CET s.r.l.

A402

MESSAGE

DISPLAY

User manual

Version 1.1

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1. INTRODUCTION

The A402 message display is a diagnosis device equipped with a 80 character alphanumeric display on two lines, which shows the Operator a series of written information relative to certain situations.

The information is represented by messages which can be composed of 2 up to 8 lines each. Each line can have a length up to 64 characters (generally 60 characters are used), with automatic scrolling of the writing in case the maximum length of the display is exceeded (40 characters).

The scrolling writing is limited to the first display line, for simplification reasons.
All texts are entered and the stored in the message display through a suitable keyboard (TS 58 CE for EUROPEAN characters or TS58 CI for CYRILLIC and INTERNATIONAL characters). As an alternative, text programming can also be carried out by a serial connected PERSONAL COMPUTER. In this case, it is possible to keep files relative to programming carried out on the different devices.
Furthermore, each display is capable, through a serial line, to transferring its programs into other devices, or to carry out relative lists on the appropriate printer ST40.
The messages contained in the message display are recalled and managed on display according to various procedures, both through the parallel interface of the COMMANDS (20 INPUTS) and through the suitable SERIAL RS232 interface.
Furthermore, the text on display can be completed (or managed) through the entering of ASCII or BCD characters (VARIABLES) directly to its inputs.
The display is equipped with programmable FUNCTIONS which make it suitable both for PROGRAMMABLE LOGICS (PLC) and independent electromechanical CONTACTS.
On the front panel of the device there are 8 keys available, with which the Operator can directly carry out both display commands and main FUNCTION programming, and also some specific visualization commands occurred and stored sequences and relative printer lists.
Below some functions and fields where such message display is particularly suitable:

- Information about conditions or function sequences of a machine with relative diagnostics in case of shut down.
- Chronological information and alarm recording.
- Alarm definition guide with 8 message lines.
- Sequence information of the setting at work operations with direct display of possible entered data (variables).
- Information about maintenance operations.
- Troubleshooting sequences.
- Sequence information in different languages (8 lines).

1.1. MAIN CHARACTERISTICS

⇒ Visualization on a fluorescent alphanumeric two lines display with 40 characters per line.
⇒ Punctiform character with 5x7 matrix, h= 5 mm with high brightness.
⇒ Complete ascii set availability (96 characters) + cyrillic set.
⇒ Possibility to enter up to 512 messages composed of 2 to 8 lines each for a maximum total of about 30.000 characters.
⇒ Written messages with a length up to 64 characters (if exceeding 40 characters there is an automatic lateral scrolling).
⇒ Text programming with suitable keyboard or with pc through a serial line rs232 or by other already programmed displays.
⇒ Entering completely guided by a suitable menu with the possibility to select 6 different languages.
⇒ Set of functional keys on the frontal for manual interface with the operator.
⇒ Direct message management by plc with coded parallel commands on 16 lines or in rs232 series.
⇒ Direct message management by 16 inputs for electromechanical contacts.
⇒ Management of up to 64 messages for the relative electromechanical contacts with extension card “mux64”.
⇒ Different management and codification for alarm and sequence visualization.
⇒ Message visualization on display according to two different programmable methods.
⇒ Alarm priority storage and visualization (up to a maximum of 64).
⇒ Programmable and addressable signals on 4 outputs.
⇒ Possibility of entering on display “variables” in ascii o bcd in any position.
⇒ Printing of the stored events with chronological time information (max. 128 events).
⇒ Programmable functions.
⇒ Built in diagnostics.
⇒ Power supply MULTI-VOLTAGE 24-110-220 Vac

⇒ Connections with removable terminals or connectors.
⇒ Front panel din 72 x 288 with protection degree ip65.

1.2. TECHNICAL FEATURES

POWER	: MULTI-VOLTAGE 24-110-220 Vac +10% -15%
FREQUENCY	: 50 - 60 Hz
ABSORPTION	: 10 VA
WORKING TEMPERATURE	: -5 °C % + 50 °C
STORAGE TEMPERATURE	: -35 °C % + 70 °C
CLIMATIC CONDITIONS	: R.H. 95 % AT 40 °C (with no c ondensate)
VISUALIZATION	: 40 punctiform alphanumeric characters (H 5 mm) with high brightness, on two lines
MESSAGE NUMBER (CAPACITY)	: 512 + WAIT. MESS. + COMMON. MESS.
MESSAGE COMPOSITION	: from 2 to 8 LINES each
LINE LENGTH	: 64 CHARACTERS MAXIMUM
TEXT MEMORY	: RAM for a total capacity of about 30.000 characters
FUNCTION AND ALARM MEMORY	: RAM (for a maximum of 64 ALL)
CHRONOLOGICAL MEASURE MEMORY	: RAM (for a Maximum of 128 measures)
MEMORY AUXILIARY POWER (for data reserve)	: Battery Ni.Cd. in buffer with an autonomy of about 2 years and duration of over 10 years.
NUMBER OF VARIABLES THAT CAN BE ENTERED (with external commands)	: as many characters as the corresponding text.
INPUTS	: PRI input for POSITIVE or NEGATIVE LOGIC programming : DATA inputs NR. 20 (see table), all opto-isolated, for the different functions.
INPUT SIGNAL LEVEL : POSITIVE logic : NEGATIVE logic	0 = 0 Vdc % 6 Vdc 1 = 10,5 Vdc % 28 Vdc 1 = 0 Vdc % 3 Vdc 0 = OFF from OPEN COLLECTOR or 0 = 12 Vdc % 30 Vdc. (connecting PRI to the terminal Vdc POWER)
INPUT AUXILIARY POWER	: 12 Vdc - 100 mA supplied to the terminal board by the message display
SERIAL INTERFACE	: RS232 with cannon connector with 9 poles
SERIAL CHARACTERS	: all characters available on display with some of the main command characters
SERIAL PROTOCOL (common in transmission and reception)	: 1 START Bit, 9 DATA Bits, PARITY NONE, 2 STOP Bits, 1200 BAUD
CONNECTIONS	: with removable terminals
PROTECTION DEGREE ON THE FRONT PANEL	: IP 65
EXECUTION	: DIN 72 X 288
ASSEMBLY	: Built in, fixed with suitable squares.

2. WORKING DESCRIPTION

2.1. SEQUENCES AND ALARMS VISUALIZATION

The "SEQUENCES" are all the operations carried out by a certain machine in consecutive times (machine CYCLES).
In case of a logic or a series of contacts capable to identify the different cycles, it is possible, through the message display, to visualize all the machine sequences, thus allowing the operator to know at anytime which function is being carried out.
In the message display the different SEQUENCES are not stored, but only scanned in time by the movement of the contacts or by the input logics commands.

The "ALARMS" are occasional events representing a machine malfunctioning and can be temporary, continuous, single or multiple.

Their recording, in case of breakdowns, allows to discover the cause of the malfunctions and to identify all the occurred inconveniences.

The ALARM resolution (removal of the cause), also in selective mode (one by one)and their recording reset, allow to point out possible connections between one alarm and another.
In case of alarm survey by contact, it can be useful to operate with N.C. contact connection wire safety.
The A402 message display gives, with a single instrument, the possibility to analyze all the events occurring on machines or plants.
In fact, the SEQUENCES can be visualized and simultaneously it is possible to keep under control all the ALARMS of a machine. All ALARMS are stored and are thoroughly managed, both in visualization and in acknowledgment.

The message display has a BUFFER for the chronological recording of 128 alarm addresses, containing the last 128 alarms occurred at any time, each one with date and time.

An operational BUFFER allows to store and process up to 64 ALARMS, with programmable management characteristics.

In case of coded logics the alarm can be entered and then acknowledged (cleared) in a completely addressed way (singularly)
In case of contacts, every single alarm can be acknowledged in a conditioned way, that is only if the respective input has gone home.
In any case, from the front keys it is possible to know how many ALARMS are in memory, which one has arrived first and which one last. It is also possible to review them one by one and in case, to reset them singularly or in programmed way.
Each alarm is always followed by the DATE and TIME of the moment when it occurred

2.2. PROGRAMMABLE FUNCTIONS

Before using this device it is necessary to program it. Such an operation can be divided into two main parts: message TEXT PROGRAMMING and FUNCTION PROGRAMMING, that is the functioning of the device itself.
All programmings can be carried out with the suitable KEYBOARD (TS58 CE / TS58 CI) whose specific use will be described later; the function programmings can be carried out also with the front keys. If necessary, it is also possible to program the texts with the front keys.
Two other programming methods are represented by external programming obtained through the serial line, through PERSONAL COMPUTER or by another MESSAGE DISPLAY (also the FV1 series or A402) already programmed.
All operations regarding the physical programming of the device are described in paragraph 5.

The following paragraphs describe the structure and meaning of all the FUNCTIONS of the message display.

2.2.1. FUNCTION MENU AND THEIR ENTERING

The FUNCTIONS are generated by the "FUNC. PROGR." option in the MAIN MENU.

Their entering is conditioned by writing the correct code **SYS** in the shown boxes.
The structure of the FUNCTIONS follows the scheme:

FUNCTION PROGR.
[. . .] Access Code

- ALARMS DISPLAY MODE
  - SINGLE DIRECT
  - SINGLE INVERSE
  - CYCLIC DIRECT
  - CYCLIC INVERSE
- ALARM ACKNOWLEDGMENT MODE
  - COMMON
  - SELECTIVE
  - CONDITIONED for contacts
  - AUTOMATIC CONDITIONED for contacts
- INPUT FUNCTIONS
  - (PLC) CODED
  - CONTACTS FOR SEQUENCES
  - CONTACTS FOR ALARMS
  - ALARMS +8 SEQUENCES CONTACTS
  - MUX CONTACTS FOR SEQUENCES
  - MUX CONTACTS FOR ALARMS
  - ALARMS + 32 SEQ. MUX CONTACTS
- INPUT CONTACTS POLARITY
  - CONTACTS N.A.
  - CONTACTS N.C.
  - CONTACTS N.C. + N.A
- PARAMETERS
  - TIME RELAYS 2 for ALARMS [.. Sec.]
  - TIME OUT3 for ALARMS [.. Sec.]
  - TIME OUT4 for SEQUENCES [.. Sec.]
  - ALARM CYCLIC SCAN. TIME [. Sec.]
  - ALARMS FOR "OUT3"
    [. . .] [. . .] [. . .] [. . .]
- GENERAL WORKING
  - GENERAL MODE 1
  - GENERAL MODE 2
- OUTPUTS WORKING
  - OUTPUTS MODE 1
  - OUTPUTS MODE 2
  - OUTPUTS MODE 3
  - OUTPUTS MODE 4
- TIMING MESSAGE
  - 1>MESS. NR. [. . .] > HOURS [. . . . .]
  - 2>MESS. NR. [. . .] > HOURS [. . . . .]
  - 3>MESS. NR. [. . .] > HOURS [. . . . .]
  - 4>MESS. NR. [. . .] > HOURS [. . . . .]

To return to the previous menu press CTRL+C

2.2.2. FUNCTIONS DESCRIPTION

2.2.2.1. Alarms display mode

There are grouped all the possible ways of presenting the stored ALARMS on display of the device: the message display can store up to 64 ALARMS; when exceeding the 64th message, the oldest one is automatically cleared.

- **SINGLE DIRECT -** The display always shows the last entered ALARM. The message flashes when there is more than one ALARMS in memory. With the S4 key (ADV), the messages regarding to the alarms in memory can be reviewed one by one in inverse order to the arrival one. The arrival of a new Alarm will directly show the corresponding message on display. After the 64th ALARM message in memory, the first entered is automatically cleared.
- **SINGLE INVERSE -** The first ALARM message is displayed (the first entered). The message flashes when there is more than one ALARMS in memory. With the S4 key (ADV) the messages regarding the alarms in memory can be reviewed one by one in the arrival order (from the first to the last entered). The arrival of a new ALARM will automatically show on display the message corresponding to the first alarm in memory. When there are more than 64 alarms in memory, the oldest will be automatically cleared.

- **CYCLIC DIRECT -** The messages corresponding to the ALARMS in memory are shown in cyclic way on display (in inverse order) and with a programmable scanning time (from I to 9 seconds).The arrival of any new ALARM displays the respective message, as in the direct visualization, and from this the scanning of the alarms starts again. In these conditions, some suitable commands, with front KEYS, allow a manual detailed examination of all the ALARMS in memory. See descriptions of the keys S1, S4, S5.

- **CYCLIC INVERSE -** The messages corresponding to the ALARMS in memory are shown in cyclic way on display (according to the arrival order) and with a programmable scanning time (from I to 9 Seconds). The arrival of any new ALARM displays the message corresponding to the first alarm arrived in memory, as in with the inverse visualization, and from this the scanning of all alarms starts again. In these conditions, some suitable commands, with front KEYS, allow a manual detailed examination of all the ALARMS in memory. See descriptions of keys S1, S7, S4, S5.

2.2.2.2. Alarm acknowledgment mode

There are grouped all the possible ways to RESET (ACKNOWLEDGMENT) the ALARMS in the device memory.

- **COMMON ACKNOWLEDGMENT -** By pressing the S7 Front key (ACK) for 3 seconds or by the input command 117, the acknowledgment of the ALARMS in COMMON mode is started, that is they are all reset.

- **SELECTIVE ACKNOWLEDGMENT -** By pressing the S7 front key (ACK) for 3 seconds or by the input command 117, the acknowledgment of the ALARMS in SELECTIVE mode is started, that is the message regarding the first entered alarm in memory is reset.

- **CONDITIONED ACKNOWLEDGMENT for contacts -** By pressing the S7 front key (ACK) For 3 seconds or by the input command 117, the acknowledgment of the ALARMS in CONDITIONED mode is started: there is the reset of all the messages regarding the alarms whose device inputs (message display or MUX) have returned to home position. The execution of this function occurs only if the display is programmed with CONTACTS function. Otherwise, a COMMON acknowledgment is carried out.

- **AUTOMATIC CONDITIONED ACKNOWLEDGMENT for contacts -** This type of acknowledgment requires no external command, but is automatically executed, that is the input alarms are stored in memory and as soon as the alarm is lacking, it is cleared from the memory (automatic acknowledgment). The execution of this function occurs only if the display is programmed to function with CONTACTS. Otherwise, if the commands are operated by the S7 key or in input 117, a COMMON acknowledgment is carried out.

2.2.2.3. Input functions

In this group are defined all the possibilities of use of the inputs in relation to the commands coming from the system.

- **CODED for PLC -** The input commands are interpreted according to the suitable coded table. This type of programming is used with PROGRAMMED LOGICS (PLC), that, through their internal program, manage all the commands for the message display.

- **CONTACTS for SEQUENCES -** The input commands are interpreted according to the 16 INPUT configuration, as shown in paragraph 7.1 and corresponding to SEQUENCE CONTACTS. To each input (IN0 ... IN15) corresponds a SEQUENCE MESSAGE (from 0 to 15), that is shown on display when the respective input is present. If more than one input is present at the same time, priority is given to the one with lowest value (towards IN0).

- **CONTACTS for ALARMS -** The input commands are interpreted according to the 16 INPUT configurations as shown in paragraph 3.1 and corresponding to ALARM CONTACTS. To each input (IN0 ... IN15) corresponds a SEQUENCE MESSAGE (from 0 to 15) which is stored and managed in the message display according to the functions received in the programming.
- **ALM. + 8 SEQ. CONTACTS -** The input commands are interpreted according to the 16 INPUT configurations as shown in paragraph 3.1 and relatively to 8 ALARM contacts (IN0 ... IN7) and 8 SEQUENCE contacts (IN8 ... IN15). The messages corresponding to the ALARM inputs have priority on those for the sequences and work in the same way as described for the 16 alarms. When in the display memory there are no more ALARMS, the message corresponding to the present sequence contact (input) is shown, in the way described for the sequence inputs.

- **MUX CONTACTS FOR SEQUENCES -** The input commands are interpreted according to the 64 INPUT configuration, as shown in paragraph 3.1 and corresponding to MUX SEQUENCE CONTACTS. To each input (IN0 ... IN64) corresponds a SEQUENCE MESSAGE (from 0 to 64) corresponds to each input which is shown on display when the respective input is present. If more than one input is present at the same time, the one with the lowest value has priority (towards IN0).

- **MUX CONTACTS FOR ALARMS -** The input commands are interpreted according to the 64 INPUT configurations, as shown in paragraph 3.1 and corresponding to ALARM CONTACTS. To each input (IN0 ... IN64) corresponds an ALARM MESSAGE (from 0 to 64) to which is stored and managed in the display according to the functions received during programming.

- **CONTACTS 32 ALM + 32 SEQ MUX -** The input commands are interpreted according to the 64 INPUT configurations as shown in paragraph 3.1 and corresponding to the 32 ALARM contacts (IN0 ... IN31) and 32 SEQUENCE contact (IN32 ... IN63). The messages corresponding to the ALARM inputs have priority on the sequence ones and work in the same way as the ones described for the 64 alarms. When no more ALARMS are present in the display memory, the message corresponding to the present sequence contact (input) is visualized, in the way described for the sequence inputs.

2.2.2.4. Input contact polarity

In this group are defined the significant modes assigned to the input contacts. These programmings are not significant when the inputs are used in coded logics.

- **CONTACTS N.C. -** The display considers all input contacts as NORMALLY CLOSED (or closed at rest), so the alarm or sequence will be activated on contact opening.

- **CONTACTS N.A. -** The display considers all input contacts as NORMALLY OPEN (or open at rest), so the alarm or sequence will be activated on contact closing.

- **CONTACTS N.C. + N.A. -** The display considers the first half of the input contacts as NORMALLY CLOSED (or closed at rest) and the second half as NORMALLY OPEN (or open at rest) and in particular if the input programming is carried out as ALARMS + SEQUENCE, the N.C. contacts will be assigned to the ALARMS, while the N.A. contacts will be assigned to the SEQUENCES.

2.2.2.5. Parameters

In this group are included the programmable time values of some timed functions and special assignments.

