Industrial Hydraulics | **Electric Drives and Controls** | Linear Motion and Assembly Technologies | Pneumatics | Service Automation | Mobile Hydraulics

Rexroth SYNAX 200
Version 12

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Edition 01

Project Planning Manual

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Purpose of Documentation This documentation assists

- in the selection of units and hardware components and
- in the basic control cabinet construction

Record of Revisions

Description	Release Date	Notes
DOK-SYNAX*-SY*-12VRS**-PR01-EN-P	09.04	Version 12VRS

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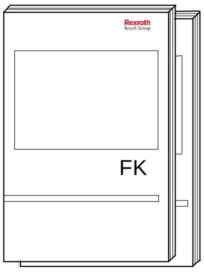
Summary of Documentation - Overview



Functional Description; Interfaces:

Help familiarize the user with SYNAX 200
and the functions of SYNAX 200

Order designation:
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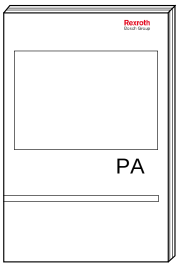

Parameter Description:

Description of the SYNAX 200 system parameters

Order designation:
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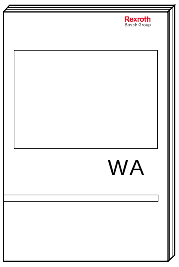
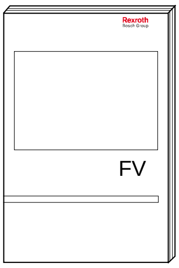


Trouble Shooting Guide:

Explanation of the diagnostics states
How to proceed when eliminating faults

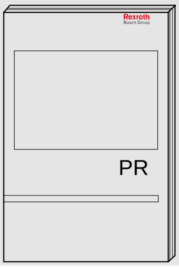
Order designation:
DOK-SYNAX*-SY*-12VRS**-WA01-EN-P



Firmware Version Notes:

Description of the new and changed
functions between SYNAX 200 version 12
and previous version 11

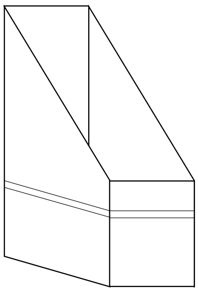
Order designation:
DOK-SYNAX*-SY*-12VRS**-FV01-EN-P



Project Planning:

Selection of units and hardware components
Basic control in cabinet construction

Order designation:
DOK-SYNAX*-SY*-12VRS**-PR01-EN-P



Order designation:
DOK-SYNAX*-SY*-12VRS**-4001-EN-P

Contents

1 System configurations

1.1 General information

SYNAX 200 systems are built of

- one or several MotionControls *PPC* with up to 40 digital intelligent drives per unit of the *DKR*, *Diax 04, EcoDrive 03, EcoDriveCs* or *IndraDrive* family,
- optional PLC or optional PLC *integrated* in the PPC,
- optional operator input terminal and visualization units IndraControl V,
- fiber-optics-cable connection between motion control and drives meeting SERCOS interface norm (IEC 61491 or EN 61491),
- a number of optional plug-in cards or option modules for the digital intelligent drives and option modules for the PPC
- and I/O components.

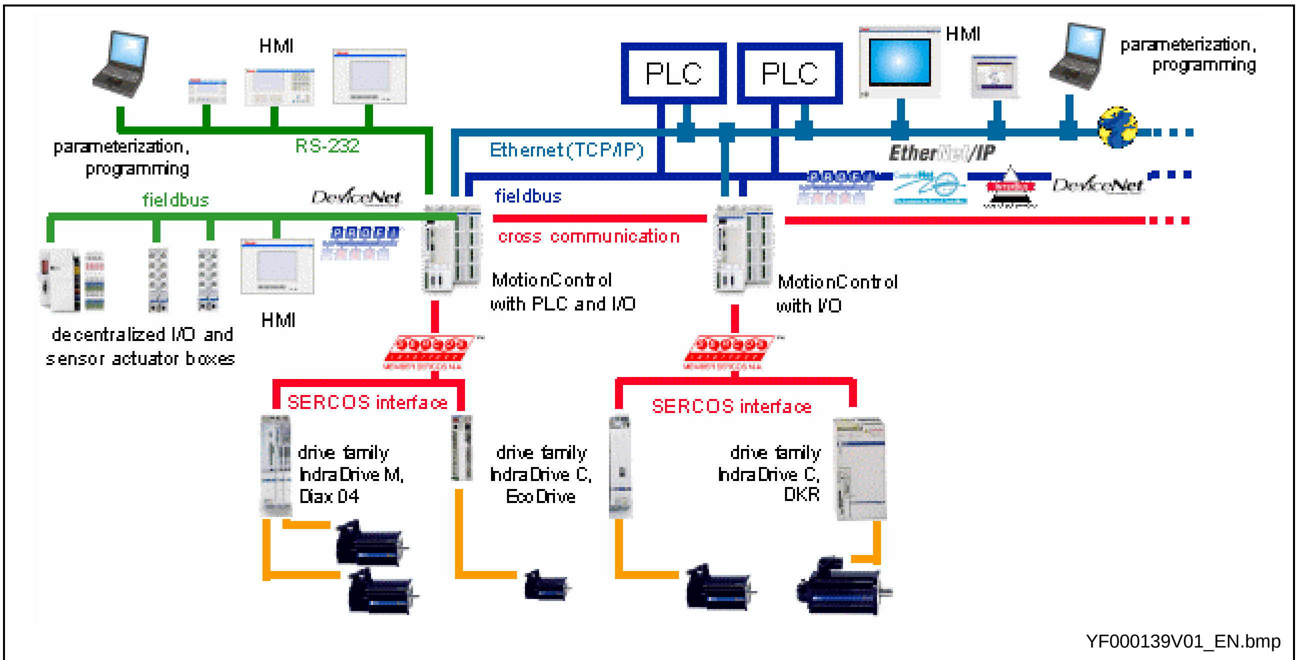


Fig. 1-1: Example SYNAX 200 system

The following describes the system components and the resulting system structures.

Note: The SYNAX 200 system is adapted to the hardware on the machine in two steps:

- First the drive concept in terms of the motor is determined. This includes drive amplifiers and linear scale (as part of the basic drive configuration).
- Then PPC motion control function and plug-in card assignment to the PPC motion controls is determined.

1.2 System components

Motion control components (MotionControl and PLC)

The system components of the motion control contain:

- PPC-R bzw. PPC-P as MotionControl system or with integrated PLC as MotionLogic system,
- option cards for MotionControl or PLC.

The MotionControl and the PLC can be adapted to meet numerous application requirements by using various option modules.

Basic device A PPC not fitted with option modules is a basic device.

MotionControl PPC-R

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Fig. 1-2: MotionControl PPC-R

MotionControl PPC-P

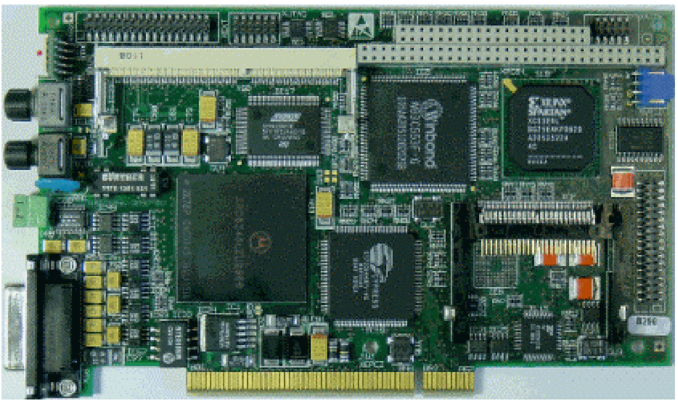

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Fig. 1-3: MotionControl PPC-P

Option modules for MotionControl PPC

The following option modules are available:

- ARCNET-/PPC link assembly,
- fieldbus assembly (fieldbus slave interface),
- master encoder interface
- Ethernet assembly (at PPC-R2x on-board).

Using the PLC integrated in the PPC the following is needed additionally:

- fieldbus assembly (fieldbus master interface)

I/O components

The following I/O components are applicable:

- (Onboard) I/Os directly connected to the motion control
- (Local) I/Os of type series RECO02 directly connected to the motion control and
- I/Os of type series Rexroth Inline or Rexroth Fieldline connected via fieldbus.

Local I/Os (RECO02)

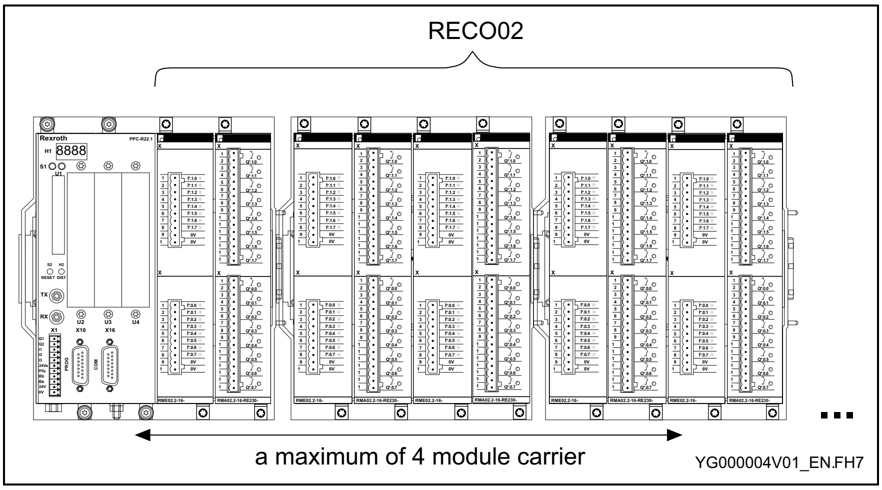

Fig. 1-4: RECO02

Decentralized I/Os (Rexroth Inline, Rexroth Fieldline)

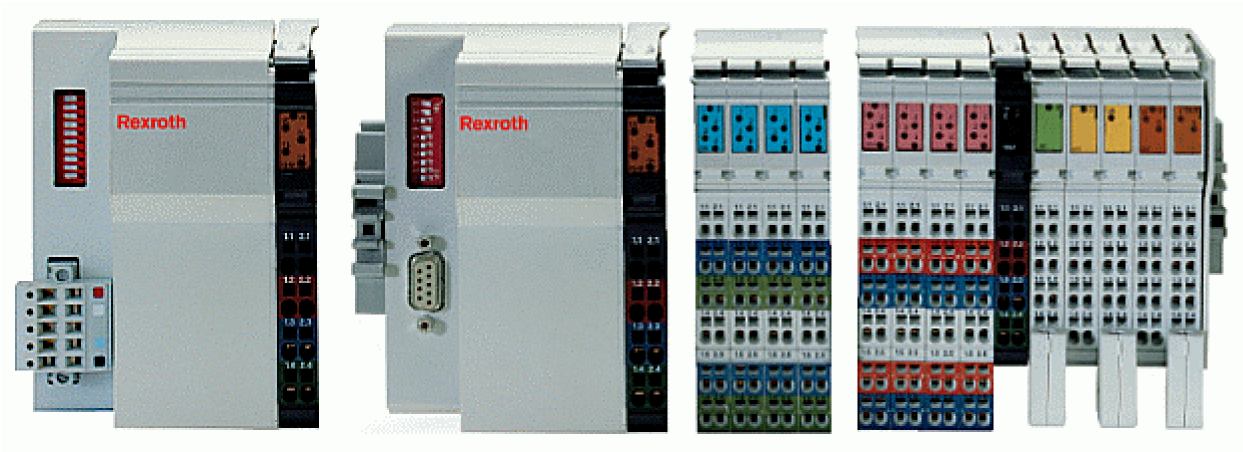

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Fig. 1-5: Rexroth Inline

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Fig. 1-6: Rexroth Fieldline

HMI components

These are the HMI components of the IndraControl V devices:

- PC based operator input terminals BTV, VSP, VSB/VDP, IPC/VDP, VPP,
- Windows CE based operator input terminals VEP or
- miniature control terminals (embedded units) VCP.

PC based operator input terminals

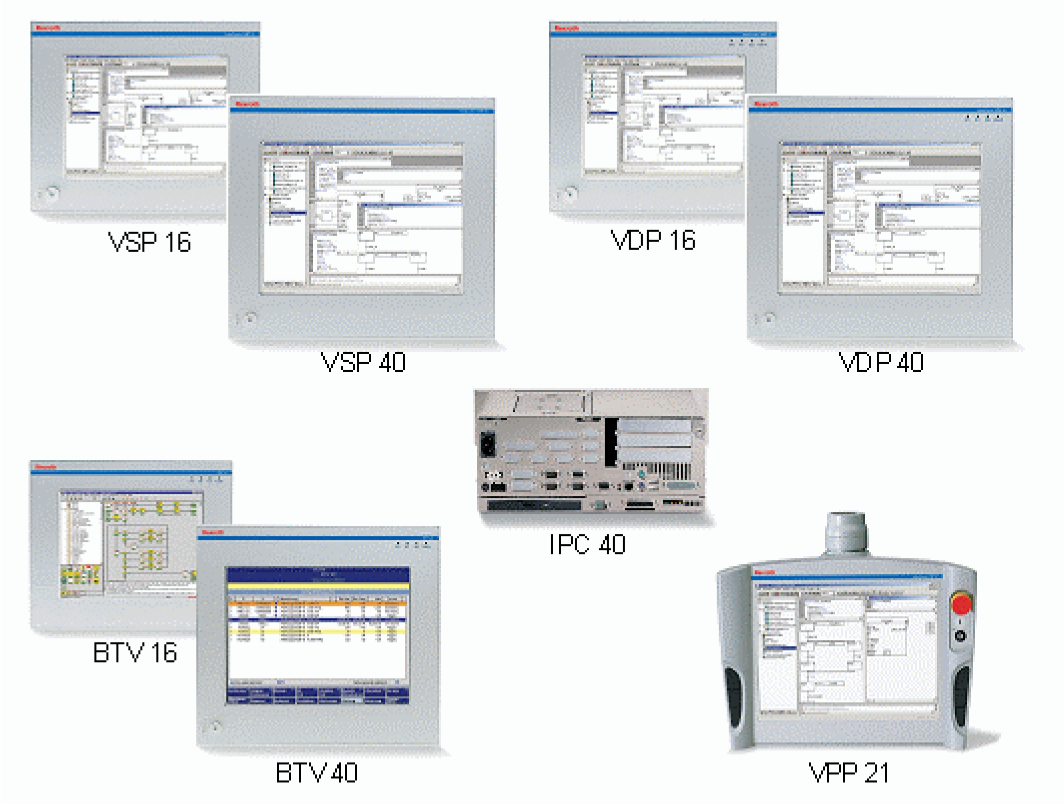

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Fig. 1-7: PC based operator input terminals BTV, VSP, VSB/VDP, IPC/VDP, VPP

Windows CE based operator input terminals

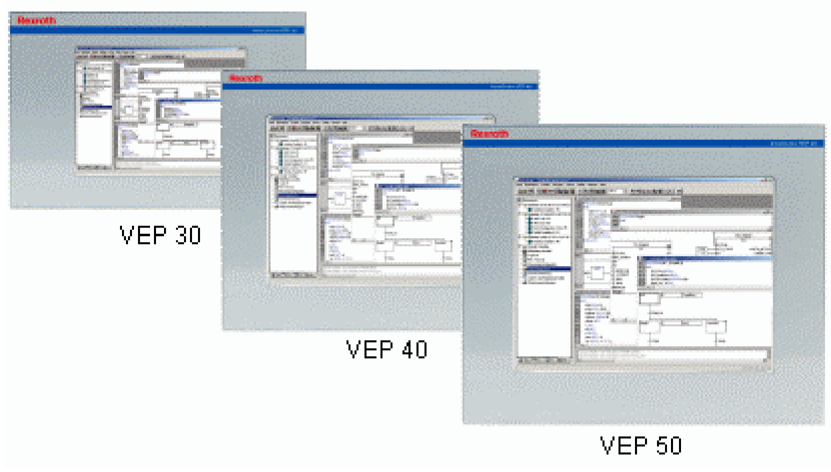

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Fig. 1-8: Windows CE based operator input terminals VEP

Miniature control terminals

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Fig. 1-9: Miniature control terminals VCP

Drives, motors

Fig. 1-10: Drive controller

Fig. 1-11: Rotary motors

Fig. 1-12: Linear motors IndraDyn L

1.3 System structures

This section shows examples for system configurations.

Example 1: PPC-R as a MotionControl subsystem

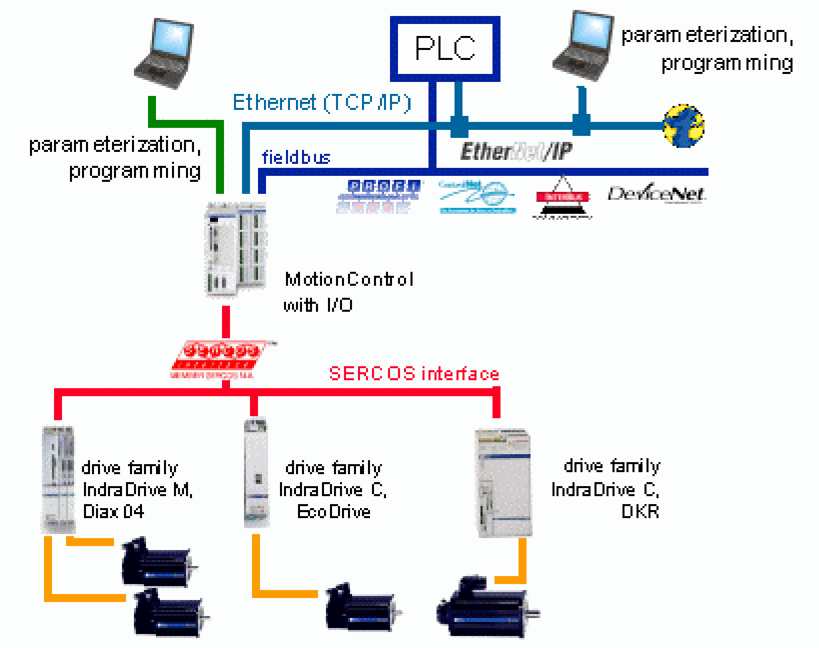

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Fig. 1-13: PPC-R as a MotionControl subsystem

Example 2: PPC-R with PLC as an automation system

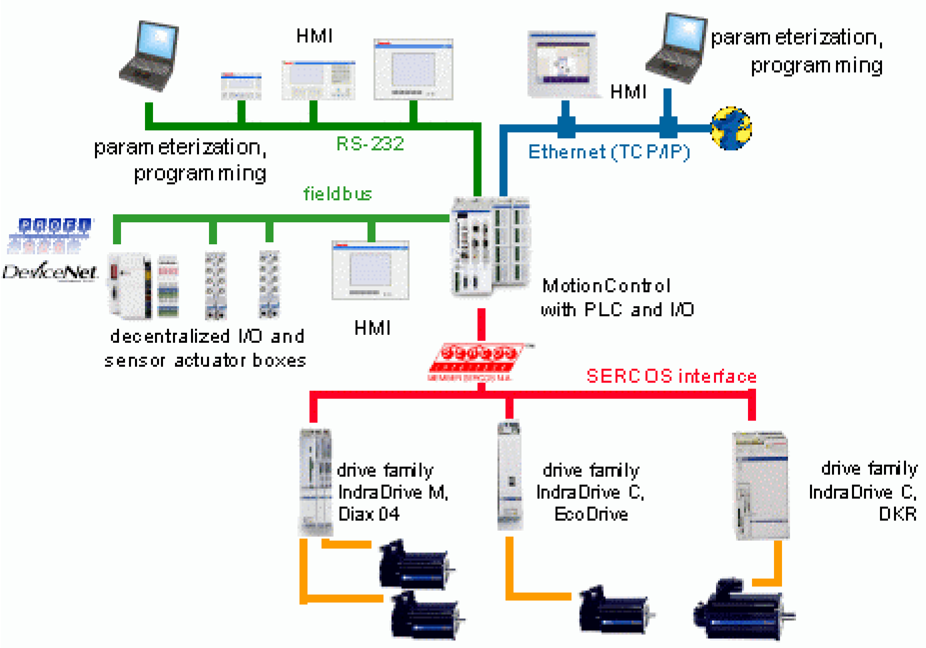

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Fig. 1-14: PPC-R with PLC as a stand alone automation system

