Application Note

FESTO

CDPX-X-E2-W-5-EX2
Manual

CDPX-X-E2-W-5-EX2

This Application Note describes the main features of the Festo operator panels. The manual refers to the following model CDPX-X-E2-W-5-EX2. This operational guidelines described below is information which relates to the device, installation, transportation, storage, assembly, use and maintenance.

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1 Components/Software used

1.1 Software Used

Type/Name	Software Version
Festo Designer Studio	V4.5.0.224

Table 1.1: Software used

1.2 Hardware Used

Type/Name	Firmware Version
CDXP-X-E2-W-5-EX2	Config-OS 1.3.638 Main-OS 1.3.638 Bootloader 1.0.11
EtherNet Cables	NEBC-R3G8M22-K-3-N-S-R3G8
	NEDU-L2R1-R3U1G12-5L1-1L2-K-R3L1G12M22

Table 1.2: Hardware used

2 APPLICATION NOTE DESCRIPTION

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

3 Product Overview

Festo CDPX products are ideal for field installation in critical areas. High-resolution displays and multitouch PCAP touchscreen with a robust glass front.
Power-over-Ethernet (PoE) for maximum simplicity of connection using standard shielded CAT 5 wiring. Full IP protection with the use of dedicated connectors for the maximum flexibility of installation, from mounting arm to a simple M22 hole. The product includes environment and motion sensors to make this device a true IIoT edge device for Industry 4.0 applications.
The CDPX product family has been optimized for use as an embedded browser or as a Designer Studio HMI device.

- Open platform for Linux applications
- Performing HTML5-compatible browser with graphic accelerator
- Designer Studio runtime with OPC UA Server and Client
- Optional CODESYS V3 PLC for integrated HMI and control applications
- Built-in sensors (temperature and acceleration)

4 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 B
EN 61000-6-3	CISPR 16-2-3	

EN 61000-6-2	EN 61000-4-2
EN 61000-6-1	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 in residential, commercial and light industrial environments may require special measures to ensure compliance with EN 61000-6-3.

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

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

5 Product Identification

The product may be identified by the indications in the back 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 the information reported is shown below:

product name	CDPX-X-E2-W-EX2
part number	8155219
year/week of production	xx/yy
serial number	AA00012P8000000561AA
approvals	CE / UL / C-Tick / ...

6 Technical Specifications

Touchscreen technology	Projected capacitive – Multitouch
Back-up battery	3V 7mAh Vanadium-Lithium, rechargeable, not user replaceable, model VL1220.
Flash	4GB
RAM	1GB
Hardware clock	Clock/Calendar with back-up battery
Accuracy RTC (at 25°C)	‹100ppm

Environmental conditions		
Operating temperature (surrounding air temperature)	-20 - +55°C (vertical installation)	EN-60068-2-14
Storage temperature	-30 - +80°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	9 – 150 Hz, 1 g 5 - 9 Hz, 7 mm $_{p-p}$	EN 60068-2-6
Shock	± 50 g, 11 ms, 3 pulses per axis	EN60068-2-27
Protection class	IP67 (requires appropriate connectors and cables)	EN 60529
Electromagnetic Compatibility (EMC)		
Radiated disturbance test	Class B	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 immnity test	80 MHz ffi 1 GHz, 10V/m 1,4 GHz ffi 2 GHz, 3 V/m 2 GHz ffi 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

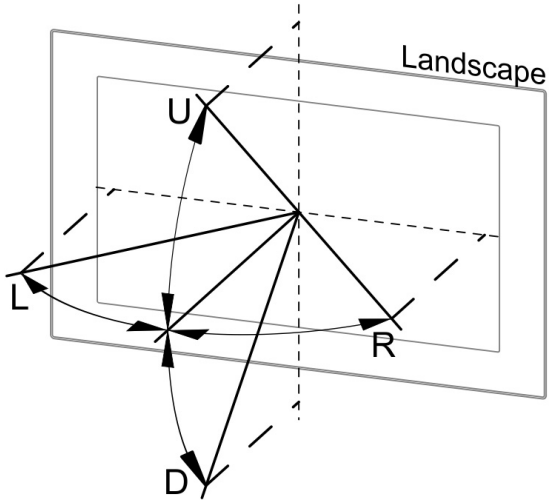
Durability information

Backlight service life (LED type)	40000 Hrs. or more (Time of continuous operation until the brightness of the backlight reaches 50% of the rated value when the surrounding 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.

