



Visualisation Terminal BTV15.2

Application Manual

SYSTEM200

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BTV15.2
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- the hardware functions of the BTV15.2
 - the connection and the mounting
 - the technical data

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Dept. ECH2 (FH/CV)
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1 System Presentation

1.1 BTV15 Brief Description

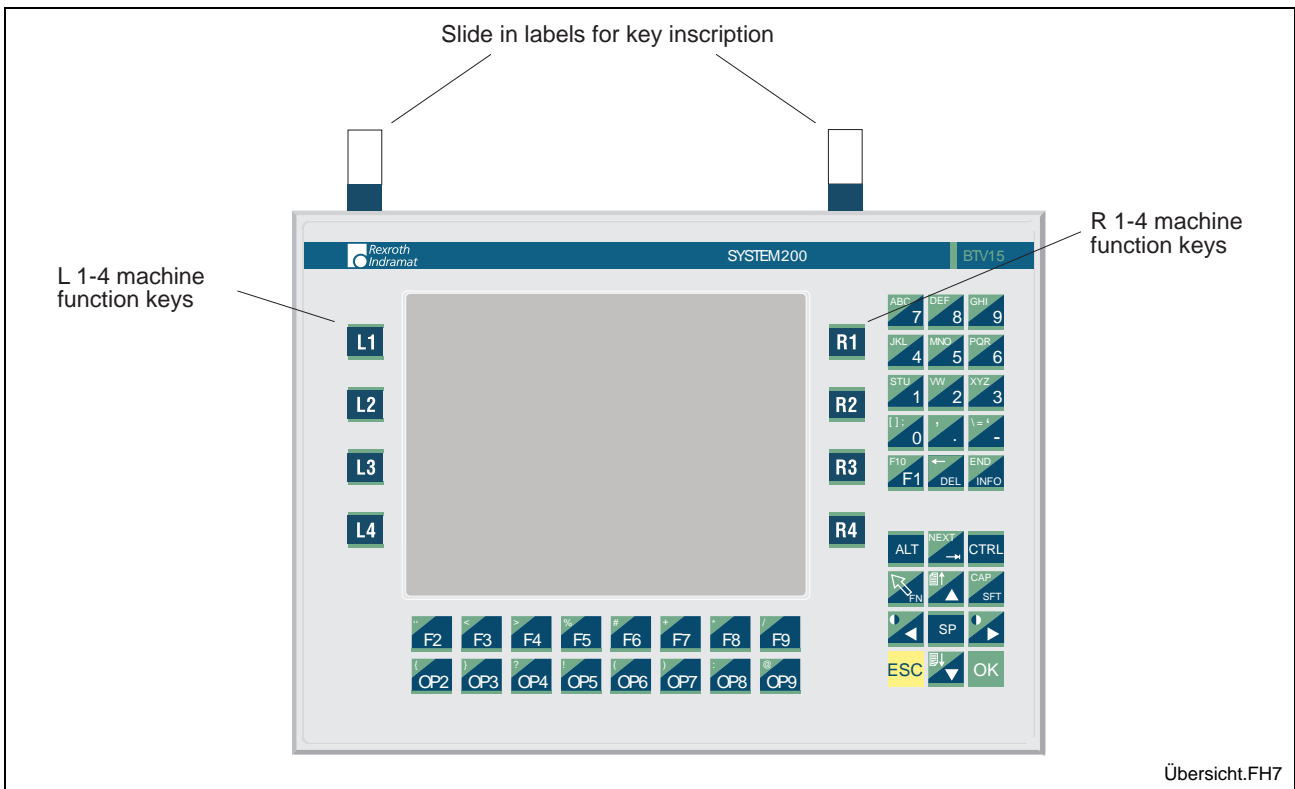


Fig. 1-1: BTV15 front panel

The BTV15 unit is a PC based machine control panel with Windows NT as operating system. The BTV15.2 unit is equipped with a Slot CPU Board in PISA form factor.

The 8.2" color display guarantees a clear visualization of the data. The display is protected by a non-reflecting plastic screen.

Furthermore, the BTV15.2 unit provides a user-oriented functional keypad. The front panel consists of a 4mm thick aluminum panel with rounded edges and is laminated with a chemical resistant polyester foil. The foil with the embossed keys is completely let in the front panel so that it is protected against separation. Nearly all functions of a standard keyboard are realized by multiple key allocation. Some keys can be individually labeled by insert strips.

As extended version it is also possible to equip the BTV15.2 unit with different plug-in cards.

1.2 Standard version

The standard version of the BTV15.2 unit has the following features:

- 5x86 266 MHz - CPU with integrated graphic controller and 2 MB graphic memory
- 64 or 128 MB work memory
- > 3 GB HDD
- 8,2" DSTN color display
- 24 VDC Power supply

1.3 Extended version

Compared to the standard version of the BTV15.2 unit the extended version is equipped with a backplane with an ISA/PCI and an ISA slot. Therefore, two additional slots for control units are available. Further information about the possible variants and the wiring of the individual components you find in chapter 8, application examples.

1.4 Software

Operating system

Please use Windows NT, version 4, service pack 5 as operating system. The Operating system is preinstalled on the harddisk.

Change of the Harddisk

Basically it is possible to change the harddisk. Its access is located on the bottom of the BTV15.2 unit. The mounting of the harddisk is inserted in the BTV15.2 unit like a drawer and is fixed with two screws.

Note: A change of the harddisk should only be executed by specially trained staff.

BIOS

The used CPU board with the features mentioned below has a BIOS of Phoenix. It's a standard PC BIOS with the conventional functionality.

Furthermore, a VGA BIOS of Chips & Technologies for the Controller C&T69000 is integrated in the BTV15.2 unit.

The settings are specified as follows:

Main Setup	
CPU Type	Pentium with MMX
CPU Speed	266 MHz
System Memory	640 KB
Extended Memory	64512 KB
System Time	HH:MM:SS
System Date	MM/DD/YYYY
Diskette Drive A	1.44MB 3 ½"
Diskette Drive B	Disabled
Primary IDE Master	Auto
32 Bit I/O	Disabled
Primary IDE Slave	Auto
32 Bit I/O	Disabled
Secondary IDE Master	Auto
32 Bit I/O	Disabled
Secondary IDE Slave	Auto
32 Bit I/O	Disabled
Keyboard Features	
NumLock	On
Key Click	Disabled
Keyboard auto-repeat rate	30/sec
Keyboard auto-repeat delay	½ sec
POST Options	
QuietBoot Mode	Disabled
QuickBoot Mode	Enabled
Summary screen	Disabled
Boot with keyboard	Enabled

Fig. 1-2: Main Setup

Advanced Setup (Part 1)	
Large Disk Access Mode	DOS
Memory Cache	Enabled
Cache System BIOS area	Enabled
Cache Video BIOS area	Enabled
Cache CC00 – CFFF	Disabled
Cache D000 – D3FF	Disabled
Cache D400 – D7FF	Disabled
Cache D800 – DBFF	Disabled
Cache DC00 – DFFF	Disabled
PCI / PnP Configuration	
Plug & Play O/S	No
ISA graphics device installed	No
Default Primary Video Adapter	AGP
PCI/PNP ISA UMB Region Exclusion	
CC00 – CFFF	Available
D000 – D3FF	Available
D400 – D7FF	Available
D800 – DBFF	Available
DC00 – DFFF	Available
PCI/PNP ISA IRQ Resource Exclusion	
IRQ 3	Available
IRQ 4	Available
IRQ 5	Available
IRQ 7	Available
IRQ 9	Available
IRQ 10	Available
IRQ 11	Available
IRQ 12	Available
PCI/PNP ISA DMA Resource Exclusion	
DMA 1	Available
DMA 3	Available
DMA 5	Available

Fig. 1-3: Advanced Setup (Part 1)

Advanced Setup (Part 2)	
PCI IRQ Routing	
Shared PCI IRQs	Auto
PCI Interrupt INTA#	Auto Select
PCI Interrupt INTB#	Auto Select
PCI Interrupt INTC#	Auto Select
PCI Interrupt INTD#	Auto Select
PCI Device, Slot #1	
Enable Master	Disabled
Latency Timer	0040h
PCI Device, Slot #2	
Enable Master	Disabled
Latency Timer	0040h
PCI Device, Slot #3	
Enable Master	Disabled
Latency Timer	0040h
PCI Device, Slot #4	
Enable Master	Disabled
Latency Timer	0040h
Reset Configuration Data	No
Secured Setup Configurations	No
I/O Device Configuration	
Serial Port A	Auto
Serial Port B	Auto
Mode	Normal
Serial Port C	Disabled
Serial Port D	Disabled
Parallel port	Auto
Mode	Bi-directional
Floppy disk controller	Enabled
Base I/O address	Primary
Local IDE Controller	Both
IDE Connectors	Standard
Local LAN Controller	Enabled
Watchdog	Disabled
DiskOnChip	Disabled
USB BIOS Legacy Support	Disabled
PS/2 Mouse	Auto Detect

Fig. 1-4: Advanced Setup (Part 2)

Advanced Setup (Part 3)	
Memory Shadow	
CC00 – CFFF	Disabled
D000 – D3FF	Disabled
D400 – D7FF	Disabled
D800 – DBFF	Disabled
DC00 – DFFF	Disabled
Advanced Chipset Control	
SDRAM CAS Latency	3T
ISA I/O recovery time	2 BUSCLK
AT bus clock frequency	PCICLK/4
AGP Aperture Size	64 Mb

Fig. 1-5: Advanced Setup (Part 3)

Security	
Supervisor Password Is	Clear
User Password Is	Clear
Set Supervisor Password	Enter
Set User Password	Enter
Network Server Mode	Disabled
Password on boot	Disabled
Fixed disk boot sector	Normal
Diskette access	Supervisor
Virus check reminder	Disabled
System backup reminder	Disabled

Fig. 1-6: Security Setup

Power Setup	
Power Savings	Disabled
Idle Mode	Off
Standby Timeout	Off
Auto Suspend Timeout	Off
Hard Disk Timeout	Disabled
Video Timeout	Disabled
Advanced Options	
Standby Timer Reload Event	
Primary IDE Event	Enabled
Secondary IDE Event	Enabled
Video Event	Enabled
Keyboard Event	Enabled
Floppy Event	Enabled
Parallel Event	Disabled
Serial Event	Disabled

USB Event	Disabled
Display Timer Reload Event	
Primary IDE Event	Disabled
Secondary IDE Event	Disabled
Video Event	Disabled
Keyboard Event	Enabled
System Wakeup Event	
USB Event	Enabled
PCI Bus Master Event	Disabled
LPT Port Event	Disabled
Keyboard Event	Enabled
Serial Port Event	Disabled

Fig. 1-7: Power Setup

Boot
Diskette Drive
Legacy Floppy Drives
Hard Drive
Type of connected HDD
Bootable Add-in Cards
Removable Devices
Lagacy Floppy Drives
ATAPI CD-ROM Drive
Network Boot

Fig. 1-8: Boot Setup

2 Important directions for use

2.1 Appropriate use

Introduction

Rexroth Indramat products represent state-of-the-art developments and manufacturing. They are tested prior to delivery to ensure operating safety and reliability.

The products may only be used in the manner that is defined as appropriate. If they are used in an inappropriate manner, then situations can develop that may lead to property damage or injury to personnel.

Note: Rexroth Indramat, as manufacturer, is not liable for any damages resulting from inappropriate use. In such cases, the guarantee and the right to payment of damages resulting from inappropriate use are forfeited. The user alone carries all responsibility of the risks.

Before using Rexroth Indramat products, make sure that all the prerequisites for appropriate use of the products are satisfied:

- Personnel that in any way, shape or form uses our products must first read and understand the relevant safety instructions and be familiar with appropriate use.
- If the product takes the form of hardware, then they must remain in their original state, in other words, no structural changes are permitted. It is not permitted to decompile software products or alter source codes.
- Do not mount damaged or faulty products or use them in operation.
- Make sure that the products have been installed in the manner described in the relevant documentation.

Areas of use and application

The BTV15.2 is a PC-based user and visualisation terminal. The BTV15.2 terminal made by Rexroth Indramat is designed for use in the following cases:

- as a user and visualisation terminal,
- in extended case with integrated control hardware as stand-alone-PLC

Note: The BTV15.2 may only be used with the accessories and parts specified in this document. If a component has not been specifically named, then it may not be either mounted or connected. The same applies to cables and lines.

Operation is only permitted in the specified configurations and combinations of components using the software and firmware as specified in the relevant function descriptions.

Available for an application-specific use of the user and visualisation terminals are unit types with different equipment and in extended version with different configurations.

Typical areas of application of a BTV15.2 are:

- lathes
- milling machines and
- machining centers.

The BTV15.2 may only be operated under the assembly, installation and ambient conditions as described here (temperature, system of protection, humidity, EMC requirements, etc.) and in the position specified.

2.2 Inappropriate use

Using the machine and visualisation terminal outside of the above-referenced areas of application or under operating conditions other than described in the document and the technical data specified is defined as "inappropriate use".

The terminals may not be used if

- they are subject to operating conditions that do not meet the above specified ambient conditions. This includes, for example, operation under water, in the case of extreme temperature fluctuations or extreme maximum temperatures or if
- Rexroth Indramat has not specifically released them for that intended purpose. Please note the specifications outlined in the general Safety Instructions!

3 Safety Instructions for Electric Servo Drives and Controls

3.1 Introduction

Read these instructions before the equipment is used and eliminate the risk of personal injury or property damage. Follow these safety instructions at all times.

Do not attempt to install, use or service this equipment without first reading all documentation provided with the product. Read and understand these safety instructions and all user documentation of the equipment prior to working with the equipment at any time. If you do not have the user documentation for your equipment contact your local Rexroth Indramat representative to send this documentation immediately to the person or persons responsible for the safe operation of this equipment.

If the product is resold, rented or transferred or passed on to others, then these safety instructions must be delivered with the product.



Inappropriate use of this equipment, failure to follow the safety instructions in this document or tampering with the product, including disabling of safety devices, may result in product damage, personal injury, severe electrical shock or death!

3.2 Explanations

The safety warnings in this documentation describe individual degrees of hazard seriousness in compliance with ANSI:




Warning symbol with signal word	Degree of hazard seriousness
	The degree of hazard seriousness describes the consequences resulting from non-compliance with the safety guidelines. Bodily harm or product damage will occur.
	Death or severe bodily harm may occur.
	Death or severe bodily harm may occur.

