EXOR

eX700 Series
Operating Instructions

Basic User's Manual for eX700 Series
Touchscreen Products

Exor International S.p.A.
MANUGENEX7xx
Ver. 2.00

EXOR

Table of Contents

Introduction

The operational guidelines described below is information which relates to the device, installation, transportation, storage, assembly, use and maintenance.

This Operating Instruction describes the main features of the Exor operator panels. The Manual refers to the following models:

eX705   Operator interface with TFT color 5" widescreen display multitouch projected capacitive touchscreen

eX707   Operator interface with TFT color 7" widescreen display multitouch projected capacitive touchscreen

eX710   Operator interface with TFT color 10.1" widescreen display multitouch projected capacitive touchscreen

eX715   Operator interface with TFT color 15.6" widescreen display multitouch projected capacitive touchscreen

eX721   Operator interface with TFT color 21.5" widescreen display multitouch projected capacitive 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

eX Series 700 HMI products combine state-of-the-art connectivity features and top performance in a great design. Products have been designed as IoT edge devices with the combination of a powerful controller with networking capability (up to 3 Ethernet networks) and outstanding communication options including client/server OPC UA. They are the ideal choice for all demanding IoT edge applications in factory, marine and building automation.

The glass projected capacitive touchscreen and the brilliant displays with size up to 21.5" and resolution up to 1920x1080 guarantee great optical performance; with the support of multitouch gesture programming they can create the most natural human interfaces.

- eX Series 700 products have been designed to run the JMobile software for powerful HMI applications.
- Gateway function with OPC UA Server and Client.
- Secure connectivity with JMcloud and full network separation.
- Powerful browser wih industry standard Web engines.
- Optional CODESYS V3 PLC runtime with choice of major I/O protocols.
- Optional plug-in modules for fieldbus systems, I/O and controllers.

2 Standards and Approvals

The products have been designed for use in an industrial environment in compliance with the 2014/30/EU EMC Directive.

The products have been designed in compliance with:

EN 61000-6-4	CISPR 22	Class A
	CISPR 16-2-3	
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	
	EN 61000-4-11	
	EN 61000-4-29	
	EN60945	

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 2002/95/EC

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.
An example of this plate is shown in the figure below:

Note: *the eX710 label is used as an example for eX700 Series*

product model name	eX710
product part number	EX710U5P1
year/week of production	1706
serial number	AA00011FV000000561AA
version id of the product	120201A01000000
manufacturer address	Exor International S.p.A. Via Monte Fiorino 9 IT-37057 San Giovanni Lupatoto (VR)

3 Technical Specifications

Touchscreen technology	Projected capacitive
Back-up battery	3V 50mAh Lithium, rechargeable, not user-replaceable, model VL2330.
Fuse	Automatic
Serial Port	RS-232, RS-485, RS-422 software configurable
Flash	4GB for eX705, eX707, eX710, 8GB for eX715, eX721
RAM	512MB for eX705, 1GB for eX707, eX710, 2GB for eX715, eX721
Hardware clock	Clock/Calendar with back-up battery
Accuracy RTC (at 25°C)	<100ppm

Environmental conditions

Operating temperature (surrounding air temperature)	-20 ÷ +60°C (vertical installation) Plug-in modules and USB devices may limit max temperature to +50°C	EN 60068-2-14
Storage temperature	-20 ÷ +70°C	EN 60068-2-1 EN 60068-2-2 EN 60068-2-14
Operating and storage humidity	5 ÷ 85 % RH not-condensing	EN 60068-2-30
Vibrations	5 ÷ 9 Hz, 7 mm $_{p-p}$ 9 ÷ 150 Hz, 1 g $^{p-p}$	EN 60068-2-6
Shock	± 50 g, 11 ms, 3 pulses per axis	EN 60068-2-27
Protection class	Front panel IP66, Rear IP20	EN 60529

Electromagnetic Compatibility (EMC)

Radiated disturbance test	Class A	CISPR 22 CISPR 16-2-3
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
Power frequency magnetic field immunity test	Enclosure, 50/60Hz, 30A/m	EN 61000-4-8

Voltage dips, short interruptions and voltage variations immunity test

Port: AC mains; Level:

0% duration: 1 cycle and 250 cycles (50Hz);
1 cycle and 300 cycles (60Hz);
40% duration: 10 cycles (50Hz);
12 cycles (60Hz);
70% duration: 25 cycles (50Hz);
30 cycles (60Hz);

Phase: 0°-180°

Test executed on the 230Vac side of the Exor International S.p.A. Power Supply   EN 61000-4-11

Port: DC mains; Level:
0% duration: 10ms   20 spaces by 1s

Test executed on the 24Vdc of the EUT   EN 61000-4-29

Durability information

Backlight service life
(LED type)

40000 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

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	eX705	eX707
Display / Backlight	TFT Color / LED	TFT Color / LED
Colors	64K	16M
Resolution	800X480	800X480
Diagonal (inches)	5" widescreen	7" widescreen
Dimming	yes	yes
Flash	4GB	4GB
SD card slot	yes	yes
RAM	512MB	1GB
Serial Port	RS-232,RS-485, RS-422 software configurable	RS-232,RS-485, RS-422 software configurable
Ethernet port	2 10/100Mb	2 10/100Mb, 1 10/100/1000Mb
USB port	1 Host interface version 2.0 max. 500mA	2 Host interface version 2.0 max. 500mA
Expansion slot	1 Optional Plugin	2 Optional Plugin
Battery	rechargeable	rechargeable
Real Time Clock	yes	yes
Voltage	24Vdc (*)	24Vdc (*)
Current rating (at 24VDC)	0.6A	0.7A
Weight	1 Kg	1.3 Kg

