

**OPERATION MANUAL**  
**FOR DISPLAYS OF SERIES**  
**DT-203P, DT-105P AND DT-110P**

10939K12K



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## 1 INTRODUCTION

The message displays of **DT-105P**, **DT-110P** and **DT-203P** series are industrial displays of parallel control.

The displays working order is basically based on a microprocessor and on technically advanced circuits of control.

Its main characteristic is the great size of the characters.

**30mm.** height for **DT-203**, which allows a reading up to 15 meters

**50mm.** height for **DT-105**, which allows a reading up to 25 meters.

**100mm.** height for **DT-110**, which allows a reading up to 50 meters.

They are manufactured in one or two sides of displaying, which provide several possibilities and solutions when it has to be installed.

They can be set up on a surface, whether they are fixed to a wall or a partition, or they can be left hanging from the lateral supports.

There is a wide range of applications of these displays, which goes from industrial applications, such as warning breakdowns or displaying production information, to common advertisements.

## 2 GENERAL CHARACTERISTICS.

### 2.1 Electrical characteristics of the displays

#### 2.1.1 Electrical characteristics of the DT-203 displays.

<b>Supply Voltage</b> .....	88 to 264 VAC 47 to 63Hz. Option 24VDC.
<b>Consumption</b> .....	See chapter 2.2.
<b>Display</b> .....	7x5 Dot matrix of 30mm high.
.....	Red Led colour. Visibility 15 meters.
<b>Parameter memory</b> .....	Eeprom.
<b>Watch calendar</b> .....	Second / Minute / Hour / Day / Month / Year.
<b>Control inputs</b> .....	12 to 24Vcc. PNP, NPN or contact.
<b>Serial line option (X)</b> .....	RS-232 and RS-485. 9600 – 19200 bauds
<b>Relay option (R)</b> .....	Contact SPDT. Maximum 48V 1A.
<b>Environmental Conditions</b> .....	Operation Temperature: -20 to 60°C.
.....	Storage temperature: -30°C to 70°C.
.....	Humidity: 5-95% without condensation.
.....	Maximum environmental illumination: 1000 lux.
.....	Sealing: IP41, IP54 and IP65.

#### 2.1.2 Electrical characteristics of the DT-105 displays.

<b>Supply Voltage</b> .....	88 to 264 VAC 47 to 63Hz. Option 24VDC.
<b>Consumption</b> .....	See chapter 2.2.
<b>Display</b> .....	7x5 Dot matrix of 50mm high.
.....	Red Led colour. Visibility 25 meters.
<b>Parameter memory</b> .....	Eeprom.
<b>Watch calendar</b> .....	Second / Minute / Hour / Day / Month / Year.
<b>Control inputs</b> .....	12 to 24Vcc. PNP, NPN or contact.
<b>Serial line option (X)</b> .....	RS-232 and RS-485. 9600 – 19200 bauds
<b>Relay option (R)</b> .....	Contact SPDT. Maximum 48V 1A.
<b>Environmental Conditions</b> .....	Operation Temperature: -20 to 60°C.
.....	Storage temperature: -30°C to 70°C.
.....	Humidity: 5-95% without condensation.
.....	Maximum environmental illumination: 1000 lux.
.....	Sealing: IP41, IP54 and IP65.

#### 2.1.3 Electrical characteristics of the DT-110 displays.

<b>Supply Voltage</b> .....	88 to 264 VAC 47 to 63Hz. Option 24VDC.
<b>Consumption</b> .....	See chapter 2.2.
<b>Display</b> .....	7x5 Dot matrix of 100mm high.
.....	Red Led colour. Visibility 50 meters.
<b>Parameter memory</b> .....	Eeprom.
<b>Watch calendar</b> .....	Second / Minute / Hour / Day / Month / Year.
<b>Control inputs</b> .....	12 to 24Vcc. PNP, NPN or contact.
<b>Serial line option (X)</b> .....	RS-232 and RS-485. 9600 – 19200 bauds
<b>Relay option (R)</b> .....	Contact SPDT. Maximum 48V 1A.
<b>Environmental Conditions</b> .....	Operation Temperature: -20 to 60°C.
.....	Storage temperature: -30°C to 70°C.
.....	Humidity 5-95% without condensation.
.....	Maximum environmental illumination: 1000 lux.
.....	Sealing: IP41, IP54 and IP65.

