

PROGRAMMING TERMINAL

TP-10

Version 1.x - 2007

(TP-10-B)

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<u>1.</u>	<u>INTRODUCTION</u>	<u>1</u>
<u>2.</u>	<u>TECHNICAL DATA</u>	<u>3</u>
2.1	Dimensions	3
2.2	Ambient working conditions	4
2.3	Weight	4
2.4	Electrical characteristics	4
2.5	Keyboard	4
2.6	SERRA References and Codes	4
<u>3.</u>	<u>GENERAL DESCRIPTION</u>	<u>5</u>
3.1	General	5
3.2	Wall mounting	5
3.3	Saving parameters on the TP-10	6
3.4	V24 connector signals	6
<u>4.</u>	<u>PROGRAMMING</u>	<u>7</u>
4.1	Display	7
4.2	Keyboard	7
4.3	Utilities Menu	8
4.4	Automatic cursor positioning (ACP)	9
<u>5.</u>	<u>Messages</u>	<u>10</u>
5.1	Introduction	10
5.2	Operation of the TP-10 in message mode	10
5.3	TP-10 Initialisation Stages	10
5.4	TP-10 Editor	11
5.5	PLC Display messages on the TP-10	11
5.6	PLC Receive key presses from the TP-10	12
<u>6.</u>	<u>Updating the firmware</u>	<u>13</u>



1. INTRODUCTION

Industrial machine programming is currently done in a variety of ways. Portable programming units are an important aspect of this area precisely because of their portable nature.

The **TP-10** programming terminal is ergonomic, robust, reliable and simple to operate. It has been designed to be able to handle the working conditions commonly found in industrial environments and is quick and easy to operate and can communicate with all SERRA controllers from the 7000 series onwards, it allows you to modify and view data and will report any errors which arise.

