

## BT06.1

Project Planning Manual

SYSTEM200

**Title**

BTV06.1

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**Purpose of Documentation** This documentation describes ...

- the BTV06 hardware functions
- the technical data
- the wiring of a BTV06

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# 1 System Presentation

## 1.1 Preliminary Remarks

This description of functions is addressed to the users of the BTV06 miniature control panel. The functions of the connected controllers or applications are not described here.

## 1.2 Brief Description

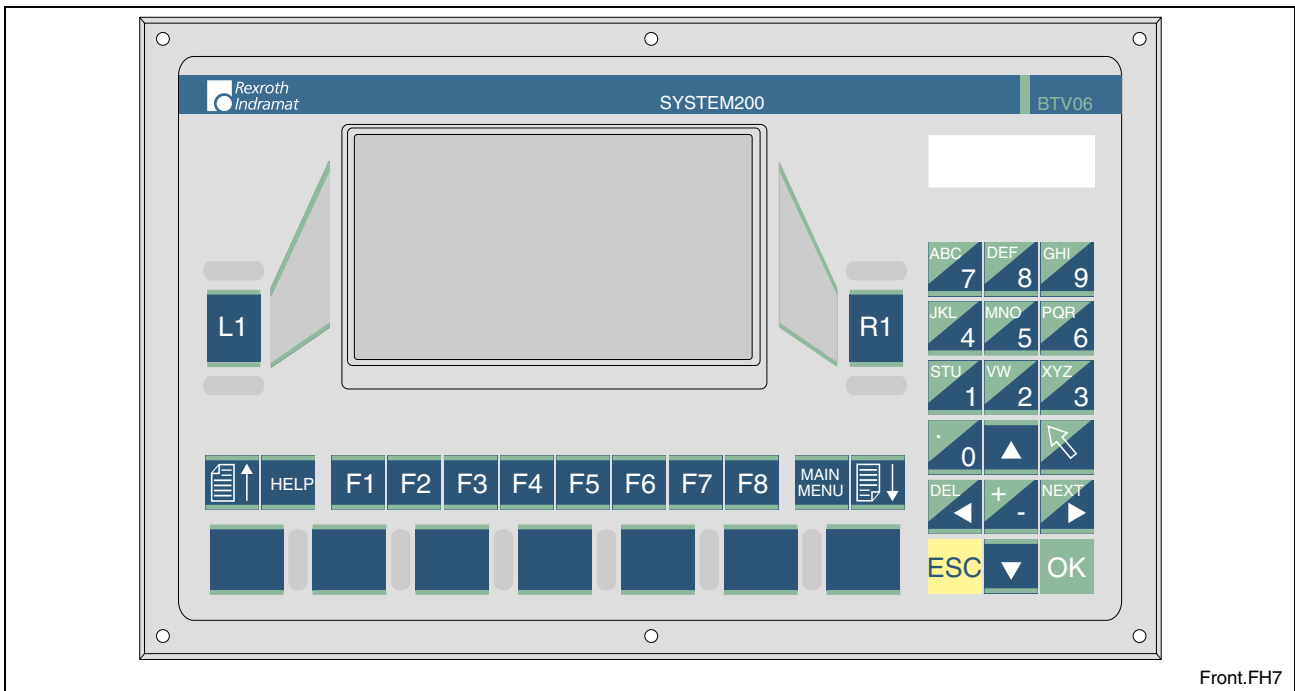


Fig. 1-1: BTV06.1 front view

The BTV06 miniature control panel provides a graphical user interface for machine handling.

Furthermore, the BTV06 convinces by the easy way it can be handled. This is achieved by a clearly structured keypad. The number of keys has been reduced to the most necessary functions.

Both serial interfaces of the BTV06 unit are equipped with the 15-way DSUB connector and are fully connected according to the Indramat standard.

The function of seven keys on the keypad can be programmed by the user. Insert strips permit these keys to be labeled as required.

Its combined RS485/422 interface makes the BTV06 unit particularly suitable for the connection to any INDRAMAT controller.

The universal ScreenManager software allows the user to create user-defined applications, which are able to access the variables of all INDRAMAT control families.





## 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.

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**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.

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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 BTV06.1 unit by Rexroth Indramat is designed for operating and controlling plant and machinery and in order to communicate the user visual information's about the operating plant.

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**Note:** The BTV06.1 unit 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.

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The miniature control panel BTV06.1 is designed for use in one and multiple axes control tasks.

Typical areas of application of a BTV06.1 unit are:

- automation and handling
- packaging and food products and
- machine tools

The BTV06.1 unit 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 BTV06 unit 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 Drives and Controls

### 3.1 Introduction

Read these instructions before the initial startup of the equipment in order to eliminate the risk of bodily harm or material damage. Follow these safety instructions at all times.

Do not attempt to install or start up 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 equipment is resold, rented or transferred or passed on to others, then these safety instructions must be delivered with the equipment.



**WARNING**

**Improper 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 material damage, bodily harm, electric shock or even death!**

### 3.2 Explanations

The safety instructions describe the following degrees of hazard seriousness in compliance with ANSI Z535. The degree of hazard seriousness informs about the consequences resulting from non-compliance with the safety instructions.

Warning symbol with signal word	Degree of hazard seriousness according to ANSI
 <b>DANGER</b>	Death or severe bodily harm will occur.
 <b>WARNING</b>	Death or severe bodily harm may occur.
 <b>CAUTION</b>	Bodily harm or material damage may occur.

Fig. 3-1: Hazard classification (according to ANSI Z535)

### 3.3 Hazards by Improper Use



**DANGER**

**High voltage and high discharge current! Danger to life or severe bodily harm by electric shock!**



**DANGER**

**Dangerous movements! Danger to life, severe bodily harm or material damage by unintentional motor movements!**



**WARNING**

**High electrical voltage due to wrong connections! Danger to life or bodily harm by electric shock!**



**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 improper handling! Bodily harm caused by crushing, shearing, cutting and mechanical shock or incorrect handling of pressurized systems!**



**CAUTION**

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

## 3.4 General Information

- Rexroth Indramat GmbH is not liable for damages resulting from failure to observe the warnings provided in this documentation.
- Read the operating, maintenance and safety instructions in your language before starting up the machine. If you find that you cannot 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.
- Only persons who are trained and qualified for the use and operation of the equipment may work on this equipment or within its proximity.
- The persons are qualified if they have sufficient knowledge of the assembly, installation and operation of the equipment as well as an understanding of all warnings and precautionary measures noted in these instructions.
- Furthermore, they must be trained, instructed and qualified to switch electrical circuits and equipment on and off in accordance with technical safety regulations, to ground them and to mark them according to the requirements of safe work practices. 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 in industrial machinery.
- The ambient conditions given in the product documentation must be observed.
- Use only safety features and applications that are clearly and explicitly approved in the Project Planning Manual.  
For example, the following areas of use are not permitted: construction cranes, elevators used for people or freight, devices and vehicles to transport people, medical applications, refinery plants, transport of hazardous goods, nuclear applications, applications sensitive to high frequency, mining, food processing, control of protection equipment (also in a machine).
- The information given in the documentation of the product with regard to the use of the delivered components contains only examples of applications and suggestions.  
The machine and installation manufacturer must
  - make sure that the delivered components are suited for his individual application and check the information given in this documentation with regard to the use of the components,
  - make sure that his application complies with the applicable safety regulations and standards and carry out the required measures, modifications and complements.
- Startup of the delivered components is only permitted once it is sure that the machine or installation in which they are installed complies with the national regulations, safety specifications and standards 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 documentation "EMC in Drive and Control Systems".  
The machine or installation manufacturer is responsible for compliance with the limiting values as prescribed in the national regulations.
- 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

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**Note:** This section refers to equipment and drive components with voltages above 50 Volts.

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Touching live parts with voltages of 50 Volts and more with bare hands or conductive tools or touching ungrounded housings can be dangerous and cause electric shock. In order to operate electrical equipment, certain parts must unavoidably have dangerous voltages applied to them.

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**DANGER**

**High electrical voltage! Danger to life, severe bodily harm by electric shock!**

- ⇒ 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 high voltage 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, even for brief measurements or tests, if the ground wire is not permanently connected to the points of the components provided for this purpose.
  - ⇒ Before working with electrical parts with voltage higher than 50 V, the equipment must be disconnected from the mains voltage or power supply. Make sure the equipment cannot be switched on again unintended.
  - ⇒ The following should be observed with electrical drive and filter components:
    - ⇒ Wait five (5) minutes after switching off power to allow capacitors to discharge before beginning to work. Measure the voltage on the capacitors before beginning to 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 (RCD) must not be used on electric drives! Indirect contact must be prevented by other means, for example, by an overcurrent protective device.
    - ⇒ Electrical components with exposed live parts and uncovered high voltage terminals must be installed in a protective housing, for example, in a control cabinet.
-

To be observed with electrical drive and filter components:



**DANGER**

**High electrical voltage on the housing!  
High leakage current! Danger to life, danger of  
injury by electric shock!**

- ⇒ Connect the electrical equipment, the housings of all electrical units and motors permanently with the safety conductor at the ground points before power is switched on. Look at the connection diagram. This is even necessary for brief tests.
- ⇒ Connect the safety conductor of the electrical equipment always permanently and firmly to the supply mains. Leakage current exceeds 3.5 mA in normal operation.
- ⇒ Use a copper conductor with at least 10 mm<sup>2</sup> cross section over its entire course for this safety conductor connection!
- ⇒ Prior to startups, even for brief tests, always connect the protective conductor or connect with ground wire. Otherwise, high voltages can occur on the housing that lead to electric shock.

## 3.6 Protection Against Electric Shock by Protective Low Voltage (PELV)

All connections and terminals with voltages between 0 and 50 Volts on Rexroth Indramat products are protective low voltages designed in accordance with international standards on electrical safety.



**WARNING**

**High electrical voltage due to wrong connections! Danger to life, bodily harm by electric shock!**

- ⇒ Only connect equipment, electrical components and cables of the protective low voltage type (PELV = Protective Extra Low Voltage) to all terminals and clamps with voltages of 0 to 50 Volts.
- ⇒ Only electrical circuits may be connected which are safely isolated against high voltage circuits. 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 of the connected motors. Some common examples are:

- improper or wrong wiring of cable connections
- incorrect operation of the equipment components
- wrong input of parameters before operation
- malfunction of sensors, encoders and monitoring devices
- defective components
- software or firmware errors

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

The monitoring in the drive components will normally be sufficient to avoid faulty operation in the connected drives. Regarding personal safety, especially the danger of bodily injury and material damage, this alone cannot be relied upon to ensure complete safety. Until the integrated monitoring functions become effective, it must be assumed in any case that faulty drive movements will occur. The extent of faulty drive movements depends upon the type of control and the state of operation.

**DANGER****Dangerous movements! Danger to life, risk of injury, severe bodily harm or material damage!**

- ⇒ Ensure personal safety by means of qualified and tested higher-level monitoring devices or measures integrated in the installation. Unintended machine motion is possible if monitoring devices are disabled, bypassed or not activated.
  - ⇒ Pay attention to unintended machine motion or other malfunction in any mode of operation.
  - ⇒ Keep free and clear of the machine's range of motion and moving parts. Possible measures to prevent people from accidentally entering the machine's range of motion:
    - use safety fences
    - use safety guards
    - use protective coverings
    - install light curtains or light barriers
  - ⇒ Fences and coverings must be strong enough to resist maximum possible momentum, especially if there is a possibility of loose parts flying off.
  - ⇒ Mount the emergency stop switch 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 starting lockout to prevent unintentional start.
  - ⇒ Make sure that the drives are brought to a safe standstill before accessing or entering the danger zone. Safe standstill can be achieved by switching off the power supply contactor or by safe mechanical locking of moving parts.
  - ⇒ Secure vertical axes against falling or dropping after switching off the motor power by, for example:
    - mechanically securing the vertical axes
    - adding an external braking/ arrester/ clamping mechanism
    - ensuring sufficient equilibration of the vertical axes
- The standard equipment motor brake or an external brake controlled directly by the drive controller are not sufficient to guarantee personal safety!

- ⇒ 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
  - ⇒ Prevent the operation of high-frequency, remote control and radio equipment near electronics circuits and supply leads. If the use of such equipment cannot be avoided, verify the system and the installation for possible malfunctions in all possible positions of normal use before initial startup. If necessary, perform a special electromagnetic compatibility (EMC) test on the installation.
- 

### 3.8 Protection Against Magnetic and Electromagnetic Fields During Operation and Mounting

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

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#### WARNING

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

- ⇒ Persons with heart pacemakers, hearing aids and metal implants are not permitted to enter the 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 heart pacemaker to enter such an area, then a doctor must be consulted prior to doing so. Heart pacemakers that are already implanted or will be implanted in the future, have a considerable variation in their electrical noise immunity. Therefore 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 housing surfaces near sources of heat! Danger of burns!
- ⇒ After switching the equipment off, wait at least ten (10) minutes to allow it to cool down before touching it.
- ⇒ Do not touch hot parts of the equipment, such as housings with integrated heat sinks and resistors. Danger of burns!

## 3.10 Protection During Handling and Mounting

Under certain conditions, incorrect handling and mounting of parts and components may cause injuries.



CAUTION

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

- ⇒ Observe general installation and safety instructions with regard to handling and mounting.
- ⇒ Use appropriate mounting and transport 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.
- ⇒ For safe protection wear appropriate protective clothing, e.g. safety glasses, safety shoes and safety gloves.
- ⇒ Never stand under suspended loads.
- ⇒ Clean up liquids from the floor immediately to prevent slipping.

## 3.11 Battery Safety

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



### **Risk of injury by incorrect handling!**

- ⇒ Do not attempt to reactivate discharged batteries by heating or other methods (danger of explosion and cauterization).
- ⇒ Never charge non-chargeable batteries (danger of leakage and explosion).
- ⇒ Never throw batteries into a fire.
- ⇒ Do not dismantle batteries.
- ⇒ Do not damage electrical components installed in the equipment.

**Note:** Be aware of 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 waste. Observe the legal requirements in the country of installation.

## 3.12 Protection Against Pressurized Systems

Certain motors and drive controllers, corresponding to the information in the respective Project Planning Manual, must be provided with pressurized media, such as compressed air, hydraulic oil, cooling fluid and cooling lubricant supplied by external systems. Incorrect handling of the supply and connections of pressurized systems can lead to injuries or accidents. In these cases, improper handling of external supply systems, supply lines or connections can cause injuries or material damage.



### **Danger of injury by incorrect handling of pressurized systems !**

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

**Note:** Environmental protection and disposal! The media used in the operation of the pressurized system equipment may not be environmentally compatible. Media that are damaging the environment must be disposed separately from normal waste. Observe the legal requirements in the country of installation.

