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iX T12C

Installation Manual
English

Installation manual for iX T12C

Foreword

All operator panels are developed to satisfy the demands of human-machine communication. Built-in functions such as displaying and controlling text, dynamic indication, time channels, alarm and recipe handling are included.

The operator panel works primarily in an object-oriented way, making it easy to understand and use. Configuration is carried out on a PC using the iX Developer configuration tool. The project can then be transferred and stored in the operator panel itself.

Various types of automation equipment such PLCs, servos or drives can be connected to the operator panels. In this manual, the term "the controller" refers to the connected equipment.

This manual explains how to install the operator panel. Please refer to the iX Developer reference manual for further information.

Order no: MAEN082D

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Contents

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1   Safety Precautions

Both the installer and the owner and/or operator of the operator panel must read and understand this installation manual.

1.1   General

- Read the safety precautions carefully.
- Check the delivery for transportation damage. If damage is found, notify the supplier as soon as possible.
- Do not use the operator panel in an environment with high explosive hazards.
- The supplier is not responsible for modified, altered or reconstructed equipment.
- Use only parts and accessories manufactured according to specifications of the supplier.
- Read the installation and operating instructions carefully before installing, using or repairing the operator panel.
- Never allow fluids, metal filings or wiring debris to enter any openings in the operator panel. This may cause fire or electrical shock.
- Only qualified personnel may operate the operator panel.
- Storing the operator panel where the temperature is lower/higher than recommended in this manual can cause the LCD display liquid to congeal/become isotopic.
- The LCD display liquid contains a powerful irritant. In case of skin contact, wash immediately with plenty of water. In case of eye contact, hold the eye open, flush with plenty of water and get medical attention.
- The figures in this manual serves an illustrative purpose. Because of the many variables associated with any particular installation, the supplier cannot assume responsibility for actual use based on the figures.
- The supplier neither guarantees that the operator panel is suitable for your particular application, nor assumes responsibility for your product design, installation or operation.
- It is recommended to turn on and shut down the operator panel at least once before installing any components/cards or before connecting the operator panel to external devices, like for example serial devices.

1.2   During Installation

- The operator panel is designed for stationary installation on a plane surface, where the following conditions are fulfilled:
  - no high explosive risks
  - no strong magnetic fields
  - no direct sunlight
  - no large, sudden temperature changes

- Install the product according to the accompanying installation instructions.
- Ground the product according to the accompanying installation instructions.
- Only qualified personnel may install the operator panel.
- Separate the high voltage, signal and supply cables.
- Make sure that the voltage and polarity of the power source is correct before connecting the product to the power outlet.

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- Peripheral equipment must be appropriate for the application and location.

1.3 During Use

- Keep the operator panel clean.
- Emergency stop and other safety functions may not be controlled from the operator panel.
- Do not use too much force or sharp objects when touching the keys, touchscreen etc.

1.4 Service and Maintenance

- Only qualified personnel should carry out repairs.
- The agreed warranty applies.
- Before carrying out any cleaning or maintenance operations, disconnect the equipment from the electrical supply.
- Clean the display and surrounding front cover with a soft cloth and mild detergent.
- Replacing the battery incorrectly may result in explosion. Only use batteries recommended by the supplier. During the warranty period, the battery needs to be replaced by an authorized Beijer Electronics service center.
- The unit can be reset by using the reset switch located behind the fan.

1.5 Dismantling and Scrapping

- The operator panel or parts thereof shall be recycled according to local regulations.
- The following components contain substances that might be hazardous to health and the environment: lithium battery, electrolytic capacitor and display.

1.6 Appearance of Air in Touch Screen

- The layer structure of the touch screen contains air and in rare cases appearance of bubbles can arise. This is purely cosmetic and does not affect any functionality of the panel. The appearance can occur under certain environmental conditions such as temperature, humidity, and atmospheric pressure.

2 Installation

2.1 Space Requirements

- Maximum installation plate thickness: 8 mm
- Space requirements in millimeters when installing the operator panel:

100 mm

242,2 mm

50 mm

50 mm

100 mm

100 mm

340 mm
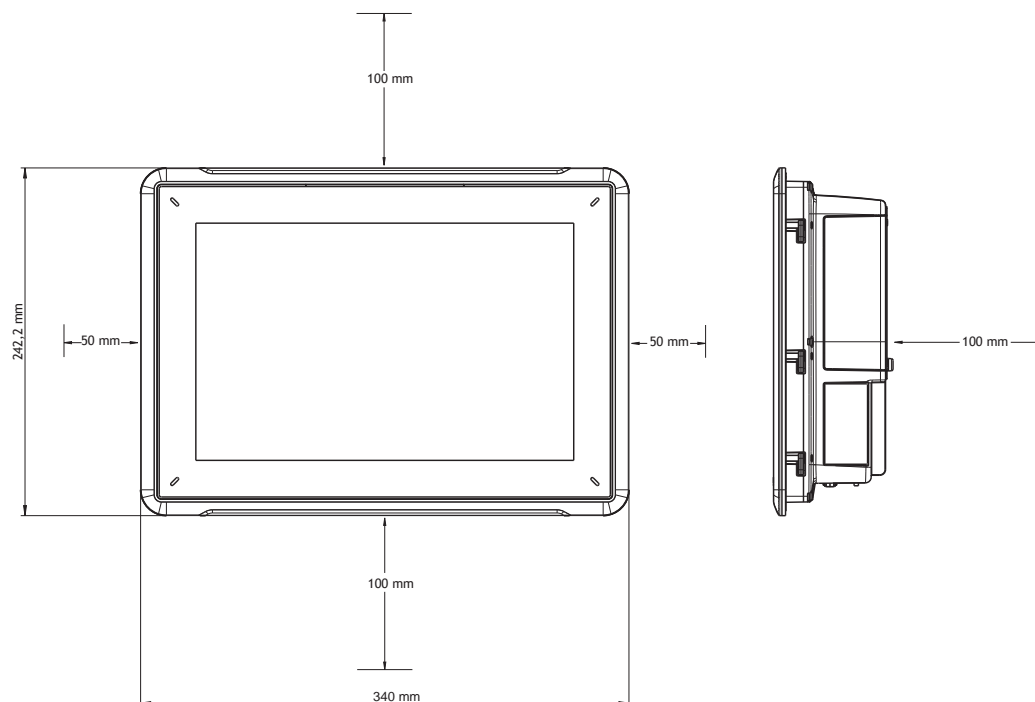
Note:

The dimensions on the drawing are not proportional.

Caution:

The openings on the enclosure are for air convection. Do not cover these openings.

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2.2   Installation Process

The following is needed:

•   A Torx TX7 screwdriver

1.   Unpack and check the delivery. If damage is found, notify the supplier.

Note:
Place the operator panel on a stable surface during installation.
Dropping the panel or letting it fall may cause damage.

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2.   Use the cut out dimensions that are included on the outline drawing, found in section *Operator Panel Drawings* and in the *Technical Data* table, to cut a correct opening in the cabinet. A separate cut out drawing is available for download from the Beijer Electronics web site.