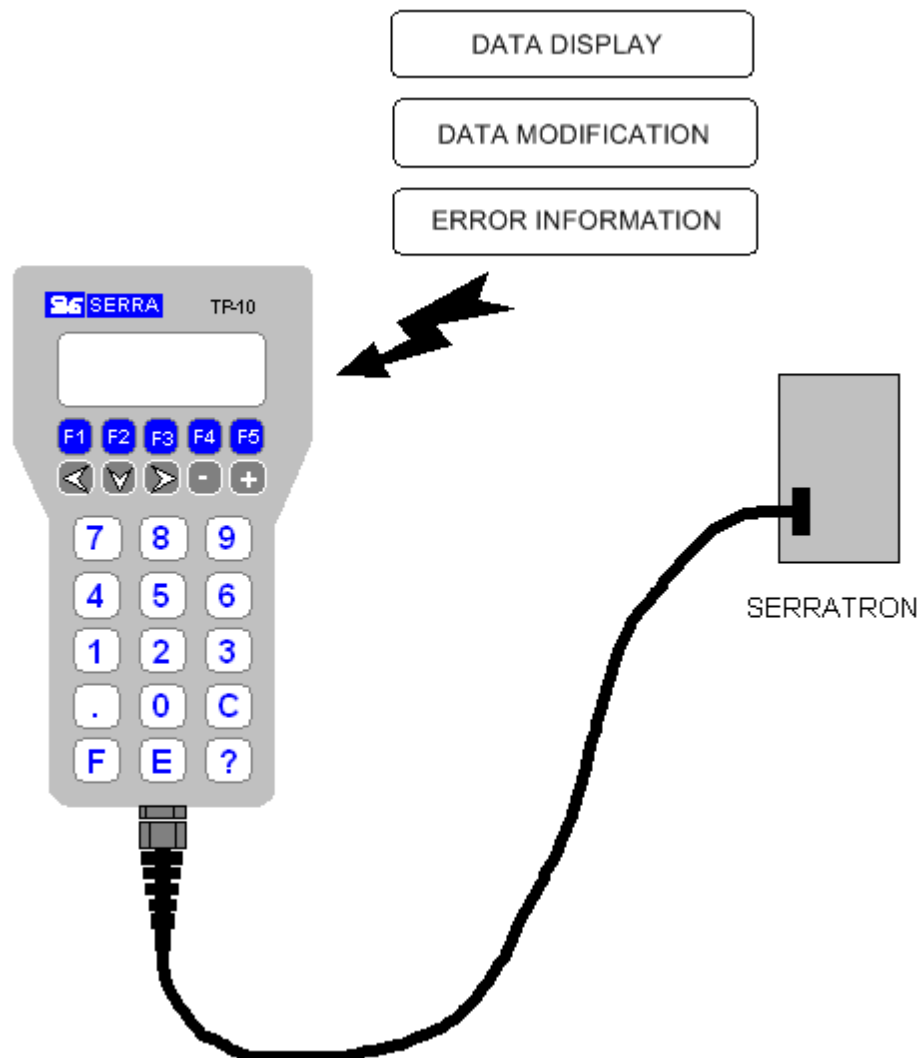


Figure 1-1 Human/Machine communication with the TP-10

Its light weight and ergonomic dimensions make the TP-10 a fully-portable unit. If the terminal needs to be located close to the controller on a permanent basis, the accessory called **TP-10 Wall Mount** allows it to be mounted next to the machine.

The electronics are shielded from electromagnetic interference and the **TP-10** Programming Terminal complies with all requirements imposed by the European Directives referring to electromagnetic compatibility and also conforms to the EN 50081-2 generic Emission standards and EN 50082-2 generic Immunity standards which both apply to industrial environments.

Note: The hardware of the TP-10 has been redesigned, although the external housing remains the same. To show that the new hardware version has been installed, the text **TP-10-B** will be displayed when the unit is turned on. If we want to update the firmware of the TP-10, we need to select the appropriate file for the hardware..

2. TECHNICAL DATA

2.1 Dimensions

The dimensions of the TP-10 Programming Terminal are shown below:

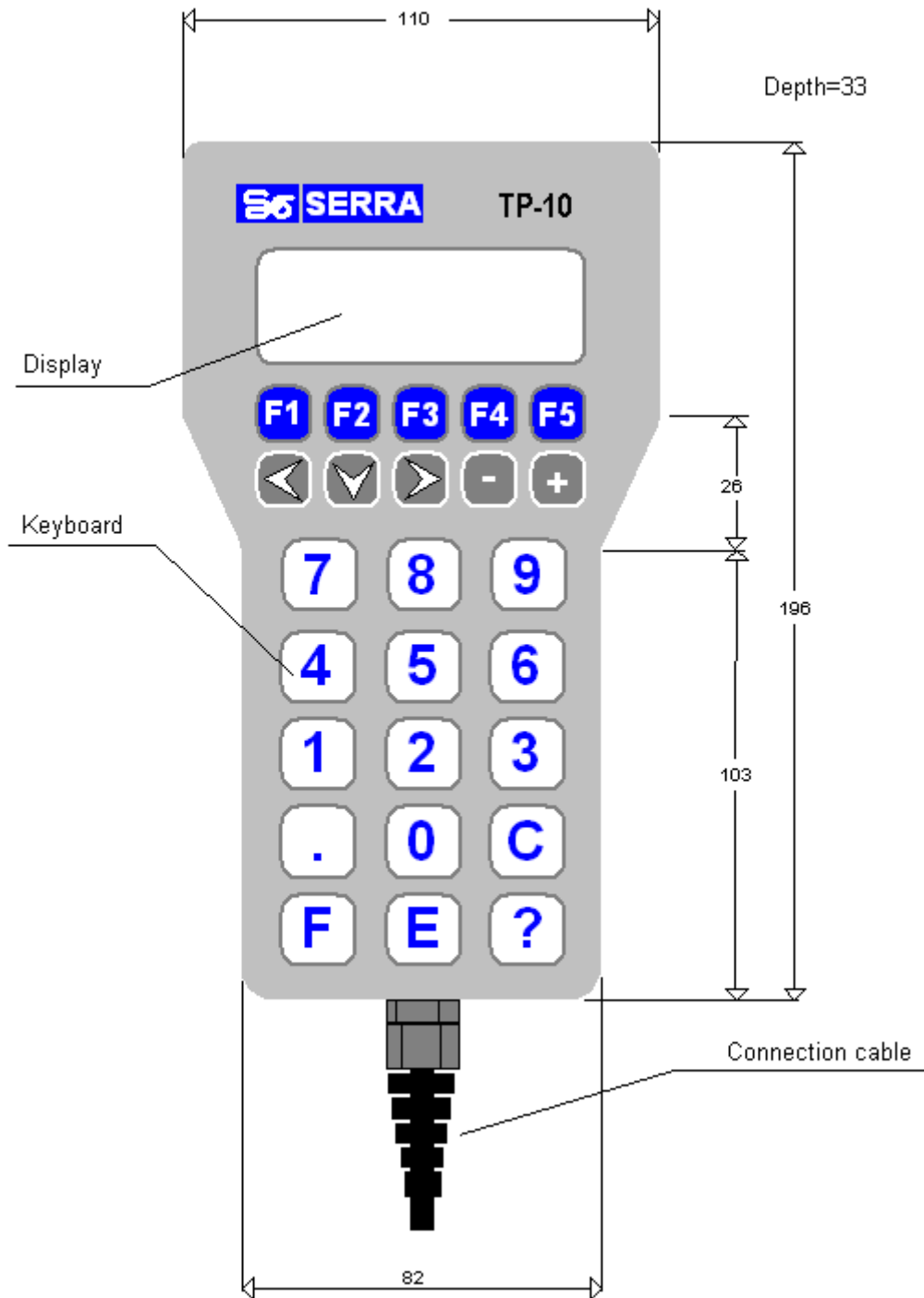


Figure 2-1. TP-10 dimensions in mm

2.2 Ambient working conditions

- Minimum temperature: -5°C
- Maximum temperature: 60°C
- Maximum humidity: 90% (without condensation)
- Maximum altitude: 1000 m. At higher altitudes, lower temperature and humidity values apply.

2.3 Weight

- TP-10: 400 g
- TP-10 Wall Mount: 100 g

2.4 Electrical characteristics

- Power supply: 24 V DC +25% -60%
- Consumption: 6 VA

2.5 Keyboard

- Type: Membrane

2.6 SERRA References and Codes

- TP-10 Programming Terminal: 92000035
- TP-10 Wall Mount: 39927550

3. GENERAL DESCRIPTION

3.1 General

The TP-10 Portable Programming terminal includes an alphanumeric display which displays information on 4 lines of 20 characters each. It also has a keyboard which is used to enter data.

Communication with the controller is handled by an RS-232 serial channel. The serial and 24 V DC power supply cables between the terminal and the controller run through a cable sleeve.

The control data can be saved on the TP-10 Terminal. This data can also be dumped to any other controller of the same series.

For the terminal to be able to function correctly with any SERRA controller from the 7000 series onwards, the control data will need to be input via programming, as is shown below.

Terminal functions also include a key press sound and dimming of the display illumination after a certain amount of time.

3.2 Wall mounting

When the TP-10 terminal needs to be attached to the side of a machine or a cabinet, we can use the TP-10 Wall Mount accessory:

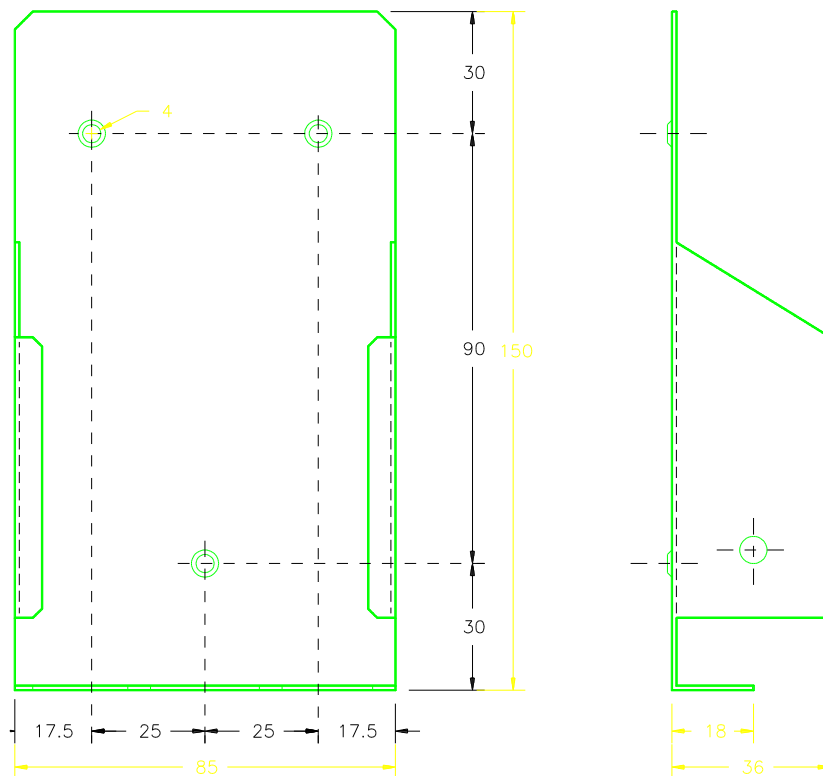


Figure 3-1. Wall Mount for the TP-10

3 x M4 holes will need to be drilled in the side of the machine or the cabinet to attach the wall mount. Their positions are shown in the figure above.

Once the wall mount has been attached, the programming unit can be mounted on it. If the user prefers to hold it when programming, it can easily be extracted by pushing it upwards. Once the task has been performed, it can then be replaced by inserting into the top of the mount and pushing down gently.

3.3 Saving parameters on the TP-10

The TP-10 programming terminal has an internal memory which is able to store welding and control parameters which can then be transferred to another controller requiring the same or similar parameters, this saves time as the parameters do not need to be reprogrammed into the second controller.

The data is stored permanently in FLASH memory.

See the instruction manual for each specific controller for the precise method for using this function.

Versions fitted with the new hardware (TP-10) are able to save Serratrón 100 parameters.

3.4 V24 connector signals

The signals which are present at the Sub-D connector correspond to an RS-232 communications channel. Two other cables also run between the unit and the welding controller and these provide the 24 V DC power supply which is required by the programming terminal. The jumpers on the V24 connector are used to make it compatible with welding controllers of different series:

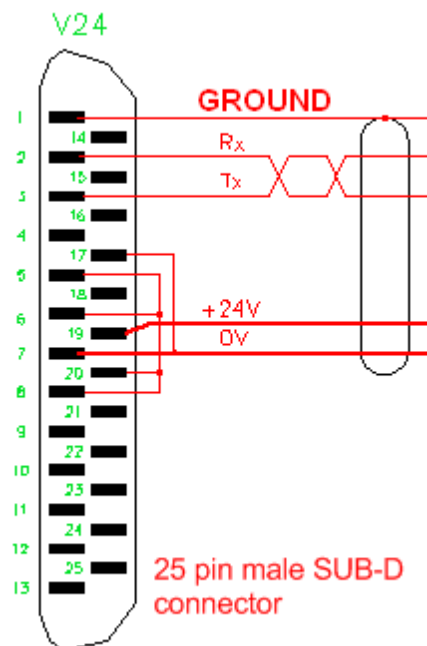


Figure 3-2. 24V Connector

4. PROGRAMMING

Programming refers to the set of operations used to edit all required parameters for the correct operation of the unit and the welding process controller and to store them in the internal memory.

4.1 Display

The **TP-10** Programming Unit includes an alphanumeric display with 4 lines of 20 characters each. The appearance of the screen immediately after the power is connected is shown below:

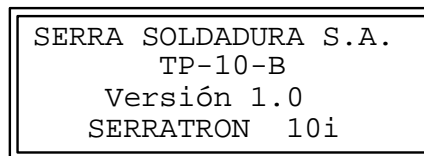


Figure 4-1. Start menu

The main screen will appear about 4 seconds later. When in **programming mode** (see following chapter), the flashing parameter will be the one which can be modified.

