EXOR
INTERNATIONAL

eSMART Series
Operating Instructions

Basic User's Manual for eSMART Series
Touchscreen Products

EXOR International S.p.A.
MANUGENESMARTxx
Ver. 1.00

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Table of contents

Introduction

The operational guidelines describe below is information on device technical data, installation, transportation, storage, assembly, use and maintenance.

The Manual refers to the following models:

eSMART04	Operator interface with TFT color 4.3" widescreen display touchscreen
eSMART04M	High performance operator interface with TFT color 4.3" widescreen display touchscreen
eSMART07	Operator interface with TFT color 7" widescreen display touchscreen
eSMART07M	High performance operator interface with TFT color 7" widescreen display touchscreen
eSMART10	Operator interface with TFT color 10.1" widescreen display touchscreen

Safety guide

The manual contains safety standards that must be respected for the personal safety and to avoid damage. Indications of attention are divided into three levels of severity:

DANGER: indicates a failure to observe safety rules and such failure may cause death or serious injuries.

> ⚠ **DANGER**

ATTENTION: indicates a failure to observe safety rules and that deficiency may cause damage.

> ⚠ **ATTENTION**

CAUTION: indicates a failure to observe safety rules and that deficiency may cause defects to the equipment or inconsistencies.

> ☛ **CAUTION**

1 Product overview

The EXOR eSMART HMI products combine state-of-the-art features and top performance with an oustanding design. They have been designed to offer an outstanding price/performance ratio for challenging applications. They are the ideal choice for HMI applications including factory and building automation.

The eSMART HMI products have been designed to run the JMobile software.

- Compatible with JMobileStudio.
- Full vector graphic support. Native support of SVG graphic objects, trasparency and alpha blending.
- Screen object dynamics: control visibility and transparency, move, resize, rotate any object on screen. Change properties of basic and complex objects.
- Multilanguage applications with TrueType fonts. Easily create, install and maintain applications in multiple languages to meet global requirements.
- Data display in numerical, text, bargraph, analog gauges and graphic image formats.
- Rich set of state-of-the-art HMI features: data acquisition and logging, trend presentation, alarm handling, scheduler and timed actions (daily and weekly schedulers, exception dates), recipes, security and user management, email and RSS feeds.
- Wide selection of communication drivers available with multiple-driver communication capability.
- Remote monitoring and control with Client-Server functionality.
- On-line and Off-line simulation with JMobile Studio.
- Powerful scripting language for automating HMI applications. Efficient script debugger improves productivity in application development.
- Rich gallery of vector symbols and objects.

2 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

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.

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

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.

eSMART07   product model name
ESMA07U301   product part number
1530   year/week of production
100100A05004000   version id of the product
AA4001001000000001AA   serial number

3 Technical specifications

Touchscreen technology	Resistive
RTC backup	Supercapacitor
Fuse	Automatic
Serial Port	RS-232, RS-485, RS-422 software configurable
User memory	30 MB Flash
Recipe memory	Flash
Hardware clock	Clock/Calendar with back-up supercapacitor
Accuracy RTC (at 25°C)	<100ppm

Environmental conditions

Operating temperature (surrounding air temperature)	0 ÷ +50°C	EN60068-2-14
Storage temperature	-20 ÷ +70°C	EN60068-2-14
Operating and storage humidity	5 ÷ 85 % RH not-condensing	EN60068-2-30
Vibrations	5 ÷ 9 Hz, 7 mm $_{p\text{-}p}$ 9 ÷ 150 Hz, 1 g	EN60068-2-6
Shock	± 50 g, 11 ms, 3 pulses per axis	EN60068-2-27
Protection class	IP66 front panel *	EN60529
Pollution degree environment	2	

* The front face of the EXOR 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 EXOR unit is equivalent to these standards, oils that should have no effect on the eSMART 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 eSMART becomes peeled off, these conditions can lead to the ingress of oil into the unit 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.

Electromagnetic Compatibility (EMC)

Radiated disturbance test	Class A	EN 55011
Electrostatic discharge immunity test	8 kV (air electrostatic discharge) 4 kV (contact electrostatic discharge)	EN 61000-4-2
Radiated, radio-frequency, electromagnetic field immunity test	80 MHz ÷ 1 GHz, 10V/m 1,4 GHz ÷ 2 GHz, 3 V/m 2 GHz ÷ 2.7 GHz, 1 V/m	EN 61000-4-3
Burst immunity test	± 2 KV dc power port ± 1 KV signal line	EN 61000-4-4
Surge immunity test	± 0,5 KV dc power port (line to earth) ± 0,5 KV dc power port (line to line) ± 1 KV 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
Voltage dips, short interruptions and voltage variations immunity test	Port: AC mains; Level: 100% duration: 1 cycle and 250 cycles (50Hz); 40% duration: 10 cycles (50Hz); 70% duration: 25 cycles (50Hz); Phase: 0°-180°	
Test executed on the 230Vac side of the EXOR International S.p.A. Power Supply		EN 61000-4-11

Durability information

Backlight service life (LED type)	20000 Hrs. or more (Time of continuos operation until the brightness of the backlight reaches 50% of the rated value when the sorrounding air temperature is 25°C) - see Note 1
Front foil (without direct exposure to sunlight or UV)	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.

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.