Fig. 3-1: Classes of danger with ANSI

3.3 Hazards by inappropriate use



DANGER

**High voltage and high discharge current!
Danger to life, risk of severe electrical shock
and risk of injury!**



DANGER

**Dangerous movements! Danger to life and risk
of injury or equipment damage by unintentional
motor movements!**



WARNING

**High electrical voltage due to wrong
connections! Danger to life, severe electrical
shock and severe bodily injury!**



WARNING

**Health hazard for persons with heart
pacemakers, metal implants and hearing aids in
proximity to electrical equipment!**



CAUTION

**Surface of machine housing could be extremely
hot! Danger of injury! Danger of burns!**



CAUTION

**Risk of injury due to inappropriate handling!
Bodily injury caused by crushing, shearing,
cutting and mechanical shock or improper
handling of pressurized systems!**



CAUTION

**Risk of injury due to inappropriate handling of
batteries!**

3.4 General Information

- Rexroth Indramat GmbH is not liable for damages resulting from failure to observe the warnings given in these documentation.
- Order operating, maintenance and safety instructions in your language before starting up the machine. If you find that due to a translation error you can not completely understand the documentation for your product, please ask your supplier to clarify.
- Proper and correct transport, storage, assembly and installation as well as care in operation and maintenance are prerequisites for optimal and safe operation of this equipment.
- Trained and qualified personnel in electrical equipment:
Only trained and qualified personnel may work on this equipment or within its proximity. Personnel are qualified if they have sufficient knowledge of the assembly, installation and operation of the product as well as an understanding of all warnings and precautionary measures noted in these instructions.
Furthermore, they should be trained, instructed and qualified to switch electrical circuits and equipment on and off, to ground them and to mark them according to the requirements of safe work practices and common sense. They must have adequate safety equipment and be trained in first aid.
- Only use spare parts and accessories approved by the manufacturer.
- Follow all safety regulations and requirements for the specific application as practiced in the country of use.
- The equipment is designed for installation on commercial machinery.
European countries: see directive 89/392/EEC (machine guideline).
- The ambient conditions given in the product documentation must be observed.
- Use only safety features that are clearly and explicitly approved in the Project Planning manual.
For example, the following areas of use are not allowed: Construction cranes, Elevators used for people or freight, Devices and vehicles to transport people, Medical applications, Refinery plants, the transport of hazardous goods, Radioactive or nuclear applications, Applications sensitive to high frequency, mining, food processing, Control of protection equipment (also in a machine).
- Start-up is only permitted once it is sure that the machine, in which the product is installed, complies with the requirements of national safety regulations and safety specifications of the application.
- Operation is only permitted if the national EMC regulations for the application are met.
The instructions for installation in accordance with EMC requirements can be found in the INDRAMAT document "EMC in Drive and Control Systems".
The machine builder is responsible for compliance with the limiting values as prescribed in the national regulations and specific EMC regulations for the application.
European countries: see Directive 89/336/EEC (EMC Guideline).
U.S.A.: See National Electrical Codes (NEC), National Electrical Manufacturers Association (NEMA), and local building codes. The user of this equipment must consult the above noted items at all times.
- Technical data, connections and operational conditions are specified in the product documentation and must be followed at all times.

3.5 Protection against contact with electrical parts

Note: This section refers to equipment with voltages above 50 Volts.

Making contact with parts conducting voltages above 50 Volts could be dangerous to personnel and cause an electrical shock. When operating electrical equipment, it is unavoidable that some parts of the unit conduct dangerous voltages.



DANGER

High electrical voltage! Danger to life, severe electrical shock and severe bodily injury!

- ⇒ Only those trained and qualified to work with or on electrical equipment are permitted to operate, maintain or repair this equipment.
- ⇒ Follow general construction and safety regulations when working on electrical installations.
- ⇒ Before switching on power the ground wire must be permanently connected to all electrical units according to the connection diagram.
- ⇒ Do not operate electrical equipment at any time if the ground wire is not permanently connected, even for brief measurements or tests.
- ⇒ Before working with electrical parts with voltage potentials higher than 50 V, the equipment must be disconnected from the mains voltage or power supply.
- ⇒ The following should be observed with electrical drives, power supplies, and filter components:
Wait five (5) minutes after switching off power to allow capacitors to discharge before beginning work. Measure the voltage on the capacitors before beginning work to make sure that the equipment is safe to touch.
- ⇒ Never touch the electrical connection points of a component while power is turned on.
- ⇒ Install the covers and guards provided with the equipment properly before switching the equipment on. Prevent contact with live parts at any time.
- ⇒ A residual-current-operated protective device (r.c.d.) must not be used on an electric drive! Indirect contact must be prevented by other means, for example, by an overcurrent protective device.
- ⇒ Equipment that is built into machines must be secured against direct contact. Use appropriate housings, for example a control cabinet.

European countries: according to EN 50178/1998, section 5.3.2.3.

U.S.A: See National Electrical Codes (NEC), National Electrical Manufacturers Association (NEMA) and local building codes. The user of this equipment must observe the above noted instructions at all times.

To be observed with electrical drives, power supplies, and filter components:



DANGER

**High electrical voltage! High leakage current!
Danger to life, danger of injury and bodily harm
from electrical shock!**

- ⇒ Before switching on power for electrical units, all housings and motors must be permanently grounded according to the connection diagram. This applies even for brief tests.
- ⇒ Leakage current exceeds 3.5 mA. Therefore the electrical equipment and units must always be firmly connected to the supply network.
- ⇒ Use a copper conductor with at least 10 mm² cross section over its entire course for this protective connection!
- ⇒ Prior to startups, even for brief tests, always connect the protective conductor or connect with ground wire. High voltage levels can occur on the housing that could lead to severe electrical shock and personal injury.

European countries: EN 50178/1998, section 5.3.2.1.

USA: See National Electrical Codes (NEC), National Electrical Manufacturers Association (NEMA), and local building codes. The user of this equipment must maintain the above noted instructions at all times.

3.6 Protection by protective low voltage (PELV) against electrical shock

All connections and terminals with voltages between 5 and 50 Volts on INDRAMAT products are protective low voltages designed in accordance with the following standards on contact safety:

- International: IEC 364-4-411.1.5
- EU countries: see EN 50178/1998, section 5.2.8.1.



WARNING

High electrical voltage due to wrong connections! Danger to life, severe electrical shock and severe bodily injury!

- ⇒ Only equipment, electrical components and cables of the protective low voltage type (PELV = Protective Extra Low Voltage) may be connected to all terminals and clamps with 0 to 50 Volts.
- ⇒ Only safely isolated voltages and electrical circuits may be connected. Safe isolation is achieved, for example, with an isolating transformer, an opto-electronic coupler or when battery-operated.

3.7 Protection against dangerous movements

Dangerous movements can be caused by faulty control or the connected motors. These causes are be various such as:

- unclean or wrong wiring of cable connections
- inappropriate or wrong operation of equipment
- malfunction of sensors, encoders and monitoring circuits
- defective components
- software errors

Dangerous movements can occur immediately after equipment is switched on or even after an unspecified time of trouble-free operation.

The monitors in the drive components make faulty operation almost impossible. Regarding personnel safety, especially the danger of bodily harm and property damage, this alone should not be relied upon to ensure complete safety. Until the built-in monitors become active and effective, it must be assumed in any case that some faulty drive movements will occur. The extent of these faulty drive movements depends upon the type of control and the state of operation.



Dangerous movements! Danger to life and risk of injury or equipment damage!

⇒ Personnel protection must be secured for the above listed reason by means of superordinate monitors or measures.

These are instituted in accordance with the specific situation of the facility and a danger and fault analysis conducted by the manufacturer of the facility. All the safety regulations that apply to this facility are included therein. By switching off, circumventing or if safety devices have simply not been activated, then random machine movements or other types of faults can occur.

Avoiding accidents, injury or property damage:

⇒ Keep free and clear of the machine's range of motion and moving parts. Prevent people from accidentally entering the machine's range of movement:

- use protective fences
- use protective railings
- install protective coverings
- install light curtains or light barriers

⇒ Fences must be strong enough to withstand maximum possible momentum.

⇒ Mount the emergency stop switch (E-stop) in the immediate reach of the operator. Verify that the emergency stop works before startup. Don't operate the machine if the emergency stop is not working.

⇒ Isolate the drive power connection by means of an emergency stop circuit or use a start-inhibit system to prevent unintentional start-up.

⇒ Make sure that the drives are brought to standstill before accessing or entering the danger zone.

⇒ Secure vertical axes against falling or slipping after switching off the motor power by, for example:

- Mechanically securing the vertical axes
- Adding an external brake / clamping mechanism
- Balancing and thus compensating for the vertical axes mass and the gravitational force

The standard equipment motor brake or an external brake controlled directly by the servo drive are not sufficient to guarantee the safety of personnel!

- ⇒ Disconnect electrical power to the equipment using a master switch and secure the switch against reconnection for:
 - maintenance and repair work
 - cleaning of equipment
 - long periods of discontinued equipment use
 - ⇒ Avoid operating high-frequency, remote control and radio equipment near electronics circuits and supply leads. If use of such equipment cannot be avoided, verify the system and the plant for possible malfunctions at all possible positions of normal use before the first start-up. If necessary, perform a special electromagnetic compatibility (EMC) test on the plant.
-

3.8 Protection against magnetic and electromagnetic fields during operations and mounting

Magnetic and electromagnetic fields generated by current-carrying conductors and permanent magnets in motors represent a serious health hazard to persons with heart pacemakers, metal implants and hearing aids.



WARNING

- Health hazard for persons with heart pacemakers, metal implants and hearing aids in proximity to electrical equipment!**
- ⇒ Persons with pacemakers, metal implants and hearing aids are not permitted to enter following areas:
 - Areas in which electrical equipment and parts are mounted, being operated or started up.
 - Areas in which parts of motors with permanent magnets are being stored, operated, repaired or mounted.
 - ⇒ If it is necessary for a person with a pacemaker to enter such an area, then a physician must be consulted prior to doing so. Pacemakers, that are already implanted or will be implanted in the future, have a considerable deviation in their resistance to interference. Due to the unpredictable behavior there are no rules with general validity.
 - ⇒ Persons with hearing aids, metal implants or metal pieces must consult a doctor before they enter the areas described above. Otherwise health hazards will occur.
-

3.9 Protection against contact with hot parts



CAUTION

**Housing surfaces could be extremely hot!
Danger of injury! Danger of burns!**

- ⇒ Do not touch surfaces near the source of heat! Danger of burns!
- ⇒ Wait ten (10) minutes before you access any hot unit. Allow the unit to cool down.
- ⇒ Do not touch hot parts of the equipment, such as housings, heatsinks or resistors. Danger of burns!

3.10 Protection during handling and installation

Under certain conditions inappropriate handling and installation of parts and components may cause injuries.



CAUTION

**Risk of injury through incorrect handling!
Bodily harm caused by crushing, shearing,
cutting and mechanical shock!**

- ⇒ Observe general instructions and safety regulations during handling installation.
- ⇒ Use only appropriate lifting or moving equipment.
- ⇒ Take precautions to avoid pinching and crushing.
- ⇒ Use only appropriate tools. If specified by the product documentation, special tools must be used.
- ⇒ Use lifting devices and tools correctly and safely.
- ⇒ Wear appropriate protective clothing, e.g. safety glasses, safety shoes and safety gloves.
- ⇒ Never stay under suspended loads.
- ⇒ Clean up liquids from the floor immediately to prevent personnel from slipping.

3.11 Battery safety

Batteries contain reactive chemicals in a solid housing. Inappropriate handling may result in injuries or equipment damage.



CAUTION

Risk of injury through incorrect handling!

- ⇒ Do not attempt to reactivate discharged batteries by heating or other methods (danger of explosion and corrosion).
- ⇒ Never charge batteries (danger from leakage and explosion).
- ⇒ Never throw batteries into a fire.
- ⇒ Do not dismantle batteries.
- ⇒ Handle with care. Incorrect extraction or installation of a battery can damage equipment.

Note: Environmental protection and disposal! The batteries contained in the product should be considered as hazardous material for land, air and sea transport in the sense of the legal requirements (danger of explosion). Dispose batteries separately from other refuse. Observe the legal requirements given in the country of installation.

3.12 Protection against pressurized Systems

Certain Motors (ADS, ADM, 1MB etc.) and drives, corresponding to the information in the Project Planning manual, must be provided with and remain under a forced load such as compressed air, hydraulic oil, cooling fluid or coolant. In these cases, improper handling of the supply of the pressurized systems or connections of the fluid or air under pressure can lead to injuries or accidents.



CAUTION

Danger of injury when pressurized systems are handled by untrained personnel!

- ⇒ Do not attempt to disassemble, to open or to cut a pressurized system.
- ⇒ Observe the operation restrictions of the respective manufacturer.
- ⇒ Before the disassembly of pressurized systems, lower pressure and drain off the fluid or gas.
- ⇒ Use suitable protective clothing (for example protective eyewear, safety shoes and gloves)
- ⇒ Remove any fluid that has leaked out onto the floor immediately.

Note: Environmental protection and disposal! The fluids used in the operation of the pressurized system equipment is not environmentally compatible. Fluid that is damaging to the environment must be disposed of separate from normal waste. Observe the national specifications of the country of installation.

4 Front panel, Keypad

4.1 System requirements


To commission the keypad an English or US keyboard driver has to be installed. Furthermore, the Numlock has to be activated in BIOS because the keypad has no ON/OFF-switch for this function. Other adjustments are not possible.

4.2 Function of the key



Fig. 4-1: Location of the OP- and F-keys

Contrast adjustment

Use the  key to adjust the contrast.

Activation of the multiple key allocation

Pressing the requested key one time activates the characters of the blue fields. Further function levels of multiple allocated keys can be released

by simultaneously pressing the FN  key and the requested key. The next character on the keys is called up by pressing the respective key once more.

Example: Holding the FN key and pressing the “MNO/5” key twice activates an “N”.

Releasing of the FN key causes the placing of the letter on the screen and the cursor switches to the next position.

Activation of capital and small letters

Set the CAP key to change between capital and small letters.

Function and operation keys (F... + OP... keys)

The allocation of the function and operation keys is determined by the used software/operating system. To store as many functions as possible there are not only function but also operation keys.

