# USER MANUAL

Longo programmable controller
LPC-2.DT2
Switch and status panel

**Version 4**

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User Manual

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STANDARDS AND PROVISIONS: Standards, recommendations, regulations and provisions of the country in which the devices will operate, must be considered while planning and setting up electrical devices. Work on 100 .. 240 V AC network is allowed for authorized personnel only.

DANGER WARNINGS: Devices or modules must be protected from moisture, dirt and damage during transport, storing and operation.

WARRANTY CONDITIONS: For all modules LONGO LPC-2 – if no modifications are performed upon and are correctly connected by authorized personnel – in consideration of maximum allowed connecting power, warranty of 24 months is valid from the date of sale to the end buyer, but not more than 36 months after delivery from Smarteh. In case of claims within warranty time, which are based on material malfunctions the producer offers free replacement. The method of return of malfunctioned module, together with description, can be arranged with our authorized representative. Warranty does not include damage due to transport or because of unconsidered corresponding regulations of the country, where the module is installed.

This device must be connected properly by the provided connection scheme in this manual. Misconnections may result in device damage, fire or personal injury.
Hazardous voltage in the device can cause electric shock and may result in personal injury or death.
NEVER SERVICE THIS PRODUCT YOURSELF!
This device must not be installed in the systems critical for life (e.g. medical devices, aircrafts, etc.).

If the device is used in a manner not specified by the manufacturer, the degree of protection provided by the equipment may be impaired.

Waste electrical and electronic equipment (WEEE) must be collected separately!

LONGO LPC-2 complies to the following standards:
•EMC: EN 61000-6-3:2007 + A1:2011, EN 61000-6-1:2007, EN 61000-3-2:2006 + A1:2009 + A2: 2009, EN 61000-3-3:2013
•LVD: IEC 61010-1:2010 (3rd Ed.), IEC 61010-2-201:2013 (1st Ed.)

Smarteh d.o.o. operates a policy of continuous development. Therefore we reserve the right to make changes and improvements to any of the products described in this manual without any prior notice.

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## Longo programmable controller LPC-2.DT2

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# 1 ABBREVIATIONS

| | |
|---|---|
| IR | Infrared |
| LED | Light emitting diode |
| LCD | Liquid crystal display |
| TB | Touch button |
| PWR | Power |
| ERR | Error |
| DIP | Dual in-line package |
| SEL | Selector |

# 2 DESCRIPTION

LPC-2.DT2 switch and status panel is an ideal replacement for regular mechanical switches for lights, blinds, etc. Instead of having a bunch of wires connected between every switch and PLC, LPC-2.DT2 have 8 touch buttons connected to the PLC by one communication cable. It also brings the ease of use by having a frameless glass screen with LCD which offers an intuitive, clear and flexible interface between the user and the building.

Panel is equipped with LCD, eight touch buttons (TB), LED on each touch button, eight status symbols on LCD, buzzer and light intensity sensor.

Color picture and size of status symbol on LCD is possible to be changed by using free Smarteh's LCD Composer software. This way - the best user experience for every situation can be achieved.

LPC-2.DT2 is controlled and powered from the main module (e.g., LPC-2.MC8, LPC-2.MC9) via Smarteh bus.

# 3 FEATURES

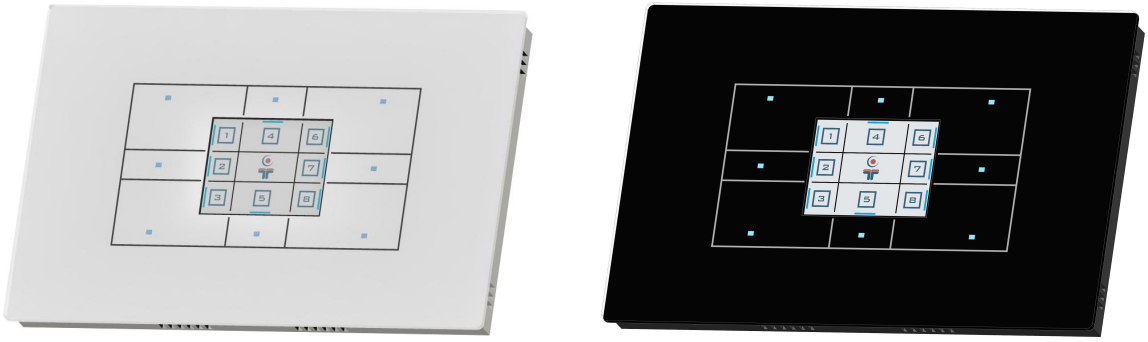


Figure 1: LPC-2.DT2

| Table 1: Features |
|---|
| 8 capacitive touch buttons |
| 8 blue LED, one on each touch button |
| 8 rectangular symbols to show on/off status on the LCD |
| Light intensity measurement |
| LCD intensity control |
| Color LCD with possibility of background picture changing and status symbols size changing[1] |
| Buzzer for touch beep signalization or other signalization which is controlled from PLC program |
| 2 diagnose LED |
| Flush mount in various flush mounting boxes or screw mount |
| Quality design |

1 For LCD background picture replacement, please refer to LCD Composer → Help.

# 4 OPERATION

LPC-2.DT2 can be in one of two operational modes - normal or error. When LPC-2.DT2 is in normal mode, module parameters can be read or written via Smarteh IDE software.