(*) 10-32Vdc
For applications requiring compliance with EN 61131-2 and specifically in reference to 10 ms voltage dips, the power supply range voltage is 18-32Vdc.

| Model	eX710	eX715
Display / Backlight	TFT Color / LED	TFT Color / LED
Colors	16M	16M
Resolution	1280X800	1366X768
Diagonal (inches)	10.1" widescreen	15.6" widescreen
Dimming	yes	yes
Flash	4GB	8GB
SD card slot	yes	yes
RAM	1GB	2GB
Serial Port	RS-232,RS-485, RS-422 software configurable	RS-232,RS-485, RS-422 software configurable
Ethernet port	2 10/100Mb, 1 10/100/1000Mb	2 10/100Mb, 1 10/100/1000Mb
USB port	2 Host interface version 2.0 max. 500mA	2 Host interface version 2.0 max. 500mA
Expansion slot	2 Optional Plugin	2 Optional Plugin
Battery	rechargeable	rechargeable
Real Time Clock	yes	yes
Voltage	24Vdc (*)	24Vdc (*)
Current rating (at 24VDC)	1.00A	1.20A
Weight	1.7 Kg	4.1 Kg

(*) 10-32Vdc
   For applications requiring compliance with EN 61131-2 and specifically in reference to 10 ms voltage dips, the power supply range voltage is 18-32Vdc.

Model	*eX721*
Display / Backlight	TFT Color / LED
Colors	16M
Resolution	1920X1080
Diagonal (inches)	21.5" widescreen
Dimming	yes
Flash	8GB
SD card slot	yes
RAM	2GB
Serial Port	RS-232,RS-485, RS-422 software configurable
Ethernet port	2 10/100Mb with integrated switch, 1 10/100/1000Mb
USB port	2 Host interface version 2.0 max. 500mA
Expansion slot	2 Optional Plugin
Battery	rechargeable
Real Time Clock	yes
Voltage	24Vdc (*)
Current rating (at 24VDC)	1.70A
Weight	6.1 Kg

(*) 10-32Vdc
For applications requiring compliance with EN 61131-2 and specifically in reference to 10 ms voltage dips, the power supply range voltage is 18-32Vdc.

4.1 Dimensions
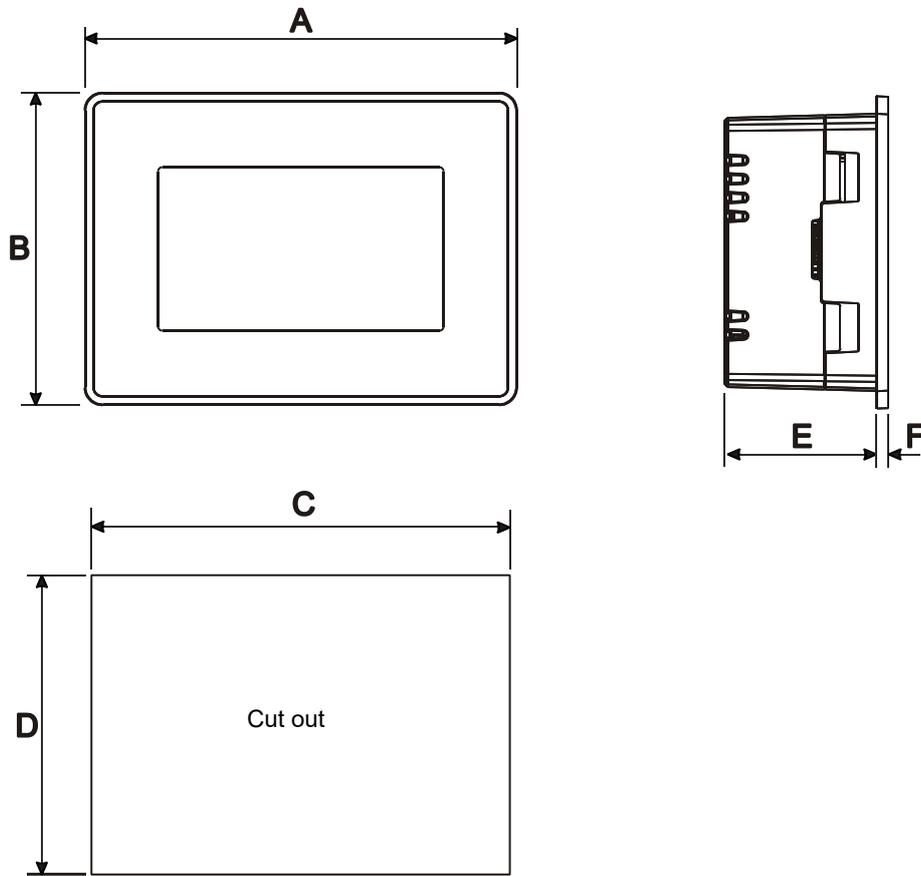
MODEL	A	B	C	D	E	F
eX705	147mm/5.78"	107mm/4.21"	136mm/5.35"	96mm/3.78"	56mm/2.40"	8mm/0.31"
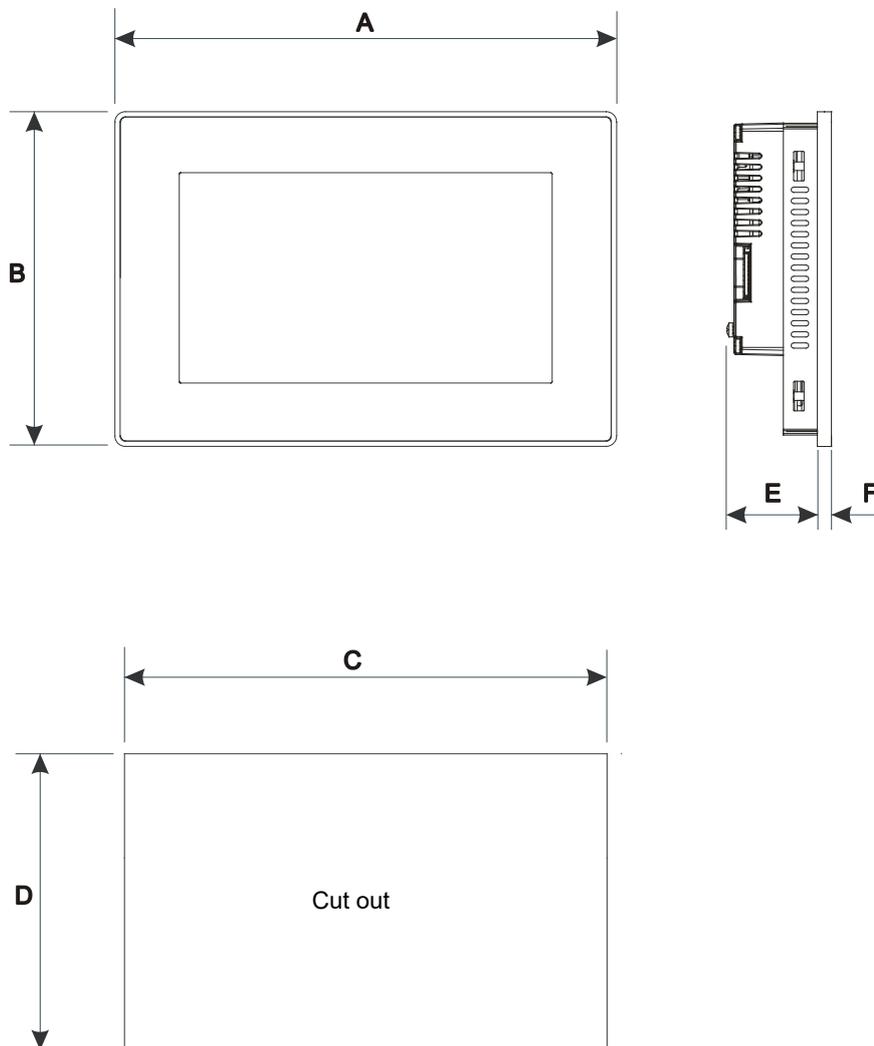
MODEL	A	B	C	D	E	F
eX707	187mm/7.36"	147mm/5.79"	176mm/6.90"	136mm/5.35"	47mm/1.85"	8mm/0.31"
eX710	282mm/11.10"	197mm/7.80"	271mm/10.67"	186mm/7.32"	56mm/2.20"	8mm/0.31"
eX715	422mm/16.60"	267mm/10.50"	411mm/16.18"	256mm/10.00"	56mm/2.20"	8mm/0.31"
eX721	552mm/21.73"	347mm/13.66"	541mm/21.30"	336mm/13.22"	56mm/2.20"	8mm/0.31"