## 2.2 Weight and power consumption. Exterior option use column h(VA).

Reference	Weight (kg)	Power (VA)	Power h (VA)	Reference	Weight (kg)	Power (VA)	Power h (VA)
DT-105/1S-6	4	12	25	DT-110/1S-6	6,5	12	25
DT-105/1D-6	4	16	46	DT-110/1D-6	7,5	16	46
DT-105/1S-13	5,5	16	46	DT-110/1S-13	10,5	16	46
DT-105/1D-13	6	28	90	DT-110/1D-13	13	28	90
DT-105/1S-20	7	22	68	DT-110/1S-20	14,5	22	68
DT-105/1D-20	8	38	134	DT-110/1D-20	18	38	134
DT-105/1S-26	9	28	90	DT-110/1S-26	19	28	90
DT-105/1D-26	10	50	179	DT-110/1D-26	23,5	50	179
DT-105/1S-33	10,5	34	112	DT-110/2S-6	9	16	48
DT-105/1D-33	12	60	222	DT-110/2D-6	11,5	28	90
DT-105/1S-40	12	38	136	DT-110/2S-13	15	28	90
DT-105/1D-40	14	72	266	DT-110/2D-13	20	50	178
DT-105/2S-6	5	16	48	DT-110/2S-20	21	38	134
DT-105/2D-6	5,5	28	90	DT-110/2D-20	28	72	266
DT-105/2S-13	7	28	90	DT-110/2S-26	27	50	180
DT-105/2D-13	8	50	178	DT-110/2D-26	36,5	92	354
DT-105/2S-20	9	38	134	DT-110/3S-6	12	22	68
DT-105/2D-20	10,5	72	266	DT-110/3D-6	15,5	38	112
DT-105/2S-26	11	50	180	DT-110/3S-13	20	38	136
DT-105/2D-26	13,5	92	354	DT-110/3D-13	27	72	244
DT-105/2S-33	13,5	60	220	DT-110/3S-20	27,5	55	200
DT-105/2D-33	16	115	442	DT-110/3D-20	38,5	105	376
DT-105/2S-40	15,5	72	266	DT-110/3S-26	35,5	72	266
DT-105/2D-40	19	138	530	DT-110/3D-26	49,5	138	510
DT-105/3S-6	5,5	22	68	DT-110/4S-20	34	72	268
DT-105/3D-6	6,5	38	112	DT-110/4D-20	48,5	138	486
DT-105/3S-13	8,5	38	136	DT-110/5S-20	41	88	330
DT-105/3D-13	10	72	244	DT-110/5D-20	58	170	600
DT-105/3S-20	11	55	200	DT-110/6S-20	47,5	105	400
DT-105/3D-20	13,5	105	376	DT-110/6D-20	68,5	204	700
DT-105/3S-26	13,5	72	266	DT-110/7S-20	53,5	120	465
DT-105/3D-26	17	138	510	DT-110/7D-20	78,5	240	820
DT-105/3S-33	16	90	332	DT-110/8S-20	60	140	530
DT-105/3D-33	20,5	170	640	DT-110/8D-20	88,5	280	930
DT-105/3S-40	18,5	105	400	DT-203/2S-20	6	35	----
DT-105/3D-40	24	205	770	DT-203/2D-20	6,5	60	----
DT-105/4S-20	12,5	72	268	DT-203/2S-40	9	60	----
DT-105/4D-20	16	138	486	DT-203/2D-40	10,5	120	----
DT-105/5S-20	14,5	88	330	DT-203/4S-20	7,5	60	----
DT-105/5D-20	18,5	170	600	DT-203/4D-20	9	120	----
DT-105/6S-20	16,5	105	400	DT-203/4S-40	12	120	----
DT-105/6D-20	21,5	204	700	DT-203/4D-40	15	240	----
DT-105/7S-20	18	120	465	DT-203/6S-20	9	90	----
DT-105/7D-20	24	240	820	DT-203/6D-20	11,5	180	----
DT-105/8S-20	20	140	530	DT-203/8S-20	11	120	----
DT-105/8D-20	27	280	930	DT-203/8D-20	14	240	----

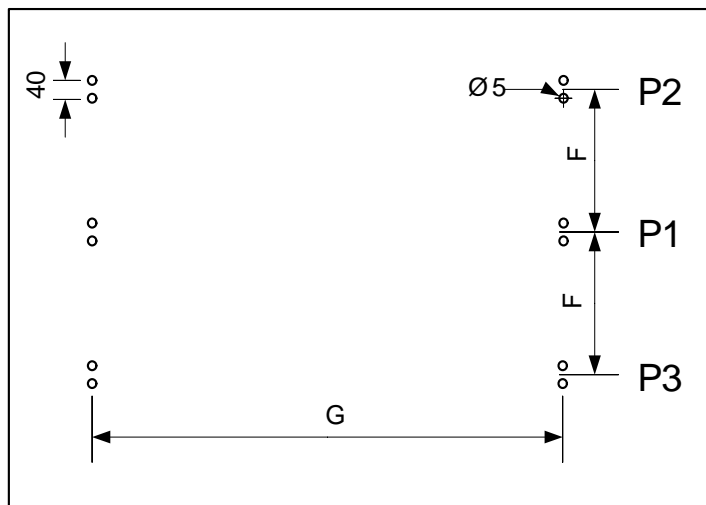
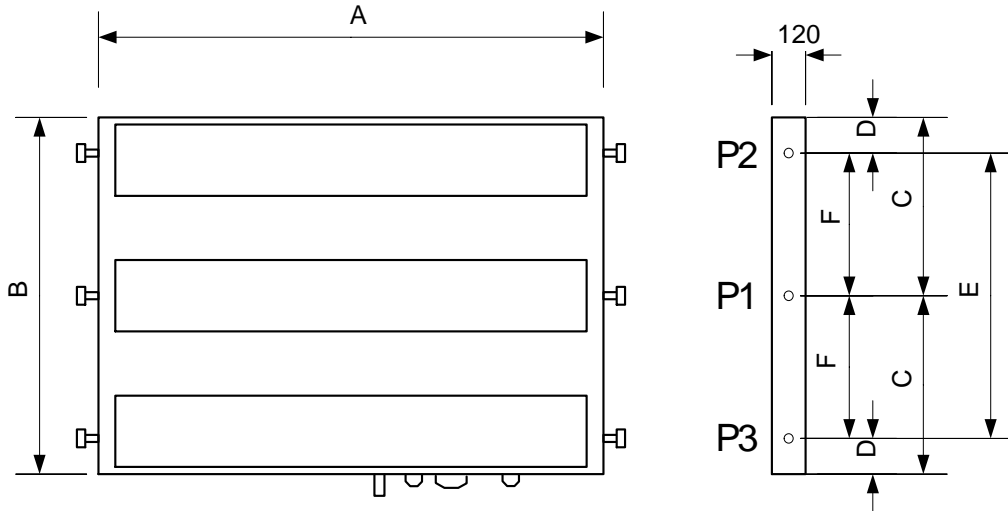
### 2.3 Dimensions of the displays