Example 3: PPC-R in the PPC link

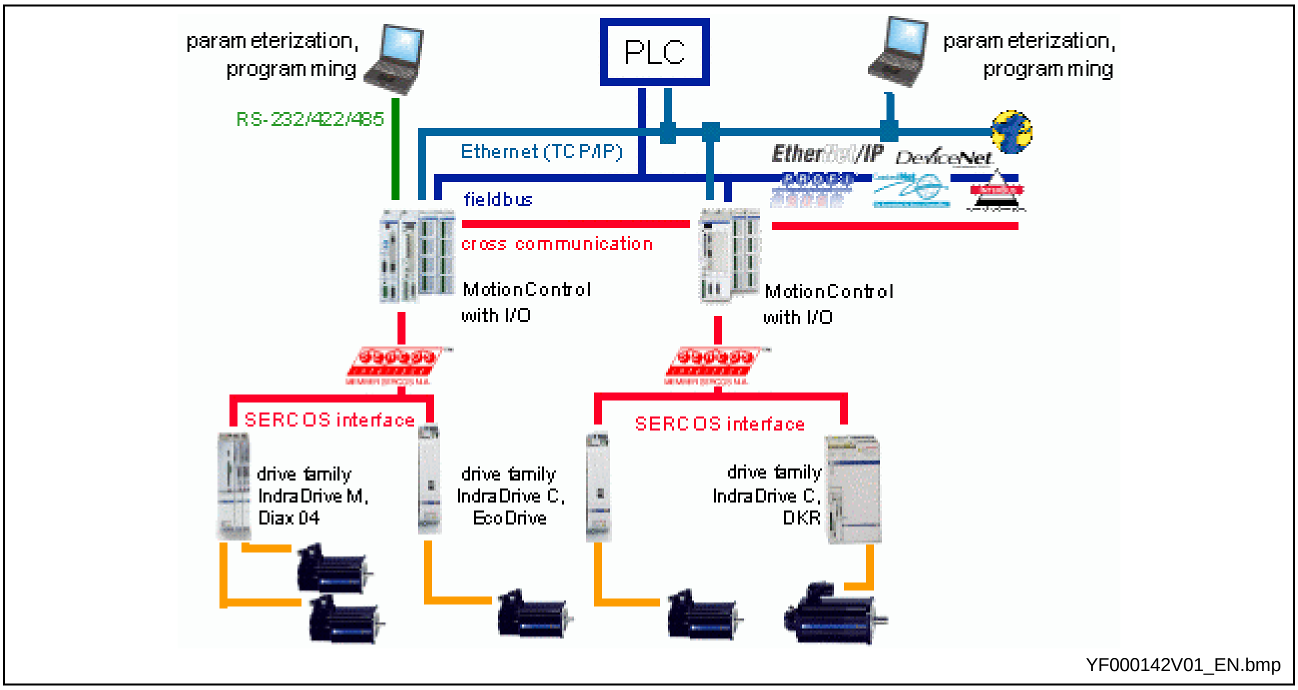

Fig. 1-15: PPC-R in the PPC link

Example 4: PPC-P in the BTV with HMI

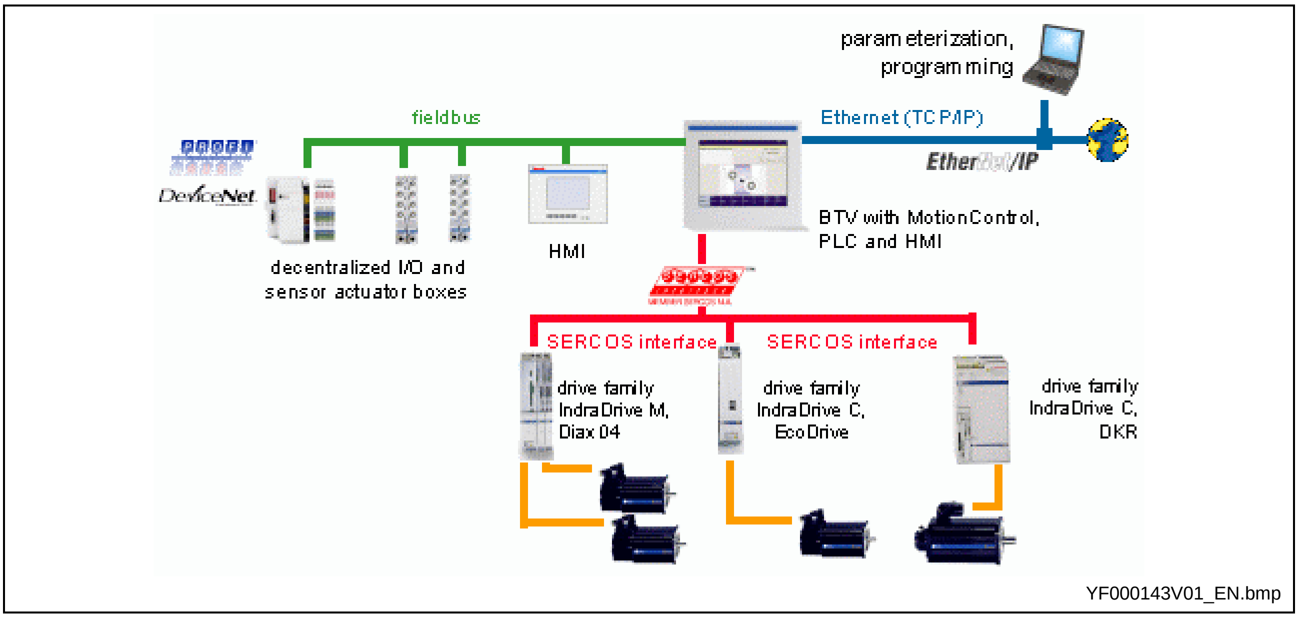

Fig. 1-16: PPC-P in the BTV with HMI

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2 Important directions for use

2.1 Appropriate use

Introduction

Rexroth 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: Bosch Rexroth, 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 products, make sure that all the pre-requisites 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

SYNAX 200 made by Bosch Rexroth is designed for the synchronization of machine axes (shaftless machines).

Control and monitoring of the drive system may require additional sensors and actors.

Note: The components 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.

The motion control and every drive controller has to be parameterized/ programmed before starting it up, making it possible for the motor to execute the specific functions of an application.

The motion control solution SYNAX 200 has been developed for use in single or multiple-axis drives and control tasks.

Typical applications of SYNAX 200 are:

- printing and paper converting machines,
- textile machines,
- handling and assembly systems and
- packaging and foodstuff machines.

The motion control and drive system 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 SYNAX 200 components 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 SYNAX 200 components 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 extremely high maximum temperatures or if
- Rexroth has not specifically released them for that intended purpose. Please note the specifications outlined in the general Safety Guidelines!

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 Bosch Rexroth 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
DANGER	Death or severe bodily harm will occur.
WARNING	Death or severe bodily harm may occur.
CAUTION	Bodily harm or material damage may occur.

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

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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

- Bosch Rexroth AG 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

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

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.

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 mm² 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 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.

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.

CAUTION

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.

CAUTION

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 Motion control configuration

4.1 Procedure

The motion control configuration choices (motion control, PLC, I/O, visualization units) conform to the functional requirements on the system.

In particular the use of the PLC is a decisively criterion.

In the appendix there's a list with supplementary documentation.

Selecting the motion control configuration without PLC (MotionControl subsystem)

To determine the motion control configuration without PLC we recommend the following procedure:

1. determine the MotionControl option cards,
2. determine the centralized I/O modules (RECO02),
3. determine the required module carrier (RMB02).

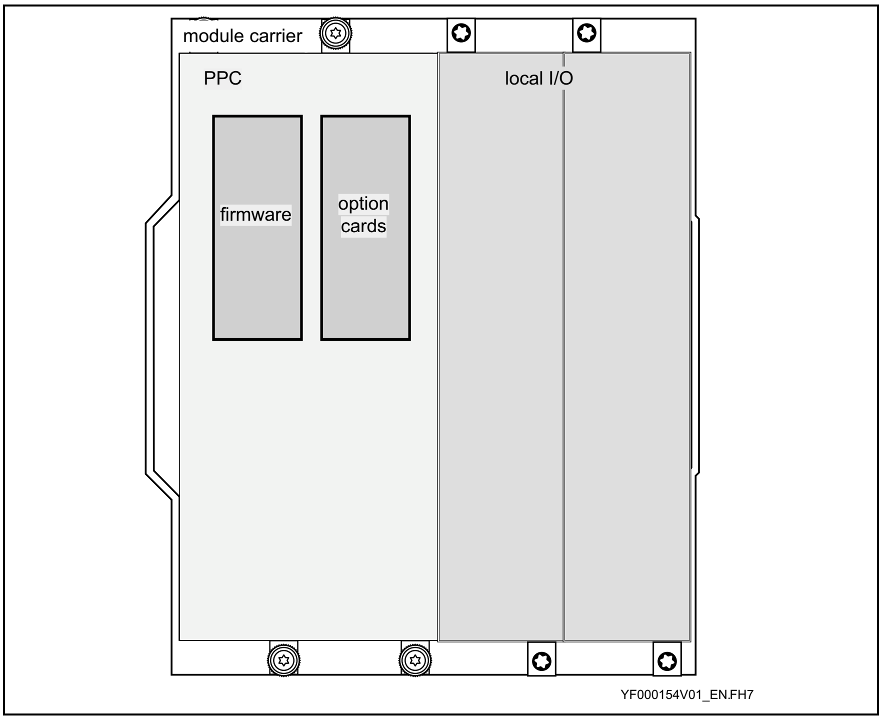

Fig. 4-1: Motion control configuration without PLC

Selecting the motion control configuration with PLC

To determine the motion control configuration with PLC we recommend the following procedure:

1. determine the MotionControl option cards,
2. determine the PLC option cards,
3. determine the centralized I/O modules (RECO02),
4. determine the required module carrier (RMB02),
5. determine the decentralized I/O modules (Rexroth Inline, Rexroth Fieldline),
6. determine the visualization components (BTV/VSP/VSB/IPC/VDP/VPP, VEP, VCP).

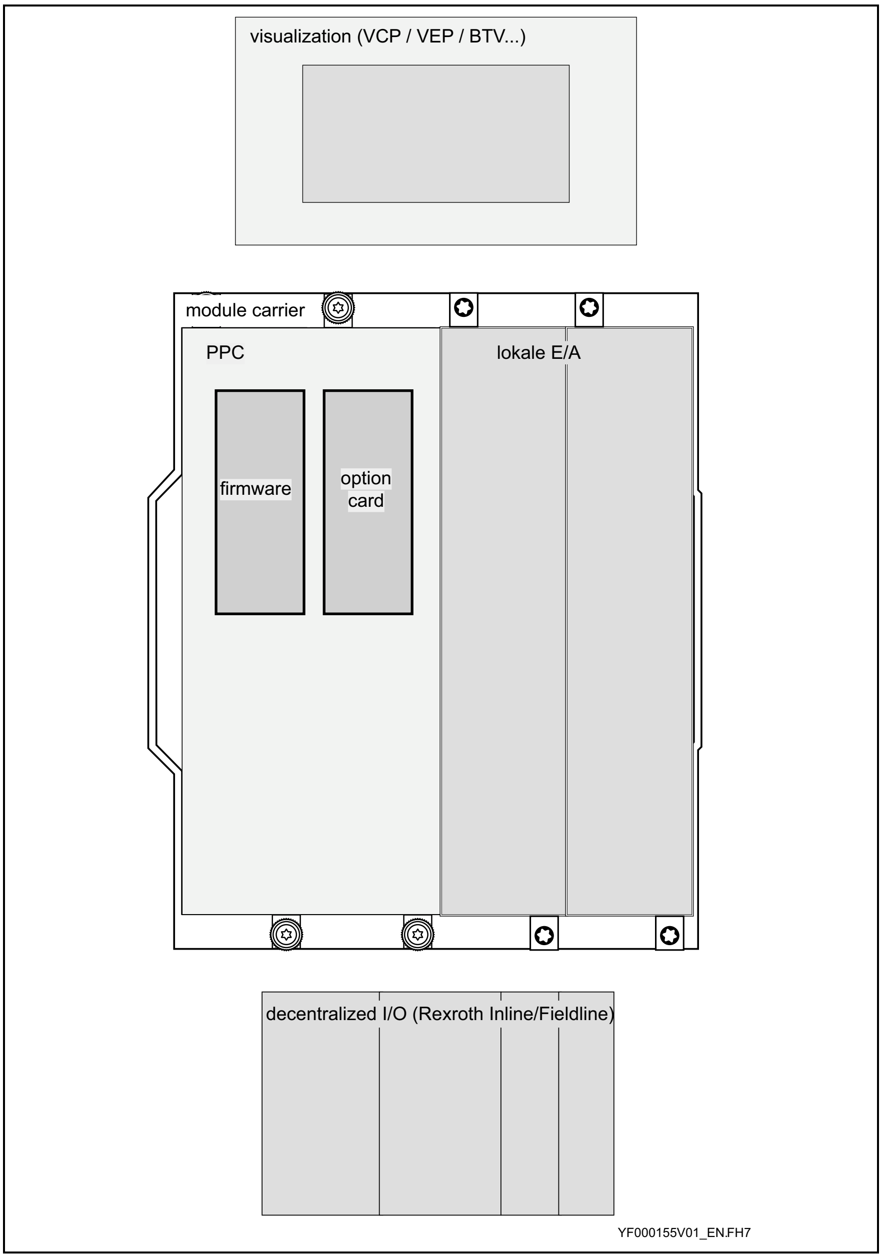

Fig. 4-2: Motion control configuration with PLC

Selecting the firmware

The PPC control can be fitted with different SYNAX firmware options:

Option	Firmware designation
MotionControl option	FWA-PPCPR*-SY*-...
MotionLogic option	FWA-PPCPR*-SL*-...
MotionLogic option "economic"	FWA-PPCPR*-SLE-...

Fig. 4-3: SYNAX firmware options

Properties of the MotionControl option SY*

- full MotionControl functionality
- I/O logic instead of integrated PLC

Properties of the MotionLogic option SL*

- full MotionControl functionality
- integrated PLC IndraLogic

Properties of the MotionLogic option SLE

- reduced MotionControl functionality
- integrated PLC IndraLogic

Reduced MotionControl functionality at SLE option

The differences of the reduced MotionControl functionality at the SLE option is displayed in the following table:

Functionality	Reduced functionality at SLE	Full functionality at SY* and SL*
Number of axes	a maximum of 8	a maximum of 40
Process controller tension controller/winding controller	a maximum of 4	no restrictions
Process controller register controller	not supported	a maximum of 16
Extension options of the PPC	a maximum of 2	a maximum of 3
Fieldbus master options of the PPC	not supported	Profibus and DeviceNet master
Fieldbus slave options of the PPC	Profibus, DeviceNet and Ethernet/IP slave	Profibus, DeviceNet and Ethernet/IP slave
Master encoder option of the PPC	not supported	is supported

Fig. 4-4: MotionControl functionality

4.2 MotionControl PPC-R

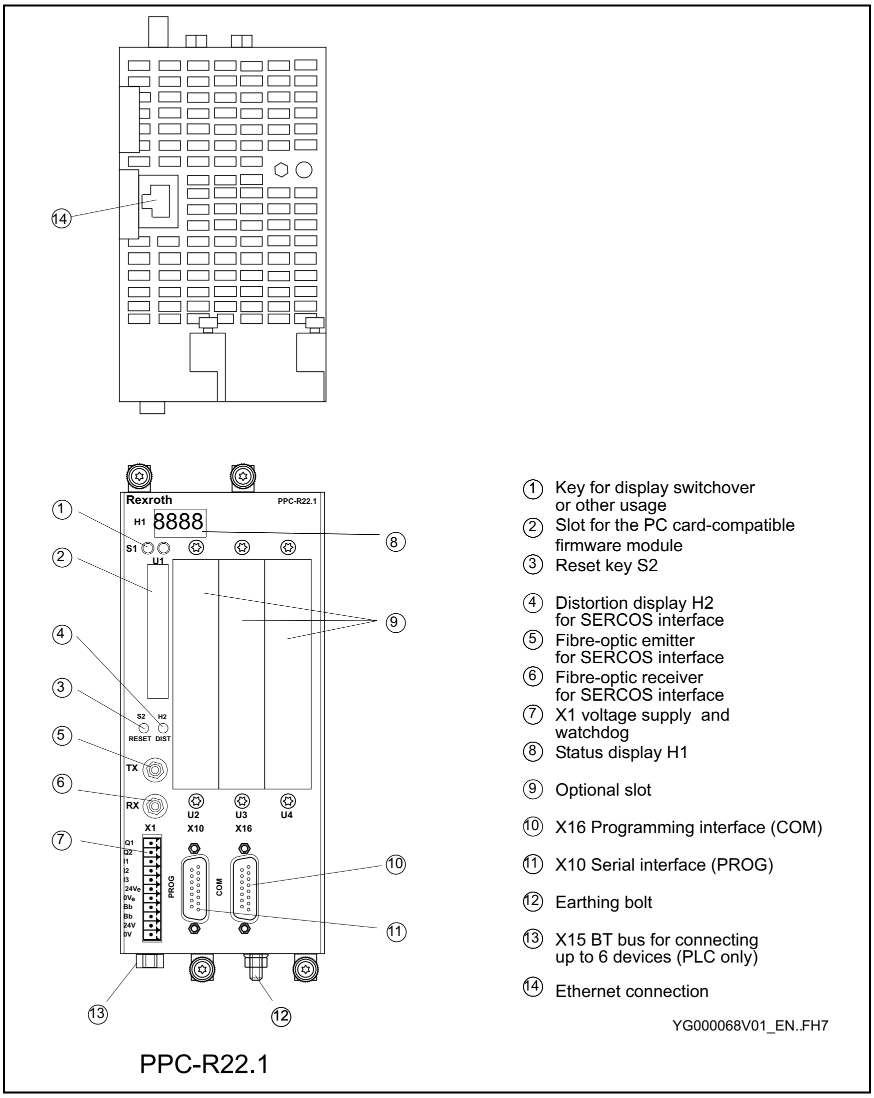

Fig. 4-5: PPC-R22.1

The PPC-R unit is a powerful controller in a small size in IP 20 rating. It is a general-purpose platform that works as a PLC or as a NC controller, depending on the application and the loaded software.

The PPC-R unit exists with two enclosure versions of different width. A single-width version and a double-width version.

The two interfaces that are available on the controller are fully connected according to the Rexroth standard (SIS = Serial Indramat Interface). The data transfer type (function) is only selected by the related application (RS232/RS422/RS485). With **PPC-R21**, the COM interface is brought out via a separate slot plate if this has not yet been assigned for a different purpose (by the PC/104 fieldbus, for example).

To install the PPC-R unit, a module carrier system is used that consists of one or several RMB02.2-04 units. The double carrier RMB02.2-02 can only be used as an installation carrier. It is merely used for fixing the PPC-R units; RECO modules cannot be controlled. Interconnecting several PPC-R units via a backplane is not possible either.

The PPC-R21.1 unit occupies one slot in the module carrier; the PPC-R22.1 occupies two units. In this carrier system, the PPC-R unit can handle up to 15 further I/O modules (RME02.2..., RMA02.2... or RMC02.2...).

The firmware or parameters of the motion control are stored on the programming module PFM01.1. The programming module PSM has PC card format, the programming module PFM has compact flash format.

Depending on the application, the PPC-R has PC/104 modules fitted that, for example, can be used for open fieldbus interfaces, such as Profibus, DeviceNet, etc..

4.3 Brief description PPC-P

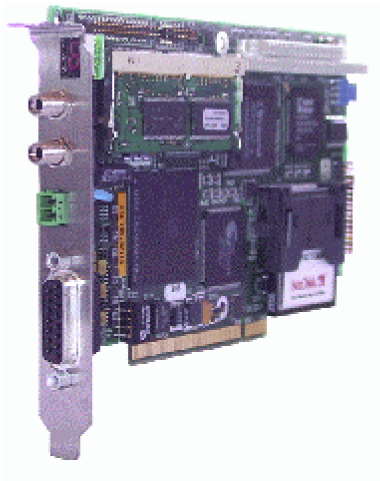

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Fig. 4-6: PPC-P01.1

The PPC-P control in PCI format is directly plugged to a PCI slot of a PC. The card supports the "plug-and-play" functionality, that means the address range in the PC is allocated dynamically. Jumpers for setting the address range are not necessary.

The interface that is available on the motion control is connected as per Rexroth norm (SIS = Serial Indramat Interface). The type of data transmission (function) is selected with the respective application (RS232/RS422/RS485).

Diagnosis of the motion control can be read with the 7 segment display.

The firmware or parameters of the motion control are stored on the PFM01.1 programming module. The programming module is in compact flash format.

Depending on the application, the PPC-P has PC104 modules fitted that, for example, can be used for open fieldbus interfaces, such as Profibus, DeviceNet, etc.

4.4 Brief description option cards

There are different option cards for the PPC-R and PPC-P. These options cards are allocated either to the MotionControl or to the PLC. The following table shows the combination possibilities between option cards and the type of motion control.

Option card	PPC with MotionControl	PPC with MotionControl and PLC
Profibus-DP Slave (option P2)	X	X
DeviceNet-Slave (option V2)	X	X
Ethernet/IP-Slave (option T2)	X (PPC-R21, PPC-R22 on-board)	X (PPC-R21, PPC-R22 on-board)
Ethernet (option T2)	X (PPC-R21, PPC-R22 on-board)	X (PPC-R21, PPC-R22 on-board)
PPC link (option Q1)	X	X
Master encoder interface (option G2)	X	X
Profibus-DP-Master (option P1)		X
DeviceNet-Master (option V1)		X

Fig. 4-7: Combination possibilities option cards - type of motion control

Option cards for the MotionControl

Profibus-DP slave (option P2, option card DPS01)

The option card DPS01 offers a Profibus-DP slave interface.