## 4.1 Operational modes

**Normal**
Communication with the main module is working. Only green “PWR” LED10 is turned on.

**Error**
In case of communication fault, red “ERR” LED9 will turn on.

## 4.2 Parameters

If parameter is set to logical “1”, is considered to be active, enabled or set. If parameter has logical value “0” is considered to be inactive, disabled or cleared.

Parameter can be a command or feedback. When parameter is marked as feedback it means that LPC-2.DT2 is sending information to the main module. On the other hand, command represents request from the main module to the LPC-2.DT2.

Command:

**Touch button LED 1 *[oTBLED1]*:** When this bit goes to "1", LED 1 turns ON.
Type: BOOL
Raw to engineering data: “0” → Touch button LED OFF
“1” → Touch button LED ON

**Touch button LED 2 *[oTBLED2]*:** When this bit goes to "1", LED 2 turns ON.
Type: BOOL
Raw to engineering data: “0” → Touch button LED OFF
“1” → Touch button LED ON

**Touch button LED 3 *[oTBLED3]*:** When this bit goes to "1", LED 3 turns ON.
Type: BOOL
Raw to engineering data: “0” → Touch button LED OFF
“1” → Touch button LED ON

**Touch button LED 4 *[oTBLED4]*:** When this bit goes to "1", LED 4 turns ON.
Type: BOOL
Raw to engineering data: “0” → Touch button LED OFF
“1” → Touch button LED ON

**Touch button LED 5 *[oTBLED5]*:** When this bit goes to "1", LED 5 turns ON.
Type: BOOL
Raw to engineering data: “0” → Touch button LED OFF
“1” → Touch button LED ON

**Touch button LED 6 *[oTBLED6]*:** When this bit goes to "1", LED 6 turns ON.
Type: BOOL
Raw to engineering data: “0” → Touch button LED OFF
“1” → Touch button LED ON

**Touch button LED 7 *[oTBLED7]*:** When this bit goes to "1", LED 7 turns ON.

Type: BOOL
Raw to engineering data: "0" → Touch button LED OFF
"1" → Touch button LED ON

**Touch button LED 8 *[oTBLED8]*:** When this bit goes to "1", LED 8 turns ON.
Type: BOOL
Raw to engineering data: "0" → Touch button LED OFF
"1" → Touch button LED ON

**Enable touch button beep *[oBeepEn]*:** This command enables short beep of the buzzer when any of the touch button is pressed and its corresponding LED is ON. Beep happens on rising-edge of the touch.

Type: BOOL
Raw to engineering data: "0" → Touch button beep OFF
"1" → Touch button beep ON

**Buzzer *[oBuzz]*:** When this bit goes to "1", buzzer turns ON until this bit is changed back to "0".
Type: BOOL
Raw to engineering data: "0" → Buzzer OFF
"1" → Buzzer ON

**LCD and LED intensity selector *[oLCDandLEDintensity]*:** This parameter defines how will the intensity of LCD and LED be regulated.
Type: WORD
Raw to engineering data: xxxxxxxxxxxxxxx0 (bin) → Default intensity regulation
Low Byte = 1 → Change intensity to value that is in High Byte of *oLCDandLEDintensity*, no fade-effect
Low Byte = 2 → Change intensity to value that is in High Byte of *oLCDandLEDintensity*, fade-effect
High Byte = 0 .. 100 → 0 .. 100% manual SP for intensity

**Status symbol selector *[oStatusSymbolSel]*[2]:** Selector for Status 1 .. Status 8 on LCD
Type: WORD
Raw to engineering data: xxxxxxxxxxxxxx00 (bin) → Status 1 not shown
xxxxxxxxxxxxxx01 (bin) → Status 1 color Foreground (ON)
xxxxxxxxxxxxxx10 (bin) → Status 1 color Background (OFF)
xxxxxxxxxxxx00xx (bin) → Status 2 not shown
xxxxxxxxxxxx01xx (bin) → Status 2 color Foreground (ON)
xxxxxxxxxxxx10xx (bin) → Status 2 color Background (OFF)
xxxxxxxxxx00xxxx (bin) → Status 3 not shown
xxxxxxxxxx01xxxx (bin) → Status 3 color Foreground (ON)
xxxxxxxxxx10xxxx (bin) → Status 3 color Background (OFF)
xxxxxxxx00xxxxxx (bin) → Status 4 not shown
xxxxxxxx01xxxxxx (bin) →
Status 4 color Foreground (ON)
xxxxxxxx10xxxxxx (bin) → Status 4 color Background (OFF)
xxxxxx00xxxxxxxx (bin) → Status 5 not shown
xxxxxx01xxxxxxxx (bin) → Status 5 color Foreground (ON)
xxxxxx10xxxxxxxx (bin) → Status 5 color Background (OFF)
xxxx00xxxxxxxxxx (bin) → Status 6 not shown
xxxx01xxxxxxxxxx (bin) → Status 6 color Foreground (ON)
xxxx10xxxxxxxxxx (bin) → Status 6 color Background (OFF)
xx00xxxxxxxxxxxx (bin) → Status 7 not shown