3.   Secure the operator panel in position by screwing the M4 Torx screw, allowing the built-in bracket to tighten against the panel:

M4 x 20.7
0.4 Nm
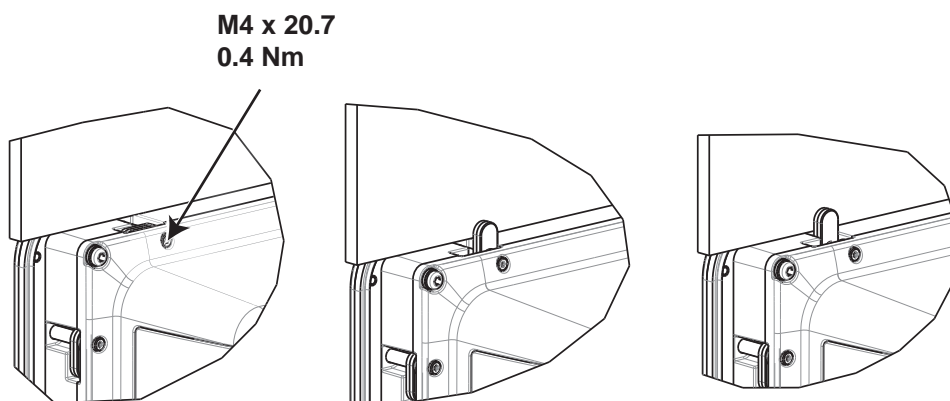
4. Connect the cables in the specified order, according to the drawing and steps below.

Caution:
- Ensure that the operator panel and the controller system have the same electrical grounding (reference voltage level), otherwise errors in communication may occur.
- The operator panel must be brought to ambient temperature before it is started up. If condensation forms, ensure that the operator panel is dry before connecting it to the power outlet.
- Ensure that the voltage and polarity of the power source is correct.
- Use only shielded communication cables.
- Separate high voltage cables from signal and supply cables.
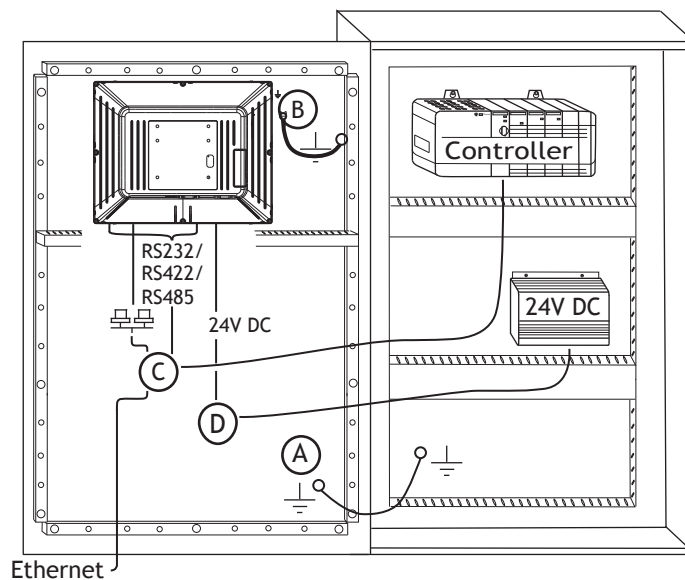
- Connect cable A.
- Connect cable B, using an M5 screw and a grounding conductor (as short as possible) with a cross-section of minimum 2.5 mm^2.
- Connect cable C.
- Connect cable D. The recommended cross-section of the cable is 2.5 mm^2.

5. Carefully remove the laminated film over the operator panel display, to avoid static electricity that could damage the panel.

2.2.1   Connections to the Controller

For information about the cables to be used when connecting the operator panel to the controller, please refer to the help file for the driver in question.

2.2.2   Other Connections and Peripherals

Cables, peripheral equipment and accessories must be suitable for the application and its environment. For further details or recommendations, please refer to the supplier.

3   Hardware Replacement

This section contains instructions on how to replace operator panel hardware. Only components included in the latest bill of material and spare parts list are allowed.

3.1   Replacing the Fan and Filter

The following is needed:

- A new fan
- A Torx TX10 and a TX20 screwdriver

Note:
Make sure to use adequate ESD protection.

Follow the steps below to replace the fan and fan filter:

1. Power off the operator panel.

2. Remove the fan lid by removing the two M3x6 Torx screws.

3. Remove the fan filter.

4. Remove the fan by removing the two M4x35 Torx screws.
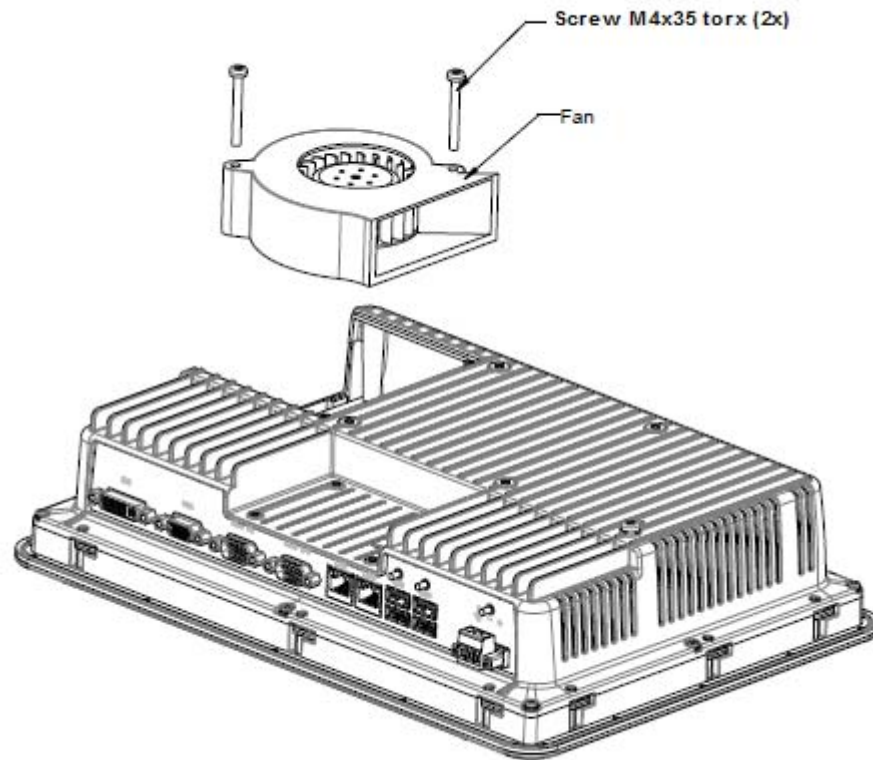
5. Reassemble with new fan and filter in reverse order. Use a maximum torque of 0.4 Nm when fastening the fan screws.

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3.2 Replacing the 2.5″ SATA Mass Storage

The following is needed:

- A new 2.5" SATA mass storage
- A TX10 Torx screwdriver

Note:
Make sure to use adequate ESD protection.