	A	B	C	D	E	F	G	P1	P2	P3
DT-105/1S(D)-6	375	118	109	X	X	X	358	O	X	X
DT-105/1S(D)-13	680	118	109	X	X	X	663	O	X	X
DT-105/1S(D)-20	985	118	109	X	X	X	968	O	X	X
DT-105/1S(D)-26	1290	118	109	X	X	X	1273	O	X	X
DT-105/1S(D)-33	1595	118	109	X	X	X	1578	O	X	X
DT-105/1S(D)-40	1900	118	109	X	X	X	1883	O	X	X
DT-105/2S(D)-6	375	230	112	X	X	X	358	O	X	X
DT-105/2S(D)-13	680	230	112	X	X	X	663	O	X	X
DT-105/2S(D)-20	985	230	112	X	X	X	968	O	X	X
DT-105/2S(D)-26	1290	230	112	X	X	X	1273	O	X	X
DT-105/2S(D)-33	1595	230	112	X	X	X	1578	O	X	X
DT-105/2S(D)-40	1900	230	112	X	X	X	1883	O	X	X
DT-105/3S(D)-6	375	338	X	72	186	X	358	X	O	O
DT-105/3S(D)-13	680	338	X	72	186	X	663	X	O	O
DT-105/3S(D)-20	985	338	X	72	186	X	968	X	O	O
DT-105/3S(D)-26	1290	338	X	72	186	X	1273	X	O	O
DT-105/3S(D)-33	1595	338	X	72	186	X	1578	X	O	O
DT-105/3S(D)-40	1900	338	X	72	186	X	1883	X	O	O
DT-105/4S(D)-20	985	436	X	72	292	X	968	X	O	O
DT-105/5S(D)-20	985	542	X	92	358	X	968	X	O	O
DT-105/6S(D)-20	985	648	X	112	424	X	968	X	O	O
DT-105/7S(D)-20	985	754	377	72	610	305	968	O	O	O
DT-105/8S(D)-20	985	860	430	72	716	358	968	O	O	O
DT-110/1S(D)-6	666	177	82,5	X	X	X	649	O	X	X
DT-110/1S(D)-13	1276	177	82,5	X	X	X	1259	O	X	X
DT-110/1S(D)-20	1886	177	82,5	X	X	X	1869	O	X	X
DT-110/1S(D)-26	2496	177	82,5	X	X	X	2479	O	X	X
DT-110/2S(D)-6	666	378	X	80	218	X	649	X	O	O
DT-110/2S(D)-13	1276	378	X	80	218	X	1259	X	O	O
DT-110/2S(D)-20	1886	378	X	80	218	X	1869	X	O	O
DT-110/2S(D)-26	2496	378	X	80	218	X	2479	X	O	O
DT-110/3S(D)-6	666	591	X	80	430	X	649	X	O	O
DT-110/3S(D)-13	1276	591	X	80	430	X	1259	X	O	O
DT-110/3S(D)-20	1886	591	X	80	430	X	1869	X	O	O
DT-110/3S(D)-26	2496	591	X	80	430	X	2479	X	O	O
DT-110/4S(D)-20	1886	805	403	80	646	322,5	1869	O	O	O
DT-110/5S(D)-20	1886	1018	509	80	858	429	1869	O	O	O
DT-110/6S(D)-20	1886	1232	616	80	1072	536	1869	O	O	O
DT-110/7S(D)-20	1886	1445	723	80	1286	643	1869	O	O	O
DT-110/8S(D)-20	1886	1654	830	80	1500	750	1869	O	O	O
DT-203/2S(D)-20	615	177	85	X	X	X	598	O	X	X
DT-203/2S(D)-40	1170	177	85	X	X	X	1153	O	X	X
DT-203/4S(D)-20	615	317	X	72	173	X	598	X	O	O
DT-203/4S(D)-40	1170	317	X	72	173	X	1153	X	O	O
DT-203/6S(D)-20	615	464	X	91	282	X	598	X	O	O
DT-203/8S(D)-20	615	611	X	112	387	X	598	X	O	O

See the draw on the next page

Measures in millimetres. X = Not valid for these model.

