TOUCH TERMINALS

HM500

Instruction Manual

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1. Introduction

This instruction manual contains information about the installation, transportation, storage, assembly, use and maintenance of programmable displays of the HM500 series.

The following models are available:

• HM504: Programmable display with TFT color 4.3" display touchscreen
• HM507: Programmable display with TFT color 7" widescreen display touchscreen
• HM510: Programmable display with TFT color 10.4" display touchscreen
• HM513: Programmable display with TFT color 13.3" widescreen display touchscreen

2.   Product overview

The HM500 series programmable displays combine state-of-the-art features and top performance with an oustanding design. They are the ideal choice for all demanding HMI applications including factory and building automation.

The HM500 series programmable displays have been designed to run the HMWIN software.

- HMWIN runtime included. Full compatibility with HMWIN Studio.
- Full vector graphic support. Native support of SVG graphic objects. Trasparency and alpha blending.
- Full object dynamics: control visibility and transparency, move, resize, rotate any object on screen. Change properties of basic and complex objects.
- TrueType fonts.
- Multilanguage applications. Easily create and manage your applications in multiple languages to meet global requirements. Far East languages are supported. Tools available in HMWIN Studio support easy third-party translations and help reducing development and maintenance costs of the application.
- Data display in numerical, text, bargraph, analog gauges and graphic image formats.
- Rich set of state-of-the-art HMI features: data acquisition, alarm handling, scheduler and timed actions (daily and weekly schedulers, exception dates), recipes, users and passwords, RSS feeds, rotating menus.
- Multiple drivers communication capability.
- Remote monitoring and control. Client-Server functionality.
- Off-line simulation with HMWIN Studio.
- Powerful scripting language for automating HMI applications. Script debugging improves efficiency in application development.
- Rich gallery of vector symbols and objects.
- Project templates.
- Optional plug-in modules.

3.   Standards and approvals

The products have been designed for use in an industrial environment in compliance with the 2004/108/EC EMC Directive.

The products have been designed in compliance with:

EN 61000-6-4	EN 55011 Class A
EN 61000-6-2	EN 61000-4-2
	EN 61000-4-3
	EN 61000-4-4
	EN 61000-4-5
	EN 61000-4-6
	EN 61000-4-8

The installation of these devices into the residential, commercial and light-industrial environments is allowed only in the case that special in measures are taken in order to ensure conformity to EN 61000-6-3.

The products are in compliance with the Restrictions on Certain Hazardous Substances (RoHS) Directive 2011/65/EC

In compliance with the above regulations the products are CE marked.

4. Product identification

The product may be identified through a plate attached to the rear cover. You will have to know the type of unit you are using for correct usage of the information contained in the guide.

The following information is provided by the plate:

- Product model name
- Product part number
- Month/year of production
- Serial number
- Version ID of the product

5. Technical data common to all models

5.1 Hardware specifications

Touch screen technology	Resistive
Back-up battery	3V 50mAh Lithium, rechargeable, not user-replaceable, model VL2330.
Fuse	Automatic
Serial Port	RS232, RS485, RS422 software configurable
User memory	• Flash 128Mb for HM504 and HM507 • Flash 256Mb for HM510 and HM513
Recipe memory	Flash
Real-time clock	Clock/Calendar with backup battery
Accuracy real-time clock (at 25°C)	<100ppm

5.2 Environmental conditions

Operating temperature (surrounding air temperature)	0 – +50°C	EN 60068-2-14
Storage temperature	-20 – +70°C	EN 60068-2-14
Operating and storage humidity	5 – 85% RH not-condensing	EN 60068-2-30
Vibrations	5 – 9 Hz, 7mm $_{p-p}$ 9 – 150Hz, 1g	EN 60068-2-6
Shock	± 50g, 11ms, 3 pulses per axis	EN 60068-2-27
Protection class	IP66 front panel (see note)	EN 60529

*   The front face of the unit, installed in a solid panel, has been tested using conditions equivalent to the standards shown in the "Environmental conditions". Even though the level of resistance unit is equivalent to these standards, oils that should have no effect on the can possibly harm the unit. This can occur in areas where either vaporized oils are present, or where low viscosity cutting oil are allowed to adhere to the unit for long periods of time. If the front face protection sheet on the becomes peeled off, these conditions can lead to the ingress of oil into the and separate protection measures are suggested.

If the installation gasket is used for a long period of time, or if the unit and its gasket are removed from the panel, the original level of the protection cannot be guaranteed.