Follow the steps below to replace the 2.5" SATA mass storage:

1. Power off the operator panel.
2. Remove the front frame assembly by removing the eight M3x8 Torx screws on the back cover assembly.

Caution:
During disassembly, it is important to take care of the cable between the front and the rear part. If you disconnect a cable, be sure that the right cable will be in the right position when assembling.

Note:
The exchange of electronic components is only for experienced professionals. Incorrect handling of electronic components or cables plugged in wrong, can lead to the destruction of the device.

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3. Remove the four M3x4 Torx screws on the two hard drive brackets. Remove the two hard drive brackets.
4. Remove the two M3x6 Torx screws that are securing the brackets to the CPU board.

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5. Remove the hard disk drive from the hard drive connection on the CPU board.
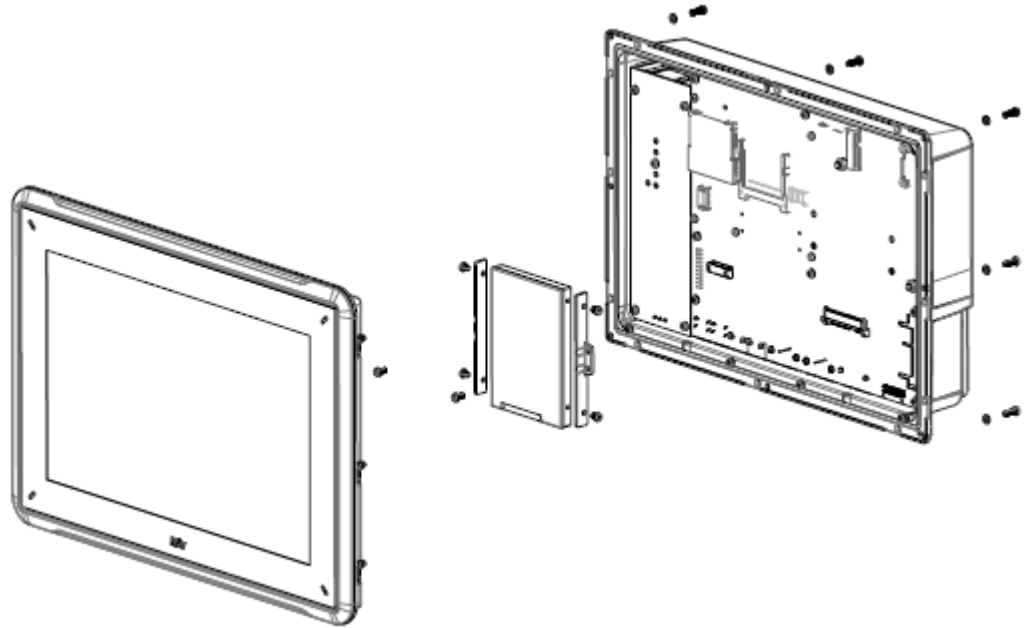
6. Reassemble with the new hard disk drive in reverse order.

1. 2.5" SATA mass storage
2. CompactFlash slot
3. CFast slot

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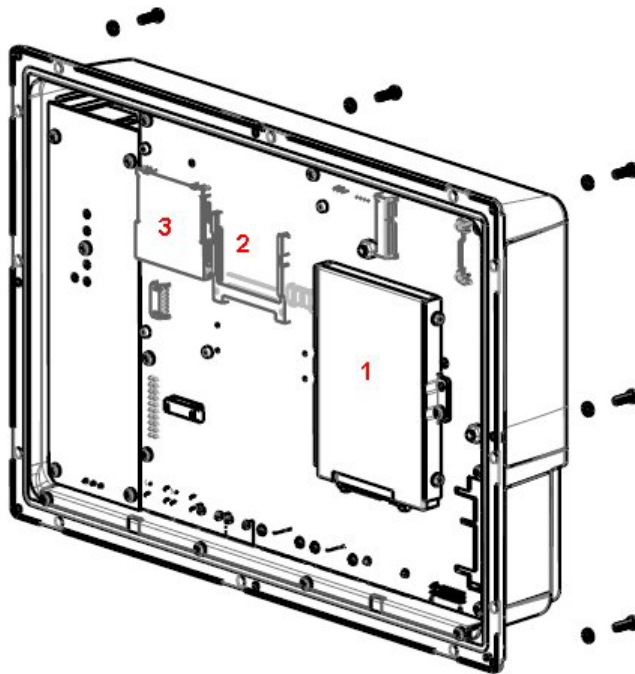
3.3 Replacing a CompactFlash or CFast Memory Card

The following is needed:
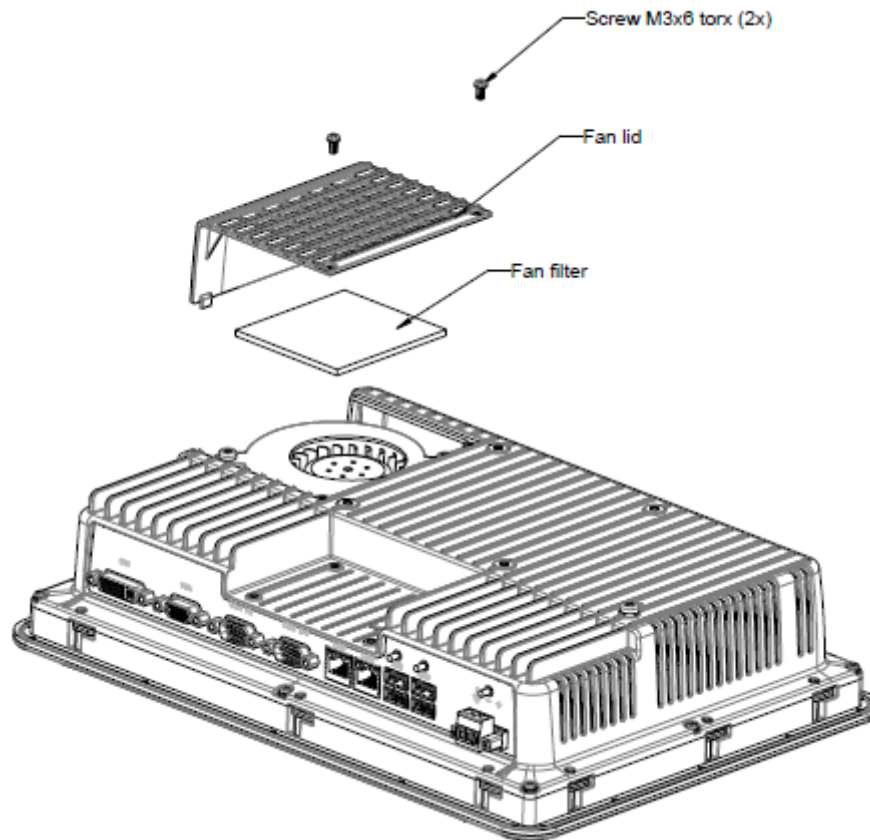- A new CompactFlash or CFast memory card.
- A TX10 Torx screwdriver

Note:
Make sure to use adequate ESD protection.

