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MTC200 / MT-CNC
Machine Control Terminal
BTV30.2

Configuration

DOK-MTC200-BTV30.2****-PR01-EN-P

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Indramat

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- Description of the BTV30.2 hardware functions
- Connection and installation of the BTV30.2 unit
- BTV30.2 specifications

Configuration control

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1 System Presentation

1.1 Brief Description

The BTV30.2 unit is a machine control terminal into which one or more NC controller(s) with SPS and/or one or more stand-alone programmable logic controller(s) can be integrated. The number of modules that can be integrated depends on their configuration (the related information can be found in the order code of the modules). Currently, 9 slots are available.

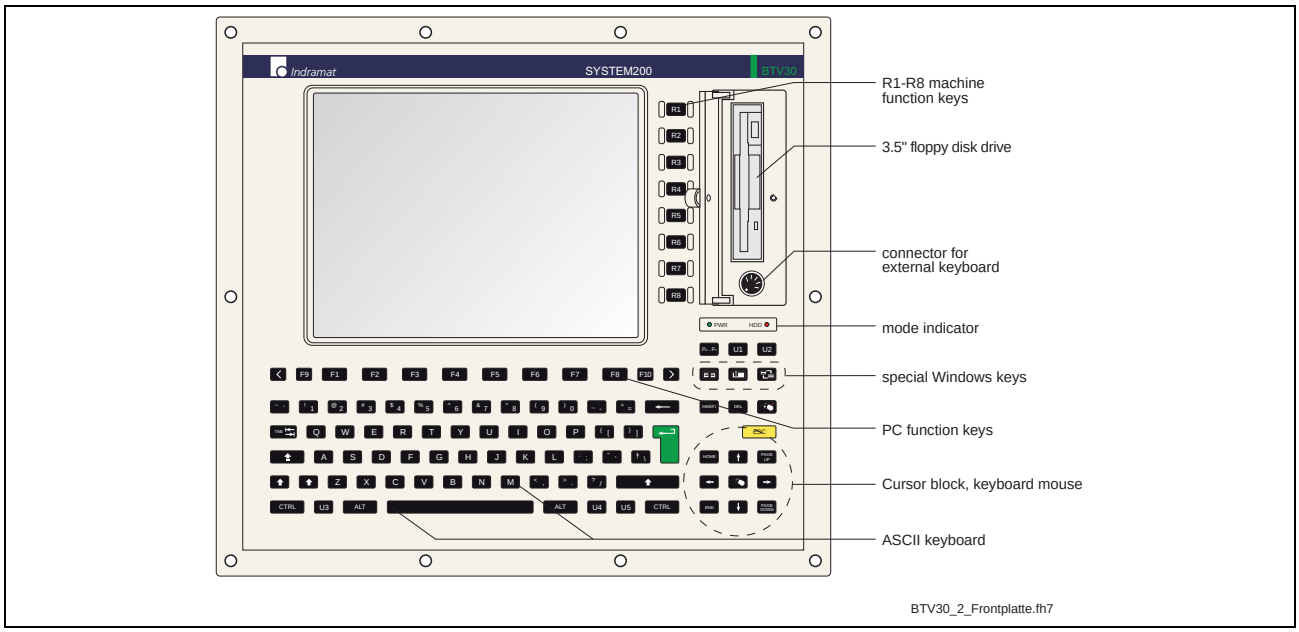


Figure 1-1: BTV30.2 front panel

1.2 Peculiarities

The BTV30.2 unit possesses the functionality and the control elements of a complete industry PC.

Besides the 10.4-in flat color display and a full ASCII keyboard (MFII compatible) with cursor block, keyboard mouse, and special Windows keys, there are a standard floppy disk drive and a connector for an external keyboard behind a lockable flap.

In addition to the 10 PC function keys beneath the display, there are 8 machine function keys to the right of the display which are either connected to an external socket or - if there is an integrated SPS module - directly to the SPS.

The sturdy front panel, which is made from PC/ABS, contains real key elements that permit non-fatigueing work, even during extended programming sessions.

The display is protected by a pane of glass that complies with the EMC requirements. When the floppy disk flap is closed, the BTV30.2 unit satisfies IP65 rating at the front, and resists all known coolants and lubricants.

The BTV30.2 unit is suitable for surface mounting and for underfloor installation. Together with the optically and dimensionally compatible BTM15 and BTM16 machine control panels, you can set up a modern and attractive control panel in a flat or raised form.

1.3 Function types

The BTV30.2 unit is available in the following five function types:

BTV30.2**T**	=	Display terminal
BTV30.2**P**	=	Industry PC without control systems
BTV30.2**S**	=	SPS control system ISP200-P
BTV30.2**C**	=	CNC control system MTC200-P
BTV30.2**E**	=	CNC control system MTC200-P, export version

Further details of the BTV30.2 configuration can be found in the order code (Chapter 6)

1.4 Standard Configuration

- Pentium 200 MHz - SLOT-CPU with integrated graphics controller and 2 MB screen memory
- 64 MB main memory
- minimum 1 GB hard disk
- 3.5-in floppy disk drive
- 10,4" TFT color display, resolution 640 x 480 pixels, 262k colors
- Ethernet interface (10 Base-T)
- 2 serial RS232 interfaces

1.5 Special Version BTV30.2T ("T" - Terminal)

In most cases, a central control structure is used for large machines (such as rotary machines or machining centers). However, a second (or third, etc.) control position can be required.

The BTV30.2T terminal has been developed for this purpose. This terminal does not contain its own PC, it is connected to a master BTV30.2P, BTV30.2S, BTV30.2C, or BTV30.2E. In addition to the master BTV, up to 7 more control positions can thus be equipped with BTV30 terminals.

The parallel connection of the terminals with the master BTV ensures that the screen contents of all control positions are identical.

The keyboards of the terminals can either be used in simultaneous mode together with the keyboard of the master BTV, or can be selected at the PCE01.1E distributor.

The terminals have neither their own PC nor a hard disk. This is why any data and program modification will take immediate effect at all control positions. Matching the data of the individual control units is not necessary.

Optically and dimensionally, the BTV30.2T unit is identical to the different master BTVs. Inside, however, there is no PC but merely a receiver unit that ensures that a terminal can be mounted at a distance of up to 100 m from the PCE01.1E distribution unit.

Behind the floppy disk flap there is merely the connector for an additional external keyboard, no additional floppy disk drive.

While the PC keys of the terminal keyboard are connected with the master BTV via the PCE01.1E distribution unit, the machine function keys at the side of the display must be wired separately.

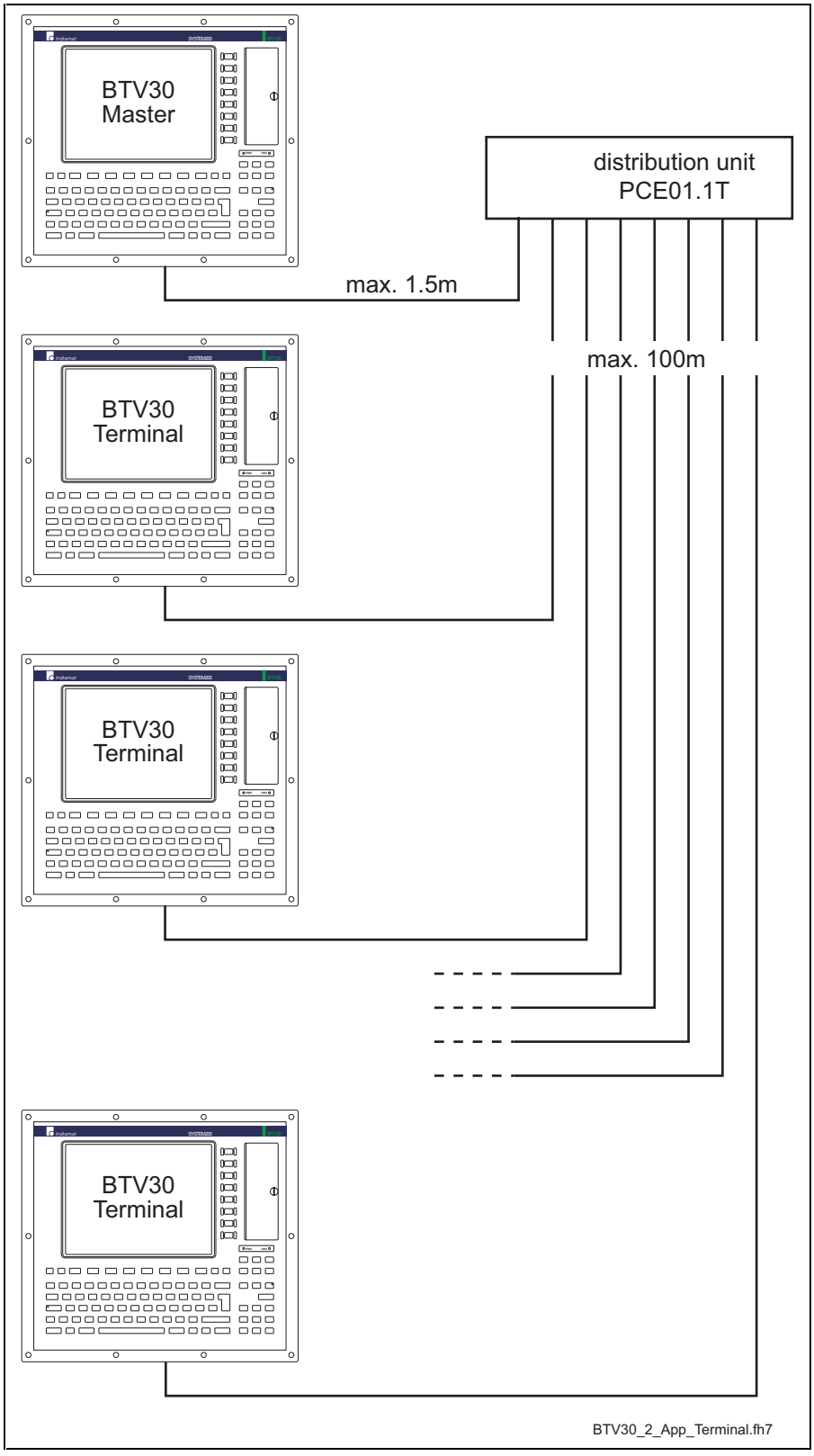


Figure 1-2: Application of the BTV30.2 terminal

Note: For this version, there is a separate document available from Indramat.