4.2 Installation Environment

Avoid prolonged exposition to direct sunlight to avoid the risk of overheating the device.

The equipment is not intended for installation in contact with corrosive chemical compounds. Check the resistance of the front panel 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, proper installation procedure must be followed:
• the borders of the cutout must be flat
• screw up each fixing screw until the 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:
• max deviation from the plane surface to the cut-out: $\leqq 0.5mm$
• thickness of the case where is mounted the equipment: from 1,5mm to 6mm
• max surface roughness where the gasket is applied: $\leqq 120$ um
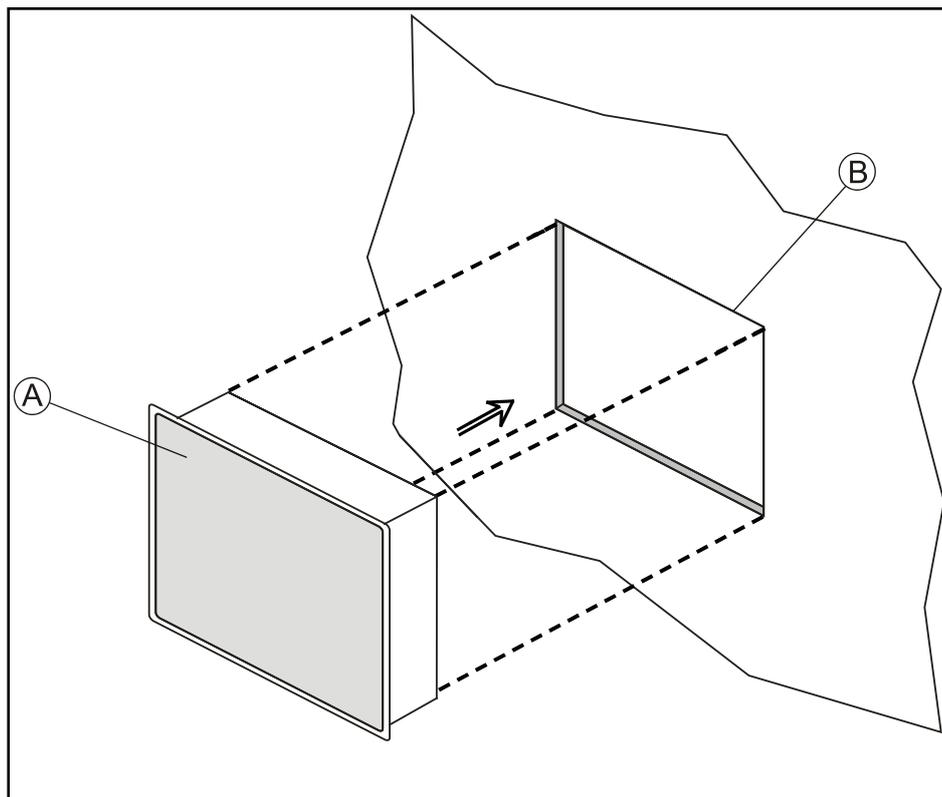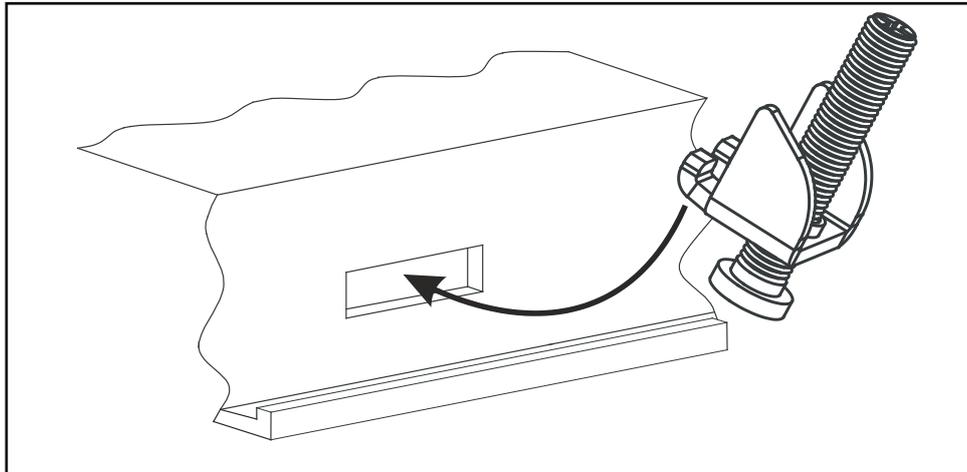