Transmission rates of up to 12 Mbit/s are supported.

The functionality contains

- cyclic transmission of binary I/O data, word and double-word parameters,
- non-cyclic transmission of all parameters and I/O data (proprietary RIN protocol, so called parameter channel),
- the support of a bus length of 32 words. With the help of a so called multiplex channel, parts of the cyclic transmission can be multiplexed, to transmit further data.

DeviceNet slave (option V2, option card DNS03)

The option card DNS03 offers a DeviceNet slave interface.

Transmission rates of up to 500 kbit/s are supported.

The functionality contains

- cyclic transmission of binary I/O data, word and double-word parameters (implicit messaging),
- non-cyclic transmission of all parameters and I/O data (proprietary RIN protocol within the explicit messaging),
- the support of a bus length of 32 words. With the help of a so called multiplex channel, parts of the cyclic transmission can be multiplexed, to transmit further data.

Ethernet/IP slave or Ethernet (option T2, option card ETH01)

ETH01 only with PPC-P11

The option card EHT01 offers a Ethernet/IP slave or a Ethernet interface.

It can only be used with PPC-P11, with PPC-R21 and PPC-R22 the functionality is on-board.

A transmission rate of 10 MBit/s is supported.

The functionality contains

- Ethernet/IP slave with cyclic transmission of binary I/O data, word and double word parameters or cyclic transmission of binary I/O data, word and double word parameters (within UDP/IP) of 4 different Ethernet master (PLC),
- Ethernet/IP slave with non-cyclic transmission of all parameters and I/O data of 1 Ethernet/IP master or proprietary RIN protocol within TCP/IP with 4 different Ethernet master (PLC),
- non-cyclic transmission of all parameters (proprietary RIN protocol within TCP/IP) of 7 different Ethernet master (SynTop, HMI),
- the support of a bus length of 32 words. With the help of the so called multiplex channel, parts of the cyclic transmission can be multiplexed, to transmit further data.

Ethernet on-board with PPC-R21 and PPC-R22

With PPC-R21 and the PPC-R22 the Ethernet interface is on-board.

The same features are supported as with interface option T2 (ETH01), 10/100 MBit/s is supported as transmission rate.

PPC link (option Q1, option card DAQ03)

Several PPC motion controls can be combined to create one PPC link. The PPC link makes it possible to assign following axes to different master axis.

Up to 32 PPC motion controls can be combined to one PPC link.

The combination of PPC motion controls is accomplished with the help of the plug-in card DAQ. All DAQ assemblies are connected with a fibre-optics cable ring thereby creating the PPC link.

The communication within the PPC link implements, as does the SYNAX 200 ring, a fibre-optics cable ring.

The PPC link can be built on a single or a double fibre-optics-cable ring.

PPC link (option Q2, option card DAQ04)

Several PPC motion controls can be combined to create one PPC link. The PPC link makes it possible to assign following axes to different master axis.

Up to 64 PPC motion controls can be combined to one PPC link.

The combination of PPC motion controls is accomplished with the help of the plug-in card DAQ. All DAQ assemblies are connected with a fibre-optics cable ring thereby creating the PPC link.

The communication within the PPC link implements, as does the SYNAX 200 ring, a fibre-optics cable ring.

The PPC link can be built on a single or a double fibre-optics-cable ring.

Note: It is not possible to link controls with option Q2 (DAQ04) and option Q1 (DAQ03).

Master encoder interface (option G2 option card LAG)

The option card LAG offers the possibility to connect master encoders.

Up to two EnDat master encoders can be connected.

The master encoder can be used by the PPC master axis functionality "real master axis" as master encoder.

Option Cards for the PLC

Profibus-DP master (option P1, option card DPM01)

The option card DPM01 offers a Profibus-DP master interface.

Transmission rates of up to 12 Mbit/s are supported.

The functionality contains

- cyclic transmission of binary I/O data, word and double word parameters,
- the support of a bus length of 256 words,
- the support of up to 125 participants per configuration with up to 32 participants per bus segment.

DeviceNet master (option V1, option card DNM03)

The option card DNM03 offers a DeviceNet master interface.

Transmission rates of up to 500 kbit/s are supported.

The functionality contains

- cyclic transmission of binary I/O data, word and double word parameters,
- the support of a bus length of 256 words.

4.5 Brief description RECO02: local I/O components

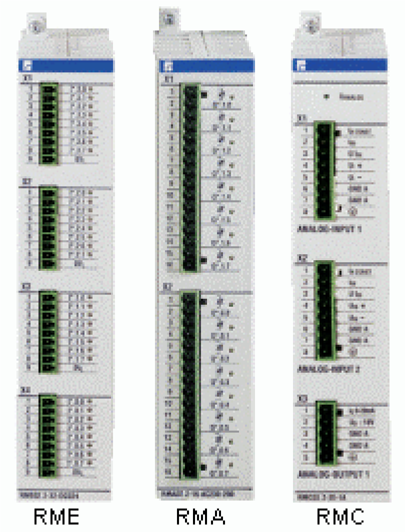

Fig. 4-8: Overview RECO02

The I/O components RECO02 serve for the connection of inputs/output on control side. Digital and analog input and output modules with different input and output voltage ranges are available .

The inputs or outputs are managed and addressed by the MotionControl or the PLC.

The following digital input modules are available:

Module	**Description**
RME02.2-16-DC024	16 inputs, 24 VDC
RME02.2-32-DC024	32 inputs, 24 VDC
RME02.2-16-AC115	16 inputs, 115 VAC

Fig. 4-9: RECO02 digital input modules

The following digital output modules are available:

Module	**Description**
RMA02.2-16-DC024-200	16 outputs, 24 VDC, 2 A
RMA02.2-32-DC024-050	32 outputs, 24 VDC, 500 mA
RMA02.2-16-AC230-200	16 outputs, 230 VAC, 2A
RMA02.2-16-RE230-200	16 outputs, relay 230 Veff

Fig. 4-10: RECO02 digital output modules

The following analog input/output modules are available:

Module	**Description**
RMC02.2-2E-1A	2 inputs, 10V; 1 output, 10V

Fig. 4-11: RECO02 analog input/output modules

4.6 Brief description Rexroth Inline: decentralized I/O components

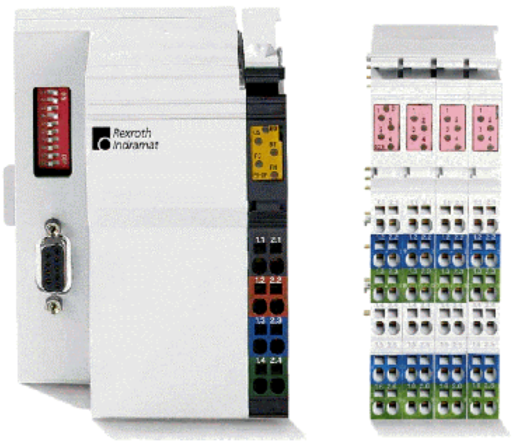

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Fig. 4-12: Rexroth Inline

The I/O components Rexroth Inline serve for the connection via the fieldbusses Profibus and DeviceNet.

The following modules are available:

- Profibus and DeviceNet fieldbus coupling modules,
- digital and analog input/output modules with different input/output voltage ranges,
- counting modules and
- block I/O modules.

The inputs or outputs or the counting modules are addressed by the PLC.

The following fieldbus coupling modules are available:

Module	Description
R-IL DP-V1 BK	bus clamp PROFIBUS DP
R-IL DN BK	bus clamp DeviceNet

Fig. 4-13: Rexroth Inline fieldbus coupling module

The following digital input modules are available:

Module	Description
R-IB IL 24 DI 2	2 inputs, 24 VDC
R-IB IL 24 DI 4	4 inputs, 24 VDC
R-IB IL 24 DI 8	8 inputs, 24 VDC
R-IB IL 24 DI 16	16 inputs, 24 VDC
R-IB IL 24 DI 32/HD	32 inputs, 24 VDC
R-IB IL 24 EDI 2-DES	2 inputs, 24 VDC (+ diagnosis)

Fig. 4-14: Rexroth Inline digital input modules

The following digital output modules are available:

Module	Description
R-IB IL 24 DO 2-2A	2 outputs, 24 VDC, 2,0 A
R-IB IL 24 DO 4	4 outputs, 24 VDC, 0,5 A
R-IB IL 24 DO 8	8 outputs, 24 VDC, 0,5 A
R-IB IL 24 DO 8-2A	8 outputs, 24 VDC, 2,0 A
R-IB IL 24 DO 16	16 outputs, 24 VDC, 0,5 A
R-IB IL 24 DO 32/HD	32 outputs, 24 VDC, 0,5 A
R-IB IL 24/230 DOR1/W	1 relay changeover contact 5-253 VAC, 3,0 A
R-IB IL 24/230 DOR4/W	4 relay changeover contacts 5-253 VAC, 3,0 A

Fig. 4-15: Rexroth Inline digital output modules

The following input/output modules are available:

Module	Description
R-IB IL AI 2/SF	2 analog inputs
R-IB IL AI 8/SF	8 analog inputs, voltage/current
R-IB IL AI 8/IS	8 analog inputs, only current input
R-IB IL TEMP 2 RTD	2 analog inputs, temperature sensor
R-IB IL AO 1/SF	1 analog output
R-IB IL AO 2/U/BP	2 analog outputs

Fig. 4-16: Rexroth Inline analog input/output modules

The following other modules are available:

Module	Description
R-IB IL CNT	counting module, 1 counter
R-IB IL 24 PWR IN	supply clamp
R-IB IL 24 SEG/F	segment clamp
R-IB IL DOR LV-SET	isolation terminal set for R-IB IL 24/230 DOR1/W

Fig. 4-17: Rexroth Inline other modules

The following block I/O modules are available:

Module	Description
R-ILB PB 24 DI16 DO16	block I/O Profibus-DP (not expandable) 16 digital inputs, 16 digital outputs
R-ILB DN 24 DI16 DO16	block I/O DeviceNet (not expandable) 16 digital inputs, 16 digital outputs

Fig. 4-18: Rexroth Inline block I/O modules

4.7 Brief description Rexroth Fieldline: decentralized I/O components IP 65

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Fig. 4-19: Rexroth Fieldline

The I/O components Rexroth Fieldline serve for the connection of inputs/outputs via the fieldbusses Profibus and DeviceNet.

Digital and analog input/output modules with different input and output voltage ranges are available.

The inputs or outputs are addressed by the PLC.

The following digital input modules are available:

Module	Description
RF-FLS PB M12 DI 8 M12	8 inputs Profibus
RF-FLS DN M12 DI 8 M12	8 inputs DeviceNet

Fig. 4-20: Rexroth Fieldline digital input modules

The following digital output modules are available:

Module	Description
RF-FLS PB M12 DO 8 M12-2A	8 outputs, 2 A, Profibus
RF-FLS DN M12 DO 8 M12-2A	8 outputs, 2 A, DeviceNet

Fig. 4-21: Rexroth Fieldline digital output modules

The following digital input/output modules are available:

Module	Description
RF-FLS PB M12 DIO 4/4 M12-2A	4 inputs, 4 outputs, 2 A, Profibus
RF-FLS DN M12 DIO 4/4 M12-2A	4 inputs, 4 outputs, 2 A, DeviceNet
RF-FLS PB M12 DIO 8/8 M12	8 inputs, 8 outputs, 0,5 A, Profibus

Fig. 4-22: Rexroth Fieldline digital input/output modules

4.8 Brief description PC based visualization units

General information

The PC based visualization units provide a graphical user interface and serve for handling/visualization. They communicate with the PPC or the PLC via serial interface, via Ethernet or via PCI interface.

The visualization units have the following properties:

- touch screen,
- 12" or 15" TFT screen,
- 3, 4 or 6 slots for motion control and option cards (PPC-P11.1),
- power supply 230V or 24V,
- programming with project planning tool "WinStudio".

The following units are available:

- BTV 16 (12")
- BTV 40 (15")
- VSP 16 (12")
- VSP 40 (15")
- VSB or IPC with VDP 16 (15")
- VSB or IPC with VDP 40 (15")
- VPP 21 (14")

BTV 16/40, VSP 16/40

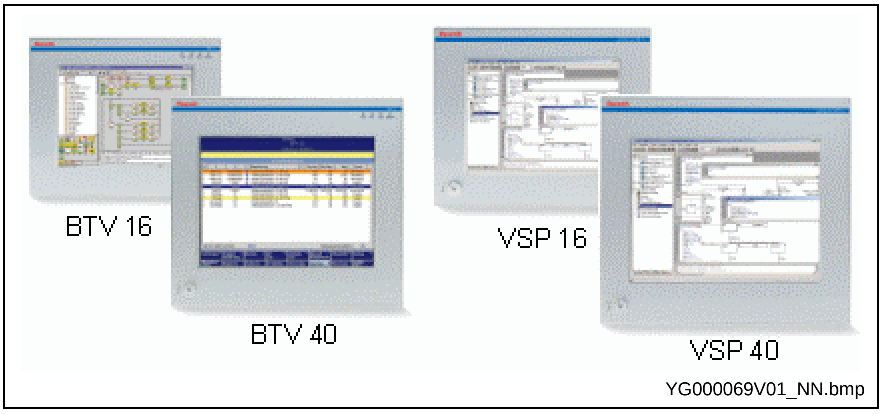

Fig. 4-23: PC based Visualization units BTV 40 and BTV 16 or VSP 40 and VSP 16

The operator input terminals BTV 16.2, BTV 40.2, VSP 16.1 and VSP 40.1 are PC based machine operator input terminals that can also serve for control functionality depending on the application or configuration. The number of the integrated plug-in cards depends on the used PC box.

VDP 16/40, IPC 40

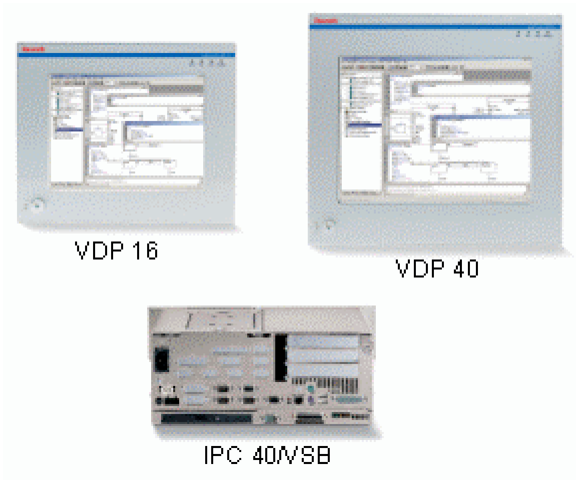

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Fig. 4-24: PC based visualization units VSB and IPC with VDP 40 or VDP 16

The IPC 40.2 is an industrial PC that serves as PC based operator input terminal in connection with a display VDP 16.1, VDP 40.1 or VDP 60.1. It can also serve for control functionality depending on the application or configuration.

VPP 21

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Fig. 4-25: PC based visualization units VPP 21

The operator input terminals VPP 21 are PC based machine operator input terminals that consists of

- a closed plastic housing
(protection category overall device: IP 40, protection category front panel: IP 64)
- TFT display with touch screen,
- different display and operator input components depending on the design and
- an integrated powerful industrial PC.

The operator input terminals of type VPP 21 are only provided for mounting at a carrier arm. Due to its construction they are predestinated as "operator input terminal control", whereto special pushbuttons (control-ON, control-OFF, emergency-STOP) are integrated in the housing. Sideways left and right three navigation buttons are integrated. For communication with external components, standardized fieldbus systems are used. The limited extendable processor unit inclusive power supply and fieldbus interface connection is located in the so-called VPP 21-Box, which is integrated in the plastic housing of the VPP 21.

4.9 Brief description Windows CE based visualization units VEP

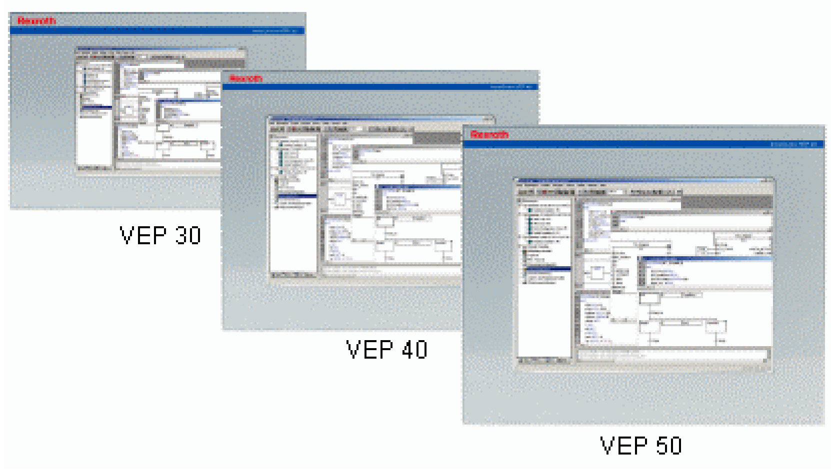

Fig. 4-26: Windows CE based visualization units VEP 50, VEP 40 or VEP 30

The Windows CE based visualization units provide a graphical user interface and serve for handling/visualization. They communicate with the PPC or PLC via serial interface or via Ethernet.

The visualization units have the following properties:

- 8,4", 12" or 15" TFT screen,
- resolution 800 x 600 pixels (SVGA) or 1024 x 768 pixels (XGA),
- Touch screen,
- aluminum front panel IP65,
- option slots for fieldbus modules (e.g., Profibus master in case of an integrated PLC IndraLogic),
- supply voltage 24V,
- short-time UPS for data backup on compact-flash,
- operating system Windows CE 4.2
- programming with project planning tool "WinStudio".

The following units are available:

- VEP 30 (8,4")
- VEP 40 (12")
- VEP 50 (15")

4.10 Brief description miniature control terminal VCP


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Fig. 4-27: Miniature control terminals VCP

Miniature control terminals VCP provide a graphical user interface and serve for handling/visualization.

They can be connected

- to the serial interface of the PPC motion control,
- to a fieldbus master interface of the PC motion control (with PLC).

All miniature control terminals have the same structure:

- control cabinet mounting,
- display with back lighting,
- aluminum front panel IP65 (VCP 01: plastics),
- short-stroke or foil keys or touch display,
- variable definable key functions, insert strips permit keys to be labeled (VCP 01: no insert strip),
- serial RS232/422 interface or fieldbus connection Profibus and DeviceNet (VCP 01: only RS232, VCP 02: only RS232/422 and Profibus),
- supply voltage 24V,
- programming with project planning tool "VI-Composer".

The following miniature control terminals are available:

- VCP 01
- VCP 02
- VCP 05
- VCP 08
- VCP 20
- VCP 25

They distinguish in graphic resolution, number of keys and dimensions.

4.11 Installation instructions RECO control

The module carriers must first be installed before the PPC-R units can be installed. These module carriers are equipped with the PPC-R unit and, according to the requirements, with the related I/O modules (RECO02 modules).

Installing the module carriers

To install the module carrier RMB02.2-04, you must latch it onto a DIN rail TS 35x27x15 and secure it with a retaining screw. The module carrier may also be installed directly on the installation plate in the control cabinet. This is done through boreholes provided in the module carrier.

Up to four RMB02.2-04 module carriers can be installed side-by-side. The PPC-R must be in slot 0, if it shall be able to control the RECO bus. Slot addressing requires the DIP switch on the bus board of the RMB02.2-04 module carrier to be configured.

Note: The installation position of the module carrier must be made in such a way, that the PPC-R is in vertical position. The supply- and exhaust air openings of the housing must be kept free.