P1, P2 and P3: Anchorage point. Used = O. Not used = X. Anchorage holes position on the wall. See valid point (P1, P2 o P3) on the table in the previous page.



### 3 INSTALLATION.

The installation of the **DT-203**, **DT-105** y **DT-110**, is not particularly delicate but some important considerations must be taken into account.

It must not be anchored to places subject to vibrations, nor should it be installed in places which generally surpass the limits specified in the display characteristics, both in terms of temperature and humidity.

The degree of protection of displays **DT-203**, **DT-105** and **DT-110** is IP41, meaning that they are protected against penetration by solid foreign objects of a diameter of about 1mm and against the vertical fall of water droplets. The **DT-203f**, **DT-105f** and **DT-110f** are IP54, which mean that are more protected. **DT-203e**, **DT-105e** and **DT-110e** are IP65.

Displays **DT-203**, **DT-105** and **DT-110**, should not be installed in places with illumination level higher than 1000 lux. Neither should the display be placed in direct sunlight as visibility would be lost. Displays **DT-105h** and **DT-110h** can be read in sunlight.

In the electrical installation, proximity to lines of high intensity circulation and high voltage lines must be avoided, as well as proximity to High Frequency generators and U/F converters for motors.

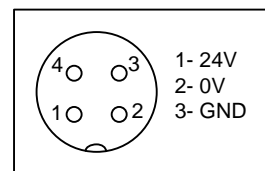
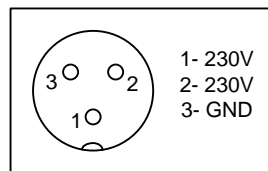
#### 3.1 Power supply.

The power supply must be 88 to 264 VAC 47 to 63Hz or 24VDC with option 24V.

The power supply conductor section will be in line with consumption and the ground conductor will be a minimum section of 1.5mm<sup>2</sup>.

The power supply connector for 220VAC has 3 contacts and is situated in the lower part of the unit. Connect the power wires following the schema below

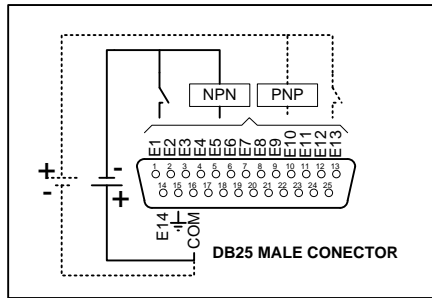
The power supply connector for 24VDC has 4 contacts and is situated in the lower part of the unit. Connect the power wires following the schema below





### 3.2 Wiring inputs

In all functions, the inputs should be between 12 to 16Vcc and allow PNP, NPN and contact

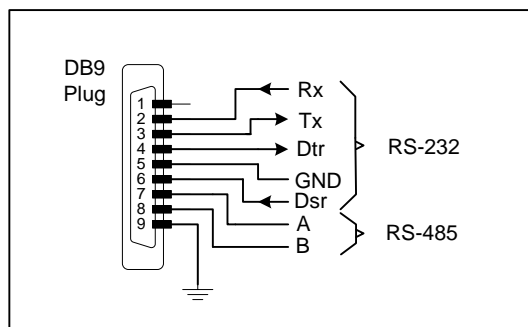


The inputs power supply must be between 12V and 26V CC with a maximum wave of 500mV. Surpassing these values can damage the display.

### 3.3 Serial line connection

All displays with serial line option may use RS232 and RS485 serial lines. Both use the same connector located at the bottom of display.

The displays use DB9 connector.

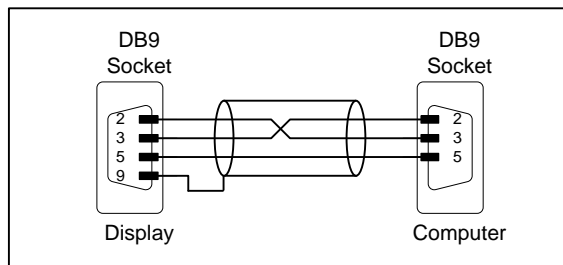


### 3.4 Connection between a display and PC computer using RS-232.

Using an RS-232 serial line, the total length must not be longer than 5m.

It is important to use shielded cable and to connect the shield to pin 9 of the DB9 connector.

The transmission line must be placed away from high power lines. The connector shown corresponds to the cable.