A. eX7xx
B. Installation cut-out

4.3 Safety instruction

⚠ For all installation notes, please refer to the Installation Guide provided with the product.

4.4 Installation Procedure

Place the fixing brackets contained in the fixing kit as shown in figure

☞ **CAUTION**
Tightening torque: 130Ncm or screw each fixing screw until the bezel corner gets in contact with the panel.
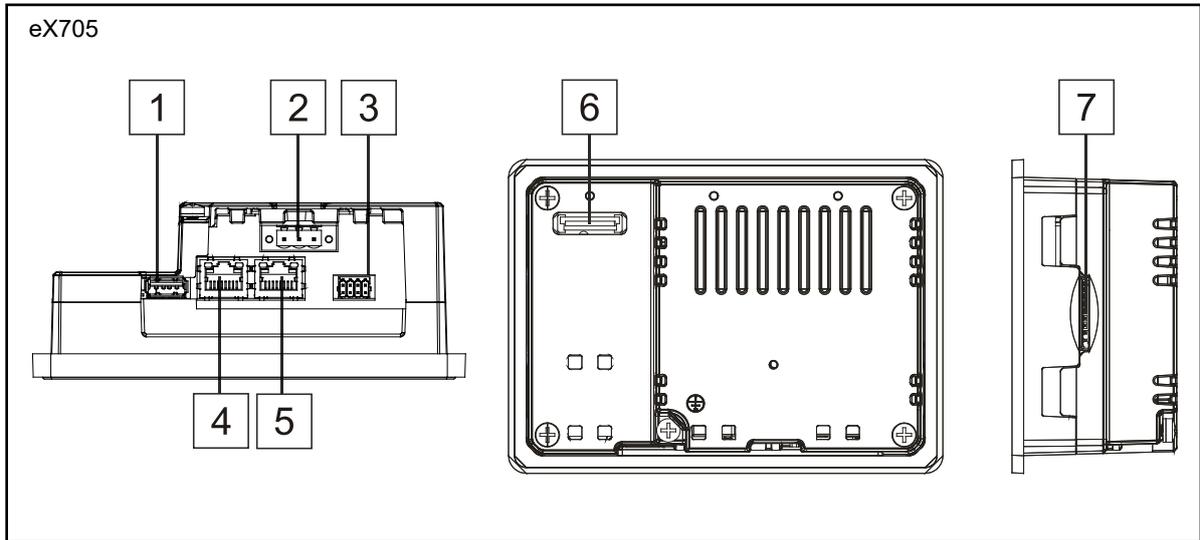
5 Connections