Follow the steps below to replace a memory card:

1. Power off the operator panel.

2. Follow the instructions in chapter *Replacing the 2.5" SATA Mass Storage* to remove the front frame assembly.

3. Install the new memory card in its intended slot illustrated in figure below.
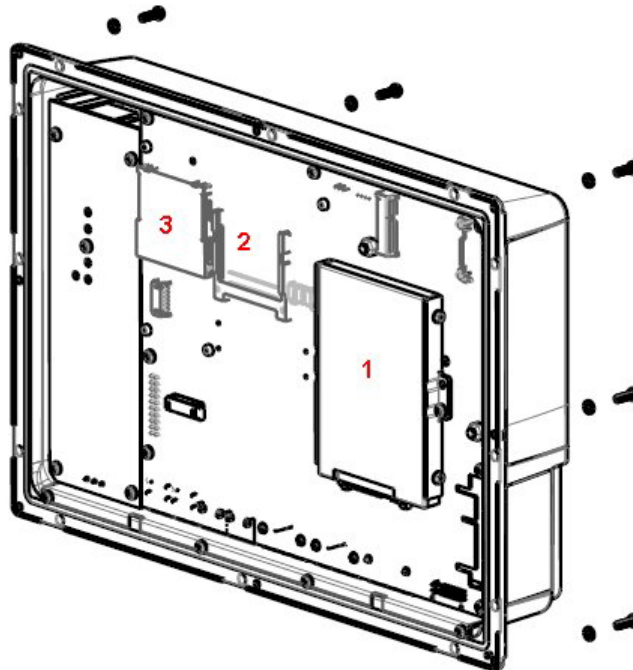
1. 2.5" SATA mass storage
2. CompactFlash slot
3. CFast slot

4. Reassemble in reverse order.

3.4 Replacing the Battery

The following is needed:

- A new BR 2032 (or CR 2032) battery.
- A Torx screwdriver

Note:
Make sure to use adequate ESD protection.

Follow the steps below to replace the battery:

1. Power off the operator panel.
2. Follow the instructions in chapter *Replacing the Fan and Filter* to remove the fan and access the battery.
3. Replace the battery.
4. Reassemble in reverse order.

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4 Technical Data

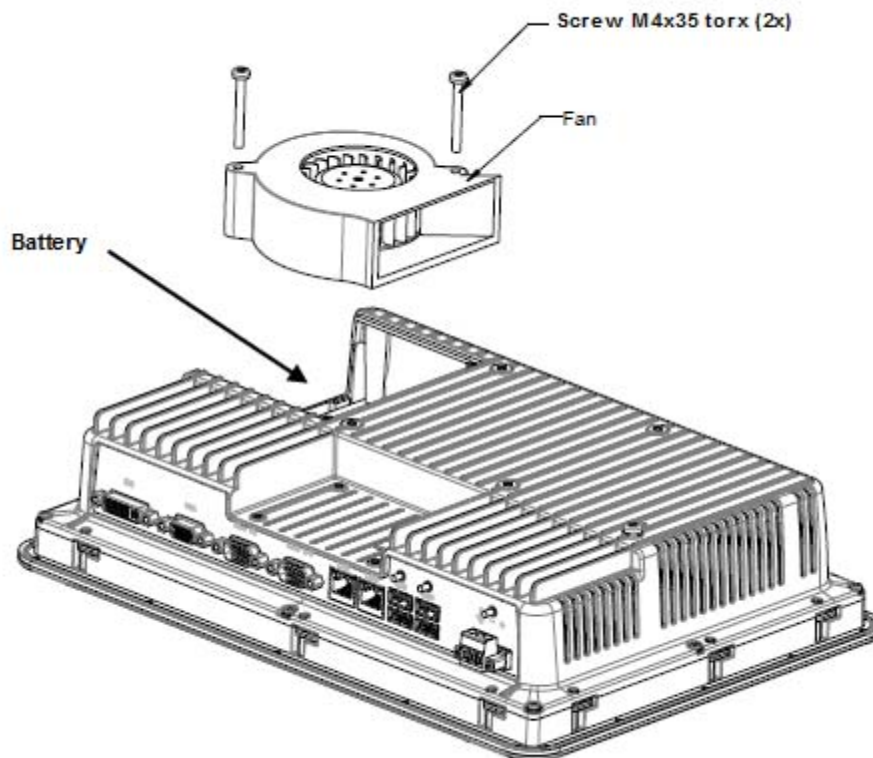| Parameter	iX T12C
Front panel, W × H × D	340 × 242 × 79 mm
Cut out dimensions, W × H	324 × 226 mm
Mounting depth	72 mm (172 mm including clearance)
Standalone mounting	VESA 100 × 100 Note: Maximum screw length for VESA mounting is 5.5 mm. Usage of longer screws may lead to damage.
Front panel seal	IP 65
Rear panel seal	IP 20
Touch screen material	Polyester on glass, resistive. Overlay: Autotex F157 or F207[1].
Touch screen operations	1 million finger touch operations
Reverse side material	Powder-coated aluminum
Frame material	Powder-coated aluminum
Weight	4.2 kg
Serial port for COM1 RS232 and COM2 RS422/RS485	9-pin D-sub contact with RS232 RTS/CTS, chassis-mounted female with standard locking screws 4-40 UNC Note: RS422 Interface is not available yet.
Serial port for COM3 RS232 and COM4 RS422/RS485	9-pin D-sub contact with RS232 RTS/CTS, chassis-mounted female with standard locking screws 4-40 UNC Note: RS422 Interface is not available yet.
Ethernet	2 × 10/100/1000 Base-T (shielded RJ 45)
USB	4 × USB Host 2.0, max output current 500 mA
Processor	Intel® Celeron® B810E (2 × 1.6 GHz), 2 MB L2 Cache, Intel® QM67 Chipset Optional: Intel® Core™ i3 2310E (2 × 2.1 GHz) (Hyperthreading), 3 MB L2 Cache, QM67 Chipset Optional: Intel® Core™ i7 2715QE (4 × 2.1 GHz) (Turbo 2.0, Hyperthreading), 6 MB L2 Cache, QM67 Chipset *for exact configuration please see price list
External storage media	via USB
Memory RAM	2 GB* / 4 GB* DDR-3 SO-DIMM 1333 MHz *depending on Processor Module
LED	1 × multi-color
Real time clock	Yes (on chip)
Battery	Lithium battery type BR 2032 (or CR 2032), exchangeable
Power consumption at rated voltage	107 W
Fuse	10 A

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Parameter	iX T12C
Power supply	DC input range: 18-32 V DC (140W) ATX standard CE: The power supply must conform with the requirements according to IEC 60950 and IEC 61558-2-4. UL and cUL: The power supply must conform with the requirements for class II power supplies.
Display	TFT-LCD with LED backlight. 1280 × 800 pixels, 16.7 million colors
VGA	1 × VGA: resolution max. 2048 × 1536@75Hz
DVI	1 × DVI-D single Link: Resolution max. 1600 × 1200 or 1920 × 1200 (with reduced blanking)
Active area of display, W × H	261.12 × 163.2 mm
Operating temperature	0 °C – +50 °C
Storage temperature	-20 °C – +70 °C
Relative humidity	5 - 85% non-condensed
Approvals and certifications	Information is available on the web site *www.beijerelectronics.com*

[1] See section *Chemical Resistance* for more information.