2 Programmer may use POU DT2_StatusSymbol in SmartehIDE, which already handles correct shifting of the bits.

xx01xxxxxxxxxxx (bin) → Status 7 color Foreground (ON)
xx10xxxxxxxxxxx (bin) → Status 7 color Background (OFF)
00xxxxxxxxxxxxx (bin) → Status 8 not shown
01xxxxxxxxxxxxx (bin) → Status 8 color Foreground (ON)
10xxxxxxxxxxxxx (bin) → Status 8 color Background (OFF)

Feedback:

**Act. Light intensity *[iLight]*:** Actual measured light intensity.
Type: WORD
Raw to engineering data: 0 .. 100 → 0 .. 100 %

**Toggle communication bit *[iComm]*:** At each valid Rx packet from main module, this bit is toggled.
Type: BOOL

**Touch button 1 *[iTB1]*:** Touch button 1 state
Type: BOOL
Raw to engineering data: "0" → Touch button OFF
"1" → Touch button ON

**Touch button 2 *[iTB2]*:** Touch button 2 state
Type: BOOL
Raw to engineering data: "0" → Touch button OFF
"1" → Touch button ON

**Touch button 3 *[iTB3]*:** Touch button 3 state

Type: BOOL
Raw to engineering data: "0" → Touch button OFF
"1" → Touch button ON

**Touch button 4 *[iTB4]*:** Touch button 4 state
Type: BOOL
Raw to engineering data: "0" → Touch button OFF
"1" → Touch button ON

**Touch button 5 *[iTB5]*:** Touch button 5 state
Type: BOOL
Raw to engineering data: "0" → Touch button OFF
"1" → Touch button ON

**Touch button 6 *[iTB6]*:** Touch button 6 state
Type: BOOL
Raw to engineering data: "0" → Touch button OFF
"1" → Touch button ON

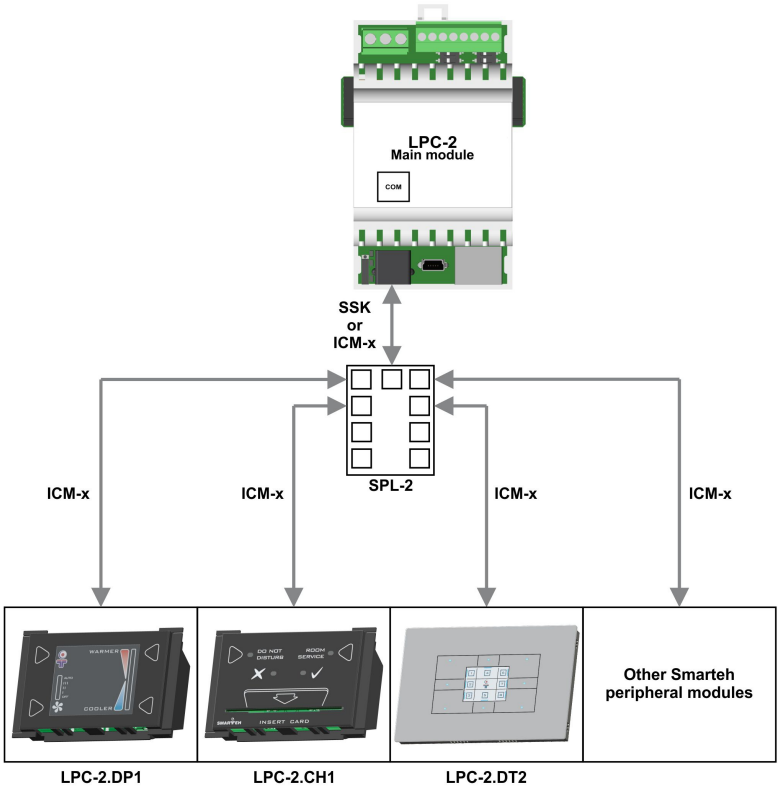
**Touch button 7 *[iTB7]*:** Touch button 7 state
Type: BOOL
Raw to engineering data: "0" → Touch button OFF
"1" → Touch button ON

**Touch button 8 *[iTB8]*:** Touch button 8 state
Type: BOOL
Raw to engineering data: "0" → Touch button OFF
"1" → Touch button ON