Fig. 5.1

1. USB Port
2. Power Supply
3. Serial port
4. Ethernet Port 0 (10/100Mb)
5. Ethernet Port 1 (10/100Mb)
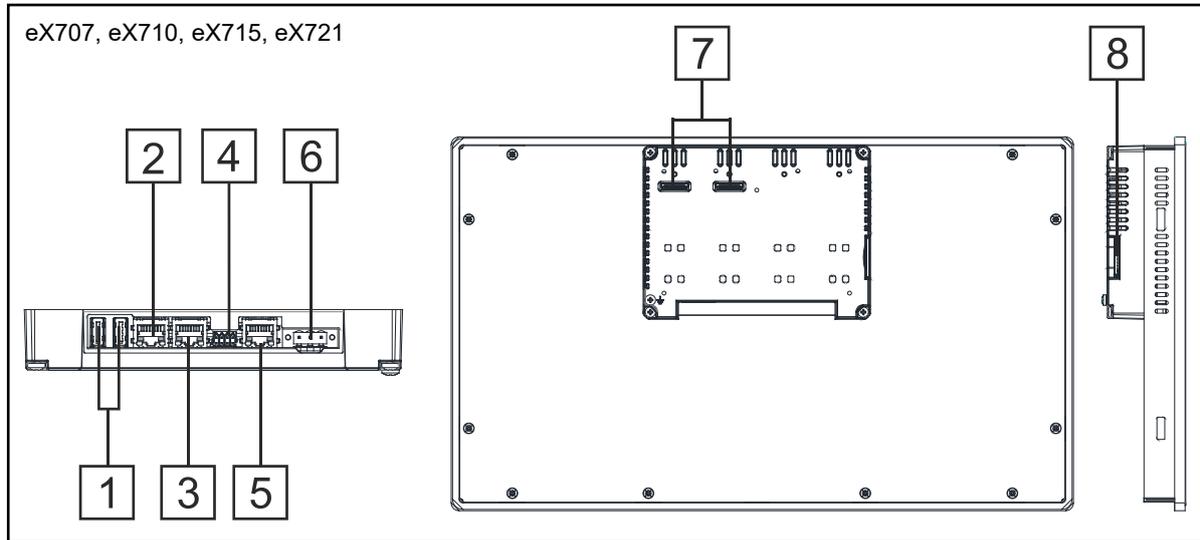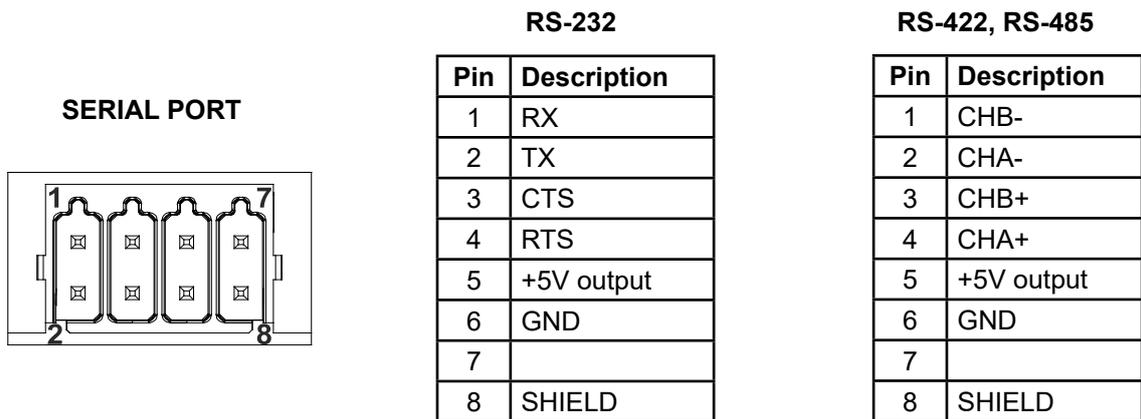6. Expansion slot for Plugin module
7. SD Card Slot

Fig. 5.2

1. USB port
2. Ethernet port 2 (10/100Mb)
3. Ethernet port 1 (10/100Mb)
4. Serial Port
5. Ethernet port 0 (10/100/1000Mb)
6. Power Supply
7. 2x Expansion slot for Plugin module
8. SD Card Slot

5.1 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: RS-232, RS-422, RS-485.

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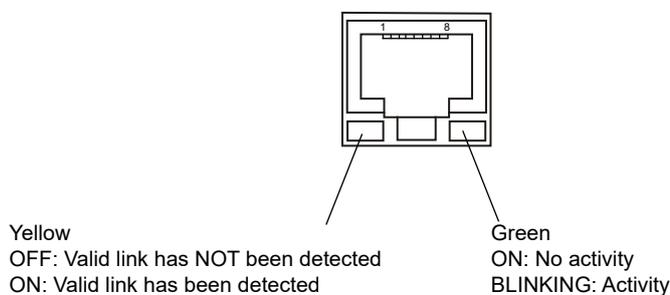
SERIAL PORT

RS-232

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

RS-422, RS-485

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

To operate in RS-485 pins 1-2 and 3-4 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 status indicators. Please see description in figure.