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5   Chemical Resistance

5.1   Metal Casing

The frame and casing material is powder-coated aluminum. This powder paint withstands exposure to the following chemicals without visible change:

Acetic acid 10%	Phosphoric acid 4%
Citric acid 10%	Phosphoric acid 10%
Diesel	Sea water
Distilled water	Sodium chloride 2%
Edible oil	Sodium chloride 20%
Fuel oil	Sulphuric acid 20%
Hydrogen peroxide 3%	Tap water

The powder paint shows limited resistance to the following chemicals at room temperature:

Butanol	Nitric acid 3%
Hydrochloric acid 5%	Nitric acid 10%
Isopropyl alcohol	Phosphoric acid 43%
Na-hypochlorite 10%	Turpentine

Note:
If exposure to any of the above chemicals is demanded, it is recommended to first test the chemical in a hidden spot of the metal casing.

The powder paint shows little or no resistance to the following chemicals at room temperature:

Acetic acid, conc.	Methyl-ethyl ketone	Toluene
Acetone	Nitric acid 30%	Trichlorethylene
Ammonia 5%	Phenol	Xylene
Ammonia, conc.	Sodium hydroxide 5%	97 octane unleaded petrol
Ethyl acetate	Sodium hydroxide 30%	98 octane leaded petrol

5.2 Touch Screen and Overlay

5.2.1 Autotex F157/207

Autotex F157 or F207 covers the overlay surrounding the touch screen.

Solvent Resistance

Autotex F157/F207 withstands exposure of more than 24 hours duration under DIN 42 115 Part 2 to the following chemicals without visible change:

Acetonitrile	Diesel Downey / Lenor[1]	Phosphoric acid (<30%)
Ajax / Vim in solution	Ethanol	Potassium ferricyanide
Alkalicarbonate solution[1]	Glycerine	Potassium hydroxide (<30%)
Ammonia (<40%)[1]	Glycol	Pure Turpentine
Acetic acid (<50%)	Gumption[1]	SBP 60/95[1]
Ariel powder in solution[1]	Hydrochloric acid (<36%)	Sulfuric acid (<10%)
Bleach[1]	Linseed oil	Tomato ketchup
Castor oil	Methanol	Trichloroacetic acid (<50%)
Caustic soda (<40%)[1]	Nitric acid (<10%)	White Spirit
Cutting oil	Paraffin oil	Windex[1]
Cyclohexanol	Persil powder in solution[1]	Wisk
Diacetone alcohol	Petroleum spirit[1]	-

[1] Extremely faint glossing of the texture was noted.

Autotex withstands DIN 42 115 Part 2 exposure of up to 1 hour duration to glacial acetic acid without visible change.

Autotex is not resistant to high pressure steam at over 100 °C or the following chemicals:

Concentrated mineral acids	Benzyl alcohol
Concentrated caustic solution	Methylene chloride

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5.2.2   Touch Screen Surface

The touch screen surface on the operator panel withstands exposure to the following solvents without visible change:

Solvents	Time
Acetone	10 minutes
Isopropanol	10 minutes
Toluene	5 hours

5.2.3   Autotex

It is recommended to use the Autoflex EBA 180Ltouch display protection film, that can be ordered from Beijer Electronics.

Solvent Resistance

Autoflex EBA 180L withstands exposure to the same chemicals as Autotex F157 or F207 according to section *Autotex F157/207*.

Outdoor Use

In common with all polyester based films, Autoflex EBA 180L is not suitable for use in conditions of long-term exposure to direct sunlight.

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6   Operator Panel Drawings

6.1   Connectors
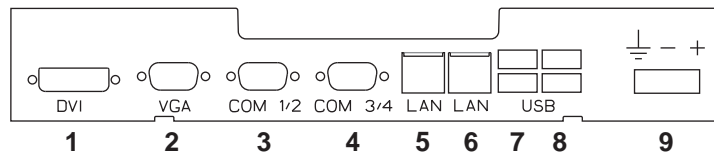
Pos.	Connector	Description
1	DVI	External monitor
2	VGA	External monitor
3	COM 3/4	Communication Ports
4	COM 1/2	Communication Ports
5	LAN Port B	1 × 10/100/1000 Base-T (shielded RJ-45); Intel 82574
6	LAN Port A	1×10/100/1000 Base-T (shielded RJ-45); Intel 82559
7	USB	2 × USB Host 2.0, max output current 500 mA
8	USB	2 × USB Host 2.0, max output current 500 mA
9	Power supply	DC input range: 18-32 V DC (140 W) ATX standard

6.2   Communication Ports

Pin	Serial port, 9-pin female		Serial port, 9-pin female	
	COM1	COM2	COM3	COM4
1	-	RS422 Tx+ RS485 Tx+/Rx+	-	RS422 Tx+ RS485 Tx+/Rx+
2	RS232 RxD	-	RS232 RxD	-
3	RS232 TxD	-	RS232 TxD	-
4	-	RS422 Rx+	-	RS422 Rx+
5	GND	GND	GND	GND
6	-	RS422 Tx- RS485 Tx-/Rx-	-	RS422 Tx- RS485 Tx-/Rx-
7	RS232 RTS	-	-	RS422 RTS+
8	RS232 CTS	-	-	RS422 RTS-
9	-	RS422 Rx-	-	RS422 Rx-