1.6 Additional Modules

The following additional modules are currently available:

- Stand-alone SPS module with:
  - INTERBUS-S master module
  - Profibus-DP master module
  - Profibus-DP slave module
  - 4-fold interface module (2 x RS232; 2 x RS422)
- SPS module with:
  - INTERBUS-S master module
  - Profibus-DP master module
  - Profibus-DP slave module
  - 4-fold interface module (2 x RS232; 2 x RS422)
- CNC module with up to 4 SERCOS interface drive interfaces.
- PC interface RS485
- Ethernet interface card

Note**:** Please refer to Chapter 6, Order Code, for further information and additional combinations.

2 Front panel

2.1 Floppy Disk Flap

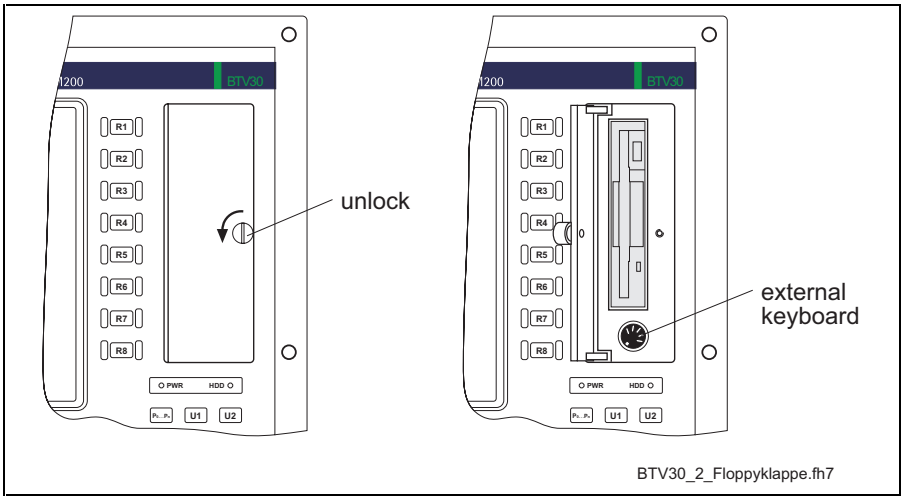


Figure 2-1: Unlocking the floppy disk flap and connector for external keyboard

The floppy disk flap is locked by a quick release lock. To open the flap, rotate the locking knob by approximately 180° to the left. To close the flap, merely press the button so that the lock snaps into place.

Note: IP65 protection rating can only be reached when the floppy disk flap is closed.

The floppy disk flap can only be closed if there is no floppy disk in the drive.

When the floppy disk flap is open, an external PC keyboard can be connected to the connector provided. This external keyboard can be used in parallel to the integrated keyboard.

Note: The external PC keyboard may only be connected or disconnected when the power to the BTV30.2 unit is switched off.

2.2 Status Indicators

Beneath the floppy disk flap, there are two red LEDs that have the following meanings:

Power lights as soon as power is applied to the BTV30 unit and the unit has been switched on.

HDD lights up as soon as there is an access to the hard disk.

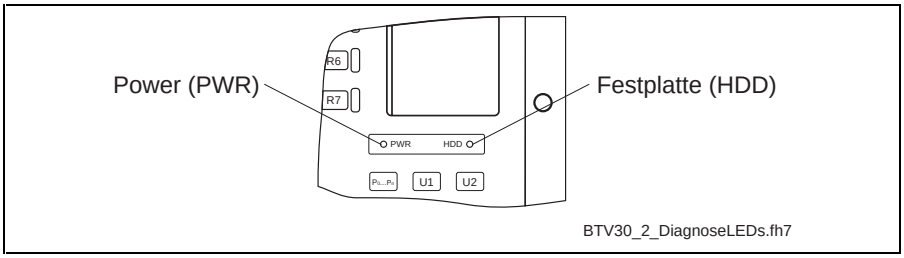


Figure 2-2: Enlarged sectional view of the LED panel

2.3 Machine Function Keys

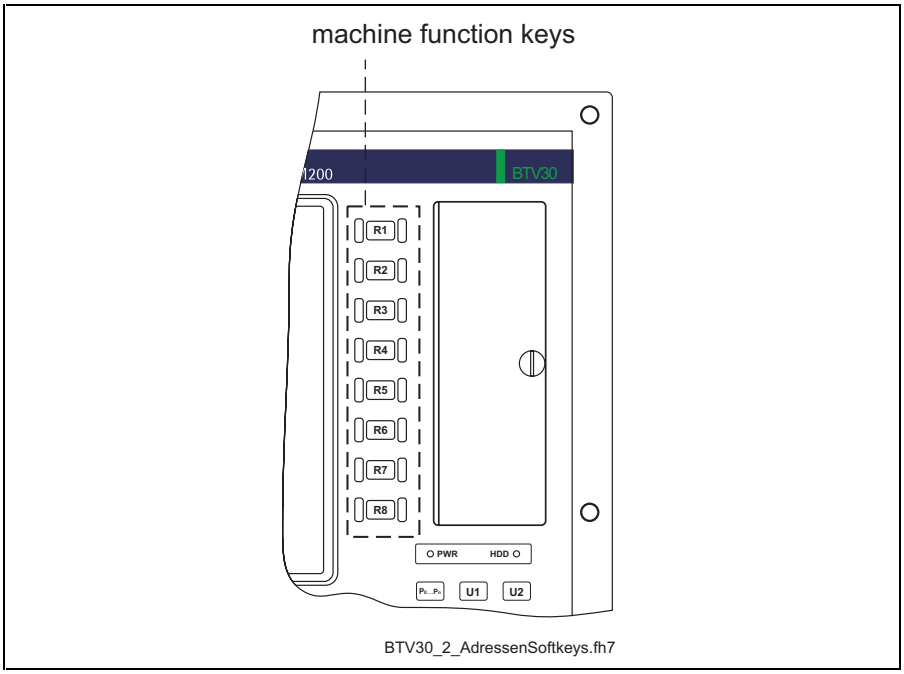


Figure 2-3: Enlarged sectional view of the machine function keys

There are eight vertically arranged machine function keys to the right of the display.

These keys are either connected directly to an integrated SPS of the MTS-P type, or are available at a 9-way socket (Fig. 2-5) for the connection of the I/O chain of an external SPS (e.g. MTS-R).

The key contacts can be used in the range between 5VDC and 24VDC. The maximum switching current is 200 mA.

Connector pin assignments of the BTV30.2P unit

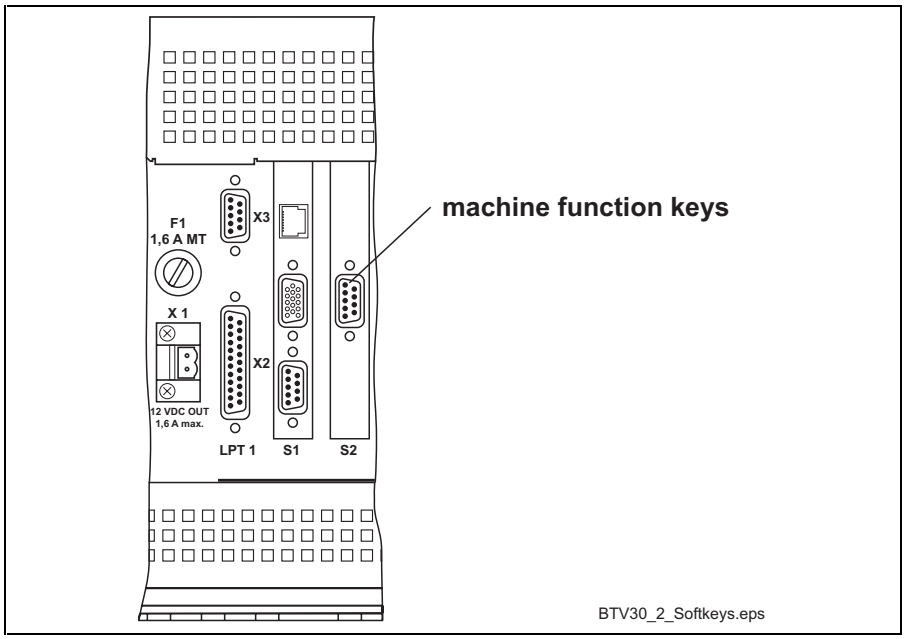


Figure 2-4: Machine function keys

In the case of a pure industry PC without integrated controller, the 8 machine function keys are available via a 9-way socket that is installed in slot 2.

Pin	Signal name
1	R1
2	R3
3	R5
4	R7
5	+24V DC
6	R2
7	R4
8	R6
9	R8

Figure 2-5: Sub-D - connector pin assignments

Addressing

BTVs of the C, E, and S function type possess an integrated SPS. In this case, the machine function keys are directly connected to the SPS and can therefore be addressed directly.

Machine function keys	Address
R1	%I0.991.0
R2	%I0.991.1
R3	%I0.991.2
R4	%I0.991.3
R5	%I0.991.4
R6	%I0.991.5
R7	%I0.991.6
R8	%I0.991.7

Figure 2-6: Machine function key addresses

2.4 Keyboard

The BTV30.2 unit possesses a full ASCII keyboard with a total of 93 keys in the American keyboard layout.

In addition to the ASCII block proper, there is a function key bar beneath the display, and a cursor block with some special keys at the right-hand side of the BTV30.2 unit.