Viewing angles

For the viewing angles values (U,D,R,L) of the display types, see the technical data of the respective device.



Legend:	Display viewing angle
U	From top
D	From bottom
L	From left
R	From right

The viewing angles are specified for the horizontal (L,R) and vertical (U,D) axes in reference to the vertical axis of the display.
The specified viewing angles above always refer to the standard mounting orientation.

Surface resistance

Chemical resistance of the front glass for an exposure time of 24 hours without visible changes:

- Betadine (10% Povidone Solution)
- Cola
- Electrode Gel/Paste
- Hydrogen Peroxide (3% Solution)
- NaCl (0.9% Solution)
- Coffee
- Dextrose (5% Glucose Solution)
- Hydrogen chloride (0.5% Solution PH=1)
- Isopropyl Alcohol
- Sodium Hypochlorite
- Ethyl Alcohol (70%-90%)
- Quaternary ammonium compound

Properties multitouch PCAP touchscreen

Number of fingers	5
Glove operation	Yes
Passive stylus pens	Yes
Active stylus pens	No
Hardened front glass	Yes

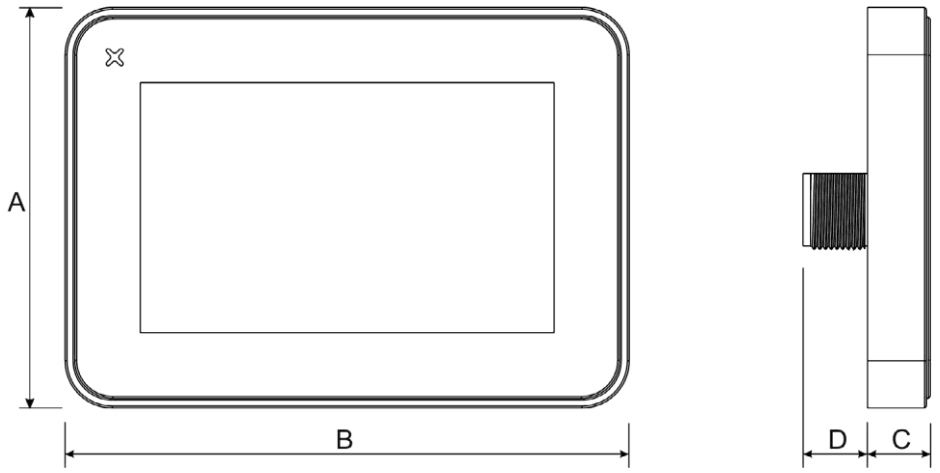
Operation with gloves

Projected capacitive touch screens (PCAP) are suitable for operation with or without gloves.
A large number of gloves (rubber gloves, light/heavy leather gloves, disposable latex gloves, etc.) are supported.
Due to the variety of commercially available gloves, however, FESTO cannot guarantee all types