- **TIME RELAYS 2 - ALARMS [.. Sec.] -** Represents the relays time value regarding to the recall (entering) of an alarm into the display. Value "0" represents the exclusion of the relays signaling. Value "99" represents continuous relays signaling until manual clearing.
- **TIME OUT 3 - ALARMS [. . Sec.] -** It represents the output time value when an alarm message among the 4 programmed ones is recalled on display. Value "0" represents the signalling exclusion. Value "99" represent the continuous signalling until manual clearing.
- **TIME OUT4 - SEQUENCES [... Sec.] -** It represents the time value of the OUT regarding the recall of a sequence into the display. Value "0" represents relays signal exclusion. Value “99” represents continuous relays signalling until manual clearing.
- **CYCLIC SCAN. TIME ALARMS [... Sec.] -** It represents the time value for the ALARM cyclic presentation on display.
- **ALARMS FOR "OUT3" [...] [...] [...] [...] -** It represents the number of ALARMS that are assigned to output "OUT3".
- **ALARMS FOR “OUT4" [...] [...] [...] [...] -** It represents the number of ALARMS that are assigned to output “ OUT4”. These alarms are used only in case of OUTPUT FUNCTIONS in MODE 3 and 4.

2.2.2.6. General working

There are two working possibilities of the device, regarding the display management. (The performance differences mainly regarding the messages recalling and its management with the frontal keys; all the programming visualization forms and the men management are not influenced.

GENERAL MODE 1 – The two display lines always show one MESSAGE. It’s possible, in this case, to visualize on display, time by time, messages of 80 characters or to show at the same time the text and the under text of the message.

GENERAL MODE 2 – On the first line of the display are always present or the SEQUENCES or the WAITIN message. On the second line are always showed the ALARM messages (40 characters); if there are no memorized alarms will be show the data and time.

2.2.2.7. Output functions

There are 4 different possibilities to operate with outputs.

OUTPUT MODE 1 - The RELAY 1 output (operation contact) operates with safety, with excited relay and no stored alarms. The OUT4 output indicates the recall of a SEQUENCE.

OUTPUT MODE 2 - The RELAY 1 output (operation contact) operates with standard function: the relay is excited when there are stored alarms. The OUT4 output indicates the recall of a SEQUENCE.

OUTPUT MODE 3 - The RELAY 1 output operates as described in mode 1. The OUT4 output represents the recall of one of the 4 ALARMS, suitably programmed in PARAMETERS.

OUTPUT MODE 4 - The RELAY 1 output Operates as described in mode 2. The OUT4 output represents the recall of one of the 4 ALARMS, suitably programmed in PARAMETERS.

The RELAY 2 and OUT3 outputs have no programmable working. At paragraph 3.2 the different types of functioning of all 4 outputs are described.

2.2.2.8. Timing message

In the device are available 4 clocks with programmable value set point, able to active 4 memorized messages when the timings are ended

1>MESS.NR.[...]>ORE [.....]
2>MESS.NR.[...]>ORE [.....]
3>MESS.NR.[...]>ORE [.....]
4>MESS.NR.[...]>ORE [.....]

In the field shown by NR. enter the number of the alarm to recall, in the field shown by ORE enter the clock SET time in hour in 6 digits, eith the non significave zeros.
Not correct selections excludes the entered values.

2.3. PROGRAMMED LOGICS MANAGEMENT (PLC)

- Starting from the home position (reset of all eventual storages), the writing WAITING MESSAGE will appear on display.

- Normally, if the text is longer than display length (40 characters), there is an automatic continuous scrolling (from right to left) of the whole message.

- With the PLC it is possible to send two types of commands to the message display input in order to recall the MESSAGES; one is associated with the meaning of recall for the SEQUENCE message, the other is associated with the meaning of the recall for the ALARM message.

- The recalled SEQUENCE MESSAGE appears on display and isn't stored; the following sequence message command clears the previous one and brings the new text on display. The recalled ALARM MESSAGE is stored in chronological order; it has the priority on the sequence one for visualization and it is shown on display according to the programming received for the alarm message visualization. Such a message can be cleared (acknowledged) according to the suitable modes.

- Furthermore, other stored alarm messages can be visualized according to different automatic or manual sequences.

- By entering service commands, the PLC can recall the various message lines on display (or ask for their automatic management); such operations are also possible with the keys on the front panel. In the same way all message lines of stored ALARMS can be managed.

- By entering suitable coded commands by suitable PLC, it is possible to manage and directly update thoroughly or partly, certain areas of the message text on display, by entering the desired characters (ASCII or BCD). In this way it is possible to complete the texts with values (VARIABLES) present in the system, for example voltage, current, speed and times.

- Furthermore, various service commands are available for clearing the variables and messages, display flashing, entering different lines, clock entering, executions, printing and others.

2.3.1. MAIN TABLE OF COMMANDS

The input signals are divided and managed according to the codes of the following table.
The inputs of the visualizator from IN0 to IN15 are here indicated from D0 to D15

	SY	INPUTS														
	D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	
TYPE “0” command	⌐▲┘	0	0	0	0											SEQUENCE message recall in BINARY code
		0	0	0	1											SEQUENCE message recall in BCD code
TYPE “1” command	⌐▲┘	0	0	1	0											ALARM message recall in BINARY code
		0	0	1	1											ALARM message recall in BCD code
TYPE “2” command	⌐▲┘	0	1	0	0											POSITION entering of the VARIABLE in BINARY code
		0	1	0	1											POSITION entering of the VARIABLE in BCD code
TYPE “3” command	⌐▲┘	0	1	1	0											CHARACTER entering of the VARIABLE in ASCII code
		0	1	1	1											CHARACTER entering of the VARIABLE in BCD code
TYPE “4” command	⌐▲┘	1	0	0	0											Acknowledgment of the ALARM message in BINARY code
		1	0	0	1											Acknowledgment of the ALARM message in BCD code
TYPE “5” command	⌐▲┘	1	0	1	0											SERVICE COMMAND with number in BINARY code
		1	0	1	1											SERVICE COMMAND with number in BCD code

The inputs D16--D19 are only used as impulsive commands, therefore they are not included in the table.

N.B. EACH COMMAND IS STORED ON THE SY CHANGE FROM 0 --> 1 (absent --> present) WHICH OPERATES AS SYNCHRONIZED IMPULSE OR STROBE.

2.3.2. MESSAGE MANAGEMENT

Each message is associated with a number which identifies the sequence position in the composition memory. In order to manage the message on display it its necessary to send to the display inputs the group of 16 data with the shown code:

D14 D13 D12	
X X X	COMMAND TYPE "0", "1", “4"
D11 = 0	INDICATES THAT THE MESS NUMBER TO BE MANAGED IS IN "BINARY” CODE .
D11 = 1	INDICATES THAT THE MESS NUMBER TO BE MANAGED IS IN "BCD" CODE.

The number of the message to be managed is situated in inputs D0 --- D10 if in BCD, in inputs D0---D8 if in BINARY.

BCD CODE (D11=1)

3°digits 2^2 2^1 2^0	2°digits 2^3 2^2 2^1 2^0	1°digit 2^3 2^2 2^1 2^0	BCD NUMBER
D10 D9 D8	D7 D6 D5 D4	D3 D2 D1 D0	INPUTS
HUNDREDS	TENS	UNITS	

BINARY CODE (D11=0)

- - 2^8 2^7 2^6 2^5 2^4 2^3 2^2 2^1 2^0	BINARY NUMBER
D10 D9 D8 D7 D6 D5 D4 D3 D2 D1 D0	INPUTS

"0" TYPE COMMAND
It is used to recall a SEQUENCE MESSAGE on display. In this case the message is not stored and a subsequent command of this type clears the sequence message and brings a new SEQUENCE message on display.

"1" TYPE COMMAND
It is used to store an ALARM MESSAGE in the device.
The entering of an alarm is shown by an acoustic BEEP if there is the appropriate enabling.
The stored alarm messages assume priority on the sequence ones and are shown on display at once, according to the programmed procedures and until they are completely acknowledge.
In the case of more than one ALARM in the message display memory, the corresponding message(s) are shown in a flashing way.

"4" TYPE COMMAND
It is used to ACKNOWLEDGE (reset) an ALARM MESSAGE in the device.
The stored alarm messages can be cleared in selective mode, as they were recalled.

2.3.3. VARIABLE ENTERING AND MANAGEMENT

In the texts of all the messages recalled on display, it is possible to enter by PLC certain characters in order to make up a word, a sentence or a number; such wording are called VARIABLES, since they are continuously changed (updated).

First of all it is necessary to foresee in advance the positions in the texts where the variables will be inserted, leaving them free. This can be carried out only for one part of the text, or for the whole text.
In any case, the variable can be entered only within the length of the text programmed in MEMORY and not further. For example, if a text is composed of 30 characters, it is possible to manage only 30 positions as variables.
The commands which must be transmitted by the PLC to the message display and which contain the VARIABLE, are mainly composed of CHARACTERS e ADDRESS (POSITION).

THE ADDRESS (from 0 to N, where N is the length of the text) represents the address in the text where the letter, symbol or number will be entered.
The CHARACTER, in ASCII code, will be the letter, symbol or number; in BCD code it will only be the number (from 0 to 9).

The whole management of the VARIABLES is carried out by using the TYPE "2" command for the address and TYPE “3” command for the character with all their eventual possibilities of sub-coding.

ADDRESS ENTERING

D14 D13 D12	
0 1 0	COMMAND TYPE "2"
D11 = 0	IT SHOWS THAT THE ADDRESS NUMBER IS IN "BINARY" CODE
D11 = 1	IT SHOWS THAT THE ADDRESS NUMBER IS IN "BCD" CODE

The address number to be entered resides in the inputs D0 --- D6 if in BCD, and in D0--D5 if in BINARY.

BCD CODE (D11=1)

- - - -	2° digit 2^2 2^1 2^0	1° digit 2^3 2^2 2^1 2^0	BCD POSITION
D10 D9 D8 D7	D6 D5 D4	D3 D2 D1 D0	INPUTS
	TENS	UNITS	

BINARY CODE (D11=0)

- - - - -	2^5 2^4 2^3 2^2 2^1 2^0	BINARY POSITION
D10 D9 D8 D7 D6	D5 D4 D3 D2 D1 D0	INPUTS

CHARACTER ENTERING

D14 D13 D12	
0 1 1	COMMAND TYPE "3"
D11 = 0	IT SHOWS THAT THE VARIABLE IS IN ASCII CHARACTER CODE
D11 = 1	IT SHOWS THAT- THE VARIABLE IS IN "BCD" CHARACTER CODE

The value of the VARIABLE to be entered is in the inputs among D0 and D3, if in BCD code, and among the input D0 and D7 if in BINARY code.

ASCII CODE (D11=0)

Sub-code X X X	2^7 2^6 2^5 2^4 2^3 2^2 2^1 2^0	ASCII CHARACTER
D10 D9 D8	D7 D6 D5 D4 D3 D2 D1 D0	INPUTS

BCD CODE (D11=1)

Sub-code X X X	2^7 2^6 2^5 2^4	2^3 2^2 2^1 2^0	BCD CHARACTER
D10 D9 D8	D7 D6 D5 D4	D3 D2 D1 D0	INPUTS

The inputs D8--D10, which specify the SUB-CODE, are foreseen for the ADDRESS in the variable entering area as indicated below:

SUBCODE

D10	D9	D8	carried out operations
0	0	0	AUTO INC
0	0	1	AUTO DEC
0	1	0	STOP
0	1	1	HOME
1	X	X	IND+BCD (only with D11=1)

AUTO INC : An increase of the address is automatically carried out; therefore the next variable which will be entered, will be placed on display after the current one, without using other TYPE 2 commands for the address set.

AUTO DEC : A decrease of the address is automatically carried out; therefore the next variable which will be entered will be placed on display before the current one, with no additional addressing.

STOP : A further confirmation (stop) of the address is automatically carried out; therefore, the next variable to be entered will be placed on display in the place of the current one, with no additional addressing.

HOME : A new positioning to the address value, previously entered, is automatically carried out with the command TYPE2.

All these subcodes, after setting the starting address with command TYPE 2, easily allow the totally automatic management and updating of a whole data string (VARIABLES) of any length, by using only command TYPE3.

IND + BCD : This type of sub-code makes the VARIABLE management in BCD code even easier. It is possible to use only the TYPE "1" command, which contains both the address data and the data of the BCD character data to be entered.

In this case the data from D0---D9 are interpreted as follows:

	2^5 2^4 2^3 2^2 2^1 2^0	2^3 2^2 2^1 2^0	
D10	D9 D8 D7 D6 D5 D4	D3 D2 D1 D0	TYPE "3" COMMAND
1	ADDRESS (IN BINARY)	BCD VARIABLE	

2.3.4. SERVICE COMMANDS

The device is equipped with a series of FUNCTIONS which the PLC can enter by sending TYPE 5 coded commands: SERVICES.

D14 D13 D12	
1 0 1	COMMAND TYPE "5" (SERVICES)
D11 = 0	IT SHOWS THAT THE NUMBER OF THE SERVICE COMMAND IS IN "BINARY" CODE
D11 = 1	IT SHOWS THAT THE NUMBER OF THE SERVICE COMMAND IS IN "BCD" CODE

The NUMBER of the SERVICE COMMAND (NCS) is found in the inputs D0 --- D7 if in BCD code and in the inputs D0 --- D5 if in BINARY code (for a maximum of 32 available commands).

BCD COMMAND (D11=1)

- - -	2 digit 2^3 2^2 2^1 2^0	1 digit 2^3 2^2 2^1 2^0	BCD NUMBER (NCS)
D10 D9 D8	D7 D6 D5 D4	D3 D2 D1 D0	INPUTS
	TENS	UNITS	

BINARY COMMAND (D11=0)

- - - - -	2^5 2^4 2^3 2^2 2^1 2^0	BINARY COMMAND (NCS)
D10 D9 D8 D7 D6	D5 D4 D3 D2 D1 D0	INPUTS

2.3.4.1. Service commands description

NCS (Number of Command of Service)

0	0	0	0	0	0	0	0	BCD	00	NULL (no effect)
-	-	0	0	0	0	0	0	BIN		
0	0	0	0	0	0	0	1	BCD	01	Shows LINE 1 of the present message on display
-	-	0	0	0	0	0	1	BIN		
0	0	0	0	0	0	1	0	BCD	02	It shows LINE 2 of the present message on display
-	-	0	0	0	0	1	0	BIN		
0	0	0	0	0	0	1	1	BCD	03	It shows LINE 3 of the present message on display
-	-	0	0	0	0	1	1	BIN		
0	0	0	0	0	1	0	0	BCD	04	It shows LINE 4 of the present message on display
-	-	0	0	0	1	0	0	BIN		
0	0	0	0	0	1	0	1	BCD	05	It shows LINE 5 of the present message on display
-	-	0	0	0	1	0	1	BIN		
0	0	0	0	0	1	1	0	BCD	06	It shows LINE 6 of the present message on display
-	-	0	0	0	1	1	0	BIN		
0	0	0	0	0	1	1	1	BCD	07	It shows LINE 7 of the present message on display
-	-	0	0	0	1	1	1	BIN		
0	0	0	0	1	0	0	0	BCD	08	It shows LINE 8 of the present message on display
-	-	0	0	1	0	0	0	BIN		
0	0	0	0	1	0	0	1	BCD	09	It moves forward one step at a time all the lines present in the message on display
-	-	0	0	1	0	0	1	BIN		

0 -	0 -	0 0	1 0	0 1	0 0	0 1	0 0	BCD BIN	10	It moves backward one step at a time all the lines present in the current message on display
0 -	0 -	0 0	1 0	0 1	0 0	0 1	1 1	BCD BIN	11	It sets the WAITING MESSAGE for SEQUENCES (resets the existing sequence message).
0 -	0 -	0 0	1 0	0 1	0 1	1 0	0 0	BCD BIN	12	It resets all the ALARMS in memory.
0 -	0 -	0 0	1 0	0 1	0 1	1 0	1 1	BCD BIN	13	It sets the FLASHING of the SEQUENCE message on display.
0 -	0 -	0 0	1 0	0 1	1 1	0 1	0 0	BCD BIN	14	It resets the FLASHING of the SEQUENCE message on display.
0 -	0 -	0 0	1 0	0 1	1 1	0 1	1 1	BCD BIN	15	It clears the entered VARIABLE characters
0 -	0 -	0 0	1 1	0 0	1 0	1 0	0 0	BCD BIN	16	It turns the display off
0 -	0 -	0 0	1 1	0 0	1 0	1 0	1 1	BCD BIN	17	It turns the display on
0 -	0 -	0 0	1 1	1 0	0 0	0 1	0 0	BCD BIN	18	It replaces line 1 of the WAITING message with the DATE CLOCK on display
0 -	0 -	0 0	1 1	1 0	0 0	0 1	1 1	BCD BIN	19	Previous function reset
0 -	0 -	1 0	0 1	0 0	0 1	0 0	0 0	BCD BIN	20	NULL (no effect)
0 -	0 -	1 0	0 1	0 0	0 1	0 0	1 1	BCD BIN	21	NULL (no effect)
0 -	0 -	1 0	0 1	0 0	0 1	1 1	0 0	BCD BIN	22	NULL (no effect)
0 -	0 -	1 0	0 1	0 0	0 1	1 1	1 1	BCD BIN	23	It sends the display contents to the PRINTER, with the DATE
0 -	0 -	1 0	0 1	0 1	1 0	0 0	0 0	BCD BIN	24	Sends the VARIABLE on display to the printer, with the DATE
0 -	0 -	1 0	0 1	0 1	1 0	0 0	1 1	BCD BIN	25	It sends the ALARM BUFFER contents (chronological recording) to the PRINTER
0 -	0 -	1 0	0 1	0 1	1 0	1 1	0 0	BCD BIN	26	It sends the ALARMS in memory to the PRINTER
0 -	0 -	1 0	0 1	0 1	1 0	1 1	1 1	BCD BIN	27	NULL (no effect)
0 -	0 -	1 0	0 1	1 1	0 1	0 0	0 0	BCD BIN	28	NULL (no effect)
0 -	0 -	1 0	0 1	1 1	0 1	0 0	1 1	BCD BIN	29	Temporary recall of the current SEQUENCE message on display