Arrangement of the module carrier

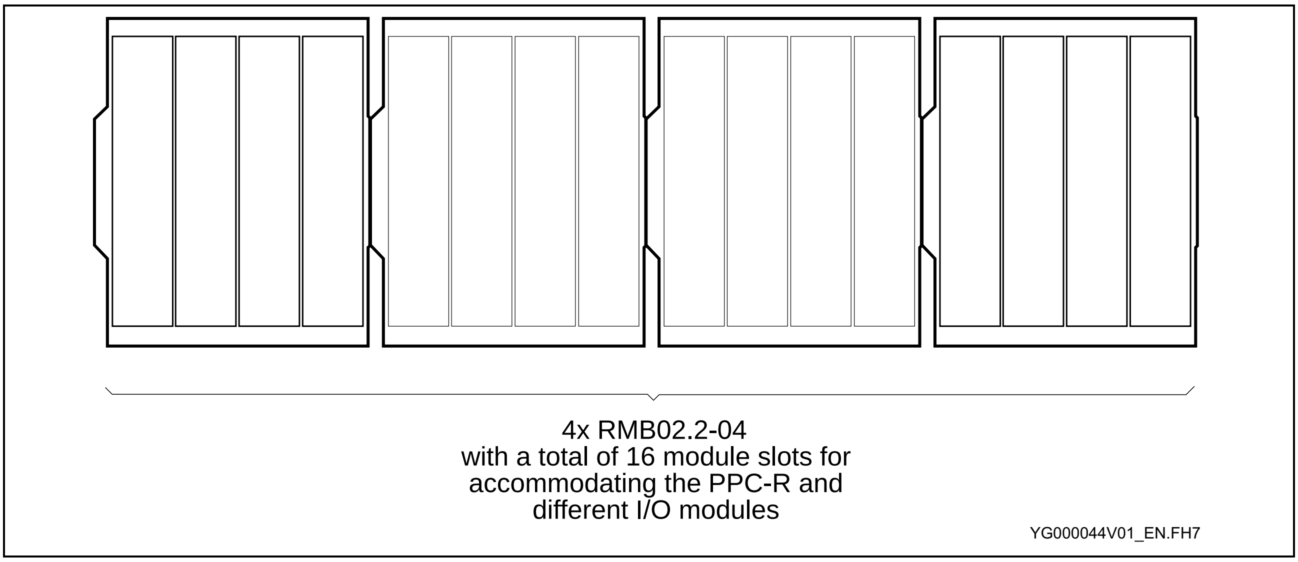


Fig. 4-28: Maximum configuration RMB02.2-04

For the accommodation of a double-width PPC-R22 or two single-width PPC-R21 without I/O modules the module carrier RMB02.2-02 is available.

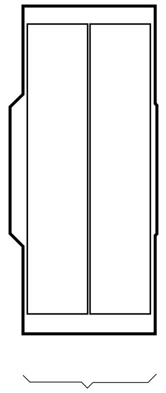


Fig. 4-29: Module carrier RMB02.2-02

Installing the modules

Starting with a PPC-R in slot 0 (left-hand side), the modules are plugged into the RMB02.2-04 module carrier. Each module is secured with two fixing screws. The I/O modules (RECO02.2) are added in the slots 1-15 or 2-15 (with PPC-R21) to the right-hand side of the PPC-R. You may leave gaps to be able to install additional modules later.

Note: Prior to commissioning, you must tighten the fixing screws of the module carriers in order to avoid lateral movements that may lead to a disconnection of the connectors. The modules must be screwed to the module carrier.

Grounding

Grounding the controller and screening the electronic components requires a grounding cable of at least 6mm² to be laid between the grounding stud of the controller to the central grounding point of the machine. The other devices of the machine must be grounded in a star-shaped configuration (see Fig. 4-30). The power supply must be grounded in the same way.

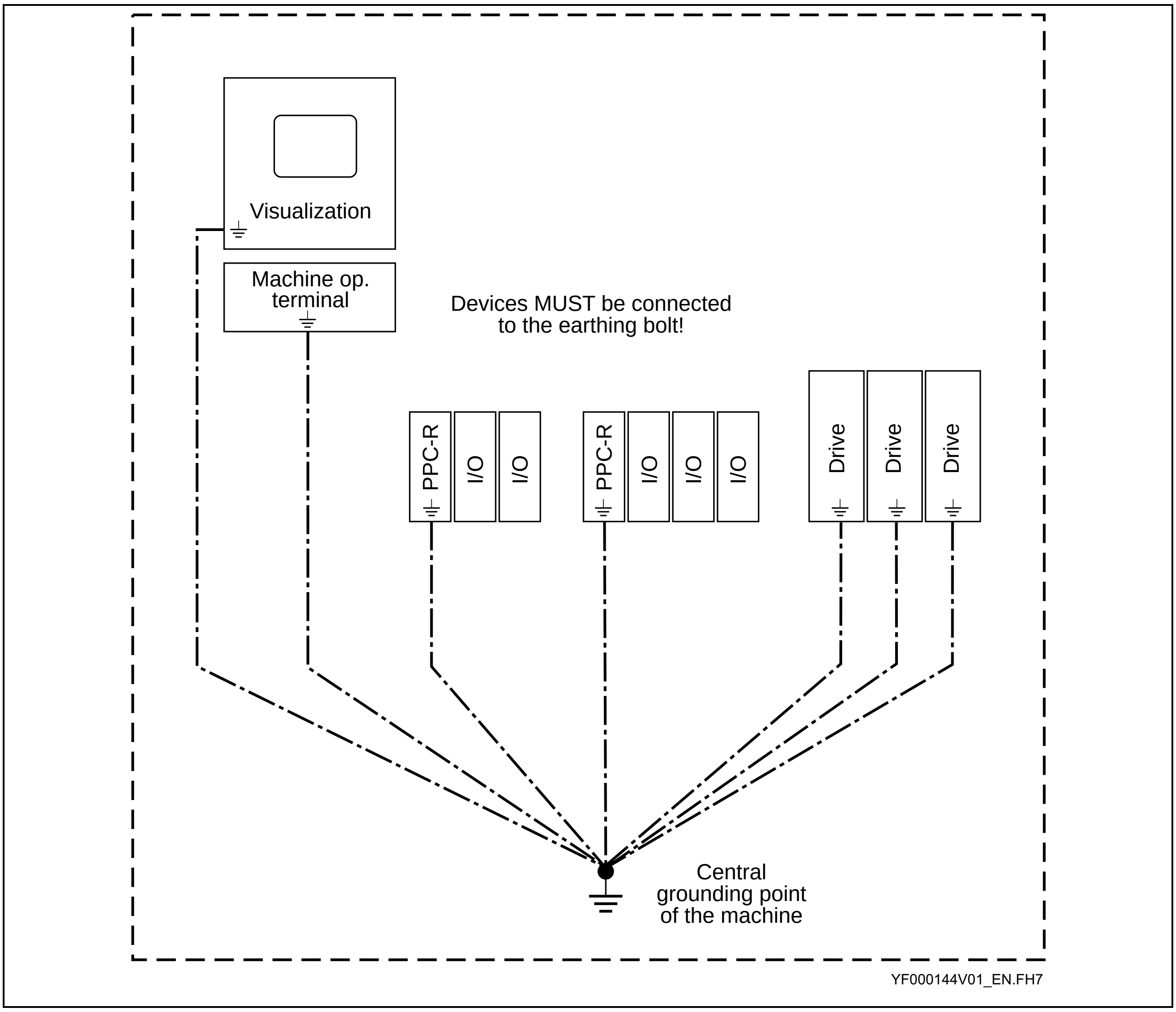


Fig. 4-30: System grounding with PPC-R

4.12 Slot addressing of the module carriers

A maximum of 4 module carriers RMB02.2-04 can be installed side by side. To be able to address the module carriers, there is a DIP switch on the bus board of the module carriers. Depending on the module carrier, the switch must be set to the corresponding module carrier number (module carrier address 00-03, see diagram below). Each module carrier number may only be set once.

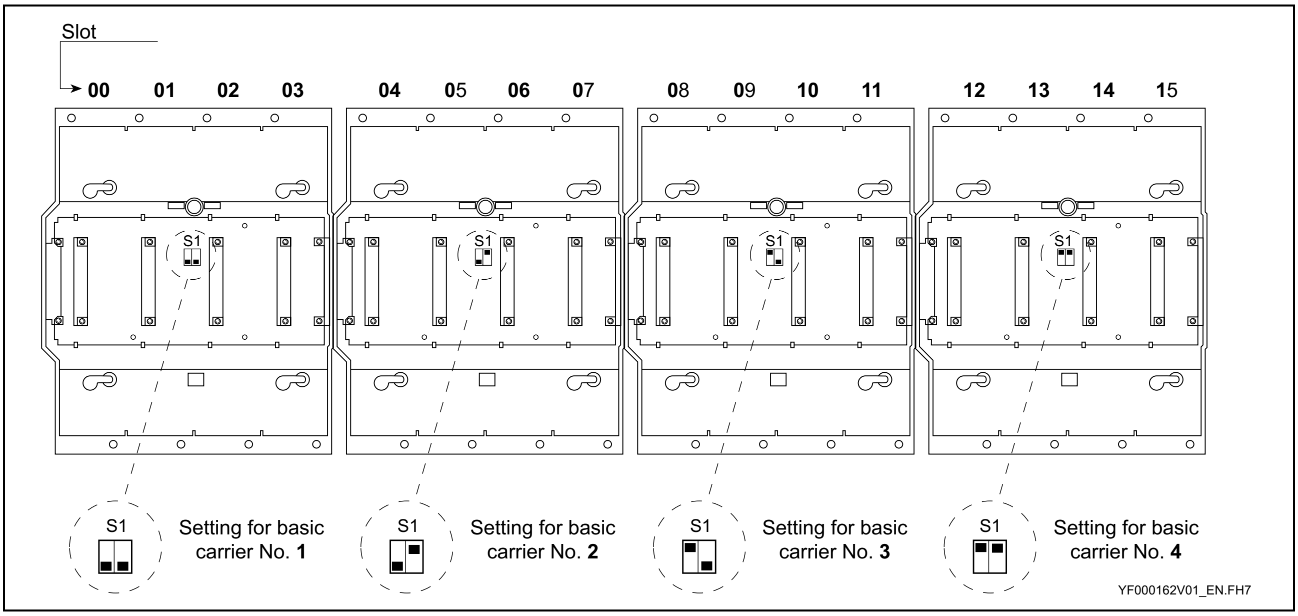


Fig. 4-31: Setting the slot address

4.13 Combination options module carrier - PPC - I/O modules

Motion control configuration

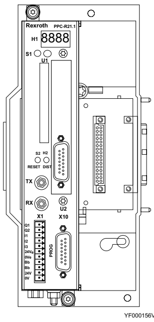
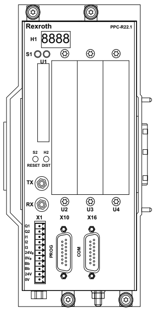
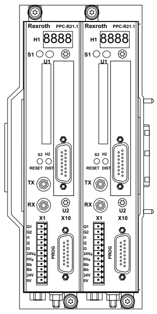
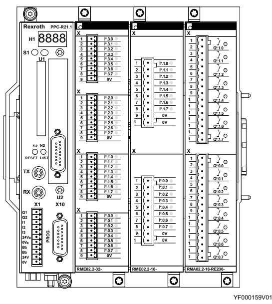
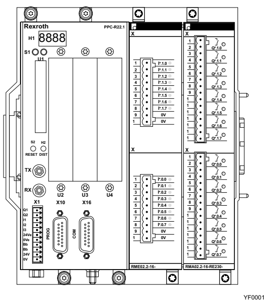
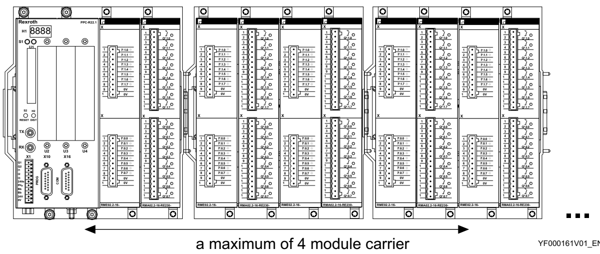
Structure	PPC	I/O	Remark
one module carrier RMB02.2-02   	1 x PPC-R21.1	without I/O	
	1 x PPC-R22.1	without I/O	
	2 x PPC-R21.1	without I/O	
one module carrier RMB02.2-04  	1 x PPC-R21.1	with I/O	PPC must be at slot (see Fig. 4-31, module carrier no. 1 left slot).
	1 x PPC-R22.1	with I/O	
several module carrier side-by-side 	1 x PPC-R21.1	with I/O	PPC at slot 0 operates I/O, the remaining PPC-R have **no** access on I/O! (slot 0: see Fig. 4-31, module carrier no. 1 left slot)
	1 x PPC-R22.1	with I/O	
	several PPC-R	without I/O	
	several PPC-R	with I/O	

Fig. 4-32: Combination options module carrier - PPC - I/O module

4.14 Installation instructions PPC-P control

The PC board of the PPC-P is mounted on the right of the front faceplate, when viewed from inside the PC (standard PCI mounting). Optional interface cards (e.g., fieldbus cards) have a small board mounted to the left of the front faceplate.

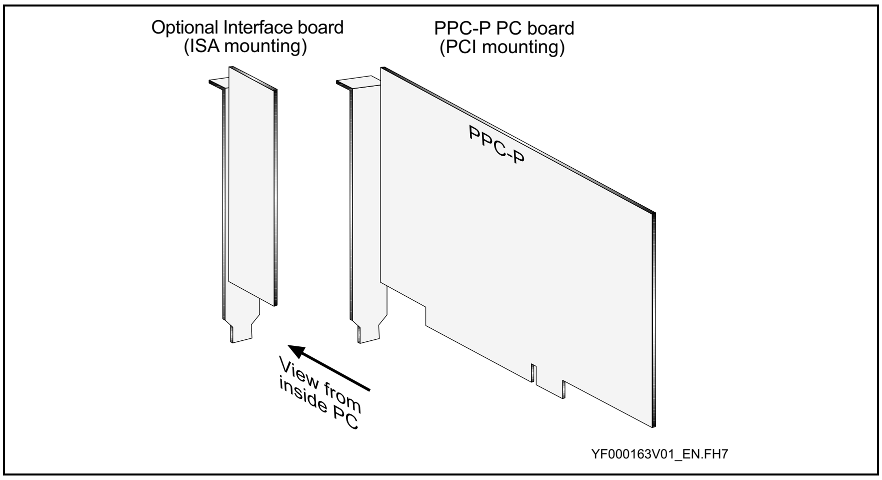


Fig. 4-33: PC board PPC-P and front faceplate (slot plate)

It is recommended that the plug-in cards that are placed beside the PPC-P (e.g., with optional interface cards) do not collide with this PC board allocations.

CAUTION

Improper installation of PCI and ISA cards in the PC can cause unwanted contact between boards.

⇒ Install cards to allow sufficient space between adjacent boards (maybe free a slot between).

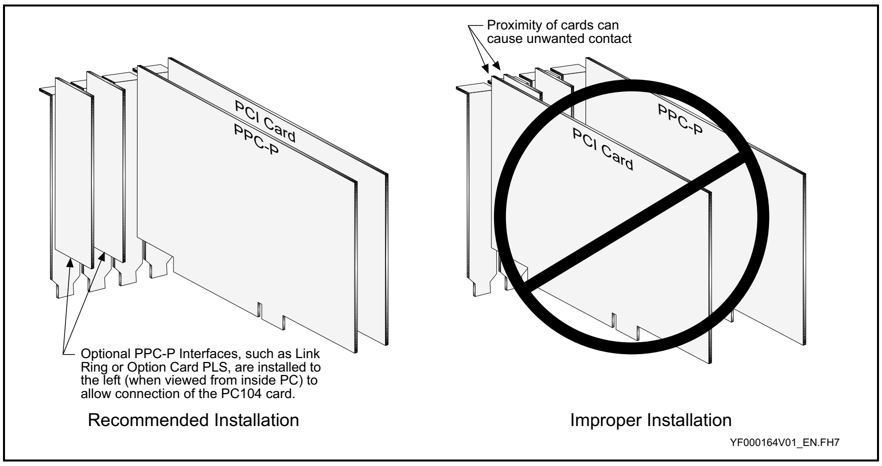


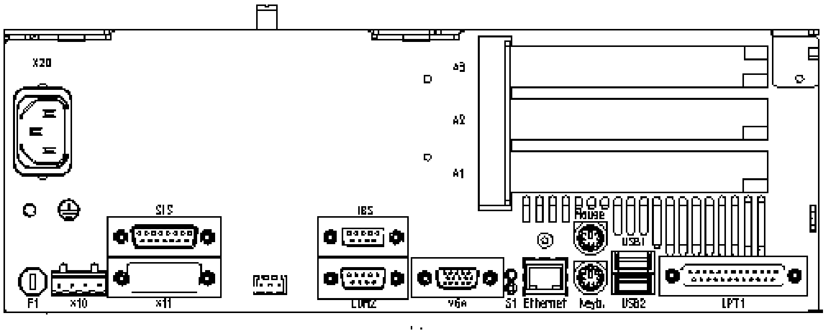
Fig. 4-34: Installation of the PPC-P with several PCI cards in the PC

4.15 Combination possibilities visualization units BTV - PPC-P

The BTVs can be delivered with different plug-in card configurations.

The base is the PCI plug-in card PPC-P11.1, the plug-in card configurations distinguish in the option cards of the PPC-P.

Each PPC option card needs a PC slot (PC slot plate). If more than 2 option cards are used the units with 6 slots must be used.



HT100007V01_NN.bmp

Fig. 4-35: PC box of the BTV with 3 slots

4.16 Specifications PPC-R2x

General specifications PPC-R2x

Attachment in the control cabinet	Module carrier RMB02.2-02/RMB02.2-04
Housing dimensions (B x H x D):	PPC-R21.1 = 41,5 x 192 x 150 mm PPC-R22.1 = 83,7 x 192 x 150 mm
Weight:	PPC-R21.1 = 1,1 kg PPC-R22.1 = 1,3 kg
Protection category:	IP20, EN60529
Ambient temperature:	0...+45 °C (operation) -25...+70 °C (transport, storage)
Relative humidity:	10...95 %, no condensation (operation) 5...95 %, no condensation (transport, storage) humidity class according to DIN EN 611131-2: RH-2 climate class according to DIN EN 60721-3: 3K3
Air pressure:	86...106 kPa (operation) 70...106 kPa (transport, storage) according to DIN EN 61131-2: operation up to 2000m over NN
Real time clock buffer	buffer time 5 days with T_A 45° C

Fig. 4-36: General specifications PPC-R2x

Power supply PPC-R2x

Rated value	24 V_{DC}
Ripples	5% max.
Permissible range	19,2...30 V_{DC} (ripple factor included)
Max current consumption on 24 V_{DC} (PPC-R21) (PPC-R22)	 0,9 A 1,2 A (+2,2 A max. I/O BUS supply)
required fuse in the supply cable	max. 4 A time-lag for 24V max. 2 A time-lag for 24Ve
Cable cross section for supply:	0,75...1,5 mm^2 (depending on the power demand)

Fig. 4-37: Power supply PPC-R2x

I/O Bus supply by control

Module supply 24 V	max 2,2 A
Module supply 5 V	max 2,5 A
Total power	max 52 W (heed the Derating)

Fig. 4-38: I/O bus supply by control

Digital inputs and outputs of the PPC-R2x

3 digital inputs (potential-free)	"0" signal: input voltage –3V.. 5V; input current ≤2,5mA "1" signal: input voltage 11V..30V; input current 2,8mA ≤I ≤6mA delay: typ. 100µs
2 digital outputs (potential-free)	output voltage 24V; output current 0,5A (nominal value), short-circuit-proof "1" signal: 2mA ... 0,6A; voltage drop ≤1,5V "0" signal: leakage current ≤0,5mA delay: < 500µs
1 Bb – relay (ready for operation) (system monitoring)	NO contact V_n = 24 V_{DC}, I_{max} = 150 mA min. 500 000 switch cycles (overcurrent protected)

Fig. 4-39: Inputs and outputs of the PPC-R2x

EMC of the PPC-R2x

Emitted interference to EN 55022	Class A (industrial environment)
Noise immunity to EN 61000-4-2 (ESD)	Rating criterion B
Noise immunity to EN 61000-4-4 (Burst)	Rating criterion B
Noise immunity to EN 61000-5-5 (Surge)	Rating criterion B

Fig. 4-40: EMC data of the PPC-R2x

DERATING I/O bus supply

0 – 35 °C	100 % (52 W)
35 – 45°C	85 % (44 W)

Fig. 4-41: DERATING I/O bus supply

Interfaces of the PPC-R2x

Programming interface (PROG)	RS232/RS422/RS485 w/o RS232 control signals (D-SUB, 15-way female connector), electrically isolated
General serial interface (COM)	RS232/RS422/RS485 with RS232 control signals (D-SUB, 15-way female connector), not electrically isolated
Ethernet interface (optional)	RJ45 female connector 10/100 BASE-TX

Fig. 4-42: Interface specifications of the PPC-R2x

Connecting the power supply of the PPC-R2x

Note: Connector and modules may only be inserted or removed when the power is switched off!