7 Technical Data

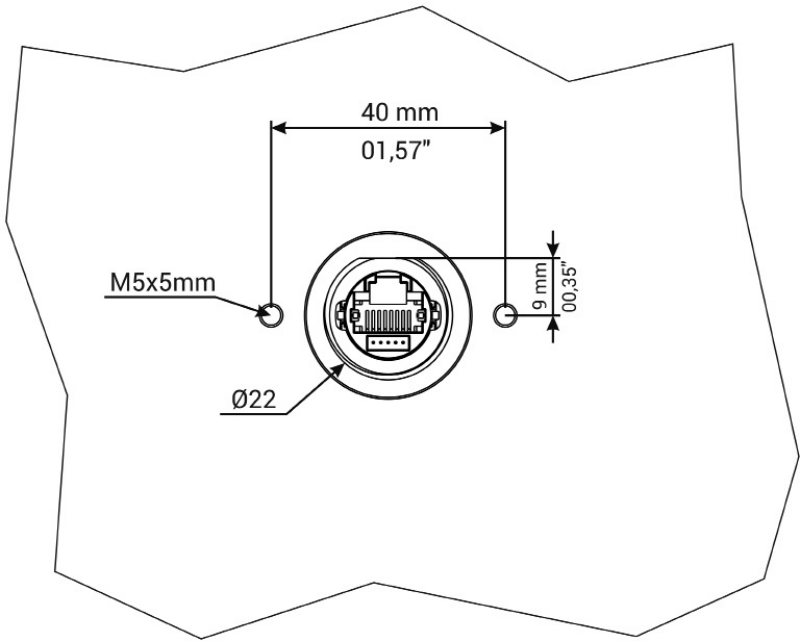
Model	CDPX-X-E2-W-EX2
Display / Backlight	TFT Colour / LED
Colours	16M
Resolution	800 x 480
Diagonal (inches)	5” widescreen
Viewing angles horizontal	Direction L / Direction R Typ. 70°
Viewing angles vertical	Direction U Typ. 50° / Direction D Typ. 70°
Dimming	yes to 0%
CPU	ARM Cortex-A9 dual core 800 MHz
Operating System	Linux RT
Flash	4GB
RAM	1GB
Ethernet port	10/100 PoE
USB port	1 (Host V2.0, request special connector)
Battery	rechargeable
Real Time Clock	yes
Power supply	IEEE 802.3af PoE
Current consumption	6W
Weight	0.5 Kg

7.1 Dimensions



MODEL	A	B	C	D
CDPX-X-E2-W-EX2	105.1mm/4.13”	148.3mm/5.83”	16,5mm/0.64”	17mm/0.66”

Rear view



7.2 Installation Environment and Procedure

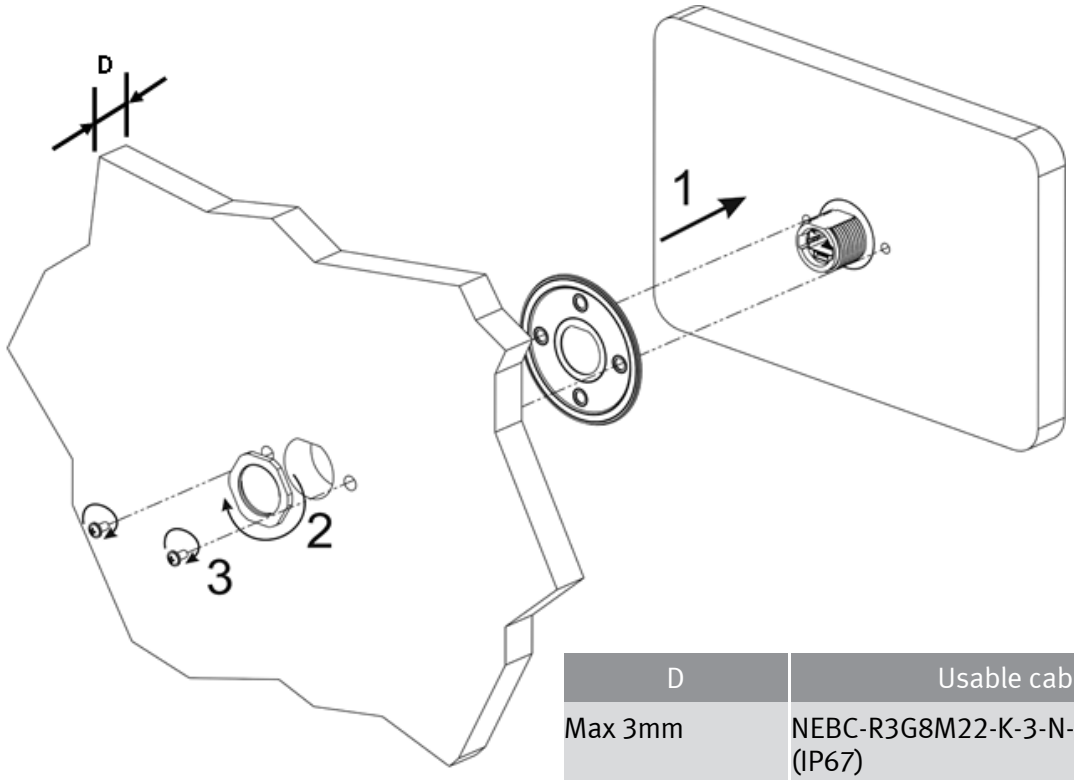
Avoid prolonged exposition to direct sunlight to avoid the risk of overheating the device.