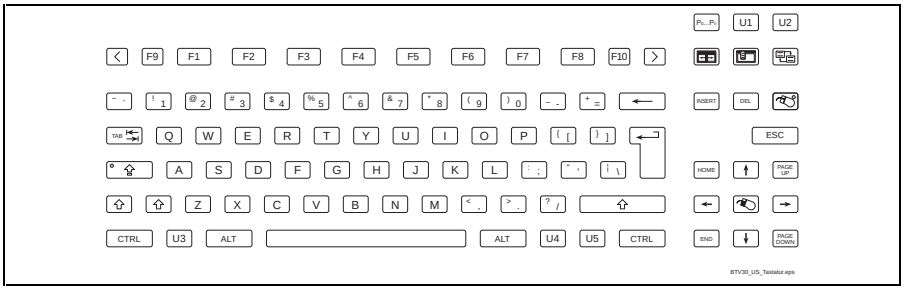


Figure 2-7: American keyboard layout

Special keys

The keyboard of the BTV30.2 unit features 13 special keys that do not exist on a normal PC keyboard. These keys are listed in the following table. The list also specifies how these keys can be emulated on an external standard keyboard.

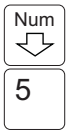
Pictogram of the key at the BTV30.2 unit	Corresponding key of the standard keyboard
	 Num 5 currently not defined currently not defined left right currently not defined currently not defined currently not defined currently not defined currently not defined currently not defined
SondertastenBTV30.fh7	SondertastenStandard.fh7

Figure 2-8: Special keys

Keyboard mouse

The cursor block of the BTV30.2 unit can be switched over and be used for controlling mouse **(only possible with Windows95 / NT)**

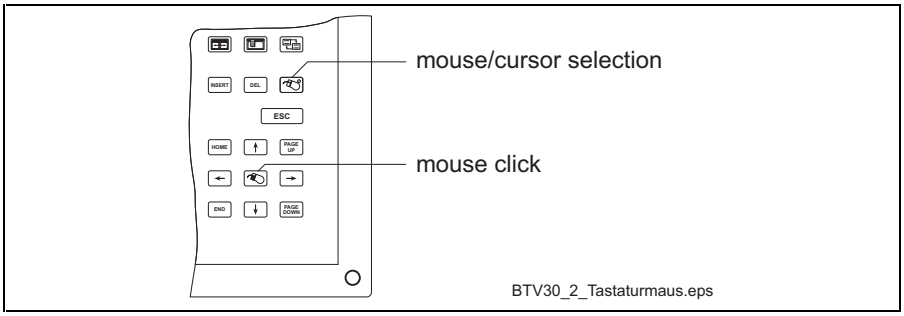


Figure 2-9: Enlarged sectional view of the cursor block with the additional keys of the keyboard mouse

Pressing the key toggles between mouse and cursor mode. The red LED in the key is ON when mouse mode is active.

The arrow keys and the PgUp, PgDn ... keys are used for moving the mouse pointer horizontally, vertically, or diagonally.

Pressing the key triggers a mouse click (left-hand mouse button).

Note: The keyboard mouse function is only available in connection with the Windows95 or WindowsNT operating systems.

Operating system

For license reasons, the BTV30.2 unit can only be delivered with an installed operating system. Depending on the application, MS-DOS Version 6.22 or WindowsNT 4.0 are available.

In addition to the operating system, the user interface of an MTC200 CNC controller or an ISP200 programmable logic controller can be preinstalled.

MS-DOS

The following firmware configurations are currently available in conjunction with MS-DOS Version 6.22:

Firmware type	Software installation	Description
FWA-BTV30*-MSD-01VRS-DE	SWA-PC*MS*-DOS-06VRS-DE-C1,44	only MS-DOS operating system, German
FWA-BTV30*-MSD-01VRS-DE-GBO001	SWA-PC*MS*-DOS-06VRS-DE-C1,44 SWA-MTC200-GBO-17VRS-MS-C1,44-MS*DOS	MS-DOS, German with graphical user interface, version 17
FWA-BTV30*-MSD-02VRS-DE-GBO001	SWA-PC*MS*-DOS-06VRS-DE-C1,44 SWA-MTC200-GBO-18VRS-MS-C1,44-MS*DOS	MS-DOS, German with graphical user interface, version 18
FWA-BTV30*-MSD-01VRS-EN	SWA-PC*MS*-DOS-06VRS-EN-C1,44	only MS-DOS operating system, English
FWA-BTV30*-MSD-01VRS-EN-GBO001	SWA-PC*MS*-DOS-06VRS-EN-C1,44 SWA-MTC200-GBO-17VRS-MS-C1,44-MS*DOS	MS-DOS, English with graphical user interface, version 17
FWA-BTV30*-MSD-02VRS-EN-GBO001	SWA-PC*MS*-DOS-06VRS-EN-C1,44 SWA-MTC200-GBO-18VRS-MS-C1,44-MS*DOS	MS-DOS, English with graphical user interface, version 18

Figure 2-10: Firmware configurations under MS-DOS

Windows-NT

The following firmware configurations are currently available in conjunction with the Windows-NT operating system:

Firmware type	Software installation	Description
FWA-BTV30*-WNT-01VRS-DE-GBO001	SWA-PC*MS*-WNT-03VRS-DE-CD600 SWA-MTC200-GBO-17VRS-MS-C1,44-WIN*NT	Windows-NT 3.51, German with graphical user interface, Version 17
FWA-BTV30*-WNT-01VRS-EN-GBO001	SWA-PC*MS*-WNT-03VRS-EN-CD600 SWA-MTC200-GBO-17VRS-MS-C1,44-WIN*NT	Windows-NT 3.51, English with graphical user interface, Version 17
FWA-BTV30*-WNT-02VRS-DE	SWA-PC*MS*-WNT-04VRS-DE-CD600	only Windows-NT 4.0, German
FWA-BTV30*-WNT-02VRS-EN	SWA-PC*MS*-WNT-04VRS-EN-CD600	only Windows-NT 4.0, English
FWA-BTV30*-WNT-02VRS-DE-GBO001	SWA-PC*MS*-WNT-04VRS-DE-CD600 SWA-MTC200-GBO-18VRS-MS-C1,44-WIN*NT	Windows-NT 4.0, German with graphical user interface, Version 18
FWA-BTV30*-WNT-02VRS-EN-GBO001	SWA-PC*MS*-WNT-04VRS-EN-CD600 SWA-MTC200-GBO-18VRS-MS-C1,44-WIN*NT	Windows-NT 4.0, English with graphical user interface, Version 18
FWA-BTV30*-WNT-02VRS-DE-ISP001	SWA-PC*MS*-WNT-04VRS-DE-CD600 SWA-ISP200-PO*-18VRS-MS-C1,44-WIN*NT	Windows-NT 4.0, German with SPS programming desktop, Version 18
FWA-BTV30*-WNT-02VRS-EN-ISP001	SWA-PC*MS*-WNT-04VRS-EN-CD600 SWA-ISP200-PO*-18VRS-MS-C1,44-WIN*NT	Windows-NT 4.0, English with SPS programming desktop, Version 18

Figure 2-11: Firmware configurations under Windows-NT

Note: The delivery of a n FWA firmware merely contains the installation of the listed software. The SWA and/or SWL software products must be ordered separately.
SWA: Software package that contains the floppy disks and the description

SWL: Software license for one additional utilization of an existing SWA software package.

3 Specifications

3.1 General Specifications

Processor	Pentium 200 MHz - Slot CPU with integrated graphics controller
Main memory	64 MB
Hard disk	min. 1 GB
Interfaces	2 serial (RS 232), 1 parallel (Centronics)
Display unit	10.4" TFT color display, resolution 640 x 480 pixels, 262k colors
Slots	10 slots; one slot is occupied by the slot CPU
Keyboard	Full ASCII keyboard, 8 machine function keys
Protection rating	Front panel IP 65, enclosure IP 20 DIN 40 050, IEC 529
Front panel surface	Material: PC/ABS Color: RAL 7035 light gray
Dimension of plug-in unit	372 x 335 x 200 mm (wxhxd)
Dimensions including front panel	407 x 370 x 220 mm (wxhxd)
Power supply	115/230 VAC ± 15%; autorange
Max. power consumption	≤ 250 VA
Typ. heat loss	100 W
Max. heat loss	200 W
Weight	approximately 10.5 kg

Figure 3-1: General specifications of the BTV30.2 unit

3.2 Ambient Conditions

	During operation	**During storage/transport**
Maximum ambient temperature	+5°C ... +45°C	-20°C ... +60°C
Max. temperature gradient	10 K/h	15 K/h
Rel. humidity	75% average, 80% occasional	no condensation, DIN 40 040 class F
Atmospheric pressure	860 ... 1060 hPa, 1500m	corresponding to 12000m
max. external magnetic field	6 Gauss	6 Gauss
max. vibration without / with FDD access	1 G / 0.5 G	1 G
max. shock: without / with FDD access	20 G / 5 G	50 G

Figure 3-2: Ambient conditions of BTV30.2 unit

3.3 Wearing parts

Wearing parts, that are not subject to warranty:

- Fans
- Backlight tubes
- Floppy disk drive (FDD)
- Hard disk drive (HDD)

The average service life of the wearing parts is five years or 20,000 operating hours.