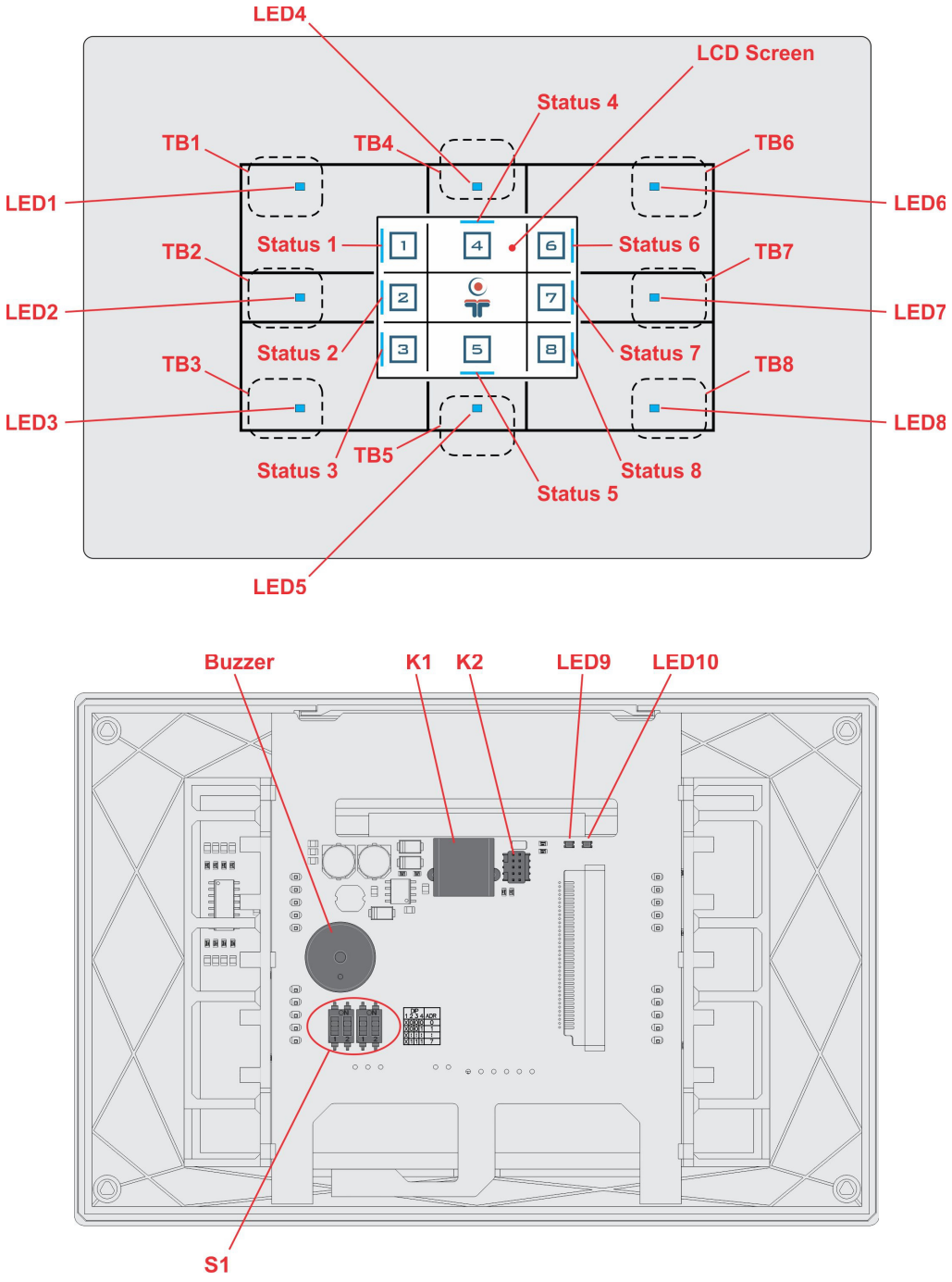
# 5 INSTALLATION

## 5.1 Connection scheme

**Figure 2: Connection scheme**



## Figure 2: Connection scheme




## Table 2: K1

| | | |
|---|---|---|
| K1.1 | GND | Ground |
| K1.2 | 7 .. 30 V DC | Power supply input |
| K1.3 | Standard RS-485 A | Data receive/send line A |
| K1.4 | Standard RS-485 B | Data receive/send line B |

| Table 3: K2 | | |
|---|---|---|
| K2 | Programming connector | Factory use only |