## Notes

## 4 BTV06 Features

### 4.1 Housing, Control and Display Element

- Aluminum front panel with 39 keys
- 240 x 128 pixel high-contrast graphical LC display with CFL back lighting and dark mode
- Impact-resistant ergonomic IP65-rated housing
- Plug-in connecting cable
- 7 machine control keys with LEDs, insert strips for customized labeling

### 4.2 Hardware Features

- Series 68000 microcontroller
- 1 MByte flash memory
- 512 KByte RAM
- Two potential-free, fully connected Indramat standard interfaces; both with RS232 and RS422/485
- 10 x 24 V inputs, 11 x 24 V outputs for external wiring





## 5 Technical Data

### 5.1 General Technical Data

<b>BTV06 base unit</b>	
Power supply	24 V (18...30 V) DC
Current consumption	max. 650 mA
Display	LCD 240 x 128 pixels, black-and-white, full graphical capability, CFL back lighting visible area 124 x 70 mm
Keypad	Polyester foil with 39 keys, 7 inscribable
Front panel material	Aluminum varnished, polyester foil which is let in holohedrally and resistant to chemicals
Protection category	IP 65 (front); IP20 (housing)
Weight	approximately 1.7 kg
Dimensions (WxHxD)	318 x 200 x 53 mm
Color	light gray (RAL7035)
24 V inputs	$U_{IN}$ = typ. 18-30 V potential-free $I_{IN}$ = min. 7 mA
24 V outputs	$U_{OUT}$ = typ. 18-30 V potential-free $I_{OUT}$ = typ. 200 mA

Fig. 5-1: General technical data

### 5.2 Ambient Conditions

	<b>During operation</b>	<b>During storage/transport</b>
Maximum ambient temperature	+5 °C ... +45 °C	-20 °C ... +60 °C
Maximum temperature gradient	10 K/h	15 K/h
Relative humidity	75% average, 80% occasional	no condensation, DIN 40 040 class F
Air pressure	860 ... 1060 hPa, 1500m	12000 m
Max. vibration	5-55 Hz +/-0,075 mm sinus 3 axis 55-500 Hz 1 g sinus 3 axis (according to norm EN60068-2-6)	
Max. shock	15 g 11 ms (half sinus)	

Fig. 5-2: BTV06 - ambient conditions



## 6 Housing Dimensions

### 6.1 Outside Dimensions

#### Front View

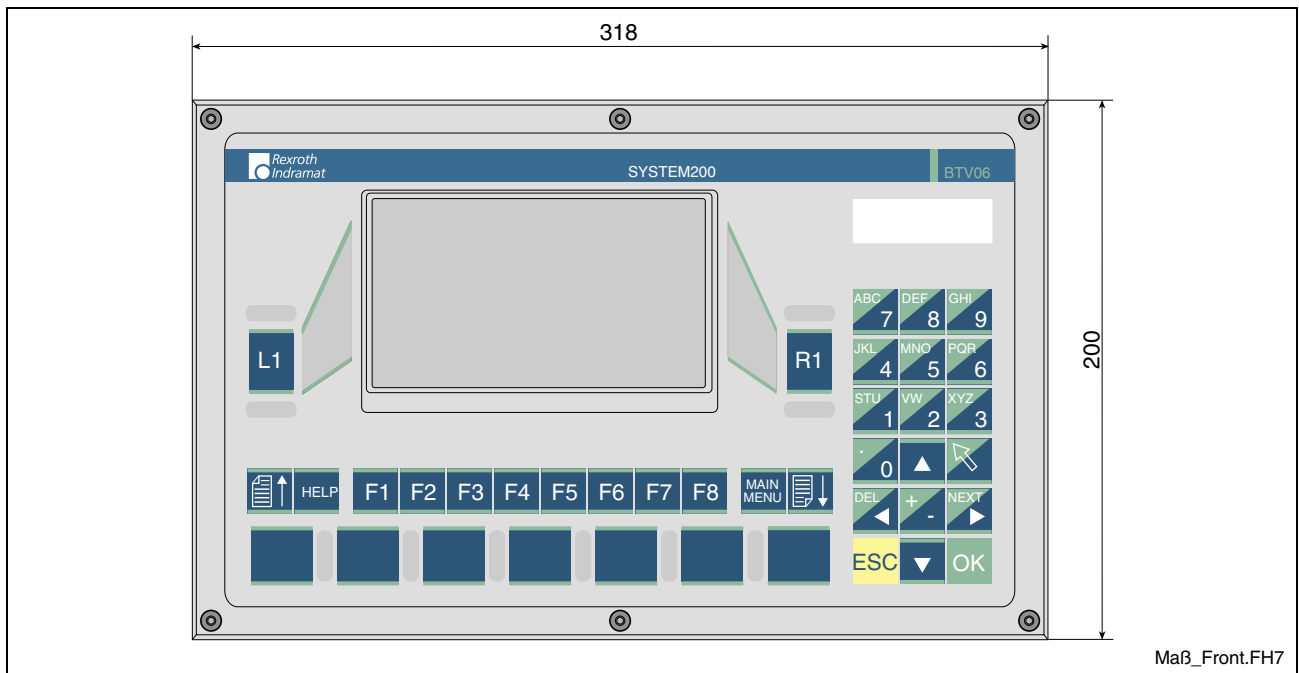


Fig. 6-1: Front panel dimensions

#### Rear View

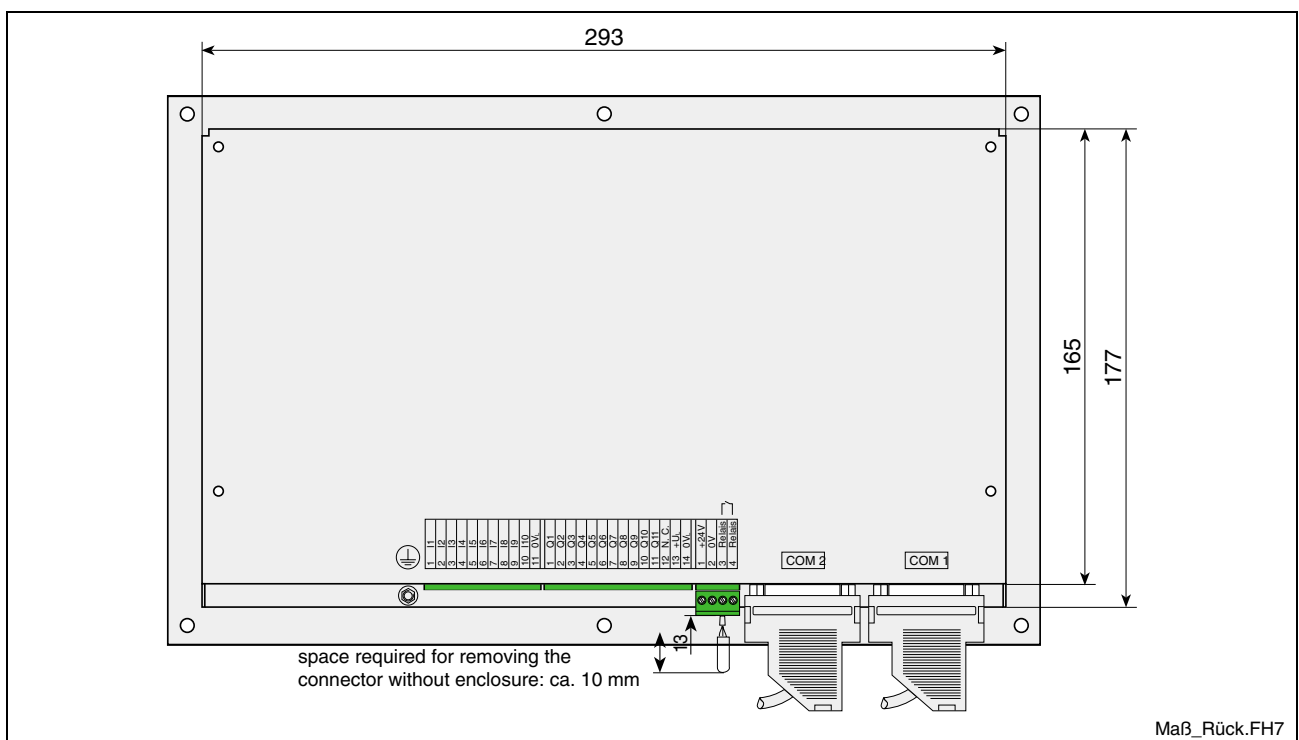


Fig. 6-2: Rear view dimensions

## Side View

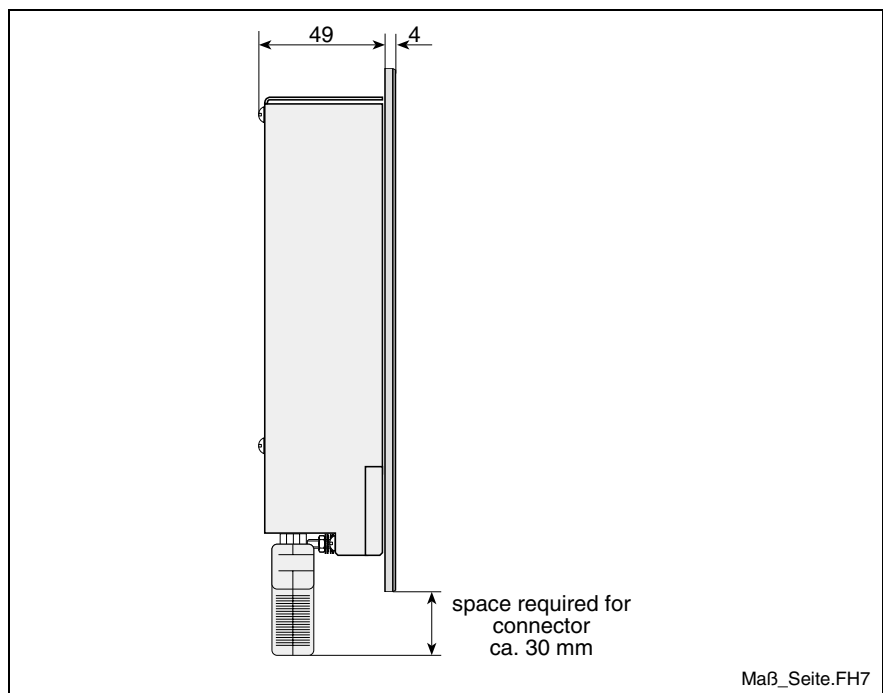


Fig. 6-3: Side view dimensions

## 6.2 Mounting Dimensions

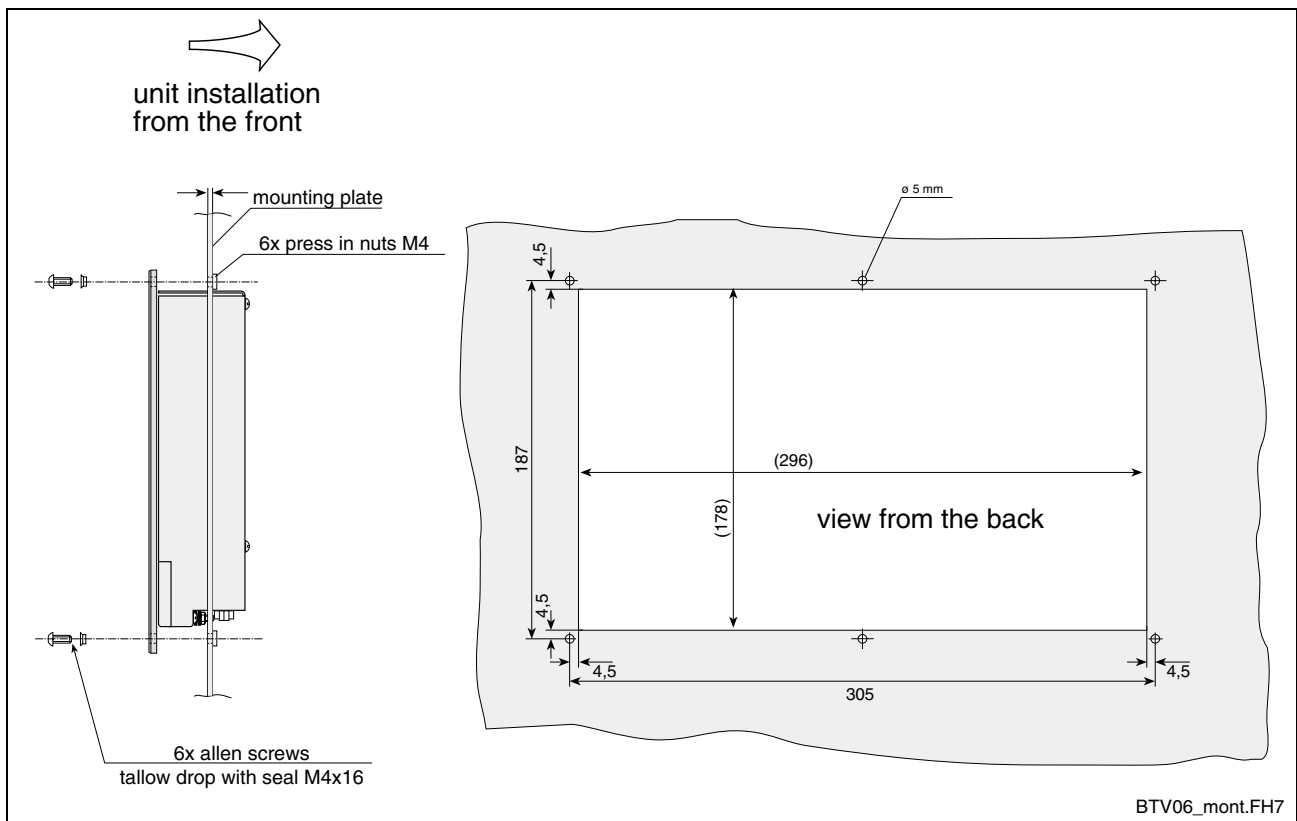


Fig. 6-4: Panel cutout

## 7 Connections

### 7.1 Connector Pin Assignments

#### Connector Locations

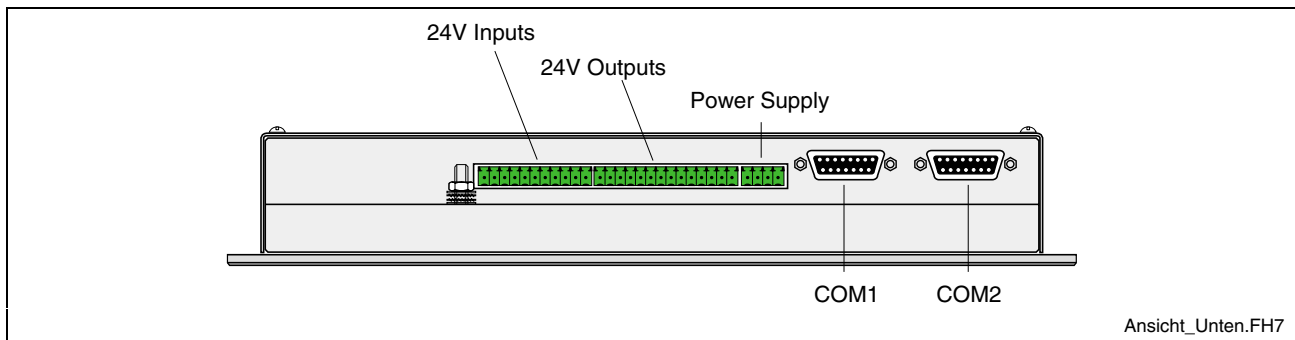


Fig. 7-1: Connector Locations

#### Power Supply

Pin	Signal name
1	24 V
2	0 V
3 + 4	Potential-free relay contact, load capacity 30 V, 1 A

Fig. 7-2: Connector pin assignments of power supply

#### Indramat COM1 and COM2 standard interfaces

Pin	Signal name	
1	Shield PE	
2	RS232 TxD	
3	RS232 RxD	
4	RS422 RxD+	RS485+
5	RS422 RxD-	RS485-
6	N.C.	
7	Signal Ground	
8	N.C.	
9	RS422 TxD+	
10	GND	
11	RS422 TxD-	
12	+ 5 V	
13	RS232 RTS	
14	RS232 CTS	
15	N.C.	