5.3   Electromagnetic compatibility (EMC)

Radiated disturbance test	Class A	EN 55011
Electrostatic discharge immunity test	8kV (air electrostatic discharge) 4kV (contact electrostatic discharge)	EN 61000-4-2
Radiated, radio-frequency, electromagnetic field immunity test	80MHz – 1GHz, 10V/m 1,4GHz – 2GHz, 3V/m 2GHz – 2.7GHz, 1V/m	EN 61000-4-3
Burst immunity test	± 2KV DC power port ± 1KV signal line	EN 61000-4-4
Surge immunity test	± 0,5KV DC power port (line to earth) ± 0,5KV DC power port (line to line) ± 1KV signal line (line to earth)	EN 61000-4-5
Immunity to conducted disturbances inducted by radiofrequency field	0.15 – 80 MHz, 10V	EN 61000-4-6

5.4   Durability information

Backlight service life (LED type)	40000 hours or more (Time of continuos operation until the brightness of the backlight reaches 50% of the rated value when the surrounding air temperature is 25°C, see note 1)
Front foil (without direct exposure to sunlight or UV rays)	10 years if the surrounding air temperature is 25°C
UV resistance	Indoor applications: After 300 hours cycled humidity in QUV accelerated weathering, some yellowing and brittleness may be present (see note 2).
Touch screen reliability	> 1 milion operations

1. Extended use in environments where the surrounding air temperature is 40°C or higher may degrade backlight quality/reliability/durability.

2. Solvent resistance:
   Contact for 1/2 hour at 21°C, no visible effect: acetone, butyl cellosolve, cyclohexanone, ethyl acetate, hexane, isopropyl alcohol, mek, methylene chloride, toluene, xylene
   Contact for 24 hours at 49°C, no visible effect: coffee, ketchup, lemon juice, mustard (slight yellow stain), tea, tomato juice.

6. Technical data by model

Model	HM504	HM507
Display / Backlight	TFT Color / LED	
Colors	64K	
Resolution	480x272	800x480
Display size (inch)	4.3"	7" widescreen
Dimming	yes	
User memory flash	128MB	
SD card slot	yes	
Recipe memory	Yes. Flash memory storage limited only by available memory	
Serial port	RS232, RS485, RS422 DB9 female software configurable	
Ethernet port	2 10/100Mbit with integrated switch	
USB port	1 Host interface version 2.0 and 1.1	2 Host interfaces, 1 version 2.0, 1 version 2.0 and 1.1
Expansion slot	1 Optional plug-in	2 Optional plug-ins
Battery	rechargeable	
Real-time clock	yes	
Voltage	10–32V DC (see note)	
Current rating (at 24V DC)	0.4A	0.65A
Weight	1kg	1kg

Model	HM510	HM513
Display / Backlight	TFT Color / LED	
Colors	64K	
Resolution	800x600	1280x800
Display size (inch)	10.4 widescreen	13.3" widescreen
Dimming	yes	
User memory flash	256MB	
SD card slot	yes	
Recipe memory	Yes. Flash memory storage limited only by available memory	
Serial port	RS232, RS485, RS422 DB9 female software configurable	
Ethernet port	2 10/100Mbit with integrated switch	
USB port	2 Host interfaces, 1 version 2.0, 1 version 2.0 and 1.1	
Expansion slot	2 Optional plug-ins	
Battery	rechargeable	
Real-time clock	yes	
Voltage	10–32V DC (see note)	
Current rating (at 24V DC)	1A	1.2A
Weight	2.1kg	2.8kg

*   For applications requiring compliance with EN 61131-2 and specifically in reference to 10ms voltage dips, the minimum power supply voltage is 18V DC.
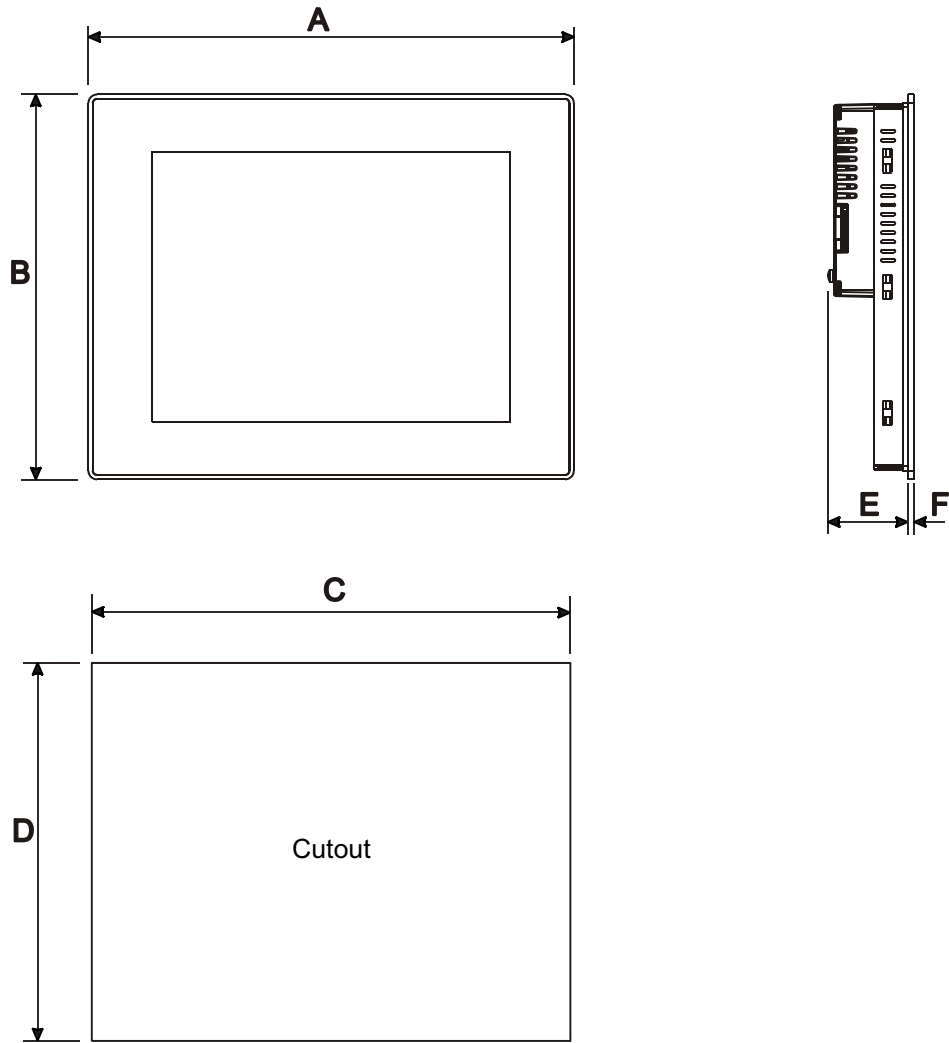
7. Dimensions