0 -	1 -	1 0	0 1	0 1	0 1	0 1	0 0	BCD BIN	30	Current serial TRANSMISSION reset
0	0	1	1	0	0	0	0	BCD	31	NULL (no effect)

-	-	0	1	1	1	1	1	BIN		
0	0	1	1	0	0	1	0	BCD	32	NULL (no effect)
-	-	1	0	0	0	0	0	BIN		
0	0	1	1	0	0	1	1	BCD	33	NULL (no effect)
-	-	1	0	0	0	0	1	BIN		
0	0	1	1	0	1	0	0	BCD	34	NULL (no effect)
-	-	1	0	0	0	1	0	BIN		
0	0	1	1	0	1	0	1	BCD	35	NULL (no effect)
-	-	1	0	0	0	1	1	BIN		
0	0	1	1	0	1	1	0	BCD	36	NULL (no effect)
-	-	1	0	0	1	0	0	BIN		
0	0	1	1	0	1	1	1	BCD	37	NULL (no effect)
-	-	1	0	0	1	0	1	BIN		
0	0	0	0	0	0	0	0	BCD	38	NULL (no effect)
-	-	1	0	0	1	1	0	BIN		
0	0	1	1	1	0	0	1	BCD	39	NULL (no effect)
-	-	1	0	0	1	1	1	BIN		
0	1	0	0	0	0	0	0	BCD	40	NULL (no effect)
-	-	1	0	1	0	0	0	BIN		
0	1	0	0	0	0	0	1	BCD	41	CLOCK 1 It enables CLOCK 1 (for timed messages)
-	-	1	0	1	0	0	1	BIN		
0	1	0	0	0	0	1	0	BCD	42	CLOCK 2 It enables CLOCK 2 (for timed messages)
-	-	1	0	1	0	1	0	BIN		
0	1	0	0	0	0	1	1	BCD	43	CLOCK 3 It enables (for timed messages)
-	-	1	0	1	0	1	1	BIN		
0	1	0	0	0	1	0	0	BCD	44	CLOCK 4 It enables (for timed messages)
-	-	1	0	1	1	0	0	BIN		
0	1	0	0	0	1	0	1	BCD	45	NULL (no effect)
-	-	1	0	1	1	0	1	BIN		
0	1	0	0	0	1	1	0	BCD	46	NULL (no effect)
-	-	1	0	1	1	1	0	BIN		
0	1	0	0	0	1	1	1	BCD	47	NULL (no effect)
-	-	1	0	1	1	1	1	BIN		
0	1	0	0	1	0	0	0	BCD	48	NULL (no effect)
-	-	1	1	0	0	0	0	BIN		
0	1	0	0	1	0	0	1	BCD	49	NULL (no effect)
-	-	1	1	0	0	0	1	BIN		
0	1	0	1	0	0	0	0	BCD	50	NULL (no effect)
-	-	1	1	0	0	1	0	BIN		

0	1	0	1	0	0	0	1	BCD	51	CLOCK 1 It disables CLOCK 1 (for timed messages)
-	-	1	1	0	0	1	1	BIN		
0	1	0	1	0	0	1	0	BCD	52	CLOCK 2 It disables CLOCK 2 (for timed messages)
-	-	1	1	0	1	0	0	BIN		

0	1	0	1	0	0	1	1	BCD	53	CLOCK 3 It disables CLOCK 3(for timed messages)
-	-	1	1	0	1	0	1	BIN		
0	1	0	1	0	1	0	0	BCD	54	CLOCK 4 It disables CLOCK 4 (for timed messages)
0	0	1	1	0	1	1	0	BIN		
0	1	0	1	0	1	0	1	BCD	55	NULL (no effect)
-	-	1	1	0	1	1	1	BIN		
0	1	0	1	0	1	1	0	BCD	56	NULL (no effect)
-	-	1	1	1	0	0	0	BIN		
0	1	0	1	0	1	1	1	BCD	57	NULL (no effect)
-	-	1	1	1	0	0	1	BIN		
0	1	0	1	1	0	0	0	BCD	58	NULL (no effect)
-	-	1	1	1	0	1	0	BIN		
0	1	0	1	1	0	0	1	BCD	59	NULL (no effect)
-	-	1	1	1	0	1	1	BIN		
0	1	1	0	0	0	0	0	BCD	60	NULL (no effect)
-	-	1	1	1	1	0	0	BIN		
0	1	1	0	0	0	0	1	BCD	61	NULL (no effect)
-	-	1	1	1	1	0	1	BIN		
0	1	1	0	0	0	1	0	BCD	62	NULL (no effect)
-	-	1	1	1	1	1	0	BIN		
0	1	1	0	0	0	1	1	BCD	63	NULL (no effect)
-	-	1	1	1	1	1	1	BIN		

2.4. ELECTROMECHANICAL CONTACTS MANAGEMENT

- This device can be used with a direct connection to the contacts; in this case 16 inputs are available for a maximum of 16 messages that can be recalled, or with connection through multiplexer card MUX64; in this way there are up to 64 contacts available with their respective 64 messages.
- In any case, through function programming, it is possible to give the input contacts three different meanings: SEQUENCE contacts, ALARM contacts, half contacts for ALARMS and half contacts for SEQUENCES.
- The messages will be activated or deactivated by contact functioning (opening or closing) according to the different modes programmed in the respective function.

2.4.1. FUNCTIONS FOR 16 INPUTS

The connections in this configuration are illustrated. in paragraph 3.1.
In case of half ALARM and half SEQUENCE: programming, the inputs IN0..IN7 will be considered alarms and the inputs IN8...IN15 sequences; furthermore, for N.C. + N.A. programming, the N.C. contacts will be given to the alarms and the N.A. ones to the sequences.
When switching on the message display, the alarms present, will be detected according to the N.C. or NA programming.

2.4.2. FUNCTIONS FOR 64 INPUTS WITH MUX EXPANSION

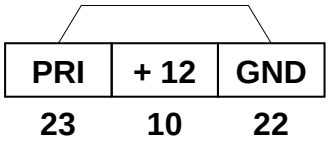
The connections in this configuration are illustrated in paragraph 3.1.
In case of half ALARM and half SEQUENCE programming, the inputs IN0..IN32 will be considered alarms and the input IN32 ... IN63 sequences; furthermore, for N.C. + N.A. programming, the N.C. contacts will be given to the alarms and the N.A. ones to the sequences.
When switching on the message display, the alarms present will be detected according to the N.C. or N.A. programming.

3. TECHNICAL DESCRIPTION

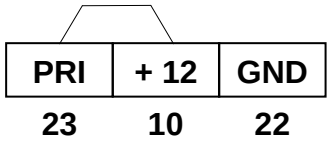
3.1. INPUTS

The device terminal board foresees 20 signal inputs, which can be used with POSITIVE LOGICS, by programming the additional EARTHED input "PRI", or With NEGATIVE LOGICS with "PRI" at +12VDC.

The terminal board supplies an outside power supply of 12VDC (100mA) which can be used to control the inputs as an alternative of the external power supply, according to the following scheme (only for programmed inputs in positive logics).

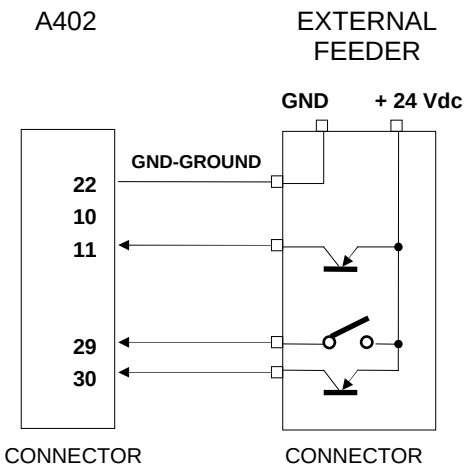


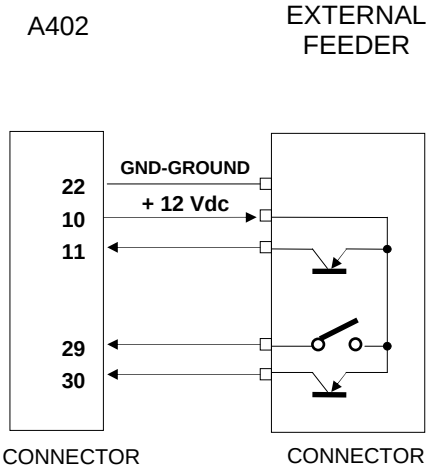
INPUTS IN POSITIVE LOGICS



INPUTS IN NEGATIVE LOGICS

The terminal board supplies an outside power supply of 12VDC (100mA) which can be used to control the inputs as an alternative to the external power supply, according to the following scheme (only for inputs programmed in positive logics).

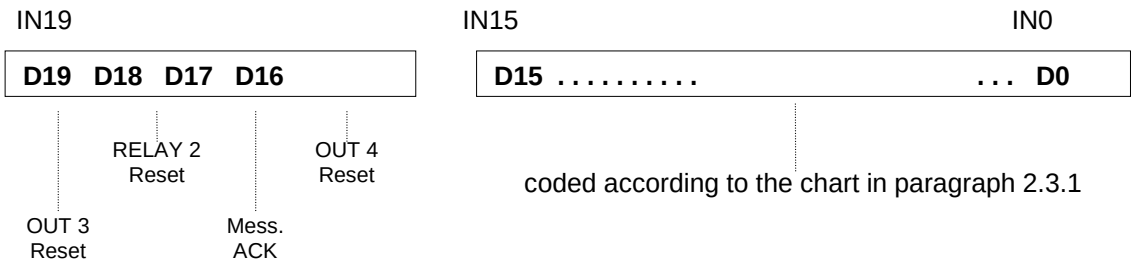




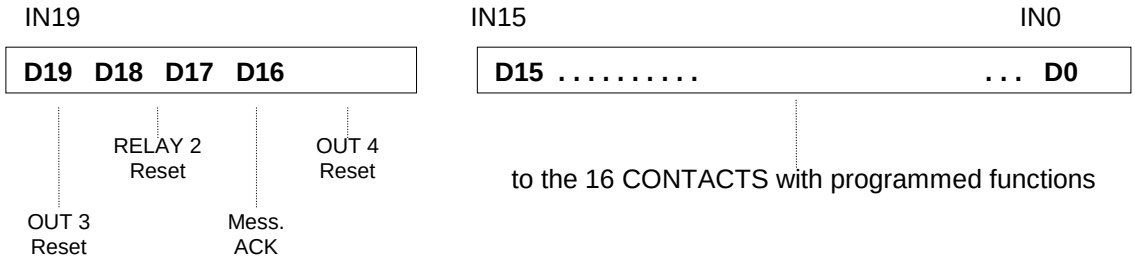
If the inputs are programmed for negative logics, only the external earth communication is necessary

3.1.1. INPUT CONFIGURATION IN THE DIFFERENT FUNCTIONS

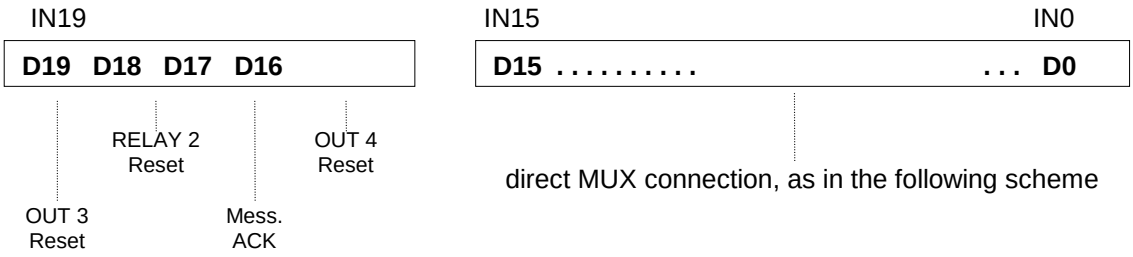
3.1.1.1. Coded inputs from PLC



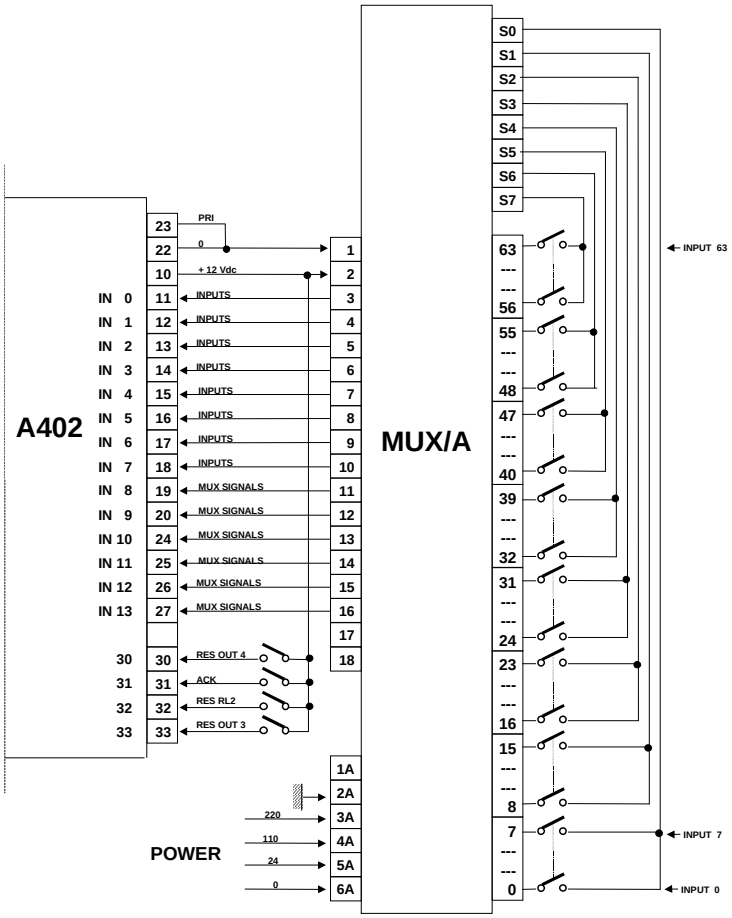
3.1.1.2. Inputs from electromechanical CONTACTS



3.1.1.3. Input from MUX electromechanical CONTACTS



Complete connection diagram between A402 and MUX64/A

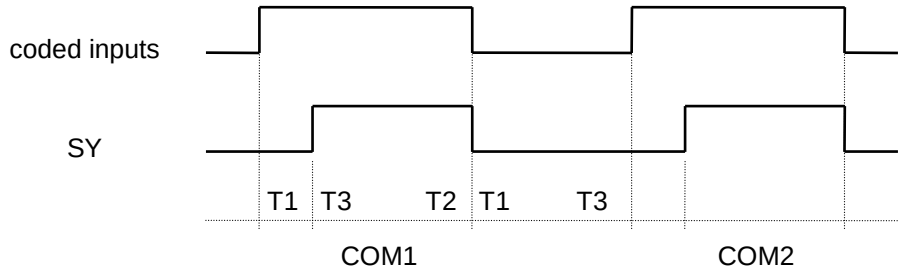


To the input IN0 (D0) corresponds MESSAGE 0 and to the input IN15 (D15) corresponds MESSAGE 15.

3.1.2. TEMPORARY OPERATIONS ON THE INPUT COMMANDS

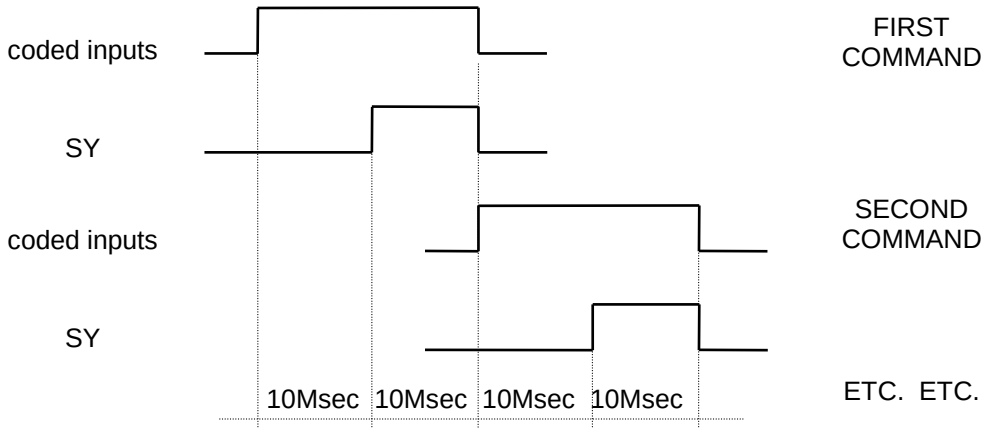
In general, every single device input, in order to be read, must remain in a stable condition for at least 8 Msec.

All coded commands are stored on the significant variation (from ABSENT to PRESENT) of the signal in SY and must respect the following min. time conditions:



T1 min. 1 Msec.
T2 min. 9 Msec.
T3 min. 9 Msec.

For a quick updating of the VARIABLES from PLC the use of a sequence is advisable, as follows:

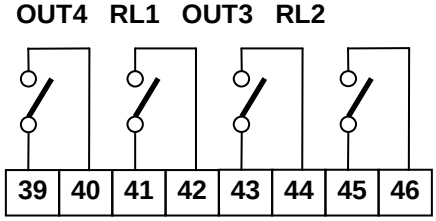


The input signals, managed with MUX64, answer with times from MUX; in general the total scanning time of the 64 input CONTACTS is (:)93 Sec., whether, there is only one input or they are all connected.

The 16 direct input CONTACTS to the device A402 are always tested with a min. time of 10 Msec.

3.2. OUTPUT CONFIGURATIONS AND CONNECTIONS

The message display has 4 output relays with operating contacts.
RL1 and RL2 are suitable for a 5A-250Vac load.
OUT3 and OUT4 can be used with a max. load of O,5A and a max. voltage of 120Vac. Their configuration on the terminal board is shown in the following diagram.