Fig. 7-3: COM1 and COM2 connector pin assignments

## 24 V Inputs and Outputs

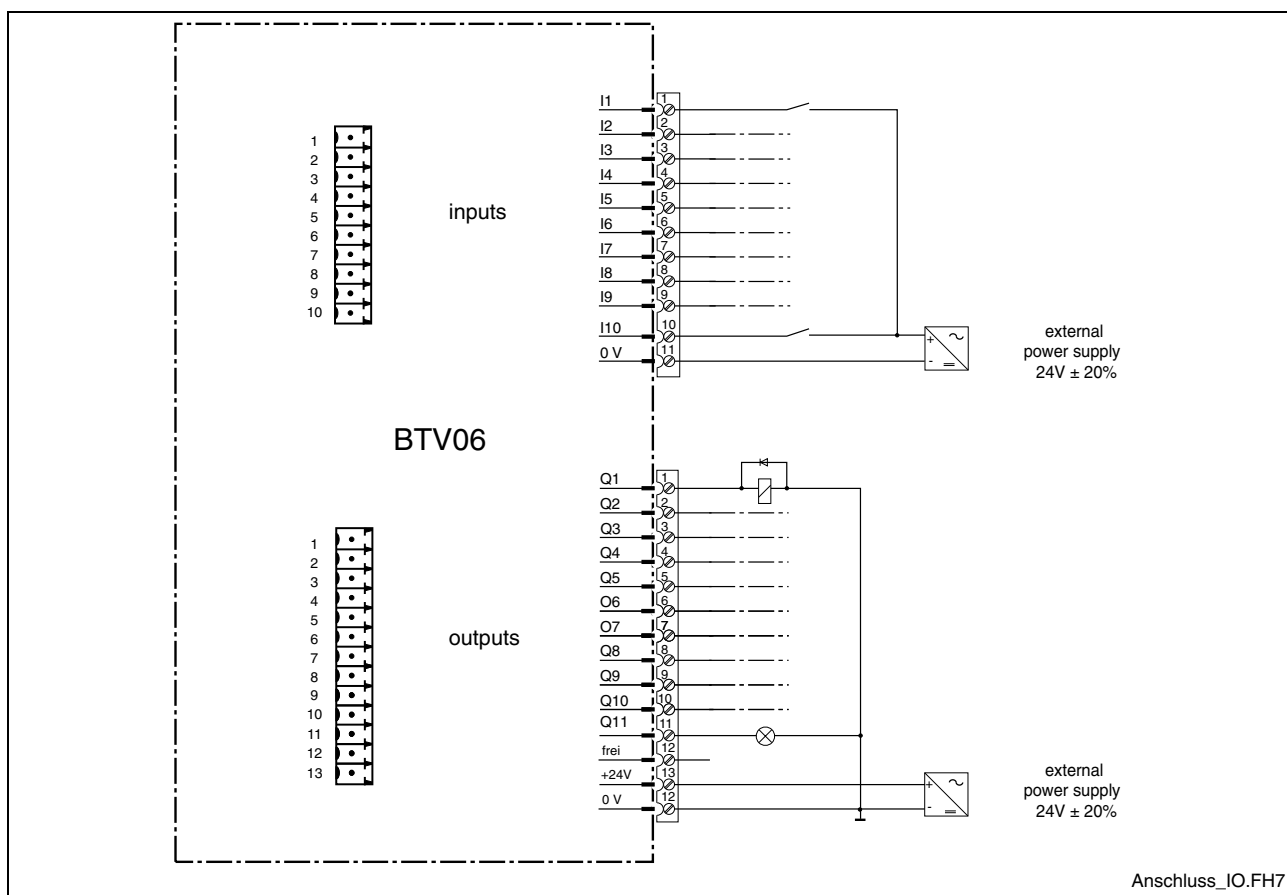


Fig. 7-4: Connection possibility of the 24 V inputs and outputs

Pin	Signal name
1	I 1
3	I 3
5	I 5
7	I 7
9	I 9
11	0 V

Fig. 7-5: Inputs 24 V

Pin	Signal name
2	I 2
4	I 4
6	I 6
8	I 8
10	I 10

Pin	Signal name
1	Q 1
3	Q 3
5	Q 5
7	Q 7
9	Q 9
11	Q 11
13	+U <sub>L</sub>

Fig. 7-6: Outputs 24 V

Pin	Signal name
2	Q 2
4	Q 4
6	Q 6
8	Q 8
10	Q 10
12	N.C.
14	0 V

Note: 24 V inputs and outputs are isolated.

## 7.2 Typical Applications

### Connection to MTC200-P / MTA200-P / ISP200-P

#### RS422 on X40 and X41 (MTS-P01.1)

One BTV on an interface

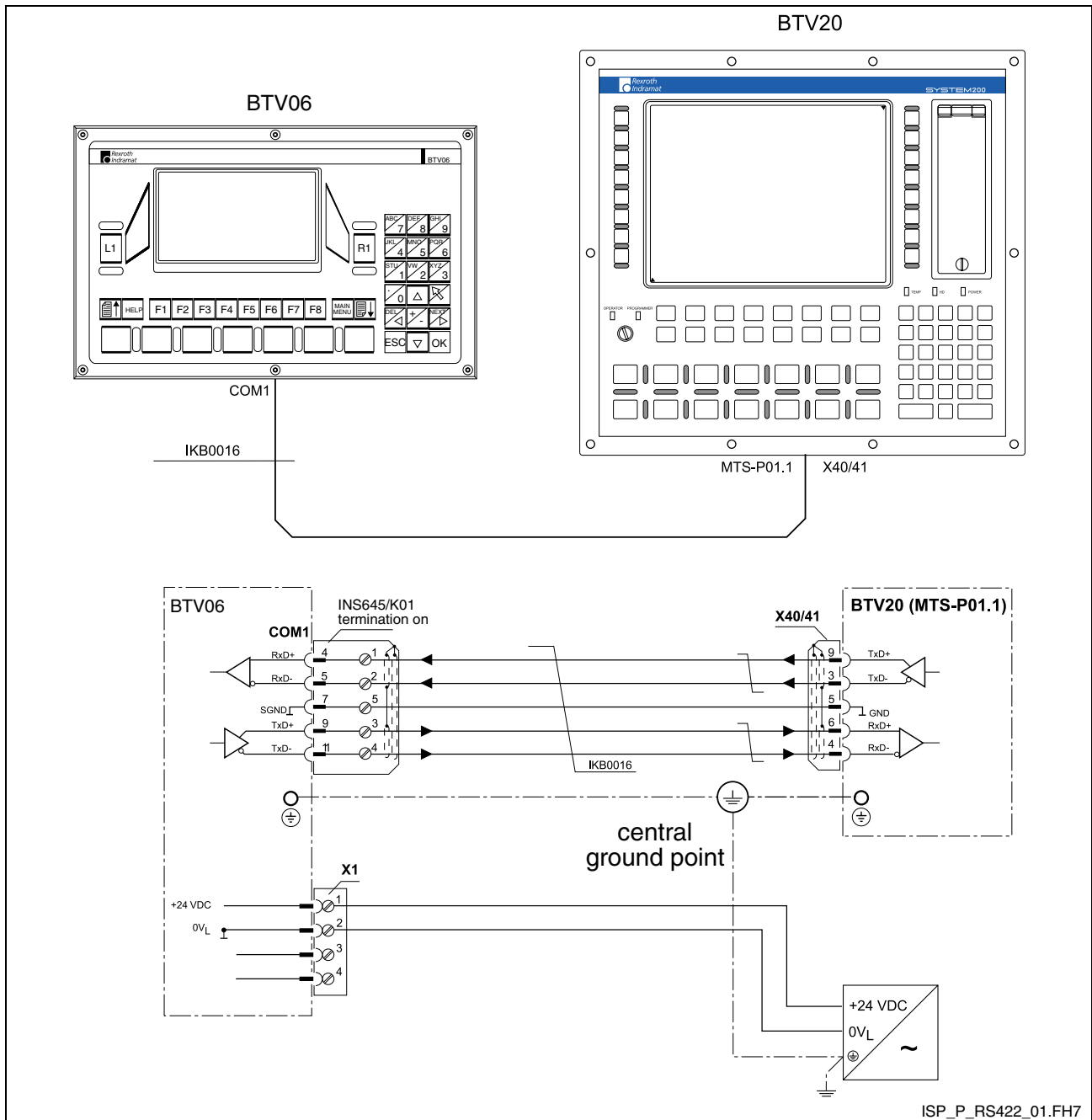


Fig. 7-7: Connecting to the MTS-P01.1 of the BTV20 (RS422)

**RS422 on X16 (MTS-P01.2)**

One BTv on an interface

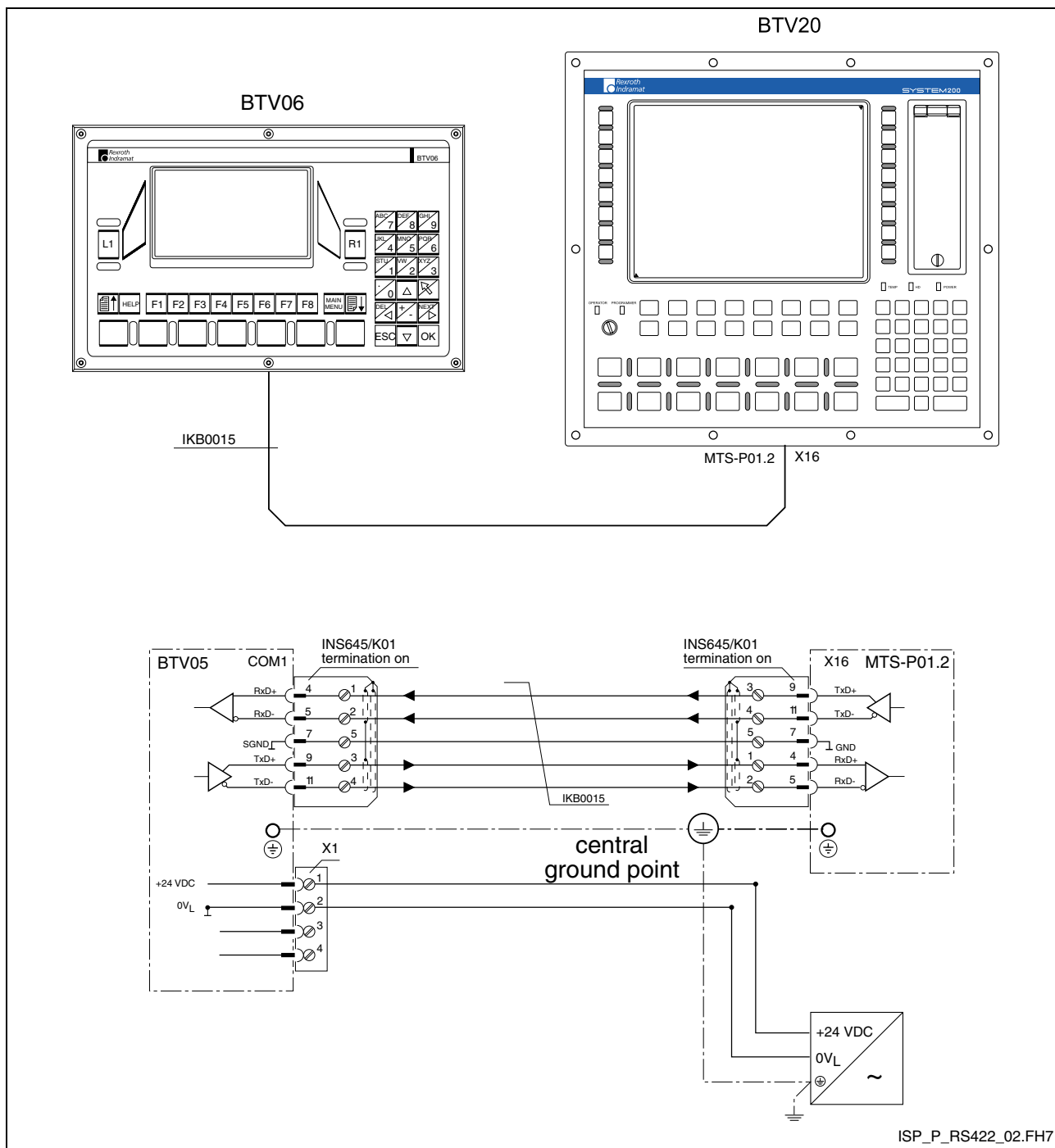


Fig. 7-8: Connecting to the MTS-P01.2 of the BTv20 (RS422)