Yellow
OFF: Valid link has NOT been detected
ON: Valid link has been detected

Green
ON: No activity
BLINKING: Activity

5.3 Optional plugin module

eX Series 700 panels have several optional plugin module, multiple modules configurations are possible.
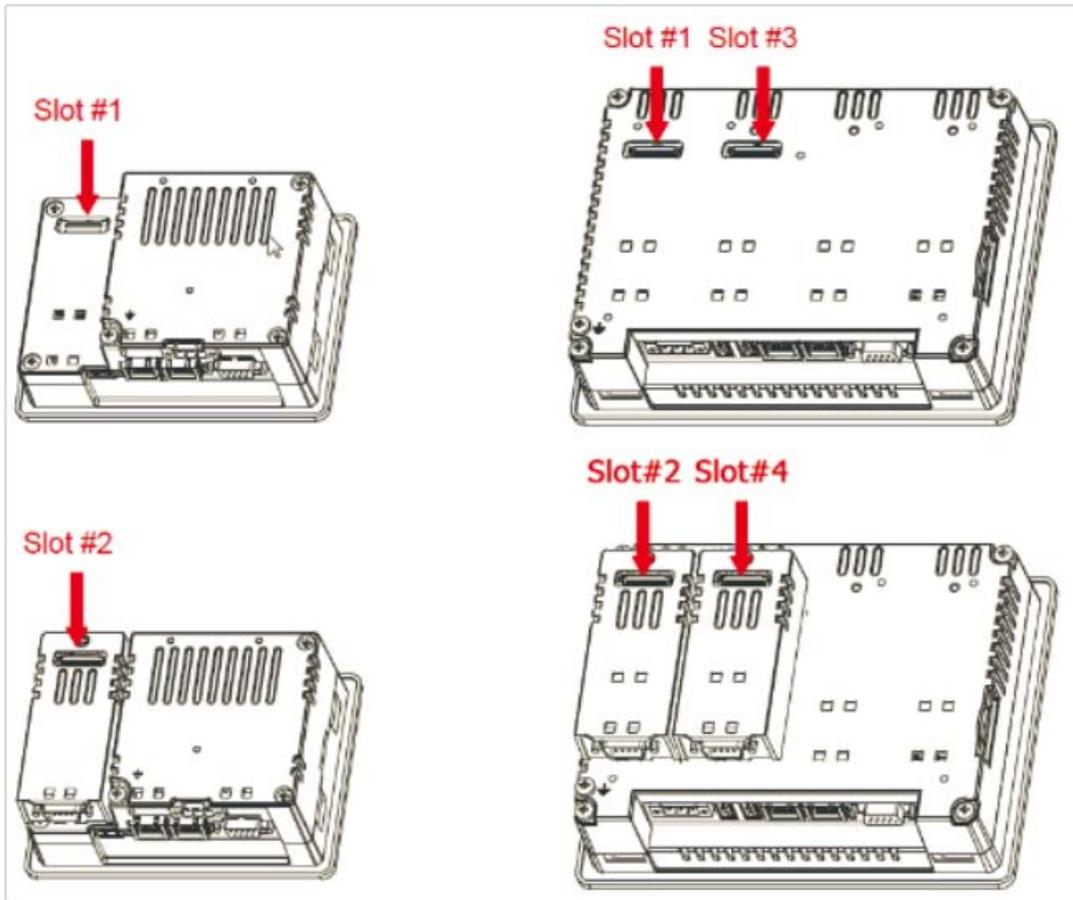
Slot#2 and Slot#4 are available only if plugin module has the "bus extension connector".

Each slot carries three communication channels:
• 1 serial interface
• 1 CAN interface
• 1 SPI interface

Note: It is not possible to stack two modules that are using the same type of interface.

Below you can find relation between modules and max number of modules that can be used into eX series 700 panels, based on their Interface Type:

Module	Application	Max Modules	Interface Type	Bus Extension connector
PLCM01	CAN	2	CAN	Y
PLCM01-NE	CAN	2	CAN	N
PLCM02	KNX	1	Serial	N
PLCM03	Serial RS232	2	Serial	Y
PLCM04	Serial RS485	2	Serial	Y
PLCM05	CODESYS License	1		Y
PLCM06	Profibus DP	1	SPI	N
PLIO03	Multifunction I/O	1	SPI	N
PLIO04	Multifunction I/O	1	SPI	N
PLIO06	Compact I/O	2	SPI	N

Max modules refers to max number of modules can be plugged into the HMI (all slots),

If you are planning to use PLCM03 and PLCM04 (additional serial ports) you will obtain following "COM - Slot#" association:
- 		a module plugged in Slot#1 or into Slot#2 will be COM2,
- 		a module plugged in Slot#3 or into Slot#4 will be COM3.

If you are planning to use two PLCM01 (CAN interface) you will obtain following Slot# association:
- 		a module plugged in Slot#1 or into Slot#2 will be the CanPort 0,
- 		a module plugged in Slot#3 or into Slot#4 will be the CanPort 1.

6 Power Supply, Grounding and Shielding

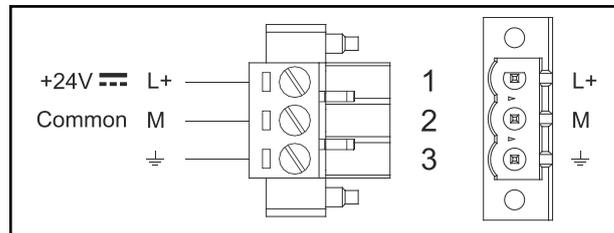The power supply terminal block is shown in the figure below.

Fig. 6.1

3 conductor 1,5mmq wire size minimum, minimum temperature conductor rating 105°C.

Note: *Ensure that the power supply has enough power capacity for the operation of the equipment.*

The unit must always be grounded to earth with 1,5mmq wire size minimum. 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 connect to 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 shown in figure (see below) with a dashed line.
When using the floating power scheme, note that the panes 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.
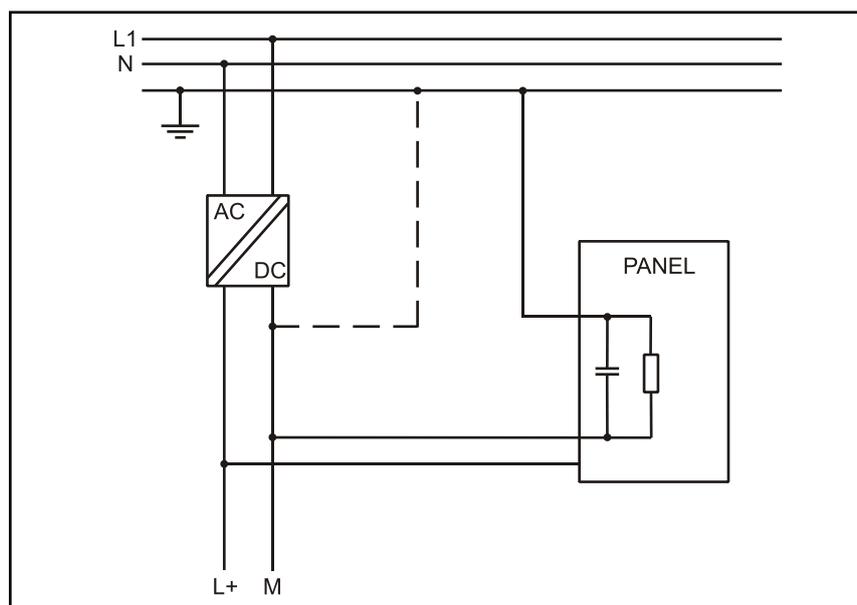The suggested wiring for the power supply is shown below.