4.3 Use of an external keyboard

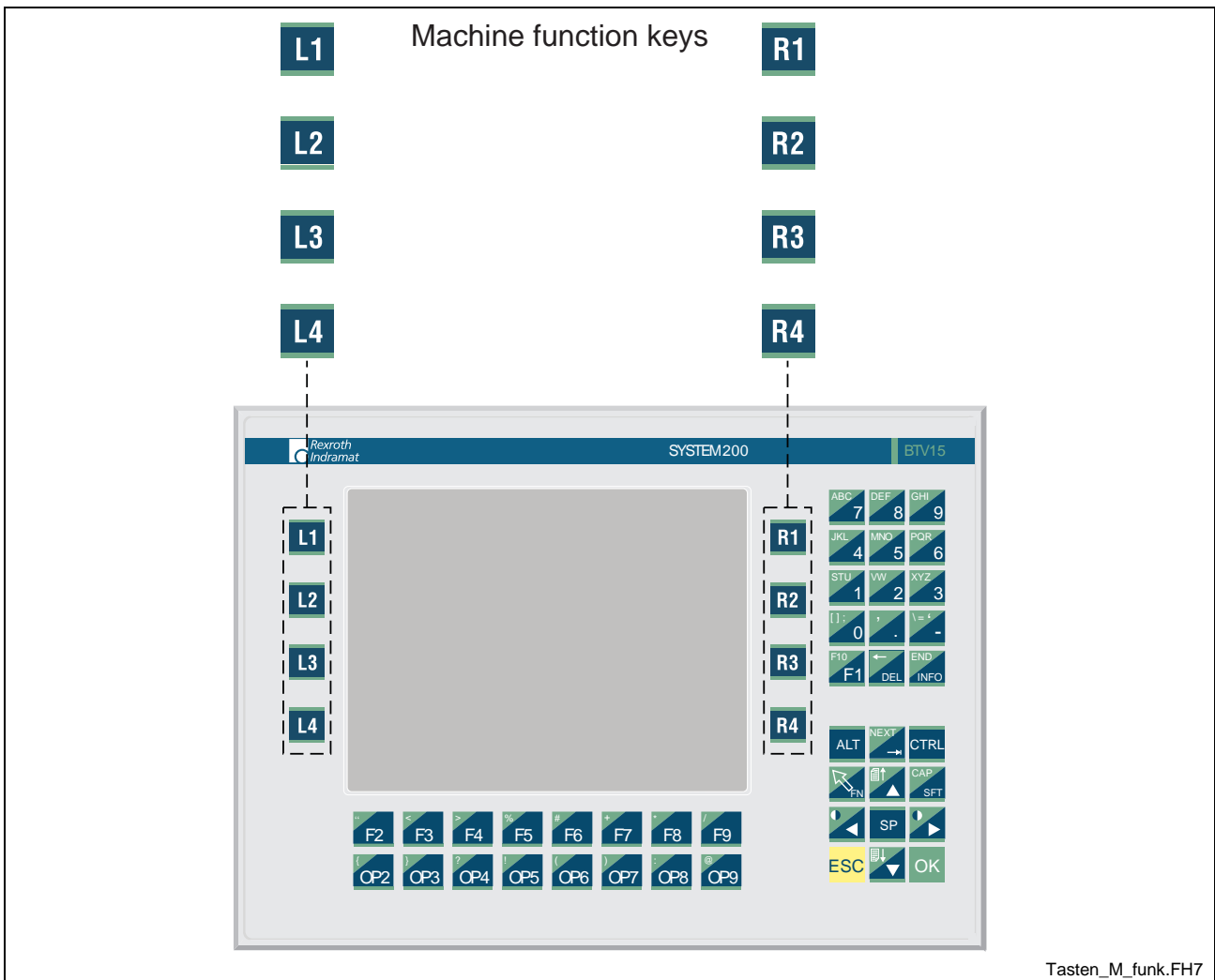
It is also possible to operate the BTV15.2 unit via a PC keyboard. As some keys do not exist on a PC keyboard they can be produced by the following key combinations:

Key on BTV15.2 unit	Key combination of the standard keyboard
OP2 ... OP9	CTRL + SHIFT + ALT + F2 ... CTRL + SHIFT + ALT + F9
NEXT	CTRL + SHIFT + ALT + N
INFO	CTRL + SHIFT + ALT + I

Fig. 4-2: Key combinations for BTV15 keys

4.4 Machine function keys

Four machine function keys are located on each side of the display.



Tasten_M_funk.FH7

Fig. 4-3: Location of the machine function keys

Connection of the machine function keys

BTV15.2 without control card (standard version)

Each key controls a hardware output. Furthermore, the corresponding signal is applied on the internal parallel port interface. The keys can be addressed in the PC with an absolute address. Refer to chapter 5.3. for details.

BTV15.2 with internal PLC (MTS-P)

The machine function keys are connected with the PLC and therefore can be addressed directly via the PLC program. The direct addresses are shown in Fig. 4-4.

Machine function keys	Address (for PLC Software V21)
L1	%I*.0.1
L2	%I*.0.3
L3	%I*.0.5
L4	%I*.0.7
R1	%I*.1.1
R2	%I*.1.3
R3	%I*.1.5
R4	%I*.1.7

Fig. 4-4: Addressing the machine function keys

BTV15.2 with integrated BIB05 plug-in card with external RECO PLC

The connection of the machine function keys with the RECO PLC is realized by the BIB05 plug-in card via Interbus.

Technical implementation

The BIB05 module is a short 8-bit PC plug-in module. The keys can be addressed from the Interbus.

ID-Code	03h	(Digital device with Input-/Output Datas)
	Data width	(2 words)

Interbus address location

The Interbus base address (I base) of the BIB05 module depends in the other devices that exist in the Interbus chain.

Note: With the keys L1 through L4 and R1 through R4, a '1' means that the related contact is closed.

The address assignments within the BIB05 module are as follows:

Machine function keys	Address (for PLC Software V21)
L1	%I*.7.1
L2	%I*.7.3
L3	%I*.7.5
L4	%I*.7.7
R1	%I*.6.1
R2	%I*.6.3
R3	%I*.6.5
R4	%I*.6.7

Fig. 4-5: Addressing the machine function keys

**Pin assignment of the
INTERBUS Out (X65)**

Pin	Signal	Pin	Signal
1	DO Data Out	2	DI Data In
3	GND	4	N.C.
5	+ 5V	6	/DO Data Out
7	/DI Data In	8	N.C.
9	RBST		

Fig. 4-6: Pin assignment of the Interbus Out (X65)

**Pin assignment of the
INTERBUS In (X66)**

Pin	Signal	Pin	Signal
1	DO1 Data Out	2	DI1 Data In
3	GND	4	N.C.
5	N.C.	6	/DO1 Data Out
7	/DI1 Data In	8	N.C.
9	N.C.		

Fig. 4-7: Pin assignment of the Interbus In (X66)

**BTV15.2 with integrated BIB05 plug-in card with foreign
PLC**

The connection of the machine function keys with the foreign PLC is realized by the BIB05 plug-in card via Interbus.

4.5 Labeling of the machine function keys

The eight machine function keys on the front panel of the BTV15.2 unit can be labeled by insert strips. When the BTV15.2 unit is delivered the strips are already inserted and can be changed as requested.

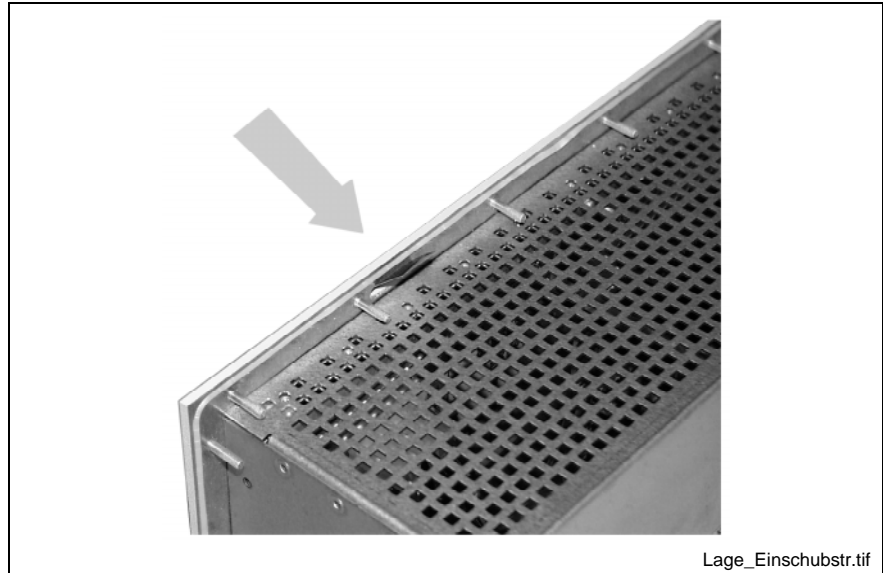


Fig. 4-8: Slide-in label aperture location

Changing of the insert strips

1. Cut the insert strip.
2. Chamfer the edges of the strip to ease the insertion.
3. Hold the strip vertically to the front plate and insert it carefully in the foil pocket (see figure Fig. 4-8).
Pay attention that you don't fold the strip!
4. Insert the strip as far as possible.
5. Check whether you can see the whole label. If that is not the case, remove the strip, cut it on the right side and insert it again.
6. Then, shorten the strip on the left side. Don't cut it too much, otherwise it will be difficult to change it again.

5 Connections

5.1 Location of the connectors

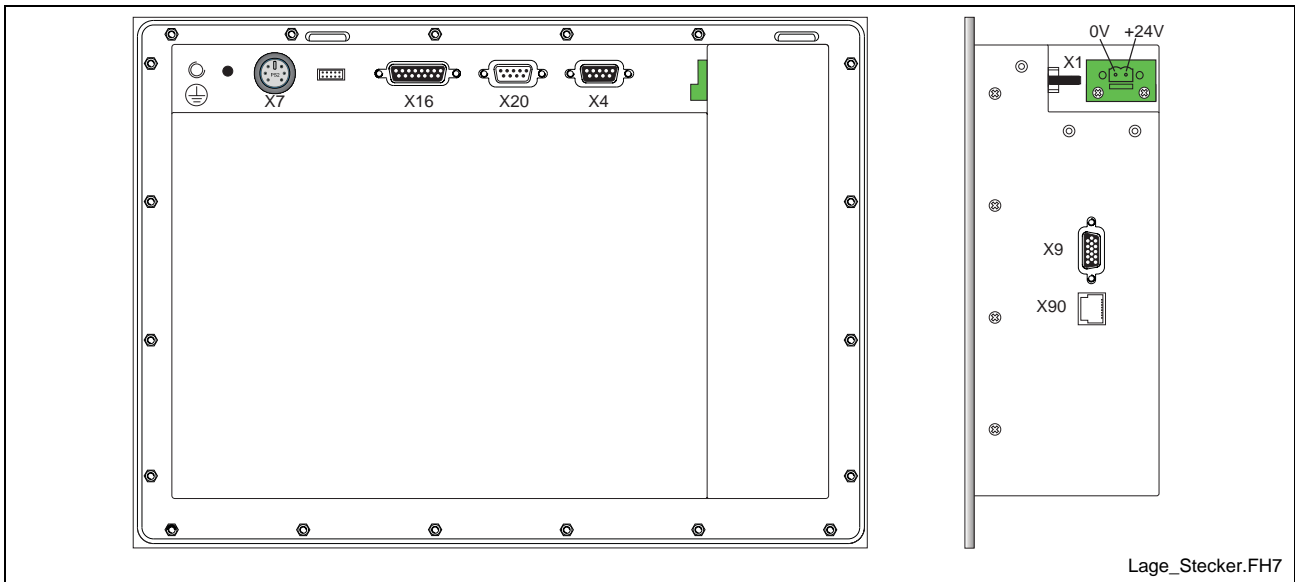


Fig. 5-1: Rear view

5.2 DC-Power Supply Connector (X1)

Note: The connection is protected against wrong polarisation

Pin	Signal
1	+24 VDC
2	0 V

Fig. 5-2: Pin assignment of the power supply connector (X1) (see also Fig. 5-1)

5.3 Hardware outputs (X4) (standard version)

Front panel	Pin	Signal
Key L1	1	HW-output on key L1
Key L2	2	HW-output on key L2
Key L3	3	HW-output on key L3
Key L4	4	HW-output on key L4
Key R1	5	HW-output on key R1
Key R2	6	HW-output on key R2
Key R3	7	HW-output on key R3
Key R4	8	HW-output on key R4
	9	Input breaking voltage (24VDC/1A)

Fig. 5-3: Pin assignment of the Hardware connections (X4)

Wiring of the HW outputs

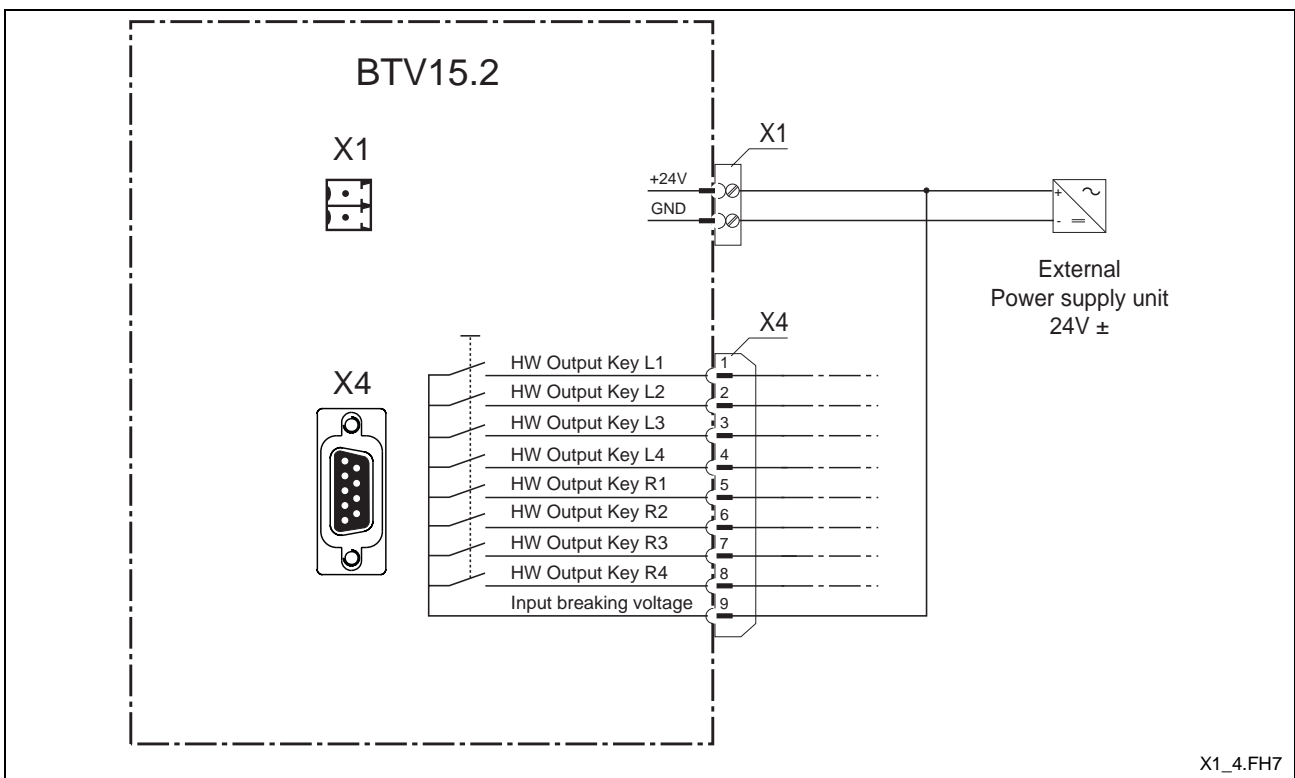


Fig. 5-4: Wiring plan of the HW outputs

5.4 Internal wiring (standard version)

Front panel	Internal LPT-Port
Key L1	LTPD0
Key L2	LTPD1
Key L3	LTPD2
Key L4	LTPD3
Key R1	LTPD4
Key R2	LTPD5
Key R3	LTPD6
Key R4	LTPD7

Fig. 5-5: Internal wiring of the machine function keys

LTPD x = Association to data line "x" on internal parallel port

5.5 Internal wiring (extended version)

Concerning the extended version the key signals are conducted as direct I/Os on the MTS-P. The addressing of the machine function keys are shown in Fig. 4-4.