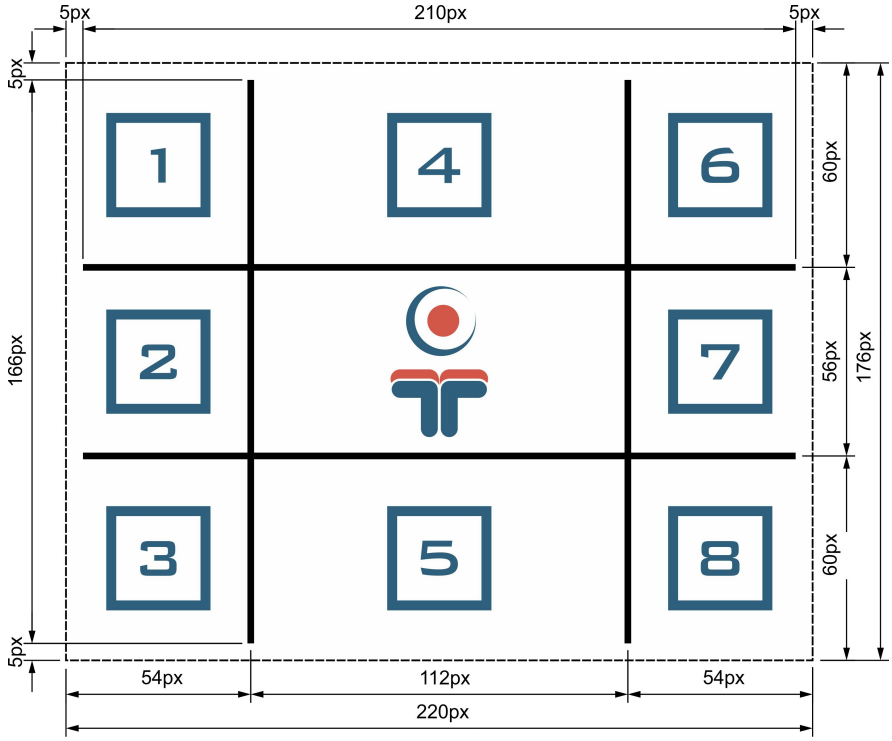
| Table 4: LEDs | | |
|---|---|---|
| LED1: blue | Touch button LED 1 | Programmable |
| LED2: blue | Touch button LED 2 | Programmable |
| LED3: blue | Touch button LED 3 | Programmable |
| LED4: blue | Touch button LED 4 | Programmable |
| LED5: blue | Touch button LED 5 | Programmable |
| LED6: blue | Touch button LED 6 | Programmable |
| LED7: blue | Touch button LED 7 | Programmable |
| LED8: blue | Touch button LED 8 | Programmable |
| LED9: red | Communication | ON: RS-485 communication fault<br>OFF: RS-485 communication OK |
| LED10: green | Power supply | ON: power supply OK<br>OFF: power supply missing or power off |

| Table 5: Buttons | | |
|---|---|---|
| TB1 | Touch button 1 | Readable |
| TB2 | Touch button 2 | Readable |
| TB3 | Touch button 3 | Readable |
| TB4 | Touch button 4 | Readable |
| TB5 | Touch button 5 | Readable |
| TB6 | Touch button 6 | Readable |
| TB7 | Touch button 7 | Readable |
| TB8 | Touch button 8 | Readable |

| Table 6: S1 | | | | |
|---|---|---|---|---|
| **RS-485 ADDRESS** | **Switch 1** | **Switch 2** | **Switch 3** | **Switch 4** |
| 0 | NOT USED | OFF | OFF | OFF |
| 1 | | OFF | OFF | ON |
| 2 | | OFF | ON | OFF |
| 3 | | OFF | ON | ON |
| 4 | | ON | OFF | OFF |
| 5 | | ON | OFF | ON |
| 6 | | ON | ON | OFF |
| 7 | | ON | ON | ON |