The functions of RL2 and OUT3 OUTPUTS are fixed:

- RL2 : It is excited every time an ALARM message is recalled. It remains excited for the programmed time or until the suitable relay reset command. It can be disenabled by programming.

- OUT3 : It operates as RL2 but only f or a group of 4 programmable ALARMS. (See paragraph 2.2.2 PARAMETERS).

The functions of RL1 and OUT4 OUTPUTS are programmable according to 4 methods (See paragraph 2.2.2 OUTPUT FUNCTIONS).

OUTPUT MODE 1

- RL1 : It is excited with message display on and with no alarm present (rest contact closed). It is de-excited if there is at least one ALARM present in the inside memory of the message display. It remains de-excited till there is the complete acquisition of all alarms. The RL1 reset command with front keys resets the relay (only for the time you act) for an operating test.

- OUT4 : It is excited every time a new SEQUENCE message is entered. It remains excited for the programmed time or until the suitable relay reset command. It can be disenabled by programming.

OUTPUT MODE 2

- RL1 : It is de-excited with message display on and with no alarm present (rest contact open). It excites if there is at least one ALARM present in the inside memory of the message display. It remains excited till there is the complete acquisition of all alarms. The suitable command with front keys excites the relay (only for the time you act) for an operating test.

- OUT4 : It is excited every time a new SEQUENCE message is entered, as in MODE 1.

OUTPUT MODE 3

- RL1 : It is excited with message display on and with no alarm present (rest contact closed). it operates as in MODE 1.

- OUT4 : It is excited every time an ALARM message, among the 4 suitably programmed for this output (as indicated at paragraph 2.2.2 PARAMETERS) is recalled. It remains excited f or the programmed time or until the suitable relay reset command. It can be disenabled by programming.

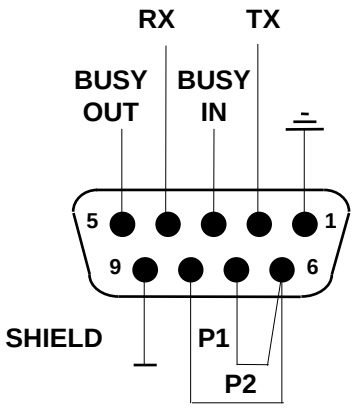
OUTPUT MODE 4

- RL1: It is de-excited with message display on and with no alarm present (rest contact open). It operates as in MODE 2.

- OUT4 : It is excited every time an ALARM message, among the 4 suitably programmed for this output is recalled; it operates as in MODE 3.

3.3. SERIAL LINE

The A402 message display is equipped with a RS232 serial line with fixed protocol:
1 START Bit, 8 DATA Bits, Parity NONE, 2 STOP Bits with transmission speed 1200 BAUD.
The physical connection is carried out through a female cup connector with 9 pins as shown in the picture:



P1	P2	
SI	NO	= COMMANDS RECEPTION
NO	SI	= PROGRAMMING RECEPTION

The two P1 and P2 bridges determine the type of connection and therefore the operations to be carried out.
With the serial line it is possible to carry out the following functions:

- PROGRAMMING TRANSMISSION
- TRANSMISSION TO PRINTER
- PROGRAMMING RECEPTION.
- COMMAND RECEPTION

The devices can transmit all programmed messages to another message display set in the "programming-reception" condition according to the procedure described in paragraph 5.3.

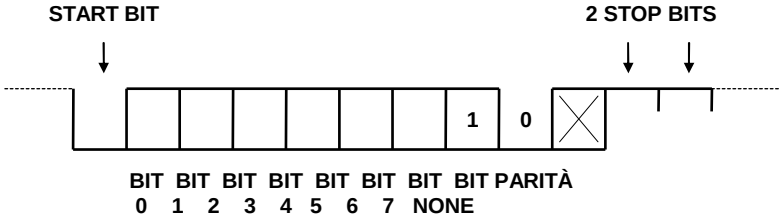
With the suitable SERVICE commands it is possible to directly pilot the ST40 PRINTER in order to print the device visualization listings.
During programming with KEYBOARD, suitable MENU commands allow to list the texts of the entered message on the PRINTER.

The message displays can be completely managed (controlled) with serial line commands instead of parallel inputs.

3.3.1. SERIAL LINE COMMANDS

The device generating of the serial line command (a PC or a PLC LOGICS) must simply build the data string, using the GENERAL COMMAND TABLE.
Each command will be composed of two words with 9 bits each, as shown in the picture and sent one after the other:

Data string composition for command:



The sequence of the transmitted bytes corresponds exactly to the sequence of the parallel commands.
The recovery of a possible byte synchronism loss between transmitter and receiver can be carried out by sending 3 BYTES composed of contiguous ZEROS.

3.4. CLOCK

The message displays are equipped with a perpetual calendar/clock.
With the suitable SERVICE command, it is possible to transfer the clock contents on display, instead of the waiting message.
This information is visualized as in the following example:

"Mon. 4 Sept. 89 - 13:25:18"

From the front panel it is always possible, with suitable keys to visualize the clock contents.
In the devices equipped with connection to the PRINTER, the carried out listings are automatically equipped with date and time, as follows:

MESS. 005 LINE 1 < 4/9/89 - 13:25 >

The time and date adjustment is carried out through the keyboard.

3.4.1. CHRONOLOGICAL ALARMS RECORDING

The device has an internal BUFFER to store in chronological order the ALARMS coming from the plant, each one equipped with date and time when they occurred.
The capacity of this memory is 128 ALARMS with direct loading of the last entered and unloading of the oldest one.

The whole BUFFER can be made available for PRINTER with a suitable command from the front keys.

This type of listing appears as in the example shown below.

MESS. 001 < 4/9/89 - 13:25 >
Message . . ..
MESS. 005 < 3/9/89 - 17:31 >
Message . . ..
MESS. 028 < 1/9/89 - 18:24 >
Message . . ..
MESS. 071 < 1/9/89 - 11:09>
Message . . ..
I
I
I
I
MESS. nnn < 1/9/89 - 1040 >
Message . . ..

4. FRONT KEYS OPERATIONS AND COMMANDS

The message display front panel has 8 keys for a direct interface with the OPERATOR.
The available commands are divided into two types:

1. **Function COMMANDS**
2. **Programming COMMANDS**

In the first case the operator can ask the message display for the information regarding the plant functioning.

In the second case, it is possible to give the device some information about its working in the plant and it will be also possible to operate on its internal composition of the message texts.

If the BEEP function is enabled, any key activation causes an acoustic signalling

Device front view

S1 S2 S3 S4 S5 S6 S7 S8

4.1. DESCRIPTION OF THE FUNCTIONAL COMMAND KEYS

Here below are listed all the operations that can be carried out as FUNCTION COMMANDS, and their effect.
The key number or numbers (S1...S8) are given as a reference, and beside there is the operation mnemonic meaning, those abbreviation is reported on the keys themselves.

4.1.1. Operations with one key

▲ 1 LIN — It increases the number of LINE of the message on display (only for existing lines).

WITH GENERAL FUNCTIONING MODE 1
The display shows message line 1 on the first line and message line 2 on the second line; with the S1 command for line increase, you obtain line 2 on line 1 and line 3 on line 2 and so on with following commands.

WITH GENERAL FUNCTIONING MODE 2
if there are no alarms present, it increases the line number for the sequence message; otherwise it increases the line number for the alarm message and it displays the message and line NR. on display line 1.

▼ 2 NUM — It visualize the message NUMBER and LINE on display with time and data when it was recalled for the time it is pressed (only if it programmed as ALARMS DISPLAY MODE - SINGLE DIRECT OR SINGLE INVERSE).

◄ 3 ALL — It visualizes the ALARM NUMBER in the message display memory, the number of the first entered and the number of the last one.

▶ 3 ADV — It INCREASES or DECREASES (respectively if the DIRECT or INVERSE visualization is enabled) the ALARM NUMBER present in memory (in temporal order) and tranfer it on the display. In functionning mode 2 for the time the key is pressed on the first line of the display is showed the time and data.

ENT 5 S/RUN — It carries out the STOP of the ALARM CYCLIC visualization (if this function is enabled). If it is in STOP, it stops the visualization.
The STOP condition remains in automatic mode for about 69 sec. from the last activation of any key.
When the device operates in ALARM CYCLIC visualization, it is necessary to stop this operation with STOP in order to be able to visualize the memorized alarms, operating on the keys marked with (*).

RES ACQ — It carries out the ALARM ACKNOWLEDGMENT according to the conditions for which it has been programmed in the specific functions of the message display;

PRINT — If it is pressed during a serial transmission, it stops its execution.

4.1.2. Operations with two keys operated with the shown sequence

PRINT + ▲ 1 LIN — It sends the contents of the displayed message to the printer.

PRINT + ▼ 2 NUM — It sends the printer the contents of the VARIABLE corresponding to the current sequence message.

PRINT + ◀ 3 ALL — It sends the printer the contents of all ALARM messages in memory.

PRINT + ▶ 4 ADV — It sends the printer the contents of all ALARM messages stored in the event BUFFER in chronological order.

PRINT + ENT 5 S/RUN — Not available

RES ACQ + ▲ 1 LIN — It carries out the RESET command for the RELAY 1 (considered as a test operation

RES ACQ + ▼ 2 NUM — It carries out the RESET command for the RELAY 2.

RES ACQ + ◀ 3 ALL — It carries out the RESET command for the OUT 3

RES ACQ + ▶ 4 ADV — It carries out the RESET command for the OUT 4

RES ACQ + ENT 5 S/RUN — It carries out the ACKNOWLEDGMENT (the RESET) of the ALARM message present on display at that moment.

ENT 5 S/RUN + ▲ 1 LIN — It transfers the CLOCK contents to the display for the time they are operated.

ENT 5 S/RUN + ▼ 2 NUM — During the ALARM visualization it transfers the message corresponding to the current sequence to the display for the time they are pressed.

ENT 5 S/RUN + ◀ 3 ALL — It enables or disenables (in SET or RESET) the acoustic BEEP function in the message display.

A GENERAL RESET command for the internal memorized alarms and for the whole EVENT BUFFER is foreseen by simultaneously pressing of the three keys: SS + S7 + S5.

4.2. KEYS DESCRIPTION FOR PROGRAMMING COMMANDS (ON THE MENU)

Here after are described all the operation that can be carried out as PROGRAMMING COMMANDS ON THE MENU and their effect.

The key number or numbers (S1 ... S8) are given as a reference, and beside there is the operation mnemonic meaning, whose abbreviations is reported on the same keys.

ENT 5 S/RUN — From the position of rest, it enters the programming menu. In the programming, it returns to the position rest.

▲ 1 LIN — It scrolls UP the menu lines (this function is also carried out by the keyboard GREEN UP cursor).

▼ 2 NUM — It scrolls DOWN the menu lines (this function is also carried out by the keyboard GREEN DW cursor).

ENT 5 S/RUN — It carries out the ENTER in the same way as the keyboard; it enters all data or increases the level.

RES ACQ + ENT 5 S/RUN — It carries out the inverse function of ENTER; it returns to the previous level; it is the equivalent command of the keyboard “Control + C".

PRINT + ENT 5 S/RUN — It carries out the programming of one COMMON TEXT line; it can only be used in text editing and it is the equivalent command of the keyboard "Control + ENTER".

PRINT + RES ACQ — It carries out the clearing of the characters in the EDIT line; it corresponds to the keyboard “ERASE" command.

PRINT + ▲ 1 LIN — It carries out the scrolling of the writing on display, one step on the right. It is the equivalent command of "SHIFT + RED CURSOR RIGHT" keyboard.

PRINT + ▼ 2 NUM — It carries out the scrolling of the writing on display, one step on the left . Equivalent command of "SHIFT+RED CURSOR LEFT" on keyboard.

PRINT + ◄ 3 ALL — It carries out the scrolling of the edit cursor on display, one step on the left. Equivalent command of "RED CURSOR LEFT" on keyboard.

PRINT + ► 4 ADV — It carries out the scrolling of the edit cursor on display, one step on the right. Equivalent command of "RED CURSOR RIGHT" on keyboard.

◄ 3 ALL — This command has no equivalent on the keyboard and it is used to enter the requested character into the position indicated by the cursor. The character is set through the scrolling of all the 224 available characters in an INCREASING way.

► 4 ADV — This command has the same function of the previous one but with the characters scrolling in a DECREASING way.

All commands marked with an (R) have an impulsive and repetitive action if kept pressed, with a differentiated initial repetition speed.

5. TEXT AND FUNCTION PROGRAMMING

5.1. TEXT ORGANIZATION

The total memory capacity of the message displays is of 32.000 characters with about 28.000 available for text programming.

The MEMORY where the message texts are programmed is organized in an Automatic way (with special delimiting characters) by means of the suitable keyboard command, "FORMAT". Initially the formatting carries out the positioning of 512 messages composed of 2 lines each, containing 0 characters and identified as LINE 1 and LINE 2. The visualization of those lines originates the message "NOT PROGRAMMED LINE".
The display of the following lines (4, 5...) originates the message “NOT-EXISTING LINE".

When a text is programmed in non existing lines, these are automatically created, including those missing between the programmed one and LINE 2.

In general, the programming operations (also for the easiness due to the guided logics) are carried out per lines and for subsequent messages.

There is a message for COMMON TEXTS identified with "COM"; it is possible, in this way, to program part of the messages (1 or more lines) all equal, without using memory; in this case, an index in the message composition will show that that line will have the same contents of the corresponding one in the COMMON TEXTS message. Furthermore, there is a message called WAITING MESSAGE, composed of 8 lines, for reasons of evenness; this message is used in the device rest mode; it is called "ATT”.
Thus, general the inside memory is composed of a WAITING MESSAGE, a COMMON TEXT MESSAGE and 512 MESSAGES, all with 2 lines min. and 8 lines max.

5.2. FUNCTION ORGANIZATION

The programmable functions are organized in a suitable menu. Their names, on display are also used as a guide for their specific function.

The access to their programming is protected by software safety code.

5.3. PROGRAMMING BY KEYBOARD

This paragraph describes all the operations that can be carried out on the message display by means of the supplied keyboard, and the main commands to carry them out. The use of all the keys in the main menu configuration is described in another specific paragraph regarding the keyboard.

The KEYBOARD is used to manage, in the device, the TEXTS of all messages and the FUNCTIONS to be assigned to the message display. The main possible operations are the following

⇒ Text programming
⇒ Function programming
⇒ Text visualization
⇒ Function visualization
⇒ Printed listing of the programmed texts
⇒ Transmission of the programmed texts to PC to carry out a documentation file
⇒ Transmission display of the programmed texts to another message for program copy.
⇒ Diagnostics

All operations are assisted by guided logics, whose composition is described hereafter:

5.3.1. Main level

1) TEXT PROGRAM. [...] ins. access code
2) FUNC. PROGRAM. [...] ins. access code
3) TEXT VISUALIZATION
4) FUNCTION VISUALIZATION
5) PRINT
6) DIAGNOSTICS
7) LANGUAGE SELECTION

It is possible to enter the main level with the "PROG" key; this command puts the device in the "MAIN PROGRAMMING" mode; furthermore all keyboard commands are enabled.

It is possible to quit the MAIN PROGRAMMING mode at any time and from any menu position with the SHIFT + PROG. command.

Using the green cursor keys it is possible to enter all the entries of the main level.

5.3.2. TEXT PROGRAMMING

By typing the "ACCESS CODE" in the three special boxes (the standard access code is “CET") and pressing ENTER, it is possible to enter the next menu level, which is composed as follows:

Text programming level:

1A) ED IT
1B) COPY
1C) COMPRESS
1D) PRINT
1E) PROGRAM. TRANSMISSION
1F) MEMORY FORMAT

it is possible to enter each entry of this level by using the green cursors again.

5.3.2.1. Edit

The EDIT function is used to edit and then program the different message texts.
By pressing the ENTER key, on display it appears the writing:

1A1) EDIT TX. NR. [. . .] LINE NR. [.]

Than on the keyboard it is necessary to type the text (MESSAGE) number (from 0 to 51 and ATT or COM, respectively for the waiting message and for the common message) and the line number (from 1 to 9), which is to be programmed.
By pressing ENTER it is possible to enter the requested message line.

If a text was already present in memory, it reappears for a possible change or a new confirmation.

By using all the edit keyboard commands, the requested text can be composed and stored in memory with ENTER.

On display, the 1A1 writing appears again with the indexes (text and line number) automatically increased of 1 line; in this way the text entering can continue with an increasing order otherwise by updating the indexes, time after time, it is possible to proceed in the described way.

While writing the text on display, by operating the SHIFT+GREEN CURSOR (UP) keys, the information message about the current editing and memory space appears on display:

EDITING TEXT NR. xxx LINE NR. x - AVAILABLE CHARACTERS xxxxx

It is possible to return to the edit line with the SHIFT+GREEN CURSOR (DW) keys.
When the text programming operations are over, it is possible to directly quit with the SHIFT + PROG key; otherwise by using the suitable commands, it is possible to enter new menu lines.

5.3.2.2. Copy

The copy function is used to copy the contents of a text line into another line of the same or of another message.
With the ENTER key the following writing appears.

1B1) COPY TX NR. [...] LINE. NR. [.] TO TEXT NR. [...] LINE NR. [.]

Type he message and line number where you have to operate and then press ENTER; when the operation is over, the guide message 1B appears on display.

5.3.2.3. Compress

The purpose of this function is to rationalize the text memory space of the device when there are a lot of inserted texts and the residual capacity is very reduced.
The use of this function in messages where there are empty lines not programmed reduces the actual byte use.

The function is carried out on one message at a time with automatic research of the following one that can be compressed.

With ENTER the following writing appears:

COMPRESS TX. NR. [...]

After entering the number, press ENTER again and the operation will be carried out; on display the same guide message reappears with the text number automatically positioned on the following message that needs to be compressed.
Proceed with ENTER until the TX. NR. remains unchanged.