5.6 Interface COM1 (X20)

Pin	Signal	Pin	Signal
1	DCD	2	RxD
3	TxD	4	DTR
5	GND	6	DSR
7	RTS	8	CTS
9	RI		

Fig. 5-6: Pin assignments of the COM1 X20

5.7 Interface COM2 (X16)

Pin	Signal
1	(Protected Ground)
2	Transmit Data (RS232)
3	Receive Data (RS232)
4	RS485 + bzw. RxD + (RS422)
5	RS485 - bzw. RxD - (RS422)
6	Data Set Ready (Modem)
7	Signal Ground
8	(Data Carrier Detected) (Modem)
9	TxD + (RS422)
10	GND
11	TxD - (RS422)
12	+ 5V
13	Request To Send (Modem)
14	Clear To Send (Modem)
15	(Data Terminal Ready) (Modem)

Fig. 5-7: Pin assignment of the RS485/RS232-Interface (X16)

Configuration COM2

The COM2 of the BTV15.2 is configured by Jumper. The pin row for this is led outward on the rear of housing (see Fig. 5-9). In the following table the possible jumper position are specified:

Interface mode	Configuration		
RS232	the communication always work; no adjustment necessary		
RS422	no Jumper is pinned		
RS485	Jumper position	Transmit	Receive
	1 – 2	RTS high	RTS low
	3 – 4	RTS low	RTS high
	5 – 6	DTR high	DTR low
	7 – 8	DTR low	DTR high
	9 – 10	Autodirection	max. Baud 115k

Fig. 5-8: Configuration possibilities of COM2 (X16)

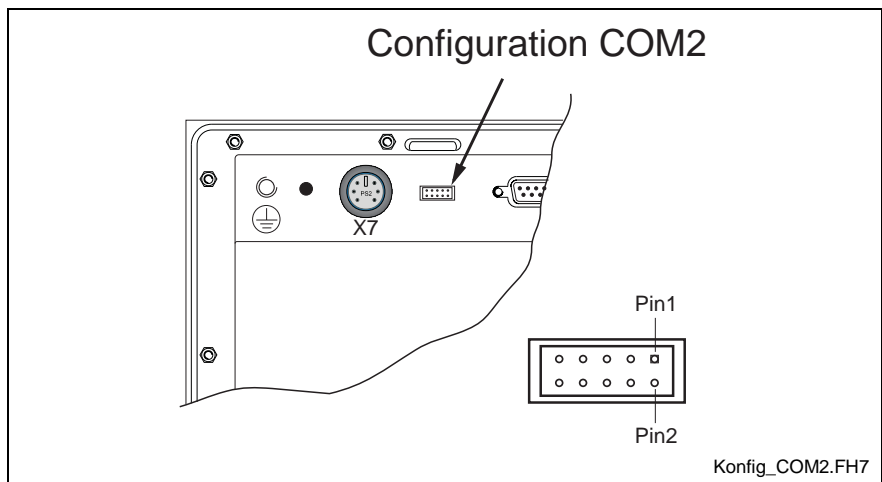


Fig. 5-9: Location of the pin row for configuring the COM2

5.8 Connection Mouse/Keyboard

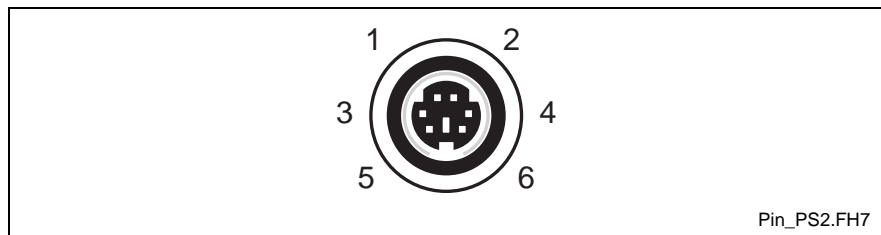


Fig. 5-10: View on the PS2-socket connection Mouse/Keyboard

Pin	Signal
1	Keyboard Data
3	GND
5	Keyboard Clock

Pin	Signal
2	Mouse Data
4	+5 V
6	Mouse Clock

Fig. 5-11: Pin assignment of the PS/2 Mouse / Keyboard interface

5.9 Ethernet interface 10 Base-T (X90)

Pin	Signal
1	TxD +
3	RxD +
5	N.C.
7	N.C.

Pin	Signal
2	TxD -
4	N.C.
6	RxD -
8	N.C.

Fig. 5-12: Pin assignment of the Ethernet interface

5.10 VGA output (X9)

Pin	Signal
1	Video Signal Red
3	Video Signal Blue
5	DIG-GND
7	ANA-GND
9	VCC
11	N.C.
13	HSYNC
15	DDCCLK

Pin	Signal
2	Video Signal Green
4	N.C.
6	ANA-GND
8	ANA-GND
10	DIG-GND
12	DDCDAT
14	VSYNC

Fig. 5-13: Pin assignment of the VGA screen connection

5.11 Connection of an external floppy unit and location of the USB interface (X100)

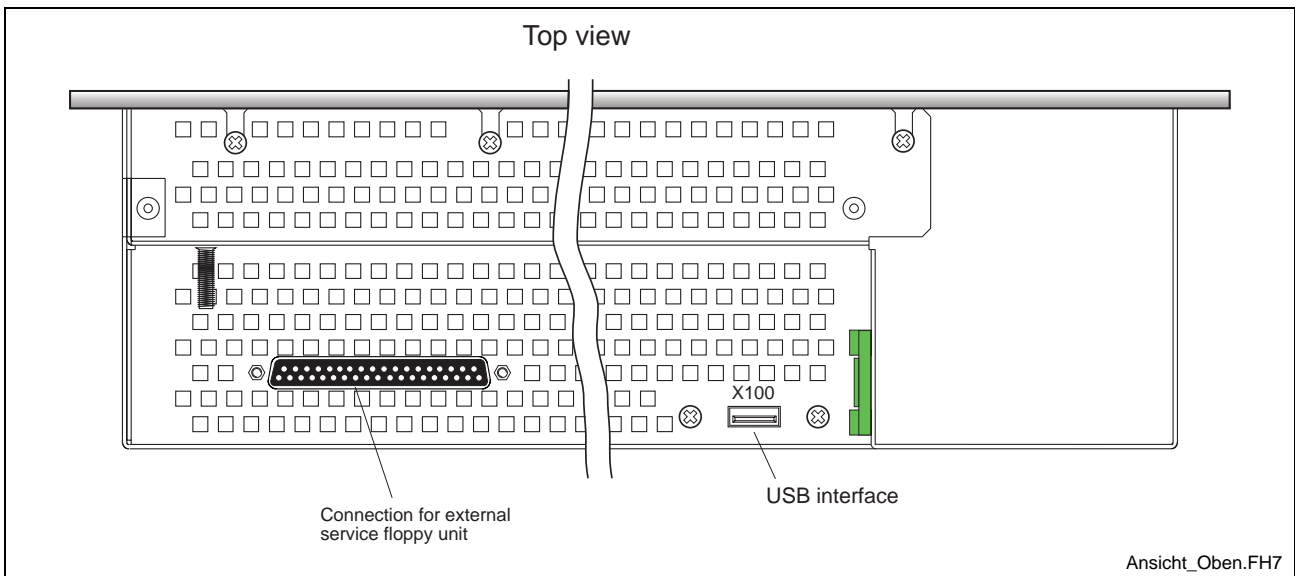


Fig. 5-14: Connection for service floppy unit and location of the USB interface

In Case of booting problems it is possible to connect an external floppy unit. This unit can be ordered with the following identification code:

PC-Z-LAUFWERK-EXTERN*FLOPPY 1,44MB, Mat. Nr. 290832

Pin assignment of the floppy unit

Pin	Signal
1 ... 34	Floppy data signals
35	GND
36	Floppy power supply +5 V DC
37	Floppy power supply +5 V DC

Fig. 5-15: Pin assignment of the external floppy unit

5.12 Reset Button

On rear of the BTV15 there is a reset button above the connector X6, that can be reached using a thin object (ball pen, etc.). Pressing the reset button terminates all open applications without saving them, and reboots the computer.

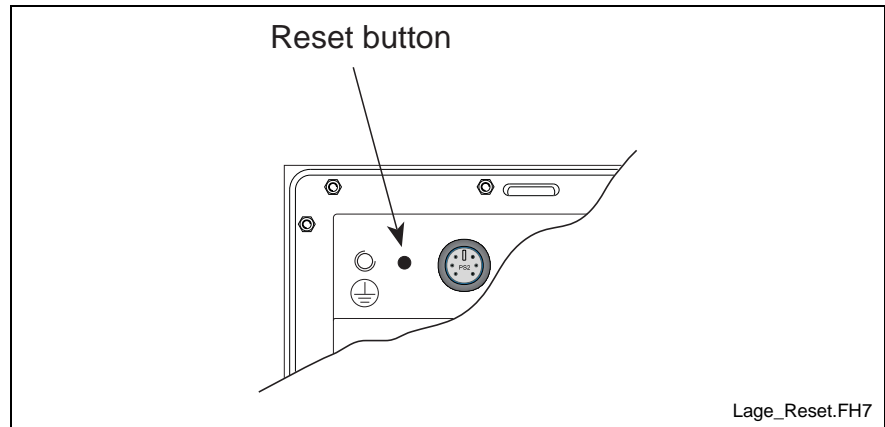


Fig. 5-16: Location of the Reset Button

6 Technical Data

6.1 General Technical Data

Processor	5x86 266 MHz - Slot CPU with integrated graphic controller
Work Memory	min. 64 MB
Hard Disk	3 GB HDD
Interfaces	1 serial (RS 232), 1 x INDRAMAT SIS (RS232, RS422, RS485)
Display Unit	8,2" DSTN color display (640 x 480 pixel)
Keyboard	PC operating keyboard, 8 machine function keys
Protection	Front panel IP 65, housing IP 20 DIN 40 050, IEC 529
Surface of front panel	Color RAL 7035 light gray
Dimension of case	294 x 194 x 80 mm (BxHxD)
Dimension with front panel	318 x 230 x 84 mm (BxHxD)
Dimension of the extended version	318 x 230 x 130 mm (BxHxD)
Power supply	19...32 VDC
Max. Power consumption	50 VA
Typical Heat dissipation	24 W
Max. Heat dissipation	40 W
Weight	approx. 4 kg on standard configuration approx. 4 kg on extended version (with control unit)
Current load of the 24 V Outputs	max. 100mA (galvanic separate)

Note: For the wiring of the power supply use braiding with a cross-section of min. 1,5 mm². On cables longer than 10m use bigger cross-sections.

6.2 Ambient Conditions

	in Operation	Storage/Shipping
max. ambient temperature	+5°C to +45°C	-10°C to +60°C
max. temperature change	10 K/h	15 K/h
Rel. humidity	75% average, 80% occasional	no bedew, DIN 40 040 class F
max. vibration	0,67 G, 5...500 Hz (Random) 1,0 G 0-peak, 5...500 Hz (Swept sine)	3,01 G, 5...500 Hz (Random) 5,0 G 0-peak, 5...500 Hz (Swept sine)
max. shock	175 G/2ms (half sine)	800 G/1ms (half sine)

Fig. 6-1: Ambient Conditions BTV15.2



Protect the HDD against shock and vibration!

⇒ It is only allowed to operate the unit with the stated conditions. Reaching or exceeding of these limit values leads to the reduction of the life span and/or operational disturbances

6.3 Parts Subject to Wear

Parts subject to wear that are not covered by warranty

- Backlight tubes

The average expected life span of parts subject to wear is 5 years or 20000 operating hours.