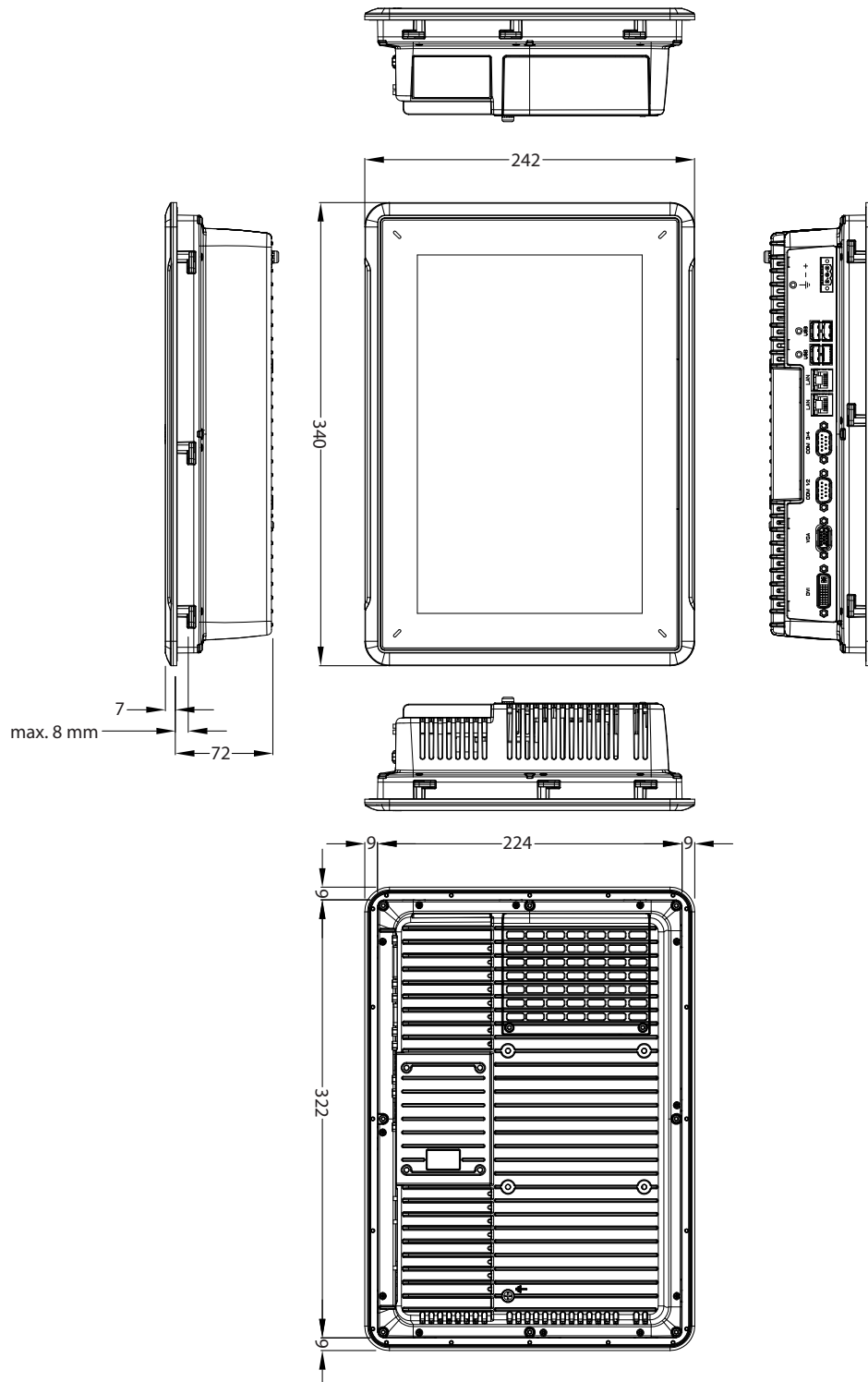**Note:** RS422 Interface is not available yet.

Note:

In order to utilize two communication ports on the same physical port, the Y-split cable CAB109 must be used.

Drawing for external cable CAB109 (drawing # Z7100-029E) is available on the web site:

www.beijerelectronics.com

6.3 iX T12C Outline

242

340

7

max. 8 mm

72

9 224 9

9

322

9

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Note:
A Step CAD file is available on the web site *www.beijerelectronics.com*

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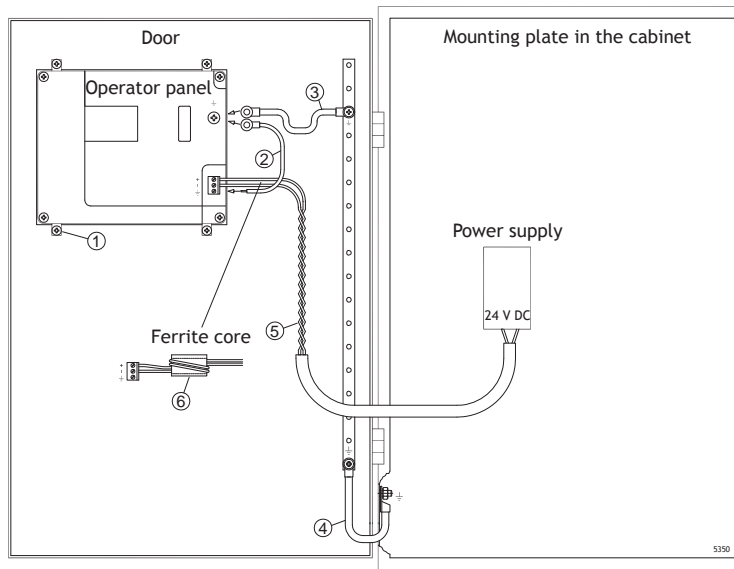.com
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7 Additional Installation Tips

When experiencing communication problems in for example noisy environments or when operating close to temperature limits, the following recommendations are to be noticed.

7.1 Grounding the Operator Panel

The operator panel's mounting clamps do not provide a secure grounding connection between the panel and the device cabinet, see 1 in drawing above.

1. Connect a 2.5 mm^2 wire between the operator panel's quick-connect plinth and the panel's chassis, see 2 in drawing above.

2. Connect a 6 mm^2 or 4 mm^2 wire or grounding braid between the operator panel's chassis and the closest grounding point on the door, see 3 in drawing above.

3. Connect a strong but short grounding braid between the door and the device cabinet, see 4 in drawing above.

4. Twist the cables onto the 24 V DC feed, see 5 in drawing above. Minimum cross-section of the cable is 2.5 mm^2.

   2 turns around the ferrite core provide 4 times the suppression of 1 turn.

   3 turns around the ferrite core provide 9 times the suppression of 1 turn.

A ferrite core suppresses disturbances to the 24 V feed, see 6 in drawing above.

Note:

The grounding wires should be short and the conductor should have a large area.

A long, thin grounding wire has a very high impedance (resistance) at high frequencies and will not guide disturbances to the ground.

Multi-wire conductors are better than single wire conductors with the same area.

A braided conductor wire with the same area is even better. The best is a short, thick grounding braid.