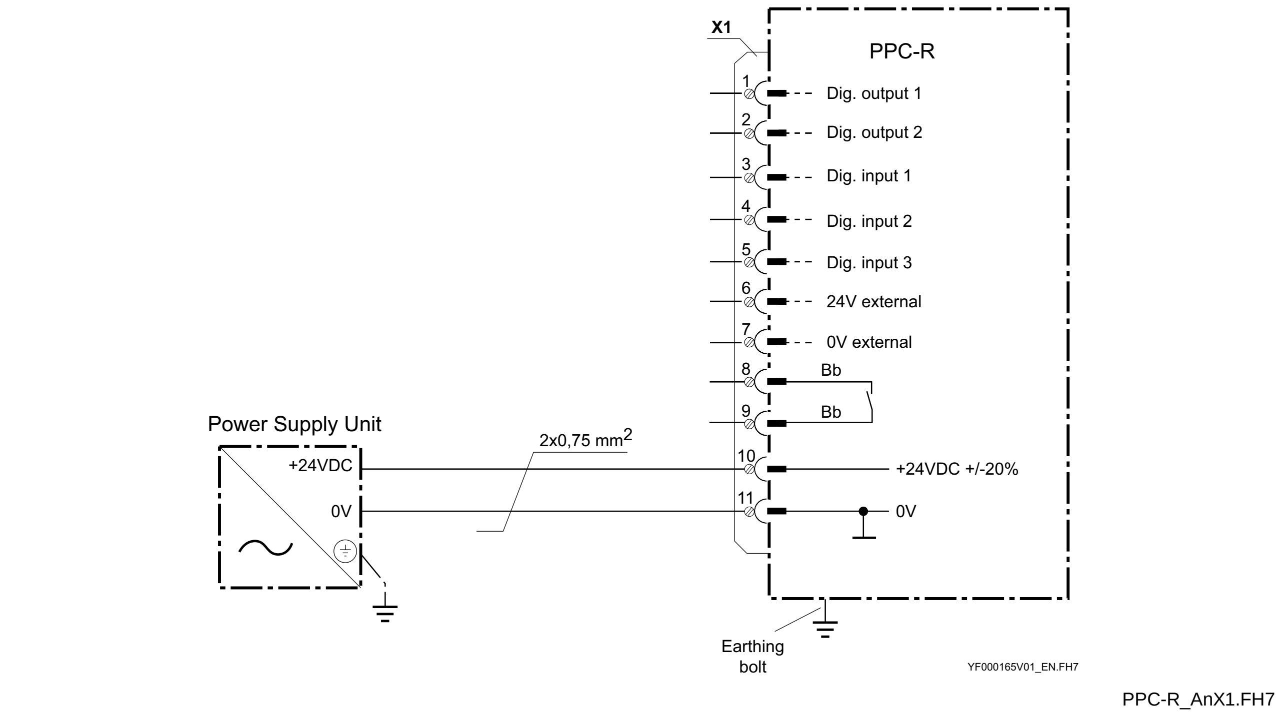


Fig. 4-43: Connecting the power supply of the PPC-R2x

Note: Pin 1 to 5 are not supported in SYNAX version 08!

Connector pin assignments of the PPC-R2x

X1 (11-way Phoenix female connector) of the PPC-R2x

Pin	Signal name
1	Dig. output 1 (Q1)
2	Dig. output 2 (Q2)
3	Dig. input 1 (I1)
4	Dig. input 2 (I2)
5	Dig. input 3 (I3)
6	24V external voltage
7	external GND
8	Bb relay
9	Bb relay
10	24V
11	GND

Fig. 4-44: Connector pin assignment X1 of the PPC-R2x

PROG-, COM interface (X10, X16) of the PPC-R2x

Serial interface as per Rexroth standard (SIS - 15-way DSUB female connectors).

The COM interfaces (X16) has full modem capability. The PROG interface (X10) is isolated and should preferably be used for permanent interfaces (e.g., 3964R, SynTop via RS485) or long cables (e.g., SynTop with long serial cable).

Pin	Signal name
1	(Protected Ground) NC
2	RS232 TxD
3	RS232 RxD
4	RS422 RxD+ or RS485+
5	RS422 RxD- or RS485-
6	NC
7	Signal Ground
8	NC
9	RS422 TxD+
10	GND
11	RS422 TxD-
12	+5V
13	NC
14	NC
15	NC

Fig. 4-45: Interface pin assignment of X10 of the PPC-R2x

Pin	Signal name
1	(Protected Ground) NC
2	RS232 TxD
3	RS232 RxD
4	RS422 RxD+ or RS485+
5	RS422 RxD- or RS485-
6	DSR
7	Signal Ground
8	DCD
9	RS422 TxD+
10	GND
11	RS422 TxD-
12	+5V
13	RTS
14	CTS
15	DTR

Fig. 4-46: Interface pin assignment of X16 of the PPC-R2x

Ethernet interface (X74) of the PPC-R2x

The Ethernet interface X74 is fitted with a RJ45 bushing according to 10/100 BASE-TX standard.

4.17 Specifications PPC-P11

General specifications PPC-P

Attachment in the PC:	standard PCI bus
Dimensions of the PC board	"short card" as per PCI spec. 2.2
Ambient temperature:	0...+45 °C (operation) -20...+70 °C (transport, storage)
Relative humidity:	5...75 %, no condensation (operation) 5...95 %, no condensation (transport, storage)
Air pressure:	86...106 kPa

Fig. 4-47: General specifications PPC-P

Power supply PPC-P

Voltage	as per PCI 2.2: +5V, +3,3V (+12V/-12V transmitted to PC/104 option slot)
Current consumption (without expansion options)	+5V 450 mA +3,3V 1400 mA +12V 0 mA -12V 0 mA
Current consumption (with expansion options)	+5V 2900 mA +3,3V 1400 mA +12V 0 mA -12V 0 mA

Fig. 4-48: Power supply PPC-P

Digital inputs and outputs of the PPC-P

1 Bb – relay (ready for operation) X5 (system monitoring)	NO contact V_n = 24 V_{DC}, I_{max} = 150 mA min. 200 000 switch cycles (overcurrent protected)

Fig. 4-49: Digital inputs and outputs of the PPC-P

Interfaces of the PPC-P

Serial interface (PROG) X10	RS232/RS422/RS485 (D-SUB, 15-way female connector), isolated

Fig. 4-50: Interface specifications of the PPC-P

Connector pin assignment of the PPC-P

Serial interface (X10) of the PPC-P

Serial interface as per Rexroth standard (SIS - 15-way DSUB female connectors).

The interfaces has full modem capability. The PROG interface (X10) is isolated.

Pin	Signal name
1	(protected ground) NC
2	RS232 TxD
3	RS232 RxD
4	RS422 RxD+ or RS485+
5	RS422 RxD- or RS485-
6	DSR
7	signal ground
8	DCD
9	RS422 TxD+
10	GND
11	RS422 TxD-
12	+5V
13	RTS
14	CTS
15	DTR

Fig. 4-51: Interface pin assignments of X10 of the PPC-P

4.18 Procedure at HMI components

General information

The following HMI device families are available at the HMI components:

- PC based devices (BTV, VSB, IPC, VDP, VPP)
- Windows CE based devices (VEP)
- compact device (VCP)

Different project planning software is available for the programming of the devices.

Device family	Project planning software
PC based device (**BTV/VSB/IPC/VDP/VPP**)	WinStudio
Windows CE based devices (**VEP**)	WinStudio
compact devices (**VCP**)	VI-Composer

Fig. 4-52: Project planning software

Software for compact devices (VCP)

Project planning: VI-Composer

At compact devices the firmware and the project planning software VI-Composer are necessary beside the visualization units.

Note: The project planning software is only necessary once per PC and not once per device as the device firmware.
The corresponding licensing agreement is part of the software delivery.

Runtime license

The runtime license is contained in the device.

Software for Windows CE based devices and PC based devices

Project planning: WinStudio

The project planning software WinStudio is necessary for the devices. This software is available in different scaling steps analog to the runtime (see below).

The scaling steps are:

Step	Variable	Array size	Class members
64K	64 000	1024	64
4K	4000	512	32
1K5	1500	256	32

Fig. 4-53: Scaling steps WinStudio project planning

Note: With the scaling steps with larger performance also runtimes with smaller performance can be projected.

Note: The project planning software is only necessary once per PC and not once per device as the device firmware.
The corresponding licensing agreement is part of the software delivery.

Runtime license

The runtime license of the visualization is necessary once per device and is available in different scaling steps analog to the project planning software.

Also a version for Windows CE as visualization system is available in addition (VEP devices).

Step	Number of variables	Array size	Class members	Target system
64K	64 000	1024	64	Windows NT/2000/XP
4K	4000	512	32	Windows NT/2000/XP
1K5	1500	256	32	Windows NT/2000/XP
WCE4K	4000	512	32	Windows CE
WCE1K5	1500	256	32	Windows CE

Fig. 4-54: Scaling steps of the WinStudio runtime licenses

4.19 Specifications BTV 16, BTV 40

The following devices are supported:

- BTV16.2BB and
- BTV40.2BE.

Specifications of the front

	BTV 16.2BB
Display	12" TFT 800 x 600 pixels
	256.000 colors
Handling	touch handling
Surface –front panel	color RAL 7035 light grey
Protection rating	front panel IP 65 DIN 40 050, IEC 529
Interface	USB connection, cover protection rating IP 65

Fig. 4-55: Front specifications BTV 16.1

	BTV 40.2BE
Display	15" TFT 1024 x 768 pixels
	256.000 colors
Handling	touch handling
Surface –front panel	color RAL 7035 light grey
Protection rating	front panel IP 65 DIN 40 050, IEC 529
Interface	USB connection, cover protection rating IP 65

Fig. 4-56: Specifications of the front BTV 40.1

Specifications of the PC box

PC box	Type A	Type C
Processor	pentium-III with a min. of 933 MHz and integrated graphic controller with a max. of 8 MB screen memory	
Working memory	512 MB	
Hard disk	Min. 20 GB	
Optional drives	CD-ROM or DVD/CD-RW	
Interfaces	• 1 x auxiliary interface (25 way, D-sub) • 1 x external VGA connection (15 way, HD-sub) • 2 x USB connection (type A) • 1 x Ethernet connection (RJ 45, 10/100 Base-T) • 1 x keyboard connection (PS/2) • 1 x mouse connection (PS/2) • 1 x external accumulator connection	
Additional interfaces	2 to 3 serial standard interfaces RS232 (9 way, D-Sub)	
Slots	2 x PCI, 1 x PCI / ISA	3 x PCI, 1 x PCI/ISA
Protection rating	PC box: IP 00	
Power supply	85/264 VAC or 24 VDC	
Max. power supply	200 W	

Fig. 4-57: Specifications PC box

Specifications of the power supply 115V / 230V

Nominal input voltage:	115 VAC / 230 VAC	
Input voltage range:	85 ...264 VAC	
Input current:	1,0 A at nominal voltage 230 VAC 2,0 A at nominal voltage 115 VAC	
Max. switch-on current (cold start 25 °C)	40 A at nominal voltage 230 VAC 20 A at nominal voltage 115 VAC	
Output voltage:	current (max.)*	tolerance (incl. rest ripple)
+5 V +12 V -12 V +20 V ISO 6V	20 A 3 A 500 mA 2 A 200 mA	+/-5 % +/-5 % +/-5 % +/-5 % +/-5 %
Max. output power:	160 W*	
Efficiency:	0,8	

*) Note: At the specification of the maximum output currents it must be noticed that these values are the maximum possible currents from the respective output voltage. But the maximum current cannot be extracted from all output voltages at the same time, because the maximum sum of output power that has an amount of 160 W, may not be exceeded.

Fig. 4-58: Specifications of the power supply 115V / 230V

Specifications of the power supply 24V

Nominal input voltage:	24 VDC	
Input voltage range:	24 VDC +20%, -15%	
Noise and surge immunity	Umax = 35 V (for t < 100 ms)	
Max. input current:	6 A at nominal voltage 24 V	
Max. switch-on current	25 A at nominal voltage 24 V	
Output voltage:	current (max.)*	tolerance (incl. rest ripple)
+5 V +12 V +24 V -12 V ISO 6VV	+5 V +12 V +24 V -12 V ISO 6V	+/-5 % +/-5 % +/-5 % +/-5 % +/-5 %
Max. output power:	110 W*	
Efficiency:	0,8	

*) Note: At the specification of the maximum output currents it must be noticed that these values are the maximum possible currents from the respective output voltage. But the maximum current cannot be extracted from all output voltages at the same time, because the maximum sum of output power that has an amount of 110 W, may not be exceeded.

Fig. 4-59: Specifications of the power supply 24 V

Ambient conditions BTV 16, BTV 40

	During operation	During storage/transport
Max. ambient temperature	+ 5 ... + 45°C	-20°C to +60°C
Max. temperature gradient	time temperature changes up to 3°C per minute	not defined
Relative humidity	climate class 3K3 according to EN 60721, condensation not permitted	climate class 3K3 according to EN 60721, condensation not permitted
Atmospheric pressure	up to 2000 m altitude according to DIN 60204	
Mechanical strength	Max. vibration : frequency range: 10...150 Hz deflection: 0,075 mm at 10...57 Hz acceleration: 1 g at 57...150 Hz according to EN 60068-2-6	Max. shock: 15 g according to DIN IEC 68-2-27, no failure of the function

Fig. 4-60: Ambient conditions BTV 16/BTV 40

Wear parts BTV 16, BTV 40

Wear parts that are without guarantee

- The service life of the backlight is limited to a certain number of operating hours. After this time the backlight will produce only 50 % of its original brightness. This time differs for the used displays:
  - 12": 40.000 hours
  - 15": 35.000 hours
- CMOS battery: 5 to 7 years
- accumulator pack: the number of the practicable load cycles of the accumulator pack and thus the service life depends on the ambient temperature the accumulator is used. In this case the ambient temperature defines the temperature where the operator input terminal or the accumulator pack is placed, e.g., the inside temperature of the control cabinet or a control panel housing.

Ambient temperature	Load cycles	Service interval
25°C	4000 cycles	6 years
35°C	2000 cycles	3 years
45°C	1000 cycles	1,5 years

Fig. 4-61: accumulator pack

The operation out of this typical conditions is permissible, whereby, however, the service life of the hard disk may be reduced. However, the ambient conditions specified for the overall device have to be absolutely kept.

- Also fans are mechanic wear components, whose service life is extremely temperature-dependent. For the fan integrated in the housing the manufacturer specifies the following service life:

Ambient temperatur	Service life
40 ° C	70 000 hours
70 ° C	35 000 hours

Fig. 4-62: Service life of the fan

4.20 Specifications VSP 16, VSP 40

The following devices are supported:

- VSP16.1DBE-512NN-C1 and
- VSP40.1DEE-512NN-C1.

Specifications of the front

	VSP16.1DB
Display	12"-TFT 800 x 600 pixels
	256.000 colors
Handling	touch handling
Surface –front panel	color RAL 7035 light grey
Protection rating	front panel IP 65 DIN 40 050, IEC 529
Interface	USB connection, cover protection rating IP 65

Fig. 4-63: Front specifications VSP16.1

	VSP 40.1DE
Display	15"-TFT 1024 x 768 pixels
	256.000 colors
Handling	touch handling
Surface –front panel	color RAL 7035 light grey
Protection rating	pront panel IP 65 DIN 40 050, IEC 529
Interface	USB connection, cover protection rating IP 65

Fig. 4-64: Front specifications VSP40.1

Specifications of the PC box

PC-Box	Type E
Processor	Celeron with a min. of 2 GHz and integrated graphic controller with a max. of 8 MB screen memory
Working memory	512 MB
Hard disk	Min. 20 GB
Optional drives	CD-ROM or DVD/CD-RW
Interfaces available in all options	• 1 x auxiliary interface (25 way, D-sub) • 1 x external VGA connection (15 way, HD-sub) • 2 x USB connection (type A) • 1 x Ethernet connection (RJ 45, 10/100 Base-T) • 1 x keyboard connection (PS/2) • 1 x mouse connection (PS/2) • 1 x serial standard interface RS232 (9 way, D-Sub) [1]
Slots	6 x PCI
Power supply	90...264 VAC, alternative 19...32 VDC
Max. power supply	330 W (at 230 VAC), alternative 380 W (at 19 VDC)
Protection rating	PC box: IP 00

Fig. 4-65: Specifications PC box

Specifications of the power supply 115V / 230V

Nominal input voltage:	115 VAC / 230 VAC		
Input voltage range:	90 ... 264 VAC		
Input current:	2,5 A at nominal voltage 230 VAC 5,0 A at nominal voltage 115 VAC		
Switch-on current:	100 A at 264 VAC		
Output voltage:	current		tolerance
	min.	max.	
+ 3,3 V	0,5 A	20 A	+/- 5 %
+5 V	0,5 A	25 A	+/- 5 %
+12 V	1,0 A	17 A	+/- 5 %
-12 V	0 A	0,8 A	+/-10 %
+ 5 V SB	0 A	2,0 A	+/- 5 %
Max. output power:	250 W*		
Efficiency (at full load):	0,73 at 115 VAC, 0,76 at 230 VAC		

*) Note: At the specification of the maximum output currents it must be noticed that these values are the maximum possible currents from the respective output voltage. But the maximum current cannot be extracted from all output voltages at the same time, because the maximum sum of output power that has an amount of 250 W, may not be exceeded. Also the maximum power at + 3,3 V and +5 V together may not exceed 150 W or 33 A.

Fig. 4-66: Specifications of the power supply 115V / 230V

[1] This interface is necessary for the optional available external USV and is not available for the connection of other devices afterwards.

Specifications of the power supply 24V

Nominal input voltage:	24 VDC		
Input voltage range:	19 ... 32 VDC		
Input current:	20 A at 19 VDC		
Switch-on current:	5 A		
Output voltage:	current		tolerance
	min.	max.	
+ 3,3 V +5 V +12 V -12 V – 5 V + 5 V SB	0 A 2 A 0,1 A 0 A 0 A 0 A	15 A 30 A 15 A 2,0 A 2,0 A 1,2 A	+ 2,93 V ... + 3,40 V + 4,80 V ... + 5,20 V + 11,4 V ... + 12,6 V – 11,4 V ... – 12,6 V – 4,75 V ... – 5,25 V + 4,75 V ... + 5,25 V
Max. output power:	300 W*		
Efficiency (at full load):	> 0,65		

*) Note: At the specification of the maximum output currents it must be noticed that these values are the maximum possible currents from the respective output voltage. But the maximum current cannot be extracted from all output voltages at the same time, because the maximum sum of output power that has an amount of 300 W, may not be exceeded. Also the maximum power at + 3,3 V and +5 V together may not exceed 150 W.

Fig. 4-67: Specifications of the power supply 24 V

Ambient conditions VSP 16, VSP 40

	during operation	**During storage/transport**
Max. ambient temperature	+5 °C... +45 °C	-20 °C to +60 °C
Max. temperature gradient	time temperature changes up to 3°C per minute	not defined
Relative humidity	climate class 3K3 according to EN 60721, condensation not permitted	climate class 3K3 according to EN 60721, condensation not permitted
Atmospheric pressure	up to 2000 m altitude according to DIN 60204	
Mechanical strength	Max. vibration: frequency range: 10...150 Hz deflection: 0,025 mm at 10...57 Hz acceleration: 0,25 g at 57...150 Hz according to EN 60068-2-6	Max. shock: 5 g according to DIN IEC 68-2-27, no failure of the function

Fig. 4-68: Ambient conditions VSP 16, VSP 40

Wear parts VSP 16, VSP 40

Wear parts that are without guarantee

- The service life of the backlight is limited to a certain number of operating hours. After this time the backlight will produce only 50 % of its original brightness. This time differs for the used displays:
  - 12": > 50.000 hours
  - 15": > 30.000 hours
- CMOS battery: 5 to 7 years
- The hard disk is an electromechanic wear part that has to be changed during the operating time. According to the manufacturer's specifications the hard disk has been developed for a service life of 60 months in consideration of the following conditions:

3,5" hard disk		
Operating hours / month		Max. 720
Input/output cycles / month		min. 10 and max. 833
Operating conditions	Temperature	< 60 °C
	Rel. humidity	< 90 %
	Height	< 3000 m
	Accesses	50 % of the operating hours
Storage conditions	Temperature	< 70 °C
	Rel. humidity	< 95 %
	Duration	< 3 months

Fig. 4-69: Typical operating and storage conditions of the hard disk

The operation out of this typical conditions is permissible, whereby, however, the service life of the hard disk may be reduced. However, the ambient conditions specified for the overall device have to be absolutely kept.

- Also fans are mechanic wear components, whose service life is extremely temperature-dependent. For the fan integrated in the housing the manufacturer specifies the following service life:

Ambient temperature	Service life
40 ° C	70 000 hours
70 ° C	35 000 hours

Fig. 4-70: Service life of the fan

4.21 Specifications IPC/VSB with VDP 16, VDP 40

The following devices are supported:

- IPC40.2G4,
- VSB40.1G4E-512NN-C1,
- VDP16.2DBN-G4-NN-NN and
- VDP40.2DEN-G4-NN-NN.