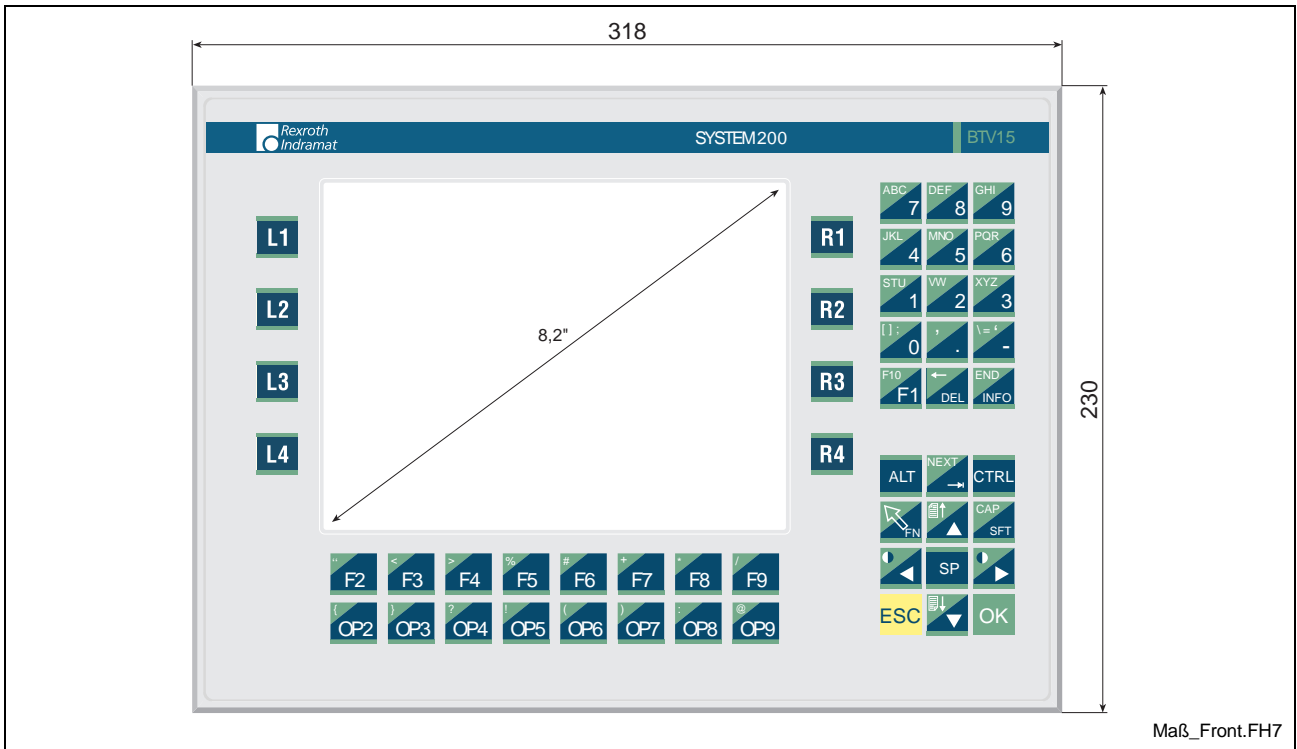
Backlight tubes

The informations for life span be worth under the following terms :	
operation hour	8 h/day x 200 days/year
Ambient Conditions	25°C; 50%RH; 100kPa; no vibration , no shock

Fig. 6-2: Backlight tubes load

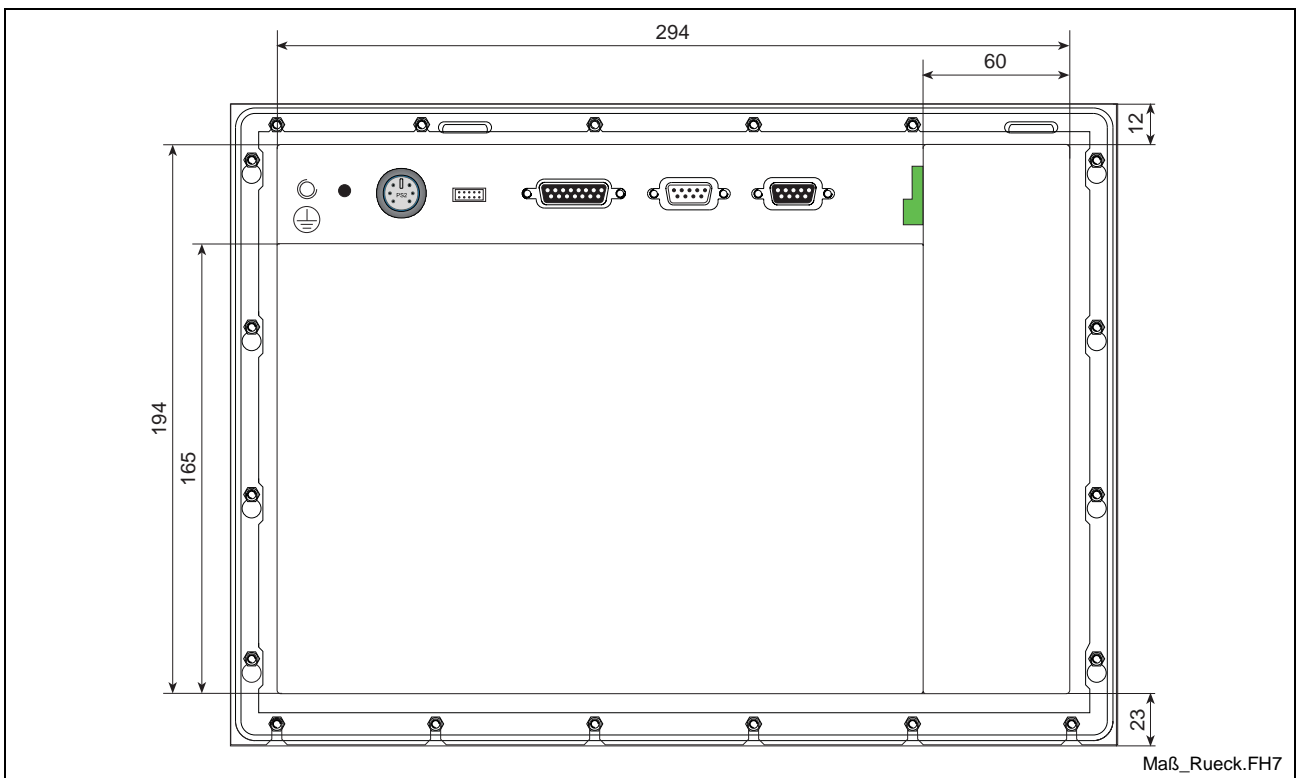
7 Dimensions

7.1 Housing Dimensions



Maß_Front.FH7

Fig. 7-1: Dimensions –Front panel



Maß_Rueck.FH7

Fig. 7-2: Rear view

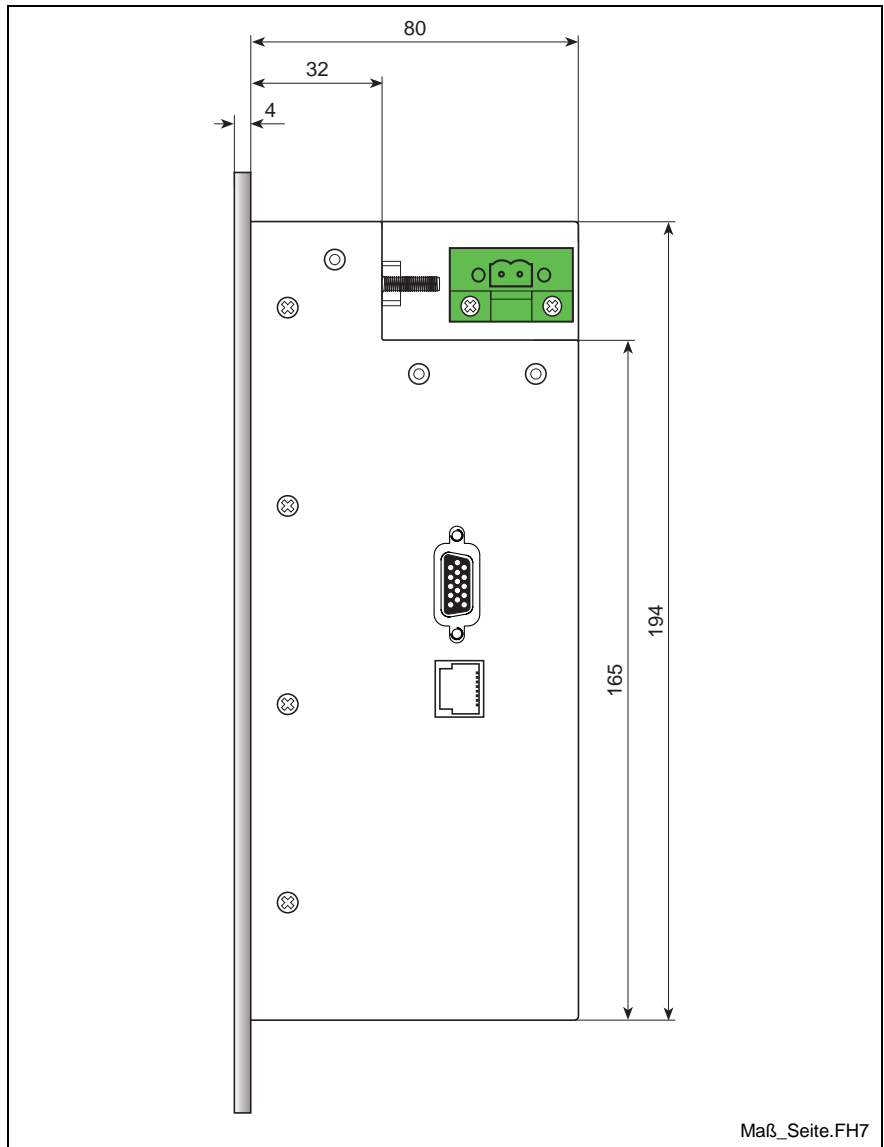
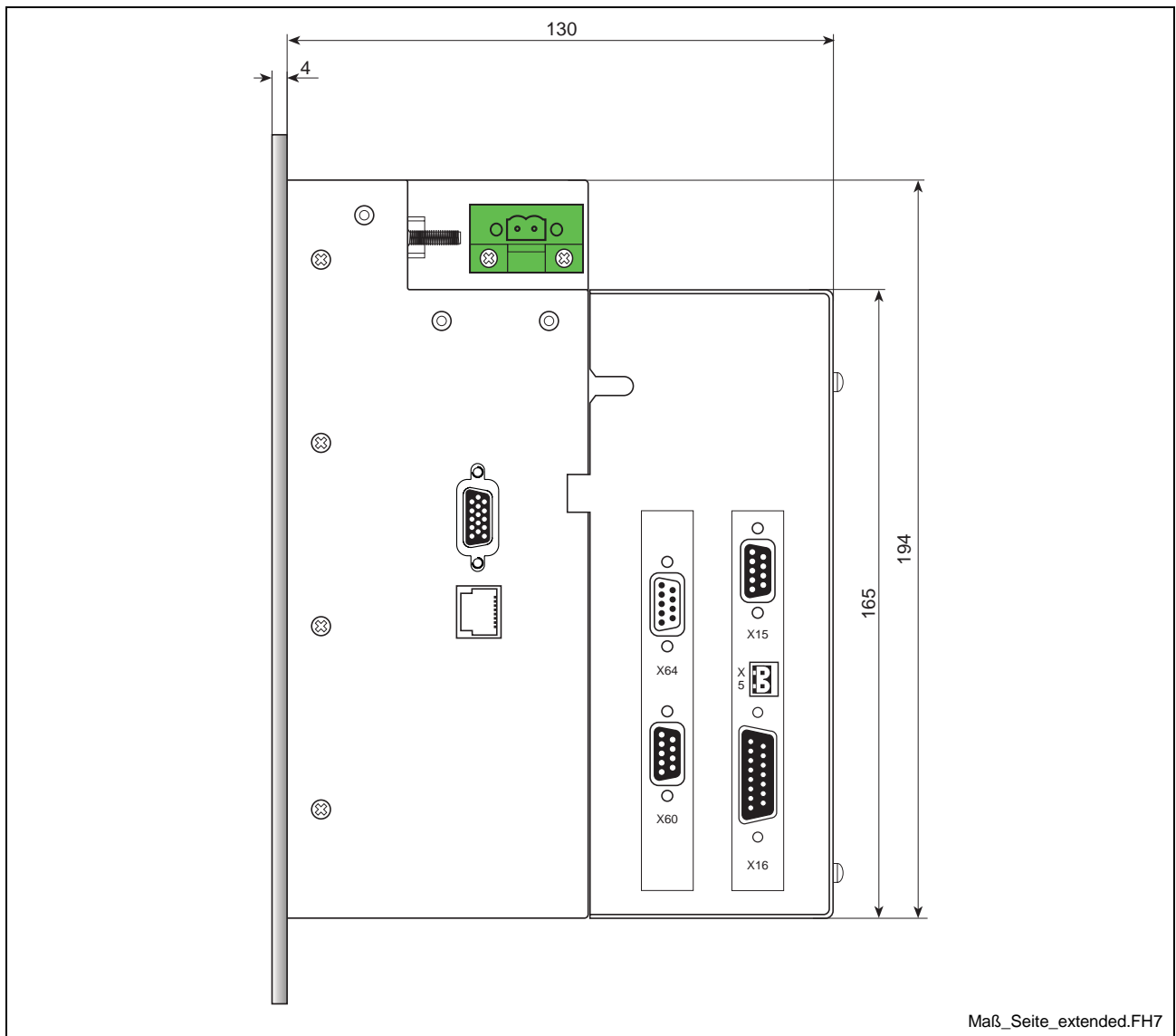