Touchscreen reliability   > 1 milion operations

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

4 Technical data

Model	eSMART04	eSMART04M
Display / Backlight	TFT Color / LED	TFT Color / LED
Colors	64K	64K
Resolution	480X272	480X272
Diagonal (inches)	4.3" widescreen	4.3" widescreen
Dimming	yes	yes
User memory	30 MB Flash	30 MB Flash
RAM	256 MB DDR	512 MB DDR
Serial Port	RS-232,RS-485, RS-422 software configurable	RS-232,RS-485, RS-422 DB9 female software configurable
Ethernet port	10/100 Mbit	10/100 Mbit
USB port	Host interface V2.0 max. 500mA	Host interface V2.0 max. 500mA
Real Time Clock	yes	yes
Voltage	18-32Vdc	18-32Vdc
Current rating (at 24VDC)	0.25A	0.25A
Weight	0.4 Kg	0.4 Kg

Model	eSMART07	eSMART07M
Display / Backlight	TFT Color / LED	TFT Color / LED
Colors	64K	64K
Resolution	800X480	800X480
Diagonal (inches)	7" widescreen	7" widescreen
Dimming	yes	yes
User memory	30 MB Flash	30 MB Flash
RAM	256 MB DDR	512 MB DDR
Serial Port	RS-232,RS-485, RS-422 software configurable	RS-232,RS-485, RS-422 DB9 female software configurable
Ethernet port	10/100 Mbit	10/100 Mbit
USB port	Host interface V2.0 max. 500mA	Host interface V2.0 max. 500mA
Real Time Clock	yes	yes
Voltage	18-32Vdc	18-32Vdc
Current rating (at 24VDC)	0.30A	0.30A
Weight	0.6 Kg	0.6 Kg

Model	eSMART10
Display / Backlight	TFT Color / LED
Colors	64K
Resolution	1024X600
Diagonal (inches)	10.1" widescreen
Dimming	yes
User memory	30MB Flash
RAM	512 MB DDR
Serial Port	RS-232,RS-485, RS-422 software configurable
Ethernet port	10/100 Mbit
USB port	Host interface V2.0 max. 500mA
Real Time Clock	yes
Voltage	18-32Vdc
Current rating (at 24VDC)	0.38A
Weight	1 Kg