5.3.2.4. Print

This function allows to print one or all message texts present in memory.
By pressing ENTER it is possible to have access to the suitable selecting level:

1D1) PRINT TX NR. [...] LINE NR. [.]

1D2) PRINT FROM TX. NR. [...] 1-11 TX NR. C ... I

There are two different methods to carry out the listings on the printer.

The first one, obtained with 1D1, prints only one line of one specific message at a time.
Insert the text (message) and line numbers and press ENTER; at the end of the transmission, the guide message 1D1 appears with the indexes positioned on the following programmed message or / and line (skipping the unprogrammed or not existing ones).
In practice, an automatic research of the following programmed line is carried out.
In this way, by pressing ENTER consecutively, it is possible to print all the lines of all the existing messages in sequence.
The second method, using the guide line 1D2, foresees the entering of the number of the start and end message, remembering that the max. number of messages to be transmitted as a group is 100.
With ENTER it is possible to print all the indicated messages, including all the lines and excluding all the unprogrammed messages and lines, and however not exceeding a max. total number of 100 lines.

5.3.2.5. Progr. Transmission

This function is used to transmit, through serial line, all programmed texts from a sample message display to others, thus avoiding any keyboard entering.
Furthermore, the same type of transmission is used to copy the whole text memory in a PERSONAL COMPUTER in order to create a data file or a file to be used later to program other message displays.
Carry out this function with ENTER.

5.3.2.6. Memory format

This function is used to completely clear the text memory of the message display.
It is generally used when operating the device for the first time, or for a new reprogramming of all its texts.

When the display shows "MEMORY ERROR" or "MEMORY NOT PROGRAMMED" its use is forced by the guide menu itself in order to enter EDIT.

its execution and the following operations are obtained with ENTER.

5.3.3. FUNCTIONS PROGRAMMING

By typing the "ACCESS CODE" in the three special boxes [the standard access code is "SYS"] and by pressing ENTER, it is possible to enter the next menu level, which is composed as follows:
function programming level

2A) ALARM DISPLAY MODE
2B) ALARM ACKNOWLEDGMENT MODE
2C) INPUT FUNCTION
2D) INPUT CONTACT POLARITY
2E) PARAMETERS

It is possible to enter each, entry of this level by using the green cursors again.
The "Control + C" command allows to return to the previous level.
The ENTER command allows to enter the level of FUNCTION choice.
The SHIFT-RUN command allows to quit the programming.

5.3.3.1. Alarm display mode

2A1) SINGLE DIRECT
2A2) SINGLE INVERSE
2A3) CYCLIC DIRECT
2A4) CYCLIC INVERSE

It is possible to enter each entry by using the green cursors.
The ENTER command allows to carry out the programming which will be shown by a flashing message.
The "Control+C" command allows to return to the previous level.

5.3.3.2. Alarm acknowledgment mode

2B1) COMMON ACKNOWLEDGMENT
2B2) SELECTIVE ACKNOWLEDGMENT
2B3) CONDITIONED ACKNOWLEDGMENT for contacts
2B4) AUTOMATIC COND. ACKNOWLEDGMENT for contacts

It is possible to enter each entry by using the green cursors,
The ENTER command allows to carry out the programming which will be shown by a flashing message.
The "Control+C" command allows to return to the previous level.

5.3.3.3. Input function

2C1) CODED (for PLC)
2C2) CONTACTS FOR SEQUENCES
2C3) CONTACTS FOR ALARMS
2C4) 8 ALL + 8 SEQ CONTACTS
2C5) MUX CONTACTS FOR SEQUENCES
2C6) MUX CONTACTS FOR ALARMS
2C7) 32 ALL + 32 SEC MUX CONTACTS

It is possible to enter each entry by using the green cursors.
The ENTER command allows to carry out the programming which will be shown by a flashing message.
The "Control+C" command allows to return to the previous level.

5.3.3.4. Input contact polarity

2D1) N.A. CONTACTS
2D2) N.C. CONTACTS
2D3) N.C.+ N.A. CONTACTS

It is possible to enter each entry by using the green cursors.
The ENTER command allows to carry out the programming which will be shown by a flashing message.
The "Control+C" command allows to return to the previous level.

5.3.3.5. Parameters

2E1) TIME RELAYS 2 ALARMS [.. Sec.]
2E2) TIME OUT4 SEQUENCES [. Sec.]
2E3) TIME OUT3 ALARMS [.. Sec.]
2E4) ALARMS CYCLIC SCAN TIME [.Sec.]
2E5) ALARMS FOR OUT3 [...] [...] [...] [...]
2E6) ALARMS FOR OUT4 [...] [...] [...] [...]

It is possible to enter each entry by using the green cursors.
The edit keys allows to enter the numbers and the time value; the ENTER command allows to carry out the programming by entering the typed data.
The "Control+C" command allows to return to the previous level.

5.3.3.6. General functioning

2F1) GENERAL MODE 1
2F2) GENERAL MODE 2

It is possible to enter each entry using the green cursors.
With the ENTER command the programming is carried out and it in shown by a flashing message.
With the "Control+C" command it is possible to return to the previous level.

5.3.3.7. Output functions

2G1) OUTPUT MODE 1
2G2) OUTPUT MODE 2
2G3) OUTPUT MODE 3
2G4) OUTPUT MODE 4

It is possible to enter each entry using the green cursors. With the ENTER command the programming is carried out and it is shown by a flashing message.
With the "Control + C" command it is possible to return to the previous level.

5.3.3.8. MESSAGGI A TEMPO

2H1) 1>MESS.NR.[...]> HOURS [.....]
2H2) 2>MESS.NR.[...]> HOURS [.....]
2H3) 3>MESS.NR.[...]> HOURS [.....]
2H4) 4>MESS.NR.[...]> HOURS [.....]

It is possible to enter each entry using the green cursors.
The edit keys allows to enter the numbers and the time value; the ENTER command allows to carry out the programming by entering the typed data.
The "Control+C" command allows to return to the previous level.

5.3.4. TEXT VISUALIZATION

This function belongs to the main menu level and it is used to visualize the different messages programmed in the device.

With ENTER the following writing appears on display:

3A) VIEW TEXT NR. [...] LINE NR. [.]

Insert the numbers and press ENTER again; in this way the corresponding message text will appear on display.
This is a continuous function with automatic research, that is, by pressing ENTER once again, the guide message 2A reappears with the numbers already positioned on the following text of the programmed line.
By going on pressing ENTER it is possible to directly visualize all the messages present in memory.

5.3.5. FUNCTION VISUALIZATION

This function, as the previous one, belongs to the main menu level and it is used to visualize the programmings of the different operations carried out on the device.

With ENTER the writing of the second level of the function Menu appears on display:

2A) ALARM DISPLAY MODE

By operating the green cursors, it is possible to enter all the entries of this menu, in order to enter and visualize the single programmings.
But the easiest and automatic method is to proceed using ENTER.
At the 2A) menu option the corresponding programmed function 2A1 or 2A2 or 2A3 or 2A4 will appear; by pressing ENTER once again, it is possible to pass to the 2B) option, whose access is the same as the previous one, and so on for all programmed components.

5.3.6. PRINT

The execution and guide messages of this function are exactly the same as those foreseen for the 1D option inside the TEXT PROGR. menu. The only difference is the possibility to enter this level without an access code.

5.3.7. DIAGNOSTICS

This function belongs to the main menu level and it is used to visualize the status of some device components and to manage the CLOCK functions.

With ENTER it is possible to enter the succeeding level.
Diagnostic level:

6A) HARDWARE DIAGNOST.
6B) INPUT/OUTPUT DIAGNOST.
6C) DISPLAY DIAGNOST.
6D) SERIAL LINE DIAGNOST.
6E) CLOCK

It is possible to enter each entry of this level by using the green cursors again.
The "Contrl + C" command allows to return to the previous level.
The ENTER command allows to enter the following execution level.

5.3.7.1. Hardware diagnost.

With ENTER it is possible to carry out particular internal checks on peripherals and memories and to visualize the results:

[CHECK OK.] or [MEM. ERROR]

5.3.7.2. Input/output diagnostic

With ENTER it is possible to insert on display a mask for the checking of 20 "0" or "1" input signals and one for the 8 front keys.
Suitably energizing the input or the key, signal "1" in the respective positions must correspond on display.

5.3.7.3. Display diagnostic

With ENTER it is possible to carry out particular internal checks on display management, with corresponding visualization of the results:

[CHECK OK] or [DISPLAY ERROR]

5.3.7.4. Serial line diagnost.

In order to carry out this test, it is necessary to connect among one another the BUSY lines and the TX and RX lines on the serial line connector.
With ENTER the suitable checks are carried out and then the results are visualized.

[CHECK OK] or [SERIAL LINE ERROR]

5.3.7.5. Clock

This line creates an additional level to be used for the operations of management and setting of the calendar clock.

Clock management level:

6E1) STOP
6E2) START
6E3) TIME AND DATE PRESET

- **STOP**
  Option: to be used (with ENTER) to stop the clock oscillator when the device is not used for a long time (during storage) or when it is going out of the factory.
  This operation increases the life of the self contained date battery.

- **START**
  Option: to be used (with ENTER) to restart the clock oscillator after STOP command and before programming the time.

- **TIME AND DATE PRESET**
  Option: with ENTER you enter the time programming phase to be carried out only with the 4 RED CURSORS.
  When the setting is over, confirm with ENTER. Quit with the usual commands.

5.3.8. LANGUAGE CHOICE

This function is included in the main menu level and it is used to choose the LANGUAGE to be used.

The device will show the operator all menu information and all guide messages relative to the programmed language.

7A) ITALIAN
7B) ENGLISH
7C) FRENCH
7D) GERMAN
7E) SPANISH
7F) RUSSIAN

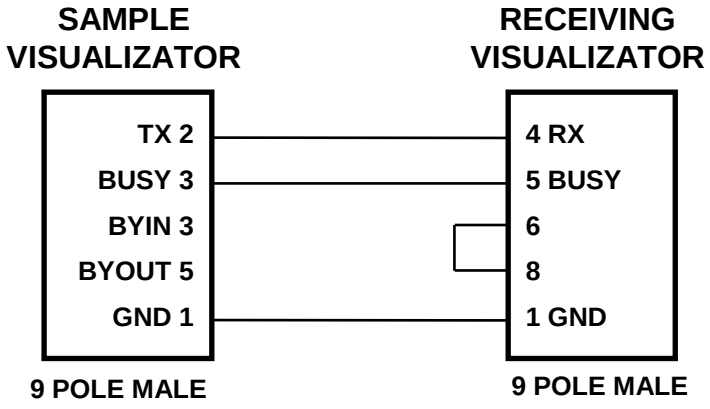
It is possible to enter each entry using the green cursors. With the "ENTER" command the programming is carried out and is shown by a flashing signal.

5.4. PROGRAMMING WITH FRONT KEYS

It is foreseen also for the front keys the access to all menus available by keyboard. However, the most rational operations that can be carried out with the keys are the FUNCTION programmings, their visualizations and the visualizations of the programmed text.
In case of necessity (when no keyboard is available) it is possible to change or to program one or more message texts, or in general to carry out, by using the front keys, all operations that can be carried out by keyboard.
Anyway, this kind of proceeding is much easier by keyboard and therefore it has been foreseen only in case of emergency.

5.5. PROGRAMMING WITH SAMPLE MESSAGE DISPLAY

With suitable serial line RS232, all message displays programmed can be directly with a sample device whose texts have been previously inserted by the keyboard (or in any case programmed).
In order to carry out this operation it is necessary to connect the two message displays through a serial line. The connector of the receiving device must have the function bond foreseen for "PROGR. RECEPTION", suitably wired as in the picture:



In the sample device it is necessary to connect the keyboard, start the programming in the "TEXT PROGR." menu, search the "PROGR. TRANSMISSION" option and press ENTER.
The messages "TRANSMISSION RUNNING" and "RECEPTION RUNNING" Will appear and at the end of the operation, the receiving device will inform with "RECEPTION OK" or with "RECEPTION ERROR".

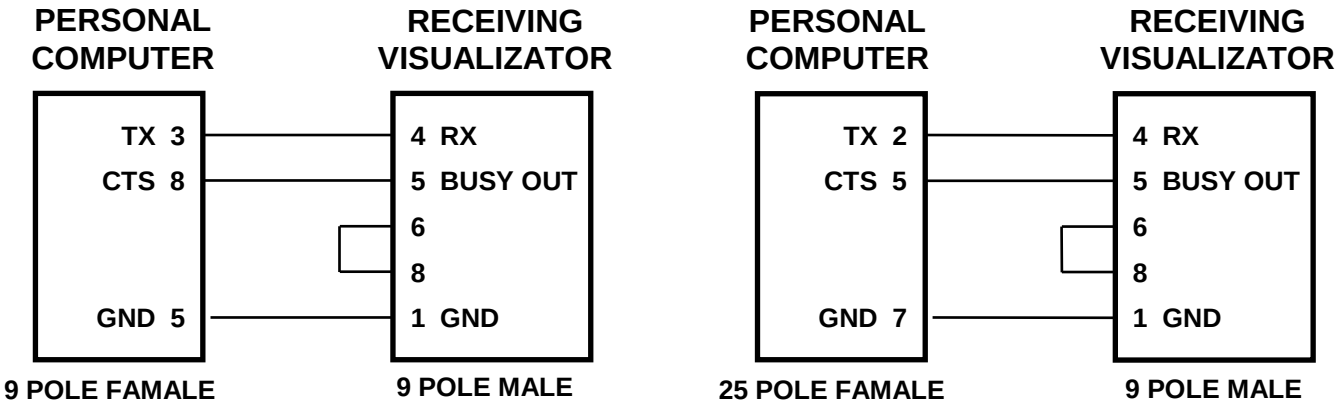
5.6. PROGRAMMING WITH PERSONAL COMPUTER

The message displays can be directly programmed with a PERSONAL COMPUTER (IBM COMPATIBLE) through the suitable serial line RS232.

The message texts present in a PC FILE could have been created in two different ways:
By using the suitable SOFTWARE package for FV1 text creation, remembering to create in any case 512 messages and considering that this software cannot create more than 2 lines.
By copying the programming from a sample message display into the PC FILE, according to the procedure described at point 5.7.

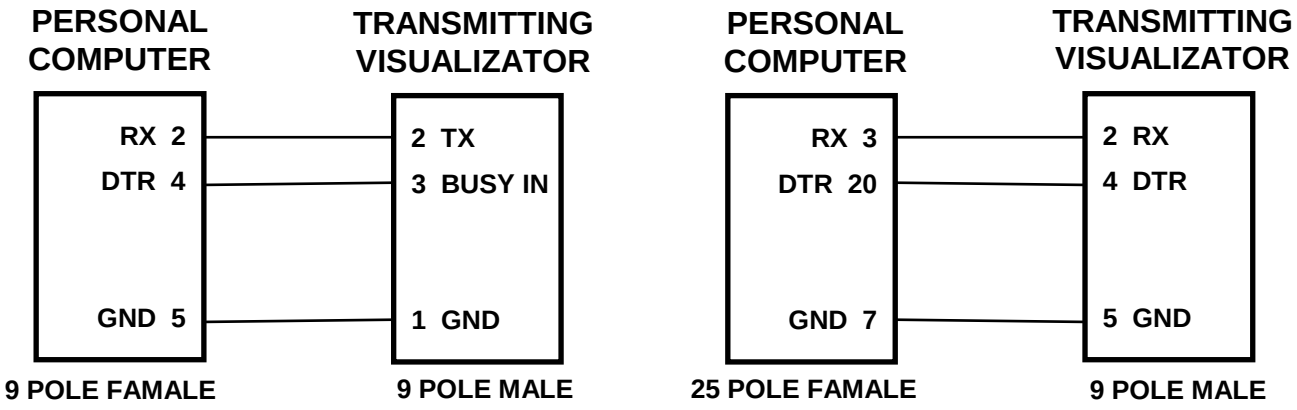
In order to carry out the message display programming with the PC, it is necessary to prepare the connection, through serial line, with the receiving device connector, programmed as described at point 5.3.

So, it is necessary to use the suitable command for the transmission present in the available "SERIAL" application FV1 SOFTWARE for PC.



5.7. PROGRAMMED MEMORY FILE

The message displays can be connected, with the serial line RS232, with a PERSONAL COMPUTER (IBM COMPATIBLE) in order to transfer all programmed texts into a data FILE. This FILE can be used both as a document file and as a programming source for other message displays.
The devices will be simply serial connected as shown:



On the PC, by using the suitable. command present in the available application software, it will be necessary to open a FILE for this purpose.

In the sample device it is necessary to connect the keyboard; to enter the programming in the "TEXT PROGR." menu and search the "PROGR. TRANSMISSION option; then press ENTER.
The messages "TRANSMISSION RUNNING" and "RECEPTION RUNNING" will appear and at the end of the operation the receiving device will inform with "RECEPTION OK" or with "RECEPTION ERROR".