Specifications of the front

	VDP16.2DB
Display	12"-TFT 800 x 600 pixels
	256.000 colors
Handling	touch handling
Surface –front panel	color RAL 7035 light grey
Protection rating	front panel IP 65 DIN 40 050, IEC 529
Interface	USB connection, cover protection rating IP 65

Fig. 4-71: Front specifications VDP16.2

	VDP 40.2DE
Display	15"-TFT 1024 x 768 pixels
	256.000 colors
Handling	touch handling
Surface –front panel	color RAL 7035 light grey
Protection rating	pront panel IP 65 DIN 40 050, IEC 529
Interface	USB connection, cover protection rating IP 65

Fig. 4-72: Front specifications VDP40.2

Specifications of the PC box

PC-Box	Type A	Type C
Processor	Pentium-III with a min. of 933 MHz and integrated graphic controller with a max. of 8 MB screen memory	
Working memory	512 MB	
Hard disk	Min. 10 GB	
Optional drives	CD-ROM or DVD/CD-RW	
Interfaces available in all options	• 1 x GIGASTAR (25-way, D-SUB) • 1 x auxiliary interface (25-way, D-Sub) • 1 x external VGA connection (15-way, HD-Sub) • 2 x USB connection (type A) • 1 x Ethernet connection (RJ 45, 10/100 Base-T) • 1 x keyboard connection (PS/2) • 1 x mouse connection (PS/2) • 1 x external accumulator connection • 1 x RS422 interface (9-way, D-Sub)	
Additional interfaces		
in the option without special interface	• 3 serial standard interfaces RS232 (9-way, D-Sub) [2]	
Slots	2 x PCI, 1 x PCI / ISA	3 x PCI, 1 x PCI / ISA
Protection rating	PC box: IP 00	
Power supply	85/264 VAC or 24 VDC	
Max. power supply	200 W	

Fig. 4-73: Specifications PC box IPC 40

[2] at devices with touch screen 2 serial interfaces

Specifications of the power supply 115V / 230V

The VDP is supplied by the IPC via the GIGASTAR interface with a voltage of 24 VDC. The maximum input current is 2 A.

Only with the use of a Y repeaters the VDP must be separately supplied with 24 VDC.

Nominal input voltage:	115 VAC / 230 VAC	
Input voltage range:	85 ...264 VAC	
Input current:	1,0 A at nominal voltage 230 VAC 2,0 A at nominal voltage 115 VAC	
Max. switch-on current (cold start 25 °C)	40 A at nominal voltage 230 VAC 20 A at nominal voltage 115 VAC	
Output voltage: +5 V +12 V -12 V +20 V ISO 6V	current (max.)* 20 A 3 A 500 mA 2 A 200 mA	tolerance (incl. rest ripple) +/-5 % +/-5 % +/-5 % +/-5 % +/-5 %
Max. output power:	160 W*	
Efficiency:	0,8	

*) Note: At the specification of the maximum output currents it must be noticed that these values are the maximum possible currents from the respective output voltage. But the maximum current cannot be extracted from all output voltages at the same time, because the maximum sum of output power that has an amount of 160 W, may not be exceeded.

Fig. 4-74: Specifications of the power supply 115V / 230V

Specifications of the power supply 24V

The VDP is supplied by the IPC/VSB via the GIGASTAR interface with a voltage of 24 VDC. The maximum input current is 2 A.

Only with the use of a Y repeaters the VDP must be separately supplied with 24 VDC.

Nominal input voltage:	24 VDC	
Input voltage range:	24 VDC +20%, -15%	
Noise and surge immunity	Umax = 35 V (for t < 100 ms)	
Max. input current:	6 A at nominal voltage 24 V	
Max. switch-on current	25 A at nominal voltage 24 V	
Output voltage: +5 V +12 V +24 V -12 V ISO 6V	current (max.)* 13 A 3 A 2 A 500 mA 200 mA	tolerance (incl. rest ripple) +/-5 % +/-5 % +/-5 % +/-5 % +/-5 %
Max. output power:	110 W*	
Efficiency:	0,8	

*) Note: At the specification of the maximum output currents it must be noticed that these values are the maximum possible currents from the respective output voltage. But the maximum current cannot be extracted from all output voltages at the same time, because the maximum sum of output power that has an amount of 110 W, may not be exceeded.

Fig. 4-75: Specifications of the power supply 24 V

Ambient conditions VDP 16, VDP 40, IPC 40/VSB40

	During operation	During storage/transport
Max. ambient temperature	+5 °C... +45 °C	-20 °C to +60 °C
Max. temperature gradient	time temperature changes up to 3°C per minute	not defined
Relative humidity	climate class 3K3 according to EN 60721, condensation not permitted	climate class 3K3 according to EN 60721, condensation not permitted
Atmospheric pressure	up to 2000 m altitude according to DIN 60204	
Mechanical strength	Max. vibration : frequency range: 10...150 Hz deflection: 0,075 mm at 10...57 Hz acceleration: 1 g at 57...150 Hz according to EN 60068-2-6	Max. shock: 15 g according to DIN IEC 68-2-27, no failure of the function

Fig. 4-76: Ambient conditions VDP 16, VDP 40, IPC 40/VSB40

Wear parts VDP 16, VDP 40, IPC 40/VSB 40

Wear parts that are without guarantee

- The service life of the backlight is limited to a certain number of operating hours. After this time the backlight will produce only 50 % of its original brightness. This time differs for the used displays:
  - 12": 40.000 hours
  - 15": 35.000 hours
- CMOS battery: 5 to 7 years
- accumulator pack: the number of the practicable load cycles of the accumulator pack and thus the service life depends on the ambient temperature the accumulator is used. In this case the ambient temperature defines the temperature where the operator input terminal or the accumulator pack is placed, e.g., the inside temperature of the control cabinet or a control panel housing.

Ambient temperature	Load cycles	Service interval
25°C	4000 cycles	6 years
35°C	2000 cycles	3 years
45°C	1000 cycles	1.5 years

Fig. 4-77: Accumulator pack

If the conditions are not exactly known, Bosch Rexroth recommends to change the accumulator every 1.5 year.

- Hard disk: The hard disk is an electromechanic wear part that has to be changed during the operating time. According to the manufacturer's specifications the hard disk has been developed for a service life of 60 months in consideration of the following conditions:

Operating hours / month		Max. 333
Input/output cycles / month		Min. 10 and max. 150
Operating conditions	Temperature	40 ° C
	Rel. humidity	30 %
	Height	< 500 m
	Accesses	30 % of the operating hours
Storage conditions	Temperature	< 30 ° C
	Rel. humidity	< 70 %
	Duration	< 3 months

Fig. 4-78 Typical operating and storage conditions of the hard disk

The operation out of this typical conditions is permissible, whereby, however, the service life of the hard disk may be reduced. However, the ambient conditions specified for the overall device have to be absolutely kept.

- Also fans are mechanic wear components, whose service life is extremely temperature-dependent. For the fan integrated in the housing the manufacturer specifies the following service life:

Ambient temperature	Service life
40 ° C	70 000 hours
70 ° C	35 000 hours

Fig. 4-79: Service life of the fan

4.22 Specifications VPP21

The following device is supported:

- VPP21.1BPD-512D-P7D-NNNN.

Specifications of the front

	VPP21.1BP
Display	14"-TFT 1024 x 768 pixels
	256.000 colors
Handling	touch handling
Surface –front panel	Bosch Rexroth design
Protection rating	front panel IP 64 DIN 40 050, IEC 529

Fig. 4-80: Front specifications VPP21.1

Specifications of the overall device

Protection rating	IP 40 (at closed doors)	
Nominal input voltage:	24 VDC	
Input voltage range:	24 VDC +20%, -15%	
Noise and surge immunity:	Umax = 35 V (for t < 100 ms)	
24 Volt power supply unit		
Maximum power consumption:	48 W [3]	
Input current:	2,0 A at nominal voltage 24 V [3]	
Output voltage **+ 5 V** **+ 12 V**	current (max.) 6 A 0,7 A	tolerance (incl. rest ripple) +/- 5 % +/- 5 %
Max. output power:	38,4 W	
Efficiency:	0,8	

Fig. 4-81: Specifications of the overall device

[3] The power supply unit receives the maximum of 48 W (24 V, 2 A) from the 24 VDC supply.
A maximum of 24 W (24 V, 2 x 0,5 A) that are necessary for the two 24 V ouptuts and are taken from the 24 VDC supply.

Specification of the PC

Processor	Pentium-III with a min. of 700 MHz and integrated graphic controller with a max. of 4 MByte screen memory
Working memory	512 MB SO-DIMM DRAM
Interfaces	• 1 x external VGA connection (15-way, HD-Sub) • 2 x Ethernet connection (RJ 45, 10/100 Base-T) • 1 x USB interface • 1 x serial standard interface • 1 x keyboard connection (PS/2) • 1 x mouse connection (PS/2) • 2 x 24 V outputs
Additional interfaces via a Hilscher-COM module	• Profibus DP master/slave
Slots at the connection field	• 1 x slot for Compact Flash card • 1 x slot for 2,5" hard disk
Slot	• 1 x PCI slot for short cards

Fig. 4-82: Specifications PC

Ambient conditions VPP 21

	During operation	**During storage/transport**
Max. ambient temperature	+5 ... +45 °C with housing fan +5 ... +25 °C without housing fan	-20 °C to +60 °C
Max. temperature gradient	time temperature changes up to 3°C per minute	time temperature changes up to 3°C per minute
Relative humidity	climate class 3K3 according to EN 60721, condensation not permitted. Amax. of 80 % humidity at 25 °C	climate class 3K3 according to EN 60721, condensation not permitted. A max. of 80 % humidity at 25 °C
Atmospheric pressure	up to 2000 m altitude according to DIN 60204	up to 3000 m altitude according to DIN 60204
Mechanical strength	Max. vibration: frequency range: 10...150 Hz deflection: 0,075 mm at 10...57 Hz acceleration: 1 g at 57...150 Hz duration of test per axis: 10 frequency cycles frequency throughput speed: 1 Octaver/min according to EN 60068-2-6, test Fc	Max. shock: 15 g according to EN 60 068-2-27, no failure of the function

Fig. 4-83: Ambient conditions VPP 21

Note: In the connection field of the VPP 21 box a slot for a 2,5" hard disk is integrated. If you insert a hard disk that is not suitable for the ambient conditions listed in Fig. 4-83, you have to ensure the ambient conditions for the VPP 21 that are given by the hard disk manufacturer.

Wear parts VPP 21

Wear parts that are without guarantee

- The service life of the backlight in the LDC display is limited to a certain number of operating hours. After this time the backlight will produce only 50 % of its original brightness. The service life at the used displays is about 10.000 hours. The backlight can not be changed separately. To change the display please contact the Bosch Rexroth customer service.
- The service life of a lithium battery to buffer the static memory is at least 5 years. So the battery has to changed after 5 years, to avoid data leakage because of discharged batteries.
- Hard disk: The hard disk is an electromechanic wear part that has to be changed during the operating time. According to the manufacturer's specifications the hard disk has been developed for a service life of 60 months in consideration of the following conditions:

Operating hours / month		Max. 333
Input/output cycles / month		Min. 10 and max. 150
Operating conditions	Temperature	40 °C
	Rel. humidity	30 %
	Height	< 500 m
	Accesses	30 % of the operating hours
Storage conditions	Temperature	< 30 °C
	Rel. humidity	< 70 %
	Duration	< 3 months

Fig. 4-84: Typical operating and storage conditions of the hard disk

The operation out of this typical conditions is permissible, whereby, however, the service life of the hard disk may be reduced. However, the ambient conditions specified for the overall device have to be absolutely kept.

4.23 Specifications VEP 30, VEP 40, VEP 50

The following devices are supported:

- VEP30.1CC,
- VEP40.1CE and
- VEP50.1CH.

Specifications of the front

Display	
Type	VGA TFT
Dimension	8,4" (VEP 30) 12" (VEP 40) 15" (VEP 50)
Resolution/colors	800 x 600 / 65000 (VEP30/40) 1024 x 768 / 65000 (VEP 50)
MTBF back lighting	20 000 h (VEP 30) 40 000 h (VEP 40) 30 000 h (VEP 50) With dimming the back lighting after 5 minutes without activity the effective service life is considerably higher.
Input medium/control elements	
Touch screen	4 wire touch
Numeric/alpha input	via virtual keyboard
Protection rating front panel	IP 65

Fig. 4-85: Specifications of the front VEP 30/40/50

Specifications of the processor

Operating system	Windows CE .NET 4.2
Memory	64 MB RAM 64 MB CompactFlash internal optional 64/128 MB CompactFlash external
Processor	NS-Geode 300 MHz

Fig. 4-86: Specifications of the Processor VEP 30/40/50

Specifications of the interfaces

Ethernet	2 x 10 / 100 Base-T
Serial interface	RS232, 9-pole, DSUB
VGA monitor	15-pole, DSUB
USB interface	2 x USB master
Key pad & mouse	1 x PS2
CompactFlash	1 x type 2 external available

Fig. 4-87: Interfaces VEP30/40/50

Specifications of the power supply 24V

Nominal input voltage	24 V DC (+19 V DC .. +30 V DC)	
Noise and surge immunity	U_{max} = 35 V (for t < 100 ms)	
Max. input current	1.1 A at nominal voltage 24 V	
Max. switch-on current	3 A at nominal voltage 24 V	
Internal output voltages + 5 V + 12 V	current (max.) 5 A 1,8 A	tolerance (incl. rest ripple) +/- 3 % +/- 4 %
Max. output power	47 W	
Efficiency	0.8	

Fig. 4-88: Specifications of the power supply VEP 30/40/50

General specification VEP 30, VEP 40, VEP 50

Dimensions L x W x D (total)	296 x 200 x 72 mm (VEP 30) 360 x 300 x 78 mm (VEP 40) 407 x 370 x 80 mm (VEP 50)
Weight	approx. 2.2 kg (VEP 30) approx. 3.8 kg (VEP 40) approx. 4.8 kg (VEP 50)
Certifications	CE / UL / CSA (in preparation)

Fig. 4-89: General specification VEP 30/40/50

Ambient conditions VEP 30, VEP 40, VEP 50

	during operation	**during storage/transport**
Max. ambient temperature Max. temperature gradient	+ 5 ... + 45 °C time temperature changes up to 3 °C per minute	- 20 °C to + 60 °C
Relative humidity	climate class 3K3 according to EN 60721, condensation not permitted	climate class 3K3 according to EN 60721,condensation not permitted
Atmospheric pressure	up to 2000 m altitude according to DIN 60204	

Fig. 4-90: Ambient conditions VEP 30/40/50

Wear parts VEP 30, VEP 40, VEP 50

Wear parts that are without guarantee:

- Backlight
- Compact Flash
- battery for CMOS clock

4.24 Specification miniature control terminal VCP 01

General specification VCP 01

VCP 01 basic device	
Supply voltage	24 V (20...30 V) DC
Current consumption	max. 180 mA (typ. 30 mA)
Display	LCD alpha numeric, 64 x 128 pixels, black-and-white, back lighting visible area 35 x 17 mm
Keypad	short stroke key pad 4 function keys 4 cursor keys
Application memory	256 kB application, 100 kB variable memory
Enclosure material	plastic
Protection rating	IP 65 front panel IP 20 backside
Temperature range	0...+45°C (operation) -20°...+70°C (storage)
Max. relative humidity	10% to 95% average (operation and storage) no condensation
Dimensions	installation disruption: 66 x 66 mm (LxW) installation depth: 80 mm without connector

Fig. 4-91: Specifications VCP 01

Connector pin assignments of the VCP 01 (serial interface)

Serial coupling:
VCP01.1BWA-TS-NN-PW

Connector	Plug-in connector
X1	9-way SUB-D female connector
X6	4-way plug-in connector Phoenix COMBICON

Fig. 4-92: Overview plug-in connector VCP01.1BWA-TS-NN-PW

Power supply of the VCP 01

X6 power supply	Signal name
Pin 1	24 V DC
Pin 2	24 V DC
Pin 3	0 V
Pin 4	0 V

Fig. 4-93: Pin assignment X1 VCP01.1BWA-TS-NN-PW

Serial interface X1

The interface X1 contains the interface for the communication with PLC and for upload/download.

RS232	Signal name
Pin 2	RxD
Pin 3	TxD
Pin 5	signal ground

Fig. 4-94: Pin assignment X1 VCP01.1BWA-TS-NN-PW

4.25 Specification miniature control terminal VCP 02

General specifications VCP 02

VCP 02 basic device	
Supply voltage	24 V (20...30 V) DC
Current consumption	300 mA
Display	LCD alpha numeric, 4 x 20 characters, black-and-white, back lighting visible area 74 x 23 mm
Keypad	short stroke key pad 7 system keys, 4 function keys 6 keys with integrated LED 4 function keys with insert strips
Application memory	256 kB
Enclosure material	aluminum/steel plate
Protection rating	IP 65 front panel IP 20 backside
Temperature range	0...+50°C (operation) -20°...+70°C (storage)
Max. relative humidity	10% - 95% (operation and storage) no condensation
Weight	approx. 0,4 kg
Dimensions	installation disruption: 82 x 138 mm (LxW) installation depth: 42 mm without connector

Fig. 4-95: Specifications VCP 02

Connector pin assignment VCP 02 (serial interface)

Serial coupling: VCP02.1BRN-RS-NN-PW

Connector	Plug-in connector
X1	3-way plug-in connector Phoenix COMBICON
X2	25-way SUB-D female connector

Fig. 4-96: Overview plug-in connector VCP02.1BRN-RS-NN-PW

Power supply of the VCP 02

X1 power supply	Signal name
Pin 1	protected ground
Pin 2	0 V
Pin 3	24 V DC

Fig. 4-97: Pin assignment X1 VCP02.1BRN-RS-NN-PW

Serial interface X2

The interface X2 contains the interfaces SER1 (communication with PLC) and SER2 (up-/download).

SER1 RS232	Signal name
Pin 6	TxD
Pin 18	RxD
Pin 17	RTS
Pin 15	CTS
Pin 25	signal ground

Fig. 4-98: Pin assignment SER1 (X2) VCP02.1BRN-RS-NN-PW

SER1 RS422	Signal name
Pin 8	TxD+
Pin 9	TxD-
Pin 22	RxD+
Pin 23	RxD-
Pin 11	signal ground

Fig. 4-99: Pin assignment SER1 (X2) VCP02.1BRN-RS-NN-PW

The scheduling of the RS422 interface is activated with a switch at the device back plane.

SER2 RS232	Signal name
Pin 1	protected ground
Pin 2	TxD
Pin 3	RxD
Pin 4	RTS
Pin 5	CTS
Pin 7	signal ground
Pin 20	DTR

Fig. 4-100: Pin assignment SER2 (X2) VCP02.1BRN-RS-NN-PW

Connector pin assignment VCP 02 (Profibus DP interface)

Profibus DP coupling: VCP02.1BRN-PB-NN-PW

Connector	Plug-in connector
X1	3-way plug-in connector Phoenix COMBICON
X2	9-way SUB-D female connector
X3	25-way SUB-D female connector

Fig. 4-101: Overview plug-in connector VCP02.1BRN-PB-NN-PW

Power supply of VCP 02

X1 power supply	Signal name
Pin 1	protected ground
Pin 2	0 V
Pin 3	24 V DC

Fig. 4-102: Pin assignment X1 VCP02.1BRN-PB-NN-PW

Profibus DP interface X2

X2 RS485	Signal name
Pin 1	n.c.
Pin 2	n.c.
Pin 3	RxD+/TxD+
Pin 4	CNTR-P (repeater plus)
Pin 5	signal ground
Pin 6	+5V (scheduling)
Pin 7	n.c.
Pin 8	RxD-/TxD-
Pin 9	CNTR-N (repeater minus)

Fig. 4-103: Pin assignment Profibus DP (X2) VCP02.1BRN-PB-NN-PW

Serial interface X3

SER2 RS232	Signal name
Pin 1	protected ground
Pin 2	TxD
Pin 3	RxD
Pin 4	RTS
Pin 5	CTS
Pin 7	signal ground
Pin 20	DTR

Fig. 4-104: Pin assignment SER2 (X3) VCP02.1BRN-PB-NN-PW

4.26 Specification miniature control terminal VCP 05

General specification VCP 05

VCP 05 basic device	
Supply voltage	24 V (20...30 V) DC
Current consumption	300 mA
Display	LCD alpha numeric, 4 x 20 characters, black-and-white, back lighting, visible area 74 x 23 mm
Keypad	foil key pad, 22 system keys, 8 function keys, 8 keys with integrated LED, 6 function keys with insert strip
Application memory	256 kB
Enclosure material	aluminum/steel plate
Protection rating	IP 65 front panel IP 20 backside
Temperature range	0...+50°C (operation) -20°...+70°C (storage)
Max. relative humidity	10% - 95% (operation and storage) no condensation
Weight	approximately 0,5 kg
Dimensions	installation disruption: 160 x 112 mm (LxW) installation depth: 40 mm without connector (standard device) 58 mm without connector (fieldbus device)

Fig. 4-105: Specifications VCP 05

Connector pin assignments of the VCP 05 (serial interface)

Serial coupling:
VCP05.1BSN-RS-NN-PW

Connector	Plug-in connector
X1	3-way plug-in connector Phoenix COMBICON
X3	25-way SUB-D female connector

Fig. 4-106: Overview plug-in connector VCP05.1BSN-RS-NN-PW

Power supply of the VCP 05

X1 power supply	Signal name
Pin 1	protected ground
Pin 2	0 V
Pin 3	24 V DC

Fig. 4-107: Pin assignment X1 VCP05.1BSN-RS-NN-PW

Serial interface X3

The interface X3 contains the interfaces SER1 (communication with PLC) and SER2 (upload/download).