7.1 HM504
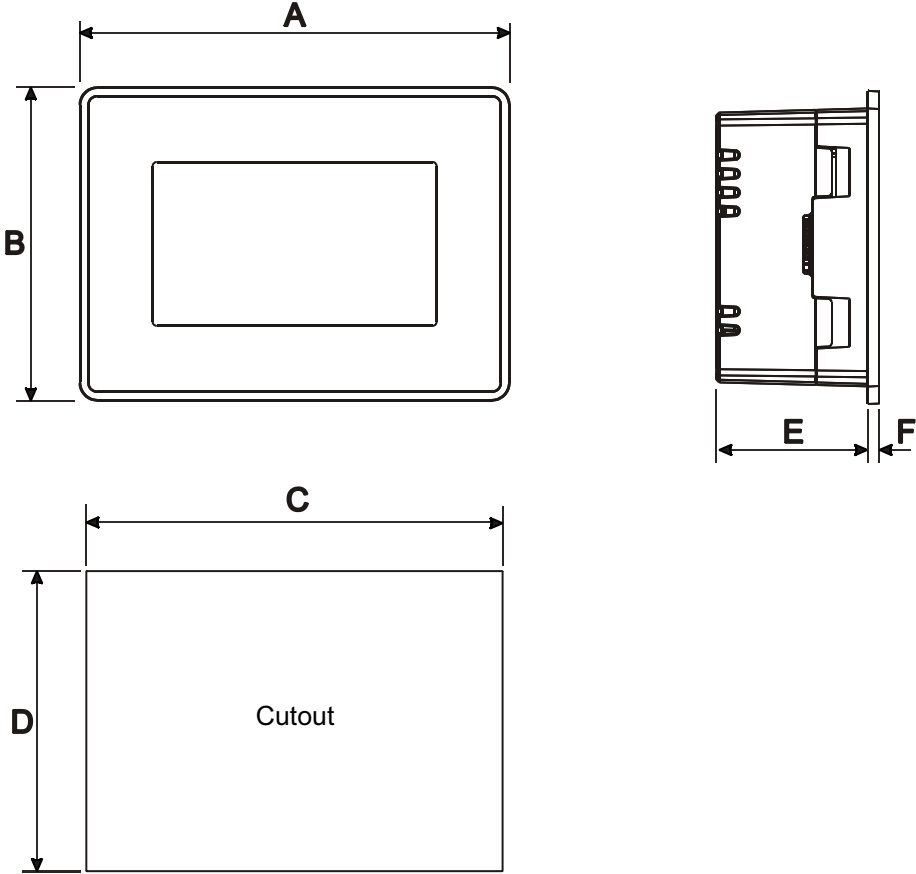
Model	A	B	C	D	E	F
HM504	149mm	109mm	136mm	96mm	56mm	4mm

7.2 HM507, HM510, HM513

Model	A	B	C	D	E	F
HM507	187mm	147mm	176mm	136mm	47mm	4mm
HM510	287mm	232mm	276mm	221mm	56mm	4mm
HM513	336mm	267mm	326mm	256mm	56mm	4mm

8. Installation

8.1 Installation environment

The equipment is not intended for continuous exposure to direct sunlight. This might accelerate the aging process of the front panel film.

The equipment is not intended for installation in contact with corrosive chemical compounds. Check the resistance of the front panel film to a specific compound before installation.

Do not use tools of any kind (screwdrivers, etc.) to operate the touch screen of the panel.

In order to meet the front panel protection classifications if the following requirements are met:

- The borders of the cutout must be flat
- Each fixing screw must be tightened until the plastic bezel corner get in contact with the panel.
- The cutout for the panel must be of the dimensions indicated in this manual.

The IP66 is guaranteed only if:
- The max. deviation from the plane surface to the cut-out is ≤0.5mm
- The thickness of the case where the equipment is mounted is from 1.5mm to 6mm
- The max. surface roughness where the gasket is applied is ≤120um.