4.1 Dimensions
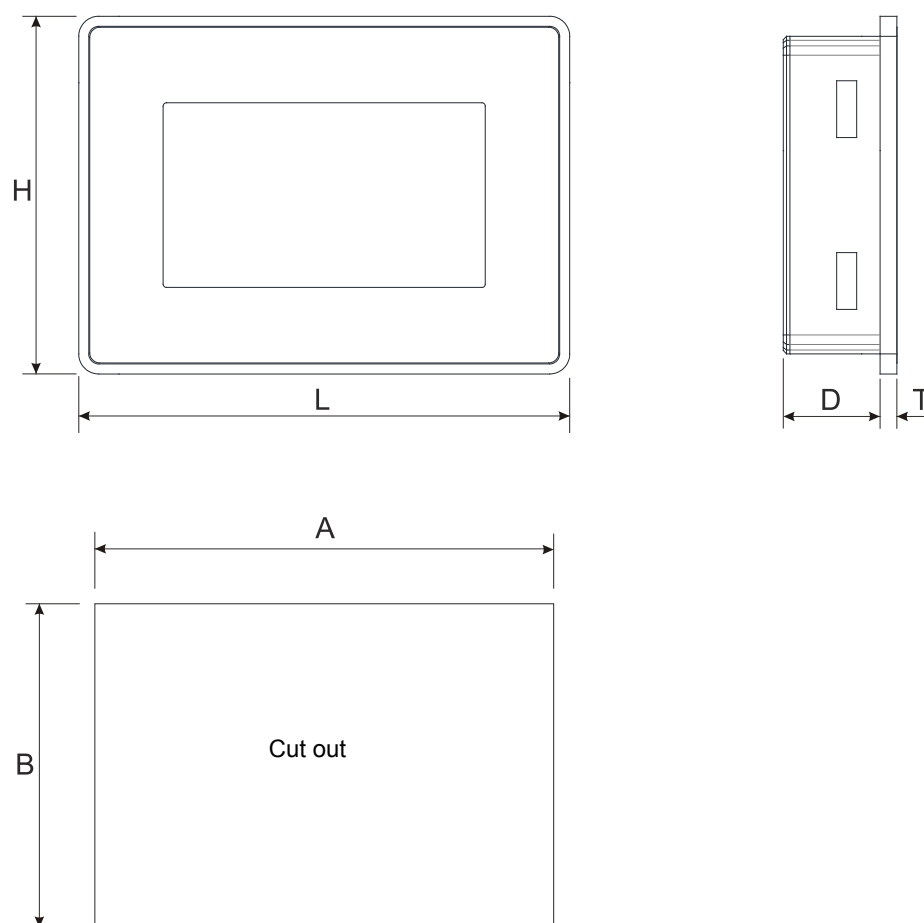
Fig. 4.1

MODEL	A	B	L	H	D	T
eSMART04	136mm/5.35"	96mm/3.78"	147mm/5.78"	107mm/4.21"	29mm/1.14"	5mm/0.19"
eSMART04M	136mm/5.35"	96mm/3.78"	147mm/5.78"	107mm/4.21"	29mm/1.14"	5mm/0.19"
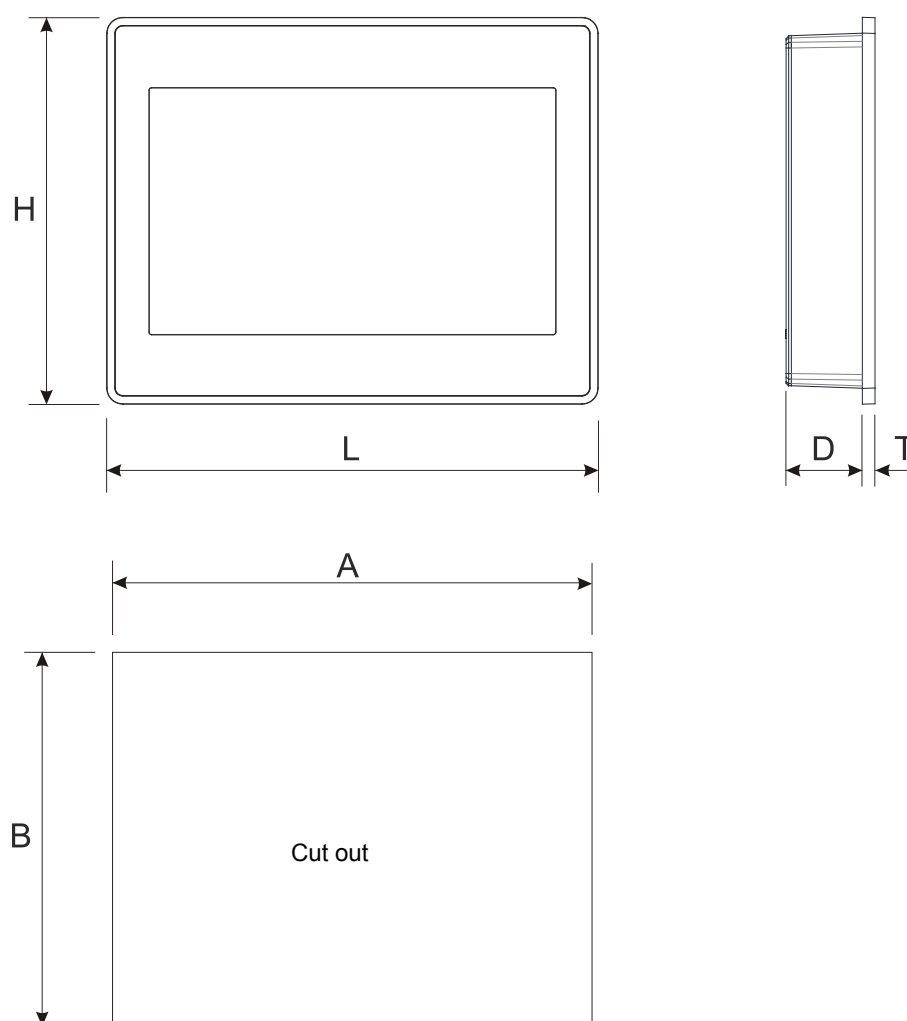
Fig. 4.2

MODEL	A	B	L	H	D	T
eSMART07	176mm/6.90"	136mm/5.35"	187mm/7.36"	147mm/5.79"	29mm/1.14"	5mm/0.19"
eSMART07M	176mm/6.90"	136mm/5.35"	187mm/7.36"	147mm/5.79"	29mm/1.14"	5mm/0.19"
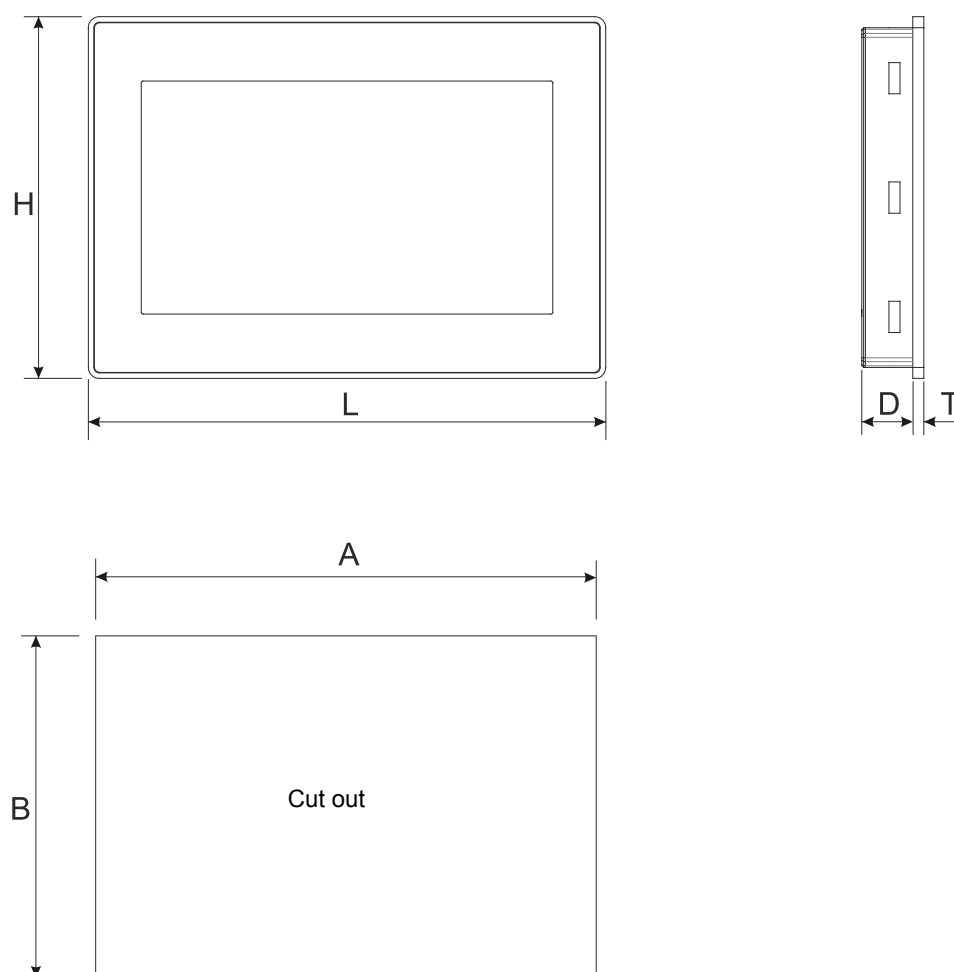
Fig. 4.3

MODEL	A	B	L	H	D	T
eSMART10	271mm/10.66"	186mm/7.32"	282mm/11.10"	197mm/7.75"	29mm/1.14"	6mm/0.23"

4.2 Installation environment

In order to meet the front panel protection classifications, proper installation procedure must be followed:
• the borders of the cutout must be flat
• screw up each fixing screw 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 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.