## RS485 on X40 and X41 (MTS-P01.1)

Max. two BTV's on an interface

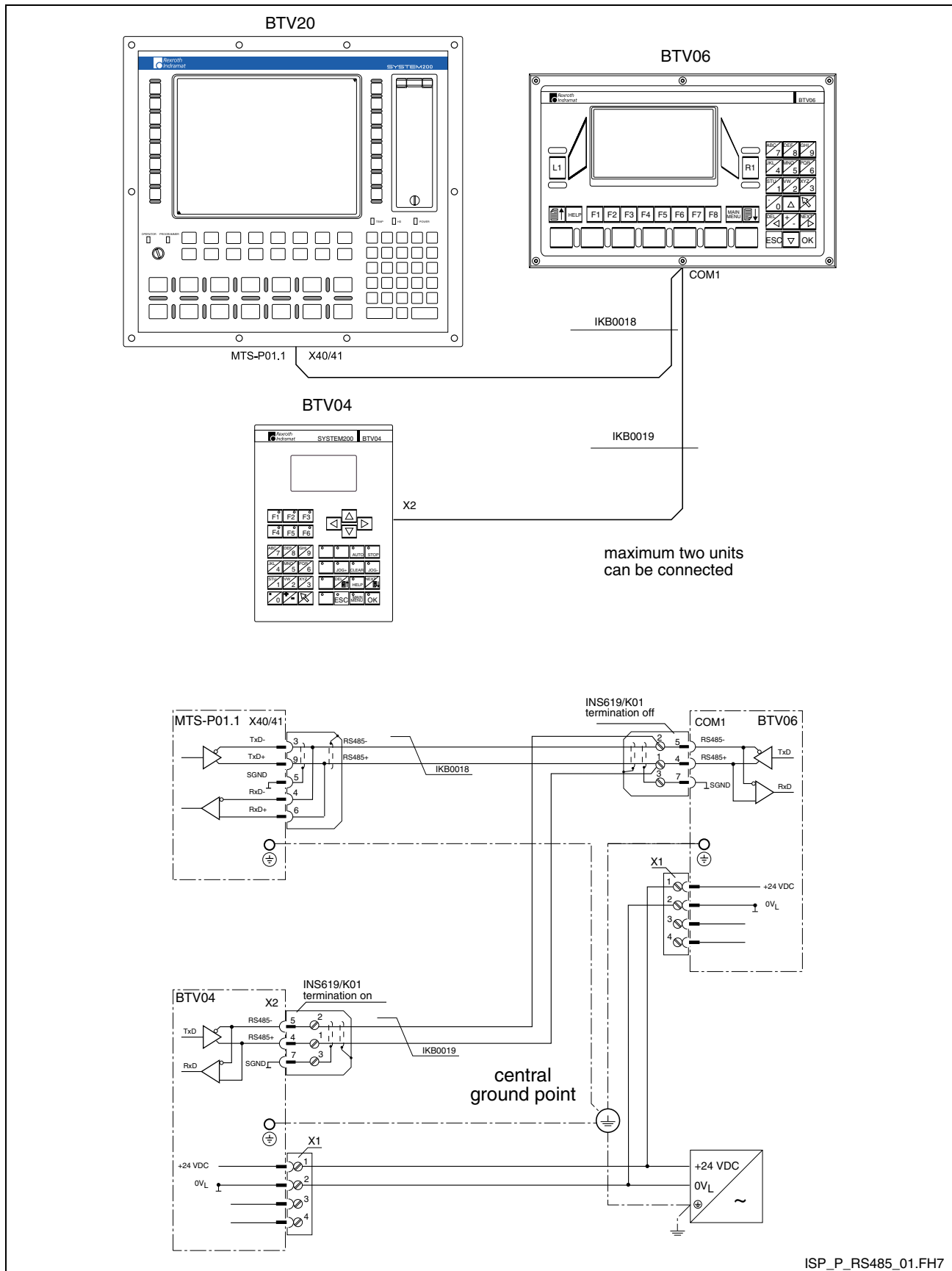


Fig. 7-9: Connecting to the MTS-P01.1 of the BTV20 (RS485)

**RS485 on X16 (MTS-P01.2)**

Max. two BTV's on an interface

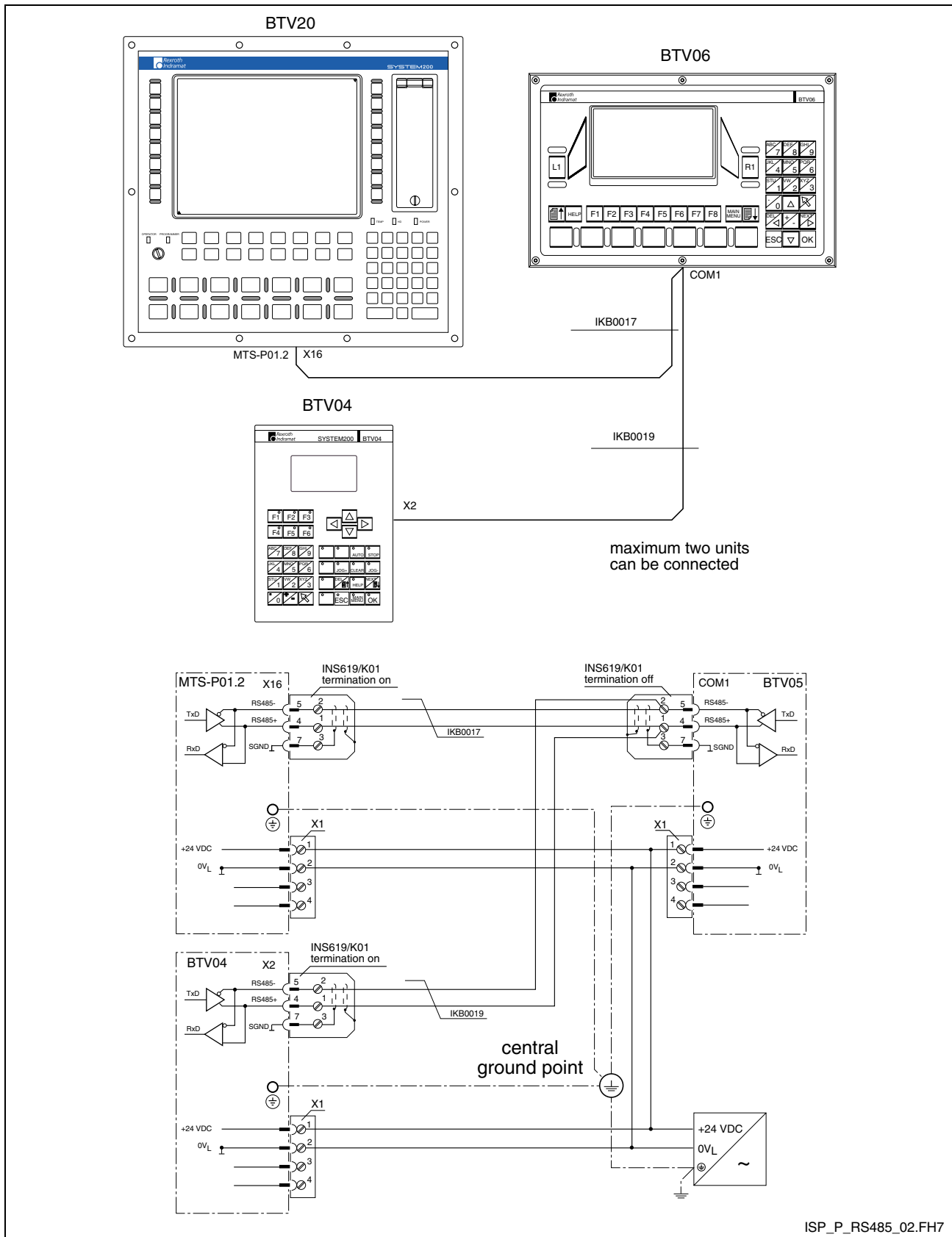


Fig. 7-10: Connecting to the MTS-P01.2 of the BTV20 (RS485)

# Connection to MTC200-R / ISP200-R

## RS422

One BTV on an interface

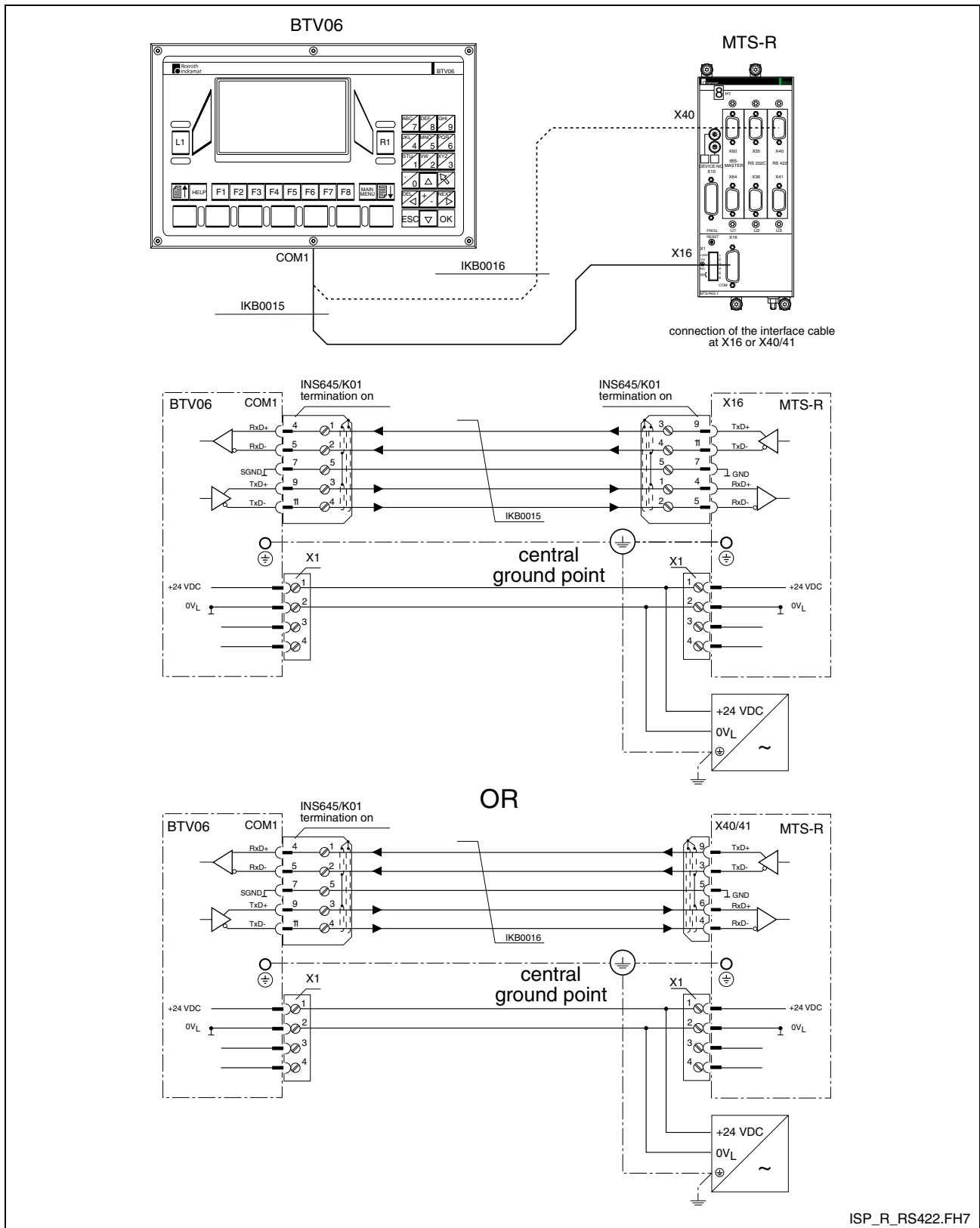


Fig. 7-11: Connecting to the MTS-R (RS422)

## RS485 on X16

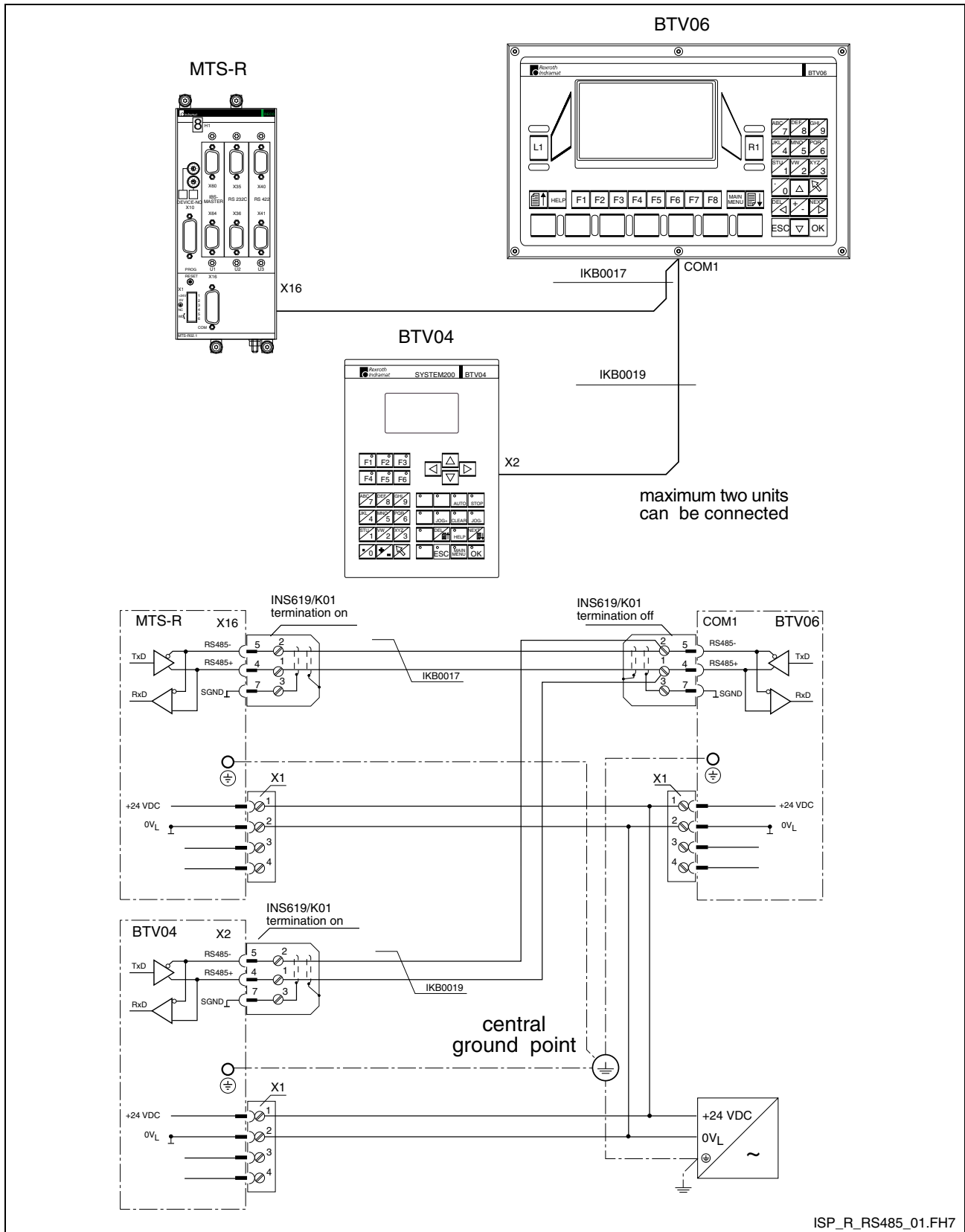


Fig. 7-12: Connecting to the MTS-R (RS485 on X16)