Fig. 6.2

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

7 Battery

These devices are equipped with rechargeable Lithium battery, not user-replaceable.
The following information is maintained by the battery:

- hardware real-time clock (date and time)

Charge:
At first installation must be charged for 48 hours.
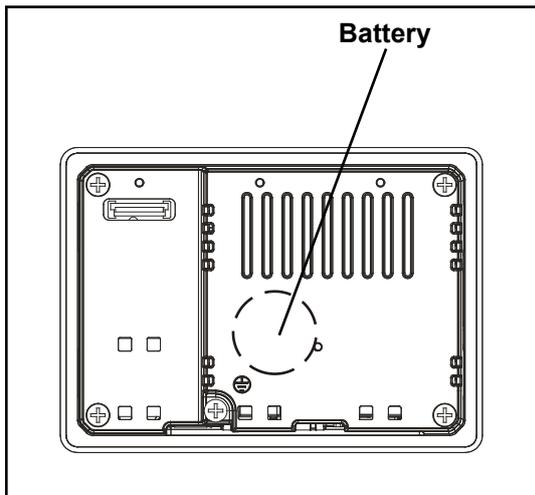When the battery is fully charged, it ensures a period of 3 months of data back-up at 25°C.
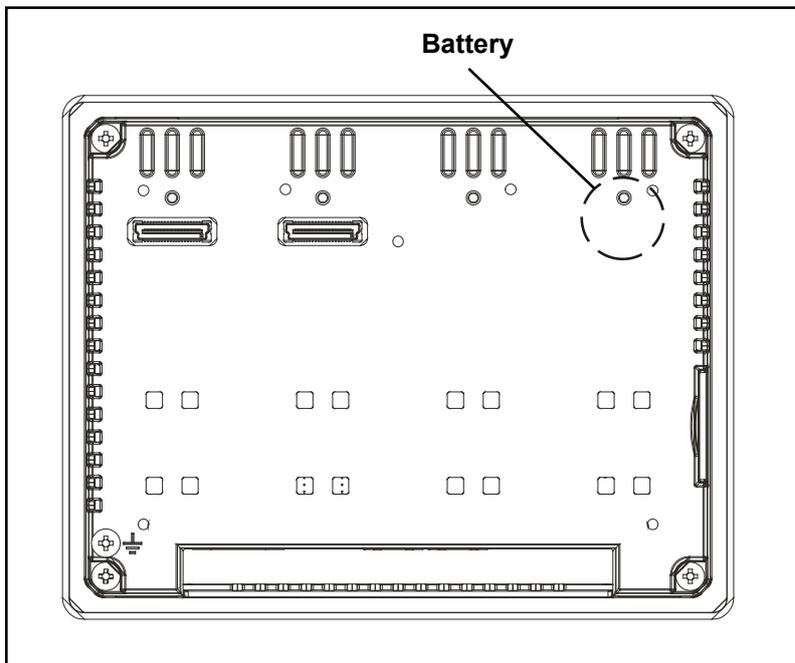
Fig. 7.1: eX705

Fig. 7.2: eX707, eX710, eX715, eX721

⚠ **ATTENTION**
Dispose of batteries according to local regulations.

8 Special Instruction for Use

- Install the HMI device according to the accompanying installation instructions.
- Ground the HMI device according to the accompanying installation instructions.
- Only qualified personnel may install the HMI device or repair it.
- Ensure that the aeration holes are not covered.
- Care shall be taken not to allow layers of dust to form on the faceplate of the HMI device in a way that might cause the accumulation of static charges. Keep the faceplate of the HMI device clean: the equipment must be cleaned only with a soft cloth and neutral soap product. Do not use solvents.
- This device should not be used for purposes and methods other than indicated in this document and in the documentation accompanying the product.

9 Getting Started

eX Series 700 HMI products delivery configuration is based on a loader. Use the services of the loader to install applications on the device such as JMobile runtime or browsers.
JMobile Studio version V2.6 or higher is required. JMo¬bile 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. In JMobile Studio select 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.