The IP66 is guaranteed only if:
• max deviation from the plane surface to the cut-out: ≤ 0.5mm
• thickness of the case where is mounted the equipment: from 1,5mm to 6mm
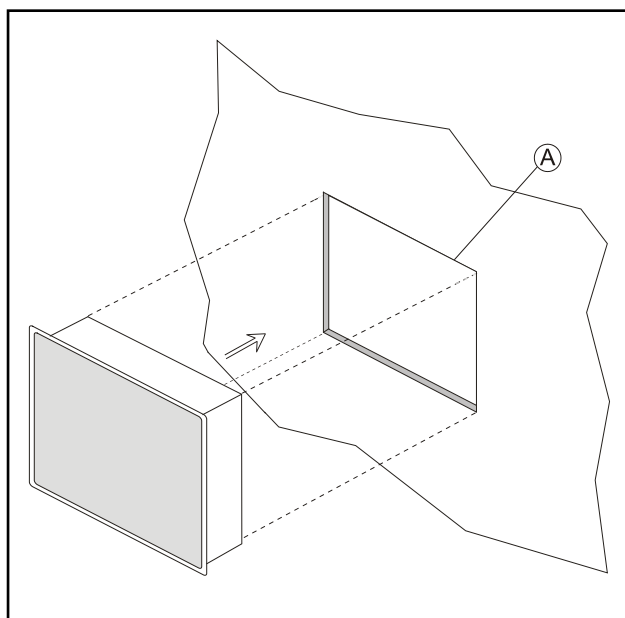• max surface roughness where the gasket is applied: ≤ 120 um

Fig. 4.4

A. Installation cut-out

4.3 Installation procedure
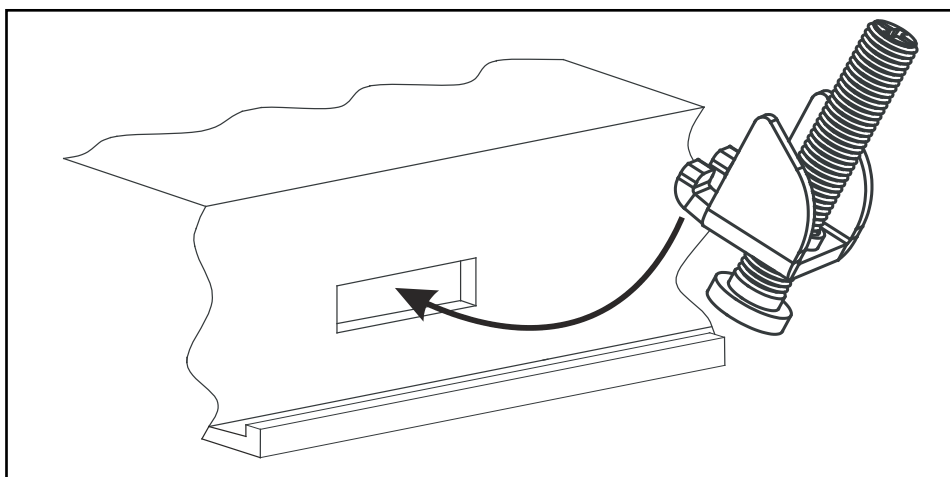
Place the fixing brackets as shown in figure.

Fig. 4.5

☛ **CAUTION**
Screw each fixing screw until the bezel corner gets in contact with the panel.
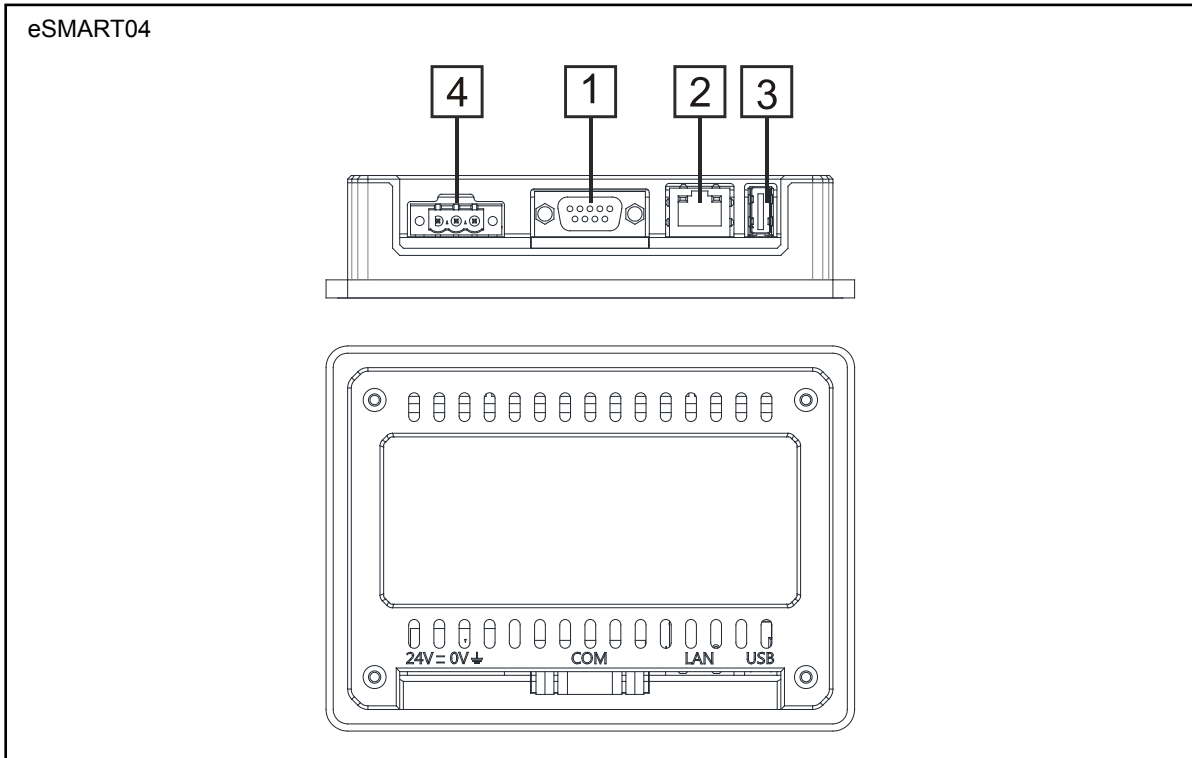Tightening torque: 75 Ncm