## RS485 on X40 and X41

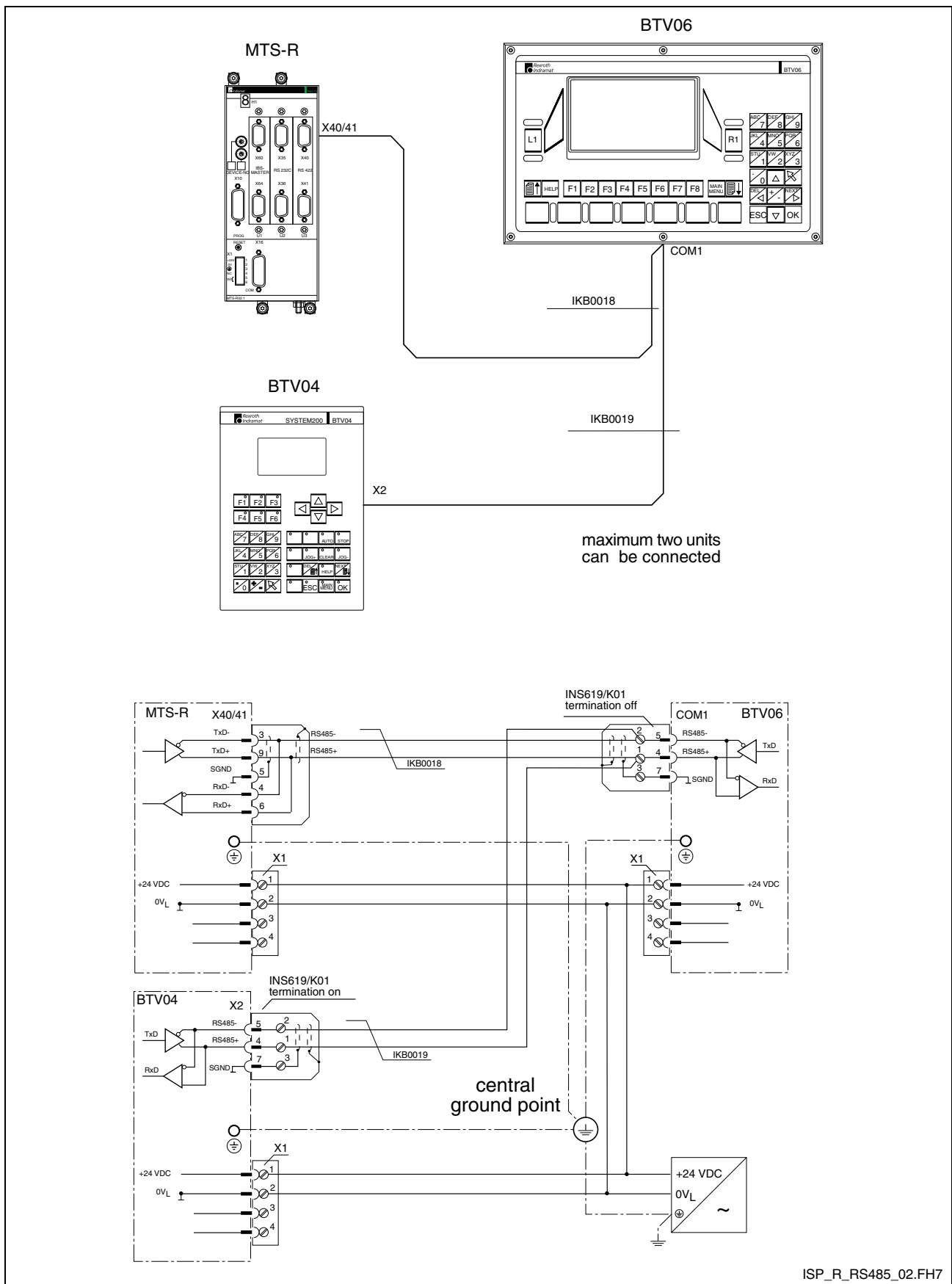


Fig. 7-13: Connecting to the MTS-R (RS485 on X40/41)

## Connection to CLC-D

One BTV on a Bus

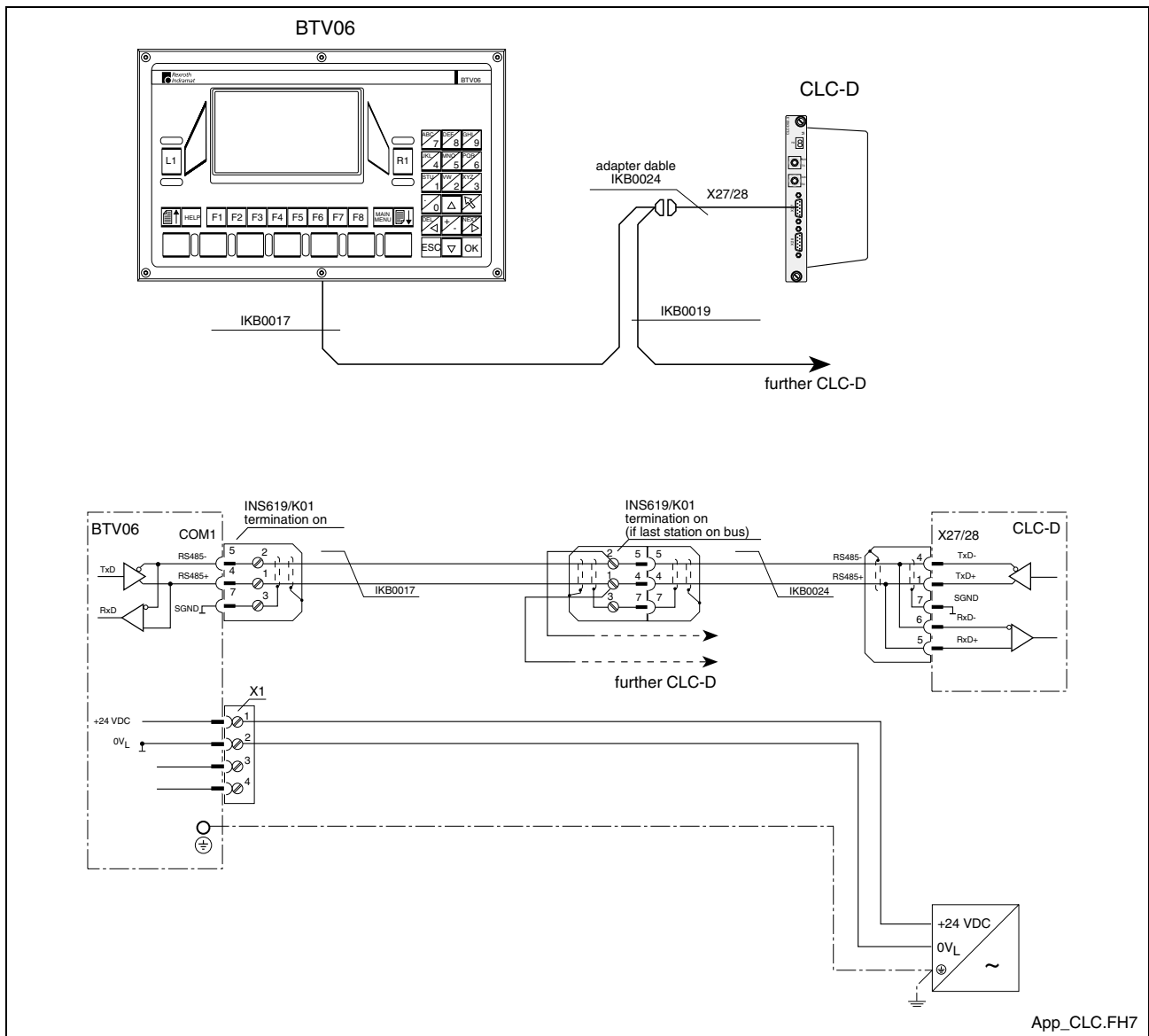


Fig. 7-14: Connecting to the CLC-D

## Connection to Ecodrive3 / ELC

One BTV on a Bus

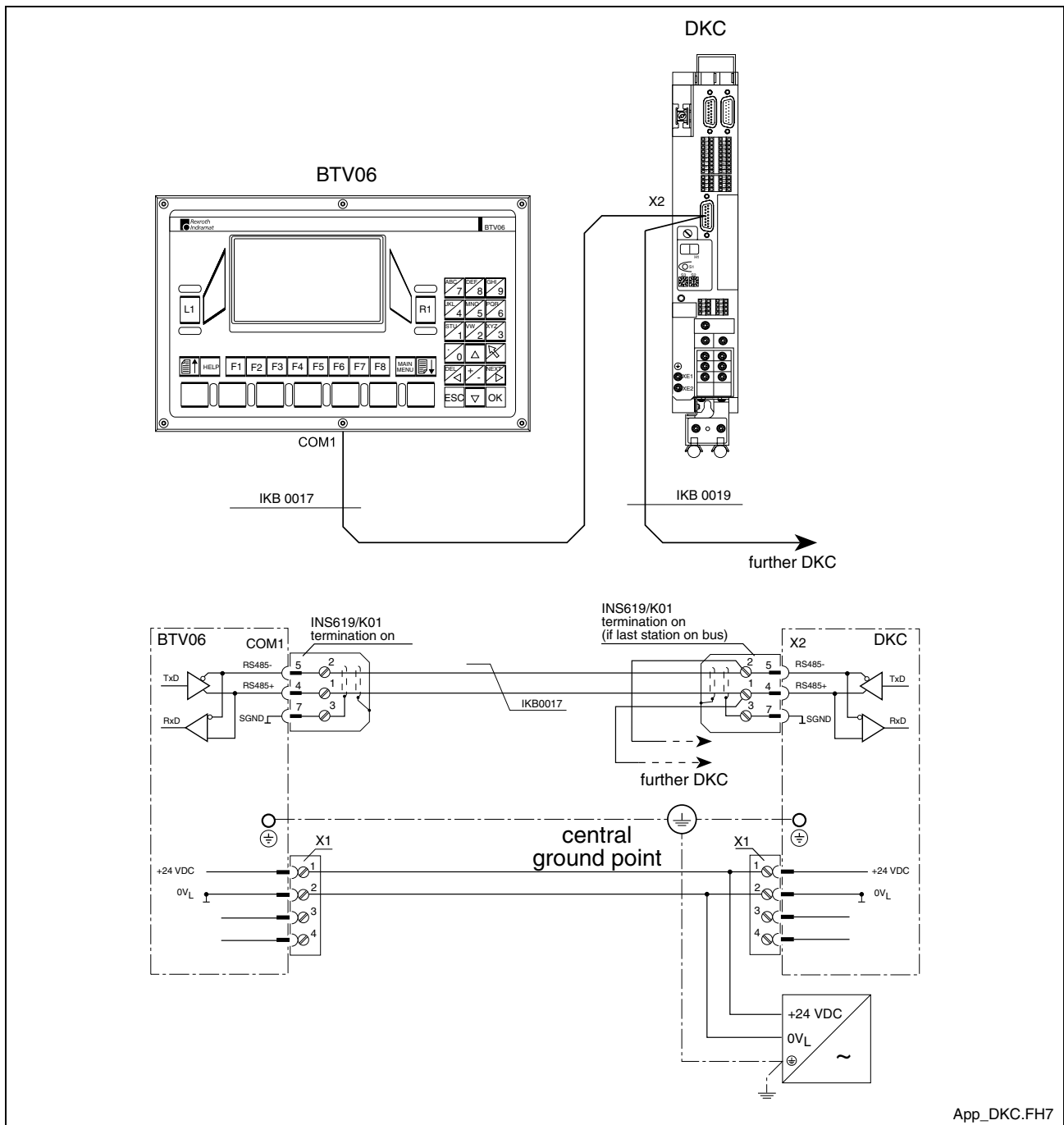


Fig. 7-15: Connecting to the Ecodrive3 (DKC) and ELC

## Connection to PPC-R

### RS485

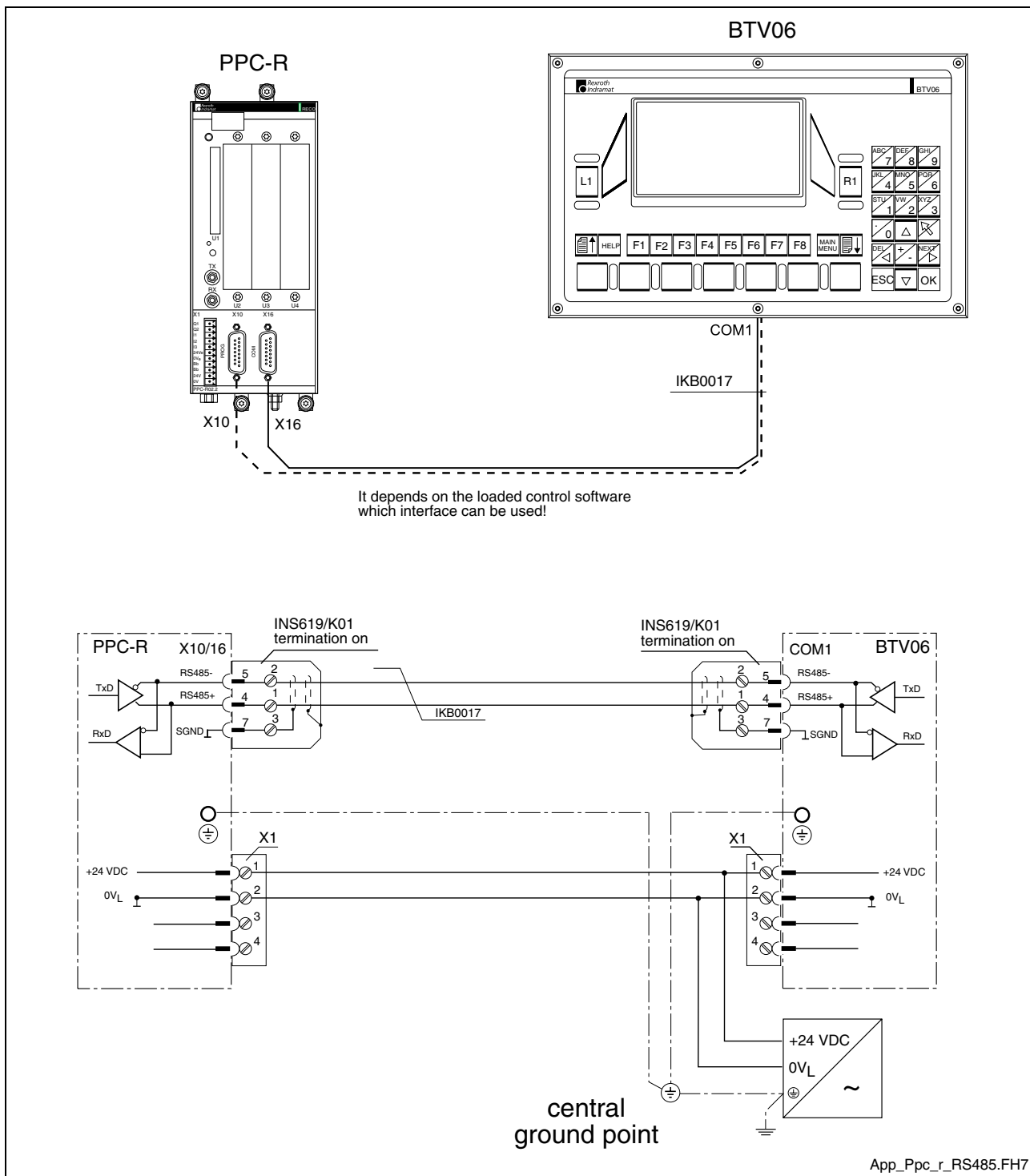


Fig. 7-16: Connecting to the PPC-R (RS485)