The specifications for the hard disk are valid under the following conditions:	
Write / read cycles	40 cycles/day x 200 days/year
Seak processes	105 cycles/day x 200 days/year
Supply voltage ON	14 h/day x 200 days/year
Operating hours (write/read)	8 h/day x 200 days/year
Ambient Conditions	25°C; 50%RH; 100kPa; no vibration, no shock

Figure 3-3: HDD loading

4 Dimensions

4.1 Enclosure Dimensions

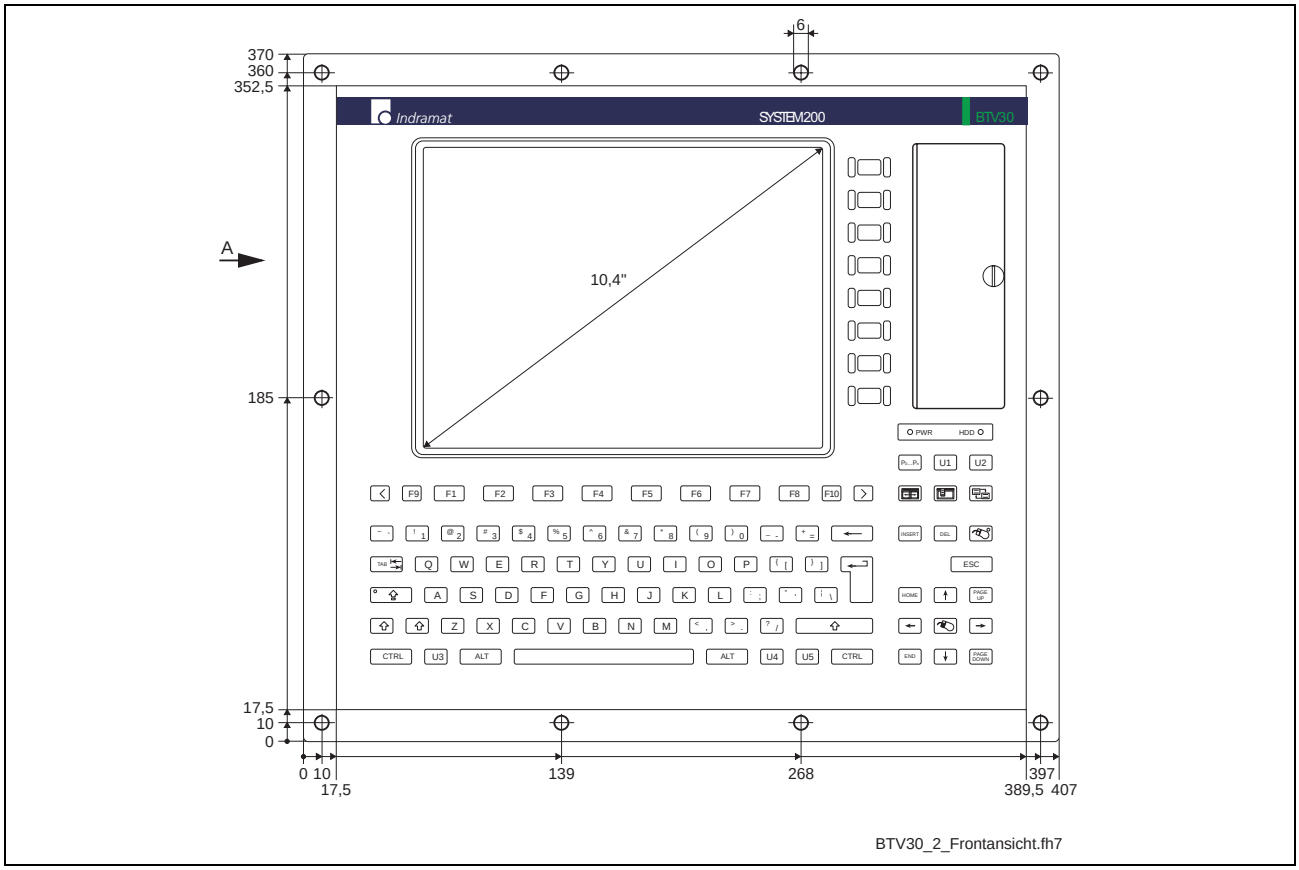


Figure 4-1: Front panel dimensions

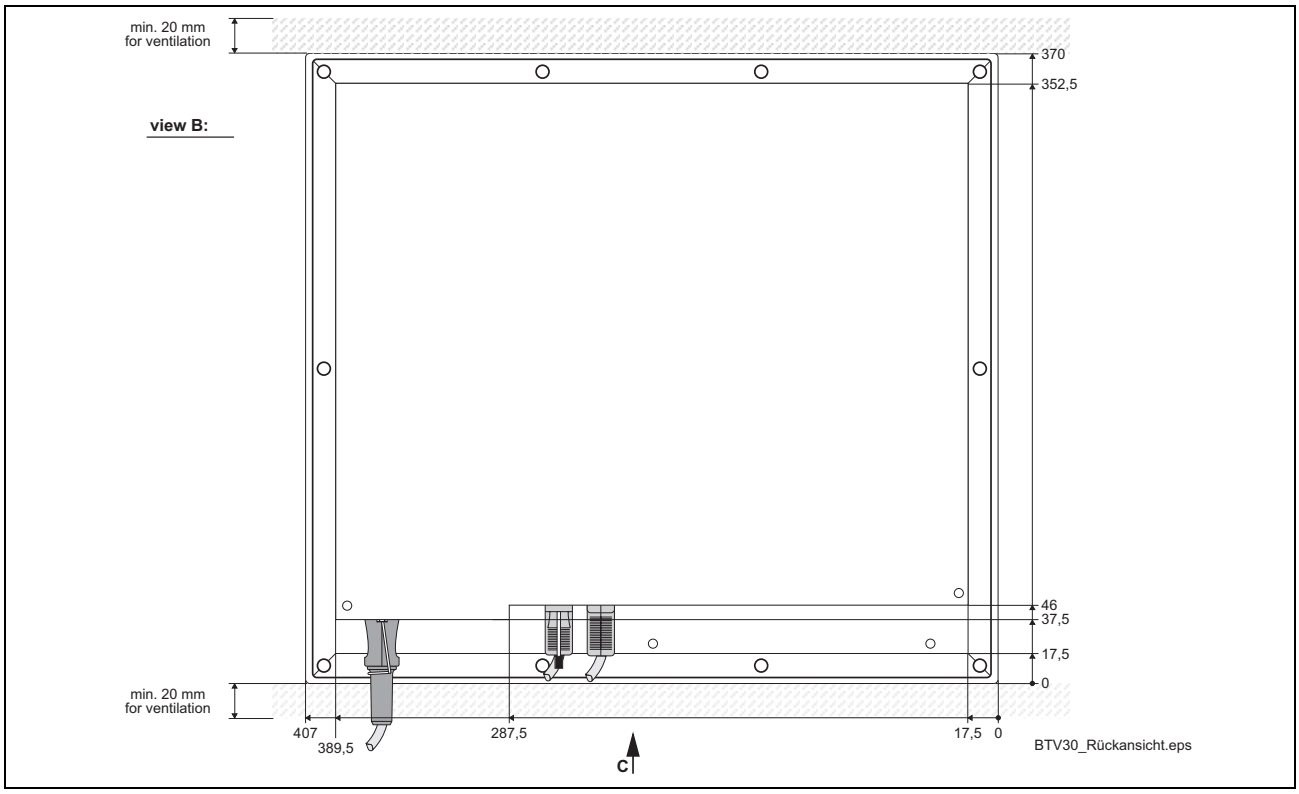


Figure 4-2: Rear view

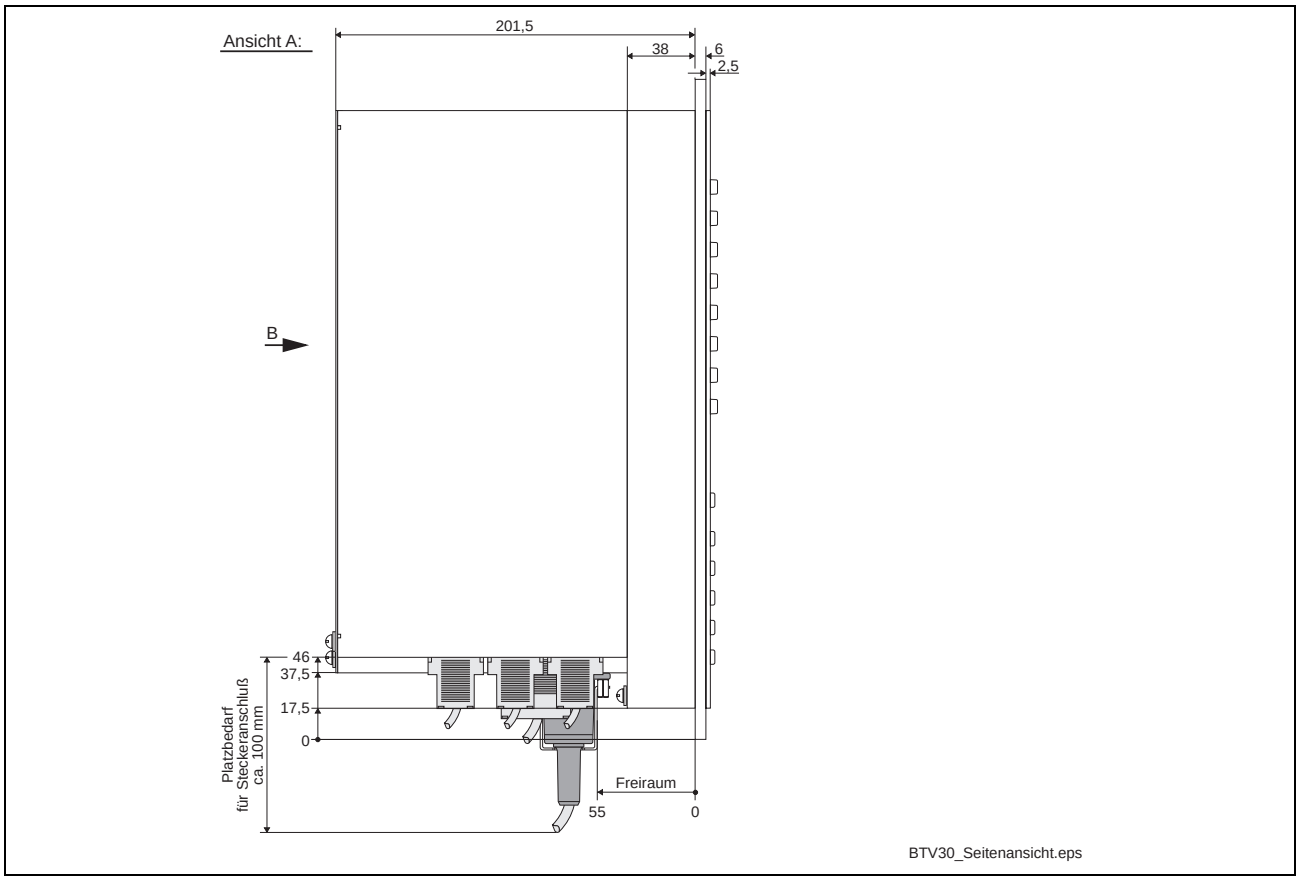


Figure 4-3: Side view

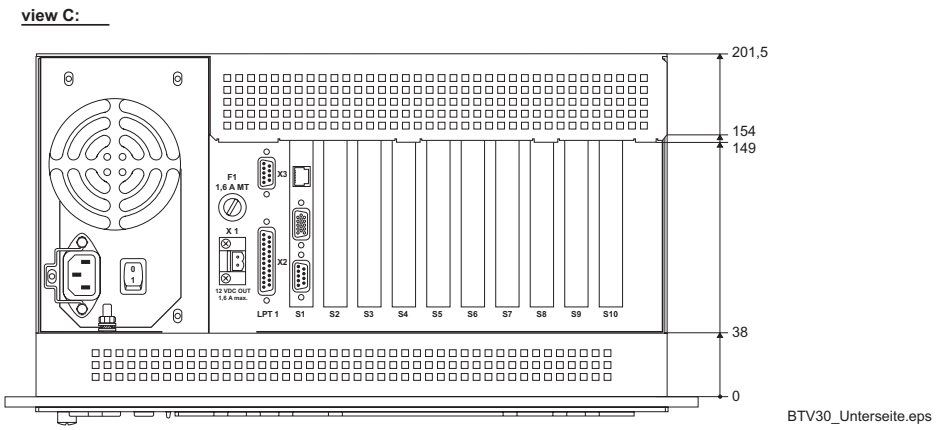


Figure 4-4: Bottom view

4.2 Mounting dimensions

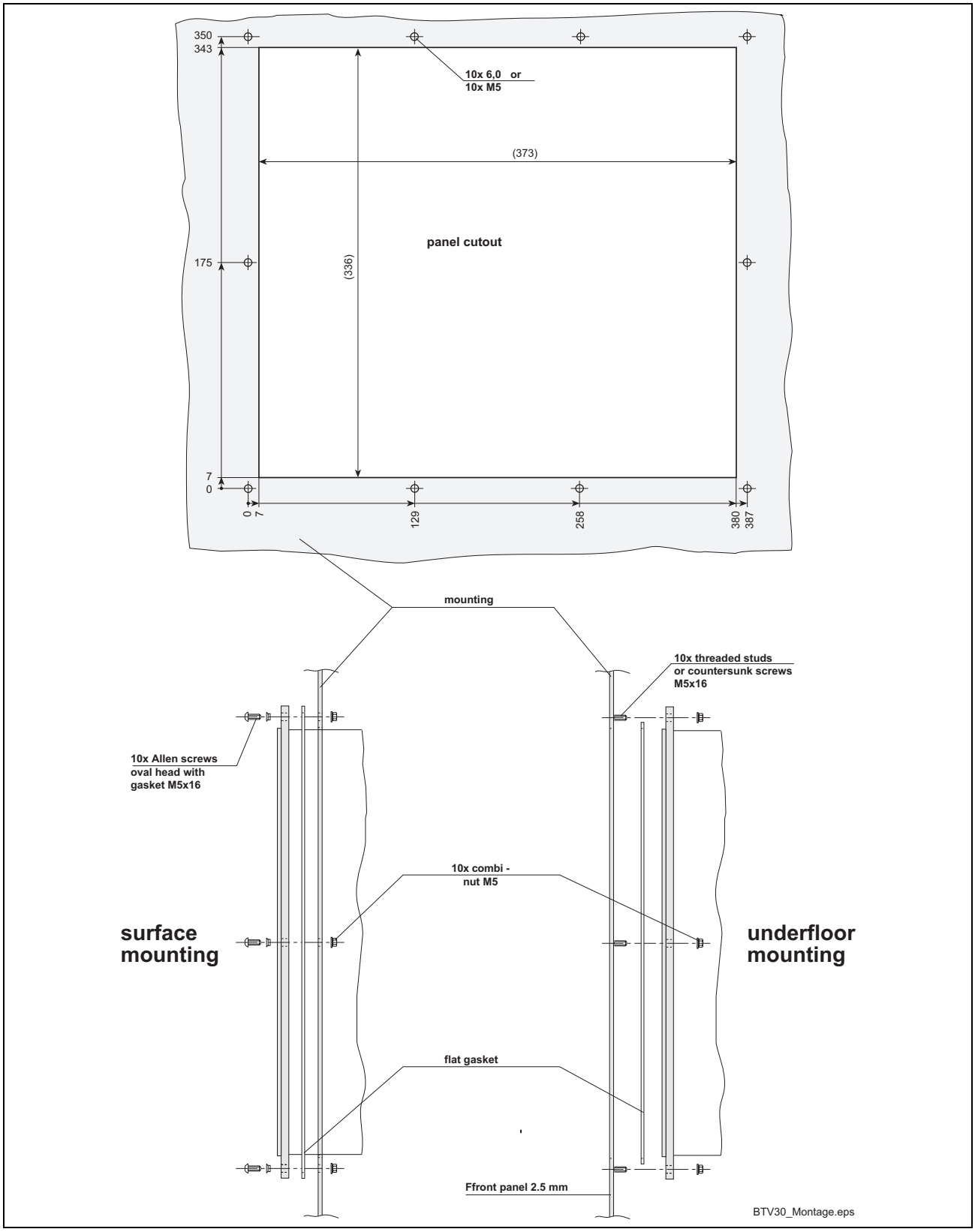


Figure 4-5: Panel cutout

5 Connections

5.1 General Connections

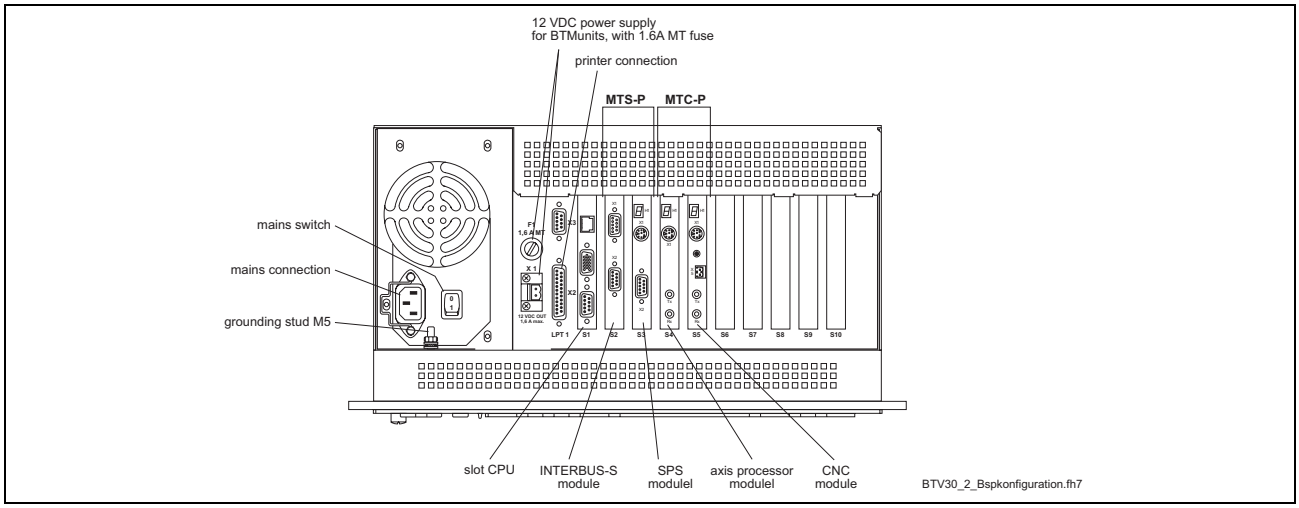


Figure 5-1: Bottom view in a typical configuration

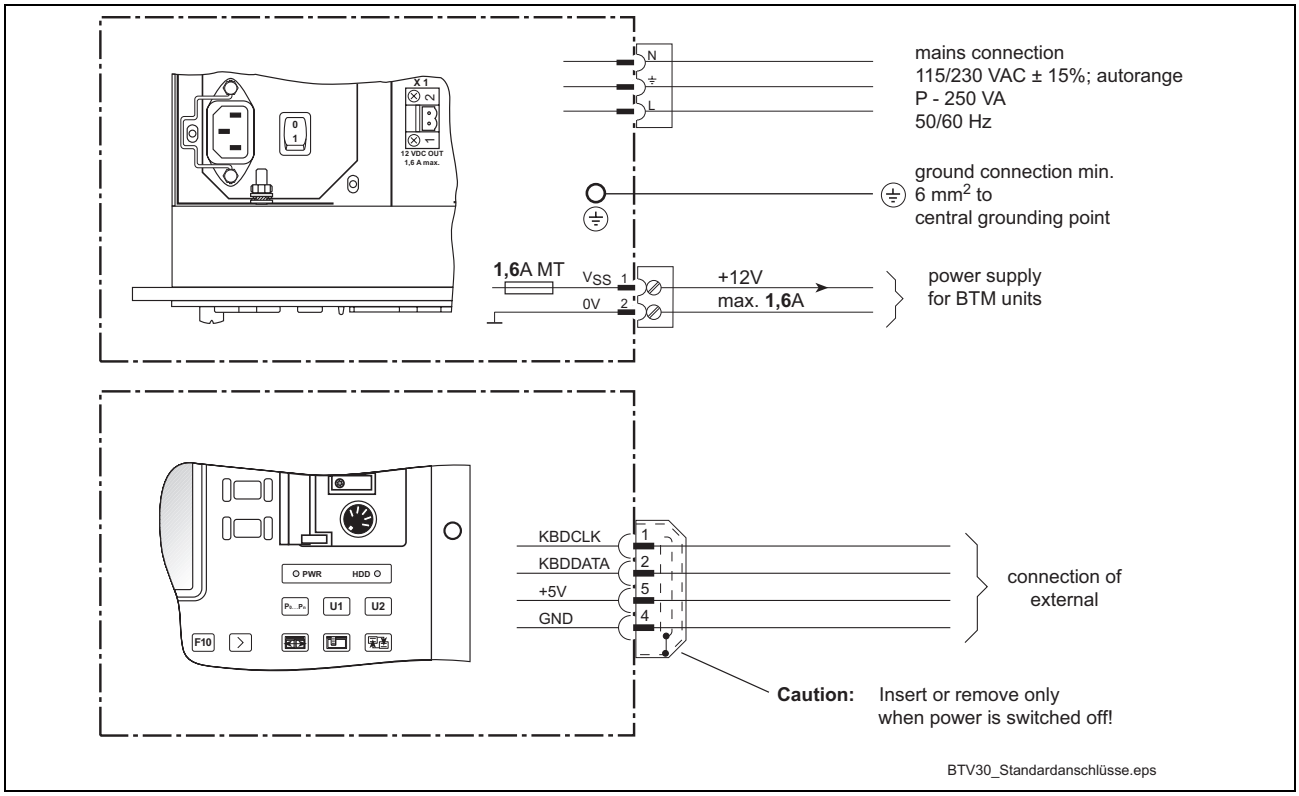
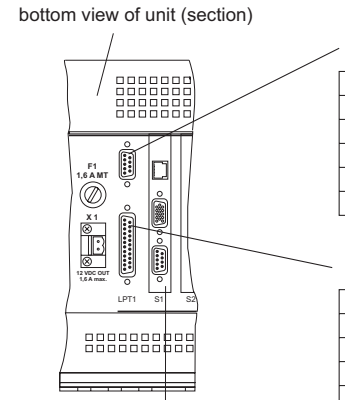


Figure 5-2: Standard connections

5.2 Interfaces of the Slot CPU



COM2 - serial interface RS 232