5 Connections

eSMART04

Fig. 5.1
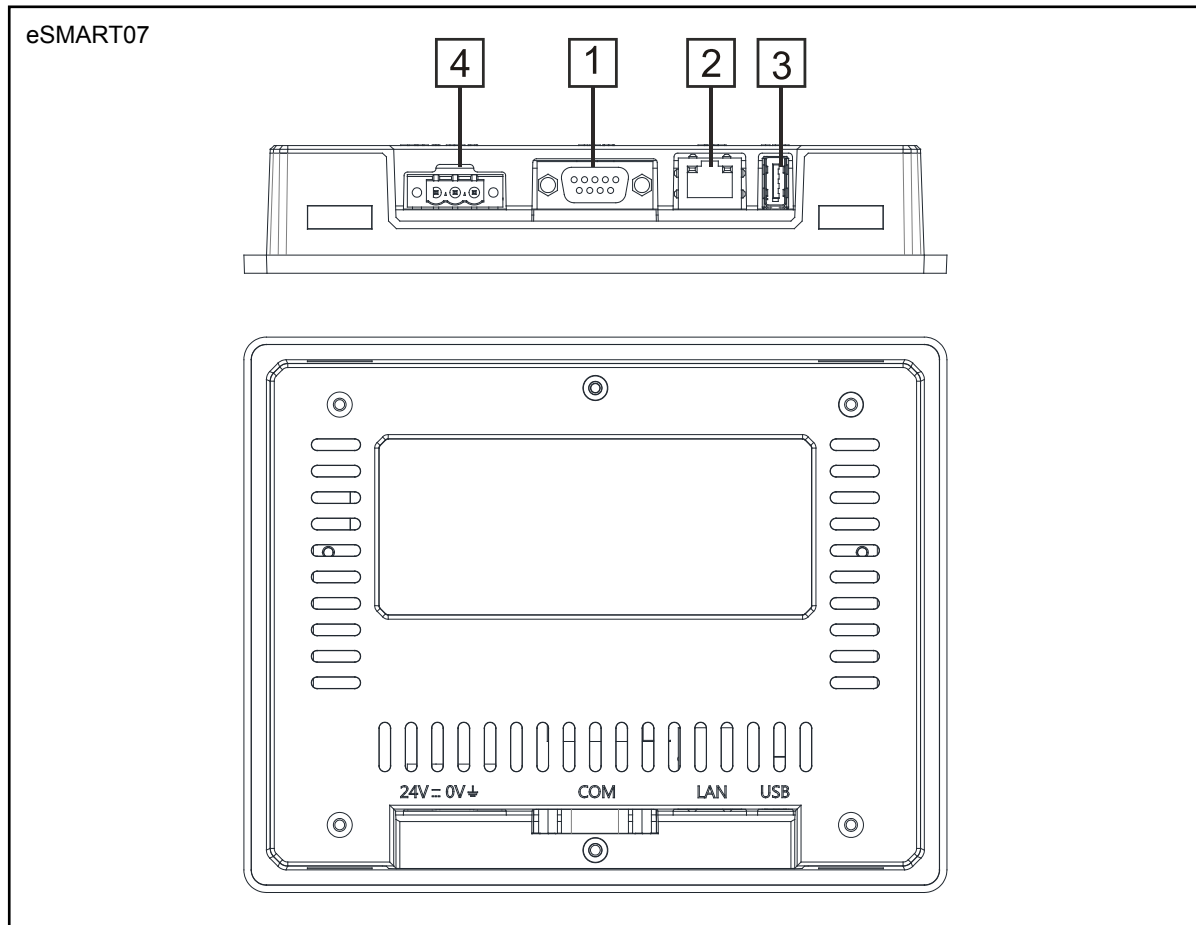
1. Serial Port
2. Ethernet Port
3. USB Port
4. Power Supply