Fig. 7-3: Side view



Maß_Seite_extended.FH7

Fig. 7-4: Side view with additional control cards

7.2 Mounting Dimensions

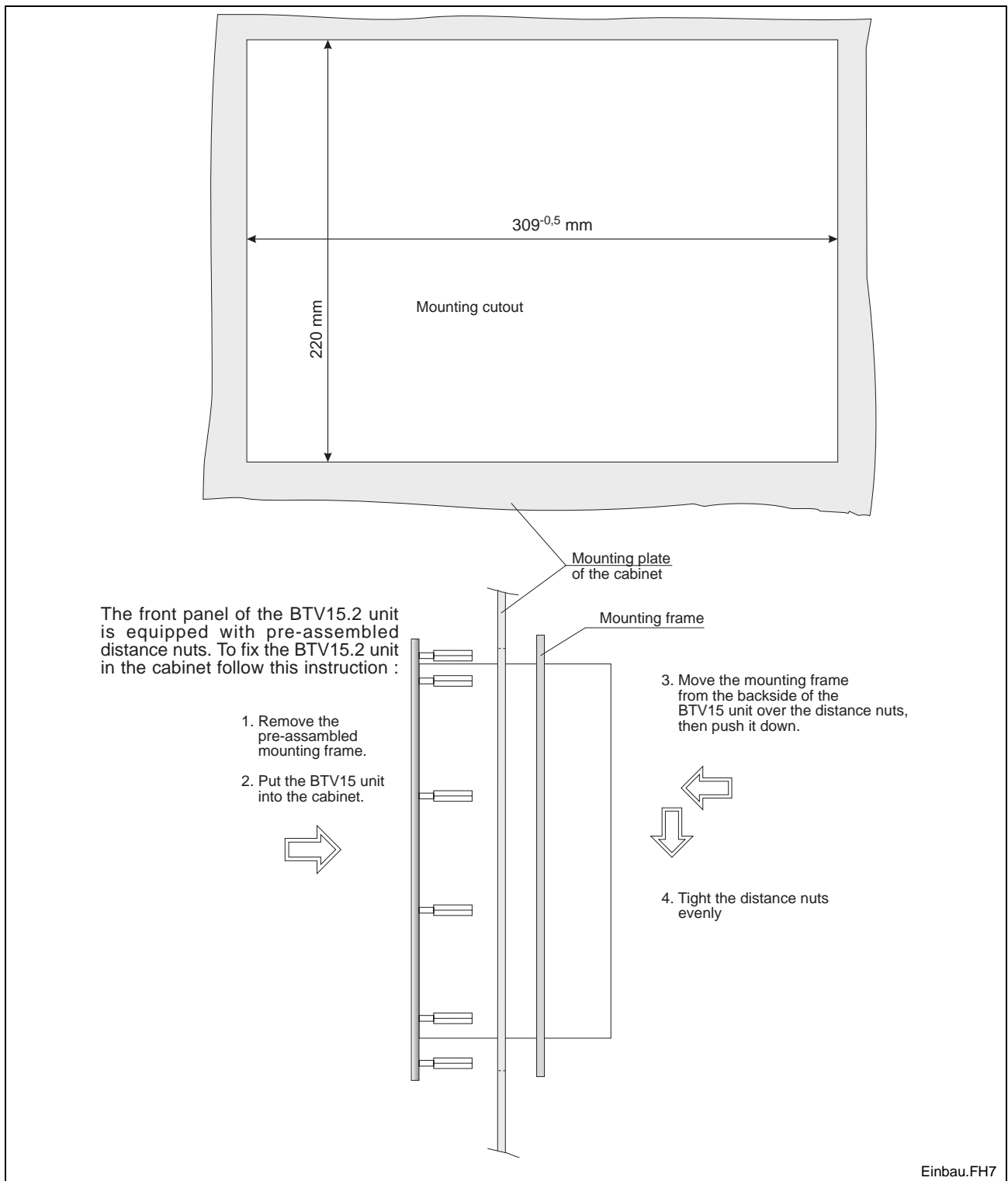


Fig. 7-5: Mounting Dimensions

8 Application Example

8.1 Configuration possibilities of the extended version

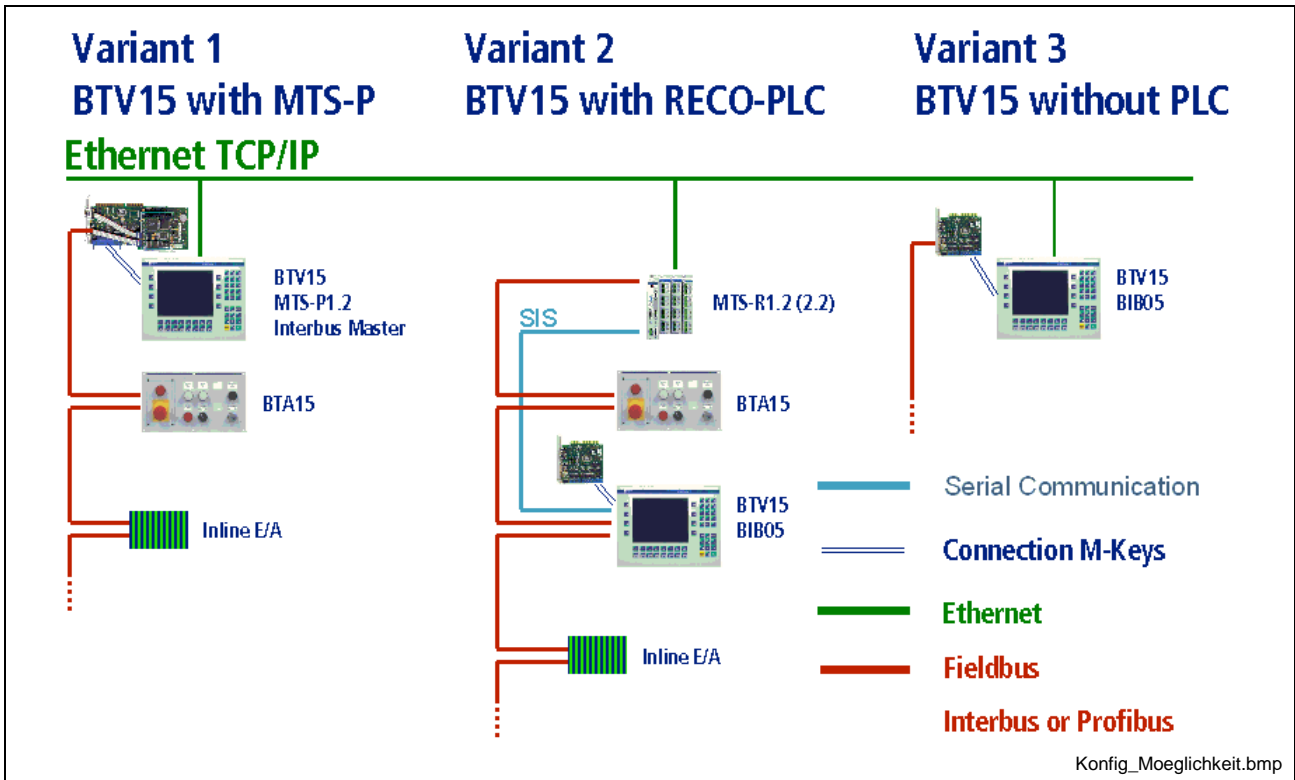


Fig. 8-1: Overview of the possible configurations

Variant 1

BTV15.2 with internal PLC

- 1x MTS-P1.2
- Max. 1x Fieldbus-Master
 - Interbus-Master or
 - Profibus-Master

Variant 2 and 3

BTV15 with external RECO-PLC or foreign PLC

- BIB05 for connecting the machine function keys

8.2 Communication by INTERBUS-S

BTV15.2 with internal PLC (MTS-P1.2)

On the following application example the BTV15.2 is equipped with a MTS-P and an INTERBUS-Master module.

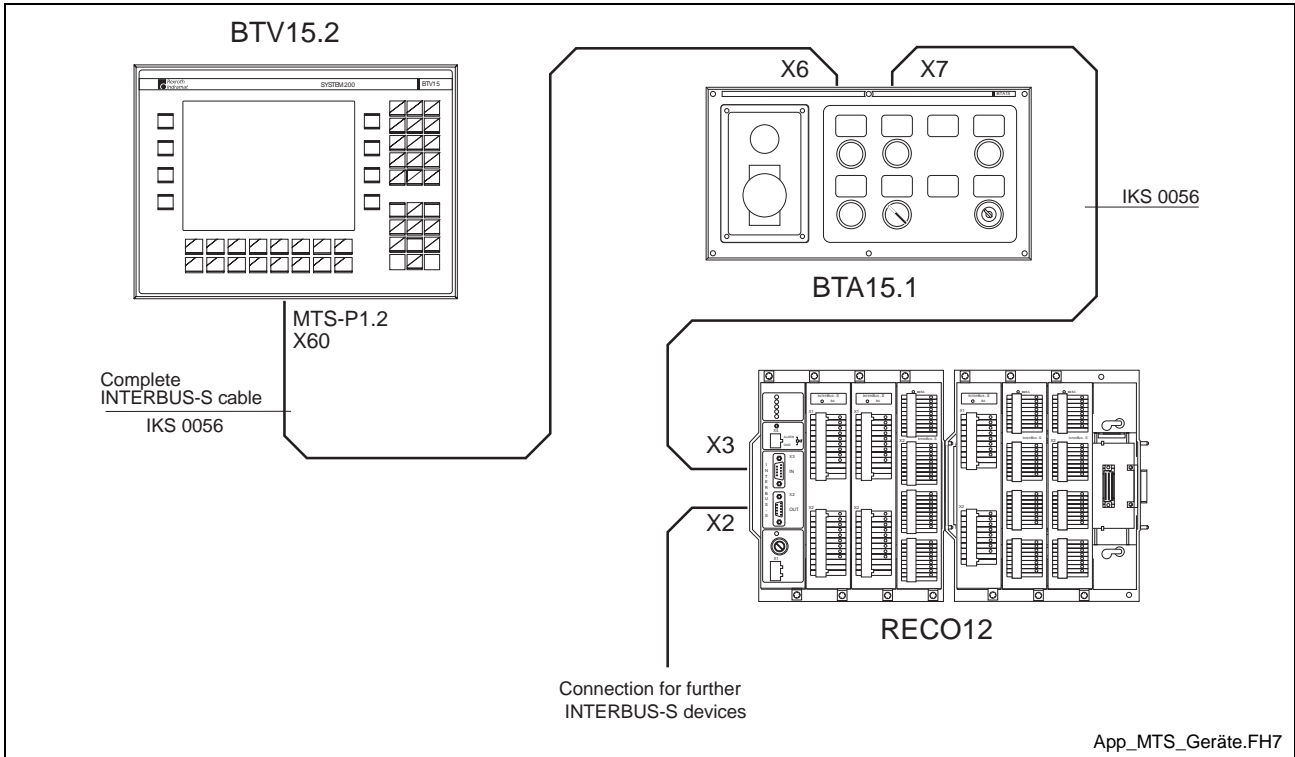


Fig. 8-2: Unit arrangement

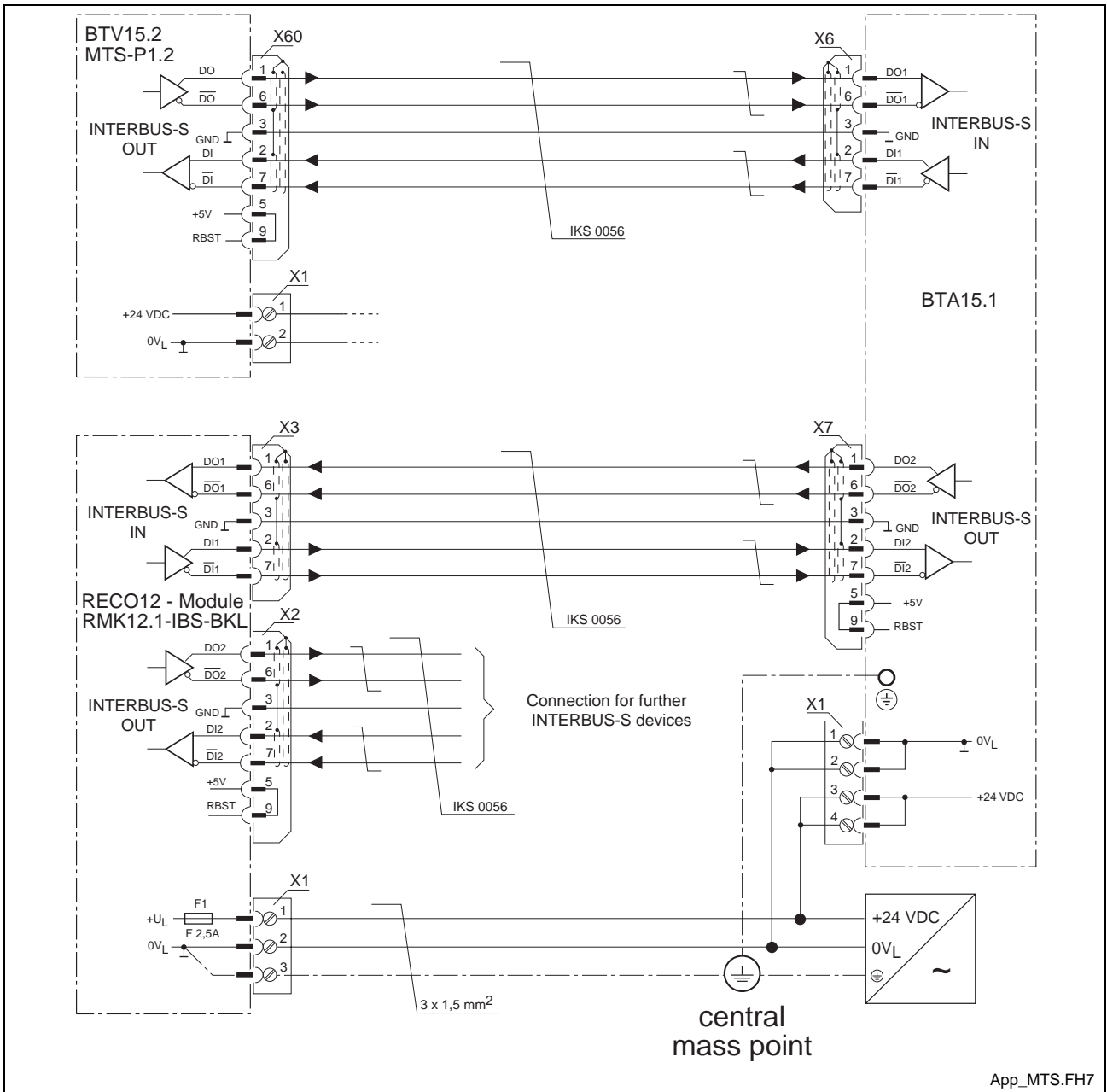


Fig. 8-3: Application example BTV15.2 with MTS-P1.2

App_MTS.FH7

BTV15.2 with an external PLC

On applications the BTV15.2 is communicated with an external PCL by INTERBUS the BTV has to equip with a BIB05. With this card the machine function keys of the BTV15 can analyzed on INTERBUS by the PLC.