### 3.5 Characteristics of temperature & humidity probe. (Option)

#### Relative humidity

**Resolution** ..... Typical 1%.  
**Accuracy** .....  $\pm 3,5\%$  between 30% and 70%.  
**Warm-up time** ..... 4s.

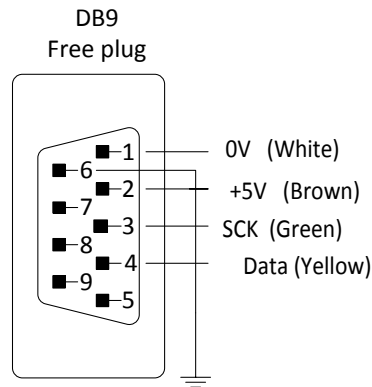
#### Temperature

**Resolution** ..... Typical 0,1°C.  
**Accuracy** .....  $\pm 0,5^\circ\text{C}$  at 25°C.  
**Warm-up time** ..... 20s.  
**Range** ..... From  $-20^\circ\text{C}$  to  $+80^\circ\text{C}$ .

### 3.6 Wiring of temperature & humidity probe (Option)

The temperature & humidity probe is delivered with 5m cable and a Sub-D9 connector ready to use.

The wiring of connector probe is shown in the diagram (cable connector).



### 3.7 Connecting displays with protection IP54 or IP65

In displays with IP54 or IP65 protection, the following instructions must be followed

- 1) The connectors must be used with the cover placed.
- 2) The covers must be the ones supplied with the display, which are provided of gland seal for cables and seal between the display and the box.
- 3) The user must take care that the union is good condition and the contact Surface is clean,
- 4) In the male connector, the white silicone joint must be placed before connecting the female connector
- 5) The user must verify that the gland is pressed and the connector is screwed

### 3.8 Reset button

If the computer has been out of power for many days, the battery may be discharged. If, when the power is restored, the battery is not fully charged, it may be necessary to force the device to be reset. The reset button is next to the power connector. The display must be connected to the power supply for the reset to be operative.

## 4 OPERATION

### 4.1 Initial Start Up.

Before connecting the display to the network, we must ensure that all of the connections have been carried out correctly and that the display is firmly in place.

Every time the display is connected to the power supply there is an initial reset, which checks all points of the display. After the initial reset the version code is displayed.

Following the initial reset, the display reads the message memory and initialises the messages table. The word "INICI" is shown until the display is prepared to receive messages.

When the initialisation process is finished, the display is ready to receive data. While waiting for the first message the display shows a programmed message on the memory.

### 4.2 Message programming.

In order to program the messages in the memory Eeprom, a PC and the TDLWin Version later than 1.5, specifically designed to program the messages into the display. Usually you may program only the message 0 because after initialisation this is the message displayed.

To program the messages, you must program the following parameters:

- Display : Parameter Protocol = TDL
- Local Port = 10001. Use Device Installer software to modify.
  
- Software TDLWin
- Serial line = TCP/IP
- IP Address = Display Address.

### 4.3 Set parameters.

Before using the display the user must set the parameters:

The parameters are:

- 1.- Language.
- 2.- Display address.
- 3-- Protocol.
- 4.- Baud rate.
- 5.- Data length.
- 6.- Parity.
- 7.- Stop bits.
- 8.- Serial input.
- 9.- Date
- 10.- Time
- 11.- Brightness.
- 12.- Position of the connectors.
- 13.- Text scroll speed.
- 14.- Exit

To set the parameters, the display has a pair of pushbuttons located at the bottom of the case. The menu is in four languages.

### 4.3.1 Enter to modify parameters.

In order to enter the sequence to modify the parameters, the Advance key “\*” must be pressed and held for three seconds. After this, the first parameters will be displayed, with the digit flashing.

There are then two options:

#### Modify the parameter value

By pressing the Advance key “\*”, entry is gained to modify the parameter value.

To go back to displaying the parameter number, press “\*” again.

To increase the parameter value, press the “+” key. After parameter EXIT it returns to parameter LANGUAGE.

#### Select another parameter

In order to select another parameter, the parameter number must be made to flash using the “\*” key and then the new parameter may be selected using the “+” key.

### 4.3.2 Exit modify parameters.

In order to exit the sequence for modifying parameters, parameter EXIT must be selected then press “\*”.

### 4.3.3 Function of each parameter.

#### 4.3.3.1 Parameter LANGUAGE or LA.

The language menu. There are four languages available: Catalan, Spanish, French and English.

#### 4.3.3.2 Parameter ADDRESS.

The network display address. Selectable between 0 and 299. Depends of each protocol

#### 4.3.3.3 Parameter PROTOCOL or PR

The selected protocol. The protocols available are: **TDL**

#### 4.3.3.4 Parameter BAUD RATE

Selects the transmission baud rate. There are three baud rates available: **4800**, **9600** and **19200**.

#### 4.3.3.5 Parameter DATA LENGHT

Selects the transmission data length. Select **7** o **8** bits

#### 4.3.3.6 Parameter PARITY

Selects the parity transmission parity. Select **Even**, **Odd** or **None**.

#### 4.3.3.7 Parameter STOP BITS.

Selects the transmission number of stop bits. Select **1** or **2**.