eSMART07

Fig. 5.2

1. Serial Port
2. Ethernet Port
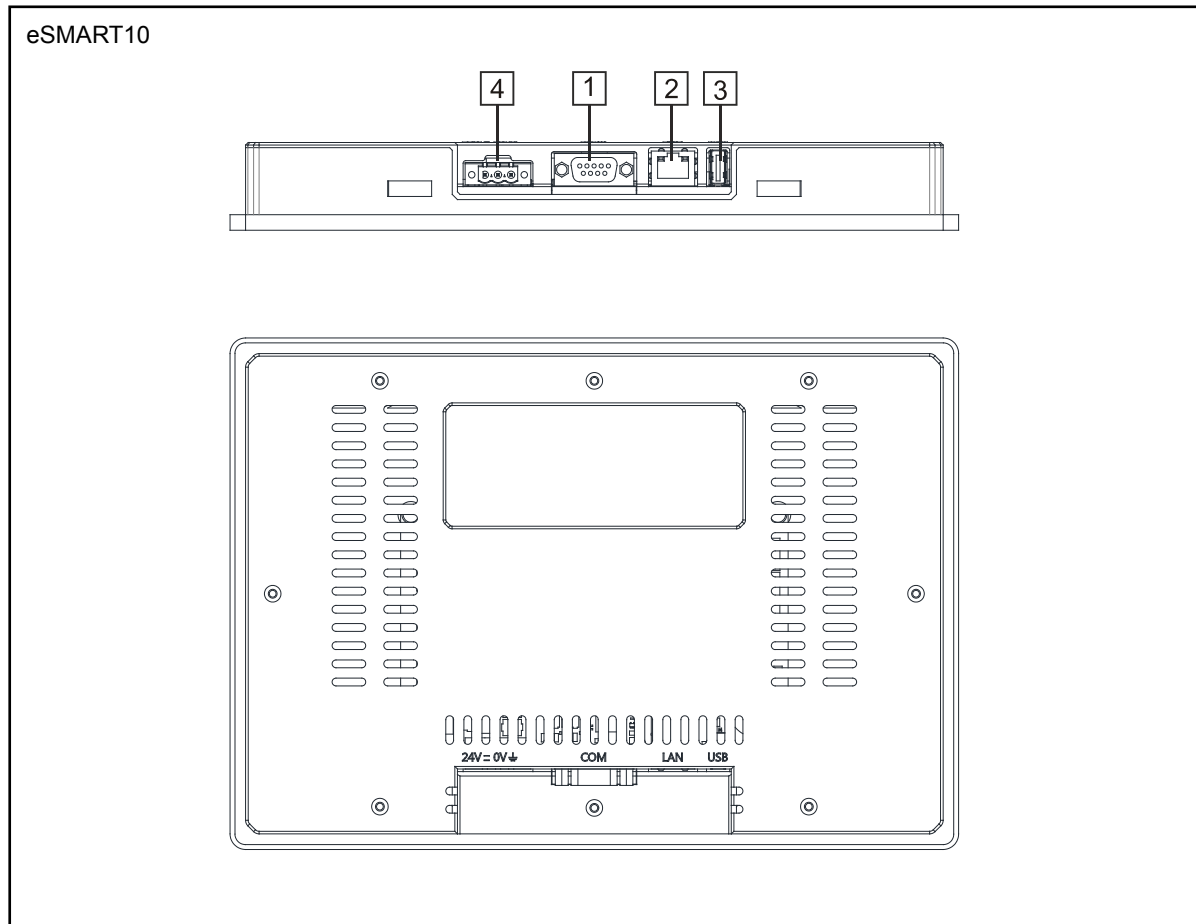3. USB Port
4. Power Supply

eSMART10

Fig. 5.3

1. Serial Port
2. Ethernet Port
3. USB Port
4. Power Supply

5.1 Serial port

The serial port is used to communicate with the PLC or with another type of controller.
Standards available for the signals in the PLC port connector are: RS-232, RS-422, RS-485.

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

RS-232

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

SERIAL PORT
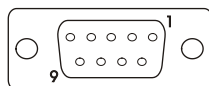
RS-422, RS-485

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

To operate in RS485 pins 4-3 and
8-7 must be connected externally.

The communication cable must be chosen for the type of device being connected.

5.2 Ethernet port

The Ethernet port have two LED indicators for status. Please see description below.
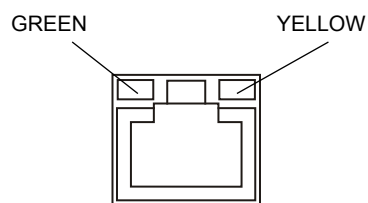
GREEN   YELLOW

LED indicators

Green	Yellow	
ON	OFF	No LAN cable connected
BLINK (link active)	ON	LAN cable connected with 100Mbit/s link
BLINK (link active)	OFF	LAN cable connected with 10Mbit/s link

6 Power supply, grounding and shielding

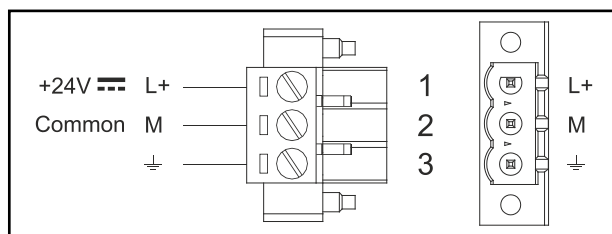The power supply terminal block is shown in figure.

Fig. 6.1

DC Power Connector - AWG24 wire size - R/C Terminal Blocks (XCFR2), Female pitch 5.08mm, torque 4.5 lb-in

Note: *Ensure that the power supply has enough 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 electro-magnetic interference on the control system.

Use terminal 3 on the power supply terminal block earth connection.