4.2 Keyboard

The keyboard of the TP-10 programming unit has 25 keys. The functions of each of the keys are shown below:

- ⇒ The function keys F1, F2, F3, F4 and F5 provide access to various menus of functions which are specific to each controller.
- ⇒ The arrow keys are used to change the cursor position within a Menu.
- ⇒ The '+' and '-' increase and decrease the cursor value by one unit.
- ⇒ The '0'...'9' number keys change the value of the numeric field of the cursor when this is allowed (**programming**).
- ⇒ The 'C' key sets the cursor value to zero.
- ⇒ The 'E' key is used to validate the numeric value at the current position of the cursor when the controller is in **programming** mode. The edited value will be saved in the memory of the controller permanently. Always remember to press 'E' to validate the edited or modified parameter.
- ⇒ The 'F' key is used for special functions in combination with other keys. These are as follows:
 - F-?Resets the TP-10 programming unit
 - F-F5 Takes you to the **utilities** menu
 - F-5, 6 ... Activates **programming**
 - F-5, 5 ... Deactivates **programming**

NOTE:

- When you see **F-5** this means that you need to press and hold the '5' key while holding down the 'F' key.
- The F-5 order should not be confused with the F5 key.

4.3 Utilities Menu

Pressing the F-F5 key combination will display the Utilities Menu:

```

F1:KEYBOARD TEST
F2:CONFIGURATION
F3:TP-10
    
```

Figure 4-2. Utilities Menu

• **F1:KEYBOARD TEST.**

Pressing F1 will open the Keyboard Test menu which is used to check that the keys are operating correctly:

```

      TECLADO/KEYBOARD
0 1 2 3 4 5 6 7 8 9
C E ? . < | > - +
F1  F2  F3  F4  F5
    
```

Figure 4-3. Keyboard Test Menu

Once the key in question is pressed, it will disappear from the screen and you will hear the buzzer sound.

The only key which cannot be tested using this menu is the 'F' key. To test this, you will need to press the F-? combination and make sure that the programming unit Resets.

• **F2: CONFIGURATION.**

Pressing F2 will take you to the Configuration Menu. This has the following appearance:

```

Terminal:           1A
Beep:               YES
Back light(min):   5
Messages:          NO
    
```

Figure 4-4. Configuration Menu

Pressing the 'down arrow' will cycle the cursor through the fields.

- * Terminal: refers to the type of controller connected, this could be one of the following:

MODEL	CONTROLLER
7000	SERRATRON-7000
8000	SERRATRON-8000
8000-NF v2	SERRATRON-8000-NF v2
8000-NF v3	SERRATRON-8000-NF v3
10i	SERRATRON-10i
10-PLC	SERRATRON-10 <i>plc</i>
1A	SERRATRON 1A
300xx	SERRATRON300
100xx	SERRATRON100
PES-20	SERRA ELECTRIC GUN
MFC-3000	SERRATRON MFC-3000

The '+' and '-' and 'right arrow' and 'left arrow' keys are used to cycle through and edit each of these values.

- * Sound: The **YES** option activates a buzzer sound when a key is pressed; the **NO** option deactivates this feature.
- * Display light (min): this refers to the amount of time the display light will remain lit after the last time a key was pressed or a blocking error occurs in the welding controller. The value is programmed in minutes and can be changed to between 1 and 15 minutes. The '+' and '-' and 'right arrow' and 'left arrow' keys are used to increase or decrease each of these values.
- * Messages: Activates or deactivates the TP-10 'Messages' mode.

To validate the data entered, press 'E'. To exit the configuration menu without changing any of the data, press F-F5.

• **F3: TP-10.**

Pressing F3 will exit the Utilities menu and the screen will be blank and dark for 2 seconds. The controller will then return to the start menu.

4.4 Automatic cursor positioning (ACP)

If you press the 'E' key while the controller is in **programming** and the cursor is over certain numeric fields, the **automatic cursor positioning (ACP)** process will commence, this will run through all the parameters needed to programme the controller so that only the numeric keys and the 'E' validation key need to be used.

The **ACP** function will be interrupted when either of the arrow keys are pressed.

The numeric field at which the APC starts and the fields it runs through will depend on the controller in question. Refer to the specific Instruction Manual in each case.

5. Messages

5.1 Introduction

The LCD display of the TP-10 is able to display user-programmed text messages. These messages will be displayed according to the commands of the PLC program residing in the Serratrón.

To achieve this, we will use:

- The “TP-10 Editor” application to edit the message table and send it to the TP-10.
- The centralisation software to edit the PLC program.
- A Serratrón with a PLC able to manage the TP-10 in message mode.