8.2 Applying the gasket

The gasket should be applied on the rear of the frame.
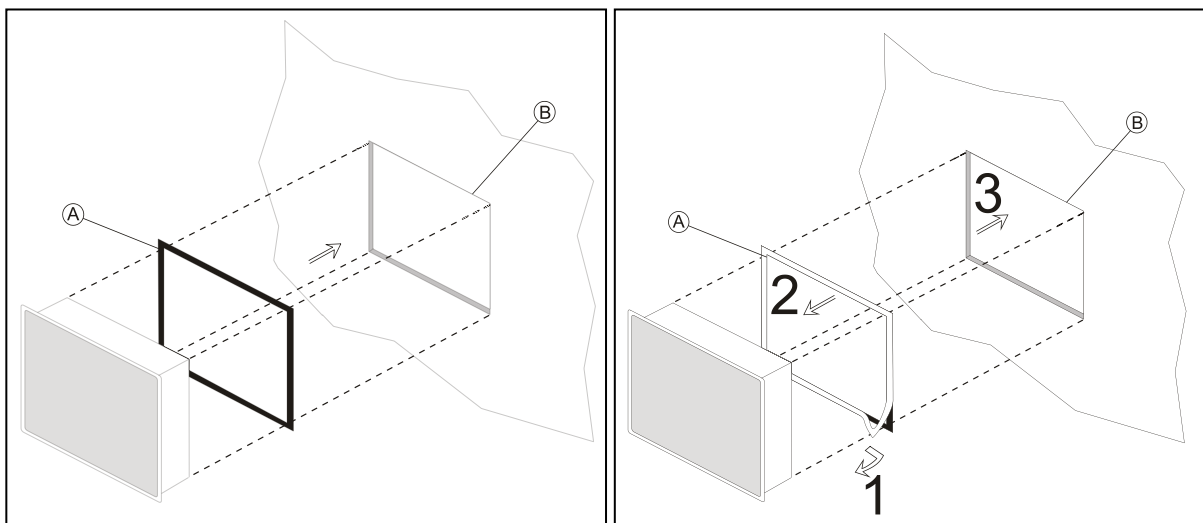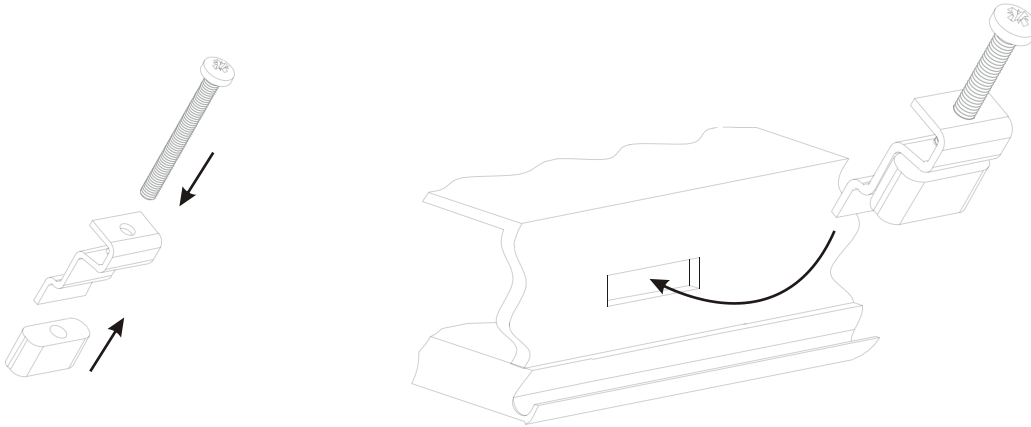

| HM504, HM507 | HM510, HM513 |

A: Gasket

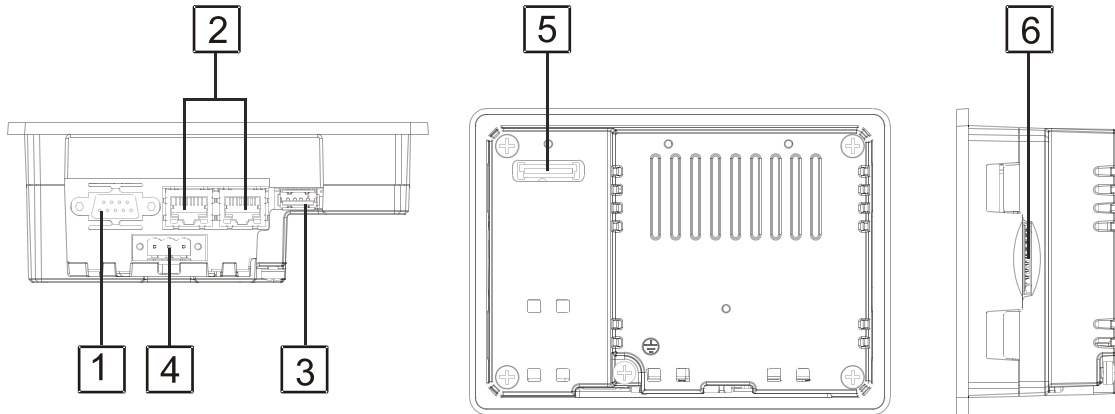**B:** Installation cutout

8.3   Installation procedure

Place the fixing brackets as shown in the figure below.