# RS422

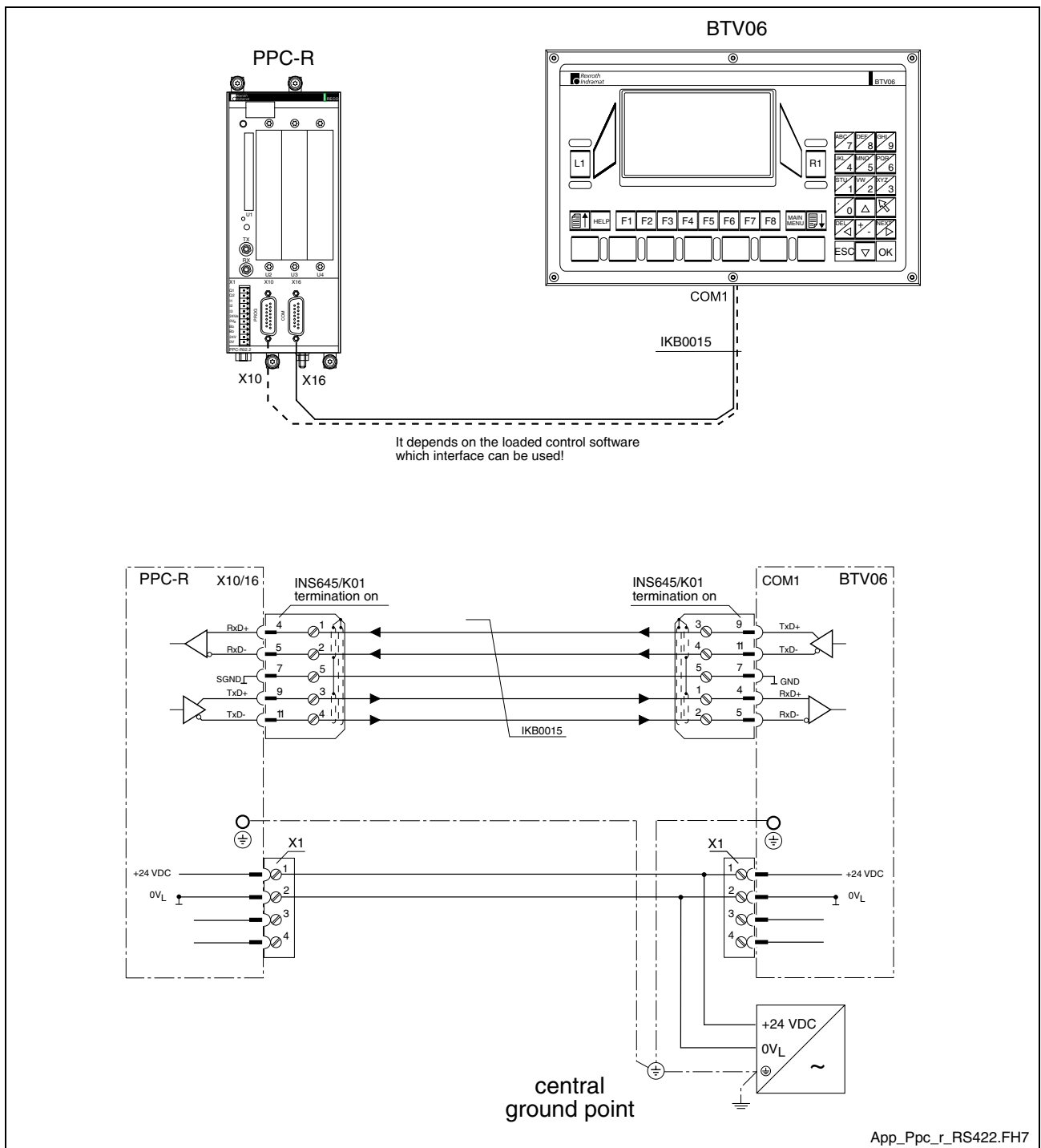


Fig. 7-17: Connecting to the PPC-R (RS422)

## Connection to DLC

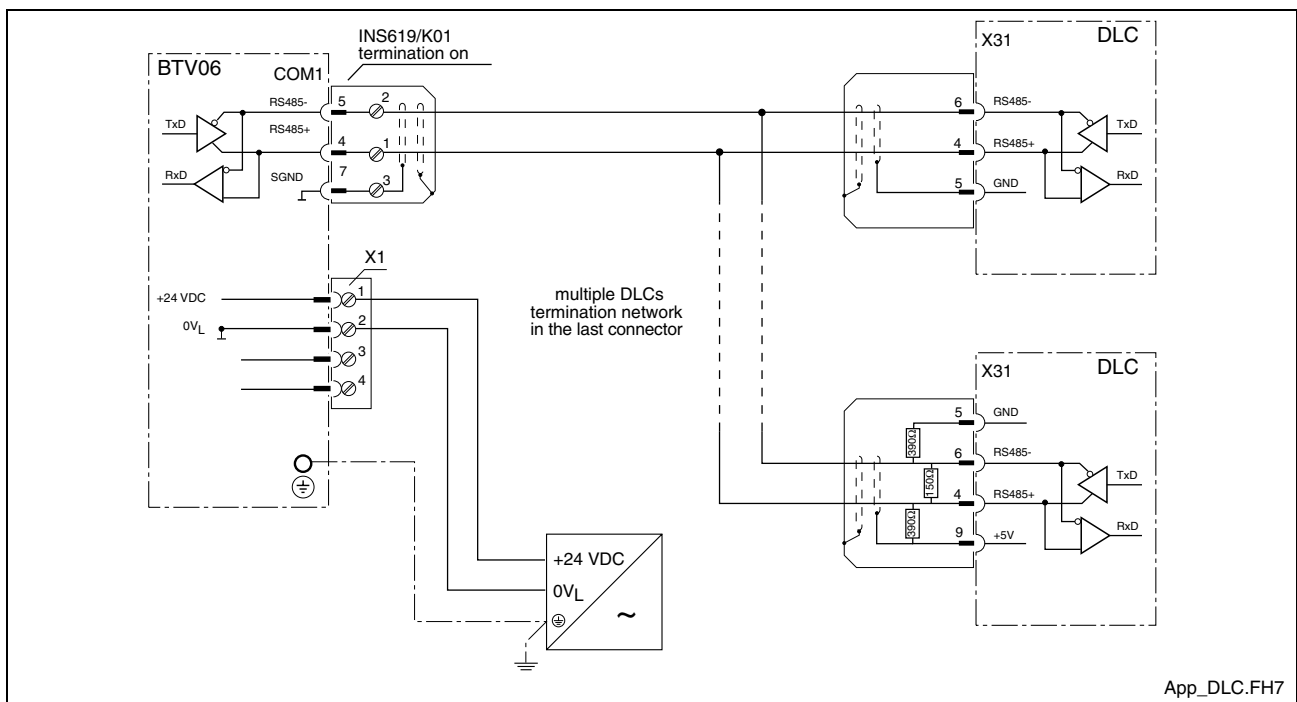


Fig. 7-18: Connecting to the DLC

## Standard interface connectors

For the communication with RS422 and RS485 interfaces there are connectors with integrated termination resistors available. The cable can be mounted with a screw terminal. The figure below shows the connector pin assignments of the both connectors.

In the chapter 9.2 (Accessories) you find a table with interface cables and connectors.

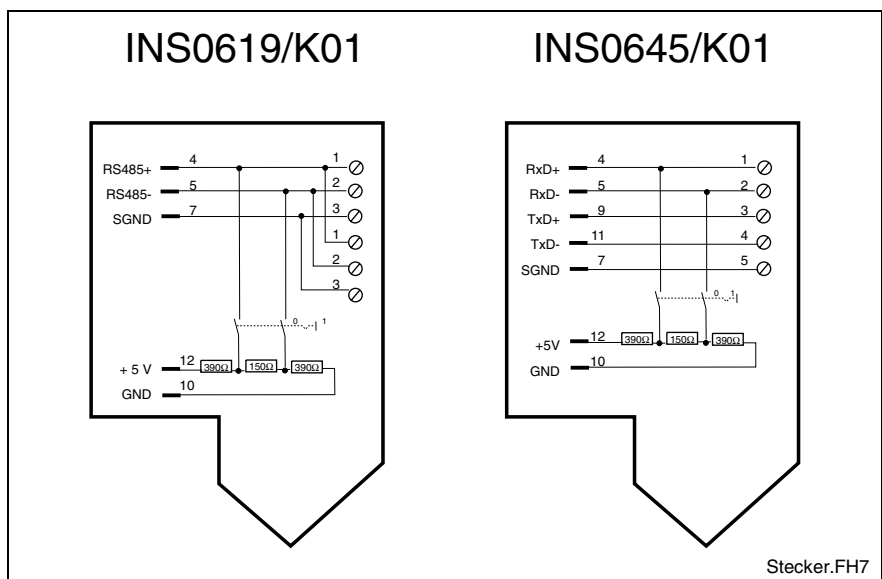


Fig. 7-19: Connector pin assignments of the confection interface connectors

The termination is turn on by the switch.

## 8 Commissioning

After the unit has been switched on for the first time, the firmware that comes with the unit on floppy disks must be loaded into the unit. To do this, you must connect the unit to a PC via the RS232 cable IKB0012.

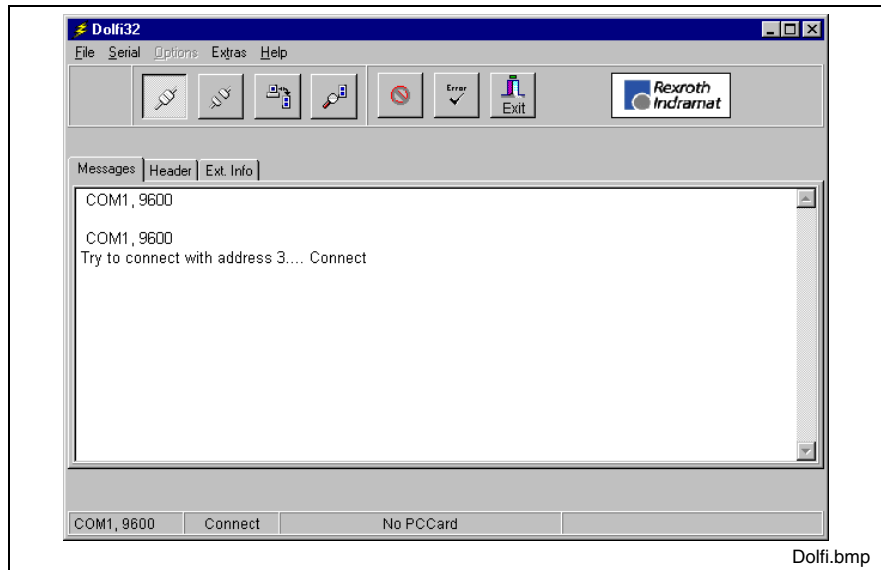


Fig. 8-1: INDRAMAT Flashtool "Dolfi"

### 8.1 Brief Description of the First-Time Commissioning Procedure

#### What do you need?

To put the unit into operation, you need the following items:

- (1) An operational BTV06 unit that is connected with the system that shall be controlled, and is fed with the 24 V operating voltage.
- (2) The PC connecting cable IKB0012
- (3) The application software for the BTV06 unit on floppy disk.
- (4) A PC with Windows 3.11 or a 32-Bit Windows (e.g. 95, 98 or NT) and the INDRAMAT flash loading tool "Dolfi" installed (included in the scope of delivery of the BTV06 application software).

#### What is to be done?

To load the software, use the following procedure:

- (1) Connect the BTV06 unit with a PC via the PC connecting cable.
- (2) Provide the BTV06 unit with power (switch on the control voltage).
- (3) Start Flashtool Dolfi on the PC and click on the "Messages" field there.
- (4) Select the menu item "Options - COM-Port":
  - Select the COM port
  - Select a baud rate of 9600 bits/s (default value)
  - Set the download baud rate to 38,400 bits/s
  - Address for receiver = 03 (default)
- (5) Select the menu item "Serial - Connect".

- (6) Select the menu item "Serial - Send". Use the "Open" dialog to select the required software.
- (7) **In the case of a software update, you should always make a backup copy of the software that is contained in the unit. To do this, select the option "Backup" from the subsequent "Send" dialog. To confirm the two subsequent dialogs, click on "Save" and "OK".** This starts the backup process. Its progress is shown by a moving bar at the bottom margin. To start the download process proper, you must again select the "Serial - Send" menu item and choose the software.
- (8) Click on "Send" to confirm the "Send" dialog. This starts the download process. Its progress is shown by a moving bar at the bottom margin.
- (9) Once the download has successfully been completed, Dolfi issues the message "Programming all modules successfully, restart with Serial - Disconnect".
- (10) The "Serial - Disconnect" menu item clears down the connection BTV06 - PC and starts the application software in the BTV06 unit for the first time.

The loaded software will now always be started automatically when the BTV06 supply voltage is applied.

## 8.2 Functions of the BTV06 Bootloader

### Procedures After Power-Up

First of all, the Indramat logo appears on the screen, and all 7 LEDs of the BTV06 unit are ON.

