

# Rexroth BF2xxT / BF3xxT Control Panel

**1070073824**  
Edition 05

## Connecting conditions



**Title** Rexroth BF2xxT / BF3xxT  
Control Panel

**Type of Documentation** Connecting conditions

**Document Typecode** DOK-SUPPL\*-BF\*\*\*T\*\*\*\*\*-PR05-EN-P

**Purpose of Documentation** The present manual informs about:

- operation and
- configuration of the BF2xxT / BF3xxT Control Panel

**Record of Revisions**

Description	Release Date	Notes
DOK-SUPPL*-BF***T*****-PR05-EN-P	03.2004	

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## Safety Instructions

# 1 Safety Instructions

Before you start working with the Bosch BF2xxT / BF3xxT Control Panel, we recommend that you thoroughly familiarize yourself with the contents of this manual. Keep this manual in a place where it is always accessible to all users.

## 1.1 Intended use


This instruction manual presents a comprehensive set of instructions and information required for the standard operation of the described products. The described products are used for the purpose of **visualization units** for application software and as **terminals** for IPC and IPC300 industrial PC and rho4.1 robot control.

The products described hereunder

- were developed, manufactured, tested and documented in accordance with the relevant safety standards. In standard operation, and provided that the specifications and safety instructions relating to the project phase, installation and correct operation of the product are followed, there should arise no risk of danger to personnel or property.
- are certified to be in full compliance with the requirements of
  - the EMC Directives (89/336/EEC, 93/68/EEC and 93/44/EEC)
  - the Low-Voltage Directive (73/23/EEC)
  - the harmonized standards EN 50081-2 and EN 50082-2
- are designed for operation in an industrial environment (Class A emissions). The following restrictions apply:
  - No direct connection to the public low-voltage power supply is permitted.
  - Connection to the medium and/or high-voltage system must be provided via transformer.

The following applies for application within a personal residence, in business areas, on retail premises or in a small-industry setting:

- Installation in a control cabinet or housing with high shield attenuation.
- Cables that exit the screened area must be provided with filtering or screening measures.
- The user will be required to obtain a single operating license issued by the appropriate national authority or approval body. In Germany, this is the Federal Institute for Posts and Telecommunications, and/or its local branch offices.

 **This is a Class A device. In a residential area, this device may cause radio interference. In such case, the user may be required to introduce suitable countermeasures, and to bear the cost of the same.**

## Safety Instructions

Proper transport, handling and storage, placement and installation of the product are indispensable prerequisites for its subsequent flawless service and safe operation.

## Safety Instructions

### 1.2 Qualified personnel

This instruction manual is designed for specially trained personnel. The relevant requirements are based on the job specifications as outlined by the ZVEI and VDMA professional associations in Germany. Please refer to the following German-Language publication:

**Weiterbildung in der Automatisierungstechnik**  
**Publishers: ZVEI and VDMA Maschinenbau Verlag**  
**Postfach 71 08 64**  
**60498 Frankfurt/Germany**

This instruction manual specifically addresses system planners and PC specialists. They require special knowledge of configuration and start-up of electrical equipment.

Interventions in the hardware and software of our products not described in this instruction manual may only be performed by our skilled personnel.

Unqualified interventions in the hardware or software or non-compliance with the warnings listed in this instruction manual or indicated on the product may result in serious personal injury or damage to property.

Installation and maintenance of the products described hereunder is the exclusive domain of trained electricians as per IEC 60364-411 (modified) who are familiar with the contents of this manual.

Trained electricians are persons of whom the following is true:

- They are capable, due to their professional training, skills and expertise, and based upon their knowledge of and familiarity with applicable technical standards, of assessing the work to be carried out, and of recognizing possible dangers.
- They possess, subsequent to several years' experience in a comparable field of endeavour, a level of knowledge and skills that may be deemed commensurate with that attainable in the course of a formal professional education.

With regard to the foregoing, please read the information about our comprehensive training program. The professional staff at our training centre will be pleased to provide detailed information. You may contact the centre by telephone at (+49) 6062 78-258.

Safety Instructions

### 1.3 Safety markings on components



DANGER! High voltage!



DANGER! Corrosive battery acid!



CAUTION! Electrostatically sensitive devices (ESD)!



DANGER! Hazardous light emissions  
(optical fibre cable emitters)!



Disconnect mains power before opening!



Lug for connecting PE conductor only!



Functional earthing or low-noise earth only!



Screened conductor only!



## Safety Instructions

## 1.4 Safety instructions in this manual

---

**DANGEROUS ELECTRICAL VOLTAGE**

This symbol warns of the presence of a **dangerous electrical voltage**. Insufficient or lacking compliance with this warning can result in **personal injury**.

---

**DANGER**


This symbol is used wherever insufficient or lacking observance of this instruction can result in **personal injury**.

---

**CAUTION**

This symbol is used wherever insufficient or lacking observance of instructions can result in **damage to equipment or data files**.

---

 This symbol is used to alert the user to an item of special interest.

★ This asterisk symbol indicates that the manual is describing an activity which the user will be required to perform.

Safety Instructions

## 1.5 Safety instructions for the described product

---



**DANGER**

Fatal injury hazard through ineffective Emergency-STOP devices!

Emergency-STOP safety devices must remain effective and accessible during all operating modes of the system. The release of functional locks imposed by Emergency-STOP devices must never be allowed to cause an uncontrolled system restart! Before restoring power to the system, test the Emergency-STOP sequence!

---



**DANGER**

Danger to persons and equipment!

Test every new program before operating the system!

---



**DANGER**

Retrofits or modifications may interfere with the safety of the products described hereunder!

The consequences may be severe personal injury or damage to equipment or the environment. Therefore, any system retrofitting or modification utilizing equipment components from other manufacturers will require express approval by Bosch.

---



**DANGEROUS ELECTRICAL VOLTAGE**

Unless described otherwise, maintenance procedures must always be carried out only while the system is isolated from the power supply. During this process, the system must be blocked to prevent an unauthorized or inadvertent restart.

If measuring or testing procedures must be carried out on the active system, these must be carried out by trained electricians.

---

Safety Instructions

---

**CAUTION****Danger to the module!****Do not insert or remove the module while the controller is switched ON! This may destroy the module. Prior to inserting or removing the module, switch OFF or remove the power supply module of the controller, external power supply and signal voltage!**

---

**CAUTION****Only Bosch-approved spare parts may be used!**

---

**CAUTION****Danger to the module!****All ESD protection measures must be observed when using the module! Prevent electrostatic discharges!**

---

Observe the following protective measures for electrostatically sensitive devices (ESD)!

- The personnel responsible for storage, transport and handling must be trained in ESD protection.
- ESDs must be stored and transported in dedicated protective packaging.
- Out of principle, ESDs may be handled only at special ESD work stations equipped for this particular purpose.
- Personnel, work surfaces and all devices and tools that could come into contact with ESDs must be on the same potential (e.g., earthed).
- An approved earthing wrist strap must be worn. It must be connected to the work surface via a cable with integrated 1 M $\Omega$  resistor.
- ESDs may under no circumstances come into contact with objects susceptible to accumulating an electrostatic charge. Most items made of plastic belong to this category.
- When installing ESDs in or removing them from an electronic device, the power supply of the device must be switched OFF.

## Safety Instructions

## 1.6 Documentation, software release and trademarks

### Relevant documentation

The present manual provides the user with comprehensive information about operation and configuration of the Bosch BF2xxT / BF3xxT Control Panel.

Overview of available manuals:

Manuals	Language	Order no.
IPC, IPC300 Connectivity Manual	English	1070 073822
IPC, IPC300 Anschlussbedingungen	German	1070 073812
BF2xxT / BF3xxT Control Panel Connectivity Manual	English	1070 073824
Bedienfeld BF2xxT / BF3xxT Anschlussbedingungen	German	1070 073814

 **In this manual the floppy disk drive always uses drive letter A:, and the hard disk drive always uses drive letter C:.**

Special keys or key combinations are shown enclosed in pointed brackets:

- Named keys: e.g., <Enter>, <PgUp>, <Del>
- Key combinations (pressed simultaneously): e.g., <Ctrl> + <PgUp>

 **The descriptive information contained in this manual applies to:**  
**Hardware version: rho4.1**  
**Software version:**

### Trademarks

All trademarks referring to software that is installed on Bosch products when shipped from the factory represent the property of their respective owners.

At the time of shipment from the factory, all installed software is protected by copyright. Software may therefore be duplicated only with the prior permission of the respective manufacturer or copyright owner.

MS-DOS® and Windows™ are registered trademarks of Microsoft Corporation.

PROFIBUS® is a registered trademark of the PROFIBUS Nutzerorganisation e.V. (user organization).

MOBY® is a registered trademark of Siemens AG.

## Safety Instructions

AS-I® is a registered trademark of AS-International Association.

INTERBUS-S® ist ein eingetragenes Warenzeichen der Phoenix Contact.

DeviceNet® ist ein eingetragenes Warenzeichen (TM) der ODVA (Open DeviceNet Vendor Association, Inc.).

Safety Instructions

Notes:

## 2 System Overview – Control Panels

The Bosch BF2xxT / BF3xxT Control Panels have been specially designed for use in an industrial environment. They feature specially designed interfaces (e.g., fail-safe transmission procedure for video, mouse and keyboard signals).

The robust and fail-safe technology makes the BF-series Control Panels particularly suited the following uses:

- Visualization / display unit for control unit processes
- Input terminals for industrial control units

The BF-series Control Panels are used in conjunction with the Bosch IPC (Industrial PC) or IPC300 or the Bosch rho4.1 Robot Controller.

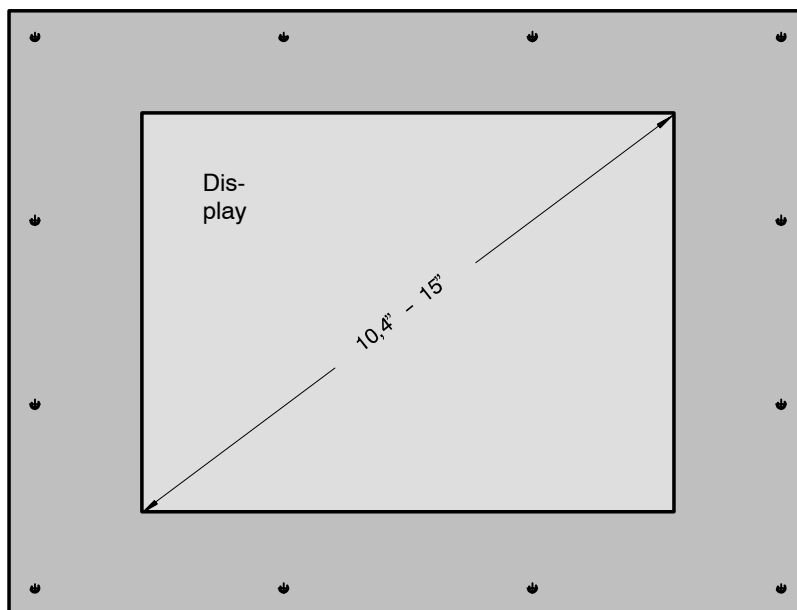
 **The units are not designed for connection to PCs supplied by other manufacturers.**

### 2.1 Hardware versions

Several hardware versions, featuring different interface connectivity and screen sizes, are available:


- with **LVDS interface** for use with **IPC** and **rho4.1**
  - BF200T with 10.4 in. touch-screen flat display
  - BF212T with 12.1 in. touch-screen flat display
- with **Gigabit interface** for use with **IPC300** and **rho4.1** (with Pentium I or Pentium III processor)
  - BF312T with 12.1 in. touch-screen flat display
  - BF315T with 15 in. touch-screen flat display

## System Overview – Control Panels



The following BF315T variants are available:

- BF315T TA with additional control devices
- BF315T P3 for connection to IPC300/rho4.1 with Pentium III processor
- BF315T P3 TA for connection to IPC300/rho4.1 with Pentium III processor, with additional control devices
- BF315T P3 OTA for connection to IPC300/rho4.1 with Pentium III processor, prepared for the mounting of additional control devices
- BF315T P3-VT for connection to IPC300/rho4.1 with Pentium III processor, variant for food technology.

 **The control panels BF315T (without addition) and BF315T TA can not be connected to an IPC300 with Pentium III. Only control panels with the addition “P3” in their designation can be used for this.**

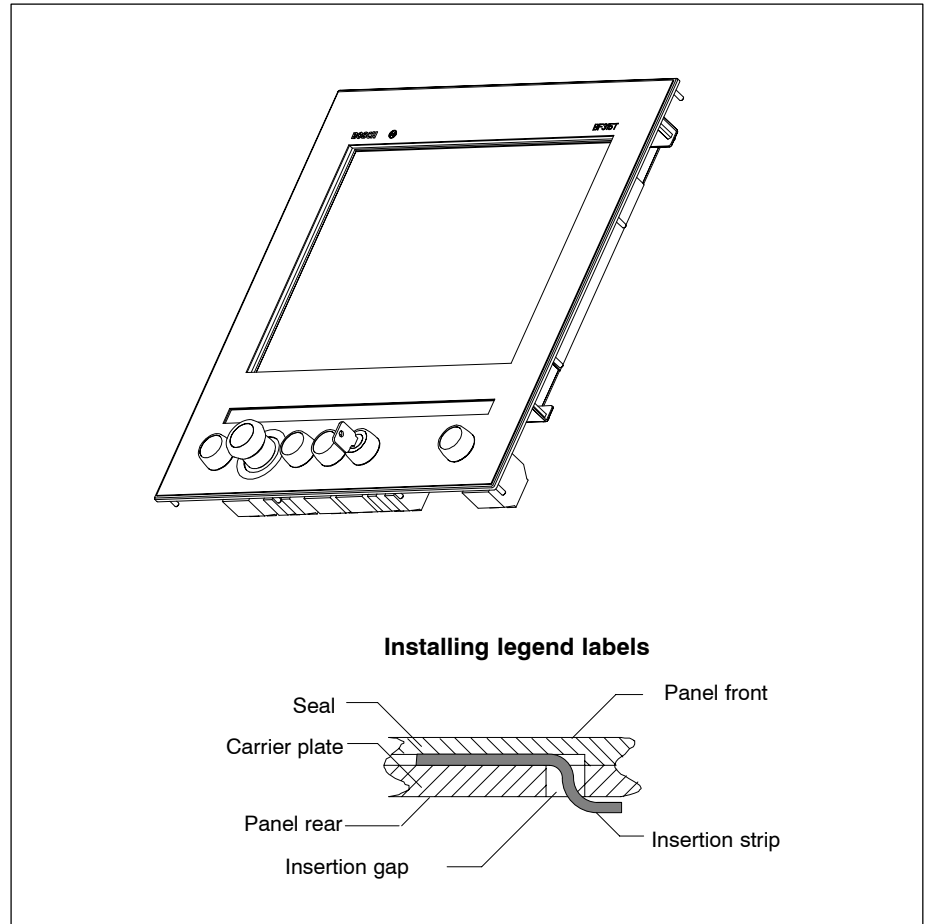
The additional control devices on the BF315T and BF315T P3 TA comprise:

- 1 x Emergency-STOP pushbutton
- 4 x Pushbutton, illuminated
- 1 x Key switch, IP65 rated

User-defined legends can be added to the units by means of a label strip inserted behind the clear panel seal.