5.8. CHART OF THE AVAILABLE CHARACTERS

D7			0	0	0	0	0	0	1	1	1	1	1	1	1	1
D6			0	0	1	1	1	1	0	0	0	0	1	1	1	1
D5			1	1	0	0	1	1	0	0	1	1	0	0	1	1
D4			0	1	0	1	0	1	0	1	0	1	0	1	0	1

D3	**D2**	**D1**	**D0**	**C / R**			**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**A**	**B**	**C**	**D**	**E**	**F**
0	0	0	0	0			SP	0	@	P	\	p	↑	α	IE	A	П	Я	—	≤
0	0	0	1	1			!	1	A	Q	a	q	↓	β	IR	Б	Р		▬	≥
0	0	1	0	2			“	2	B	R	b	r	←	γ	Ä	В	С		■	±
0	0	1	1	3			#	3	C	S	c	s	→	δ	Ö	Г	т		■	≠
0	1	0	0	4			$	4	D	T	d	t	¬	ε	Ü		у		■	⌐
0	1	0	1	5			%	5	E	U	e	u	⌐	η	ä	Е	ф		▌	∞
0	1	1	0	6			&	6	F	V	f	v	◢	θ	ö	Ё	Х		▌	ʕ
0	1	1	1	7			‘	7	G	W	g	w	◣	λ	ü	Ж	ц		■	C
1	0	0	0	8			(	8	H	X	h	x	-1	μ	Å	З	ч		■	£
1	0	0	1	9			)	9	I	Y	i	y	2	π	Ñ	И	ш		∓	§
1	0	1	0	A			*	:	J	Z	j	z	3	ρ	¿	Й	щ			℃
1	0	1	1	B			+	;	K	[	k	{	0	σ		К	ъ		▶	◳
1	1	0	0	C			,	<	L	\	|	¦	½	φ		Л	ы		◀	◰
1	1	0	1	D			-	=	M	]	m	}	x	ω		М	ь		▼	▒
1	1	1	0	E			.	>	N	^	n	~	÷	Δ		Н	Э		▲	~
1	1	1	1	F			/	?	O	_	o	▒	Ω	Σ		О	Ю	╨	◆	≒

6. ACCESSORIES

6.1. KEYBOARD TS58

Two types of keyboards are available, both with the same functioning philosophy and each one showing the mostly used characters. The keyboard is used to communicate with the display devices Which have an internal mass memory, and carries out the following functions:

⇒ PROGRAMMING
⇒ STATUS DISPLAY
⇒ DIAGNOSTIC EXECUTION
⇒ MEASURING LISTINGS.

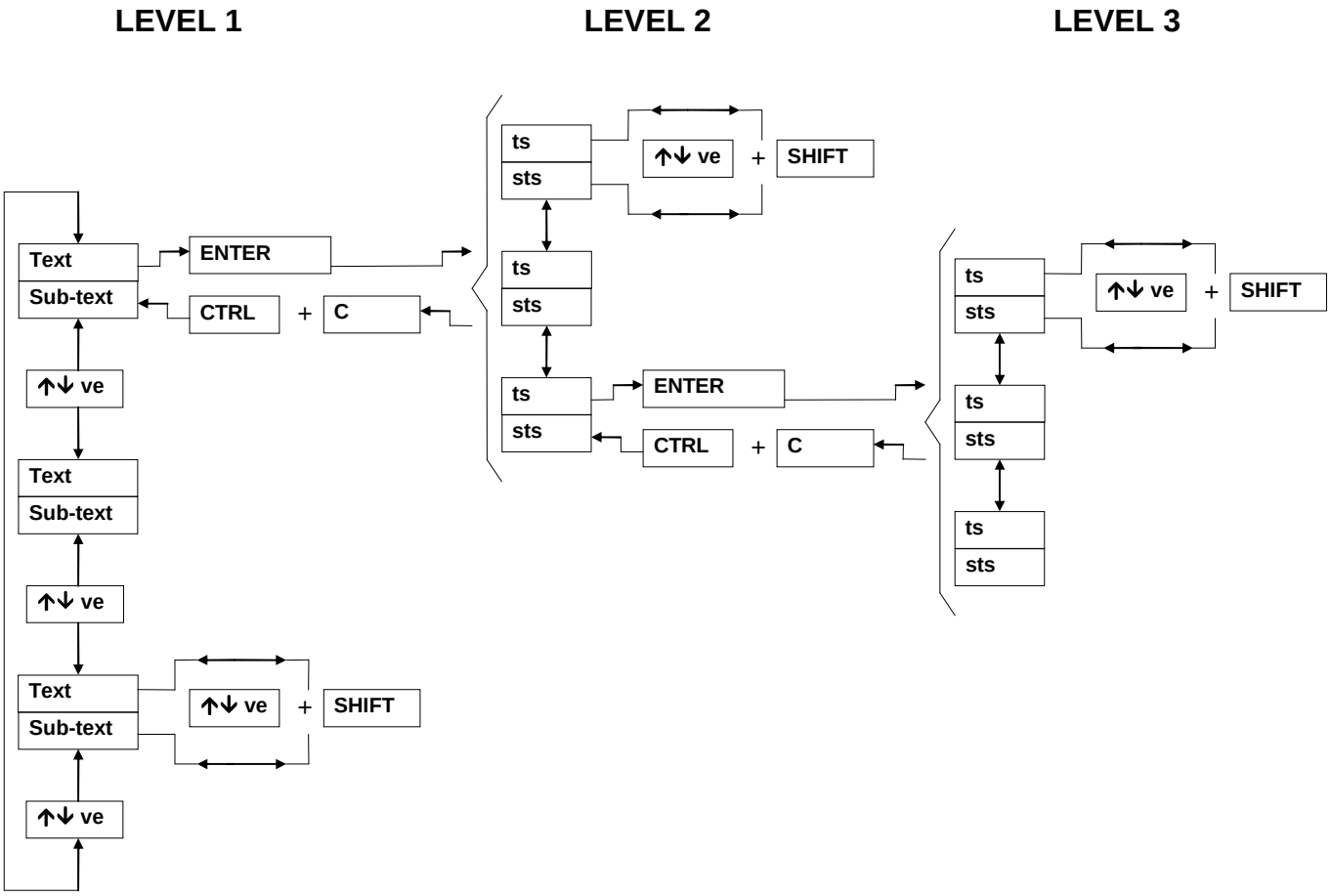
The keyboard has 58 keys, of which 42 are used to enter characters (letters, numbers and symbols) and 16 to execute commands. Some operations have free access, while others are protected by a safety code.
All operations are guided according to the suitable structured menu, reported in the charts of the following pages.
The functional keyboard structure is valid for all "CET" display devices with display of 20, 32 or 40 characters, with one or two lines. Among the various models it is possible to find out differences in the composition of the various menus, which are specific for the devices themselves and are thus reported in the display descriptions.
The menu are composed of 1 or 2 lines and therefore directly visible on the devices with 2 line displays, while for the 1 line ones it will be necessary to operate the suitable commands in order to read the possible sub-text.
When the menu writings exceed the display character capacity, the suitable commands are available to scroll the writing on the right and the left.
For the displays equipped with BEEP, with the function enabled, there is an acoustic BEEP signal any time a key is used.

6.1.1. DESCRIPTION OF THE KEYS

STOP/RUN	It takes the device to the STOP mode, ready for the programming by entering the selection menu main list. Only in this condition the functions of all the other keys are available.
SHIFT or **CTRL** + **STOP/RUN**	It takes the device back to the RUN mode, ready to function and in rest conditions (waiting message on display).

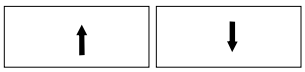
6.1.1.1. ORGANIZATION AND ACCESS TO MENUS.

The menu structure is a tree type, according to the following scheme:

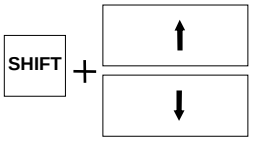


All menus are composed of 1 or 2 lines (TS = text + STS = sub-text)

The different accesses are obtained through the following keys:

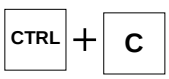


It carries out a choice among the different functions offered by the menu inside the same level.



It carries out the passing of TEXT/SUB-TEXT (if it exists) on display, that it is takes on the main line of the display the text or the sub-text and vice versa. All ENTER operations are possible only with the TEXT on the main line of the display.

Generally speaking, it carries out the entering operation regarding the indication writing on display. In practice, it controls the set data, it carries out their operation, it shifts to the following level and if it is necessary it gets ready to receive new data with increased parameters, it cancels an interactive indication message and in any case it always shifts to the following logic operation that can be executed.



It returns to the previous menu level.

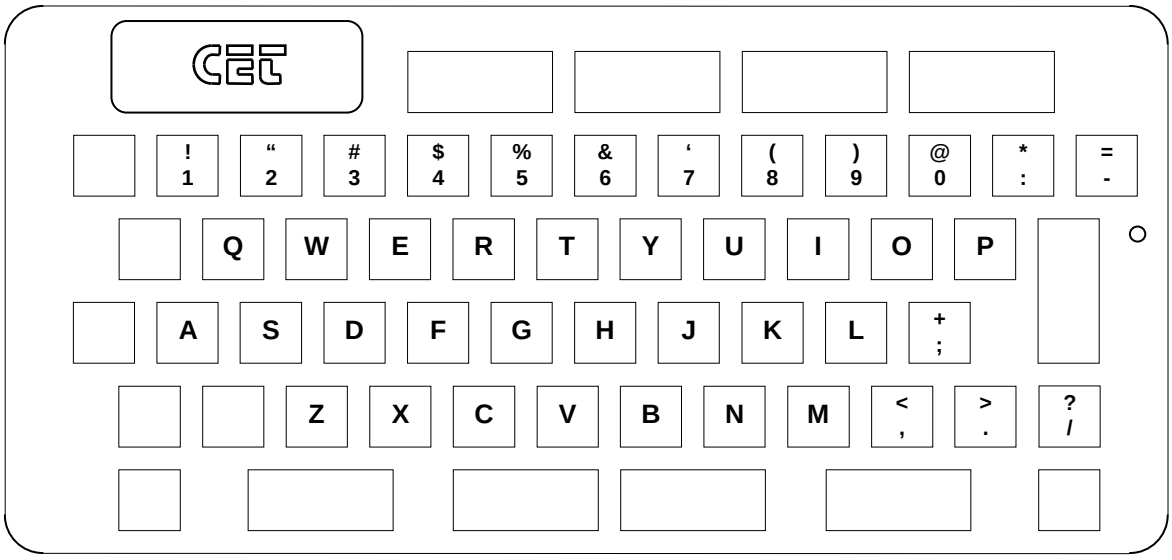
6.1.2. EDIT COMMANDS

It used usually considered EDIT the single or the whole character entering operations on display in the position shown by a cursor, identified by a flashing point or by a flashing character, or by an actual cursor.
On each main line it is possible to have one or more EDIT areas; they are always identified by the presence of the suitable cursor. The EDIT in the secondary line (sub-text) is never foreseen, since this line is only used as an operator help message.
The EDIT writing in the menu is expressly used for the programming and the composition of the different TEXT lines "TEXT EDIT", for which the entering of the different characters and the writing of the sentences represent the EDIT normal use.
In EDIT (cursor on display) the following two types of operations are possible:

1) COMMANDS
2) CHARACTER WRITING

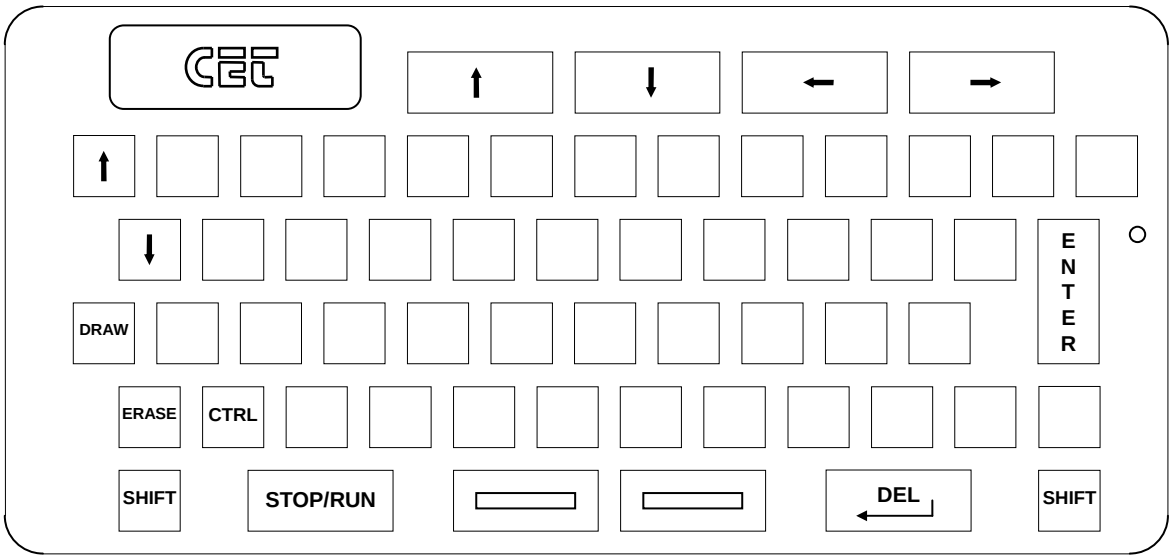
6.1.2.1. Keys for characters writing

On the keyboard, there are 42 keys for character entering (letters, numbers and symbols). With a special command it is possible to select two different key banks with different symbols and, inside each bank, every key identifies two different symbols or characters selected with the SHIFT command.
As a total it is possible to define 168 characters: 96 standard ASCII characters, all the CYRILLIC characters, further specific EUROPEAN characters, part of the GREEK alphabet and a certain number of special symbols.
For reason of clearness, on the keyboard are reporter only the symbols of the mostly used characters. Instead, in the enclosed scheme of the two banks are described all the characters which is possible to enter.



6.1.2.2. Command keys

The possible EDIT commands are reported in the following scheme:



Edit Cursor commands (red keys)

→	It moves the cursor one position to the right. If it is on the last position of the display, the whole line is moved one position to the left. If kept pressed, it carries out a continuous action.
←	As above, but to the left.
↑	As above, but the cursor movement is 20 positions to the right.
↓	As above, but the cursor movement is 20 positions to the left.

Line commands

SHIFT + →	It moves the whole present edit line one step to the right. If kept pressed, it carries out a continuous action.
SHIFT + ←	It moves the whole present edit line one step to the left. If kept pressed, it carries out a continuous action.
SHIFT + ↑	As above., but the line is moved 20 steps to the right.
SHIFT + ↓	As above., but the line is moved 20 steps to the left.

These line commands are also used in functions different from EDIT, any time the writing exceeds the display capacity, in order to read the whole contents.

Character selection commands:
the EDIT entering automatically selects the main bank (bank 1) and the main characters (this setting is shown by the keyboard led off; the led lights on with any key pressing): this condition is called DEFAULT condition.

CTRL + A
or
CTRL + Q

It alternatively selects (flip - flop) bank 1 or 2 and vice-versa

CTRL + 1

It alternatively selects (flip-flop) the main character or the secondary character.

- the bank 2 selection is shown by the keyboard led constantly on (it switches off with any key pressing)
- in bank 1, with secondary character selected, there is the flashing of the keyboard led with prevalent switching off time.
- in bank 2, with the secondary character selected, there in the flashing of the keyboard led with prevalent switching on time.

X

It enters the character selected from the bank or from the main or secondary selection in the position shown by the cursor.

SHIFT + X

It enters the character selected from the bank in an inverse way respect to the setting carried out in the main or secondary selected.

CTRL + R

It takes the selection of bank, main or secondary characters, back to DEFAULT conditions.

Commands for character management:

DEL

It deletes the character highlighted by the cursor and moves the cursor one step backwards.

SHIFT + DEL

It cancels the character on the cursor and moves all line characters, which are on the right of the cursor, one step to the left.

ERASE

It erases all characters of the line and moves the cursor to the beginning (if pressed for 3 seconds).

CTRL + I

It carries out the "INSERT" operation, that is the entering of characters in the middle of the already written line. If pressed a second time, it takes the edit back to normal conditions.

Commands with special function:

DRAW + DEL

It cancels the little point on the right of the last character of the line, sizing the line length with the real number of written characters.

CTRL + ENTER

In the message line edit, it programs this line as common text or sub-text, independently from the contents.

Special commands:

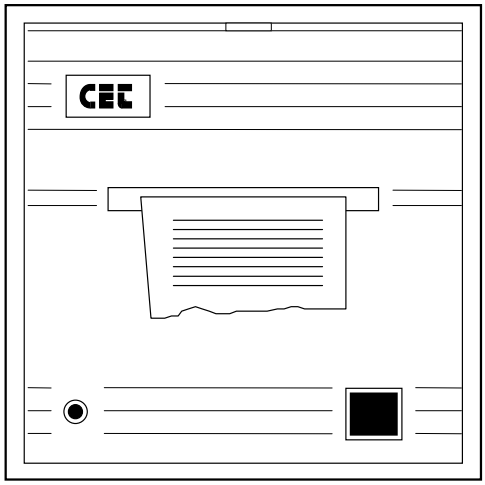
CTRL + B

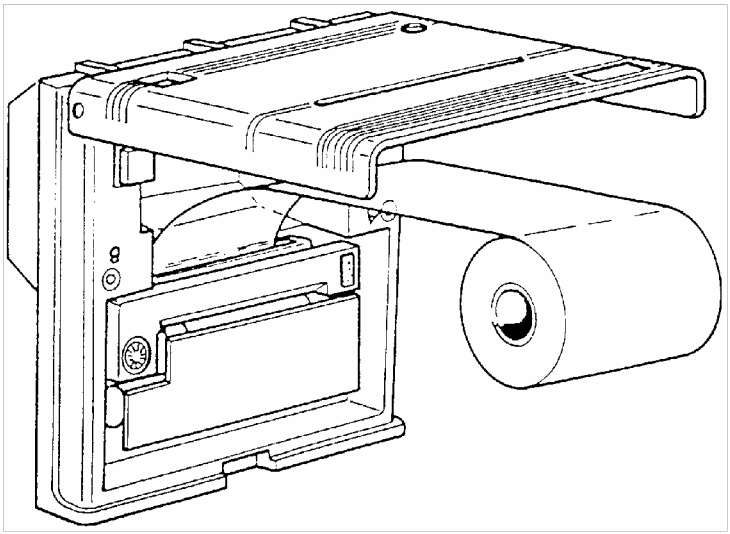
It sets and resets the acoustic BEEP function.

PARTICULAR REMARKS: In the text line edit, all positions indicated by a little dot (or with a little dash) represent a programmed “space". These spaces defined beyond the last character are used to distance the text end and its beginning in case of scrolling on of display.
The text length is, in any case, delimited by the last little dot (or little dash) present on the line.
When a message takes up the whole display length, at the end the cursor (little dot) is automatically positioned on the following space, moving the writing one character to the left. Thus, to avoid the message scrolling, it is possible to remove this space using the "DRAW" or "CLEAR" key.