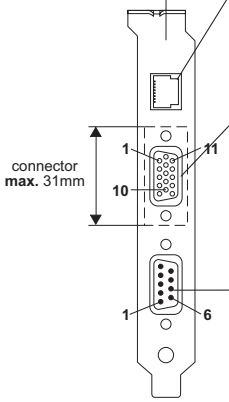
Pin	Signal name	Pin	Signal name
1	DCD - Data Carrier Detect	6	DSR - Data Set Ready
2	RxD - Receive Data	7	RTS - Ready To Send
3	TxD - Transmit Data	8	CTS - Clear To Send
4	DTR - Data Terminal Ready	9	RI - Ring Indicator
5	SGND - ground		

LPT1 - printer interface (Centronics)

Pin	Signal name	Pin	Signal name
1	/STB - Strobe	14	/AFD - Auto Feed
2	PD0	15	/ERR - Error
3	PD1	16	/INIT
4	PD2	17	/SLCTIN - Select In
5	PD3	18	GND
6	PD4	19	GND
7	PD5	20	GND
8	PD6	21	GND
9	PD7	22	GND
10	/ACK - Acknowledge	23	GND
11	Busy	24	GND
12	PE - Paper End	25	GND
13	SLCT - Select		

Ethernet - interface (10 Base-T)

Pin	Signal name	Pin	Signal name
1	T+ = Transmit positive	5	N.C.
2	T- = Transmit negative	6	R- = Receive negative
3	R+ = Receive positive	7	N.C.
4	N.C.	8	N.C.



XGA/SVGA - screen connection

Pin	Signal name	Pin	Signal name
1	Video signal red	9	N.C.
2	Video signal green	10	Ground synchronization
3	Video signal blue	11	N.C.
4	N.C.	12	DDCD
5	GND - ground	13	Horizontal synchronization
6	Ground red	14	Vertical synchronization
7	Ground green	15	DDCC