#### 4.3.3.8 Parameter SERIAL INPUT.

Selects the transmission type of serial line: **RS-232** or **RS-485**

---

**4.3.3.9 Parameter DATE.**

---

Allows you to modify the display date.

---

**4.3.3.10 Parameter TIME.**

---

Allows you to modify the display time.

---

**4.3.3.11 Parameter BRIGHTNESS.**

---

Allows you to modify the display brightness. Level 1 is the minimum brightness while level 8 is the maximum brightness.

---

**4.3.3.12 Parameter POSITION OF THE CONNECTORS.**

---

This allows the user to select the orientation of the text depending on the position of the connectors (top or bottom).

---

**4.3.3.13 Parameter SCROLL. DISPLAY or SDI.**

---

Allows the user to adjust the scrolling speed of text in messages that have more characters than the display. Example text of 21 characters in the 20-character display.

---

**4.3.3.14 Parameter END.**

---

To exit modify parameter menu, push advance key ("\*\*").

#### 4.4 Internal working order

Although it is not necessary to know how the internal working order operates, it is interesting to know its composition and structure in order to know better how to work with it.

DT-105P, DT-110P and DT-203P displays can store up to 512 messages, with a maximum length of 160 characters per message. The sum of all the characters of all messages cannot be more than 32000 characters.

Every message is composed by two blocks:

**\*Message number** -It takes two characters. It is the number to be used to call the message from PLC

**\*Printing message code**- It takes one character. Not used now.

**\*Message characters**- It takes one character.

**\*Control orders** - It takes two or more characters.

They indicate the special functions which the message must do when they are displayed. The orders used are:

- **Number of line**- It takes three characters.

- **Start of characters in flashing** - From this code on all the characters are displayed in flashing mode to the end of the message or until ending of flashing code is used (It takes two characters).

- **End of characters in flashing**- From this code on the characters are not in flashing method anymore.

**External variable.** It saves one character from the text to enter an external variable (it takes two characters). In message memory one external variable takes two characters. However, the following variables of this message, if they are correlative, take only one variable.

Example: Message N° 15, Pieces: xxxx Errors: xxx

		Ext. Var 0 (2c)	Ext. Var 1 (1c)	Ext. Var 2 (1c)	Ext. Var 3 (1c)			Ext. Var 4 (2c)	Ext. Var 5 (1c)	Ext. Var 6 (1c)
N° of message	Pieces =	4	6	9	1	Errors =		1	5	3

- **Internal variable.** Hour: Minutes. It saves 5 characters from the text. When the display shows this variable, it sets automatically the present time in Hour: Minutes format (It takes two characters).

- **Internal variable.** Hour: Minutes: Seconds. It saves 8 characters from the text. When the display shows this variable, it sets automatically the present time in Hour: Minutes: Seconds format (It takes two characters).

- **N° of message internal variable.** It adds the message number to the text. It saves three characters (It takes two characters).

- **Message lasting time.** It does not save any characters from the text. It is the time of period that the message last. Once the lasting time of the message is programmed, this value is not changed until another message, which is programmed with message lasting time order, is operated (It takes 4 characters).

#### 4.5 Inputs characteristics.

- D0 Data inputs. Bit 1
- D1 Data inputs. Bit 2
- D2 Data inputs. Bit 4
- D3 Data inputs. Bit 8
- D4 Data inputs. Bit 16
- D5 Data inputs. Bit 32
- D6 Data inputs. Bit 64
- D7 Data inputs. Bit 128
- D8 Data inputs. Bit 256
- CT1-CT2 Select specific functions.
- SM Strobe Messages. Impulse (10ms) activated or deactivated a message.
- SV Strobe Variables. Impulse (10ms), variable validate.
- SR Set/Reset. Auxiliary signal for activated or deactivated.

#### 4.6 How to send messages to the display

There are three ways to send a message once the displayed is programmed:

- **Displaying only one message**
- **Displaying all messages in EEPROM**

**The number of lines of a message has nothing to do with the way a message is sent because the corresponding lines and texts are defined by the message edited in TED program.**

All the following specifications have nothing to do with the number of lines of the display

#### 4.7 General specifications for working with the variables.

To display variables, there are some conditions to consider:

-The variables characters have to be previously programmed from TED program to the message.

- The message has to be activated and it has to be the last activated. When a message is not the last one activated, it has to be activated again. The fact of activating one message which has been previously activated does not display this message two times.

- The internal position counter of the variables has to be loaded with (0-15) value, which says the position of the variable.

This method allows modifying a variable value or group of variables value without changing the other variables. Every time a variable character is sent, the position counter increases automatically to the following position. The variable direction of every character can be sent although it is easier to load the direction value of the first variable and to let the counter increase the directions by itself.

- **To load the variable value in the position counter.**

Set **CT2=1** (Activated)

**CT1, SM, SR=0** (Deactivated)

**D4-D8= Irrelevant.**

**D0-D3= Variable position.**

**SV=1** Pulse activated  $\geq 10$  mseg.

The variable position can be from 0 to 15 in hexadecimal (0-F), for the first line and see 4.8.1.2 "Displaying all messages in EEPROM for the other lines.