The power supply circuit may be floating or grounded. In the latter case, connect to ground the power source common as shown in figure with a dashed line.
When using the floating power scheme, note that the HMI devices internally connects the power common to ground with a 1MΩ resistor in parallel with a 4,7nF capacitor.
The power supply must have double or reinforced insulation.
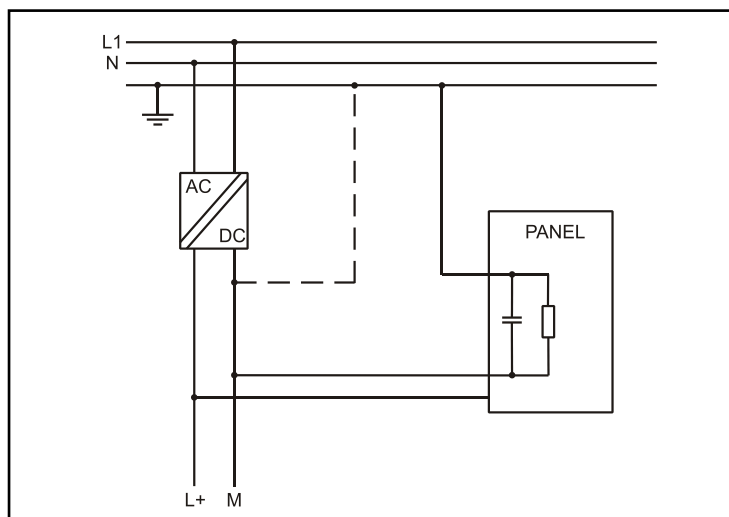The suggested wiring for the power supply is shown in figure.

Fig. 6.2

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

7 Cleaning faceplates

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

8 Getting started

eSMART HMI products must be programmed with the software JMobile Studio (starting from v2.00). JMobile Studio is a software tool that must be properly installed on a computer running Microsoft Windows.

There are two options to transfer a JMobile application project to a HMI device:

Ethernet   Connect the HMI device to the computer with an Ethernet network connection. From JMobile Studio choose the command Run/Download to target. You may have to ensure that the proper firewall policy has been configured in the computer to allow JMobile Studio to access the network.

USB   Create an Update Package using JMobile Studio and copy it to a USB Flash drive.

9 System settings

eSMART HMI products have a system settings interface to allow configuration of system options.

The user interface of System Settings is based on HTML pages accessible locally on HMI or in remote using a Web browser Chrome v44 or higher on port 443 (https://IP/machine_config). Default username is "admin", default password is "admin". Use navigation menu on the left side of the screen to browse through the available options.
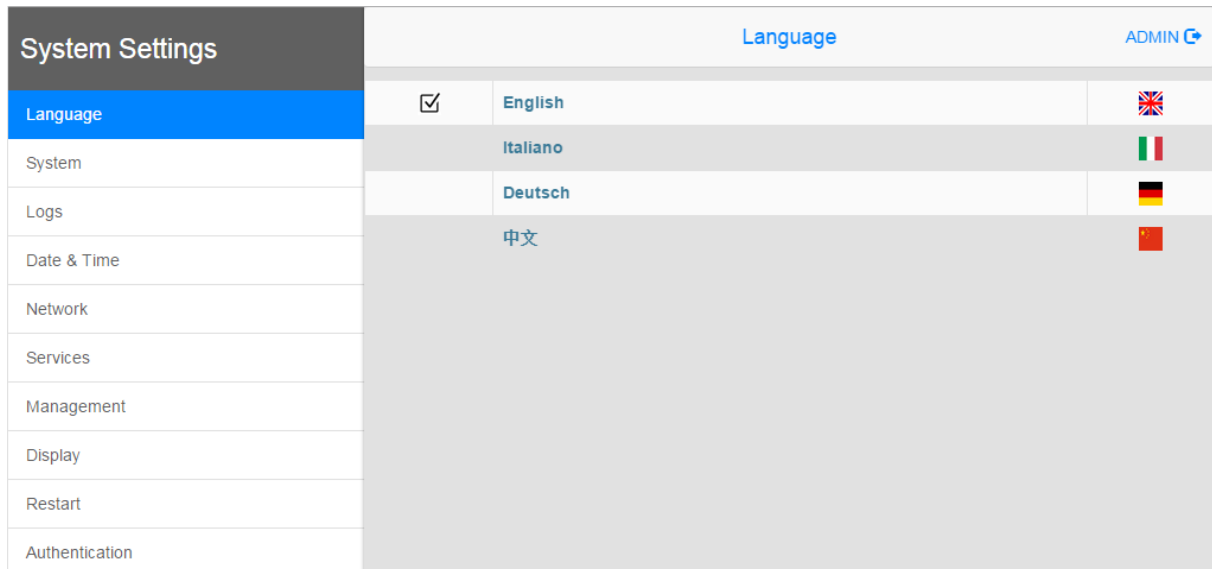
The active item of menu is highlighted on the left side. The right side shows related information and settings. Based on the size of the HMI screen, both menu and content of selected item may be shown on screen or not.

System Settings has two modes of operation:

User Mode   JMobile runtime is running or the HMI device is in "factory default" status.

System Mode   JMobile runtime is not running or the HMI device has a software failure.
System Mode includes all options available in User Mode and offers in additions commands dedicated to system upgrade and recovery not availables when running in User Mode.

Activation of System Settings in **User Mode**:

JMobile runtime not running   Press "System Setting" button on the HMI screen

JMobile runtime running   Recall context menu and select "System Settings". To recall the context menu click and hold any unused area of the touchscreen for a few seconds. Default hold time is 2 seconds.

Activation of Systems Settings in **System Mode**:

Normal operation   If JMobile runtime is not running: Press "System Setting" button on the HMI screen to enter in System Settings in User Mode. Select "Restart" -> "Config OS" to reboot in System Mode.
If JMobile runtime is running: recall context menu and select "System Settings". To recall the context menu click and hold any unused area of the touchscreen for a few seconds. Default hold time is 2 seconds to enter in System Settings in User Mode. Select "Restart" -> "Config OS" to reboot in System Mode.