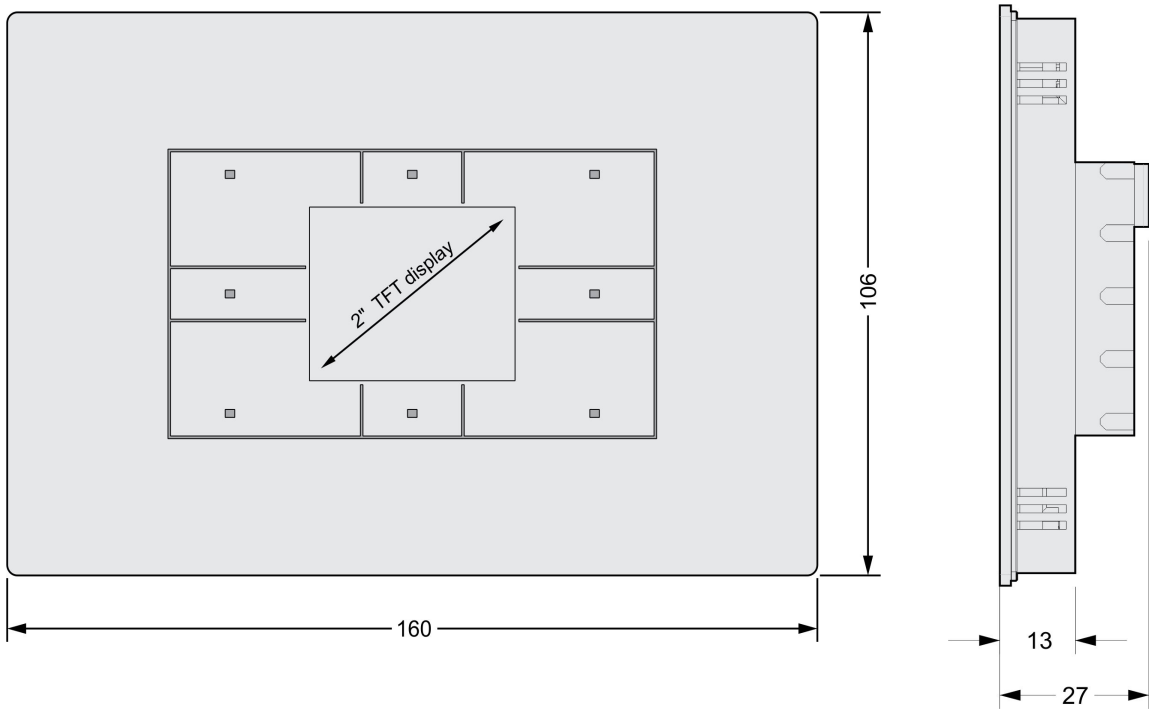
## 5.2 Default image drawing

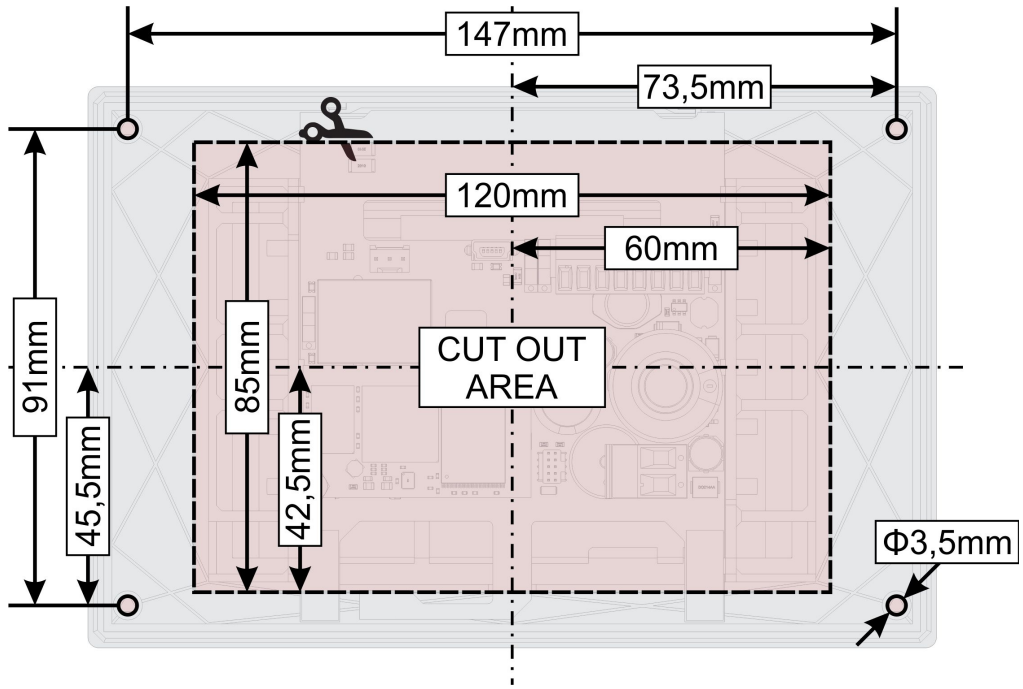
**Figure 3: Default image drawing**



## 5.3 Mounting instructions

**Figure 4: Housing dimensions**




Dimensions in milimeters.

All connections, module attachments and assembling must be done while module is not connected to the power supply.