The external variables can be **ASCII or Binary**.

- **ASCII variables:** They are sent in ASCII code to the display. They take one character.

Set **SR=1** (Activated)

**CT1, CT2, SM=0** (Deactivated)

**D0-D7= ASCII code.**

**D8= Irrelevant.**

**SV=1** Pulse activated  $\geq 10$  mseg

- As BCD forms part of ASCII code, variables can be sent in BCD code with D4 and D5, inputs. They have to be activated permanently.

Set **SR=1** (Activated)

**CT1, CT2, SM, D6, D7=0** (Deactivated)

**D0-D3= Code BCD.**

**D4-D5= 1** (Activated)

**D8= Irrelevant.**

**SV=1** Pulse activated  $\geq 10$  mseg.

- **Binary variable:** There are two kinds of binary variables depending on the number of characters: 8 bits plus sign and 16 plus sign.

- **8 bits binary plus sign.** It changes a value from **0 to FF** (Hexadecimal). Into a decimal (3 digits plus sign). It takes 4 characters.

Set **SR, CT1, CT2=1** (Activated)

**SM=0** (Deactivated)

**D0-D7= 8 bits number.**

**D8= Sign** (=0 positive, =1 negative)

**SV=1** Pulse activated  $\geq 10$  mseg.



- **16 bits binary plus sign**. It changes a value from **0 to FFFF** (Hexadecimal) into a decimal (5 digits plus sign). It takes 6 characters. Two consecutive operations are needed to send it. The 8 high bits with the sign must be sent and then the 8 low bits with the sign.

To send the 8 high bits:

Set **SR, CT1=1** (Activated)

**CT2, SM=0** (Deactivated)

**D0-D7= 8 high bits.**

**D8= 0 (Positive sign) =1 (Negative sign)**

**SV=1** Pulse activated  $\geq 10$  mseg.

To send the 8 low bits:

Set **SR, CT1, CT2=1** (Activated)

**SM=0** (Deactivated)

**D0-D7= 8 low bits.**

**D8= 0**

**SV=1** Pulse activated  $\geq 10$  mseg.

## 4.8 Protocols

### 4.8.1 Protocol 512-M.

512-M designates the 2048 protocol for managing control messages with variables. The messages are encoded in binary and using 11 inputs, the 2048 messages are controlled. (2E11 = 2048).

#### 4.8.1.1 Displaying only one message.

It is the easiest way to send an only message to the display. The direction of the message must be sent to the display inputs in binary code.

The message number must be codified to D0-D8, CT1 and CT2 inputs and keep it activated for the period of time it is wished to be displayed. The display always shows the message whose direction is applied.

This method **neither memorise the messages nor allows codifying the variables**. SM, SV and SR control signs are not used in this method, which means that they must be activated.

Inputs:

**SM, SV and SR = '1'** (activated)

**D0-D8, CT1, CT2 = binary code**

The maximum number of messages to be sent is 2048 messages by using 11 PLC outputs.

The number of PLC outputs required depends on the number of messages wished to be sent. For example, to send 52 messages it is required to use 6 PLC outputs, which allows sending 64 messages, from the message n° 0 to message n° 63.

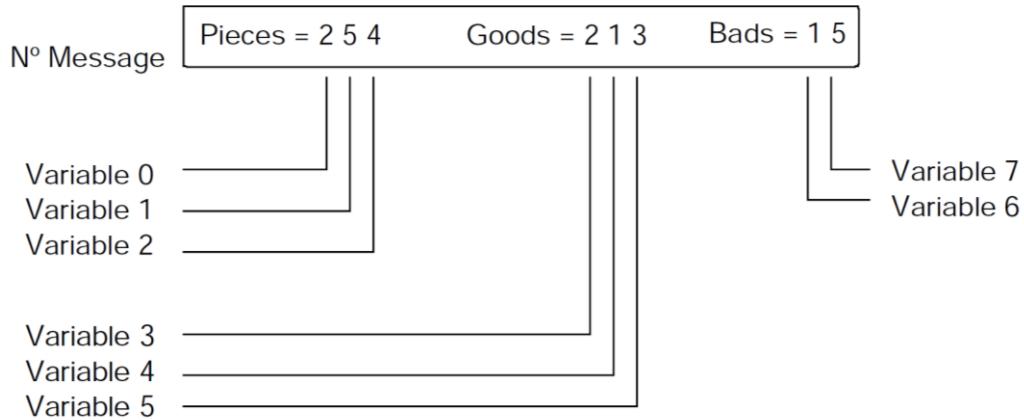
When the display is used to display only one message, PLC outputs can be static or relay outputs.

#### 4.8.1.2 Displaying all messages in EEPROM

DT-105P, DT-110P and DT-203P displays allow the entry of variables to insert in permanent texts of the programmed messages. This value must be send externally by way of the parallel inputs of the display.

The external variables are useful tools, which allow introducing numeric and ASCII values in the messages or modifying them depending on the situation. For example, it can be displayed a counter of pieces, the temperature degree, a variable of a process, etc.