Make sure to screw each fixing screw until the bezel corner gets in contact with the panel.
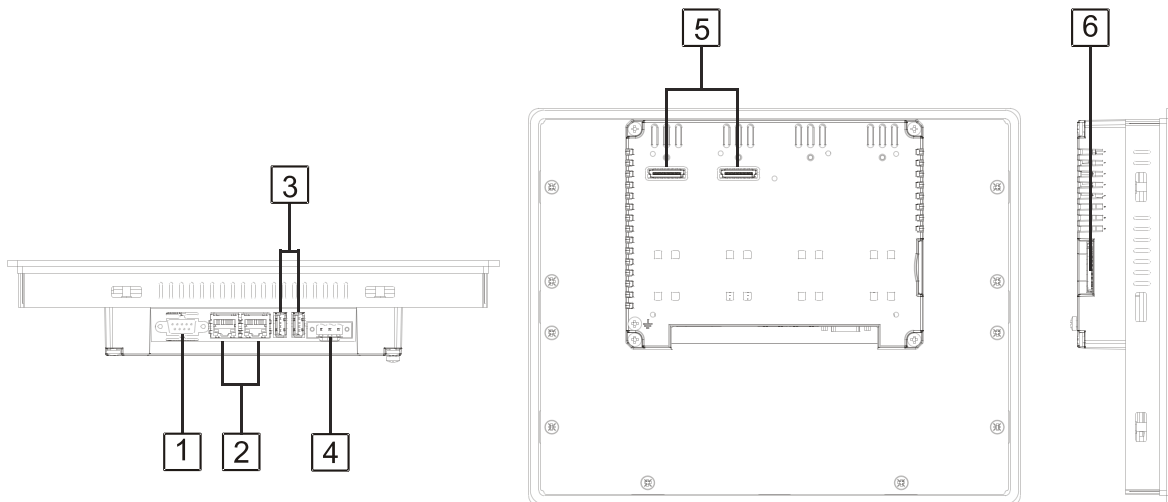
9. Connections

9.1 HM504

1	Serial port
2	2x Ethernet port
3	USB port
4	Power supply
5	Expansion slot for plug-ins
6	SD card slot

9.2 HM507, HM510 and HM513

1	Serial port
2	2x Ethernet port
3	2x USB port
4	Power supply
5	2x Expansion slot for plug-ins
6	SD card slot

9.3 Serial port

The serial port is used to communicate with the PLC or with another type of controller.
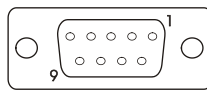
Different electrical standards are available for the signals in the PLC port connector: RS232, RS422, RS485. Use the corresponding communication cable for the connection.

The serial port is software programmable. Make sure you select the appropriate interface in the programming software.

RS232

Pin	Description
1	GND
2	
3	TX
4	RX
5	
6	+5V output
7	CTS
8	RTS
9	

Serial port

RS422, RS485

Pin	Description
1	GND
2	
3	CHA-
4	CHB-
5	
6	+5V output
7	CHB+
8	CHA+
9	

For RS485, pins 4-3 and 8-7 must be connected externally.

9.4 Ethernet port

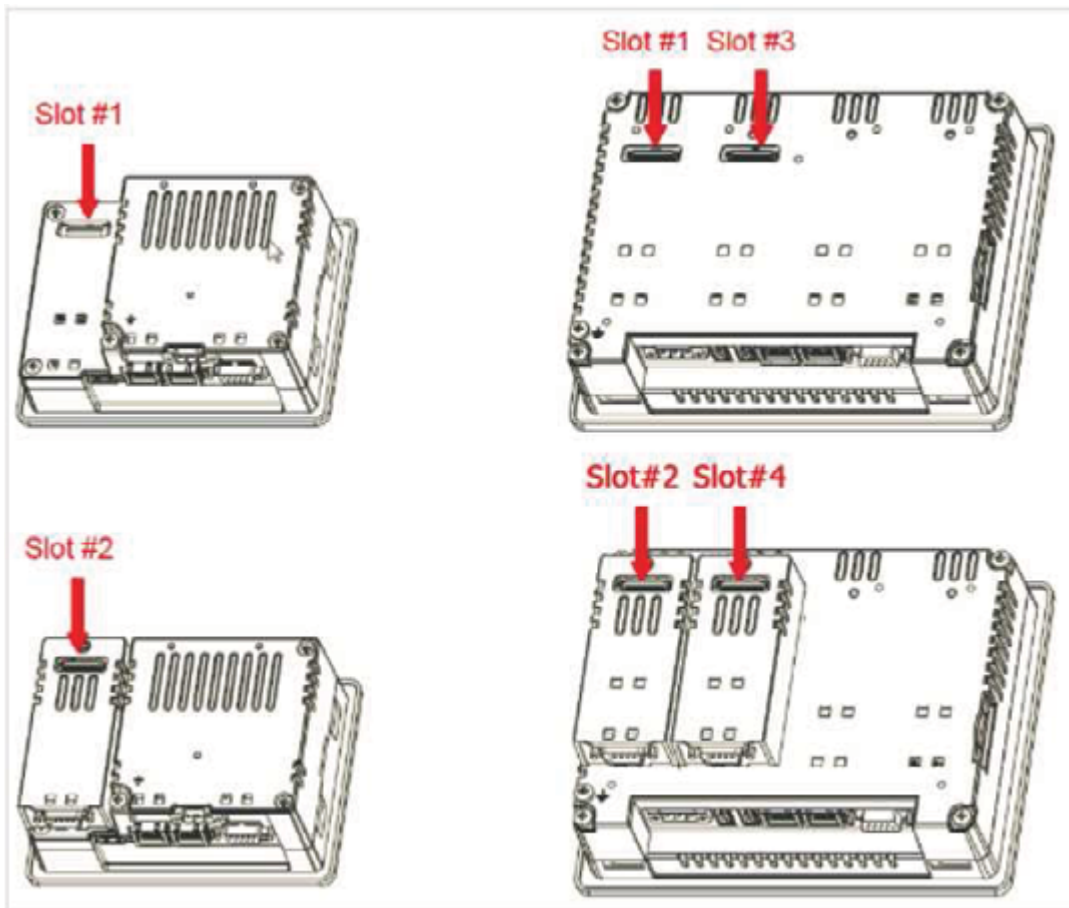The Ethernet ports have two status indicators. They work as shown in the picture below.
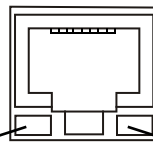
OFF: Valid link has NOT been detected
ON: Valid link has been detected