8	Ground blue		

COM1 - Serielle Schnittstelle RS 232

Pin	Signal name	Pin	Signal name
1	DCD - Data Carrier Detect	6	DSR - Data Set Ready
2	RxD - Receive Data	7	RTS - Ready To Send
3	TxD - Transmit Data	8	CTS - Clear To Send
4	DTR - Data Terminal Ready	9	RI - Ring Indicator
5	SGND - ground		

BTV30_Schnittstellen_CPU.eps

Figure 5-3: Interface of the slot CPU

5.3 Interface in the version with RS485 (COM2)

The BTV30.2 unit is also available in a version with an RS485 interface. This enables up to 5 MTC200-R units (RECO CNC controller) or ISP200-R units (RECO stand-alone SPS) to be interconnected in a network.

Note: **In the version with RS485 interface, the RS485 interface replaces the RS232 COM2 interface.**

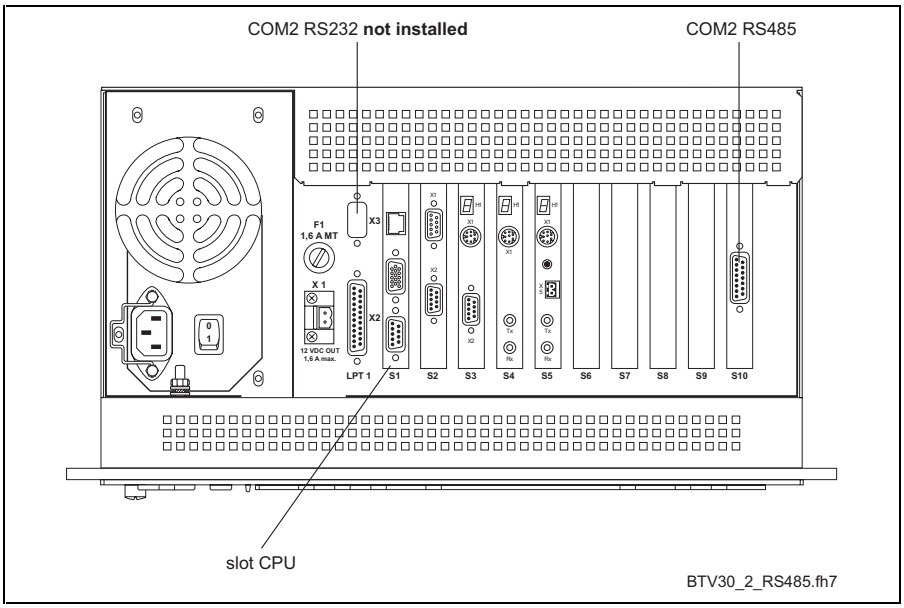


Figure 5-4: Configuration with COM2 interface RS485

RS485 interface pin assignments

The COM2 RS485 interface has the following pin assignments:

Pin	Signal name	Pin	Signal name
1	n.c.	2	n.c.
3	n.c.	4	RxD/TxD +
5	RxD/TxD -	6	n.c.
7	Signal ground	8	n.c.
9	n.c.	10	GND
11	n.c.	12	+ 5V
13	n.c.	14	n.c.
15	n.c.		