SER1 RS232	Signal name
Pin 6	TxD
Pin 18	RxD
Pin 17	RTS
Pin 15	CTS
Pin 25	signal ground

Fig. 4-108: Pin assignment SER1 (X3) VCP05.1BSN-RS-NN-PW

SER1 RS422	Signal name
Pin 8	TxD+
Pin 9	TxD-
Pin 22	RxD+
Pin 23	RxD-
Pin 11	signal ground

Fig. 4-109: Pin assignment SER1 (X3) VCP05.1BSN-RS-NN-PW

The scheduling of the RS422 interface is activated with a switch at the device back plane.

SER2 RS232	Signal name
Pin 1	protected ground
Pin 2	TxD
Pin 3	RxD
Pin 4	RTS
Pin 5	CTS
Pin 7	signal ground
Pin 20	DTR

Fig. 4-110: Pin assignment SER2 (X3) VCP05.1BSN-RS-NN-PW

Connector pin assignments of the VCP 05 (Profibus DP interface)

Profibus DP coupling: VCP05.1BSN-PB-NN-PW

Connector	Plug-in connector
X1	3-way plug-in connector Phoenix COMBICON
X2	9-way SUB-D female connector
X3	25-way SUB-D female connector

Fig. 4-111: Overview plug-in connector VCP05.1BSN-PB-NN-PW

Power supply of the VCP 05

X1 power supply	Signal name
Pin 1	protected ground
Pin 2	0 V
Pin 3	24 V DC

Fig. 4-112: Pin assignment X1 VCP05.1BSN-PB-NN-PW

Profibus DP interface X2

X2 RS485	Signal name
Pin 1	n.c.
Pin 2	n.c.
Pin 3	RxD+/TxD+
Pin 4	CNTR-P (repeater plus)
Pin 5	signal ground
Pin 6	+5V (scheduling)
Pin 7	n.c.
Pin 8	RxD-/TxD-
Pin 9	CNTR-N (repeater minus)

Fig. 4-113: Pin assignment Profibus DP (X2) VCP05.1BSN-PB-NN-PW

Serial interface X3

SER2 RS232	Signal name
Pin 1	protected ground
Pin 2	TxD
Pin 3	RxD
Pin 4	RTS
Pin 5	CTS
Pin 7	signal ground
Pin 20	DTR

Fig. 4-114: Pin assignment SER2 (X3) VCP05.1BSN-PB-NN-PW

Connector pin assignment VCP 05 (DeviceNet interface)

DeviceNet coupling: VCP05.1BSN-DN-NN-PW

Connector	Plug-in connector
X1	3-way plug-in connector Phoenix COMBICON
X2.1	9-way Sub-D connector (strip)
X2.2	9-way Sub-D female connector (socket board)
X3	25-way SUB-D female connector

Fig. 4-115: Overview plug-in connector VCP05.1BSN-DN-NN-PW

Power supply of the VCP 05

X1 power supply	Signal name
Pin 1	protected ground
Pin 2	0 V
Pin 3	24 V DC

Fig. 4-116: Pin assignment X1 VCP05.1BSN-DN-NN-PW

DeviceNet interface X2.1 and X2.2

All signal lines are bridged from X2.1 to X2.2.

X2 RS485	Signal name
Pin 1	n.c.
Pin 2	CAN_L (CAN_L bus line, dominant LOW)
Pin 3	CAN_GND (CAN ground)
Pin 4	n.c.
Pin 5	n.c.
Pin 6	CAN_GND (CAN ground)
Pin 7	CAN_H (CAN_H bus line, dominant HIGH)
Pin 8	n.c.
Pin 9	n.c.

Fig. 4-117: Pin assignment DeviceNet (X2.1 and X2.2) VCP05.1BSN-DN-NN-PW

Note: The connector FBUSCA-K1451 (FCT-electronic GmbH), for example, is recommended as DeviceNet connector.

Serial interface X3

SER2 RS232	Signal name
Pin 1	protected ground
Pin 2	TxD
Pin 3	RxD
Pin 4	RTS
Pin 5	CTS
Pin 7	signal ground
Pin 20	DTR

Fig. 4-118: Pin assignment SER2 (X3) VCP05.1BSN-DN-NN-PW

4.27 Specification miniature control terminal VCP 08

General specification VCP 08

VCP 08 basic device	
Supply voltage	24 V (20...30 V) DC
Current consumption	max. 500 mA (typ. 300 mA)
Display	graphic display (LC display), 4x20 characters, 120x32 Pixel, back lighting, visible area 119 x 38 mm
Keypad	short stroke key pad, 22 system keys, 14 function keys, 16 keys with integrated LED, 12 function keys with insert strip
Application memory	256 kB
Enclosure material	aluminum/steel plate
Protection rating	IP 65 front panel IP 20 backside
Temperature range	0...+50°C (operation) -20°...+70°C (storage)
Max. relative humidity	10% - 95% (operation and storage) no condensation
Weight	approximately 0,8 kg
Dimensions	installation disruption: 199 x 139 mm (LxW) installation depth: 58 mm without connector

Fig. 4-119: Specifications VCP 08

Connector pin assignments of the VCP 08 (serial interface)

Serial coupling:
VCP08.1BTN-RS-NN-PW

Connector	Plug-in connector
X1	3-way plug-in connector Phoenix COMBICON
X3	25-way SUB-D female connector

Fig. 4-120: Overview plug-in connector VCP08.1BTN-RS-NN-PW

Power supply of the VCP 08

X1 power supply	Signal name
Pin 1	protected ground
Pin 2	0 V
Pin 3	24 V DC

Fig. 4-121: Pin assignment X1 VCP08.1BTN-RS-NN-PW

Serial interface X3

The interface X3 contains the interfaces SER1 (communication with PLC) and SER2 (upload/download).

SER1 RS232	Signal name
Pin 6	TxD
Pin 18	RxD
Pin 17	RTS
Pin 15	CTS
Pin 25	signal ground

Fig. 4-122: Pin assignment SER1 (X3) VCP08.1BTN-RS-NN-PW

SER1 RS422	Signal name
Pin 8	TxD+
Pin 9	TxD-
Pin 22	RxD+
Pin 23	RxD-
Pin 11	signal ground

Fig. 4-123: Pin assignment SER1 (X3) VCP08.1BTN-RS-NN-PW

The scheduling of the RS422 interface is activated with a switch at the device back plane.

SER2 RS232	Signal name
Pin 1	protected ground
Pin 2	TxD
Pin 3	RxD
Pin 4	RTS
Pin 5	CTS
Pin 7	signal ground
Pin 20	DTR

Fig. 4-124: Pin assignment SER2 (X3) VCP08.1BTN-RS-NN-PW

Connector pin assignments of the VCP 08 (Profibus DP interface)

Profibus DP coupling: VCP08.1BTN-PB-NN-PW

Connector	Plug-in connector
X1	3-way plug-in connector Phoenix COMBICON
X2	9-way SUB-D female connector
X3	25-way SUB-D female connector

Fig. 4-125: Overview plug-in connector VCP08.1BTN-PB-NN-PW

Power supply of the VCP 08

X1 power supply	Signal name
Pin 1	protected ground
Pin 2	0 V
Pin 3	24 V DC

Fig. 4-126: Pin assignment X1 VCP08.1BTN-PB-NN-PW

Profibus DP interface X2

X2 RS485	Signal name
Pin 1	n.c.
Pin 2	n.c.
Pin 3	RxD+/TxD+
Pin 4	CNTR-P (repeater plus)
Pin 5	signal ground
Pin 6	+5V (scheduling)
Pin 7	n.c.
Pin 8	RxD-/TxD-
Pin 9	CNTR-N (repeater minus)

Fig. 4-127: Pin assignment Profibus DP (X2) VCP08.1BTN-PB-NN-PW

Serial interface X3

SER2 RS232	Signal name
Pin 1	protected ground
Pin 2	TxD
Pin 3	RxD
Pin 4	RTS
Pin 5	CTS
Pin 7	signal ground
Pin 20	DTR

Fig. 4-128: Pin assignment SER2 (X3) VCP08.1BTN-PB-NN-PW

Connector pin assignment VCP 08 (DeviceNet interface)

DeviceNet coupling: VCP08.1BTN-DN-NN-PW

Connector	Plug-in connector
X1	3-way plug-in connector Phoenix COMBICON
X2.1	9-way Sub-D connector (strip)
X2.2	9-way Sub-D female connector (socket board)
X3	25-way SUB-D female connector

Fig. 4-129: Overview plug-in connector VCP08.1BTN-DN-NN-PW

Power supply of the VCP 08

X1 power supply	Signal name
Pin 1	protected ground
Pin 2	0 V
Pin 3	24 V DC

Fig. 4-130: Pin assignment X1 VCP08.1BTN-DN-NN-PW

DeviceNet interface X2.1 and X2.2

All signal lines are bridged from X2.1 to X2.2.

X2 RS485	Signal name
Pin 1	n.c.
Pin 2	CAN_L (CAN_L bus line, dominant LOW)
Pin 3	CAN_GND (CAN ground)
Pin 4	n.c.
Pin 5	n.c.
Pin 6	CAN_GND (CAN ground)
Pin 7	CAN_H (CAN_H bus line, dominant HIGH)
Pin 8	n.c.
Pin 9	n.c.

Fig. 4-131: Pin assignment DeviceNet (X2.1 and X2.2) VCP08.1BTN-DN-NN-PW

Note: The connector FBUSCA-K1451 (FCT-electronic GmbH), for example, is recommended as DeviceNet connector.

Serial interface X3

SER2 RS232	Signal name
Pin 1	protected ground
Pin 2	TxD
Pin 3	RxD
Pin 4	RTS
Pin 5	CTS
Pin 7	signal ground
Pin 20	DTR

Fig. 4-132: Pin assignment SER2 (X3) VCP08.1BTN-DN-NN-PW

4.28 Specification miniature control terminal VCP 20

General specification VCP 20

VCP 20 basic device	
Supply voltage	24 V (20...30 V) DC
Current consumption	max. 3 A (typ. 0,7 A)
Display	graphic display (LC display), 16x40 or 8x20 characters, 240x128 pixel, back lighting, visible area 131 x 72 mm
Keypad	short stroke key pad, 22 system keys, 12 function keys, 14 keys with integrated LED, 12 function keys with insert strip
Application memory	768 kB
Enclosure material	aluminum/steel plate
Protection rating	IP 54 front panel IP 20 backside
Temperature range	0...+50°C (operation) -25°...+60°C (storage)
Max. relative humidity	10% - 95% (operation and storage) no condensation
Weight	approximately 1,1 kg
Dimensions	installation disruption: 152 x 292 mm (LxW) installation depth: 60 mm without connector 106 mm with connector

Fig. 4-133: Specifications VCP 20

Connector pin assignments of the VCP 20 (serial interface)

Serial coupling:
VCP20.1BUN-768RS-NN-PW

Connector	Plug-in connector
X1	3-way plug-in connector Phoenix COMBICON
X3	25-way SUB-D female connector

Fig. 4-134: Overview plug-in connector VCP20.1BUN-768RS-NN-PW

Power supply of the VCP 20

X1 Power supply	Signal name
Pin 1	protected ground
Pin 2	0 V
Pin 3	24 V DC

Fig. 4-135: Pin assignment X1 VCP20.1BUN-768RS-NN-PW

Serial interface X3

The interface X3 contains the interfaces SER1 (communication with PLC) and SER2 (upload/download).

SER1 RS232	Signal name
Pin 6	TxD
Pin 18	RxD
Pin 17	RTS
Pin 15	CTS
Pin 25	signal ground

Fig. 4-136: Pin assignment SER1 (X3) VCP20.1BUN-768RS-NN-PW

SER1 RS422	Signal name
Pin 8	TxD+
Pin 9	TxD-
Pin 22	RxD+
Pin 23	RxD-
Pin 11	signal ground

Fig. 4-137: Pin assignment SER1 (X3) VCP20.1BUN-768RS-NN-PW

The scheduling of the RS422 interface is activated with a switch at the device back plane.

SER2 RS232	Signal name
Pin 1	protected ground
Pin 2	TxD
Pin 3	RxD
Pin 4	RTS
Pin 5	CTS
Pin 7	signal ground
Pin 20	DTR

Fig. 4-138: Pin assignment SER2 (X3) VCP20.1BUN-768RS-NN-PW

Connector pin assignments of the VCP 20 (Profibus DP interface)

Profibus DP coupling: VCP20.1BUN-768PB-NN-PW

Connector	Plug-in connector
X1	3-way plug-in connector Phoenix COMBICON
X2	9-way SUB-D female connector
X3	25-way SUB-D female connector

Fig. 4-139: Overview plug-in connector VCP20.1BUN-768PB-NN-PW

Power supply of the VCP 20

X1 power supply	Signal name
Pin 1	protected ground
Pin 2	0 V
Pin 3	24 V DC

Fig. 4-140: Pin assignment X1 VCP20.1BUN-768PB-NN-PW

Profibus DP interface X2

X2 RS485	Signal name
Pin 1	n.c.
Pin 2	n.c.
Pin 3	RxD+/TxD+
Pin 4	CNTR-P (repeater plus)
Pin 5	signal ground
Pin 6	+5V (scheduling)
Pin 7	n.c.
Pin 8	RxD-/TxD-
Pin 9	CNTR-N (repeater minus)

Fig. 4-141: Pin assignment Profibus DP (X2) VCP20.1BUN-768PB-NN-PW

Serial interface X3

SER2 RS232	Signal name
Pin 1	protected ground
Pin 2	TxD
Pin 3	RxD
Pin 4	RTS
Pin 5	CTS
Pin 7	signal ground
Pin 20	DTR

Fig. 4-142: Pin assignment SER2 (X3) VCP20.1BUN-768PB-NN-PW

Connector pin assignment VCP 20 (DeviceNet interface)

DeviceNet coupling: VCP20.1BUN-768DN-NN-PW

Connector	Plug-in connector
X1	3-way plug-in connector Phoenix COMBICON
X2.1	9-way Sub-D connector (strip)
X2.2	9-way Sub-D female connector (socket board)
X3	25-way SUB-D female connector

Fig. 4-143: Overview plug-in connector VCP20.1BUN-768DN-NN-PW

Power supply of the VCP 20

X1 power supply	Signal name
Pin 1	protected ground
Pin 2	0 V
Pin 3	24 V DC

Fig. 4-144: Pin assignment X1 VCP20.1BUN-768DN-NN-PW

DeviceNet interface X2.1 and X2.2

All signal lines are bridged from X2.1 to X2.2.

X2 RS485	Signal name
Pin 1	n.c.
Pin 2	CAN_L (CAN_L bus line, dominant LOW)
Pin 3	CAN_GND (CAN ground)
Pin 4	n.c.
Pin 5	n.c.
Pin 6	CAN_GND (CAN ground)
Pin 7	CAN_H (CAN_H bus line, dominant HIGH)
Pin 8	n.c.
Pin 9	n.c.

Fig. 4-145: Pin assignment DeviceNet (X2.1 / X2.2 VCP20.1BUN-768DN-NN-PW

Note: The connector FBUSCA-K1451 (FCT-electronic GmbH), for example, is recommended as DeviceNet connector.

Serial interface X3

SER2 RS232	Signal name
Pin 1	protected ground
Pin 2	TxD
Pin 3	RxD
Pin 4	RTS
Pin 5	CTS
Pin 7	signal ground
Pin 20	DTR

Fig. 4-146: Pin assignment SER2 (X3) VCP20.1BUN-768DN-NN-PW

4.29 Specification miniature control terminal VCP 25

General specification VCP 25

VCP 25 basic device	
Supply voltage	24 V (20...30 V) DC
Current consumption	400 mA
Display	STN color display, Touch (analog/resistive), 320 x 240 pixel, 20x40 characters, 256 colors, visible range 120 x 90 mm
Application memory	3 MB
Enclosure material	aluminum/steel plate
Protection rating	IP 65 front panel IP 20 backside
Temperature range	0...+50°C (operation) -25°...+60°C (storage)
Relative humidity	10% - 95% (operation and storage) no condensation
Weight	approximately 1,1 kg
Dimensions	installation disruption: 140 x 196 mm (LxW) installation depth: 48 mm without connector (standard device) 70 mm without connector (fieldbus device)

Fig. 4-147: Specifications VCP 25

Connector pin assignments of the VCP 25 (serial interface)

Serial coupling:
VCP25.1BVN-003RS-NN-PW

Connector	Plug-in connector
X1	3-way plug-in connector Phoenix COMBICON
X3	25-way SUB-D female connector

Fig. 4-148: Overview plug-in connector VCP25.1BVN-003RS-NN-PW

Power supply of the VCP 25

X1 power supply	Signal name
Pin 1	protected ground
Pin 2	0 V
Pin 3	24 V DC

Fig. 4-149: Pin assignment X1 VCP25.1BVN-003RS-NN-PW

Serial interface X3

The interface X3 contains the interfaces SER1 (communication with PLC) and SER2 (upload/download).

SER1 RS232	Signal name
Pin 6	TxD
Pin 18	RxD
Pin 17	RTS
Pin 15	CTS
Pin 25	signal ground

Fig. 4-150: Pin assignment SER1 (X3) VCP25.1BVN-003RS-NN-PW

SER1 RS422	Signal name
Pin 8	TxD+
Pin 9	TxD-
Pin 22	RxD+
Pin 23	RxD-
Pin 11	signal ground

Fig. 4-151: Pin assignment SER1 (X3) VCP25.1BVN-003RS-NN-PW

The scheduling of the RS422 interface is activated with a switch at the device back plane.

SER2 RS232	Signal name
Pin 1	protected ground
Pin 2	TxD
Pin 3	RxD
Pin 4	RTS
Pin 5	CTS
Pin 7	signal ground
Pin 20	DTR

Fig. 4-152: Pin assignment SER2 (X3) VCP25.1BVN-003RS-NN-PW

Connector pin assignments of the VCP 25 (Profibus DP interface)

Profibus DP coupling: VCP25.1BVN-003PB-NN-PW

Connector	Plug-in connector
X1	3-way plug-in connector Phoenix COMBICON
X2	9-way SUB-D female connector
X3	25-way SUB-D female connector

Fig. 4-153: Overview plug-in connector VCP25.1BVN-003PB-NN-PW

Power supply of the VCP 25

X1 power supply	Signal name
Pin 1	protected ground
Pin 2	0 V
Pin 3	24 V DC

Fig. 4-154: Pin assignment X1 VCP25.1BVN-003PB-NN-PW

Profibus DP interface X2

X2 RS485	Signal name
Pin 1	n.c.
Pin 2	n.c.
Pin 3	RxD+/TxD+
Pin 4	CNTR-P (repeater plus)
Pin 5	signal ground
Pin 6	+5V (scheduling)
Pin 7	n.c.
Pin 8	RxD-/TxD-
Pin 9	CNTR-N (repeater minus)

Fig. 4-155: Pin assignment Profibus DP (X2) VCP25.1BVN-003PB-NN-PW

Serial interface X3

SER2 RS232	Signal name
Pin 1	protected ground
Pin 2	TxD
Pin 3	RxD
Pin 4	RTS
Pin 5	CTS
Pin 7	signal ground
Pin 20	DTR

Fig. 4-156: Pin assignment SER2 (X3) VCP25.1BVN-003PB-NN-PW

Connector pin assignment VCP 25 (DeviceNet interface)

DeviceNet coupling:
VCP25.1BVN-003DN-NN-PW

Connector	Plug-in connector
X1	3-way plug-in connector Phoenix COMBICON
X2.1	9-way Sub-D connector (strip)
X2.2	9-way Sub-D female connector (socket board)
X3	25-way SUB-D female connector

Fig. 4-157: Overview plug-in connector VCP25.1BVN-003DN-NN-PW

Power supply of the VCP 25

X1 power supply	Signal name
Pin 1	protected ground
Pin 2	0 V
Pin 3	24 V DC

Fig. 4-158: Pin assignment X1 VCP25.1BVN-003DN-NN-PW

DeviceNet interface X2.1 and X2.2

All signal lines are bridged from X2.1 to X2.2.

X2 RS485	Signal name
Pin 1	n.c.
Pin 2	CAN_L (CAN_L bus line, dominant LOW)
Pin 3	CAN_GND (CAN ground)
Pin 4	n.c.
Pin 5	n.c.
Pin 6	CAN_GND (CAN ground)
Pin 7	CAN_H (CAN_H bus line, dominant HIGH)
Pin 8	n.c.
Pin 9	n.c.

Fig. 4-159: Pin assignment DeviceNet (X2.1 / X2.2 VCP25.1BVN-003DN-NN-PW

Note: The connector FBUSCA-K1451 (FCT-electronic GmbH), for example, is recommended as DeviceNet connector.

Serial interface X3

SER2 RS232	Signal name
Pin 1	protected ground
Pin 2	TxD
Pin 3	RxD
Pin 4	RTS
Pin 5	CTS
Pin 7	signal ground
Pin 20	DTR

Fig. 4-160: Pin assignment SER2 (X3) VCP25.1BVN-003DN-NN-PW

5 Drive configurations

5.1 Procedure

The drive configuration choices (motor, drive amplifier, drive-related plug-in cards) conform to the power requirements and the precision requirements of the respective drive task.