To activate the TP-10 message system, go to the TP-10 configuration menu and select the option:

- Messages: YES

5.2 Operation of the TP-10 in message mode

In this mode, the TP-10 will display the messages ordered by the Serratrón. When there are no specific messages to be displayed, the TP-10 will display the message which the user has defined as the default message using the “TP-10 Editor” program.

The user can go to the parameter programming screen of the Serratrón at any time using the F+F1 key combination. The TP-10 will remain in this display mode until:

- 10 minutes have passed during which the user does not press any key.
- The user presses F+F1 again.

The TP-10 will then return to message mode.

5.3 TP-10 Initialisation Stages

When turning on the TP-10 in message mode, the following will appear in succession:

- A screen displaying the TP-10 program version.
- The start message programmed by the user will then appear for a few seconds.
- The Serratrón parameter programming screen will then appear.
- If the user does not press any button for 10 minutes, the TP-10 will go into message mode. If there are no specific messages to display, the user-programmed default message will appear.

5.4 TP-10 Editor

This program runs on the PC. It can be used to edit up to 250 text messages. Once they have been edited, these messages are sent to the TP-10 via the Serratrón over the Ethernet network by a command from the program itself. It also allows an initial message and a default message to be defined which will be displayed on the TP-10 screen when it is turned on and there are no other specific messages to be displayed.

Character sequences which will be interpreted by the TP-10 in a special way can be inserted into the edited messages. Some of these are:

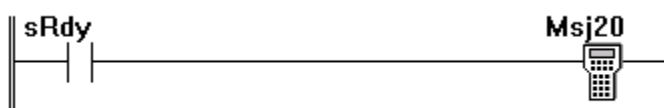
Sequence	Meaning	Parameter
\s1	The TP-10 emits a beep.	No
\b1	The following characters will be flashing.	No
\b0	The following characters will not be flashing.	No
\nu	Interprets the parameter as an integer without a sign, occupying <i>n</i> positions.	Yes
\1f	The parameter is interpreted as a 5 figure number with 1 decimal place.	Yes
\c	Interprets the parameter as an ASCII character.	Yes
\l1	Turns on the LCD light.	No
\l0	Turns off the LCD light.	No

As we can see, the edited message can include character sequences which need parameters. These parameters are sent to the TP-10 by the PCL automation program with the order to display the message. Up to 4 parameters can be sent.

5.5 PLC Display messages on the TP-10

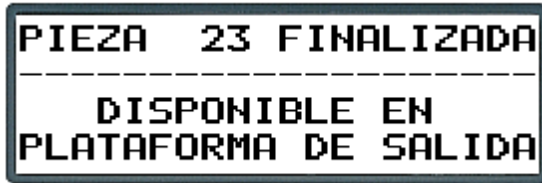
Once the messages have been sent to the TP-10, the Serratrón PLC program can order the TP-10 to display them.

This is done by entering an equation in the PLC which causes the message to be sent, for example:



Activation of the sRdy contact causes the TP-10 to display message number 20.

We might wish to include a variable in the message such as a counter value. For example, we want the TP-10 to display the message:



The text edited using the "TP-10 Editor" will then be:

PART \3u FINISHED----- AVAILABLE AT EXIT PLATFORM

The PLC automation equation could therefore be:

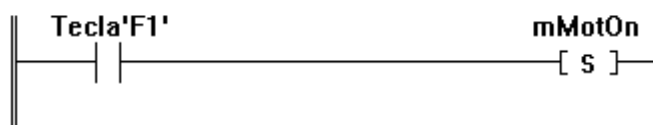


The copy block transfers the contents of counter C0 in the automation system to parameter 1 of the TP-10. The Msj24 block orders the TP-10 to display message 24 using the correct parameter 1.

5.6 PLC Receive key presses from the TP-10

In message mode, each key press on the TP-10 (except some which are reserved) will be sent to the Serratrón.

The PLC program can detect when a TP-10 key is pressed and/or released using a special input. For example:



Pressing F1 on the TP-10 will activate the mMotOn output. Releasing the key will deactivate the mMotOn output.

6. Updating the firmware

The firmware, this being the program executed on the TP-10, is constantly being improved and new versions are released as required.

Using the TP-Editor and a Serratrón, we can update the TP-10 firmware in a simple fashion.

To do this, we will need the file containing the desired firmware and we download it into the TP-10 using the TP-Editor.