## System Overview – Control Panels



## 2.2 Standards compatibility

The control panels are certified to comply with the following standards:

- EN 60 204-1      Electrical systems on machines
- EN 50 081-2      Basic specification for interference emission (industrial environment)
- EN 50 082-2      Basic technical standard, interference resistance (industrial environment)
- EN50178            with respect to VDE160
- EN 60 950        Overvoltage category II
- EN 418            Machine safety, Emergency-STOP devices
- EN 60 529        Protection categories (incl. housings and installation compartments)
- EN 60 068-2-6    Vibration test
- EN 60 068-2-27   Impact test
- .IS.114            "X-ray Radiation" Directive, as per Official Federal Gazette

## 2.3 Operating conditions

All control panels are designed for continuous operation (24 hours/day). The display backlight can be switched off (refer to page 3–4).

The following specifications apply unless otherwise indicated in the individual sections:

### Temperature

#### Storage temperature

- BF200T, BF212T:  $-20^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$
- BF312T, BF315T:  $-20^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$

#### Ambient temperature

(for installation conditions described in Section 4)

- BF200T, BF212T:  $+0^{\circ}\text{C}$  to  $+45^{\circ}\text{C}$
- BF312T, BF315T:  $+0^{\circ}\text{C}$  to  $+45^{\circ}\text{C}$

Temperature fluctuations of up to  $3^{\circ}\text{C}$  per minute are permitted.

### Relative humidity

Climate class 3K3, as per EN 60529; condensation not permitted.

### Atmospheric pressure

To DIN 60204, when operating at altitudes up to 2000 m above sea level.

### Protection Category ratings

Control cabinets and installation compartments for the control panels must conform to IP 54 rating (dust filters upstream of air intake and exhaust):

- BF200T, BF212T: Front panels IP65, otherwise IP00
- BF312T, BF315T: Front panels IP65, otherwise IP00



#### CAUTION

**Conditions hazardous to the product!**

**The ambient air must be free of electrically conductive pollutants (e.g., acids, alkali, corrosives, salts, metallic vapours, etc.).**

**Air intake and exhaust filters must be serviced at regular intervals.**

---

## 3 Display Elements

All flat-screen displays feature touch-screen functions.

The display elements are protected by a splash-proof sealed film, and comprise the following components:

- Thin-film transistor (TFT) display
- Touch screen
- Backlight

### 3.1 TFT flat screen display

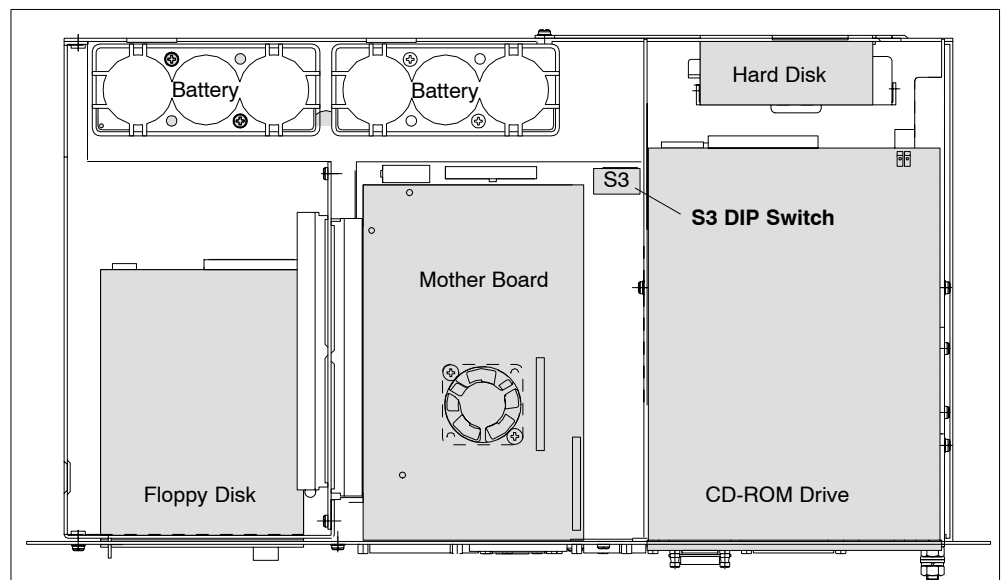
Due to its shallow installation depth, the TFT (Thin Film Transistor) display is ideally suited to the subject control panel application. It features excellent contrast and wide-angle viewability. The display colours are adapted to the requirements of the application environment by means of settings in the operating system, or via the respective application software.

#### BF2xxT with LVDS interface

For connection to the Bosch IPC Industrial PC or the rho4.1 Robot Controller, the BF200T and BF212T control panels require 3 interface cables (refer to Section 6).

The display resolutions must be selected in the connected IPC or rho4.1 via the S3 DIP switch (see diagram below):

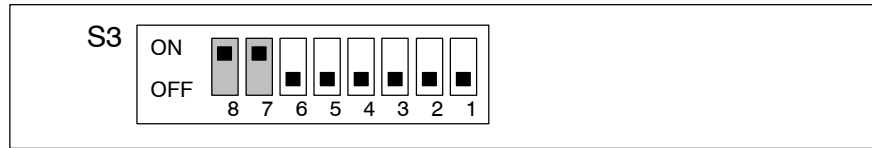
- BF200T (10.4 in. colour display): 640 x 480 pixels, 256000 colours
- BF212T (12.1 in. colour display): 800 x 600 pixels, 256000 colours



Display Elements

To change display resolutions, the IPC or rho4.1 housing must be opened, and the selections made by adjusting segments 7 and 8 on the S3 DIP switch:

- 640 x 480 pixels



- 800 x 600 pixels

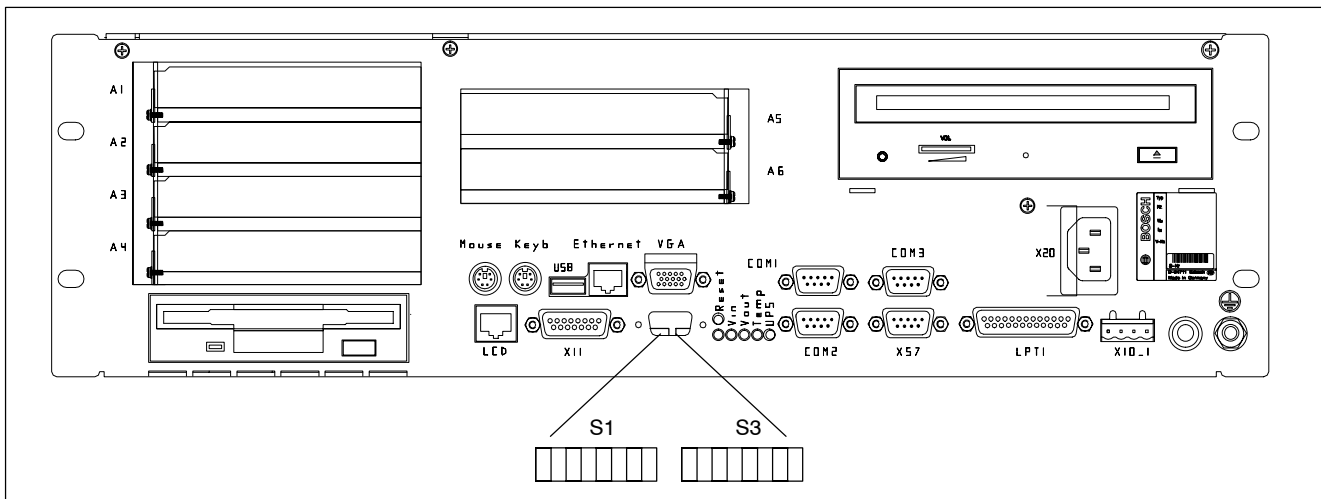


BF3xxT with Gigabit interface

For connection to the Bosch IPC300 Industrial PC or to the rho4.1 Robot Controller, the BF312T and BF315T control panels require 2 interface cables (refer to Section 6).

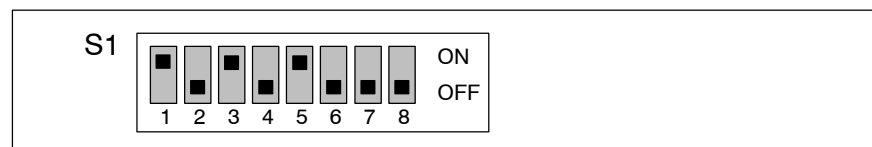
The display resolution must be selected in the connected IPC300 or rho4.1 via the S1 DIP switch (see diagram below):

- BF312T (12.1 in. colour display): 800 x 600 pixels
- BF315T (15 in. colour display): 1024 x 768 pixels



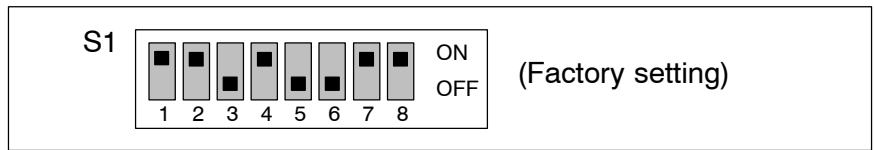
To change display resolutions, segments 1 through 8 on the externally accessible S1 DIP switch are set as follows:

- 800 x 600 pixels

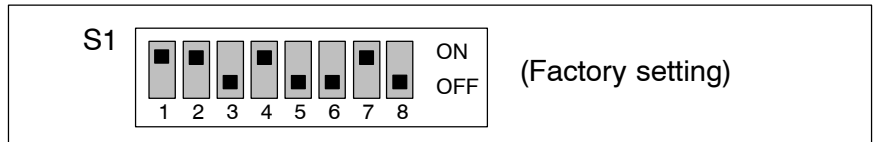


## Display Elements

- 1024 x 768 pixels  
(IPC300/rho4.1 with Pentium I / 266 MHz)



- 1024 x 768 Pixel  
(IPC300/rho4.1 with Pentium III / 400 MHz)



## 3.2 Touch screen controller

All control panels are supplied with a touch screen controller. The touch screen facilitates manual operation via the touch-sensitive display surface, and replaces the mouse. The touch screen is calibrated by the IPC / IPC300 and/or onboard the rho4.1 Robot Controller.

The touch screen controller functions are communicated via the dedicated COM2 port on the IPC, IPC300, or rho4.1.

### Software drivers

Operation of the touch screen requires the appropriate software drivers for the operating system. To install the drivers, proceed as follows:

- Go to CONTROL PANEL ► MOUSE ► DISKETTE and select the touch screen controller on the path:

IPC: C:\Rbtool\Elotouch\MMWin95\Setup.exe (Win95)  
OR:  
C:\Rbtool\Elotouch\MMWinNT\Setup.exe (WinNT)

IPC300: C:\Rbtool\Elotouch\MMWin95\Setup.exe (Win95)  
OR:  
C:\Rbtool\Elotouch\MMWinNT\Setup.exe (WinNT)

rho4.1: C:\Bosch\InstallBF200T\Elotouch\MMWin95\Setup.exe (Win95)  
OR:  
C:\Bosch\InstallBF200T\Elotouch\MMWinNT\Setup.exe (WinNT)

- Or, effective with version 3.10 (Windows NT) , directly via the respective SETUP.EXE file.

## Display Elements

### 3.3 Backlight timer function

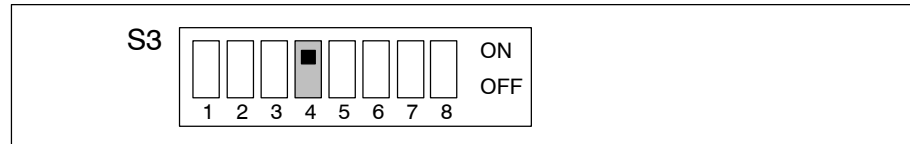
The fluorescent backlight tube provides the background lighting for the TFT display. After approx. 15,000 operating hours, because the tube has a limited service life, it will produce only 50% of its original brightness. Refer to Section 7.2 for information about replacing the backlight unit.

To extend the service life of both display and backlight tube, the flat screen display features a timer ("sleep") function for the backlight. This circuit darkens the display if the control panel is not operated for a preset period of time.

#### Activating the backlight timer

The backlight "sleep" function is activated on the IPC, IPC300 or on the rho4.1:

- ★ **rho4.1/IPC300 with Pentium-III/400 MHz only:** Always make sure that segment 4 of the DIP switch S3 is closed (ON):



- ★ In the BIOS setup, select the menu option:
  - **IPC, rho4.1:** POWER MANAGEMENT SETUP ► OnBoard LCD Backlight Timer OFF
  - **IPC300:** POWER ► LCD Backlight Off TimerThen set the timer to an interval between 28 seconds and 14 minutes.
- ★ To ensure that the screen contents no longer change, go to the operating system, and select a screen saver which will darken the display (Blank Screen, i.e., no objects on the screen). Select a wait time for the screen saver that is shorter than the interval time of the backlight timer.

The above adjustments ensure that the backlight will again be activated, illuminating the display when pressing a key, moving the mouse, or touching the touch screen.

Installation

## 4 Installation

When installing the control panels, refer to the information on standards compatibility and operating conditions in Sections 2.2 and 2.3 .