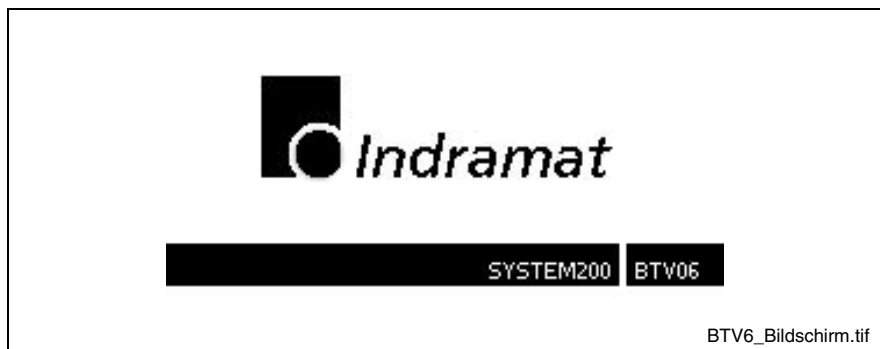


Fig. 8-2: Screen after power-on

The bootloader searches the flash memory for existing software. This process is commented by the footer line „test program CRC“. The search is performed by interrogating the program header and verifying the CRC checksums. A header is a program element that contains information about the employed hardware and firmware. If, for example, firmware has not yet been loaded when first-time commissioning is started, or if the memory content is corrupted, only the bootloader itself will be recognized. The message "dolphi loader active" is displayed in this case and the unit is immediately ready for receiving software from the PC.

**Hinweis:** Once a valid software has been loaded, the LEDs are extinguished one by one and the software is started. Up to this point in time you can still press and release the F1 key to abort the software startup and to remain in the Dolphi Loader. The display then shows the versions of bootloader and loaded software (service mode).

## 8.3 Dolfi Functions

The Dolfi user interface is used for loading the delivered software via the RS232 interface of the BTV06 unit into the unit. Please refer to the documentation that comes with the Dolfi product for a detailed description of the Dolfi functions.

### Messages from Dolfi

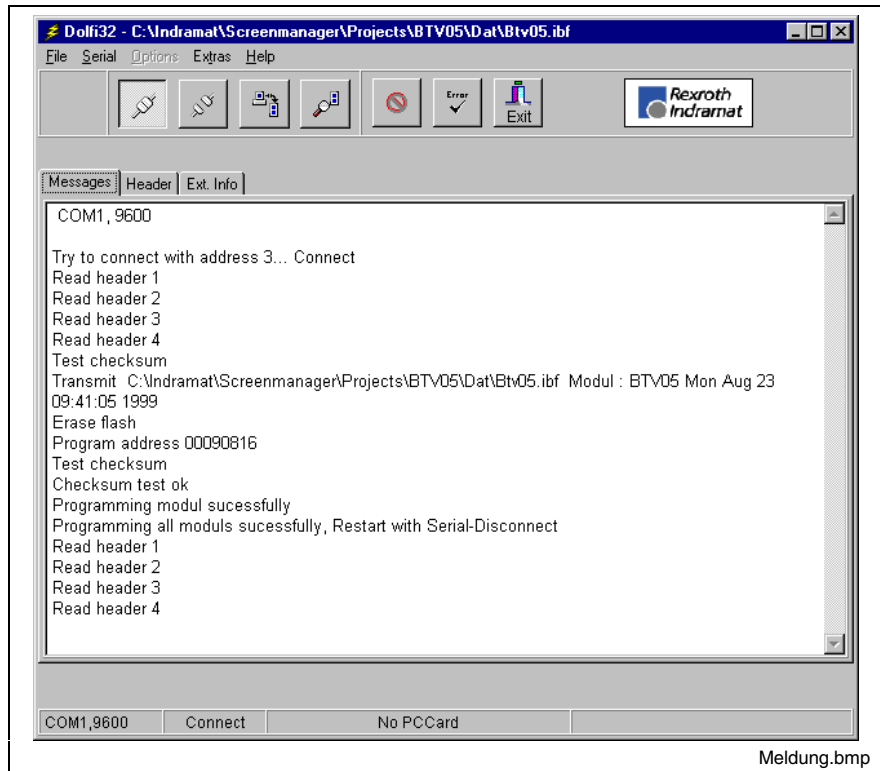


Fig. 8-3: INDRAMAT Flash tool "Dolfi"

Dolfi permits one out of three main windows to be selected: Messages Header and Extended Informations. Messages informs about the currently running operations and issues error messages (if there are any). The Header button displays information about the software loaded into the BTV unit and the contained bootloader.

## Header Information

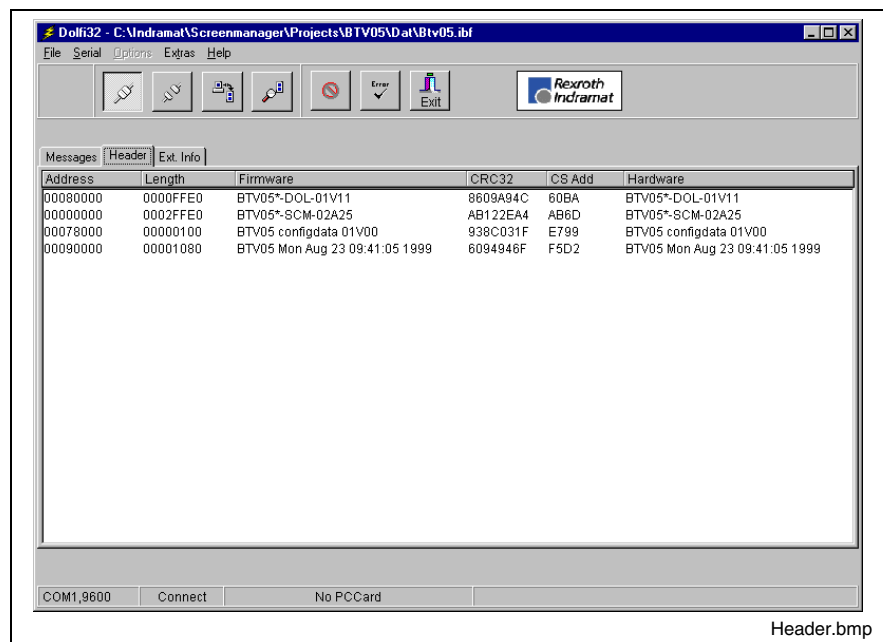


Fig. 8-4: Header list with four modules

After the connection has been established and the Option "Serial - Firmwareinfo" has been selected, the "Header" menu item shows the software and data modules that have been located in the BTV06 unit. Addresses, lengths, and hardware and software names are specified here at the same time.

## Interface Settings

To establish communications, the serial COM2 interface of the unit is connected with a PC via the RS232 cable IKB0012. In addition, the matching selections for data transfer must be made. The „Options“ menu item permits the employed interface, the baud rate, the addresses, and the required language to be selected. The figure below shows the compatible settings for the BTV06 unit.

The standard baud rate for establishing the connection is always 9600 bits/s. For the BTV06 unit, the increased baud rate for the download is usually 38,400 bits/s.

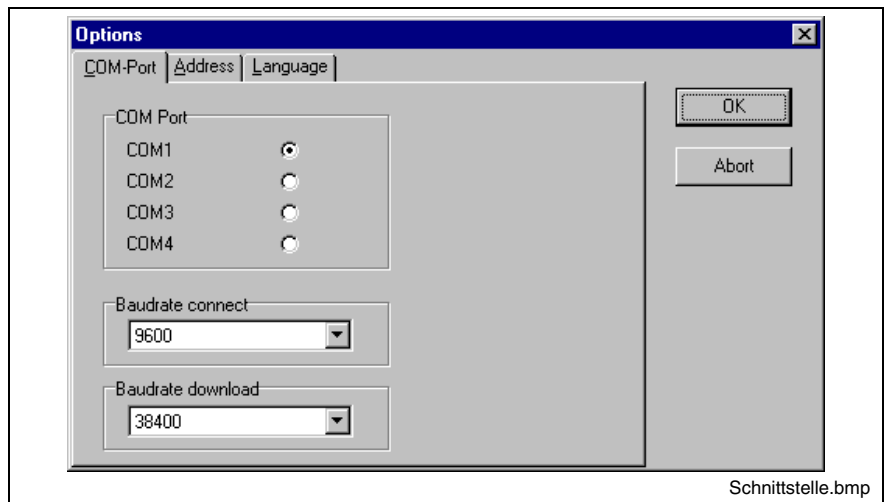


Fig. 8-5: Interface settings

With the BTV06 unit, the address selection is always receiver = 03 (default).

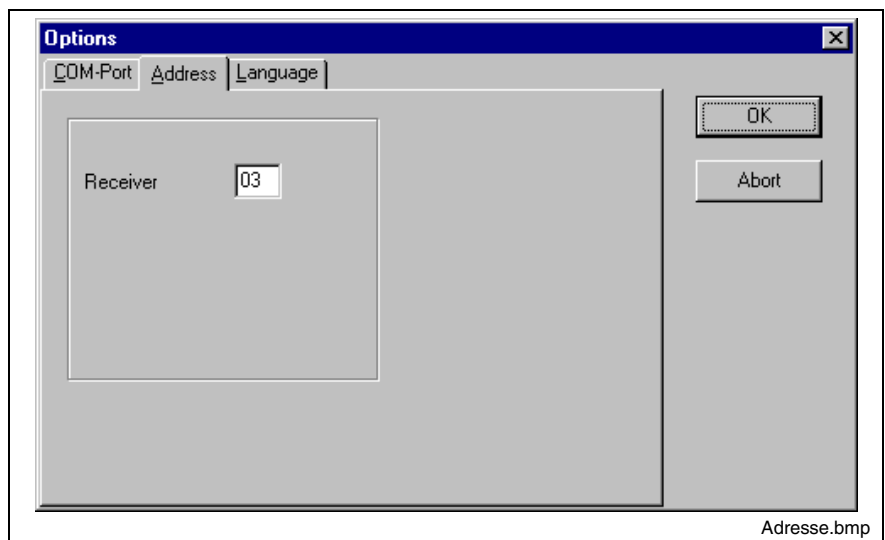


Fig. 8-6: Address selection

## Reading Software from the BTV06 unit

The "Serial - Send" menu item starts a firmware loading process. A window is opened in which Dolfi enables the user to compare a previously loaded software with the new one. While "File info" shows the information about the selected file, "Module info" shows the information about the firmware found in the BTV06 unit. With the option "Backup" the file will be read out of the unit.

**Note:** This is the last opportunity of saving the software that is contained in the unit before a new software is downloaded from the PC. This must be done before a new software update is loaded.

This is the only possibility of loading the old file back into the unit if the new software does not work properly. The read file has automatically the extension '.BAK' assigned.

## Loading Software

The "Serial - Send" menu item starts the firmware loading process. The software transfer begins when you select the "Send" option.

If the software that is displayed here is not the one you wish to load, abort the process and use "File/Open" to select and confirm the required IBF file. A window "FWA" is displayed now that contains information about the firmware. It is now possible to download the selected file. For this you must select the option "Send".

---

**Note:** If you wish to reload a saved file, you must select the file type 'All \*.\*' to make this extension visible. After a read process, you must start the download again via the corresponding icon.

---

The progress of the transfer is shown by the moving bar with percent indication at the lower screen margin and in the message window. The BTV06 unit shows a corresponding status information in the bottom screen line.

During the load process, the required area in the flash is cleared first, before the program is written to it. Once loading is completed, a CRC and addition checksum is verified. Dolfi shows the status of the transfer on the screen.

The "Disconnect" icon interrupts the connection between PC and BTV06 and starts the firmware in the unit.

## 8.4 Connecting Cable IKB0012

The connecting cable IKB0012 make a RS232 communication between the BTV06 and a PC. The cable is used to load a software in the BTV06 by the download tool Dolfi.

### Cable plan of the IKB0012

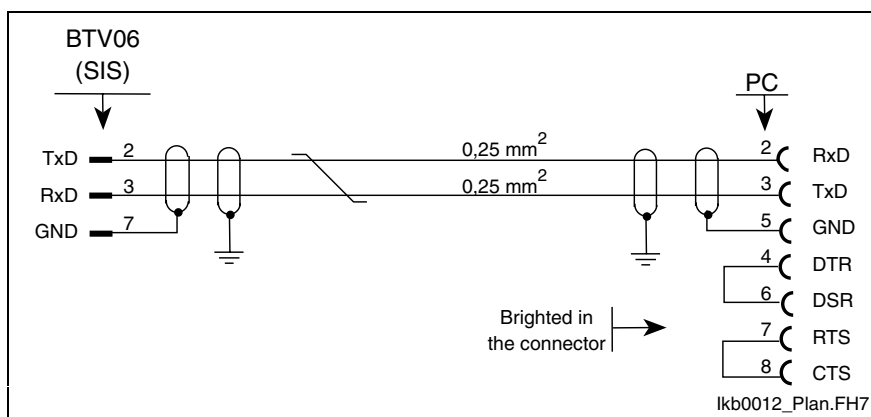


Fig. 8-7: Cable plan of the IKB0012



# 9 Ordering Information

## 9.1 BTV06 Type Code

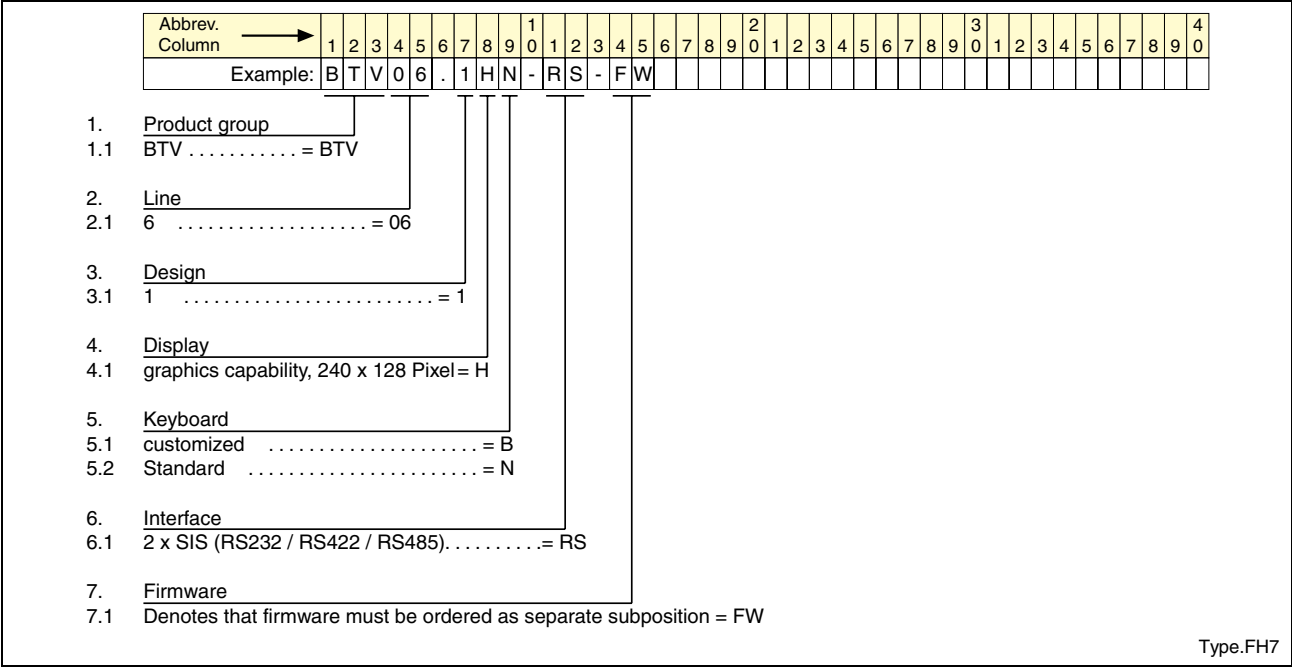
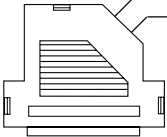
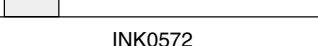
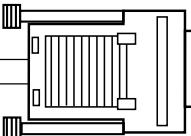
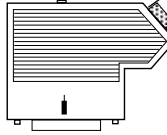
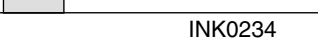
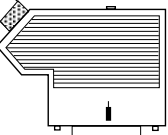
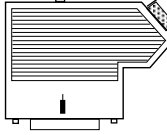