6.2. ST40 PRINTER

The displays of the "CET" series, if equipped with serial line RS232, can pilot the suitable printer, “ALFAPANEL” type.
It is a wall printer, placed in the suitable box DIN 144 x 144, equipped with multi-voltage main feeder.
The printing matrix impact and with 40 columns with standard paper.
The paper roll is contained in the suitable internal housing, to which it is possible to acceed by opening the front door. With this printer it is possible to obtain listing both of the texts present on the display and of the contents of their memory buffers; when the display has a calendar/clock, also the date and the time will be printed.
The front panel has feeding on leds and one push button for paper advancing and auto-test.





6.2.1. TECHNICAL FEATURES

POWER SUPPLY	: 24 - 110 - 220 V ac +10 -15%
FREQUENCY	: 50 - 60 Hz
ABSORPTION	: 6 VA
OPERATING TEMPERATURE	: 0°C % 50 ℃
CLIMATIC CONDITIONS	: relative humidity 95% at 40 °C without condensate
RELIABILITY (MCBF)	: 500.00 lines
INKED TAPE	: with cartridge
TAPE ENDURANCE	: 200.000 characters
PAPER FEATURES	: width 69.5 + - 0.5 mm
	: thickness: 0.07 mm
	: max. roll diameter 50 mm
PAPER ADVANCING SPEED	: 0.4 lines per sec.
WRITING SPEED	: 0.4 lines per sec.
CHARACTER SIZES	: normal 2,4 x 1,3 mm (40 c/r)
	double width: 2,4 x 2,6 mm (20 c/r)
	double height: 4,8 x 1,7 mm (40 c/r)
	expanded 4,8 x 2,6 mm (20 c/r)
CHARACTER AVAILABILITY	: 96 ASCII characters
INTERFACE	: serial EIA RS232C
SERIAL PROTOCOL	: 1 start bit, 8 data bits, parity none, 2 stop bits 1200 baud
EXECUTION	: DIN 144 X 144
CONNECTIONS	: with terminals and removable connectors
ASSEMBLY	: built-in locking with suitable squares

6.2.2. INSTALLATION

PRINTER: connect to the printer the power cable and the special cable of interface RS232 connecting the printer and the message display.

INKED CARTRIDGE: the printer is normally supplied with the inked cartridge and the paper roll, already installed. The inked cartridge allows the printing of about 10.000 lines with 20 characters per line, keeping the writing perfectly clear for reading.
The cartridge replacement is a very easy operation. The operations to carry out the following:

1) remove the paper; usually the inked cartridge is replaced when also the paper roll is replaced; if for particular reasons it is necessary to replace the cartridge with half paper roll, it is necessary to cut the paper.
2) take off the used cartridge by pushing its left end in the point shown by the word "PUSH.
3) insert the new cartridge with a slight pressing. After inserting the cartridge it can happen that the tape is not perfectly placed; in this case it is enough to ask the printer to make some paper forwards.

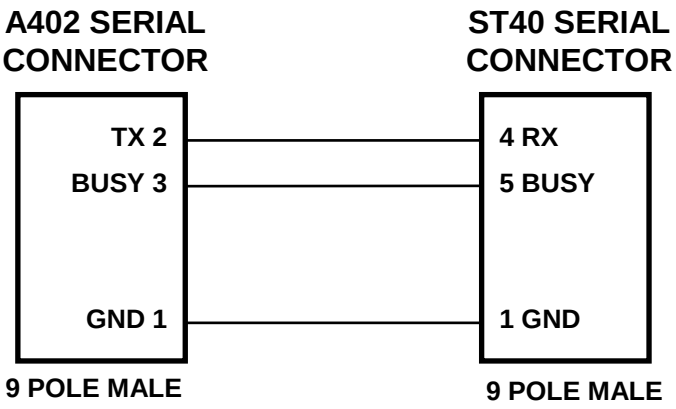
PAPER ROLL INSTALLATION: the insertion of a new paper roll must be carried out with the printer on and with the front panel open. The operation sequence is the following:

1) take off the written paper roll.
2) take the new paper end to the mouth of the printing mechanism
3) press the paper forward push button till the paper comes out from the printing mechanism.
4) insert the new roll into its housing and close the panel.

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

AUTO-TEST EXECUTION: ALFAPANEL can easily carry out an auto-test, which allows to test the printer condition.
In order to carry out this auto-test it is enough to switch the printer on by keeping the paper forward push button pressed.
The auto-test consists in printing 6 lines with the 4 different writing formats available on ALFAPANEL.
When installing the printer it is always advisable to carry out the auto-test at least once in order to check that the printer is in good conditions and to familiarize with the ALFAPANEL writing formats and character sets.

CONNECTION BETWEEN PRINTER AND MESSAGE DISPLAY



6.3. “FV1” SOFTWARE PROGRAMS FOR PC MS-DOS AND ITS USE

6.3.1. FV1 PROGRAM

This program is called "FV1" and its description is in referred to the message display of the FV1 series, with some indications about the A402 device when the application is quit different.
With the FV1 software module it is possible to create text of 2 lines (TEXT and SUB-TEXT). The created files are used for EPROM programming or to directly transfer the programmed texts to the displays with RAM memory.
The displays with RAM memory are equipped with an 8 line structure for each message, that in this case cannot be completely used as the message programming is limited to 2 lines (programming with PC)
For the EPROM programming, this software directly supports the prom programmers, SUNSHINE type, with 1 or 4 places, but any other type of EPROM programmer can be used.
The program is developed in two different parts: one for text management, which depending on the "TEXT MANAGEMENT" menu where it is possible to create, change, print and erase text files, and one for absolute file management, which depending on the "MAIN MENU", where it is possible to create absolute files, to print them and program them on the EPROM. Any operation is made easier thanks to the indications present in each function.

6.3.1.1. Installation

The application software can directly function on the floppy disk, where it can be stored only in case of a 3,5" - 1Mbyte floppy disk; on the contrary the software must be installed on the hard disk or copied on a 5"1/4 floppy disk with 1Mbyte capacity.
For the installation on hard disk, follow these operations:

1) insert into drive A or B the floppy disk containing the "CET FV1" program
2) position the cursor on the hard disk directory “ > C: “ which will contain the software
3) type A: or B: “INSTALL" and press [ENTER].

6.3.1.2. Use guide file

On the "CET FV1" floppy disk there is a guide file for the use of the application software: it is the "ISTRUZIO" file, which can lither visualize on the screen or print this use guide. Insert “ISTRUZIO” and then press [ENTER].

6.3.1.3. Symbols and hints

WAITING MESSAGE: it is the message, with corresponding sub message, which is placed on the FV1 display when no message is recalled from the outside; it must be programmed in order to avoid that in such conditions the display remains off; the programming is the same as for a normal text.
COMMON TEXTS: the common text and the common sub - text are messages usable when a text must appear more than once within a file being edited: they can be recalled with a simple procedure and allow the operator to write this message (or sub - message) only once; the programming is the same as for a normal text.

6.3.1.4. Created files

The "CET FV1" software creates 3 files for each operation step: the source file, with “.SRG" extension, the data file with “.DAT” extension and the absolute file, with “.TXT" extension. Once the absolute file is defined, the files with “. SRG” and ”.DAT" extension can be unloaded in order to make space on disk.

6.3.1.5. Program start

To starting the program it is necessary to type FV1 and then press [ENTER].

6.3.1.6. Main menu

Once started, the program shows on video the "MAIN MENU" with option "TEXT MANAGEMENT" highlighted.
To choose the desired entry, use the vertical arrow keys (the cursor will move onto a new line which becomes highlighted), or type the chosen option number. After this operation, press [ENTER] to confirm.

The MAIN MENU is composed of 5 options:

- TEXT MANAGEMENT
- CONVERSION
- EPROM PROGRAM PRINTING
- EPROM PROGRAMMING
- QUIT

To quit the program, select option 5 “QUIT”: the system control will return to DOS.
If option 1 "TEXT MANAGEMENT" is selected, the system control goes to the "TEXT MANAGEMENT" menu.

6.3.1.7. Text management menu

The text management menu is composed of 5 options:

- 1 TEXT FILE CREATION
- 2 TEXT FILE CHANGE
- 3 TEXT FILE DISPLAY
- 4 TEXT FILE PRINTING
- 5 TEXT FILE REMOVAL

The menu shows line 1 "CREATION" highlighted.
Also in this case, use the vertical. arrows keys:, to move the menu cursor. (the selected option is highlighted) or type the chosen menu number; then press [ENTER] to confirm. To return to the MAIN MENU, press the [ESC] key.

6.3.1.8. Text file creation

In order to create a text file, position the cursor of the "TEXT MANAGEMENT" menu on option 1 "CREATION" and press [ENTER] to confirm or type 1 and then press [ENTER].
On the video the following table will appear:

DATE		NEW PROGRAM CREATION						
USED PROGRAM NAME		EPROM		DATE		FREE BYTES		
NUMBER	TYPE	TEXT						
ATT.	T							
ATT.	S							
COM.	T							
COM.	S							
0	T							
0	S							
1	T							
1	S							
2	T							
2	S							
3	T							
3	S							
TAB.		1	10	20	30	40	50	60

At the beginning the cursor is positioned next to the “PROGRAM NAME" index; it will insert with the following order (press [ENTER] after each operation):

- the name of the in which the text to be created will be contained; if you want to store the text on a disk different from the one which contains the program, specify the driver (ex. B: FILEX) .
- the EPROM type in which the text will be contained, with the function keys F1 -> F4.
- the date with dd-mm-yy (ex. 010389 for March, 1st 1989) format; for the current date press [ENTER].
- possible notes for text use.

At the end of these operations the max. number of texts (or sub - texts) to be inserted is requested: insert a number between 200 and 4095 and press [ENTER] key; the higher the message number, the greater the memory used on disk by the program. As an indication, for every 100 messages, 18.500 memory bytes are used. The unused messages will remain empty.

The page is divided into three columns called:

- NUMBER: it is indicated the number of the message and of the corresponding sub-message; the "ATT." index represents the waiting message and the "COM." index the common text.
- TYPE: it is indicated the text type to be treated in that line: "TT" means a normal text, "SS" a normal sub- text "TC" and "SC" mean a common text and a common sub-text. “TT” and "SS" are automatically inserted by the program and can be changed in "TC" and “SC” for common text entering.
- TEXT this is the area where the texts are written.

The writing is made easier by the tabulation index ("TAB:” at the bottom on the left, followed by the tabulation number where the cursor is) and by the fixed tabulation 10, 20...60.
After the preliminary operations it is possible to enter the text writing; the cursor is on the first character of the waiting text; for text composition it is possible to use all standard ASCII characters (see characters table on the FV1 use manual).
Each written message and sub-message must be confirmed by the I enter I key; the Cursor will move onto the first character of the next line.

When the [ENTER] key is pressed, all the characters on the right of the cursor are removed: so the [ENTER] key can be used to remove a part or a whole message (position the cursor. at the beginning of the line; a removing confirmation will be asked).
To pass from one line to the other, both downwards and upwards, use the vertical direction keys (the arrows); if after writing one line, the cursor is moved with these keys without the [ENTER] confirmation, all that had been written, is removed.
The other two direction keys, the horizontal arrows, can be used to move the cursor inside the line you are writing.

ATTENTION: do not use these keys to leave blank spaces but use the space bar: the spaces are identified on video by a horizontal small line “ _ “. Remember that the FV1 device automatically scrolls the texts which have a length longer than 20 characters; it is this advisable, for these texts, to leave some blank spaces at the end of each message in order to avoid that, during the display, the end and the beginning of the message coincide. To enter a common text or to replace an already written text with a common one, position the cursor on the first character of the line and press the "BACK SPACE" key: the cursor moves inside the "TYPE" column.
Enter letter "C" and press [ENTER]: in the "TYPE" column remain the "TC" index for a text or the "SC" one for a subtext remain and the cursor moves on the next line. In case of error, that is when the cursor has been moved to the "TYPE" column but you don't want to insert a common text, enter “T” for texts or "S" for sub - texts and press [ENTER].
In order to carry out the inverse operation, that is the replacement of a common text with a normal one, it is enough to write the message and press [ENTER] (a replacement confirmation will be requested).
To pass from one line to the other, besides the vertical arrow keys, it is possible to use the following procedure: position the cursor on the first character of the line and press the "BACK SPACE" key twice; the cursor will move to the "NUMBER" column; type the number of the line where you want to go (without exceeding the max. number of previously entered messages) and press [ENTER].
It is possible to exceed the max. number of entered messages: position the cursor on the last sub--message, then with the [ENTER] key or with the downwards arrow, overtake the max. number step by step. On the top right hand of the screen there is an index ("FREE BYTES") which shows at any time how much free memory is available on the EPROM.
It is possible to quit the CREATION at any time by pressing the [ESC] key.

6.3.1.9. Note for the displays with RAM memory

The displays with RAM memory (both FV1 and A402) have a fixed number of messages equal to 511. When the texts are created by a PC, it is necessary to compose the texts with 511 messages in any case, otherwise there will be an "error". In order to obtain this, on opening a the text file, when the max. number of texts is requested, enter 511, than go to the 511th text; type anything (for ex. "END"), press [ENTER] and then return to the beginning and create the file.
FV1 Software version 1.94

6.3.1.10. Text file change

In order to carry out the change of a text file, position the cursor of the "TEXT MANAGEMENT" menu onto option 2 “CHANGE" and press [ENTER] to confirm or type “ 2 “ and then [ENTER].

On the video the previous diagram will appear with the headline "PROGRAM CHANGE", with the cursor positioned next to the "PROGRAM NAME" index.
Insert the name of the text file to be edited and press [ENTER]; if it is necessary to store the text on a disk different from the one which contains the program, specify the driver (ex: B:FILEX).

In this way the program allows to copy the text file; then, it is necessary to specify the new file name and press [ENTER]; after the copy the program returns to the "PROGRAM CHANGE".

If the file is not copied, the program allows to change the headline data: EPROM type, date and use remarks (to keep the old data press [ENTER]).
After these preliminary steps, it moves to the text editing which follows exactly the already outlined methods of creation.
At any time it is possible to quit the CHANGE by pressing the [Esc] key.

6.3.1.11. Text file view

In order to view a text file, position the cursor of the "TEXT MANAGEMENT" menu onto option 3 "VIEW" and press [ENTER] to confirm or type “ 3 “ and then [ENTER].

On the video the previous diagram will appear with the headline "PROGRAM VIEW”, with cursor positioned next to the "PROGRAM NAME" index.
Insert the name of the text file to be displayed and press [ENTER]; if the file is on a disk different from the one which contains the program, specify the driver (ex: B:FILEX). Follow the view indications. Press [Esc] to quit.

6.3.1.12. Text file printing

In order to print a text file, position the cursor of the "TEXT MANAGEMENT" menu onto option 4 "PRINTING" and press [ENTER] to confirm or type “ 4 “ and then [ENTER].
On the video the previous diagram will appear with the headline "PROGRAM PRINTING", with the cursor positioned next to the "PROGRAM NAME" index.
Insert the name of the text file to be printed and press [ENTER]; if the file is on a disk different from the one which contains the program, specify the driver. (ex.: B:FILEX). Insert the number of the first line ("ATT" for wait, "COM" for common text) and the number of the last line to be printed; then align the printer and confirm the printing.
At the end press the [Esc] key to quit.

6.3.1.13. Text file removal

In order to remove a text file, position the cursor of the "TEXT MANAGEMENT" menu onto option 5 "REMOVE" and press [ENTER] to confirm or type “5" and then [ENTER].
On the video the previous diagram will appear with the headline "REMOVE", with the cursor positioned next to the "PROGRAM NAME" index.
Insert the name of the text file to be removed and press [ENTER]; if the file is on a disk different from the one which contains the program, specify the driver (ex: B:FIL.EX). Confirm the removal.
In this way the text files and the data files are removed but the absolute files are not removed because they must be removed with DOS commands. To quit press the [ESC] key.

6.3.1.14. Conversion of a text file into an absolute file

In order to convert a text file into an absolute file, position the cursor of the "MAIN MENU" onto option 2 "CONVERSION" and press [ENTER] to confirm or type "2" and then [ENTER].
On video the previous diagram will appear with the headline "CONVERSION", with the cursor positioned next to the "PROGRAM NAME" index.
Insert the name of the text file to be converted and press [ENTER]; if the file is on a disk different from the one which contains the program, specify the driver (ex: B: FILEX) .
After confirmation, the program carries out the conversion showing the absolute writing address., it is possible that during the conversion the address remains still for some seconds; once they are expired, the counting restart regularly.
On conversion end press [Esc] to quit.

6.3.1.15. Absolute file printing

In order to print an absolute file, position the cursor of the "MAIN MENU" onto option 3., "EPROM PROGRAM PRINTING" and then on video the previous diagram will appear with the headline "EPROM PROGRAM PRINTING", with the cursor positioned next to the "PROGRAM NAME" index.
Insert the name of the absolute file to be printed and press [ENTER]; if the file is on a disk different from the one which contains the program, specify the driver (ex: B:FILEX).
After confirmation, the program carries out the printing of the necessary parts of the absolute file; it is possible that the printing is interrupted for some seconds; once they are expired, it restarts regularly.
On conversion end press [Esc] to quit.

6.3.1.16. Eprom programming

Before proceeding with the EPROM programming, make sure you have converted the involved text file into an absolute file. In order to carry out the EPROM PROGRAMMING, position the cursor of the "MAIN MENU" onto option 4 "EPROM PROGRAMMING" and press [ENTER] to confirm or type "4" and then [ENTER].
As already mentioned, the "CET FV1" software directly supports the Prom Programmers SUNSHINE type with the models EW701, EW702, EW901, EW904 and, on request, the model EW910. On video the writing "ATTENTION the EPROM programming must be carried out ....." appears.

- If there is no SUNSHINE programmer available, press [Esc] (return to the main menu), then position the menu cursor onto option 5 "QUIT" and press [ENTER], or type "5" and then [ENTER].