### CAUTION

**Conditions hazardous to the product!**

**The ambient air must be free of electrically conductive pollutants (e.g., acids, alkali, corrosives, salts, metallic vapours, etc.).**

---



### DANGER

**The operational reliability of components designed to be installed in housings or control cabinets will be severely impeded if they are used or operated without having first been installed.**

**Therefore, do not use or operate the control panels unless they have been properly installed.**

---

### Note

- The use of silicon-based sealing compounds, adhesives and insulating agents is prohibited.
- Ensure that the installation is maintenance-friendly, i.e., that it provides unrestricted access to connections, cables and fuses.
- Precede all installation procedures by writing down the information on equipment rating plates. In the event that rating plates are hidden from view as a result of the installation, you will still have quick access to this information whenever required.


## Installation

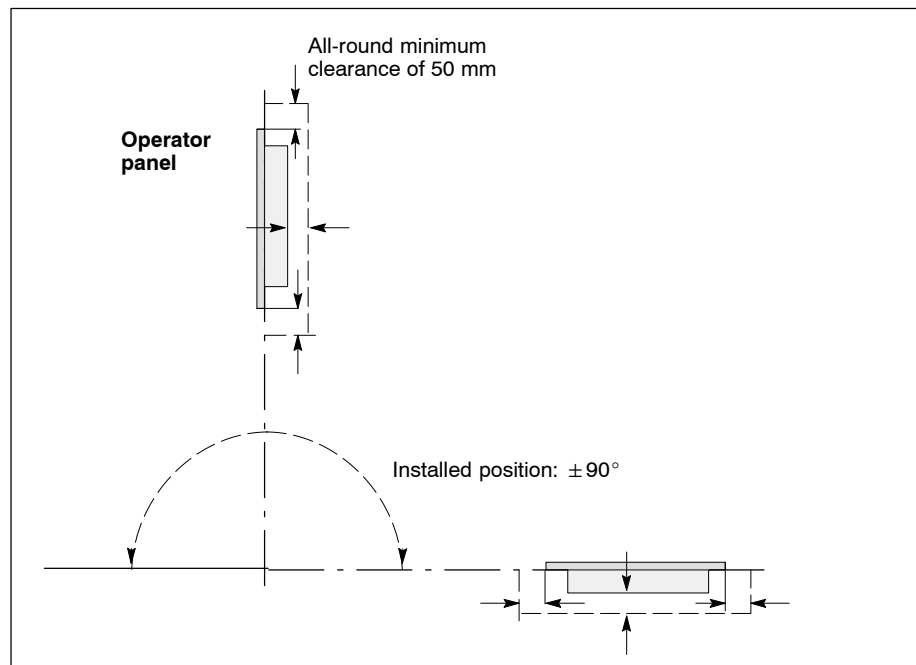
**4.1 Installed positions and clearances**

Weight:	BF200T, BF212T:	approx. 2.8 kg
	BF312T:	approx. 2.8 kg
	BF315T (incl. pushbuttons):	approx. 3.8 kg

Installed pos.:  $\pm 90^\circ$  inclined (slanted)

Installation type: In console frame or hinged frame, sealed as per IP54 type:

 **Remember that the front of the control panel may become dirty more quickly if installed at an angle, instead of vertically.**



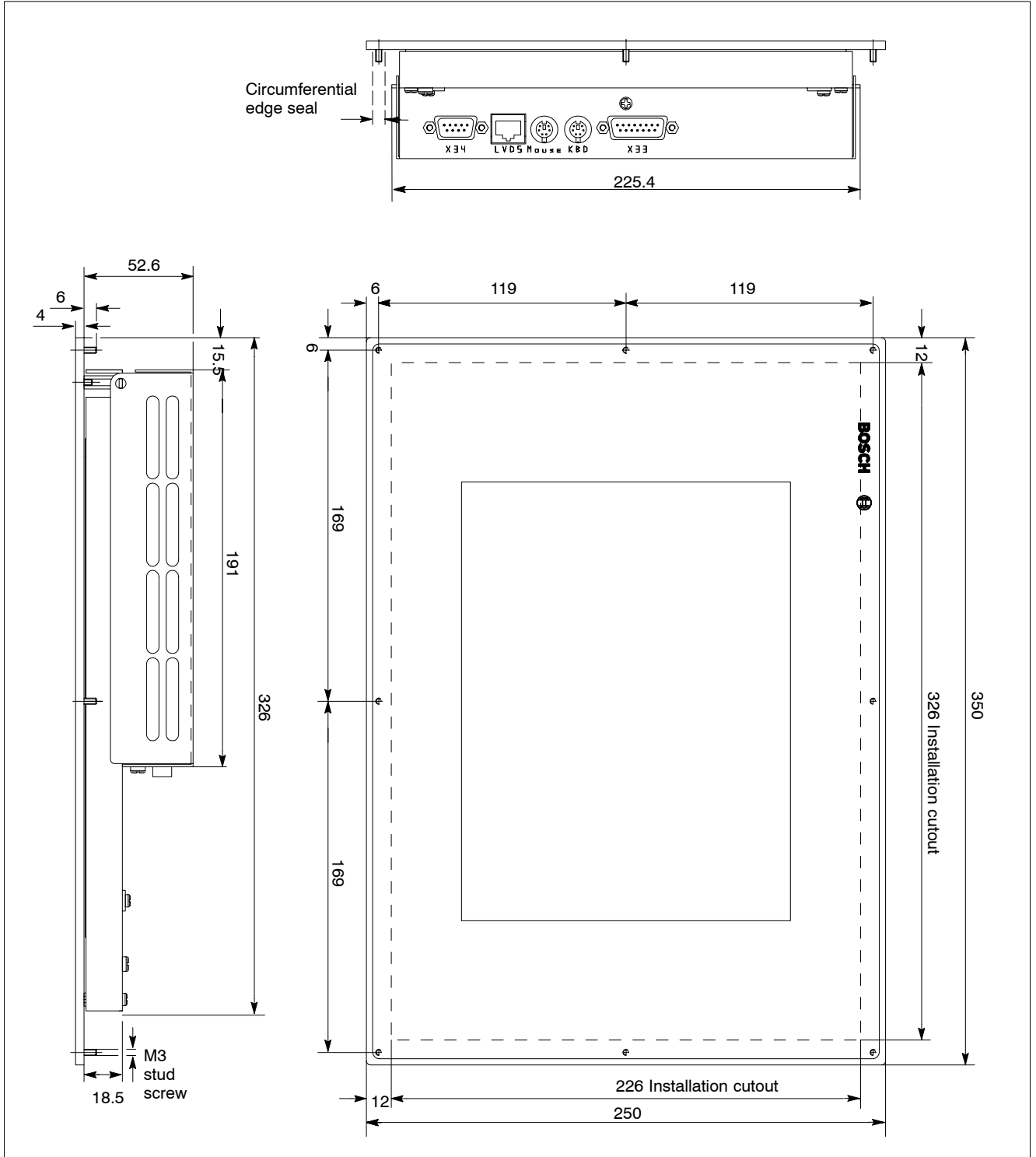
- Install the control panel, ensuring that it can be operated ergonomically. Also, the operator must have an unrestricted view of moving machine parts at all times!
- To prevent reduced screen readability and additional thermal load, avoid installation locations that are exposed to direct sunlight.
- To provide sufficient ventilation and cable routing space, provide an all-round minimum clearance of 50 mm.
- Allow for connecting loops in all cable routings; provide strain relief for all cables.
- Maintain suitably large distances from sources of interference.
- Use only silicon-free sealing compounds, adhesives and insulating agents.