Figure 5-5: Pin assignments of the COM2 RS485 interface

Typical network

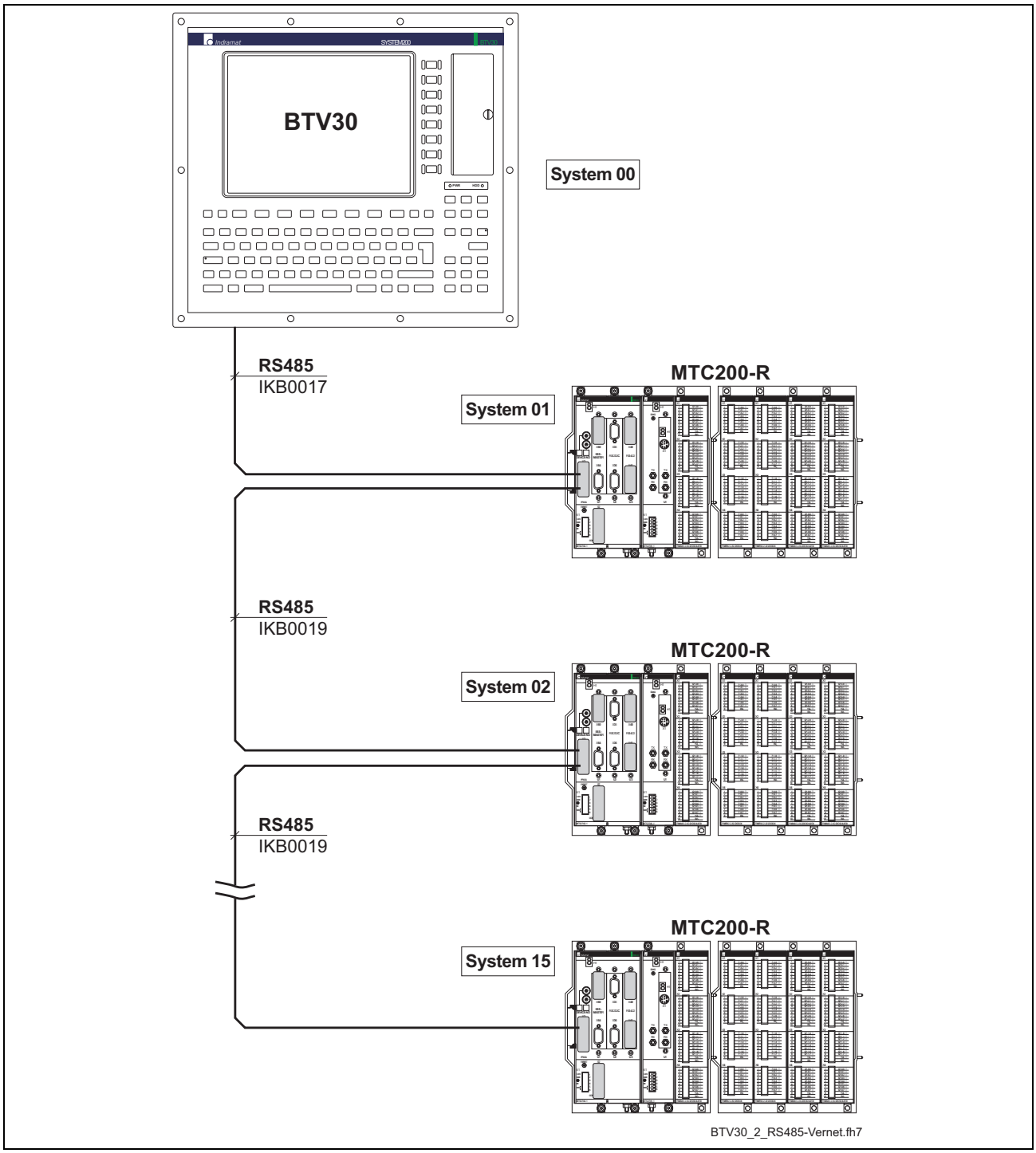


Figure 5-6: RS485 network structure

5.4 Typical Applications

Typical application for INTERBUS-S interface

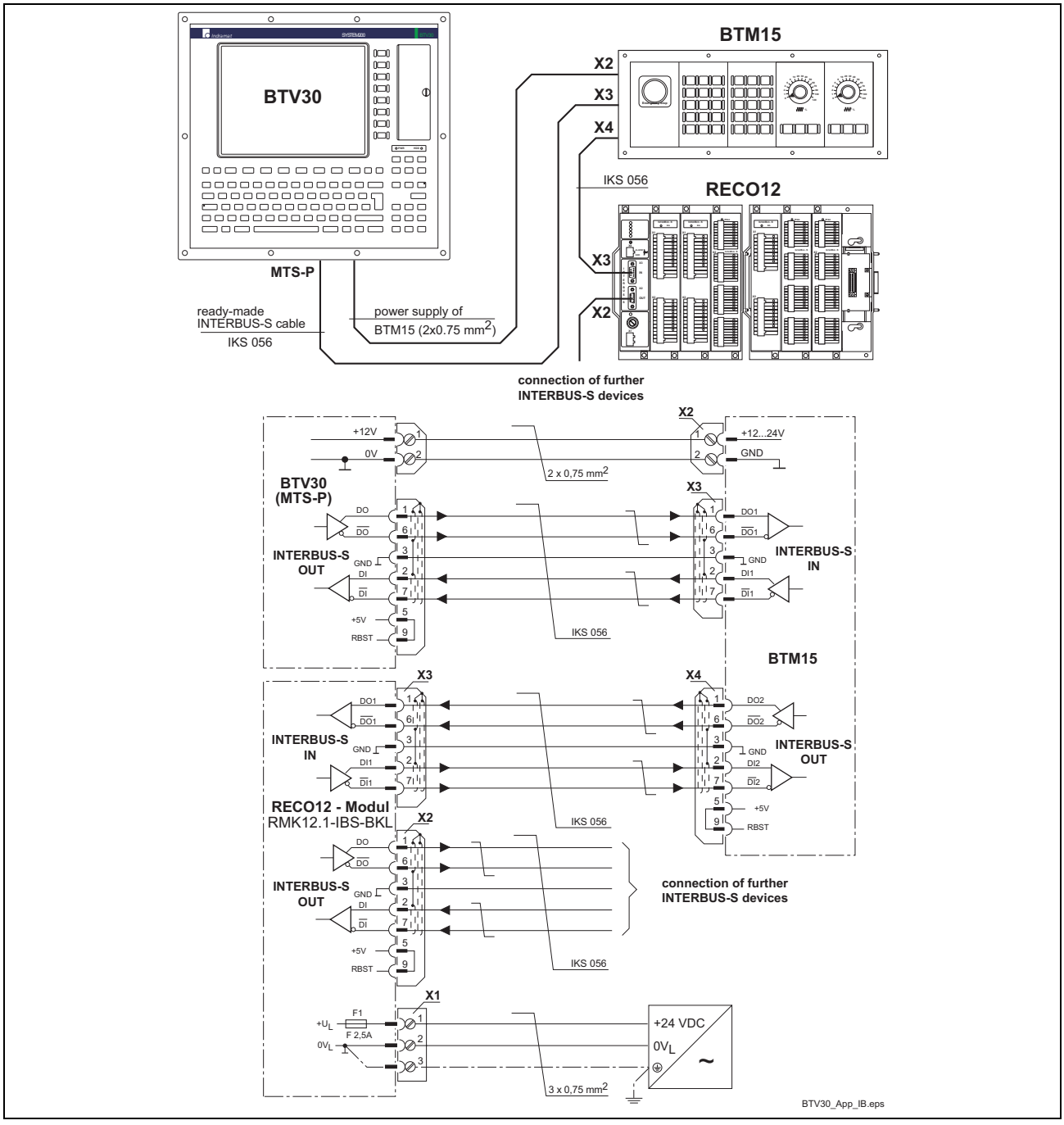


Figure 5-7: INTERBUS-S - typical connection

Typical application for SERCOS interface

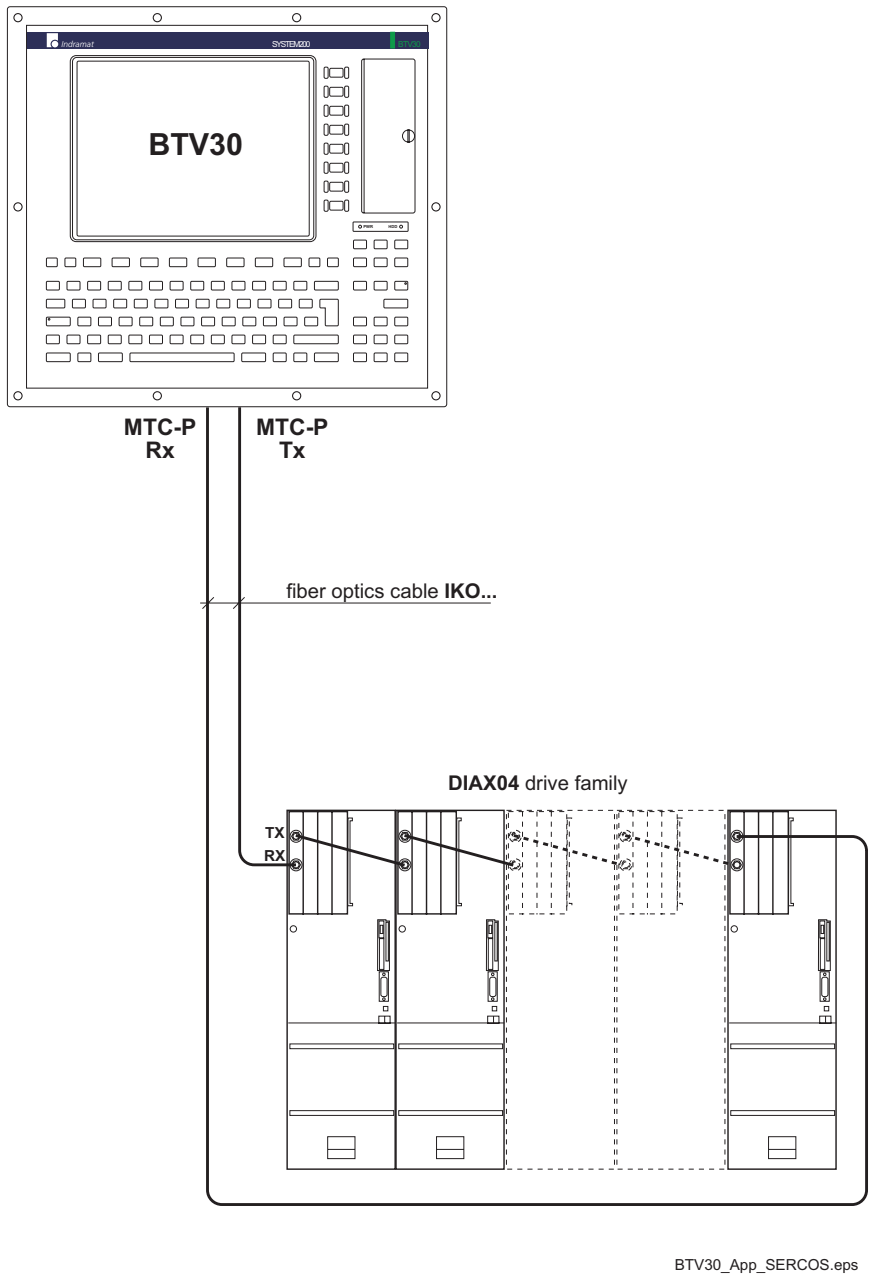


Figure 5-8: SERCOS interface

6 Ordering Code

6.1 Type Code

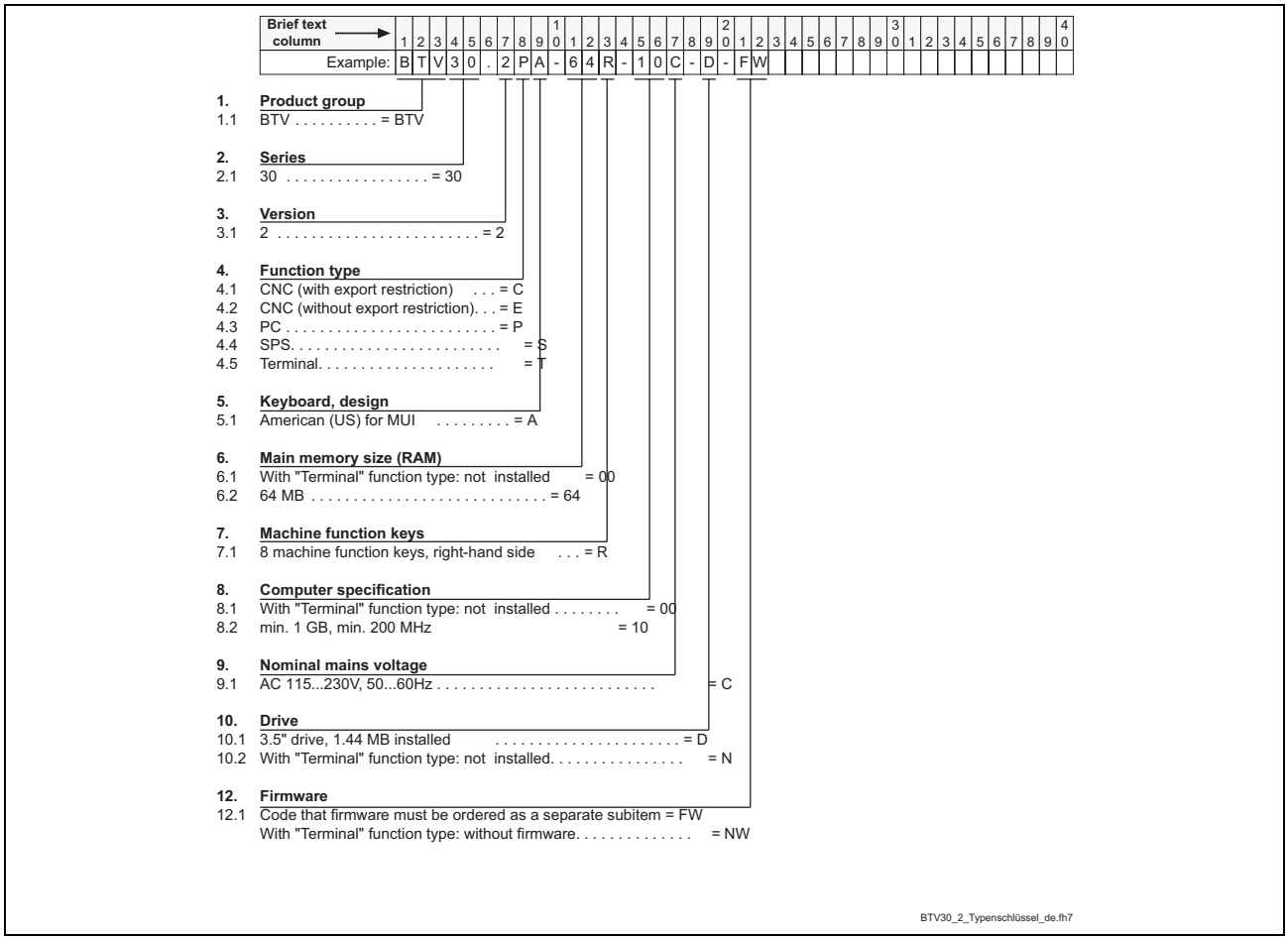


Figure 6-1: BTV30.2 type code

6.2 Configuration Type Code

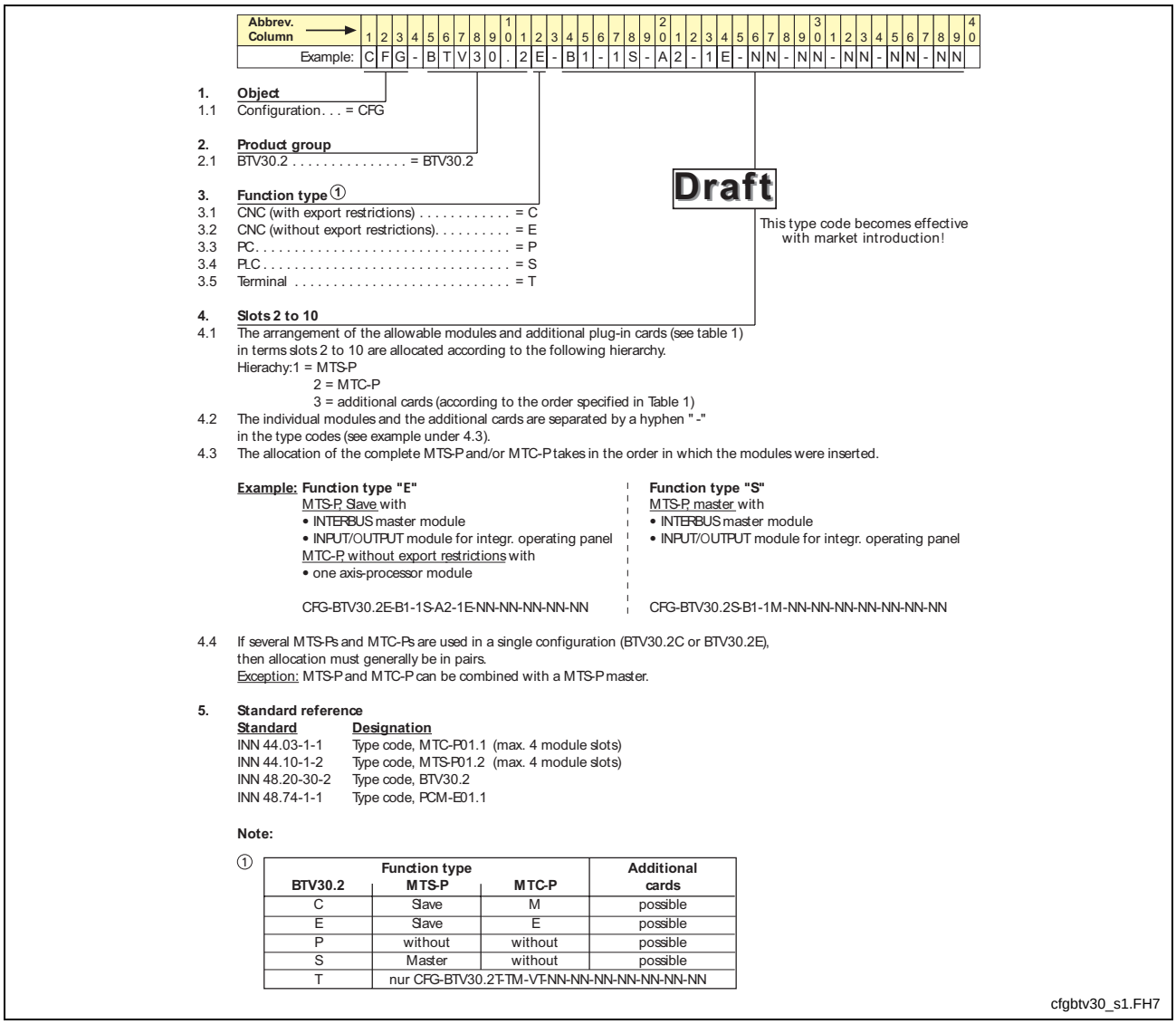


Figure 6-2: Configuration type code

Table 1

MTS-P	Serial interface module (2xRS232 + 2xRS422/485)	-	S4 ②
	INTERBUS master module	-	B1
	PROFIBUS-DP master module	-	P1
	PLC module (MTS-P01.1-M1), 1MB-RAM	Master	1M
	PLC module (MTS-P01.1-S1), 1MB-RAM	Slave	1S
MTC-P	Axis-processor module, with co-processor	-	A2
	CNC module (MTC-P01.2E, with 8 axes), 1MB-RAM	E	1E
	CNC module (MTC-P01.2M, with 8 axes), 1MB-RAM	M	1C
	CNC module (MTC-P01.2E, with 8 axes), 2MB-RAM	E	2E
	CNC module (MTC-P01.2M, with 8 axes), 2MB-RAM	M	2C