A total of 16 variable characters can be associated for every line, which can be in groups or isolated messages, and which is ordered by a position counter (see 4.7 "General specifications for working with the variables.")



In this example, there are 8 variables in groups of (0, 1, 2), (3, 4, 5), (6, 7) from the first line. The other 8 variables available in the line are not used. Every line has a direction of variable associated, which must be used to send various variables to the lines.

Line 1	Variable 0-15
Line 2	Variable 16-31
Line 3	Variable 32-47
Line 4	Variable 48-63
Line 5	Variable 64-79
Line 6	Variable 80-95

Up to 10 messages can be displayed simultaneously in displaying messages in EEPROM mode, which are loaded in an internal buffer of RAM memory. If there are more than ten messages, no more messages will be accepted until some messages from the buffer are eliminated.

There are three displaying methods:

**a) Displaying the first activated message.**

Set **CT2=1** (Activated)

**CT1, SV, SR=0** (Deactivated)

**D0-D8= N° Message**

**SM=1** Pulse activated  $\geq 10$  mseg.

**b) Displaying the last activated message.**

Set **CT1=1** (Activated)

**CT2, SV, SR=0** (Deactivated)

**D0-D8= N° Message**

**SM=1** Pulse activated  $\geq 10$  mseg.

**c) Displaying all the activated messages.**

Set **CT1, CT2=1** (Activated)

**SV, SR=0** (Deactivated)

**D0-D8= N° Message**

**SM=1** Pulse activated  $\geq 10$  mseg.

For any of these options ( a), ( b), ( c) it is necessary to have at least one of the inputs CT1, CT2, SV, SR, SM activated, although it is not necessary to be always the same input. In case of deactivating all the inputs for more than 0, 5 seconds, the display will change to displaying only one message mode (see 4.3.1) and all the messages activated will disappear.

At any time one kind of displaying mode (a), (b) or (c) can be changed to another without deactivating the messages. It is only necessary to activate again the message with the new selected mode.

Example: If message n°3, n°22 and n°1 are activated in this order in (a) option, message n°3 will be displayed. In order to display all the messages, any of these three messages has to be activated in (c) option.

The activation code of one message can be repeated as many times as wished without affecting the working order of the other messages. This fact allows to change the displaying mode and to select the message to which the variable will be sent.

**- To deactivate a message.**

It can be used in any of three displaying mode (A), (B), o (C).

Set **SR=1** (Activated)

**CT1, CT2, SV=0** (Deactivated)

**D0-D8= N° Message**

**SM=1** Pulse activated  $\geq 10$  mseg.

**- To deactivate all the messages at the same time.**

Set **SR, CT2 y D0 a D7=1** (Activated)

**CT1, SV=0** (Deactivated)

**D8= Irrelevant**

**SM=1** Pulse activated  $\geq 10$  mseg.

**When messages with variables are displayed, PLC outputs have to be static.**

### 4.8.2 Protocol 14M-1

14M-1 designates the protocol that allows managing up to 14 messages directly activating one of the 14 input. This protocol does not support external variables.

If there is no active input, message 0 is displayed.

If more than one input is activated, the messages displayed are the ones corresponding to the inputs depending on the numerical input number.

Messages may contain the following control codes:

- Display the date
- Display the time
- Display the temperature in degrees Celsius.
- Display the temperature in degrees Fahrenheit.
- Display the relative humidity.
- Change the display brightness. Minimum 1 and maximum of 8. After executing this command all messages are posted with the configured brightness.
- Modify the time between messages. Between 1 and 99 seconds. After executing this command all posts use this time

### 4.8.3 Protocol 14M-2

14M-2 designates the protocol that activates a single message directly activating one of the 14 inputs. This protocol does not support external variables.

If no active input message displayed is 0.

If more than one input enabled, the displayed message is the one corresponding to the least significant input activated, according to the numerical order of the inputs.

Messages may contain the following control codes:

- Display the date
- Display the time
- Display the temperature in degrees Celsius.
- Display the temperature in degrees Fahrenheit.
- Display the relative humidity.
- Change the display brightness. Minimum 1 and maximum of 8. After executing this command all messages are posted with the configured brightness.

## **STATEMENT OF CONFORMITY**



Tetralec Electronica Industrial S.L.  
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08403 Granollers

As the builder of the equipment of the **LARTET** brand:  
DT-203P in all versions.  
DT-105P in all versions.  
DT-110P in all versions.

We declare under our sole responsibility that the aforementioned product complies with the following European directives:

Directive: LVD 2006/95/CEE Low Voltage Directive.  
Standard UNE-EN61010-1 Security in electric equipment.

Directive: EMC 2014/30 UE Electromagnetic Compatibility  
Standard UNE-EN 61000-6-4 Generic Emission Standard. Industrial environment.  
Standard UNE-EN 61000-6-2 Generic Immunity Standard. Industrial environment.  
Directive 2011/65/CE: Restriction of the use of certain hazardous substances in electrical and electronic equipment

Granollers, February 13<sup>th</sup>, 2014