Installation

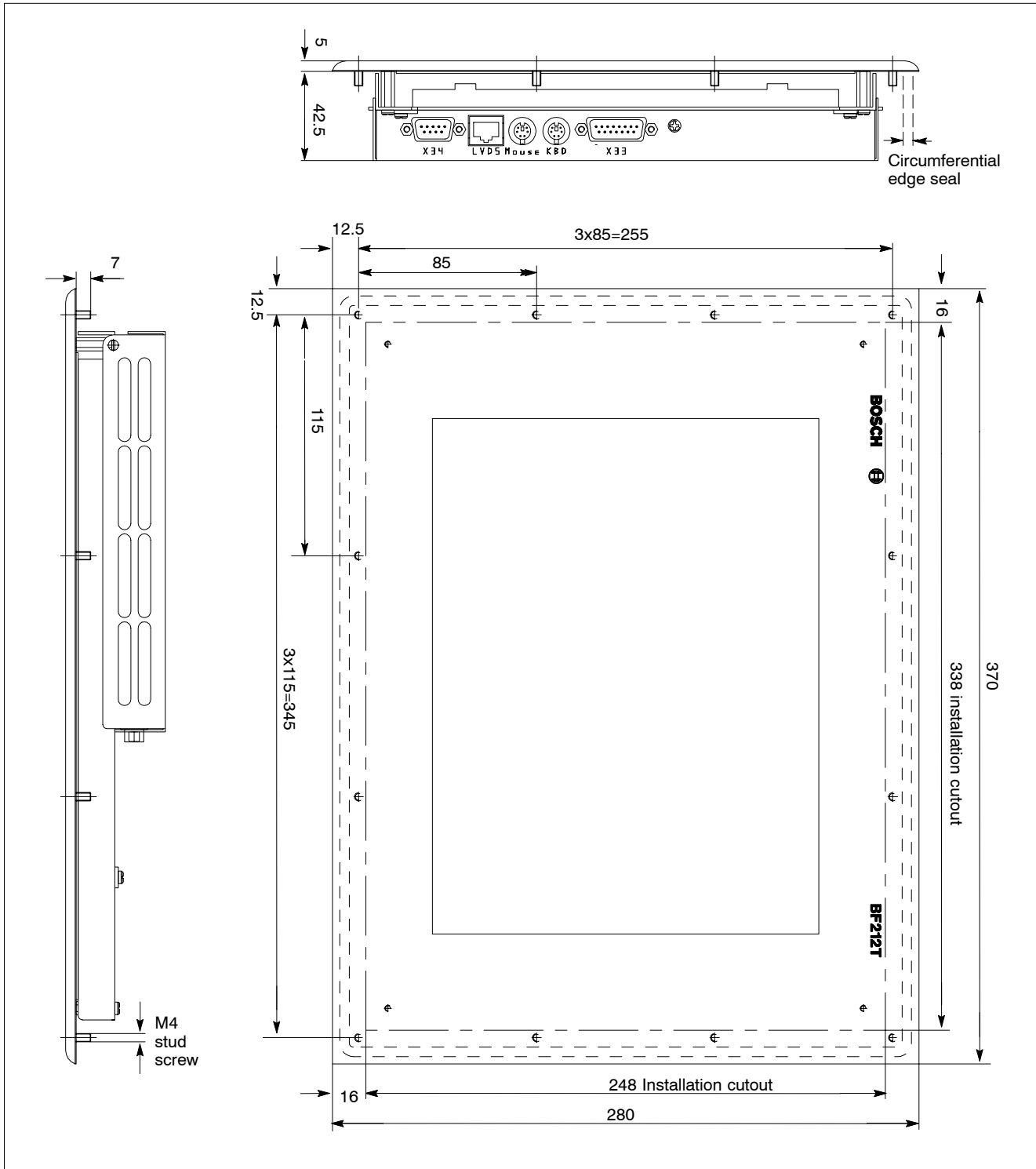
## 4.2 Dimensioned drawings

### BF200T with 10.4 in. display



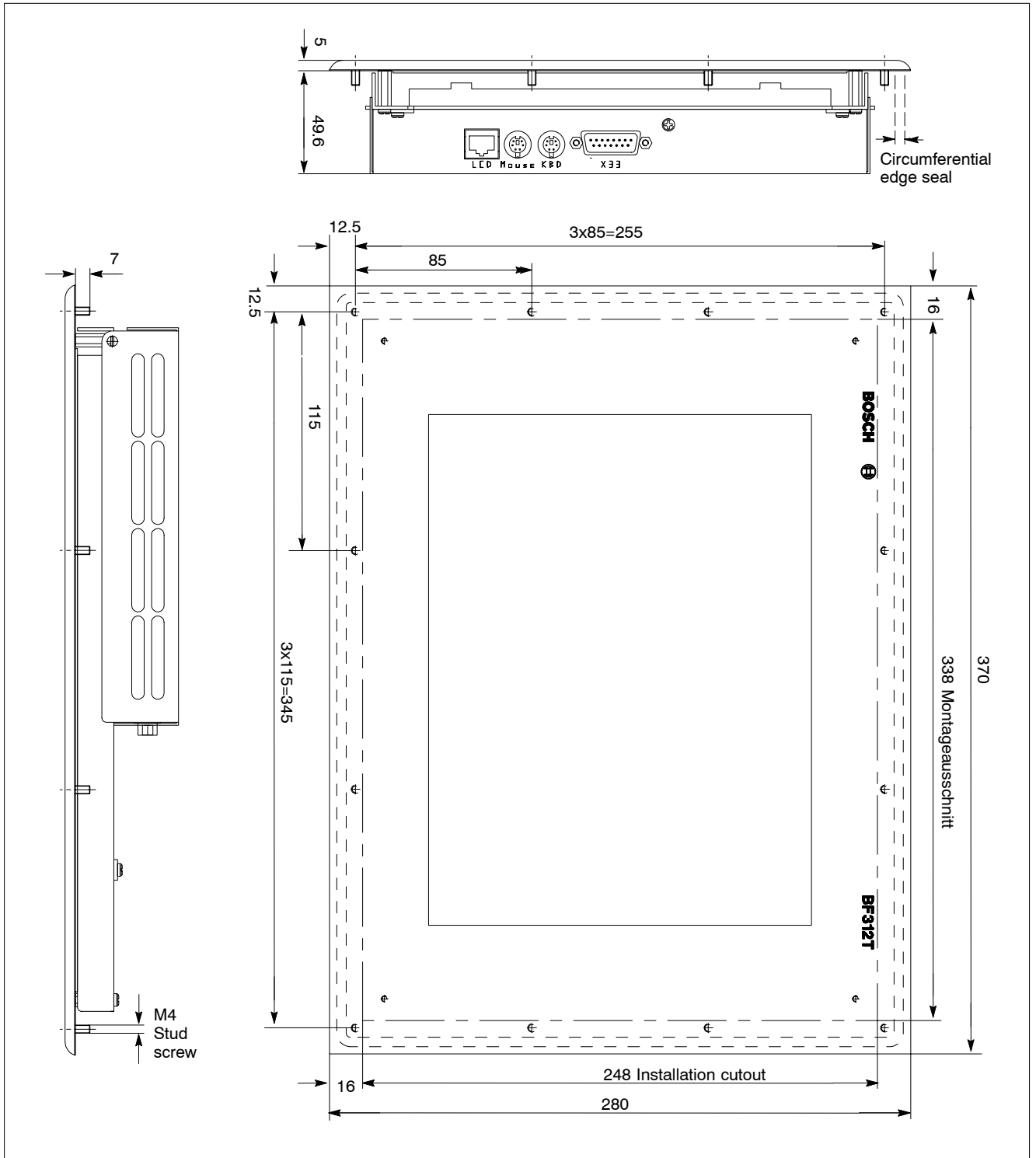
Installation

**BF212T with 12.1 in. display**



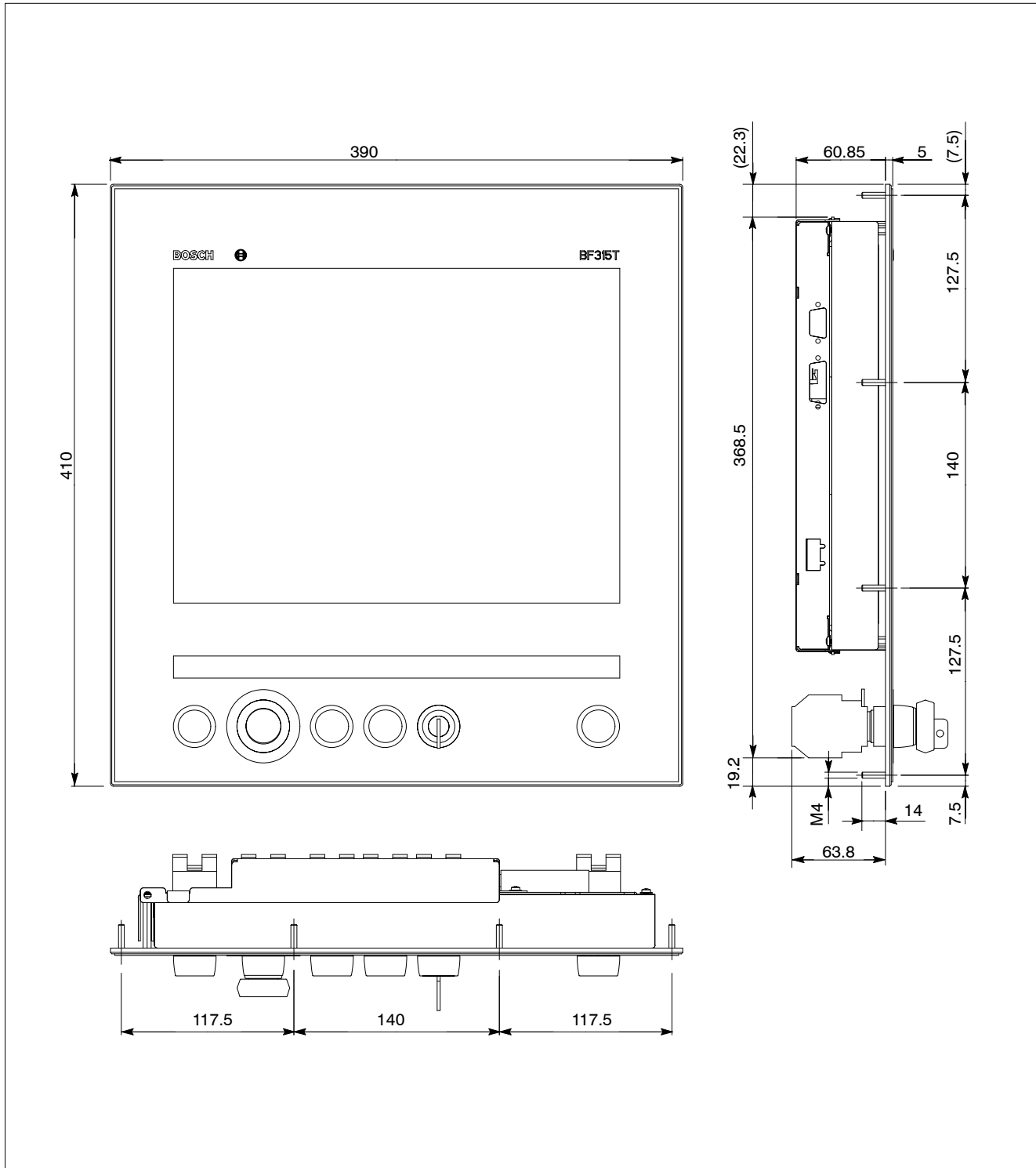
Installation

**BF312T with 12.1 in. display**



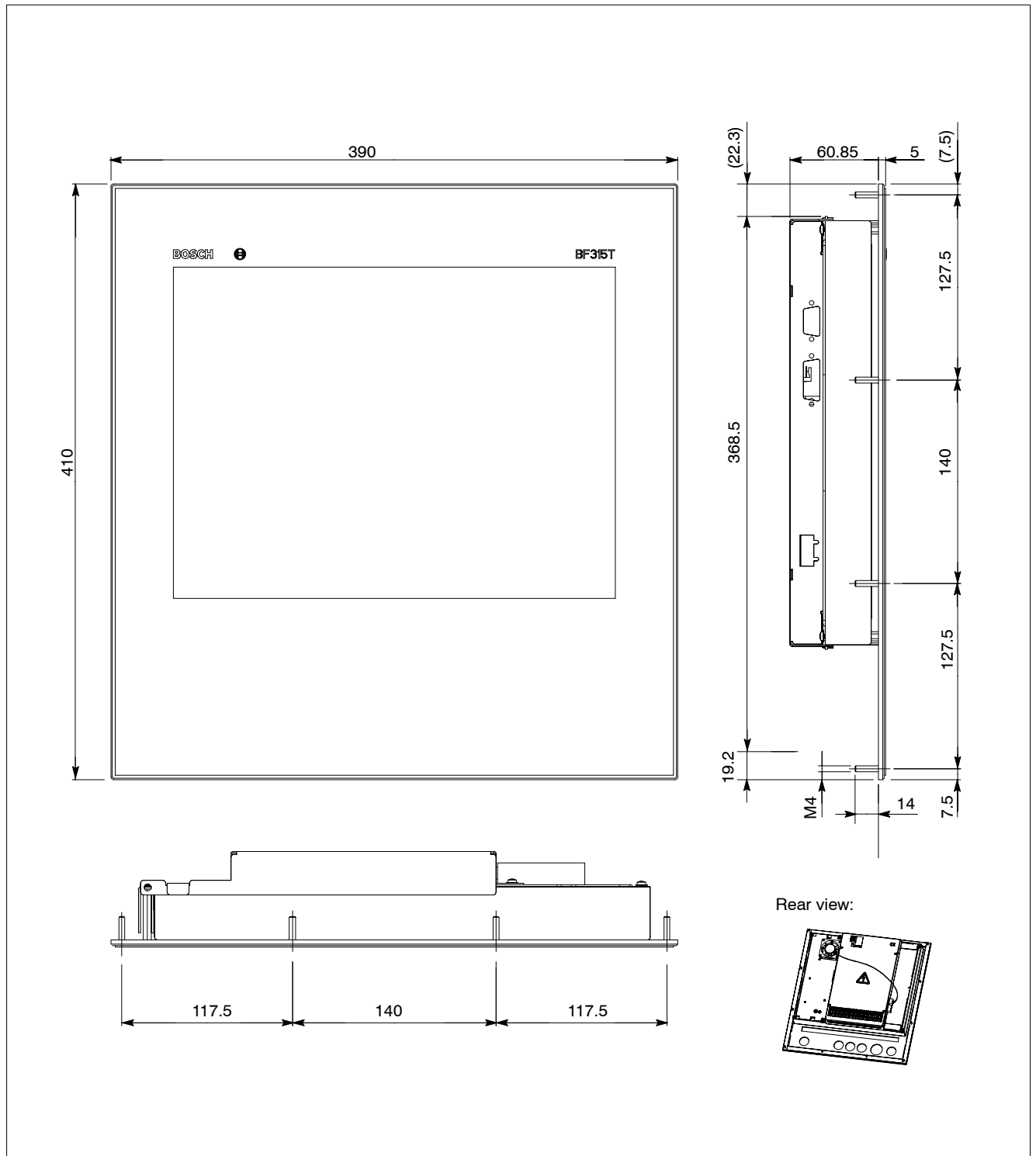
Installation

**BF315T (P3) TA with 15 in. display and optional control devices**



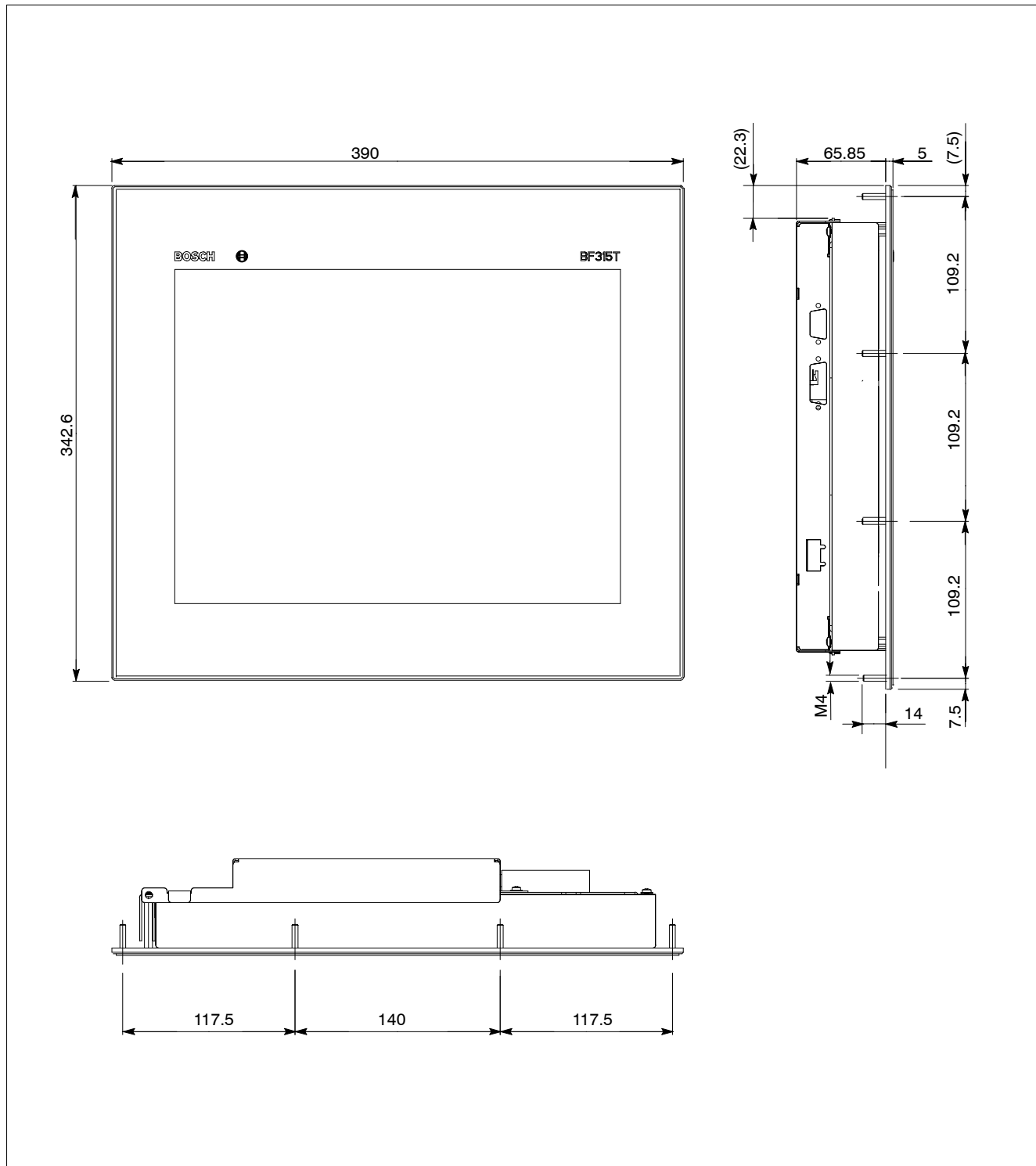
Installation

**BF315T P3 OTA with 15" display, prepared for optional control devices**

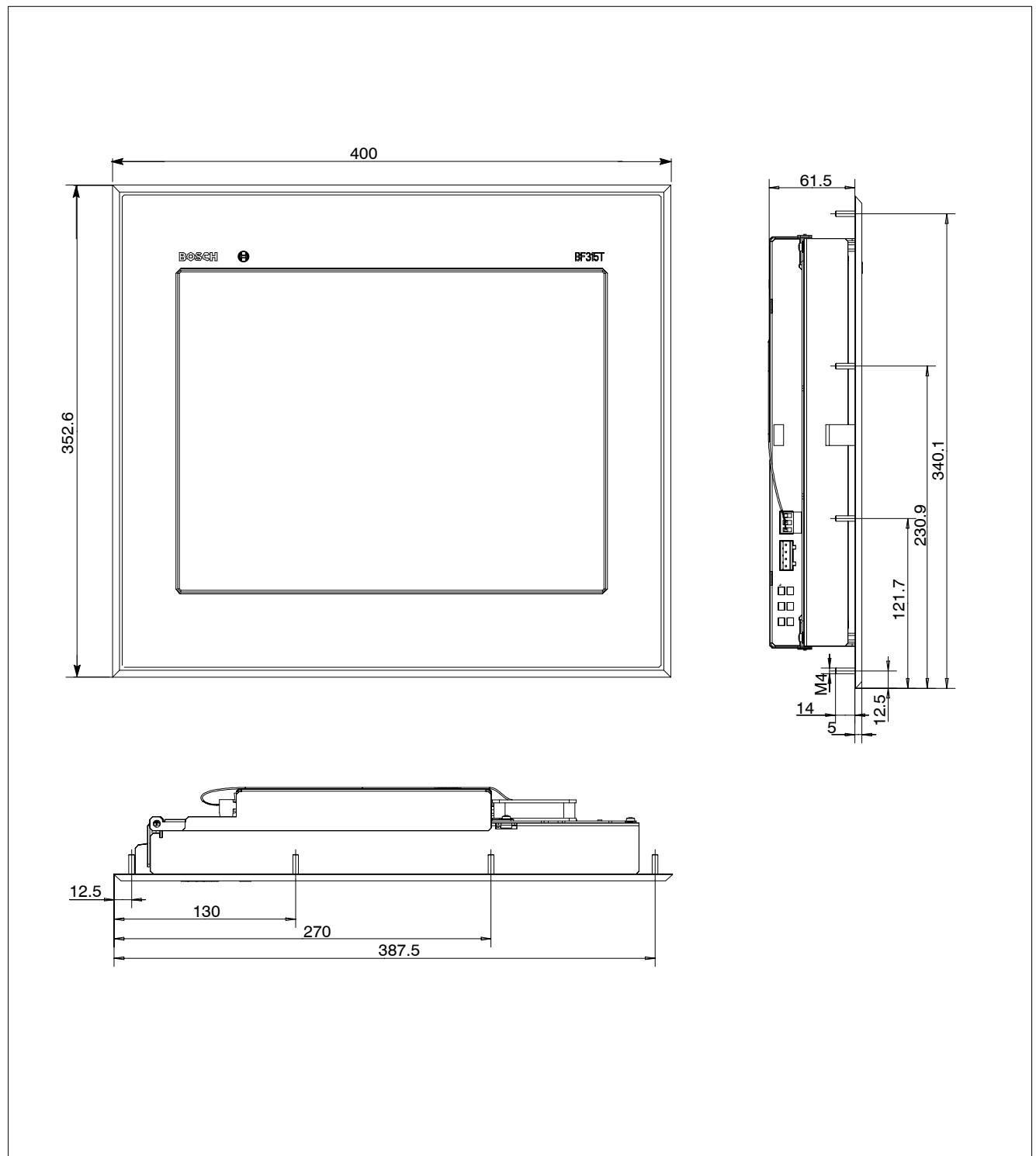


Installation

**BF315T P3 with 15" display**



## Installation

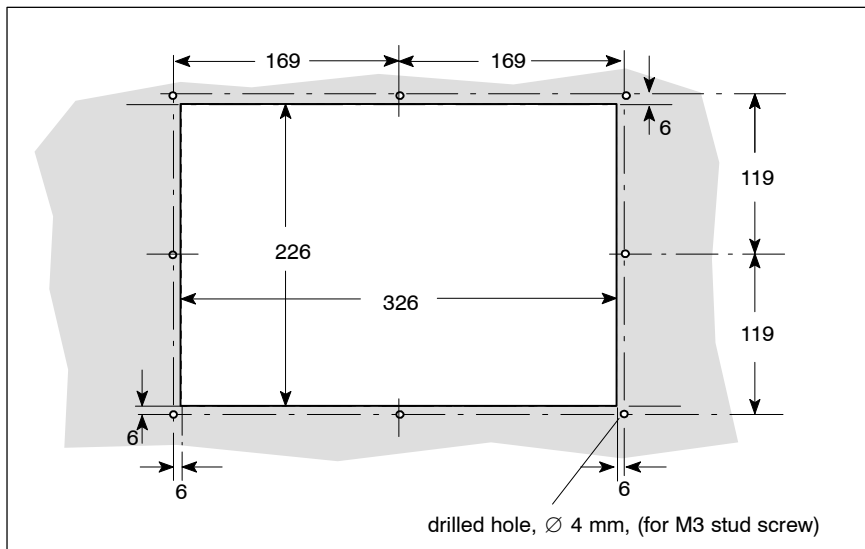
**BF315T P3-VT – variant for food technology with 15" display**

Installation

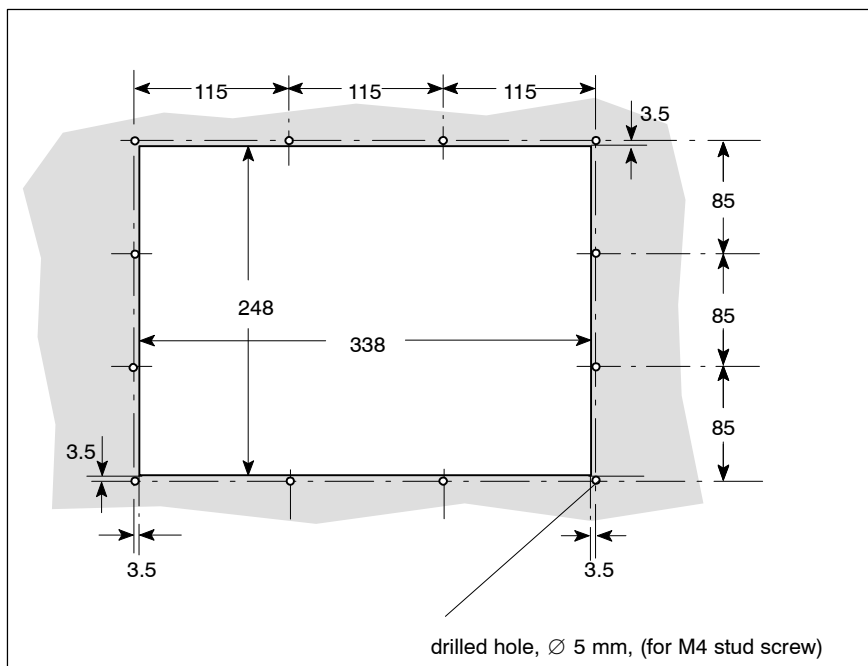
### 4.3 Installing BF2xxT and BF3xxT

★ Make an installation cutout with –

- 8 drilled holes,  $\varnothing$  4 mm, for BF200T



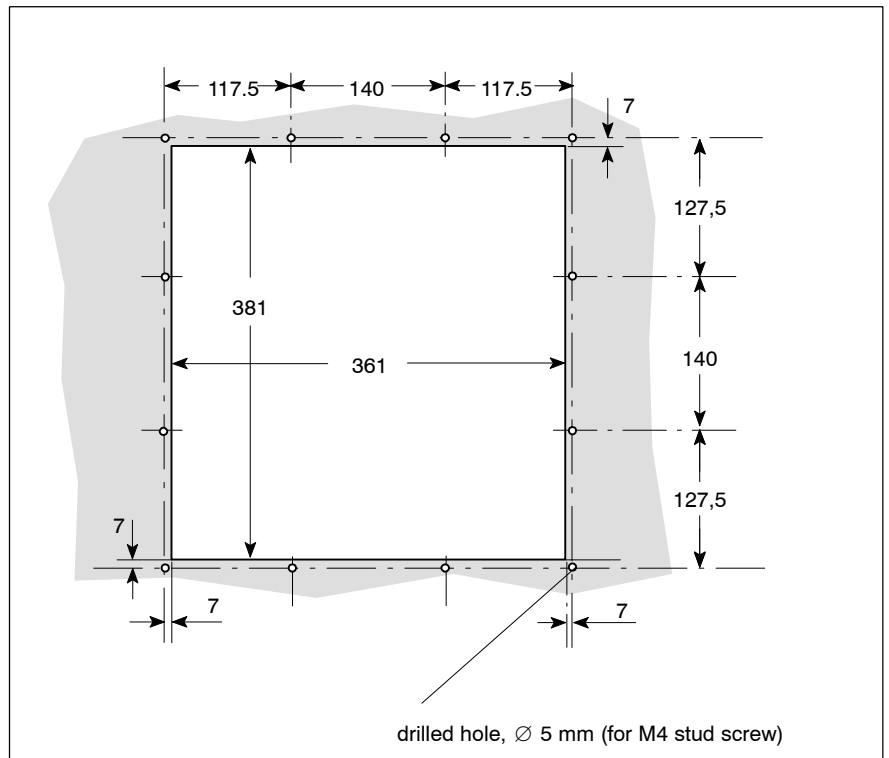
- 12 drilled holes,  $\varnothing$  5 mm, for BF212T and BF312T



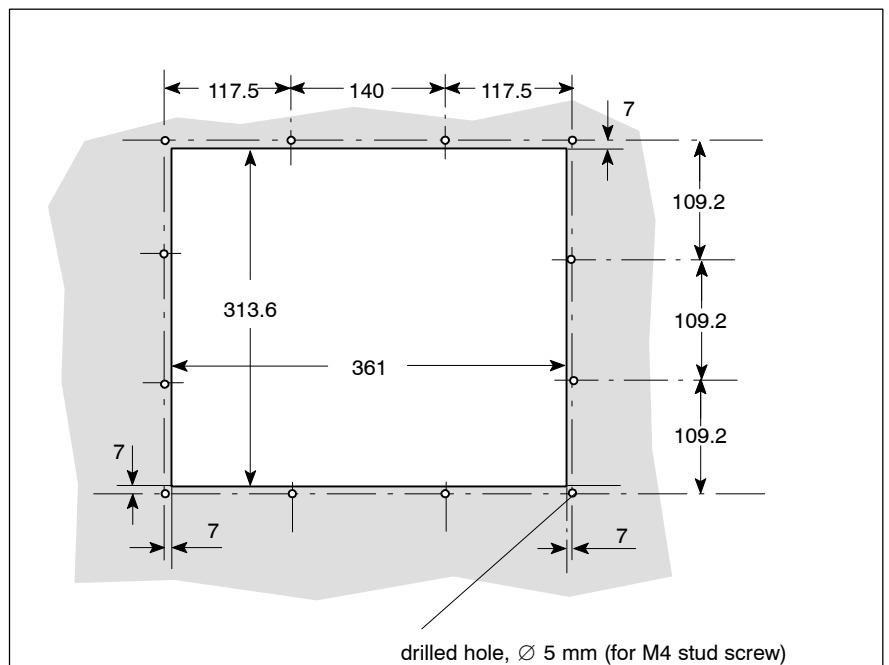


## Installation

- 12 drilled holes,  $\varnothing$  5 mm, for BF315T (P3) TA with control devices and BF315T P3 OTA prepared for optional control devices.