The control returns to DOS. Use the software of the Prom Programmer available, by using the absolute File with ".TXT" extension (ex: FILEX.TXT); if the file is on a disk different from the one which contains the program, specify the driver and the path (ex: C:\FV1\FILEX.TXT) .

- If there is a SUNSHINE programmer of series 9 (EW901, EW904 or EW910) available, type "1". The system control goes to prom programmer software.
- If there is a SUNSHINE programmer of series 7 (EW701, EW704), type "2". The system control goes to the prom programmer software.

6.3.1.17. Details about the use of the software of the eprom programmers sunshine type

The following details are used only as an indication; for further information see to the use manual of the available programmer.
The reported examples refer to the EPROM programming with a 12,5V voltage.

- Programmers series 9
First it is necessary to select the EPROM type to be used (the same as in the type selected in the text file); press the "E" key (eprom type) and then select the EPROM type; press:

5 for 27C64
7 for 27C128
9 for 27C256
B for 27C512

Press “L” (load) in order to load the absolute file; the starting path in requested; insert 0000 followed by [ENTER], then the file name with ".TXT" extension (ex: FILEX.TXT) and press [ENTER]. If the file is on a disk different from the one which contains the program, specify the driver and the path (ex.: C:\FV1\FILEX.TXT).
Insert the EPROM into the programmer and press the "4" (blank check and copy); confirm it with "Y".
In case of error, repeat the procedure and make sure that the EPROM is removed. Press “Q" to return to the "CET FV1" software.

- Programmers series 7
If the writing "Error Identification" appears, press "Q" to quit and make sure that the programmer card is correctly connected.
First it is necessary to select the EPROM type to be used (the same as the type selected in the text file): press the "T" key (type select) and then select the EPROM type. Press:

4 for 27C64
6 for 27C128
7 for 27C256
8 for 27C512

Press [ENTER].
Press “2” (load) in order to load the absolute file; insert the file name with ".TXT" extension (ex: FILEX.TXT) and press [ENTER]. If the file is on a disk different from the one which contains the program, specify the driver and the path (ex: C:\FV1\FILEX.TXT). Then the starting path is requested: insert 0000 followed by [ENTER]; in the window on the right appears "OK".
Insert the EPROM into the programmer and press the "A" key (auto b&p); the writing "Ready to start” appears; confirm with the "Y" key.
When the programmer has programmed the EPROM, the writing “VERIFY OK" will appear on video. In case of error, repeat the procedure and make sure that the EPROM is removed.
Press "Q" to return to the "CET FV1" software.

6.3.1.18. "SERIAL" PROGRAM (For message displays with RAM memory and serial line)

The "CET FV1" software package includes a program which allows the serial communication between the Personal Computer and message displays FV1 and A402 type, through the serial port RS232.
The program is started by entering "SERIAL.", followed by [ENTER].
The menu foresees 3 options:

- **1**_ Transmission from PC to Message display: it allows to transmit a file with texts to the message display. Carry out the serial connection (with P2 closed) as shown in paragraph 3.3 and switch the equipment On. The message display will show the writing "PROGRAMMING RECEPTION".
  Insert into the PC the name of the file to be transmitted and start the transmission. On the message display video "TRANSMISSION RUNNING" appears and, at the end of the communication, it is shown if the new programming has been correctly received (if not, repeat the communication).
  Remove the P2 bridge to set the message display ready to work.

  N.B. In any case the message display looses the previous programming. - Make sure that the transmitted file is a file previously received from a message display with RAM memory, or that it is composed in the standard FV1.

- **2**_ Transmission from Message display to PC: it allows to load on PC the texts programmed on a FV1. After carrying out the serial connection, set the PC for reception (by entering the destination file name), and position the message display on "PROGR. TRANSMISSION". Press [ENTER] key on the keyboard of the message display; on video "TRANSMISSION RUNNING" appears. The PC indicates that is receiving and, at end of the reception, it signals if the reception has been correctly carried out (if not, repeat the communication).

  N.B. After the end of the transmission from the message display, the PC waits for a few seconds before considering the reception over.

- **0**_ Return to DOS: by entering 0 in the menu, it is possible to quit the program of serial communication.
  Remove the band P2 in operative.

6.4. MULTIPLEXER DEVICE MUX 64/A

THIS DEVICE IN VERSION / A IS USED AS A SUPPORT FOR THE MESSAGE DISPLAY “A402” WITH THE CONFIGURATION "ELECTROMECHANICAL CONTACTS".
THIS DEVICE INCREASES THE A402 CAPACITY BRINGING THE MAX. NUMBER OF MANAGEABLE CONTACTS TO 64, LEAVING ALL THEIR PROGRAMMABILITY AND FUNCTIONALITY SERVICES UNCHANGED.
IT IS SUPPLIED WITH THE SUITABLE VERSION FOR POSITIVE LOGICS, THEREFORE THE MESSAGE DISPLAYS WILL BE CONSEQUENTLY CONNECTED (FOLLOWING THE REPORTED SCHEMES).

6.4.1. TECHNICAL FEATURES

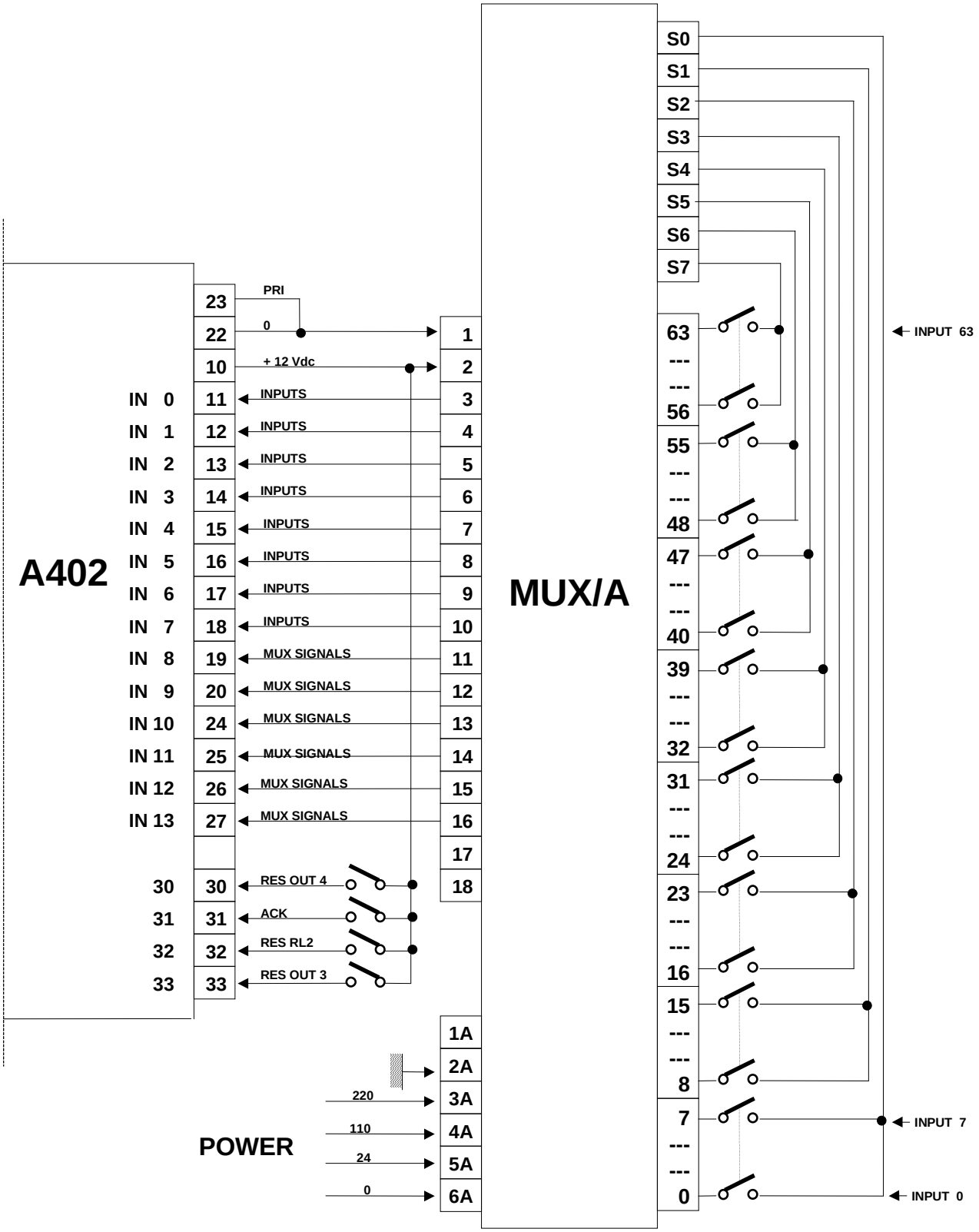
POWER SUPPLY (MULTI-VOLTAGE)	: MULTI-VOLTAGE 24-110-220 Vac +10% -15%
FREQUENCY	: 50 - 60 Hz
ABSORPTION	: 6 VA
OPERATING TEMPERATURE	: 0 °C % 50 °C
CLIMATIC CONDITIONS	: RELATIVE HUMIDITY 95% at 40°C (without condense)
INPUTS FROM FIELD	: 64 CONTACTS, free from voltage. N.O. or N.C. according to the programming carried out on the message display
OUTPUTS TOWARDS FIELD	: 8 communication lines for MULTIPLEXING of 8 banks with 8 contacts each
OPERATION LEVEL ON FIELD :	: 24Vdc with 15 mA load
OUTPUTS FOR MESSAGE DISPLAY	: 8 data signals (MULTIPLEXED) and 5 service signals
INTERFACE TYPE	: version suitable for A402 with positive logics. Complete signal opto-coupling between plant side and electronic side
CONNECTIONS	: With terminals, fixed with screws for connection to the system. With removable connectors for the connections to A402 and network
EXECUTION	: Protected CARD and DIN 100 X 220 X 50 support
ASSEMBLY	: Inside the panel, on a DIN or OMEGA bar

6.4.2. CONNECTIONS AND USE

The MUX 64 device is simply connected to the message display as shown in the picture, by using a pre-assembled cable or specific connection.

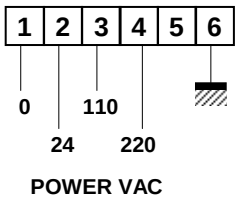
The part connecting to the system is provided with independent power; therefore it is only possible to use contacts free from voltage.
It is advisable to keep the length of each connection within about 50 m.
All contacts must be organized in banks with 8 positions; in each bank, the common connection is carried out on one side and the connection to the input is carried out on the other side. The multiplexing operation is carried out by operating a common connector of one bank at a time.
The MUX is supplied with two LEDs: one (5V) to indicate if it receives power from the A402 device and the other one (24V) to indicate if it is powered by the mains.
The power supplies are completely independent both for A402 and MUX.

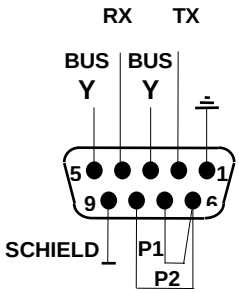
6.4.3. A402 - MUX64A CONNECTION DIAGRAMS



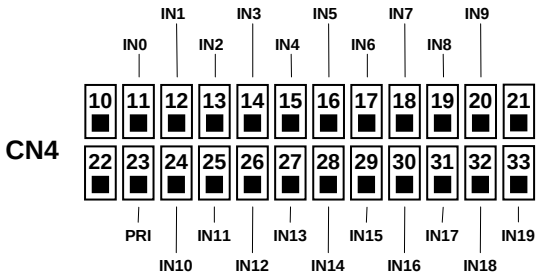
7. TERMINAL BOARD AND MECHANICAL PART DIMENSIONS

7.1. CONNECTION SCHEMES AND TERMINAL BOARDs

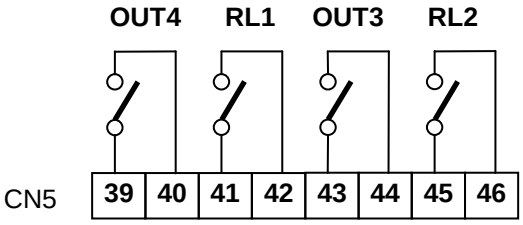


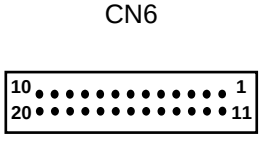


NOTE
Inputs in positive logics (LP) connect terminals 22-23
Inputs in negative logics (LN) connect terminals 10-23



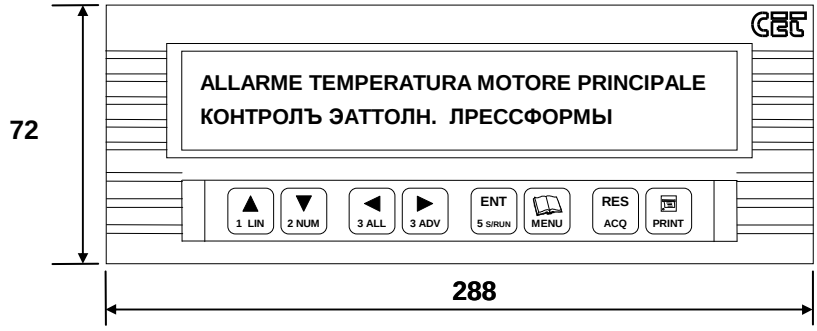
RL1 = RL2 = 5A - 250Vac Max.
OUT1 = OUT2 = 0,5A - 120Vac Max.

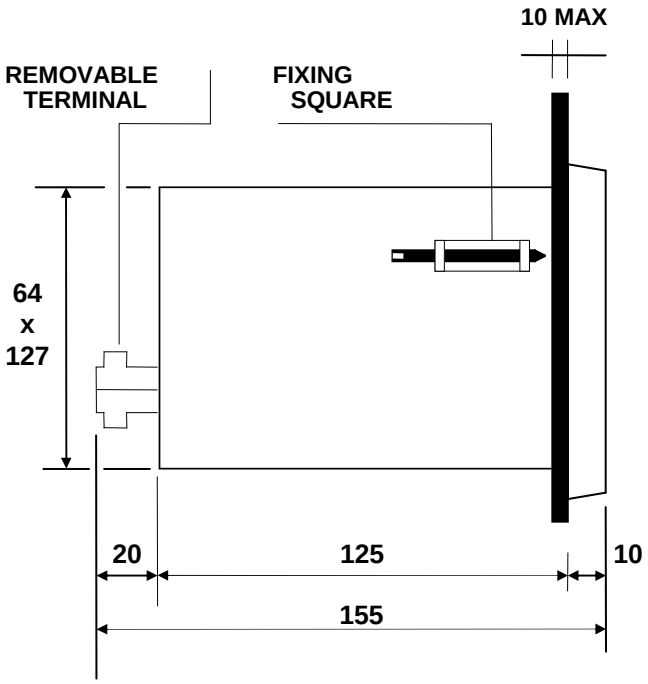




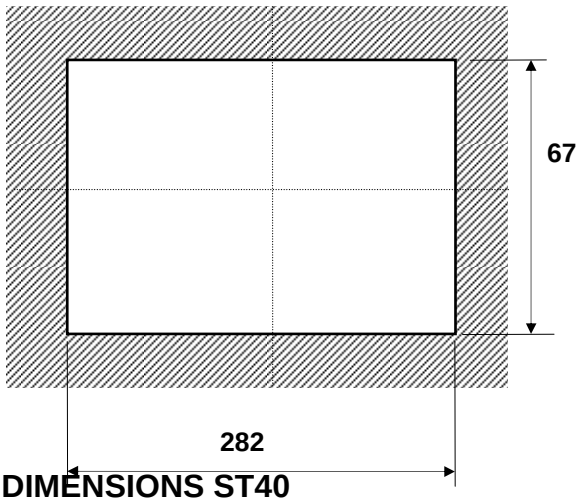
7.2. OVERALL DIMENSIONS

7.2.1. OVERALL DIMENSIONS A402

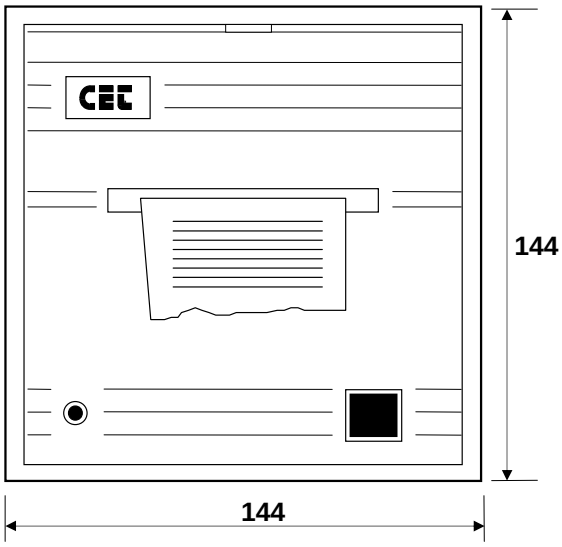


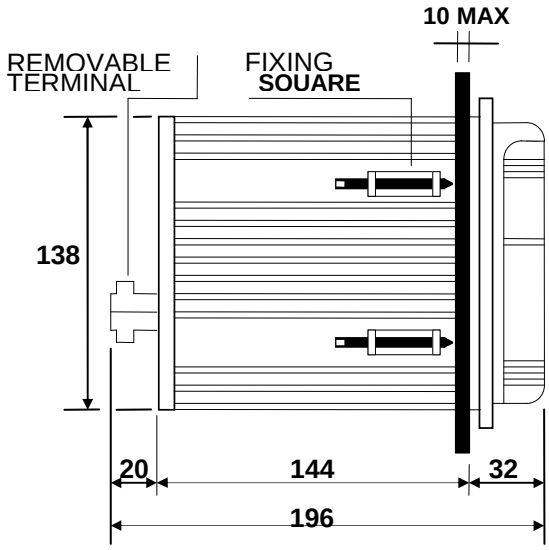


PANEL DRILLING



7.2.2. OVERALL DIMENSIONS ST40





PANEL DRILLING