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.

IP67 is guaranteed only if a NEBC-R3G8M22-K-3-N-S-R3G8 cable is used and if:

- max deviation from the plane surface to the cut-out: <=.5mm
- thickness of the case where is mounted the equipment: from 1,5mm to 3mm
- max surface roughness where the gasket is applied: O120 um



D	Usable cable
Max 3mm	NEBC-R3G8M22-K-3-N-S-R3G8 (IP67)
Max 10mm	Standard Ethernet

CAUTION

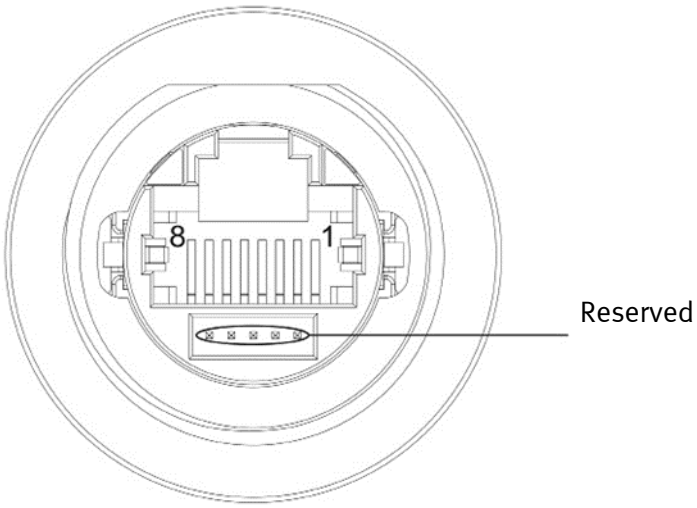
Tightening torque: 1000Ncm for nut, 130Ncm for screws

7.3 Safety instructions

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

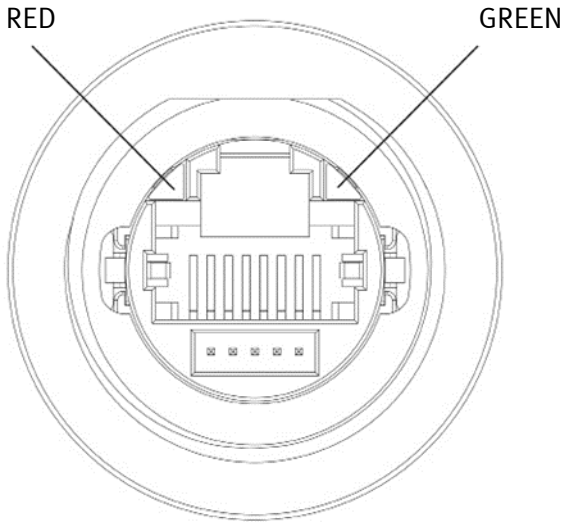
8 Connections

Ethernet Port



Pin	Description
1	TX+
2	TX-
3	RX+
4	n/c
5	n/c
6	RX-
7	n/c
8	n/c

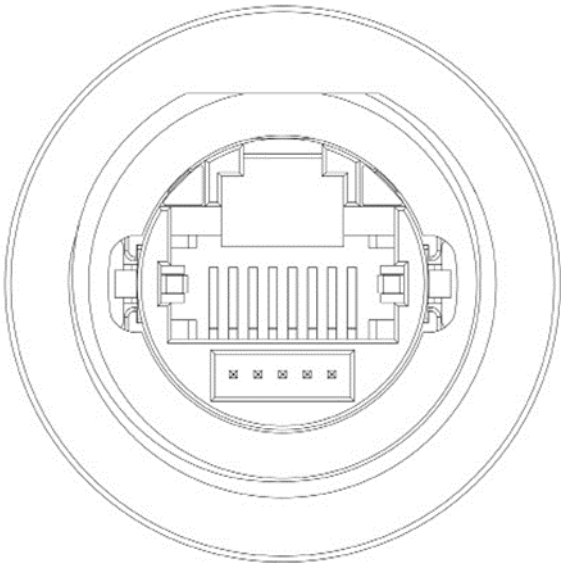
The Ethernet port has two status indicators. Please see description in figure



Red	Green
OFF: Valid link has not been detected	ON: No activity
ON: Valid link has been detected	Blinking: Activity

9 Power Supply, Grounding and Shielding

The power supply terminal block is shown in the figure below



Use a shielded CAT 5 cable or higher

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 shielded CAT 5 cable. Grounding helps limit the effects of noise due to electromagnetic interference on the control system.