- 12 drilled holes,  $\varnothing$  5 mm, for BF315T P3 and BF315T P3-VT



- ★ Insert the control panel from the front into the cutout, ensuring that the mounting bolts go through the drilled holes.
- ★ Fasten the control panel by placing and tightening M4 nuts on the stud screws protruding at the rear of the control panel.

Installation

Notes:

## 5 Electrical Connections



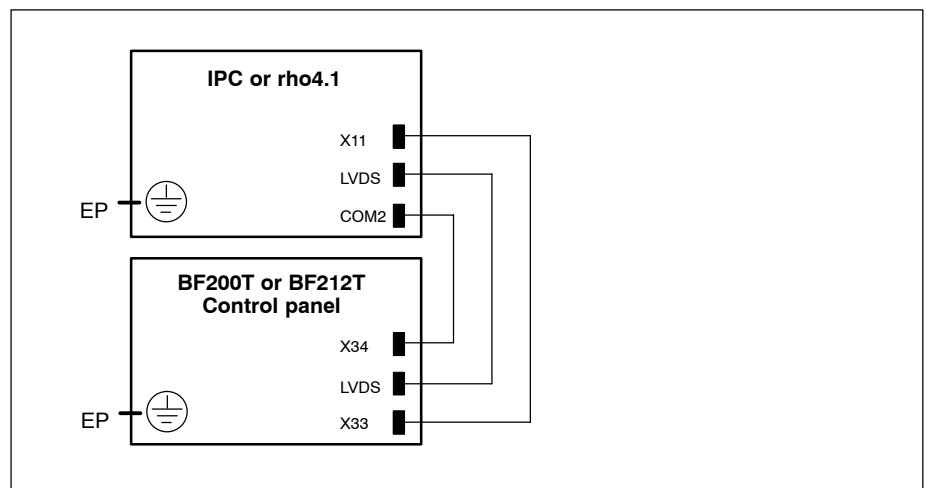
### CAUTION

Risk of damage to system components caused by inserting or removing plug connectors while circuits are energized!  
Ensure that connections are made only with the system switched off.

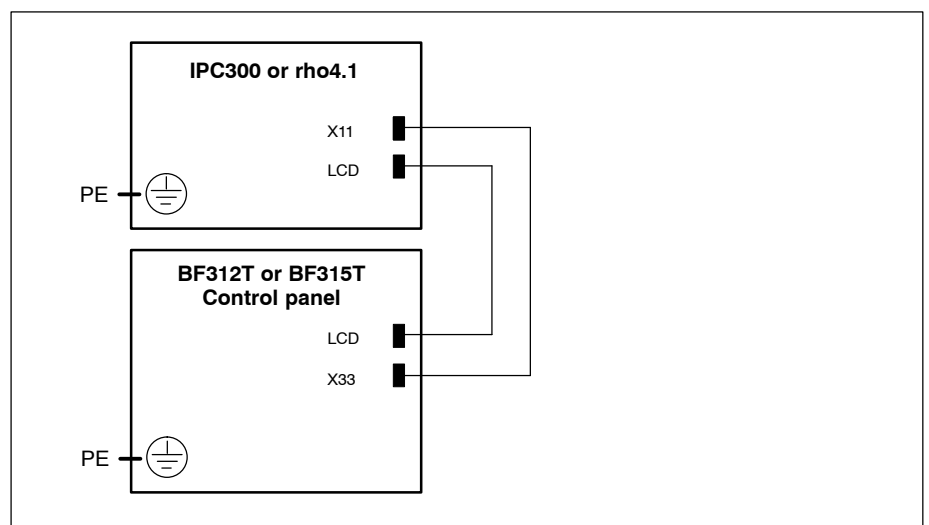
### 5.1 12 VDC power supply

The control panel requires a 12 V<sub>DC</sub> power supply via the X33 interface. This presupposes the presence of an IPC, IPC300 or rho4.1 to which the control panel is connected. The required power is supplied by the X11 interface of the IPC or the rho4.

#### BF2xxT



#### BF3xxT



Electrical Connections

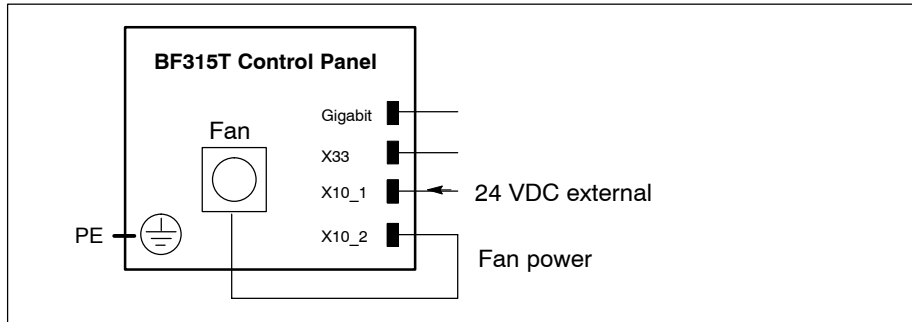
## 5.2 24 VDC power supply (BF315T)



### DANGEROUS ELECTRICAL VOLTAGE

The 24 VDC input power must comply with the requirements for “protective separation”!