10 System Settings

eX Series 700 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 from the HMI screen or remotely using a Web browser Chrome v44 or higher using port 443. To connect enter the address https://IP/machine_config where IP is the IP address of the HMI device. Default username is "admin", default password is "admin". Use navigation menu on the left side of the screen to browse through the available options.
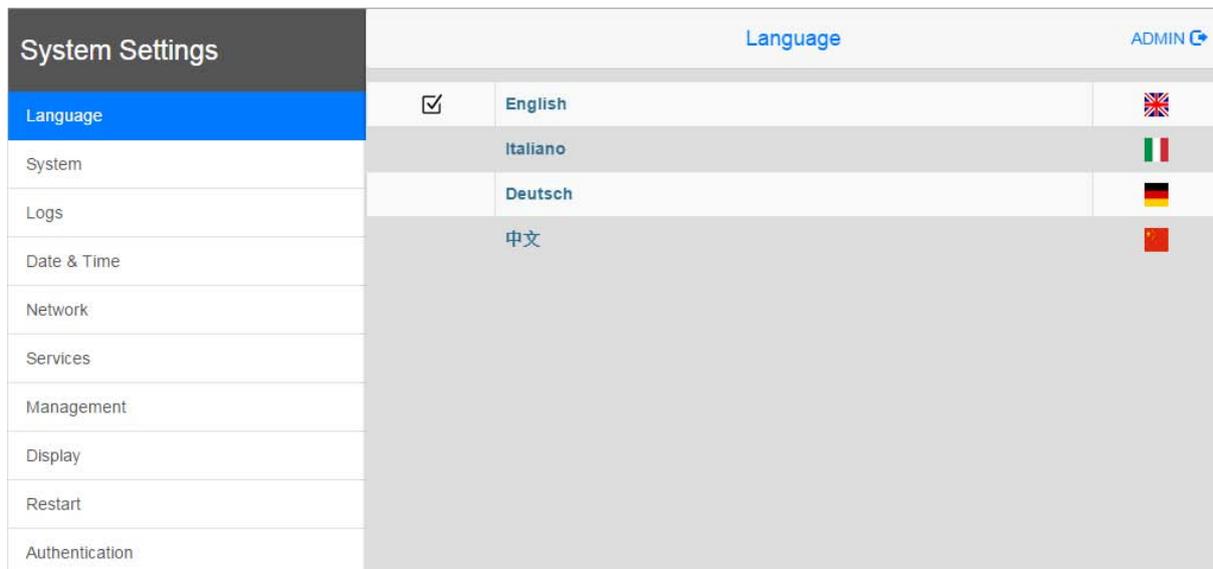
The active item of menu is highlighted on the left side of the screen. The right side shows related information and settings. Depending on the size of the HMI screen, both menu and content of selected item may be shown on screen at the same time or not.

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 additionally includes commands dedicated to system upgrade and recovery not available when running in User Mode.

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

Factory default status   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 device screen to recall 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 device 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 information about platform, status and timers (like System on time, backlight on time).
Logs	Enable persistent log for BSP and allows exporting 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, routing and bridging.
Services	Enable/disable services. Examples of services are: OpenSSH server, Bridge, Cloud, Router, SNMP and logging.
Management	Update of BSP components (Main OS, Config OS, Boot loader, XLoader), check for partitions consistence, update of splash screen, information 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 display brightness, configure automatic backlight turnoff and select HMI orientation (90°, 180°, 270° and 360°).
Restart	Restart the device. "Main OS" option restarts the device in User Mode, "Config OS" option restarts the device in System Mode showing System Settings.
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: *Additional informations on System Settings are available in dedicated manual.*

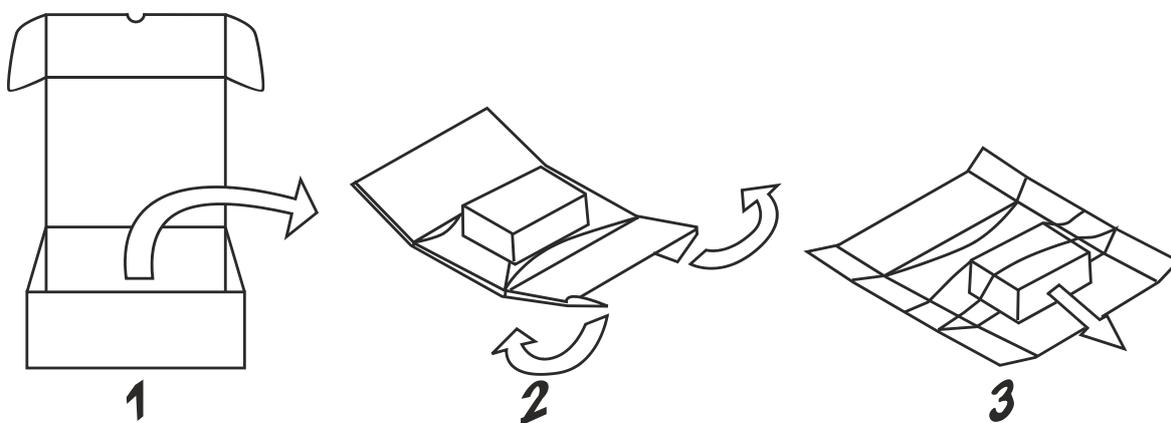# 11   Unpacking and Packing Instructions
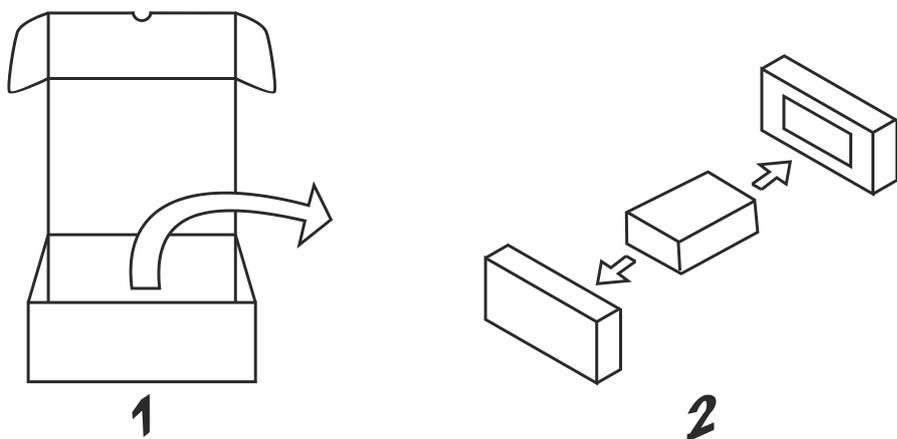
Fig. 11.1: eX705, eX707, eX710

Fig. 11.2: eX715, eX721

to repack the unit, please follow the instructions backwards.