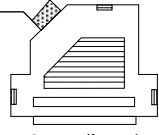
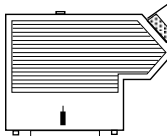

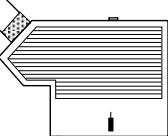
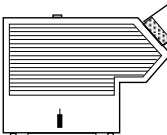
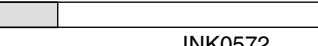
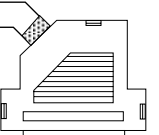
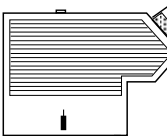
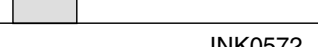
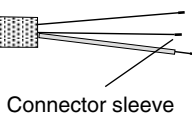
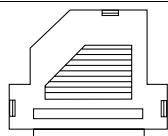


Fig. 9-1: BTV06 type code

## 9.2 Accessories

### List of Connectors and Cable Sets

Order number of finished cable	Mating connector of the unit	INDRAMAT cable	Cable end
<b>IKB0012/000,0</b> MN: 281 715 (RS232, max 10m)	 15-way/male		 9-way/female
<b>IKB0015/000,0</b> MN: 282 870 (RS422, max 400m)	 15-way/male		 15-way/male
<b>IKB0016/000,0</b> MN: 282 871 (RS422, max 400m)	 15-way/male		 9-way/female
<b>IKB0017/000,0</b> MN: 282 872 (RS485, max 400m)	 15-way/male		 15-way/male
<b>IKB0018/000,0</b> MN: 282 874 (RS485, max 400m)	 15-way/male		 9-way/female
<b>IKB0019/000,0</b> MN: 282 875 (RS485, max 400m)	 15-way/male		 Connector sleeve
<b>INS0526/L01</b> MN: 259 762	 INS0526/L01 (9-way/female)	Connector for building a connection with the MTS-P/MTS-R	

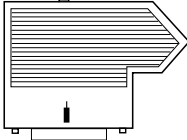
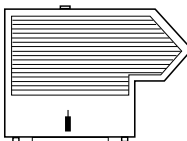
<b>INS0619/K01</b> MN: 279 583	 <p>Y connector for building cables with termination</p> <p>INS0619/K01 RS485 (15-way/male)</p>
<b>INS0645/K01</b> MN: 282 040	 <p>Connector for building cables with termination</p> <p>INS0645/K01 RS422 (15-way/male)</p>

Fig. 9-2: Connectors and Cable accessories of the BTV06

## Software

Performance / Control	Software designation
ScreenManager for: MTS/P, MTS/R, CLC	SWA-BTV06*-SCM-01VRS-MS (Runtime) SWA-BTV06*-SCM-02VRS-MS (Runtime) SWA-BTV06*-SCM-03VRS-MS (Runtime) SWA-BTV06*-SCM-04VRS-MS (Runtime) SWA-SCM*PC-INB-04VRS-MS (PC-programming tool)
Download tool Dolfi for PC	SWD-DOL*PC-INB-01VRS-MS-C1,44

Fig. 9-3: BTV06 Software



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Use *See appropriate use and inappropriate use*



## 12 Service & Support

### 12.1 Helpdesk

Unser Kundendienst-Helpdesk im Hauptwerk Lohr am Main steht Ihnen mit Rat und Tat zur Seite. Sie erreichen uns

- telefonisch: **+49 (0) 9352 40 50 60**  
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

- by phone: **+49 (0) 9352 40 50 60**  
via Service Call Entry Center Mo-Fr 7:00 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

**+49 (0) 171 333 88 26**  
**+49 (0) 172 660 04 06**

oder

After helpdesk hours, contact our service department directly at

**+49 (0) 171 333 88 26**  
**+49 (0) 172 660 04 06**

or

### 12.3 Internet

Ergänzende Hinweise zu Service, Reparatur und Training sowie die **aktuellen** Adressen unserer Service- und Vertriebsbüros finden Sie unter **www.indramat.de** – einige Angaben in dieser Dokumentation können inzwischen überholt sein.

Außerhalb Deutschlands nehmen Sie bitte zuerst Kontakt mit Ihrem lokalen Ansprechpartner auf.

- ☐ Verkaufsniederlassungen  
☐ Niederlassungen mit Kundendienst

Additional notes about service, repairs and training as well as the **actual** addresses of our sales- and service facilities are available on the Internet at **www.indramat.de** – some information in this documentation may meanwhile be obsolete.

Please contact the sales & service offices in your area first.

- ☐ sales agencies  
☐ offices providing service

### 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.

## 12.5 Kundenbetreuungsstellen - Sales & Service Facilities

### Deutschland – Germany

vom Ausland:

(0) nach Landeskennziffer weglassen!

from abroad:

don't dial (0) after country code!

Vertriebsgebiet Mitte Germany Centre	SERVICE	SERVICE	SERVICE
Rexroth Indramat GmbH Bgm.-Dr.-Nebel-Str. 2 97816 Lohr am Main <b>Kompetenz-Zentrum Europa</b>  Tel.: +49 (0)9352 40-0 Fax: +49 (0)9352 40-4885	<b>CALL ENTRY CENTER</b> <b>MO – FR</b> <b>von 07:00 - 18:00 Uhr</b>  <b>from 7 am – 6 pm</b>  <b>Tel. +49 (0) 9352 40 50 60</b> <a href="mailto:service@indramat.de">service@indramat.de</a>	<b>HOTLINE</b> <b>MO – FR</b> <b>von 17:00 - 07:00 Uhr</b> <b>from 5 pm - 7 am</b> + SA / SO  <b>Tel.: +49 (0)172 660 04 06</b> <b>oder / or</b> <b>Tel.: +49 (0)171 333 88 26</b>	<b>ERSATZTEILE / SPARES</b> verlängerte Ansprechzeit - extended office time - ♦ nur an Werktagen - only on working days - ♦ von 07:00 - 18:00 Uhr - from 7 am - 6 pm -  <b>Tel. +49 (0) 9352 40 42 22</b>
Vertriebsgebiet Süd Germany South	Gebiet Südwest Germany South-West	Vertriebsgebiet Ost Germany East	Vertriebsgebiet Ost Germany East
Rexroth Indramat GmbH Landshuter Allee 8-10 80637 München Tel.: +49 (0)89 127 14-0 Fax: +49 (0)89 127 14-490	Bosch Rexroth AG Vertrieb Deutschland – VD-BI Geschäftsbereich Rexroth Indramat Regionalzentrum Südwest Ringstrasse 70 / Postfach 1144 70736 Fellbach / 70701 Fellbach  Tel.: +49 (0)711 57 61-100 Fax: +49 (0)711 57 61-125	Bosch Rexroth AG Beckerstraße 31 09120 Chemnitz  Tel.: +49 (0)371 35 55-0 Fax: +49 (0)371 35 55-333	Bosch Rexroth AG Regionalzentrum Ost Walter-Köhn-Str. 4d 04356 Leipzig  Tel.: +49 (0)341 25 61-0 Fax: +49 (0)341 25 61-111
Vertriebsgebiet West Germany West	Vertriebsgebiet Mitte Germany Centre	Vertriebsgebiet Nord Germany North	Vertriebsgebiet Nord Germany North
Bosch Rexroth AG Vertrieb Deutschland Regionalzentrum West Borsigstrasse 15 40880 Ratingen  Tel.: +49 (0)2102 409-0 Fax: +49 (0)2102 409-406	Bosch Rexroth AG Regionalzentrum Mitte Waldecker Straße 13 64546 Mörfelden-Walldorf  Tel.: +49 (0) 61 05 702-3 Fax: +49 (0) 61 05 702-444	Bosch Rexroth AG Walsroder Str. 93 30853 Langenhagen  Tel.: +49 (0) 511 72 66 57-0 Fax: +49 (0) 511 72 66 57-95	Bosch Rexroth AG Kieler Straße 212 22525 Hamburg  Tel.: +49 (0) 40 81 955 966 Fax: +49 (0) 40 85 418 978

## Europa (West) - Europe (West)

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from abroad: don't dial (0) after country code,

**Italien:** 0 nach Landeskennziffer mitwählen  
**Italy:** dial 0 after country code

<b>Austria - Österreich</b> Bosch Rexroth GmbH Bereich Indramat Stachegasse 13 1120 Wien Tel.: +43 (0)1 985 25 40 Fax: +43 (0)1 985 25 40-93	<b>Austria – Österreich</b> Bosch Rexroth G.m.b.H. Gesch.ber. Rexroth Indramat Industriepark 18 4061 Pasching Tel.: +43 (0)7221 605-0 Fax: +43 (0)7221 605-21	<b>Belgium - Belgien</b> Bosch Rexroth AG Electric Drives & Controls Industrielaan 8 1740 Ternat Tel.: +32 (0)2 5830719 Service: +32 (0)2 5830717 Fax: +32 (0)2 5830731 <a href="mailto:indramat@boschrexroth.be">indramat@boschrexroth.be</a>	<b>Denmark - Dänemark</b> Bosch Rexroth A/S Zinkvej 6 8900 Randers Tel.: +45 (0)87 11 90 60 Fax: +45 (0)87 11 90 61
<b>Great Britain – Großbritannien</b> Bosch Rexroth Ltd. Rexroth Indramat Division Broadway Lane, South Cerney Cirencester, Glos GL7 5UH Tel.: +44 (0)1285 863000 Fax: +44 (0)1285 863030 <a href="mailto:sales@indramat.co.uk">sales@indramat.co.uk</a> <a href="mailto:service@indramat.co.uk">service@indramat.co.uk</a>	<b>Finland - Finnland</b> Rexroth Mecman Oy Rexroth Indramat division Ansatie 6 017 40 Vantaa Tel.: +358 (0)9 84 91-11 Fax: +358 (0)9 84 91-13 60	<b>France - Frankreich</b> Bosch Rexroth S.A. Division Rexroth Indramat Avenue de la Trentaine BP. 74 77503 CHELLES CEDEX Tel.: +33 (0)164 72-70 00 Fax: +33 (0)164 72-63 00 <b>Hotline:</b> +33 (0)608 33 43 28	<b>France - Frankreich</b> Bosch Rexroth S.A. Division Rexroth Indramat 1270, Avenue de Lardenne 31100 Toulouse Tel.: +33 (0)5 61 49 95 19 Fax: +33 (0)5 61 31 00 41
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<b>Italy - Italien</b> Bosch Rexroth S.p.A. Via Mascia, 1 80053 Castellammare di Stabia NA Tel.: +39 081 8 71 57 00 Fax: +39 081 8 71 68 85	<b>Italy - Italien</b> Bosch Rexroth S.p.A. Viale Oriani, 38/A 40137 Bologna Tel.: +39 051 34 14 14 Fax: +39 051 34 14 22	<b>Netherlands - Niederlande/Holland</b> Bosch Rexroth B.V. Kruisbroeksestraat 1 (P.O. Box 32) 5281 RV Bommel Tel.: +31 (0)411 65 19 51 Fax: +31 (0)411 65 14 83 <a href="mailto:indramat@hydraudyne.nl">indramat@hydraudyne.nl</a>	<b>Netherlands - Niederlande/Holland</b> Bosch Rexroth Services B.V. Kruisbroeksestraat 1 (P.O. Box 32) 5281 RV Bommel Tel.: +31 (0)411 65 19 51 Fax: +31 (0)411 67 78 14
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<b>Sweden - Schweden</b> Rexroth Mecman Svenska AB Indramat Support Ekvändan 7 254 67 Helsingborg Tel.: +46 (0) 42 38 88 -50 Fax: +46 (0) 42 38 88 -74	<b>Switzerland West - Schweiz West</b> Bosch Rexroth Suisse SA Département Rexroth Indramat Rue du village 1 1020 Renens Tel.: +41 (0)21 632 84 20 Fax: +41 (0)21 632 84 21	<b>Switzerland East - Schweiz Ost</b> Bosch Rexroth Schweiz AG Geschäftsbereich Indramat Hemrietstrasse 2 8863 Buttikon Tel.: +41 (0) 55 46 46 205 Fax: +41 (0) 55 46 46 222	

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## Africa, Asia, Australia – incl. Pacific Rim

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## Nordamerika – North America

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<b>Canada East - Kanada Ost</b>  Bosch Rexroth Canada Corporation Burlington Division 3426 Mainway Drive Burlington, Ontario Canada L7M 1A8 Tel.: +1 905 335 55 11 Fax: +1 905 335-41 84 <a href="mailto:michael.moro@boschrexroth.ca">michael.moro@boschrexroth.ca</a>	<b>Canada West - Kanada West</b>  Bosch Rexroth Canada Corporation 5345 Goring St. Burnaby, British Columbia Canada V7J 1R1 Tel.: +1 604 205-5777 Fax: +1 604 205-6944 <a href="mailto:david.gunby@boschrexroth.ca">david.gunby@boschrexroth.ca</a>		

## Südamerika – South America

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<b>Columbia - Kolumbien</b>  Refflutec de Colombia Ltda. Calle 37 No. 22-31 Santafé de Bogotá, D.C. Colombia Tel.: +57 1 368 82 67 +57 1 368 02 59 Fax: +57 1 268 97 37 <a href="mailto:reflutec@inter.net.co">reflutec@inter.net.co</a>			





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