The 24 VDC power supply is necessitated by the housing fan which is integrated in the BF315T. The fan is already electrically connected.



### X10\_1 24 VDC input

This input on the BF315T accepts the connection of an external 24 VDC power supply. X10\_1 is looped through to X10\_2 (24 VDC output).

Weidmüller push-lock terminal, MSTB 1.5, 4-pin

Rated voltage: 24 VDC

Max. conductor cross-sect.: 1.5 mm<sup>2</sup>

X10_1		Pin	Signal
1		1	24V
2		2	24V
3		3	0V
4		4	0V

### X10\_2 24 VDC output

24 VDC power for housing fan.

Weidmüller push-lock terminal, MSTB 1.5, 3-pin

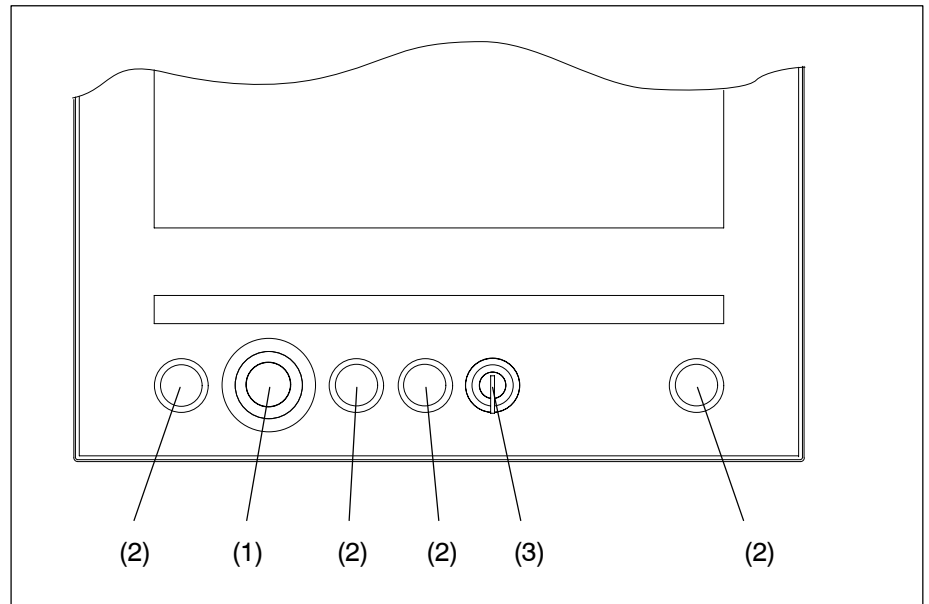
Rated voltage: 24 VDC

Fan connection ratings: 21.6 – 26.4 VDC; 1.1 W

Max. conductor cross-sect.: 1.5 mm<sup>2</sup>

X10_2		Pin	Signal
1		1	24 V
2		2	0 V
3		3	–

## Electrical Connections

**5.3 Control devices****(1) Emergency-STOP button**

Pushbutton for Emergency STOP functions as per DIN EN 60 204, IEC 73, IEC 204, IEC 947, DIN EN 60 947, VDE 0660 Part 200, VDE 0113 Part 1.

2 break / make contact units; see specifications below.

**(2) Pushbutton with lamp socket**

Pushbutton, clear. Return to home initial position each time it is pressed.

2 break / make contact units; see specifications below.

Lamp sockets for lamps with max. 250 VAC/1.2 W rating.

**(3) Key switch, IP65 rating**

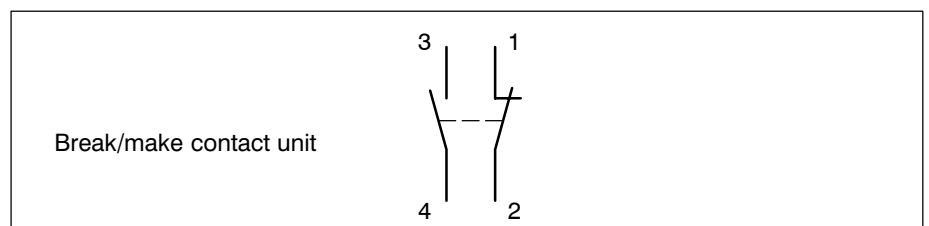
Key switch with detent. Switch is actuated by turning key through a 90° arc.

2 break / make contact units; see specifications below..

**Specifications**

Operating voltage: 24 VDC / 2.75 A  
240 VAC, 50 Hz / 3 A

Terminal cross-section: 2 x 0.75...2.5 mm<sup>2</sup> ,  
2 x 0.75...1.5 mm<sup>2</sup> (with wire-end ferrules)



## Electrical Connections

Notes:

Interfaces, Ports &amp; Connectors

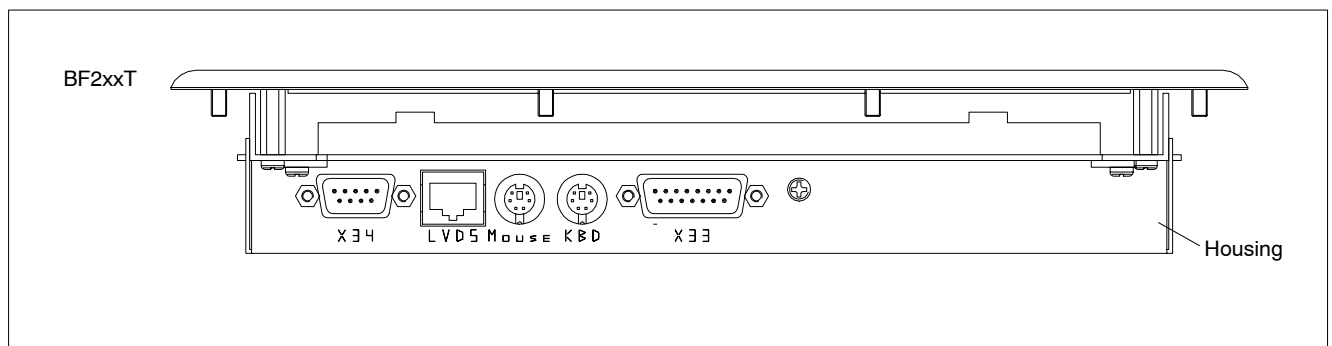
## 6 Interfaces, Ports & Connectors

The ports and connectors are situated in the rear housing of the control panels.

### 6.1 Overview of ports and connectors

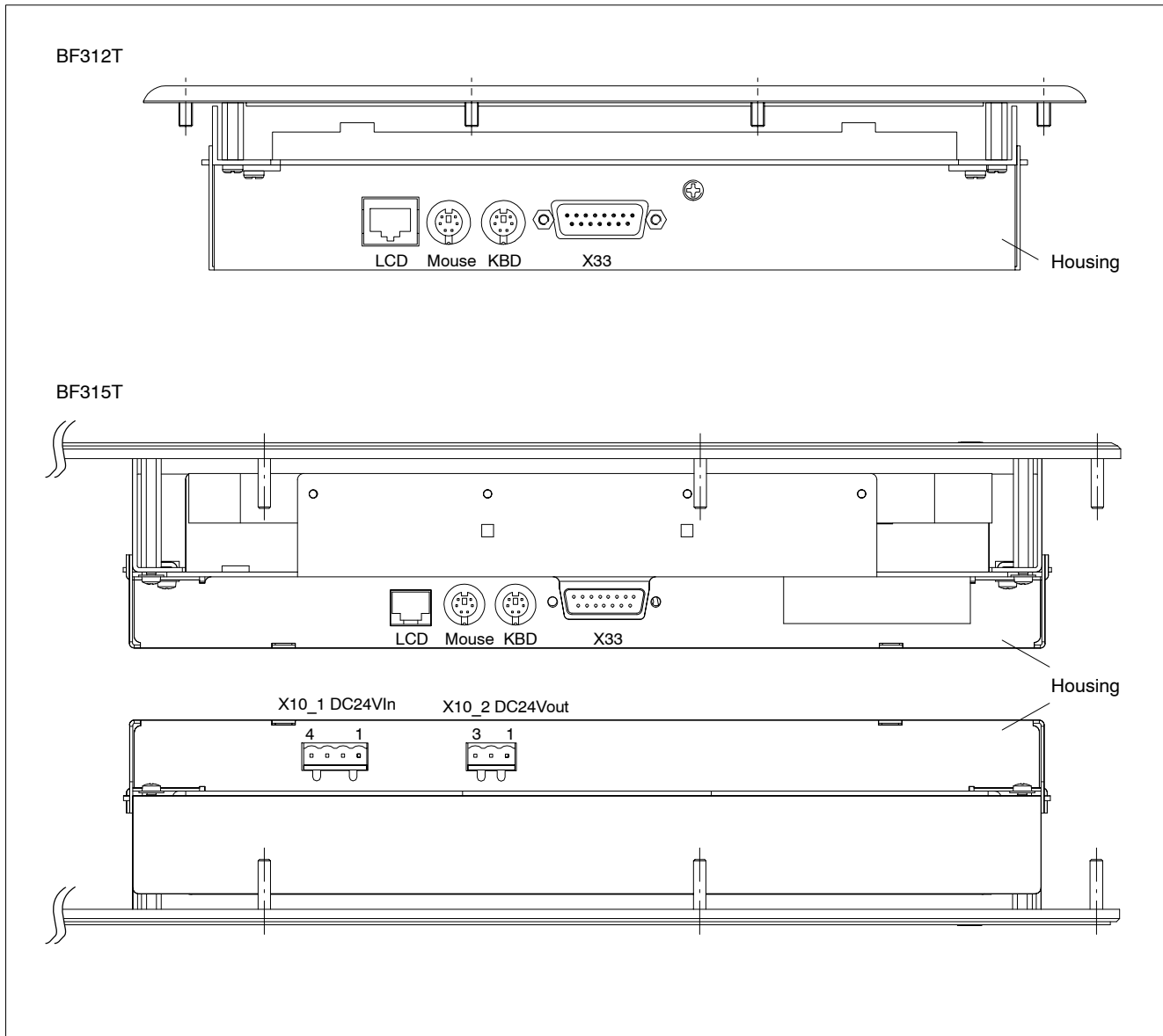
Panel label		Interface service	Physical connector type	Mating connector or cable (external)
BF2xxT	BF3xxT			
X34	–	RS-232, Serial interface for touch screen controller	Male DB-9 connector	Female DB-9 connector
LVDS	–	LVDS: Video signal for video transmission	Female RJ45 connector, 8-pin	Male RJ45 conn., twisted-pair, 8-core
–	LCD	Gigabit: Video transmission – RS-422 serial interface for touch screen controller	Female RJ45 connector, 8-pin.	Male RJ45 conn., twisted-pair, 8-core
Mouse		PS/2 mini DIN mouse	Female mini DIN PS/2, 6-pin	Male mini DIN PS/2, 6-pin.
KBD		PS/2 mini DIN keyboard	Female mini DIN PS/2, 6-pin	Keyboard cable with male mini DIN PS/2 connector, 6-pin
X33		Power supply, mouse and keyboard signals	Female DB-15 connector	Male DB-15 connector
Described in Section 5.2 of this manual:				
–	X10_1	24 VDC input	4-pin Weidmüller	4-pin Weidmüller
–	X10_2	24 VDC output power for housing fan	3-pin Weidmüller	3-pin Weidmüller

### 6.2 BF2xxT port and connector layout



Interfaces, Ports & Connectors

### 6.3 BF3xxT port and connector layout





## Interfaces, Ports &amp; Connectors

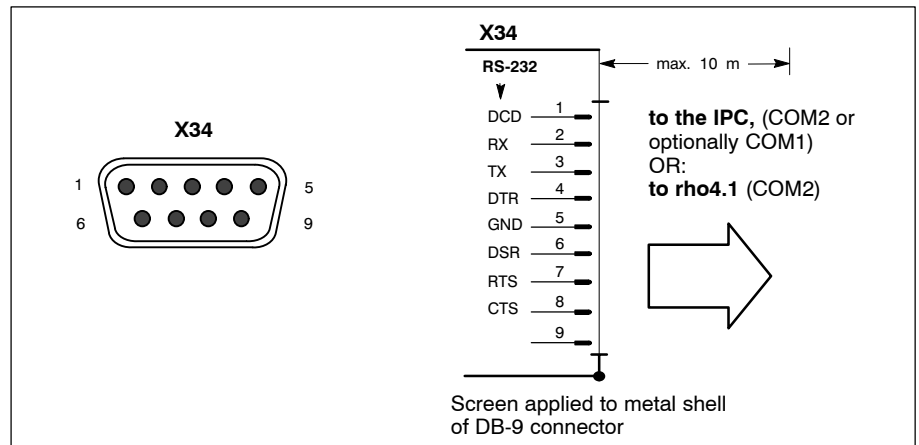
**6.4 X34 serial interface****X34 BF2xxT: Touch screen controller interface**

This interface is used for the touch screen controller signals. Although this interface is connected as standard to the COM2 of the IPC or rho4.1, X34 can also be connected to the COM1 serial port on the IPC.

Male DB-9 connector

Type:	RS-232
Cable length:	Max. 10 m
Cable type:	Screened, min. cross-section 0.14 mm <sup>2</sup>
Transfer rate:	Max. 115200 bps
Handshake:	Hardware and software handshake (X <sub>ON</sub> , X <sub>OFF</sub> )

See also information on premanufactured connecting cables in Section 8.2.



DCD	Data Carrier Detect. RCV channel used, for example, by a connected modem to inform the PC that it is receiving a carrier signal (active connection).
RX	Receive Data. Line on which data is received.
TX	Transmit Data. Line on which data is transmitted to a peripheral device.
DTR	Data Terminal Ready. XMIT channel used by the PC to signal to a connected peripheral device that its interface is switched on and initialized.
DSR	Data Set Ready. RCV channel used by the connected peripheral device to signal to the PC that it is switched on and initialized.
GND	Signal Ground
RTS	Request to Send. RCV channel used by the connected peripheral device to signal to the PC that it wishes to transmit data.