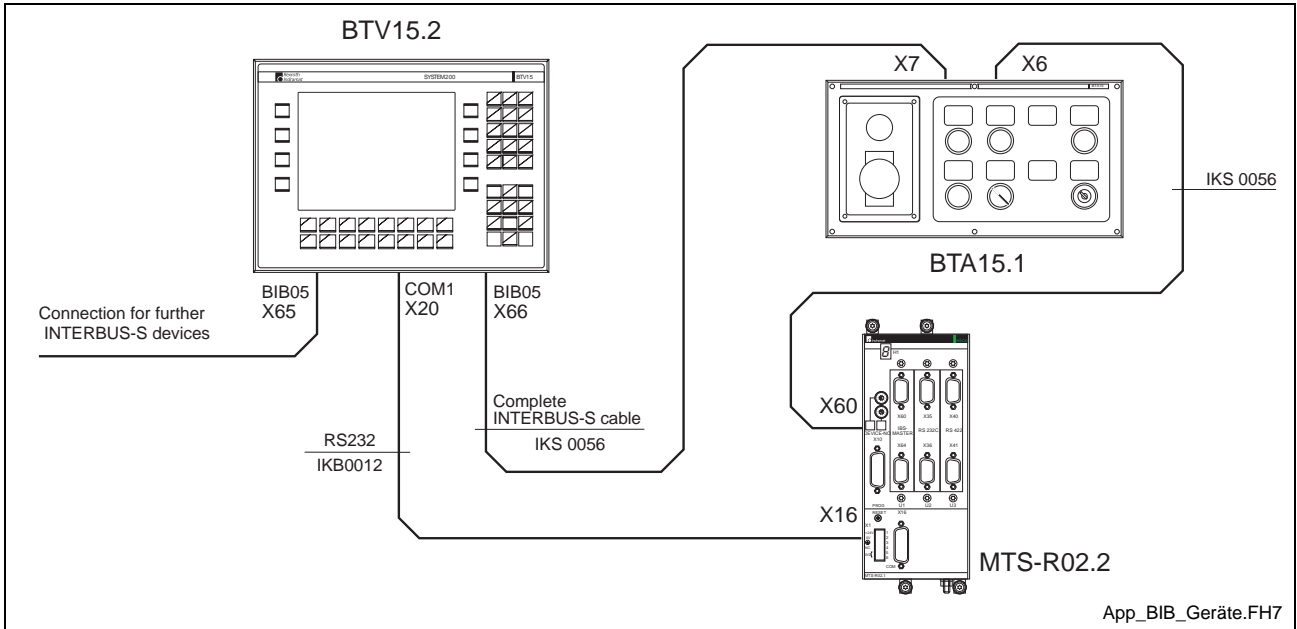
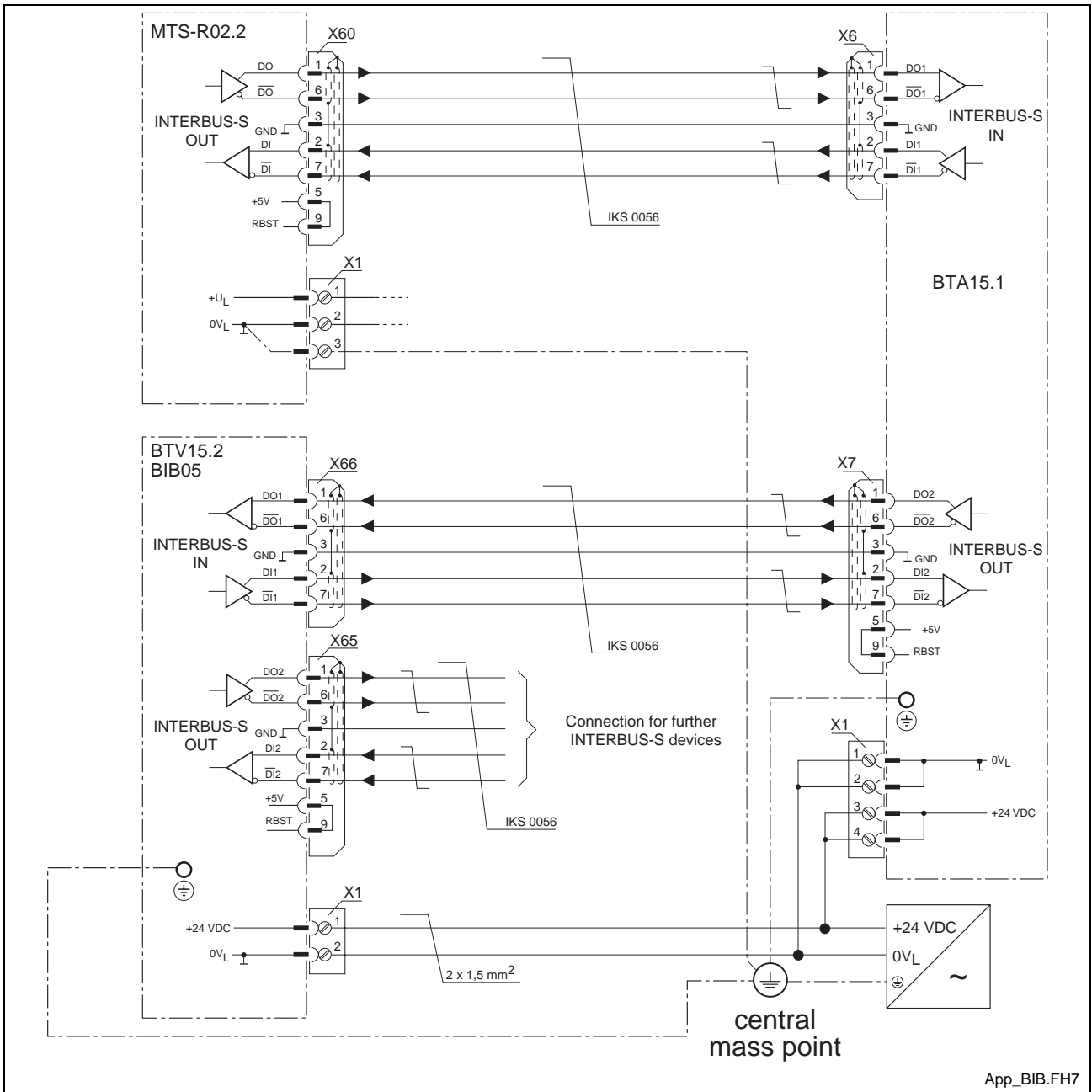


Fig. 8-4: Unit arrangement



App_BIB.FH7

Fig. 8-5: Application example BTV15.2 with an external MTS-P2.2

8.3 Serial communication

BTV15.2 with CLM

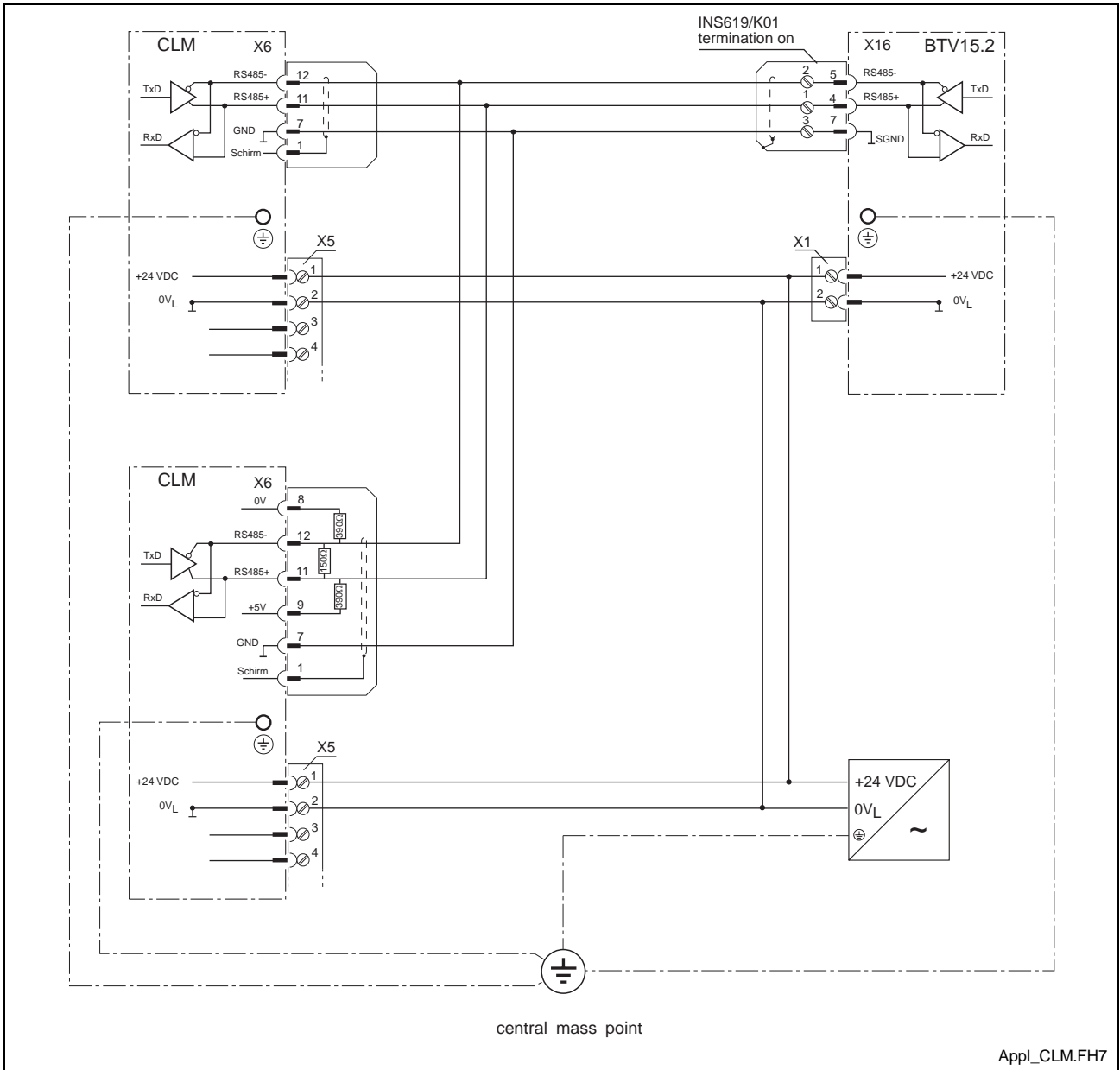


Fig. 8-6: Application example BTV15.2 with CLM

Standard Interface connectors

There are appropriate connectors available for both RS422 and RS485 communication. These include termination in the housing already. The cable can be mounted with the use of screw-in clamps. Pin assignment of both connectors is illustrated (see Fig. 8-7).

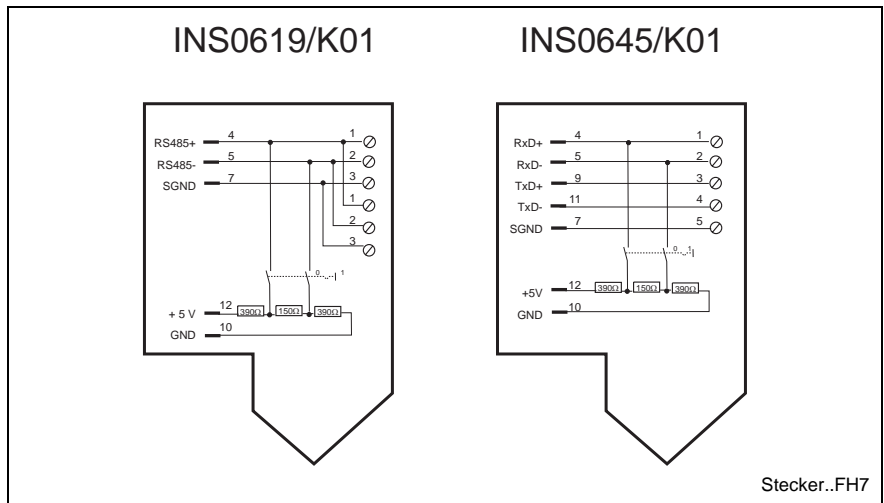


Fig. 8-7: Connector assignment of the standard connector housing
Termination can be added by using the appropriate switch.

