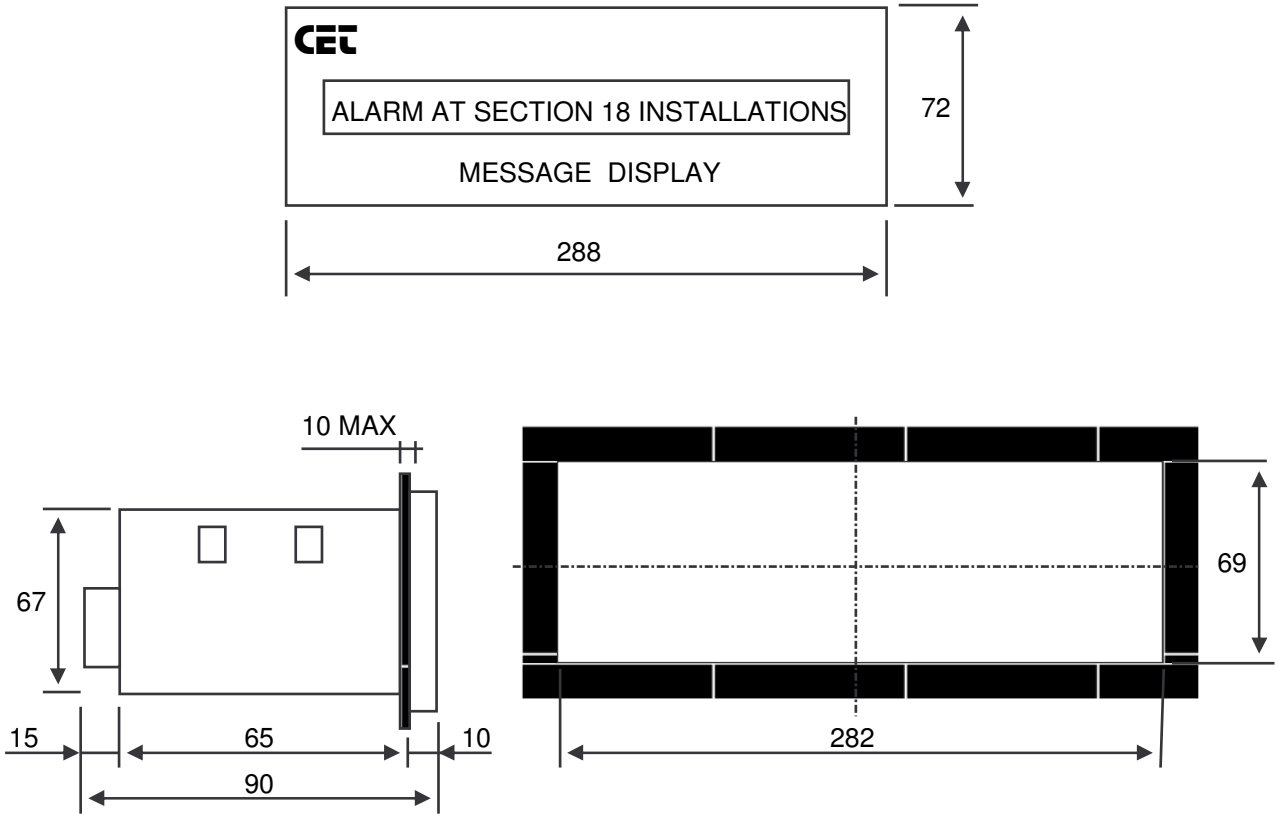
6.2.1. Overall dimensions for FMC202



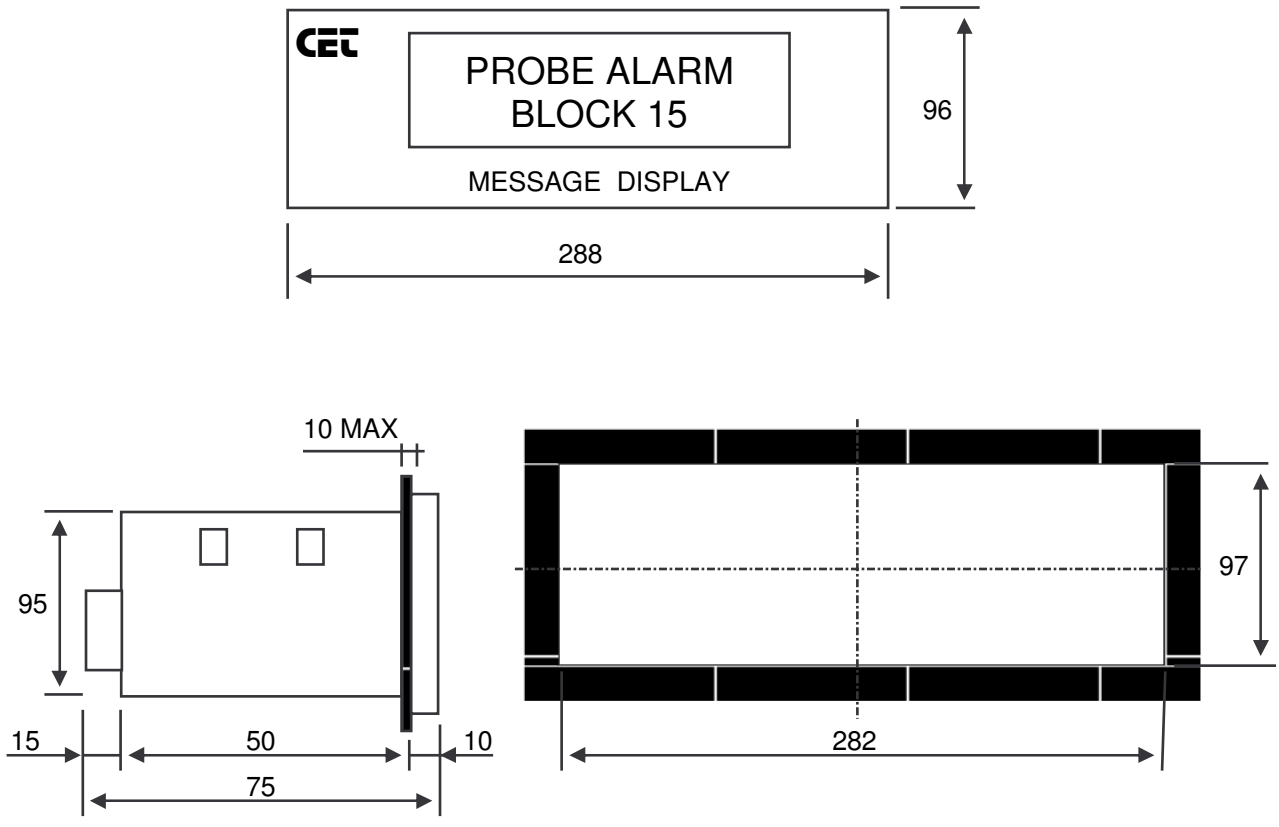
6.2.2. Overall dimensions for EMC202 - EMC402 - EMF202 -EMF402



6.2.3. Overall dimensions for AMF401 - AMF402



6.2.4. Overall dimensions for BMF202



6.2.5. Overall dimensions for printer ST40