## Interfaces, Ports & Connectors

CTS	Clear to Send. XMIT channel used by the PC to signal to the connected peripheral device that it is permitted to transmit data.
Screen	Contact with housing frame via metallic shell of the D-Sub connector.



### **CAUTION**

**Functional failures caused by insufficient screening!**

**Use only metallic and/or conductive plug or socket housings featuring large-area screen contact.**

---

Interfaces, Ports &amp; Connectors

## 6.5 LVDS video signal interface

BF200T, BF212T

### LVDS Video transmission

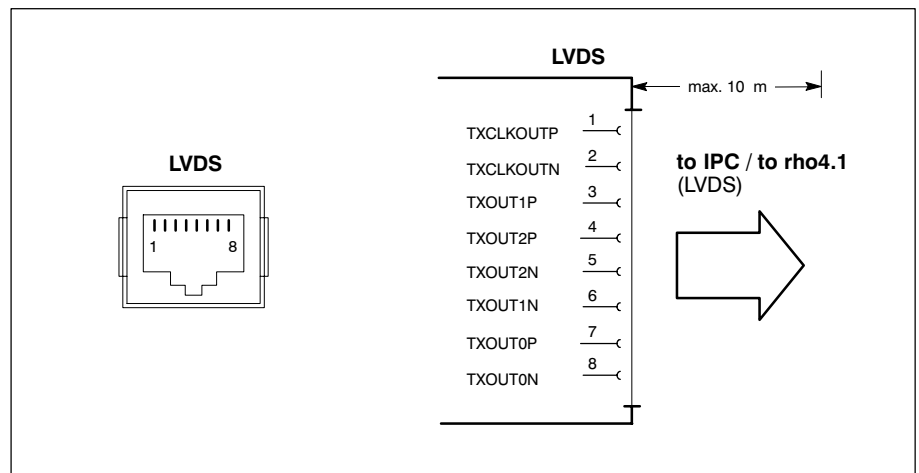
The video signals are transmitted via the LVDS port. The port has been specifically designed for longer transmission routes and interference-free transmission, and can only be connected to the LVDS port of the IPC or rho4.1. Connection to a PC supplied by another manufacturer is not possible.

Female RJ45, 8-pin

Cable length: Max. 10 m

Cable type: Twisted pair, 8-pin, screened

See also information on premanufactured connecting cables in Section 8.2.



Interfaces, Ports & Connectors

**BF312T, BF315T**

**LCD Gigabit interface (video transmission and RS-422 for touch screen controller)**

The Gigabit interface simultaneously handles the transfer of video signals and control communications for the touch screen controller (RS-422). On the IPC300 the controller signals are internally connected to COM2.

The Gigabit interface has been specifically designed for longer transmission routes and interference-free transmission, and can only be connected to the Gigabit interface on the IPC300.

Female RJ45, 8-pin

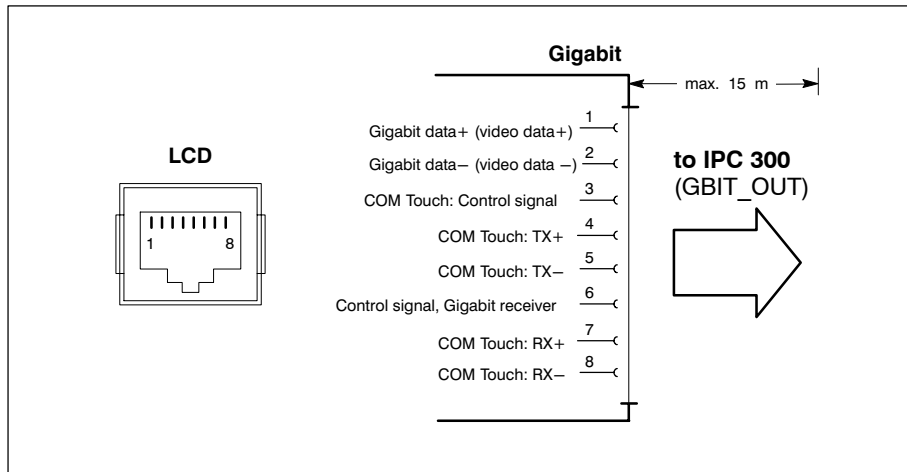
Cable length:

Max. 15 m, max. 75 m with repeater

Cable type:

Twisted pair, 8-pin, screened

See also information on premanufactured connecting cables in Section 8.2.

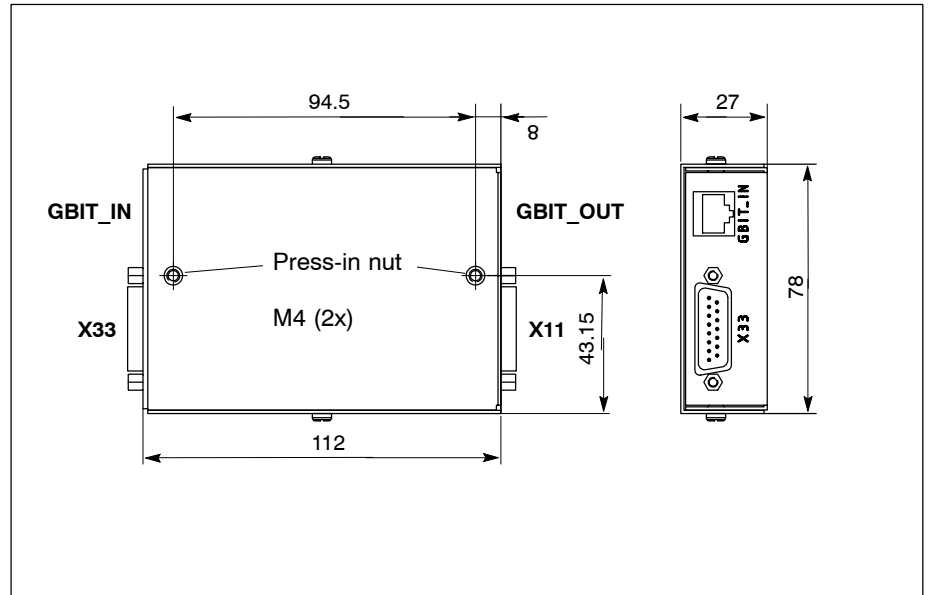


## Interfaces, Ports &amp; Connectors

**Repeater GBIT**

The use of the Gigabit repeater extends the reach of required connections between the IPC300 and BF3xxT (LCD and X33) to a maximum of 75 metres. Installs via M4 press-in nuts. Using standard mounting clamps, snap-on installation on a standard DIN rail is also possible.

Refer to ordering information in Section 8.2.



## 6.6 Keyboard connector

### KBD PS/2 mini DIN keyboard connector

A keyboard with PS/2 mini DIN connector can be connected to this port.



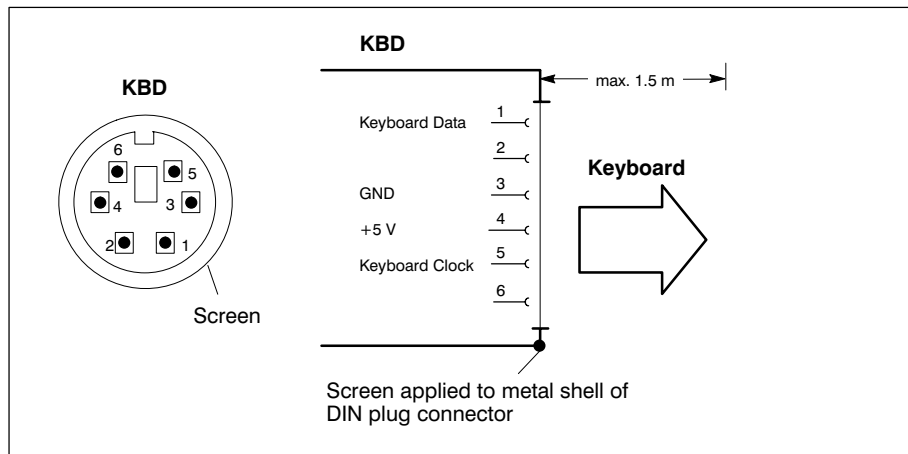
#### WARNING

Use this connection only if no keyboard is connected to the “KBD” port of the IPC or the “Keyb” port of the rho4.1. Otherwise, the keyboard signals may be faulty even if only one keyboard is used.

Female PS/2 mini DIN, 6-pin

Cable length: Max. 1.5 m

Cable type: Screened, min. cross-section 0.14 mm<sup>2</sup>



If the system fails to recognize the keyboard, the interface in the BIOS may have been set to “Absent”, i.e., “Not Connected”. Change the BIOS setting to “Present” (only IPC, rho4.1).

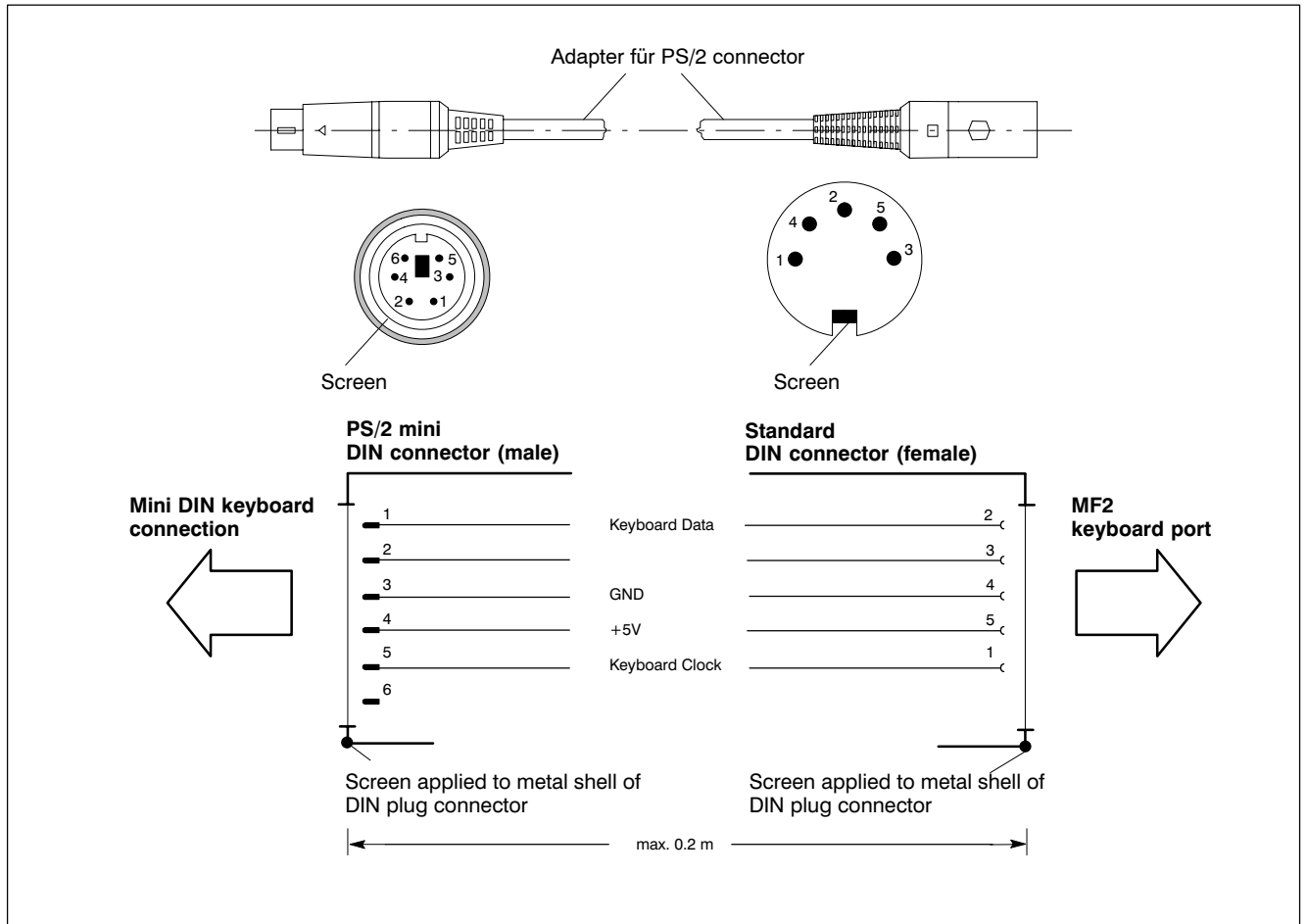
Interfaces, Ports & Connectors

**Keyboard adapter**

In the event that the MF2 keyboard is equipped with a standard 5-pin DIN plug, you will require a keyboard plug adapter to a female PS/2 Mini DIN connector.

A suitable adapter is approx. 20 cm in length with a DIN connector and a mini DIN coupling on the ends. Connector assignment as per diagram below.

These premanufactured adapters are available from computer stores.



## 6.7 Mouse port

### Mouse PS/2 mouse port



#### WARNING

Use this connection only if no mouse is connected to the “Mouse” port of the IPC or rho4.1.

Otherwise, the mouse signals may be faulty, even if only one mouse is used.

Female PS/2 mini DIN, 6-pin

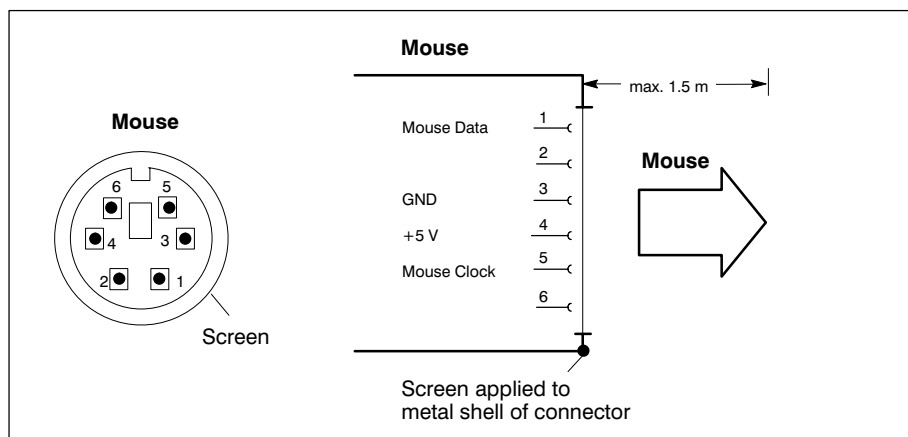
Cable length: Max. 1.5 m

Cable type: Screened, min. cross-section 0.14 mm<sup>2</sup>

Interrupt (IRQ): 12

BIOS preset: IPC, rho4.1: PS/2 Mouse Support: Enabled

IPC 300, rho4.1: PS/2 Mouse: Auto Detect



If the system fails to recognize the PS/2 mouse, the interface in the BIOS may have set to “Disabled”, i.e., “Not Available”. Change the BIOS setting to “Enabled” (only IPC, rho4.1). The operating system will not recognize the insertion of an external mouse after completed startup because the mouse initialization occurs during the boot phase.