**Mounting instructions:**

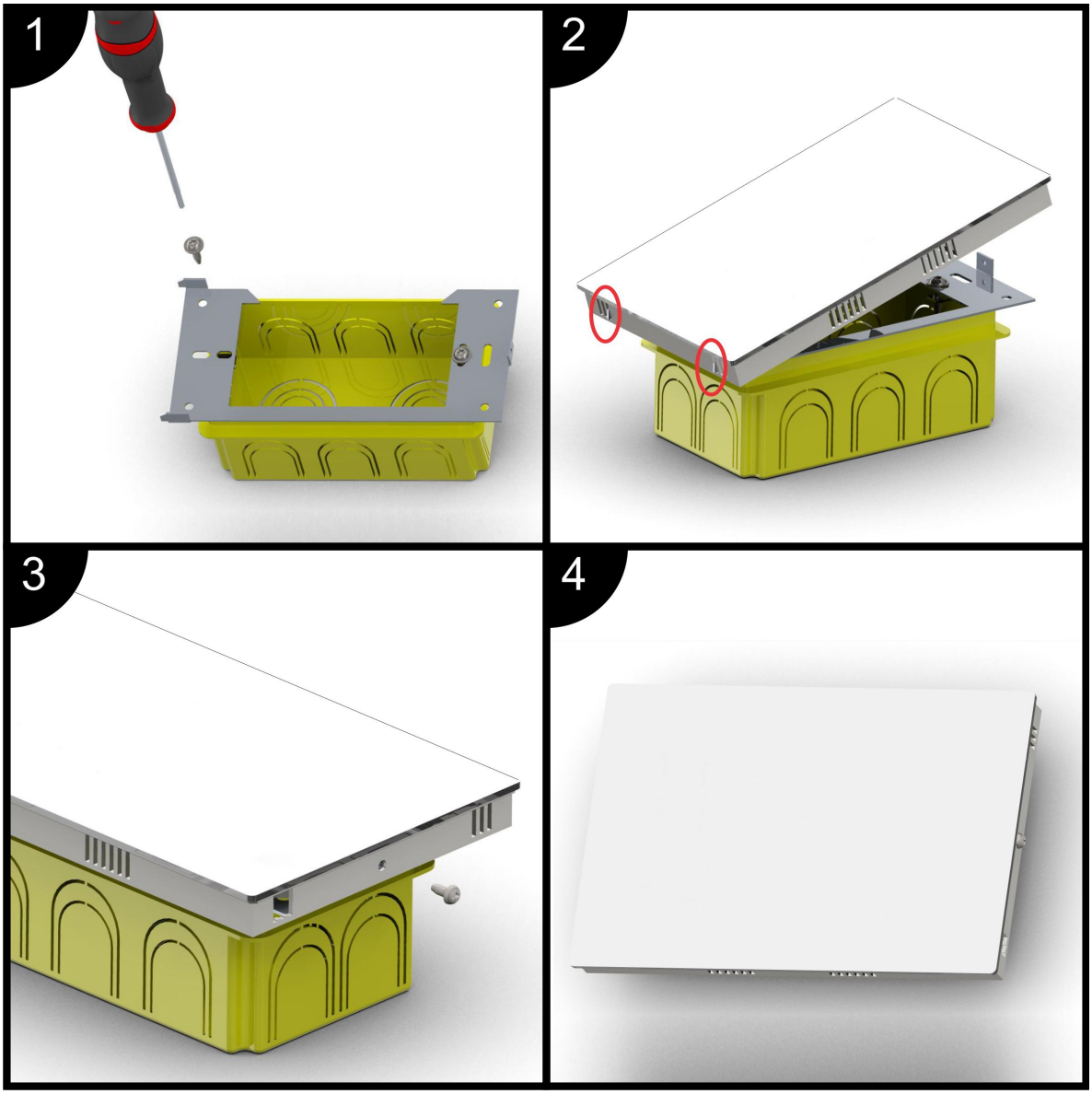
1. Fasten mounting frame[3] with screws[5] into TEM VM4 HM40, TEM PM4 DM40, Elettrocanali EC37104, Legrand 801 42 or similar flush mounting box[4] - see Figure 5.[5]
2. Set the correct RS-485 address for LPC-2.DT2 (refer to the table 5).
3. Connect interconnection cable to the connector K1. Max. allowed tensile force is 30 N.
4. Mount LPC-2.DT2 into flush mounting box, using provided springs - see Figure 5.

LPC-2.DT2 module must be installed properly, isolating any potential connection with electrical sources other than power supply from main module. Improperly installed module may cause failure of the module itself, other devices on the same wiring, main module or may lead to fire or personal injury.
LPC-2.DT2 is connected to the main module with interconnection cable (e.g. SSK, ICM-7). When more modules are connected to the main module, splitter (e.g. SPL-2) is also required (figure 2).

**NOTE**: Signal wires must be installed separately from power and high voltage wires in accordance with general industry electrical installation standard.

3 Mounting frame, screws and springs are provided in package with LPC-2.DT2
4 Flush mounting box must be ordered separately - contact Smarteh.
5 In case that the bracket touches the walls of the mounting box, it can be folded inwards.

**Figure 5: Mounting instructions for flush mount**

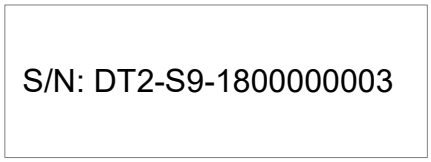


## 5.4 Module labeling

**Figure 6: Labels**

Label 1 (sample):


Label 2 (sample):




***Label 1 descriptions:***

1. **LPC-2.DT2** is the full product name.
2. **P/N: 225DT218001001** is the part number.
   - **225** – general code for product family,
   - **DT2** – short product name,
   - **18001** – sequence code,
     - 18 – year of code opening,
     - 001 – derivation code,
   - **001** – version code (reserved for future HW and/or SW firmware upgrades).
3. **D/C: 01/18** is the date code.
   - **01** – week and
   - **18** – year of production.

***Label 2 descriptions:***

1. **S/N: DT2-S9-1800000003** is the serial number.
   - **DT2** – short product name,
   - **S9** – user code (test procedure, e.g. Smarteh person xxx),
   - **1800000003** – year and current stack code,
     - 18 – year (last two cyphers),
     - 00000003 – current stack number; previous module would have the stack number 00000002 and the next one 00000004.