7.2 Ethernet Connection in the Operator Panel
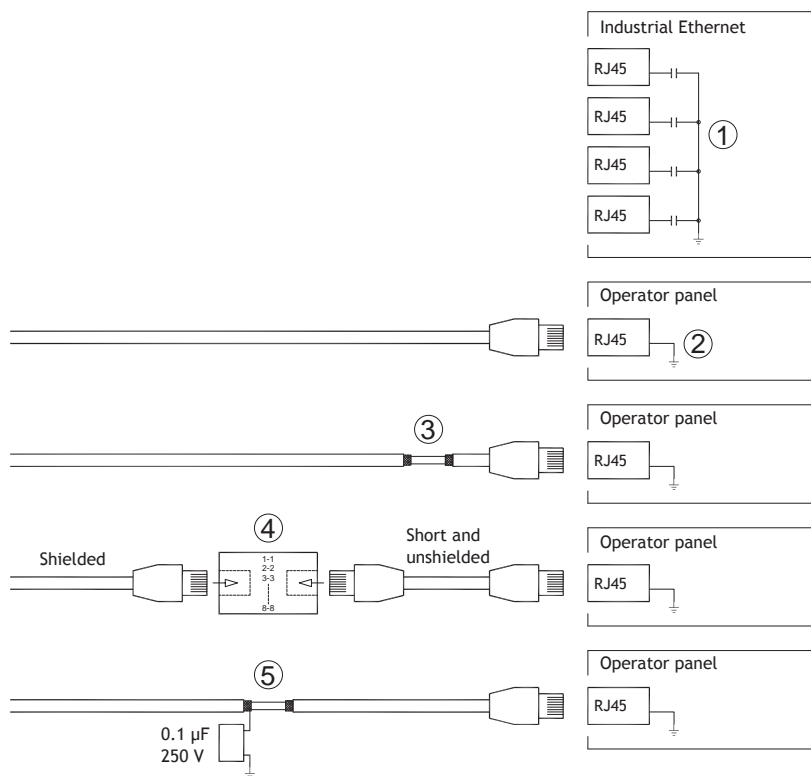
In some industrial units for Ethernet, the RJ45 contact's shield is connected to the chassis via a capacitor, see 1 in drawing above.

The operator panel's Ethernet shield is directly connected to the chassis, see 2 in drawing above.

1. Check whether the other Ethernet unit has its shield directly grounded or grounded via a capacitor.

Note:

In many cases, connecting the shielded Ethernet cabling to the chassis at both ends is inappropriate. Hum or grounding loops can occur. Unshielded cabling may even result in fewer communication errors.

A good solution may be to use a shielded Ethernet cable, but to connect the shield at one end only.

One option is to break the shield, see 3 in drawing above.

A more elegant method is to expand the shielded Ethernet cabling with a piece of unshielded Ethernet cable, see 4 in drawing above.

The shield can be grounded via an external 0.1 µF/250 V plastic capacitor, see 5 in drawing above. This will connect the HF transients to ground.

7.3 To Achieve Better EMC Protection

- Initially, use the original cabling from Beijer Electronics primarily.
- Use shielded cables for RS232 communication.
- Use twisted pair and shielded cabling for RS422 and RS485.
- Use the cabling intended for the bus type; Ethernet, Profibus, CC-Link, CAN, Device Net etc.
- Install and connect according to applicable specifications for the relevant bus standard.
- Use shielded cabling for Ethernet, preferably with foil and a braided shield.
- D-sub covers should be shielded, and the shield should be connected to the cover 360° where the cable enters.
- Connect the shield at both ends.
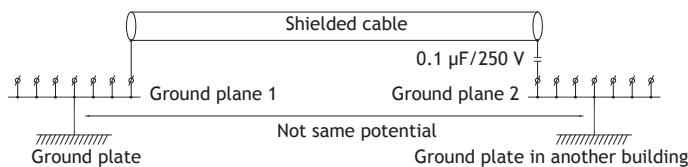
With longer distances, there is a risk that the ground potential may be different. In that case, the shield should only be connected at one end. A good alternative is to connect the other end of the shield to the ground via a 0.1 µF/250 V plastic capacitor. Both ends are then connected to the ground in terms of HF, but only connected to the ground at one end in terms of LF, thus avoiding the 50/60 Hz grounding loops.
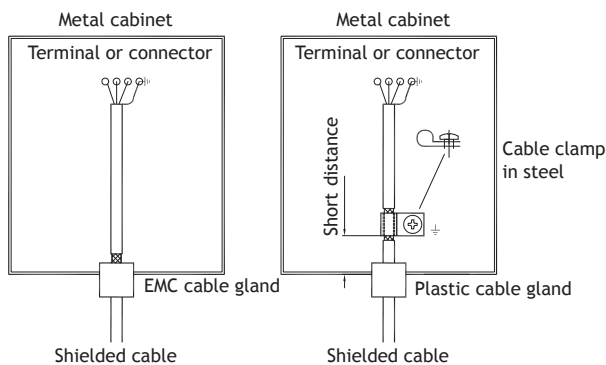

1. Use an EMC cable gland or regular plastic cable gland, remove the outer jacket and connect the shield to the installation plate with a 360° metal cable clamp.

2. Place the 24 V DC and communications cabling in one cable trunk/cable duct and 230/380 V AC in another. If the cables need to be crossed, cross them at 90° only. Avoid combining the cabling for stronger 24 V DC outputs with the communication cabling.

Ferrite cores that are snapped onto the shielded cabling may remove minor disturbances. Large ferrite pieces that are snapped onto unshielded cabling and where the wires go 2-4 times around the cores are approximately 5-25 times more efficient.

7.4   Ambient Temperature

The maximum ambient temperature for the operator panel is provided in the specifications. The ambient temperature refers to the temperature in the device cabinet which cools the operator panel's electronics.
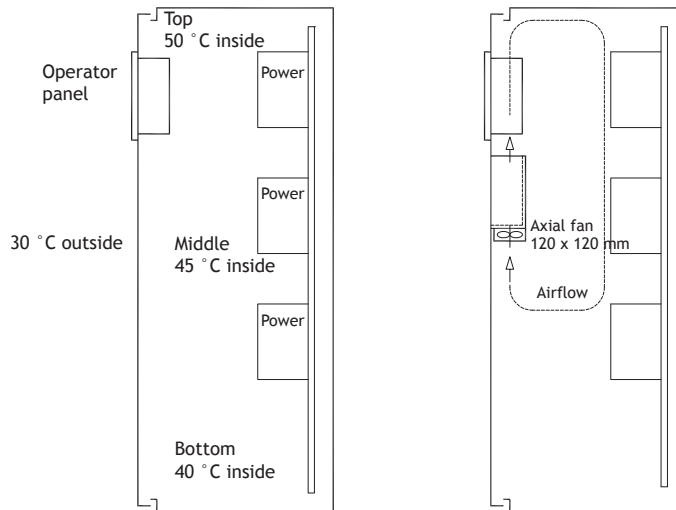
In most cases, the ambient temperature for the operator panel is significantly higher than the device cabinet's ambient temperature.

If the cabinet is tall and there are a number of heat-generating devices, the temperature at the top of the cabinet will be considerably higher than the theoretical temperature increase that would be expected. All electronics are sensitive to heat. The lifespan of an electrolytic capacitor is cut in half with an 8-10 °C increase in temperature. A 15-20 °C temperature increase results in a quarter of the lifespan etc.

Rittal has a good program for estimating the anticipated average temperature in the cabinet as well as a large program for controlling the temperature in the device cabinet.

An enamel-coated steel cabinet has a radiant heat value of 5.5 W/m^2 and degrees C.

Installing a fan inside the cabinet will even out the temperature, while moving air provides considerably better cooling than still air.

Install the fan so that it sits in the cooler area and blows cold air against the operator panel. If the fan is mounted at the top and sucks warm air upwards, the fan's ambient temperature will be higher, resulting in a shorter lifespan.