- ☞ **The connected mouse must be PS/2-compatible, otherwise it cannot be used with the PC PS/2 connection.**  
**The BIOS normally reserves IRQ12 for the PS/2 mouse.**  
**If there are address conflicts, e.g., if IRQ 12 has already been occupied by another PC expansion card, you should change the IRQ of the expansion card to one that is still free.**



## 6.8 X33 power supply input

### X33 12 VDC power supply, backlight power, mouse and keyboard signals

The X33 power supply port is connected to X11 on the IPC, IPC300 or rho4.1 Robot Controller. It ensures the **faultless** operation of the control panel with the connected components, even over an **extended distance**.

This port provides:

- 12 VDC power to the control panel
- Required power for the backlight source
- Transmission of mouse and keyboard signals (refer also to Sections 6.6 and 6.7).

Female DB-15 connector

Cable length:

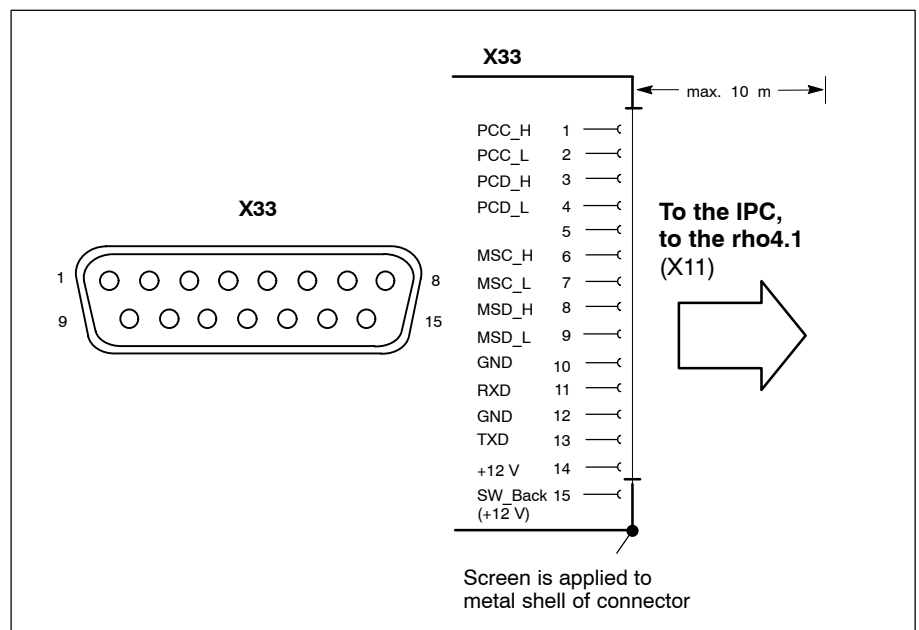
IPC: Max. 10 m

IPC300: Max. 15 m, can be extended to 75 m via repeaters in conjunction with Gigabit interface (refer to page 6-7)

Cable type:

Screened, min. cross-section 0.14 mm<sup>2</sup>

See also information on premanufactured connecting cables in Section 8.2.



Interfaces, Ports & Connectors

Notes:

Maintenance and Replacement

## 7 Maintenance and Replacement

The BF2xxT und BF3xxT control panels are maintenance-free. However, some components are subject to wear and must be replaced.

### 7.1 Maintenance schedule

Include the following tasks in your maintenance schedule:

- Clean the surface of the screen at least once a week with an anti-static cloth or window cleaning agent containing denatured alcohol.



#### CAUTION

**Dissolution of sealed key panel surface and display seal through contact with solvents!  
Do not use any solvents (e.g., paint thinner)!**

- 
- At least once a year check that all plug-and-socket and terminal connections of the components are correctly seated and not damaged. Check that cables are not broken or crushed. Replace damaged parts immediately.
  - Check fan and fan filter mats at least once a year. Clogged and contaminated filter mats reduce the air volumes required for proper ventilation and cooling. Therefore, wash dirty filter mats in soapy water or replace with new mats. Allow washed filter mats to dry thoroughly before reinstalling.



#### DANGER

**Risk of injury through rotating fan impeller!  
Keep hands and fingers clear, and do not insert any items into the fan impeller.**

- 
- ☞ **Functional compatibility of spare parts is guaranteed for a minimum of 5 years.**

## 7.2 Replacing the backlight and display



### CAUTION

**Danger to the module!**

**All ESD protection measures must be observed when using the module! Prevent electrostatic discharges!**

### Removal and installation

- The display and backlight unit of the **BF200T** and **BF315T** can be replaced independently of each other.
- The display and backlight unit of the **BF212T** and **BF312T** form a unitized component, and are therefore always replaced as one unit.

To install and remove the display and backlight, the rear of the unit must be accessible; if required, the control panel must be removed completely in order to gain access to the rear of the unit.

1. For reasons of safety interrupt the power supply to the connected IPC or rho4.1. Remove all connectors from the control panel.
2. After loosening the retaining screws, you can open the cover of the sheet-metal housing on the rear of the control panel (see diagram on page 7-3).

#### **BF2xxT and BF312T:**

3. Loosen/remove the retaining screws for the display.
4. To replace the **display** or **display unit and backlight**, disconnect the ribbon cable from the display connector, and replace the old display with a new one.  
To replace the **backlight** in the BF200T, disconnect the backlight from the mount, and replace it with a new one.

#### **BF315T:**

3. Remove the ribbon cables from the display connector, and remove the housing frame including display and backlight unit in a sideways direction.
4. Loosen/remove the retaining screws for the display, disconnect the backlight from the mount, and replace it with a new one.



### WARNING

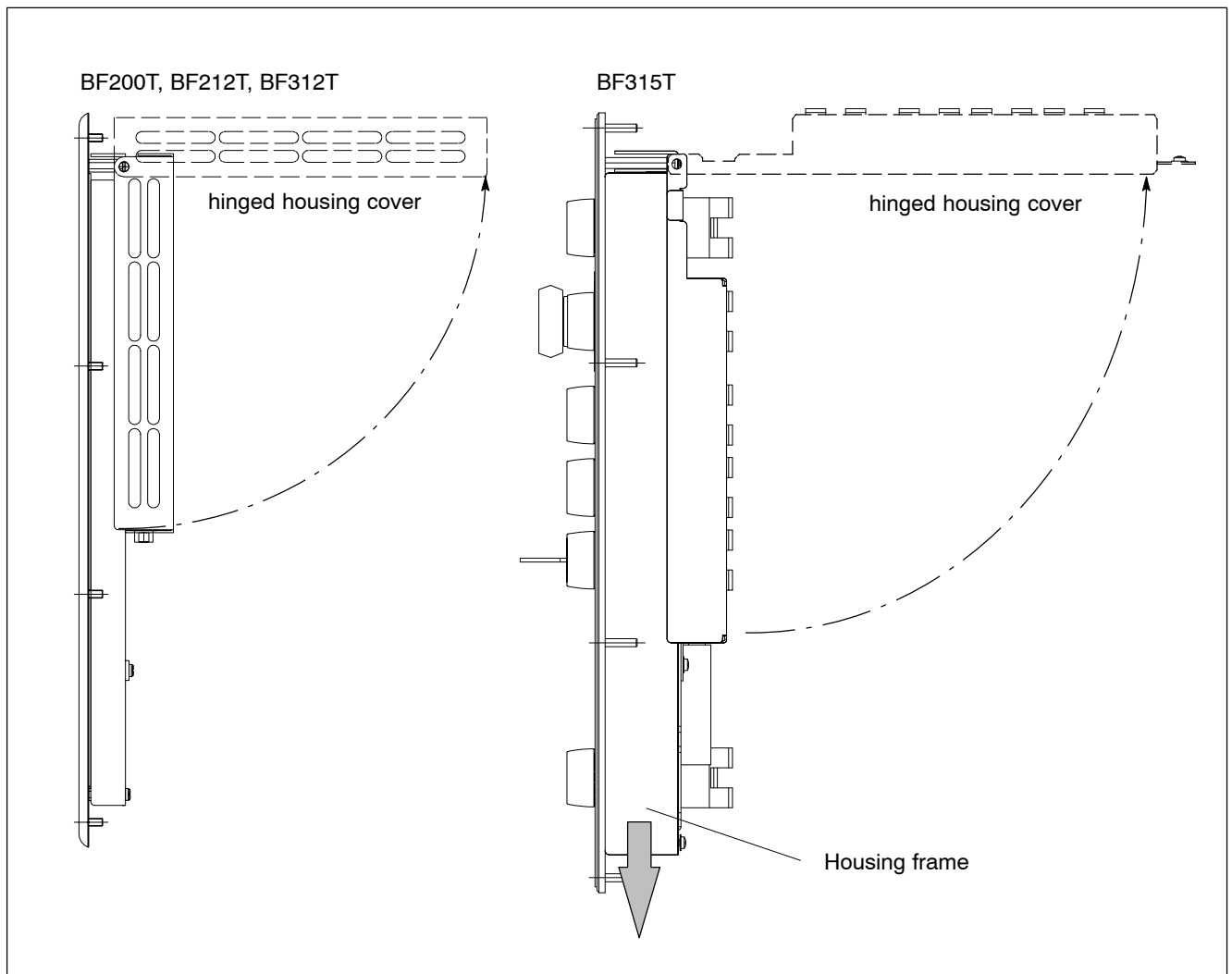
**Use only the same type of displays!**

**Ensure that the backlight is compatible with the display!**

5. Installation is in reverse sequence to disassembly described above.
6. In the event that, subsequent to the installation, the display does not produce an image, check for the following:
  - proper seating and positive contact of display ribbon cable
  - proper seating and positive contact of backlight unit

## Maintenance and Replacement

- proper seating of all reconnected connectors



*BF2xxT and BF3xxT housing cover*

## Maintenance and Replacement

Notes:

Part numbers

## 8 Part numbers

### 8.1 Control panels

Designation		Order no.
BF200T	Touch screen 10.4 in. TFT (w/o connecting cables)	1070 080 676
	Touch screen 10.4 in. TFT, (incl. 3 connecting cables, length 10 m)	1070 081 286
BF212T	Touch screen 12.1 in. TFT (w/o connecting cables)	1070 081 212
BF312T	Touchscreen 12.1" TFT (w/o connecting cables)	1070 079 484
BF315T TA	Touchscreen 15 in. TFT, w/ optional control devices for conn. to IPC300/rho4.1 with Pentium I (w/o connecting cables)	1070 083 215
BF315T P3 TA	Touchscreen 15" TFT, w/ optional control devices for conn. to IPC300/rho4.1 with Pentium III (w/o connecting cables)	1070 085 388
BF315T P3 OTA	Touchscreen 15" TFT, prepared for mounting of addi- tional control devices, for conn. to IPC300/rho4.1 with Pentium III (w/o connecting cables)	1070 084 844
BF315T P3	Touchscreen 15" TFT, for conn. to IPC300/rho4.1 with Pentium III (w/o connecting cables)	1070 084 845
BF315T P3-VT	Touchscreen 15" TFT, for conn. to IPC300/rho4.1 with Pentium III, variant for food technology (w/o connecting cables)	1070 085 773

Part numbers

## 8.2 Accessories

Designation		Order no.	
Connecting cables BF2xxT	X34, length 2.5 m	1070 083 117	
	5 m	1070 083 116	
	10 m	1070 080 771	
	LVDS,length 2.5 m	1070 918 793	
	5 m	1070 919 258	
	10 m	1070 918 794	
	LVDS,hi-flex cable length 2.5 m	1070 920 456	
	5 m	1070 920 457	
	10 m	1070 920 271	
	X33, length 2.5 m	1070 083 120	
	5 m	1070 083 119	
	10 m	1070 080 744	
Connecting cables BF312T	LCD, rigid cable length 2,5 m	1070 920 456	
	5 m	1070 921 385	
	10 m	1070 921 384	
	15 m	1070 921 070	
	X33, length 2,5 m	1070 083 120	
	5 m	1070 083 119	
	10 m	1070 080 744	
	15 m	1070 079 383	
	Connecting cables BF315T TA	LCD, rigid cable length 2,5 m	1070 920 456
		5 m	1070 921 385
10 m		1070 921 384	
X33, length 2,5 m		1070 083 120	
5 m		1070 083 119	
10 m		1070 080 744	



## Part numbers

Designation		Order no.	
Connecting cables	LCD, rigid cable	length 2,5 m	1070 920 456
		5 m	1070 921 385
		10 m	1070 921 384
	LCD, hi-flex cable	length 2,5 m	1070 922 022
		5 m	1070 922 021
		10 m	1070 921 891
	X33,	length 2,5 m	1070 083 120
		5 m	1070 083 119
		10 m	1070 080 744
	Repeater for BF3xxT	Cable extension 15 m, for LCD and X33 (max. 4 repeaters allowed)	1070 079 423

Part numbers

Notes:

Appendix

# A Appendix

## A.1 Abbreviations

<b>Abbreviation</b>	<b>Meaning</b>
BAPS3	Movement and sequence programming language, version 3
C:	Drive designation, here drive C (hard disk drive)
CAN	Controller Area Network
DDE	Dynamic Data Exchange
DLL	Dynamic Link Library
EGB	Subassemblies at risk from electrostatic discharge
ESD	Electrostatic discharge Abbreviation for all terms concerning electrostatic discharges, eg ESD protection, ESD hazard
I/O	Input / Output
LCD	Liquid Crystal Display
LED	Light Emitting Diode
MMI	Man-Machine-Interface
OEM	Original Equipment Manufacturer
PCL	PC-programmable logic control
PE	Protective Earth
PHG	Hand-held programmer (Programmier Handgerät)
PLC	Programmable logic controller
ROPS4	Robot programming system for rho4
TCP/IP	Transmission Control Protocol / Internet Protocol
UPS	Uninterruptible Power Supply

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