ON: No activity
BLINKING: Activity

9.5 Optional plug-ins

There are several optional plug-ins available for the HM500 series. Depending on the panel type, there are one or two expansion slots.

Slot #2 and slot #4 are available only if the plugin module is equipped with the bus extension connector.

| Module	Application	Max. No. of plug-ins	Bus extension connector
PLCM03	Serial RS232	2	Yes
PLCM04	Serial RS485	2	Yes

If you are planning to use PLCM03 and PLCM04 (additional serial ports), the COM port numbers will be assigned as follows:

- A module plugged in slot #1 or slot #2 will be COM2,
- A module plugged in slot #3 or slot #4 will be COM3.

9.6 Power supply, grounding, and shielding

The power supply terminal block is shown in the figure below.
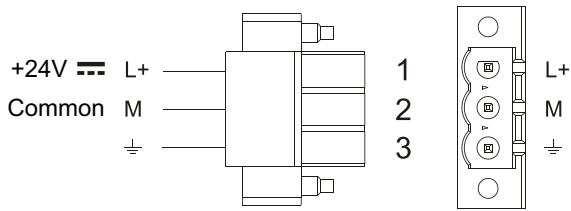
> **NOTICE**
>
> Make sure that the power supply has sufficient power capacity for the operation of the equipment.

The unit must always be grounded to earth. Grounding helps limit the effects of noise due to electromagnetic interference on the control system.

Earth connection will have to be done using either the screw or the faston terminal located near the power supply terminal block. A label helps identify the ground connection. Also ground the terminal 3 on the power supply terminal block.

The power supply circuit may be floating or grounded. In the latter case, connect to ground the power source common as indicated with a dashed line in the figure below.

When using the floating power scheme, note that internally the power common is connected to the ground with a 1MΩ resistor in parallel with a 4,7nF capacitor.

The power supply must have double or reinforced insulation. The suggested wiring for the power supply is shown below.
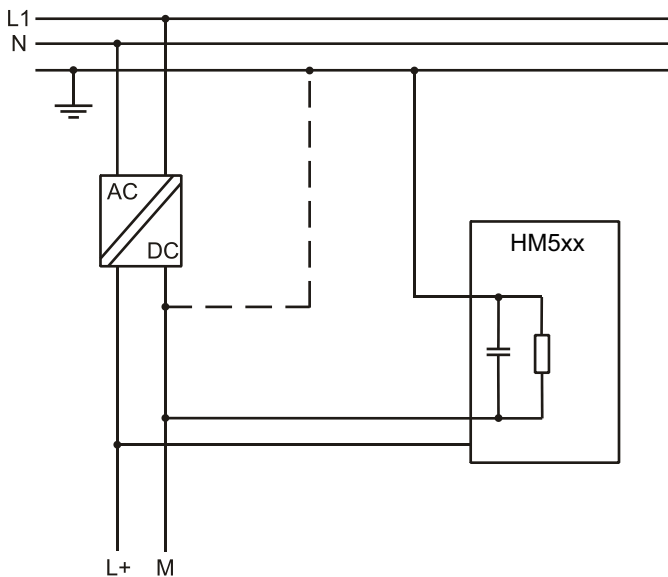

All the electronic devices in the control system must be properly grounded. Grounding must be performed according to applicable regulations.

10. Battery

The touch panels are equipped with rechargeable Lithium batteries that are not user-replaceable. The battery is needed to keep the real-time clock running (date and time).