The earth connection can also be made using the screws located near the connector.
A label helps identify the ground connection.

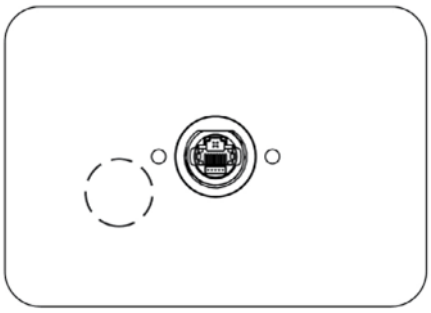
All the electronic devices in the control system must be properly grounded. Grounding must be performed according to applicable regulations.

10 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 date and time back-up at 25°C.

◌ Battery



ATTENTION
Dispose of batteries according to local regulations.

ATTENTION
This device cannot be disposed of as a domestic waste but according to WEEE European Directive 2012/19/EU

11 Special Instructions for Use

- The equipment shall only be used in an area of not more than pollution degree 2, as defined in IEC/EN 60664-1.
- The equipment shall be installed in an enclosure that provides a degree of protection not less than IP 54 in accordance with IEC/EN 60079-15.
- Transient protection shall be provided that is set at a level not exceeding 140 % of the peak rated voltage value at the supply terminals to the equipment.
- 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.
- Care shall be taken not to allow layers of dust to form on the graphic panel 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.

12 Getting Started

CDPX-X-E2-W-5-EX2 HMI products delivery configuration is based on a loader. Use the services of the loader to install applications on the device such as Designer Studio runtime or browsers.

Designer Studio version V4.5 or higher is required. Designer Studio is a software tool that must be properly installed on a computer running Microsoft Windows.

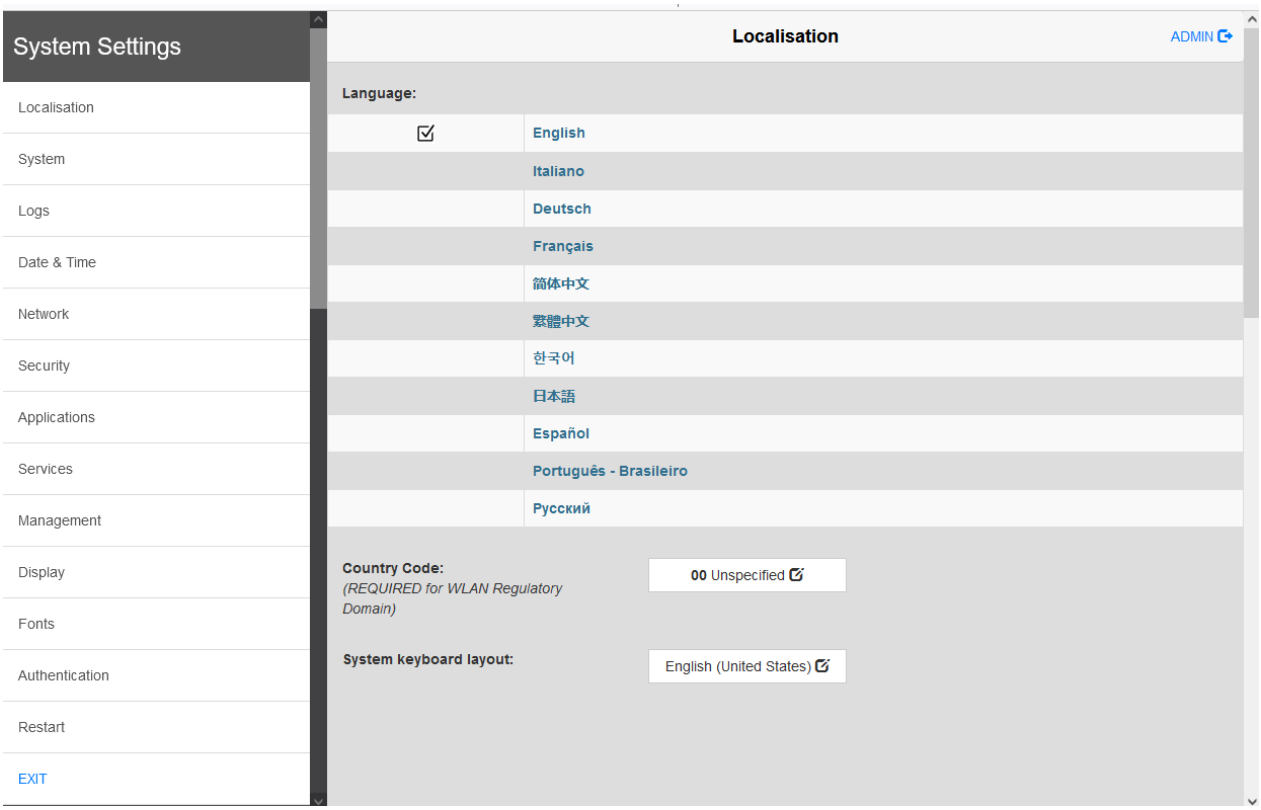
There are two options to transfer a Designer Studio application project to a HMI device:

Ethernet	Connect the HMI device to the computer with an Ethernet network. In Designer 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 Designer Studio to access the network.
USB	Create an Update Package using Designer Studio and copy it to a USB Flash drive (to transfer via USB, use the dedicated accessory cable).

13 System Settings

CDPX-X-E1-../E2-.. 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 “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	Designer Studio runtime is running or the HMI device is in “factory default” status.
System Mode	Designer Studio 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:	Designer Studio runtime is running. Press “System Setting” button on the HMI screen. 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:**

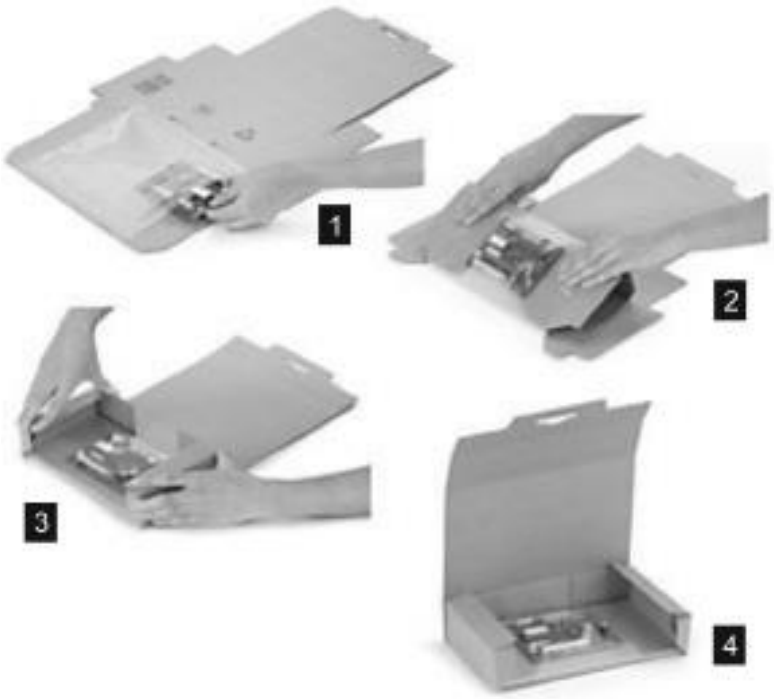
Normal operation:	If Designer Studio runtime is not running: Press “System Setting” button on the device screen to recall System Settings in User Mode. Select “Restart” -› “Config OS” to reboot in System Mode. If Designer Studio runtime is running: recall context menu and select “System Settings”. To 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 Designer Studio 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 information on System Settings are available in dedicated manual

14 Unpacking and Packing instructions



To repack the unit, please follow the instructions backwards