The operator panel's loss effect = supply voltage x current. Virtually no power goes to external users and no loss effects due to inputs.

7.5   Safety

Most of the operator panels are fed with 24 V DC.
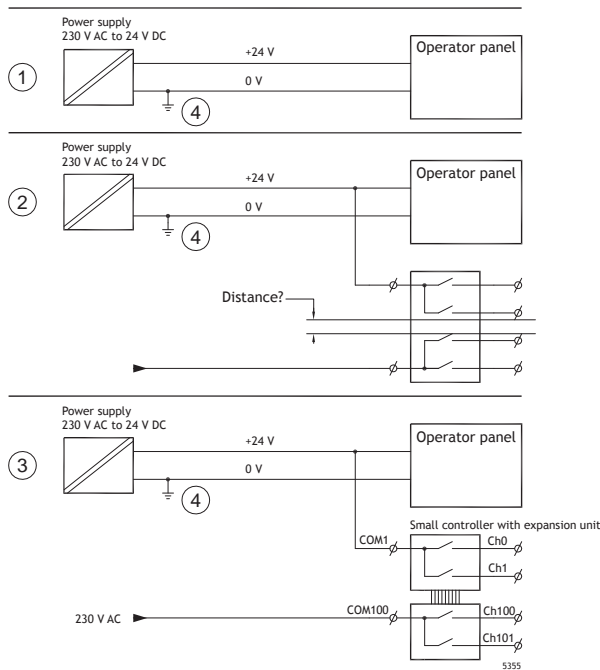
If a power supply that meets safety standards is used and only feeds the operator panel, there is no problem. See 1 in drawing above.

However, if a 24 V unit that also feeds other units is used, there is reason to be cautious, see 2 in drawing above. The operator panel does not have insulation that meets safety requirements in the event of a potential short circuit between 230 V AC and 24 V DC. It is assumed that the 24 V feed is secure, for example, SELV according to EN 60950 (protection against electric shock) and UL 950.

Example:
Here is an example that explains why a secure 24 V DC feed can be ruined by mixing 24 V relay contacts with 230 V AC relay contacts in a smaller controller. Check that the clearances and creepage distances between 24 V DC and 230 V AC fulfill EN 60950 or UL 950. If not, input a separate 24 V unit into the operator panel.

If there is a substantial distance between the relay contacts for 24 V DC and 230 V AC, it is OK to use the same 24 V devices for all feeds. See 3 in drawing above.

Connect 0 V on the 24 V feed to the ground, see 4 in drawing above. This offers three advantages:

• Safety is increased. The 24 V feed will not be live in the event of a faulty connection or short circuit between 0 V (24 V) and 230 V phase.
• Transients on the 24 V feed are connected to the ground.
• No risk that the 24 V feed is at a high level in relationship to the ground. This is not unusual since there is high static electricity.

7.6 Cable and Bus Termination RS485

- If maximum transfer distance and maximum transfer speed is needed, shielded and twisted pair cable should be used. The mutual capacitance may not exceed 52.5 pF/m, and the cable area should be at least 0.25 mm^2 (AWG 24).
- 0 V, the reference voltage for communication should be included in the cabling. With two-way communication use two pairs; one pair for communication and one pair for 0 V.
- The shield must be grounded at one end. The other end is usually grounded, but with longer distances or when there is a difference in the ground potential, the shield should be connected to the ground via 0.1 µF/250 V plastic capacitor to prevent ground current in the braided shield. A number of manufacturers recommend that the shield be grounded at each node. Various manufacturers have different systems for bus termination.

Depending on the recipients' design, the bus wires may be on the same level or require pull-up or pull-down to ensure that no faulty signals are detected when the bus is in resting mode (all transmitters are disconnected).

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7.7   Boot Priority

The boot priority is the order in which the hardware storage devices are read.

Pressing F7 during boot will display a drop down menu with all available bootable devices.

A change of the boot priority is only temporary. On next startup the boot priority will be restored back to the factory setting.

7.8   Entering BIOS

Caution:
Unless you are an expert computer user, do not change the BIOS settings for this program. Certain changes can cause your operator panel to work incorrectly.

Note:
Before using BIOS setup, it is recommended to write down the setup information for future reference.

Note:
It is recommended to turn on and shut down the operator panel at least once before installing any components/cards or before connecting the panel to external devices, like for example serial devices.

1. Connect a USB Keyboard.
2. Connect power supply and turn on the operator panel.
3. While booting, press the F2 key immediately after the keyboard is initialized. The initialization is indicated by the keyboard LED's.

   If F2 is pressed before the keyboard is initialized, this keystroke will be lost.

   If you waited too long and the operating system logo appears, continue to wait until the operating system desktop is appearing. Then, shut down the operator panel and try again.

Note:
The key used to enter the BIOS setup can differ depending on model and CPU Board. The commonly used keys are ESC, DEL, F1 and F2. For more information, refer to the BIOS manual.
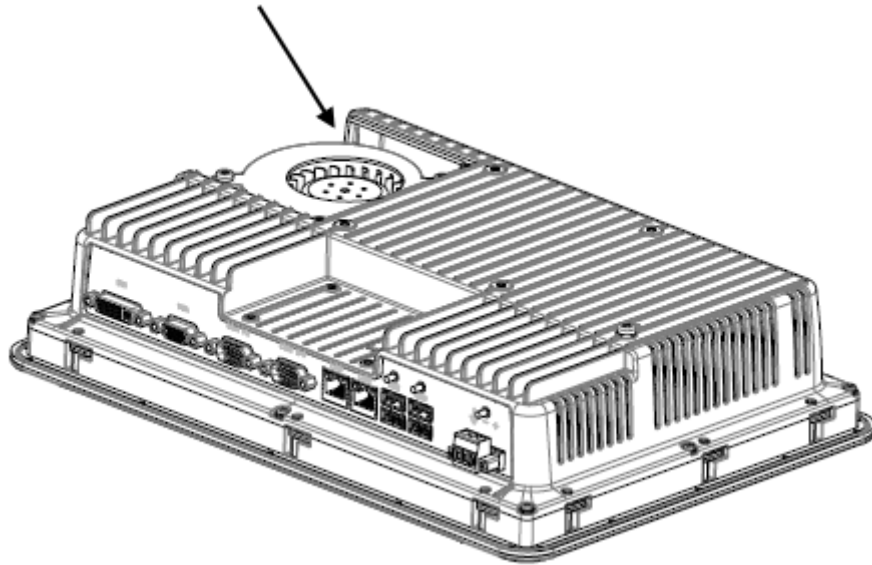
The system setup allows to:
- Change the system configuration (new installed hardware).
- Setup boot devices and sequences.
- Setup or change user options, for example passwords.
- Read the installed memory and environmental parameters, for example CPU heat.

For more information, refer to the BIOS manual.

7.9 Reset Switch

A reset switch is located under the fan lid.

Follow the instructions in chapter *Replacing the Fan and Filter* on how to remove the fan lid to access the reset switch.

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