Add. plug-in card	Keyboard interface	-	TC ③
	Interface module RS485	-	1R
	Ethernet card PCM-E01.1	-	1T
	Slot not equipped	-	NN
Other	Interface for machine funktion keys	-	TM ③④
	Interface for keyboard and video signals	-	VT ⑤

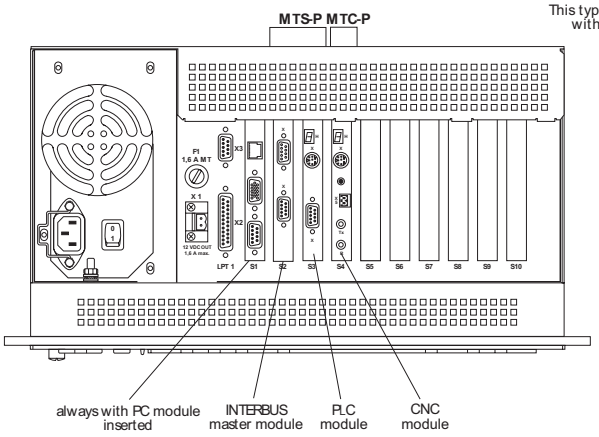
Note to Table 1 (Code)
Modules inserted into the ISA-bus of the BTV30.2 are made up of a number and a letter (e.g., 1M).
Modules inserted into the PC104 bus are made up of a letter and a number (e.g., S4).
Other modules are made up of 2 letters.

② Serial interface module (S4) in 2 slots and must be assigned in configuration as (BB-S4).
③ Slot "S2" is used.
④ Interface for machine funktion keys only possible with function type "P" and "T".
The interface for machine function key "TM" must be outfitted with function type "P".
⑤ Interface for keyboard and video signals only possible with function type "T".

Illustration example: CFG-BTV30.2E-B1-1S-1E-NN-NN-NN-NN-NN-NN

Draft

This type code becomes effective with market introduction!



cfgbtv30_s1.FH7

Figure 6-3: Configuration type code

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