# 6 TECHNICAL SPECIFICATIONS

| Table 7: Technical specifications | |
|---|---|
| Power supply | from main module |
| Interconnection connector type | RJ-12 6/6 |
| Power consumption | 1 W |
| Display | 2", 220 × 176 resolution |
| Dimensions (L x W x H) | 106 x 160 x 27 mm |
| Weight | 300 g |
| Maximum altitude | 2000 m |
| Mounting position | vertical |
| Ambient temperature | 0 to 50 °C |
| Ambient humidity | max. 95 %, no condensation |
| Transport and storage temperature | -20 to 60 °C |
| Protection class | IP 20 |

# 7 PROGRAMMING GUIDE

## 7.1 Background picture replacement and changing of status symbols

For LCD background picture replacement, please refer to LCD Composer → Help.

For changing the size of rectangular status symbols, adjust Xs and Ys on Bar graphs/symbols data number 4 in LCD composer as it is shown in Figure 7. Figures 8 and 9 shows two examples of how number of Xs and Ys influences the size of displayed status symbol. Color of the status symbol can be toogled between Back color and Fore color using *oStatusSymbolSel* parameter. For more information about color definition and other, please refer to LCD Composer → Help.

Default values can be seen in Figure 7.

**Figure 7: LCD Composer**

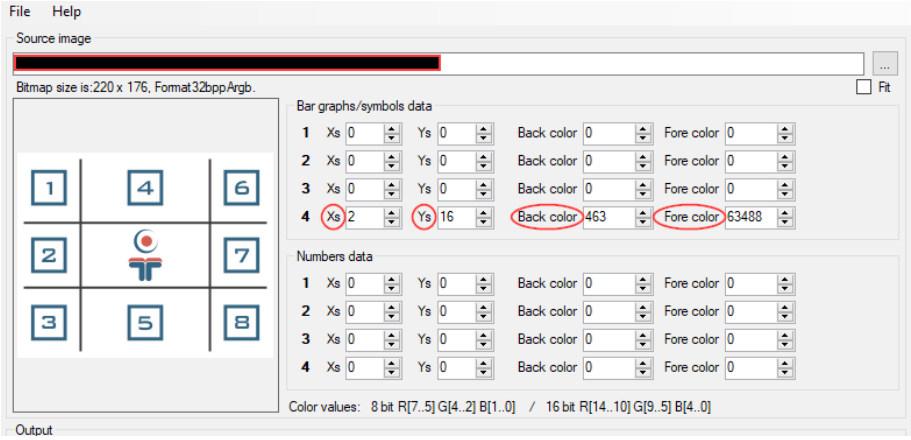
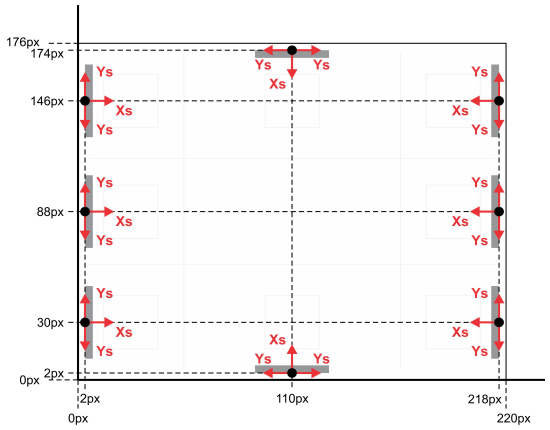
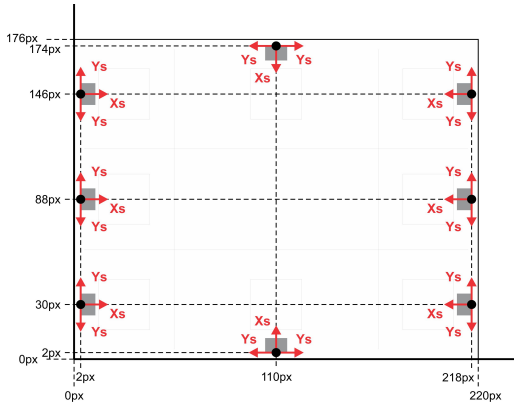



**Figure 8: Example for Xs = 4, Ys = 19**



## Figure 9: Example for Xs = 8, Ys = 6



# 8 SPARE PARTS

For ordering spare parts following Part Numbers should be used:

| LPC-2.DT2 switch and status panel | |
|---|---|
| LPC-2.DT2 - white | P/N: 225DT218001001 |
| LPC-2.DT2 - black | P/N: 225DT220002001 |

| Interconnection cable | |
|---|---|
| ICM-x | P/N: 203ICMxxxxxxxx |

| Splitter | |
|---|---|
| SPL-2 (1/8) | P/N: 206SPL04002001 |

# 9 CHANGES

The following table describes all the changes to the document.

| Date | V. | Description |
|---|---|---|
| 25.11.21 | 4 | Figure 5 updated. |
| 16.04.20 | 3 | Black version added. |
| 27.03.20 | 2 | Mounting instructions update. |
| 15.03.18 | 1 | The initial version, issued as *LPC-2.DT2 User Manual*. |

# 10 NOTES