9 Ordering information

9.1 Type code

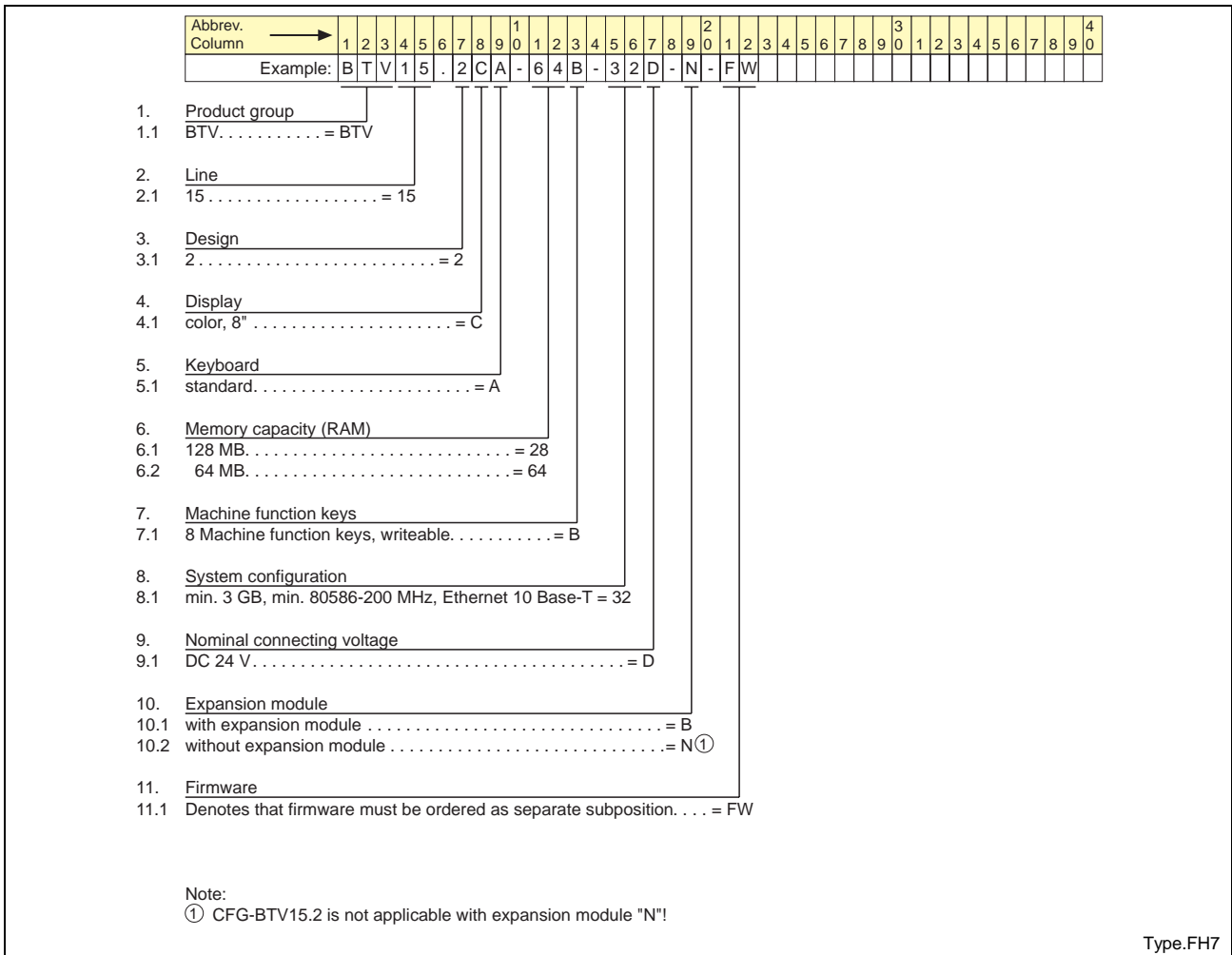


Fig. 9-1: Type code BTV15.2

Type.FH7

9.2 Configuration Type code

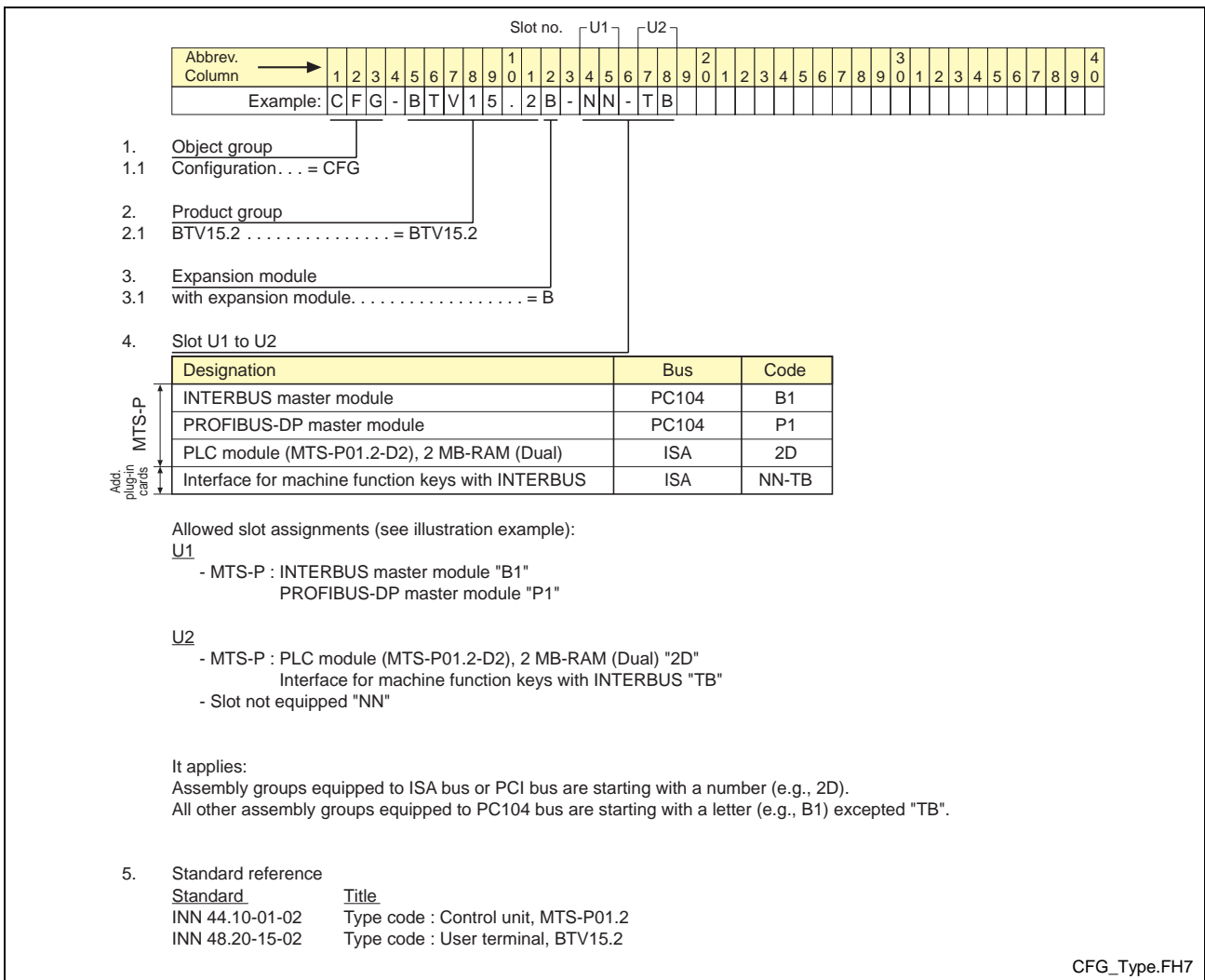
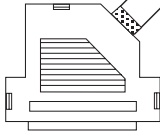
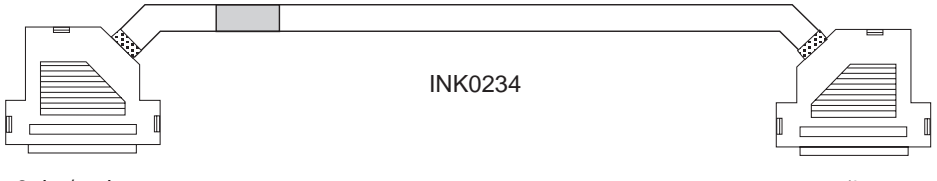
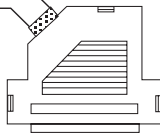
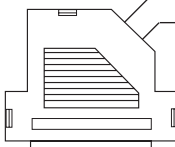
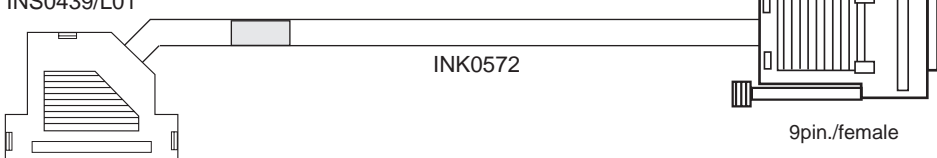
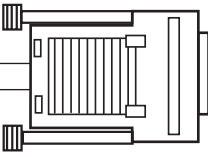
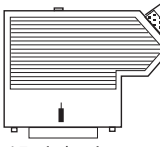
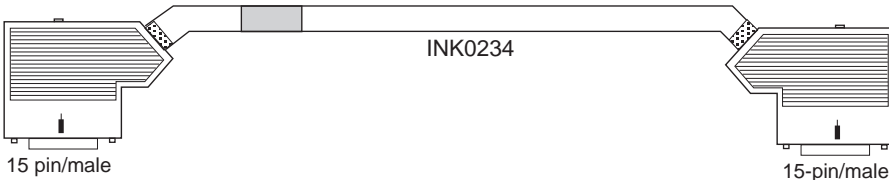
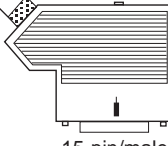
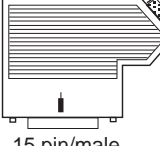
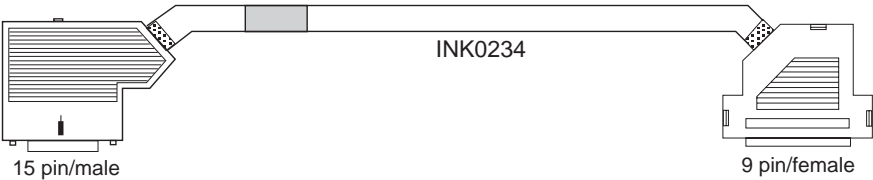

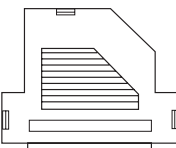
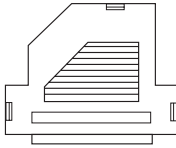


Fig. 9-2: Configuration type code BTV15.2

9.3 Accessories

Connectors and Standard Cables

Order designation of standard cables	Matching connector of unit	INDRAMAT cable	Cable end type
<p>IKS0056/000,0 MN: 255 968 (Interbus cable)</p>	<p>INS0525/L01</p>  <p>9pin./male</p>	<p>INK0234</p> 	<p>INS0526/L01</p>  <p>9pin./female</p>
<p>IKB0012/000,0 MN: 281 715 (RS232, max. 15m)</p>	<p>INS0439/L01</p>  <p>15pin./male</p>	<p>INK0572</p> 	<p>INS0588/L01</p>  <p>9pin./female</p>
<p>IKB0015/000,0 MN: 282 870 (RS422, max. 400m)</p>	<p>INS0645/K01</p>  <p>15 pin/male</p>	<p>INK0234</p> 	<p>INS0645/K01</p>  <p>15-pin/male</p>
<p>IKB0016/000,0 MN: 282 871 (RS422, max. 400m)</p>	<p>INS0645/K01</p>  <p>15 pin/male</p>	<p>INK0234</p> 	<p>INS0526/L01</p>  <p>9 pin/female</p>
<p>INS0439/L01 MN: 252 884</p>	 <p>INS0439/L01 (15pin./male)</p>	<p>D-subminiature plug-in connector</p>	
<p>INS0525/L01 MN: 259 759</p>	 <p>INS0525/L01 (9 pin/male)</p>	<p>D-subminiature plug-in connector</p>	

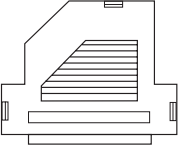
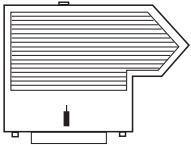
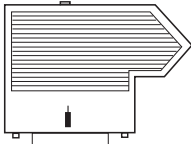
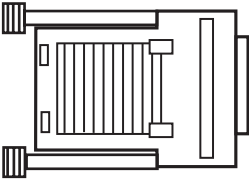
<p>INS0526/L01 MN: 259 762</p>	 <p>INS0526/L01 (9 pin/male)</p>	<p>D-subminiature plug-in connector</p>
<p>INS0619/K01 MN: 279 583</p>	 <p>INS0619/K01 RS485 (15 pin/male)</p>	<p>Y-connector for customer connection with termination</p>
<p>INS0645/K01 MN: 282 040</p>	 <p>INS0645/K01 RS422 (15 pin/male)</p>	<p>Connector for customization with termination.</p>
<p>INS0588/L01 MN: 270 490</p>	 <p>INS0588/L01 (9pin./female)</p>	<p>D-subminiature plug-in connector</p>

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12 Service & Support

12.1 Helpdesk

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über Service-Call Entry Center Mo-Fr 07:00-18:00
- per Fax: **+49 (0) 9352 40 49 41**
- per e-Mail: **service@indramat.de**

Our service helpdesk at our headquarters in Lohr am Main, Germany can assist you in all kinds of inquiries. Contact us

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via Service-Call Entry Center Mo-Fr 07:00 am -6:00 pm
- by fax: **+49 (0) 9352 40 49 41**
- by e-mail: **service@indramat.de**

12.2 Service-Hotline

Außerhalb der Helpdesk-Zeiten ist der Service direkt ansprechbar unter

oder **+49 (0) 171 333 88 26**
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After helpdesk hours, contact our service department directly at

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12.3 Internet

Weitere Hinweise zu Service, Reparatur und Training finden Sie im Internet unter

www.indramat.de

Außerhalb Deutschlands nehmen Sie bitte zuerst Kontakt mit Ihrem lokalen Ansprechpartner auf. Die Adressen sind im Anhang aufgeführt.

Additional notes about service, repairs and training are available on the Internet at

www.indramat.de

Please contact the sales & service offices in your area first. Refer to the addresses on the following pages.

12.4 Vor der Kontaktaufnahme... - Before contacting us...

Wir können Ihnen schnell und effizient helfen wenn Sie folgende Informationen bereithalten:

1. detaillierte Beschreibung der Störung und der Umstände.
2. Angaben auf dem Typenschild der betreffenden Produkte, insbesondere Typenschlüssel und Seriennummern.
3. Tel./Faxnummern und e-Mail-Adresse, unter denen Sie für Rückfragen zu erreichen sind.

For quick and efficient help, please have the following information ready:

1. Detailed description of the failure and circumstances.
2. Information on the type plate of the affected products, especially type codes and serial numbers.
3. Your phone/fax numbers and e-mail address, so we can contact you in case of questions.

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<p>USA Hauptniederlassung - Headquarters</p> <p>Mannesmann Rexroth Corporation Rexroth Indramat Division 5150 Prairie Stone Parkway Hoffman Estates, IL 60192-3707</p> <p>Competence Centre America</p> <p>Tel.: +1 847 6 45 36 00 Fax: +1 847 6 45 62 01 service@indramat.com</p>	<p>USA Central Region - Mitte</p> <p>Mannesmann Rexroth Corporation Rexroth Indramat Division Central Region Technical Center Auburn Hills, MI 48326</p> <p>Tel.: +1 248 3 93 33 30 Fax: +1 248 3 93 29 06</p>	<p>USA Southeast Region - Südwest</p> <p>Mannesmann Rexroth Corporation Rexroth Indramat Division Southeastern Technical Center 3625 Swiftwater Park Drive Suwanee, Georgia 30174</p> <p>Tel.: +1 770 9 32 32 00 Fax: +1 770 9 32 19 03</p>	<p>USA SERVICE-HOTLINE</p> <p>- 7 days x 24hrs -</p> <p>+1-800-860-1055</p>
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<p>Argentina - Argentinien</p> <p>Mannesmann Rexroth S.A.I.C. Division Rexroth Indramat Acassusso 48 41/7 RA - 1605 Munro (Buenos Aires)</p> <p>Tel.: +54 (0)11 4756 01 40 Fax: +54 (0)11 4762 6862 mannesmann@mannesmannsaic.com.ar</p>	<p>Argentina - Argentinien</p> <p>NAKASE Servicio Tecnico CNC Calle 49, No. 5764/66 RA - 1653 Villa Balester Prov. - Buenos Aires</p> <p>Tel.: +54 (0) 11 4768 36 43 Fax: +54 (0) 11 4768 24 13 nakase@usa.net nakase@infovia.com.ar</p>	<p>Brazil - Brasilien</p> <p>Mannesmann Rexroth Automação Ltda. Divisão Rexroth Indramat Rua Georg Rexroth, 609 Vila Padre Anchieta BR - 09951-270 Diadema-SP [Caixa Postal 377] [BR-09901-970 Diadema-SP]</p> <p>Tel.: +55 (0)11 4075 90 60 +55 (0)11 4075 90 70 Fax: +55 (0)11 4075 90 50 alexandre.wittwer@rexroth.com.br</p>	<p>Brazil - Brasilien</p> <p>Mannesmann Rexroth Automação Ltda. Divisão Rexroth Indramat R. Dr.Humberto Pinheiro Vieira, 100 Distrito Industrial BR - 89220-390 Joinville - SC [Caixa Postal 1273]</p> <p>Tel./Fax: +55 (0)47 473 58 33 Mobil: +55 (0)47 974 66 45 prochnow@zaz.com.br</p>
<p>Mexico</p> <p>Mannesmann Rexroth Mexico S.A. de C.V. Calle Neptuno 72 Unidad Ind. Vallejo MEX - 07700 Mexico, D.F.</p> <p>Tel.: +52 5 754 17 11 +52 5 754 36 84 +52 5 754 12 60 Fax: +52 5 754 50 73 +52 5 752 59 43</p>			

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