Recovery operation   If panel is not responsive, use the so-called "tap-tap" procedure. This procedure consists in tapping the surface of the touchscreen during the device power-up phase. Tapping frequency must be high. You have to start tapping the touchscreen as soon as power has been applied to the device. When the sequence has been recognized, the system shows the message: "TAP-TAP DETECTED". At this point release touch to boot in User Mode without running JMobile runtime or press and hold few seconds (selecting so "RESTART: CONFIG OS") to boot in System Mode.

System Settings includes options for basic settings of the device.

Language	Configure language used for System Setting menu only.
System	show informations about platform, status and timers (like System on time, backlight on time).
Logs	enable persistent log for BSP and allows to export it.
Date & Time	change the device date and time, including time zone and NTP Server
Network	configure IP Address of Ethernet interface and the other network settings like DNS, Gateway, DHCP, Hostname.
Services	enable/disable services. Example of services are OpenSSH server, Cloud services, SNMP and logging.
Management	update of BSP components (Main OS, Config OS, Boot loader, XLoader), check for partitions consistence, update of splash screen, informations about usage and size of partitions.
The update of Main OS is available only in System Mode, the update of Config OS is only in User Mode.
| **Display**	adjust brightness, configure automatic backlight turnoff and select HMI orientation (90°, 180°, 270° and 360°).
Restart	restart the device. "Main OS" option restarts as per default in User Mode, "Config OS" option restart panel directly into System Settings in System Mode
Authentication	configure password for administrator ("admin") and for the standard user ("user"). Administrator has full access to System Settings (updates of BSP and other system components). Standard user has some limitations.

Note: *the System Settings tool includes also other options, not described and not documented at this moment*

10   Touchscreen calibration

eSMART HMI products support calibration of the interface. To start calibration proceed as follow:
1) Use the "tap-tap" procedure at boot (this procedure consists in tapping the surface of the touchscreen during the device power-up phase. Tapping frequency must be high. You have to start tapping the touchscreen as soon as power has been applied to the device). When the sequence has been recognized, the system shows the message: "TAP-TAP DETECTED".
2) Release touch and wait few seconds until the message "ENTERING SYSTEM SETTINGS" appears
3) Press and hold touch for few seconds for selecting "TOUCHSCREEN CALIBRATION".

11   Unpacking and packing Instructions

1   **2**   **3**
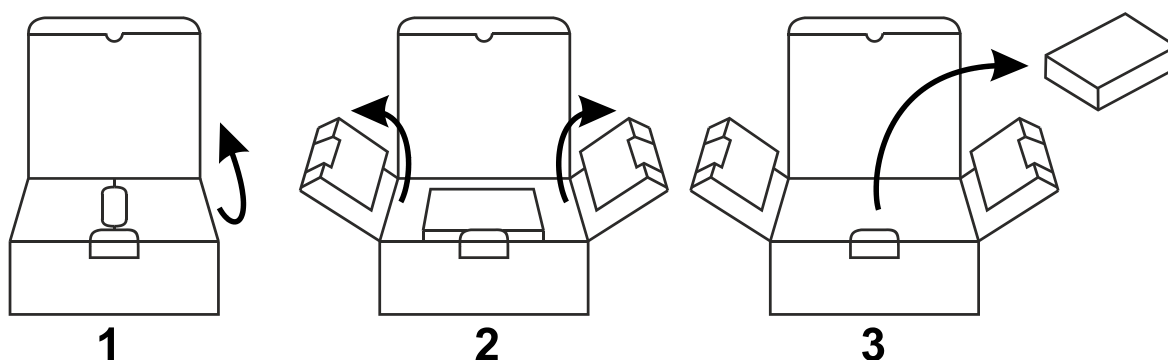
eSMART04, eSMART04M, eSMART07, eSMART07M

1   **2**

3   **4**
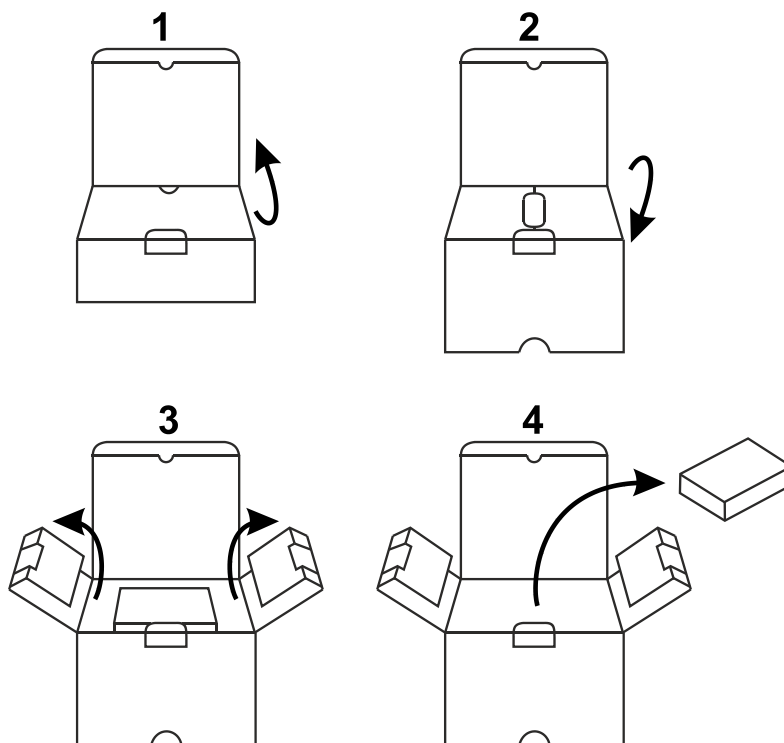
eSMART10

to repack the unit, follow the instructions backwards.

MANUGENESMARTxx
Operating Instructions
VER 1.00