When the touch panel is installed for the first time, the battery must be charged for 48 hours. When the battery is fully charged, data backup at 25°C is guaranteed for 3 months.
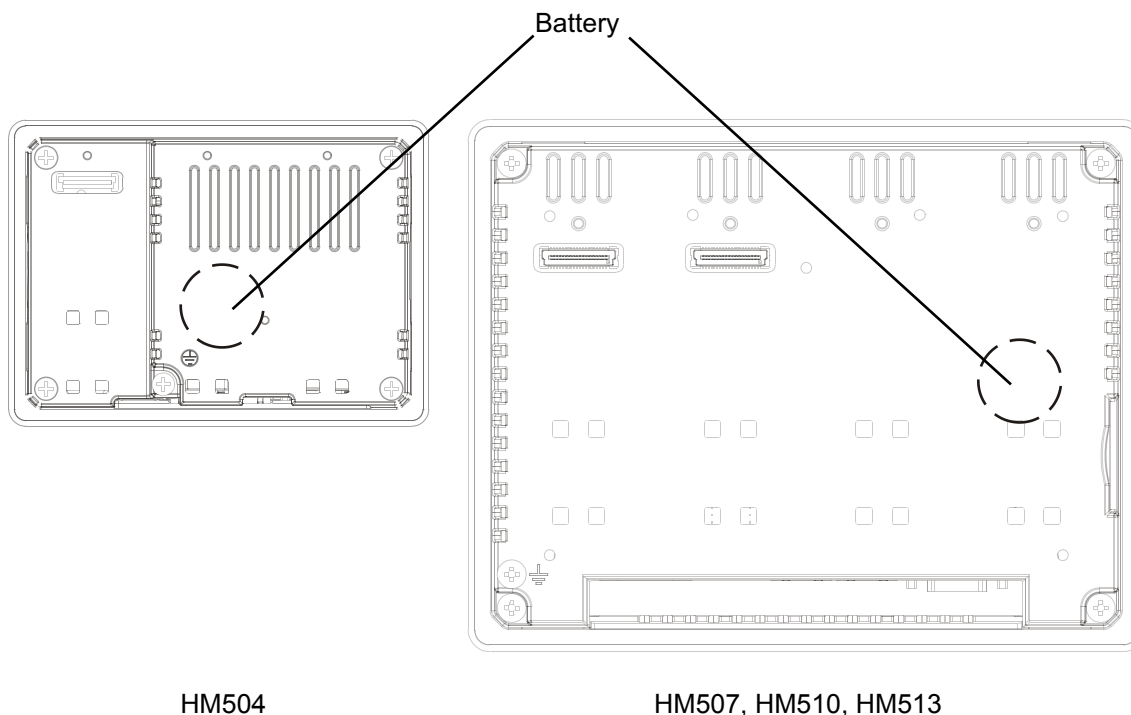
Battery

HM504   HM507, HM510, HM513

NOTICE
Dispose of batteries according to local regulations.

11. Cleaning faceplates

The equipment must be cleaned only with a soft cloth and neutral soap product. Do not use solvents.

12. Getting started

The HM500 series panels must be programmed with the programming software HMWIN Studio, a Windows application. To program a panel you will have to connect the panel via the Ethernet interface to a personal computer running the HMWIN Studio software.

Make sure that the firewall policy is configured in a way that allows HMWIN Studio to access the network. The version of the HMWIN Studio used must be compatible with the HMWIN runtime version installed on the panel to be programmed.

13. System settings tool

13.1 Introduction

The panels have a system settings tool to allow basic and preliminary settings. The system settings tool comes in the shape of a rotating menu with navigation buttons at the top and the bottom to move between the available options. The tool is shown in the picture below.

On the left side, a component or functions is highlighted. The right side shows information about the current version, when applicable. The picture below shows the version of the Main OS component.
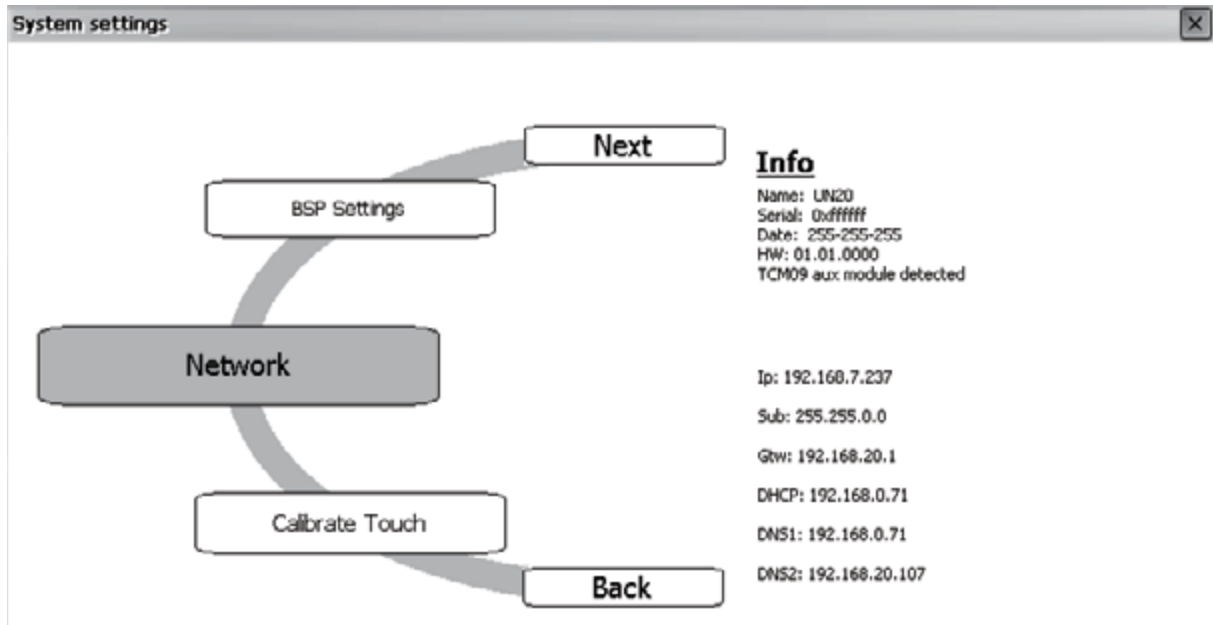
The system settings tool has two operating modes:

- User mode and
- System mode.

The difference between them is only in the number of available options.

To activate the system settings in **user mode**, you need to access the context menu by touching and holding any unused area of the touchscreen for a few seconds. The default holding time is 2 seconds and can be changed.

To activate the system settings in **system mode**, you need to tap the middle of the touchscreen repeatedly at a high frequency while the system is powering up. This only works during power-up.

13.2 Options available in user mode

User mode is the simplest possible interface, where a generic user can get access to the basic settings of the panel:

Calibrate touch	Allows to calibrate the touch screen interface
Network	Allows to change the options of the panel on-board network card
Time	Allows to change the real-time clock options including time zone and DST
Display settings	Automatic backlight turnoff and brightness adjustment
BSP settings	Allows to check the BSP (Board Support Package) version (e.g. 2.37), the operating hours timers for both the unit and backlight, enable/disable the buzzer, enable/disable the use of the "low battery" front LED indicator
Plugin list	Allows to check whether optional plugin modules are installed

13.3 Options available in system mode

System mode is the complete interface of the system settings tool where all options are available. In addition to the options listed under "13.2 Options available in user mode" on page 19, the following important options are available:

Format Flash	Allows to format the internal panel flash disk
Resize Image Area	Allows to resize the flash portion reserved to store the splash screen image displayed by the unit at power-up; default settings are normally ok for all the units
Download Configuration OS	Allows to check current version and upgrade the backup operating system.
Download Main OS	Allows to check current version and upgrade the main operating system
Download Splash Image	Allows to change the splash screen image displayed by the unit at power up. The image needs to be in a specific format. We suggest to update the image directly from the HMWIN Studio software, which supports this feature starting from version 1.50
Download Bootloader	Allows to check the current version of the system boot loader and to upgrade it

Only for HM510 and HM513

|	
Download Main FPGA	Allows to check the current version and upgrade the main FPGA firmware
Download Safe FPGA	Allows to check the current version and upgrade the backup (safe) copy of the FPGA firmware,
Download System Supervisor	Allows to check the current version and upgrade the system supervisor firmware responsible for the real-time clock and the handling of the power supply handling,

Note: the system settings tool includes also other options that are not described and not documented in this manual.

14. LED indicator on the front

The table below shows how the LED indicator works.

Symbol	Color	State	Meaning
	red	ON	Hardware fault or battery low
	green	ON	Normal operation
		Flashing	Communication error

15. Unpacking and packing instructions

1   **2**   **3**
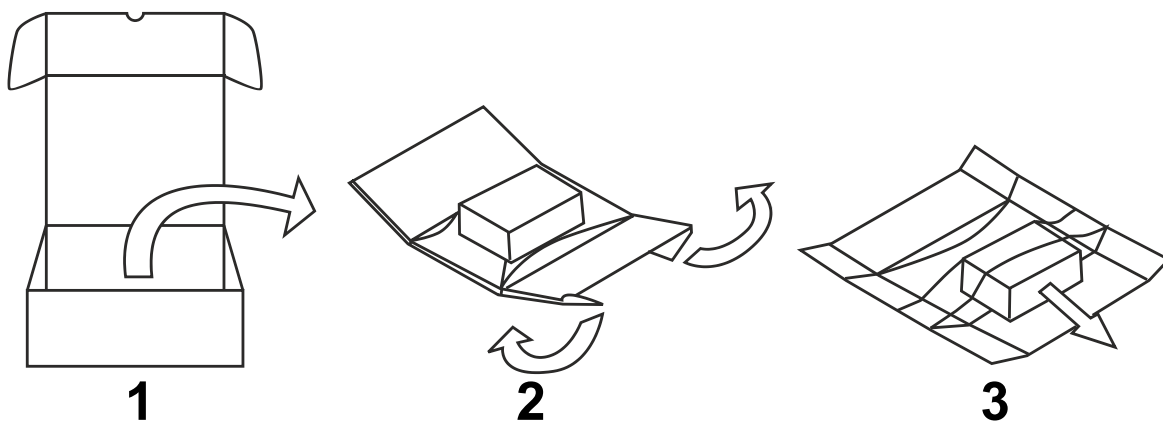
To repack the unit, please follow the instructions backwards.

Global Network

| North America | Europe | Asia Pacific | China | Japan |

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