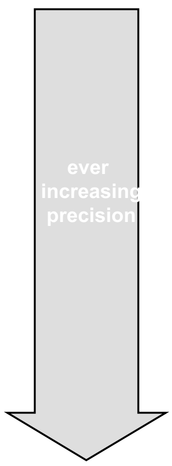
To determine the drive configuration or to specify the hardware configuration labeling of a drive controller for the corresponding machine, we recommend the following procedure:

1. Determine the precision requirements:
   - Select the required gearbox and linear scales.
2. Determine the motor/controller combination:
   - Determine rpm/torque requirements for your purpose.
   - Select motor/controller combination from the list.
3. Determine the drive configuration labeling:
   - Select motor - motor feedback combination.
   - Select desired features.
   - Determine configuration labeling based on the plug-in modules required for the desired features.

a) Definition of precision requirements

A differentiation is made between absolute and relative precision (repetitive precision) as well as scale resolution. It depends primarily on the mechanical transmission elements and the quality of the mounting location of the linear scale.

Motor type	Motor type
Motor with gearbox and resolver as motor feedback	MKD
Motor with gearbox and DSF as motor feedback	MKE 2AD MHD ADF
Motor with gearbox and external encoder mounted loadside (direct position detection)	MKD MKE 2AD MHD ADF
Conventional motor as direct drive and encoder loadside	MKD MKE 2AD MHD ADF
Mounted motor and loadside encoder	1MB MBW MBS



YF000166V01_EN.FH7

Fig. 5-1: Selection table for precision

b) Selecting the suitable motor/controller combinations

The selection lists must be used. The following figure offers a rough orientation.

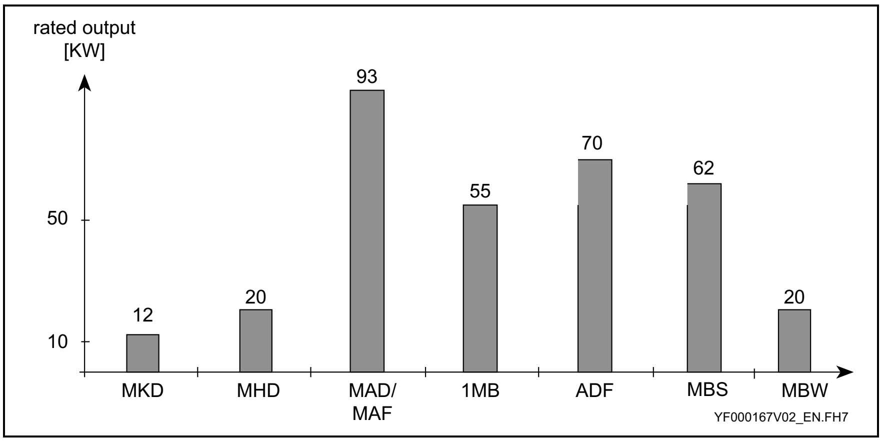


Fig. 5-2: Power range of different lines of motors

Once motor type and encoder arrangements are fixed, a suitable basic drive configuration is selected using the subsections below.

Note: The technical advice about the drive construction should be done by the corresponding sales partner.

c) Determining the drive configuration labeling

The following illustrations offer an idea on how to determine the configuration labeling.

Illustration: Determining the motor/controller combination

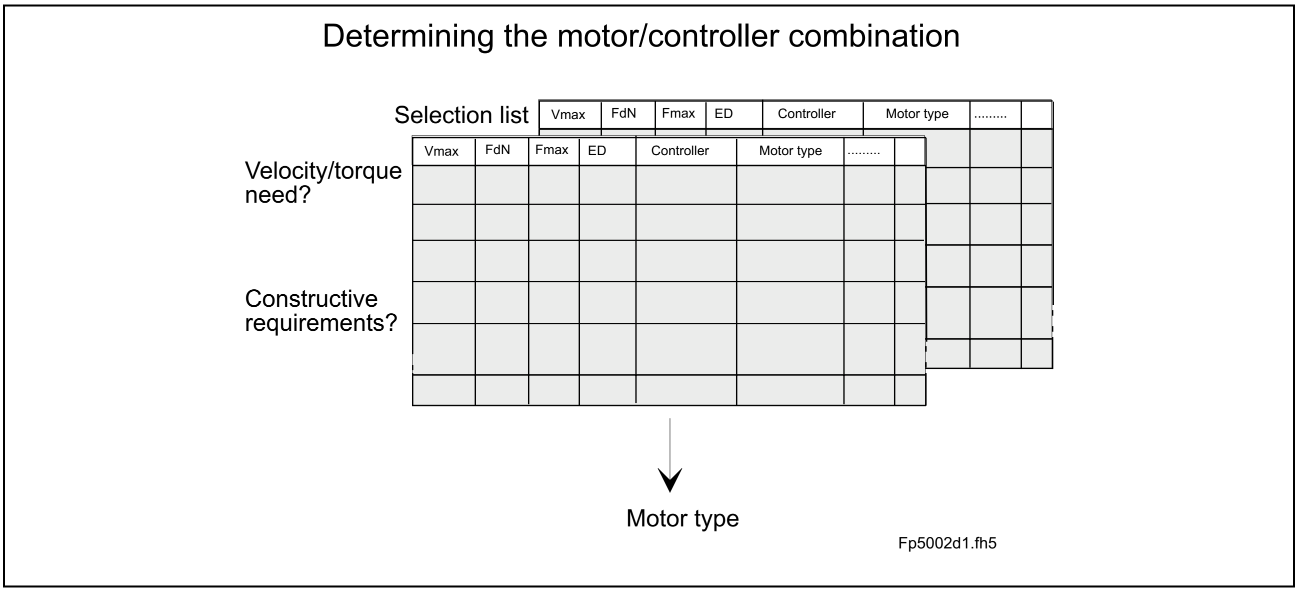


Fig. 5-3: Illustration for working with selection lists

Illustration: Determining the hardware configuration labeling

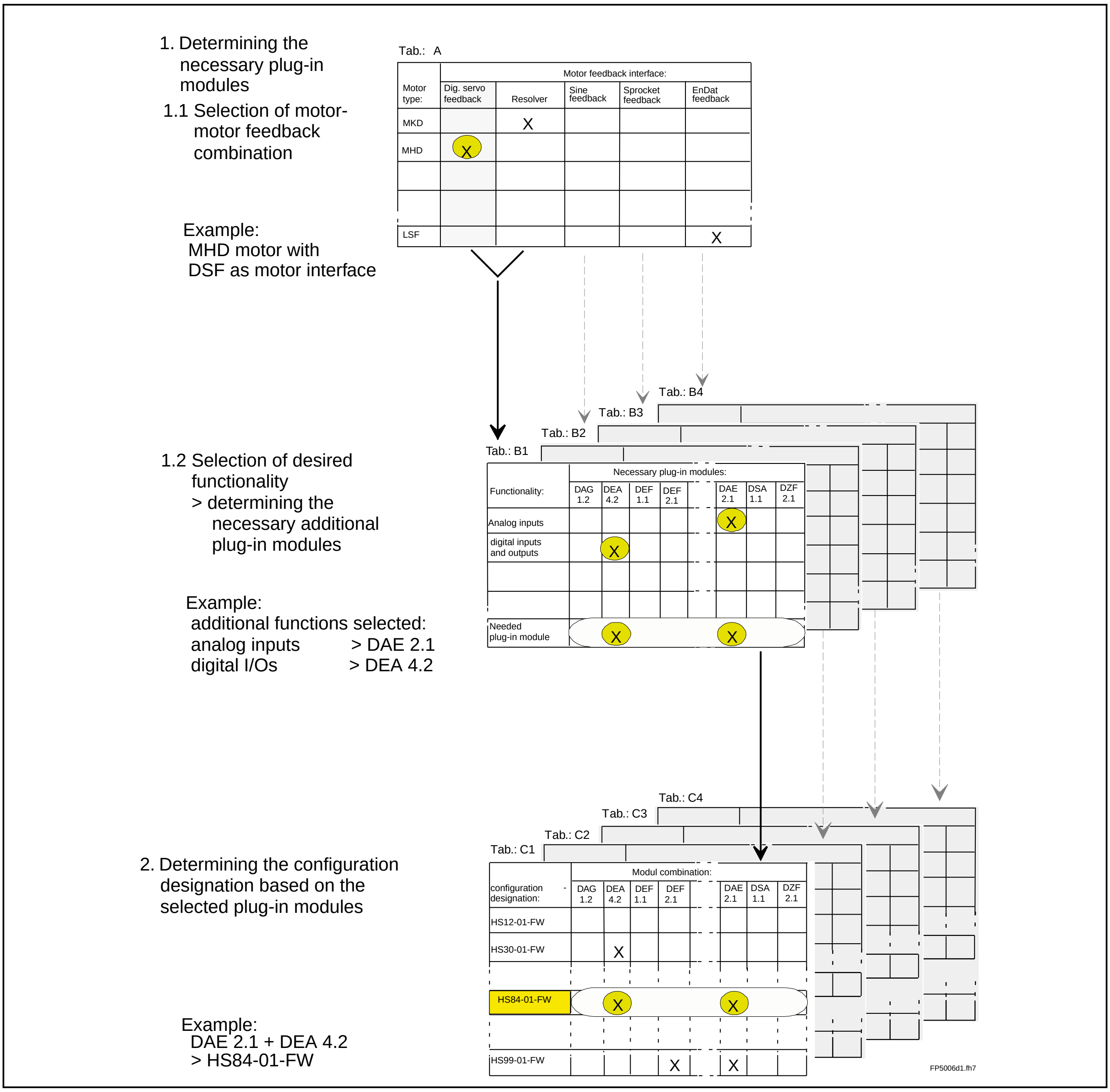


Fig. 5-4: Illustration for determining configuration labeling

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5.2 Rotary axes

Drive with step-down gear and indirect position detection

Features:

- Precision is determined with gear error
(generally four angle minutes)
- encoder is integrated into motor
- motor encoder with singleturn or multiturn absolute encoder

Usuable motors

IndraDrive

- MHD
- MKD
- MKE
- 2AD with HSF (HSF: digital servo feedback)
- ADF with HSF
- MAD with HSF
- MAF with HSF
- MBW with HSF
- MBT with HSF
- MBS with HSF

DKR

- 2AD mit HSF (HSF: digital servo feedback)
- ADF mit HSF
- MAD mit HSF
- MAF mit HSF

Diax 04

- MHD
- MKD
- MKE
- 2AD mit HSF
- ADF mit HSF
- MAD mit HSF
- MAF mit HSF

Basic drive configuration with EN1 option (IndraDrive)

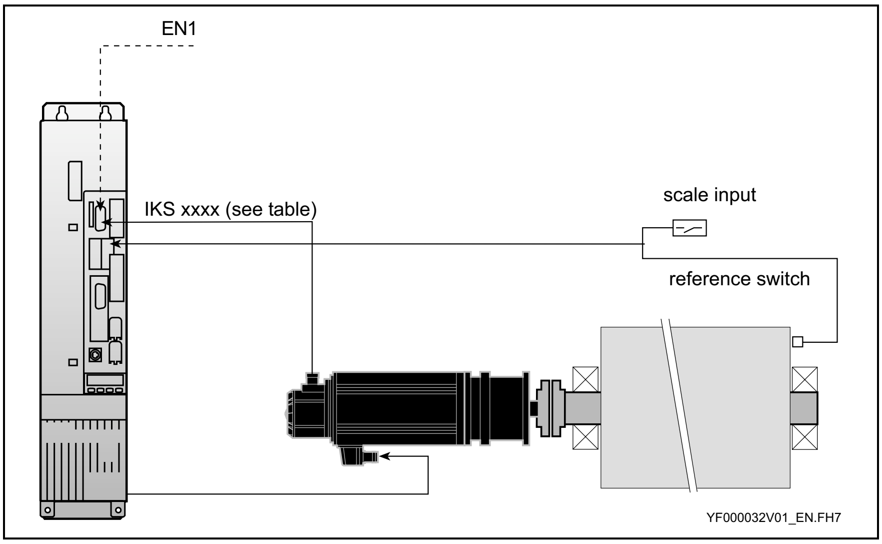

Fig. 5-5: Drive with step-down gears and indirect position detection (IndraDrive)

Motor type	Straight connector at IndraDrive	Bent connector at IndraDrive
MKD, MHD, 2AD, ADF, MAD, MAF, MBW, MBT, MBS with connector	IKS4042	IKS4044
MKD with terminal box	IKS4043	-
MKE with terminal box	IKS0223	-

Fig. 5-6: Encoder cable at EN1 option slot

Basic drive configuration BE12 (DKR)

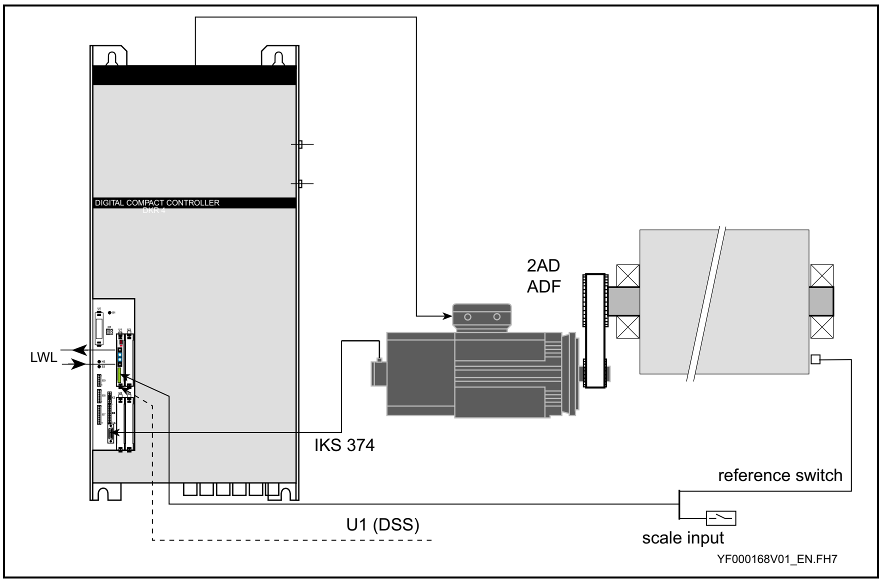

Fig. 5-7: Drive with step-down gears and indirect position detection (DKR)

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Basic drive configuration HS12 (Diax 04)

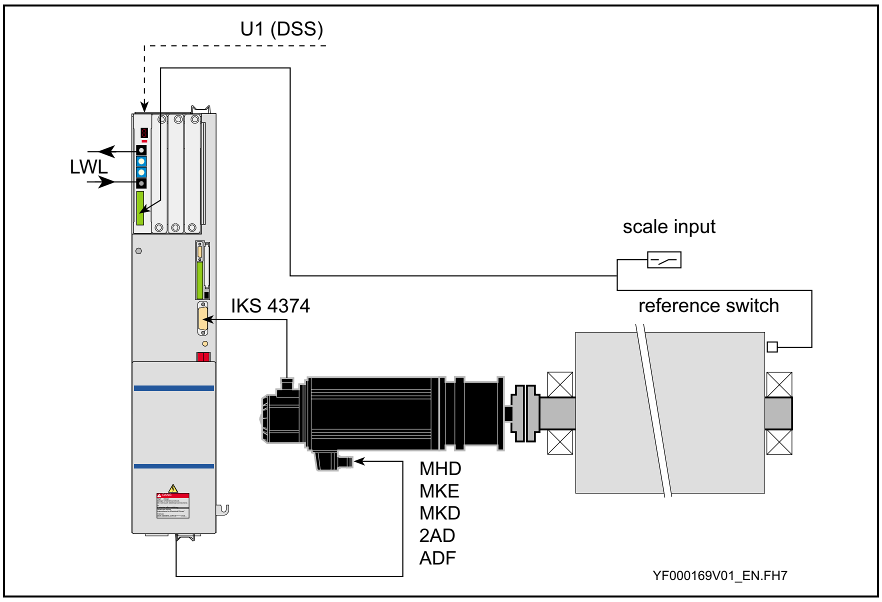

Fig. 5-8: Drive with step-down gears and indirect position detection (Diax 04)

Drive with step-down gears and direct incremental position detection

Feature:

- Precision determined by gear error (generally four angle minutes)
- encoder is integrated into motor
- motor encoder single-turn encoder
- load angle directly detected via incremental external encoder
- gear error is statically compensated

Usable motors

IndraDrive

- MHD
- MKD
- MKE
- 2AD with HSF
- ADF with HSF
- MAD with HSF
- MAF with HSF
- MBW with HSF
- MBT with HSF
- MBS with HSF

DKR

- 2AD with HSF
- ADF with HSF
- MAD with HSF
- MAF with HSF

Diax 04

- MHD
- MKD
- MKE
- 2AD with HSF
- ADF with HSF
- MAD with HSF
- MAF with HSF

Basic drive configuration with EN1 and EN2 option (IndraDrive)

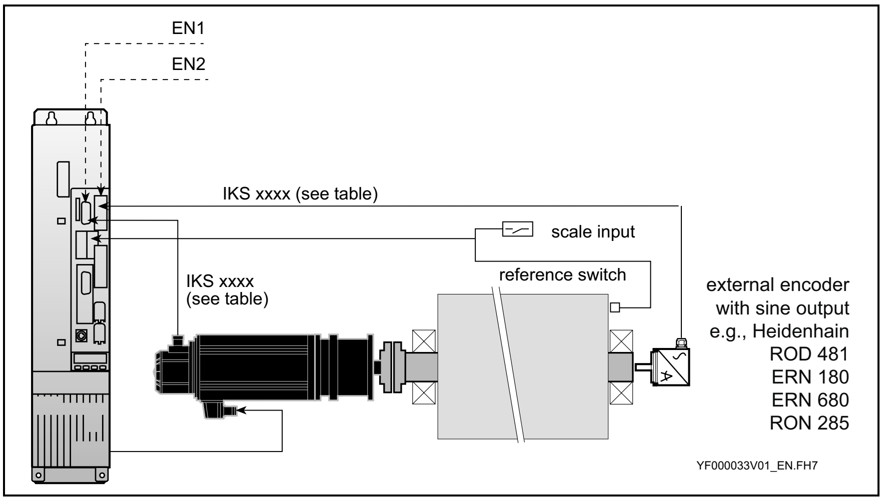

Fig. 5-9: Drive with step-down gear and direct incremental position detection (IndraDrive)

Motor type	**Straight connector at IndraDrive**	**Bent connector at IndraDrive**
MKD, MHD, 2AD, ADF, MAD, MAF, MBW, MBT, MBS with connector	IKS4042	IKS4044
MKD with terminal box	IKS4043	-
MKE with terminal box	IKS0223	-

Fig. 5-10: Encoder cable at EN1 option slot

Encoder type	**Straight connector at IndraDrive**	**Bent connector at IndraDrive**
Sine encoder 1Vss	IKS4040	-

Fig. 5-11: Encoder cable at EN2 option slot

Basic drive configuration BE32 (DKR)

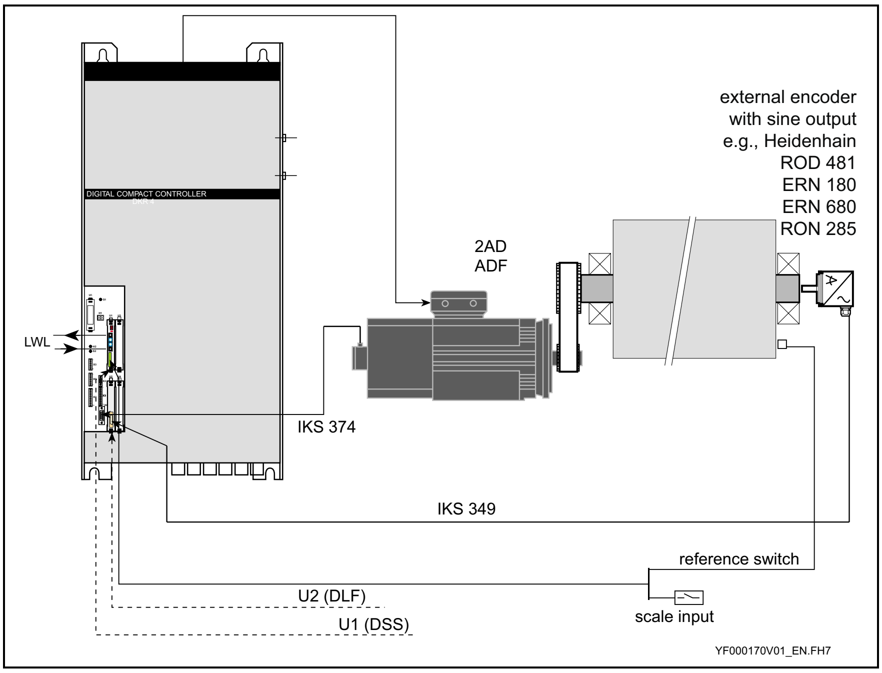

Fig. 5-12: Drive with step-down gear and direct incremental position detection (DKR)

Basic drive configuration HS32 (Diax 04)

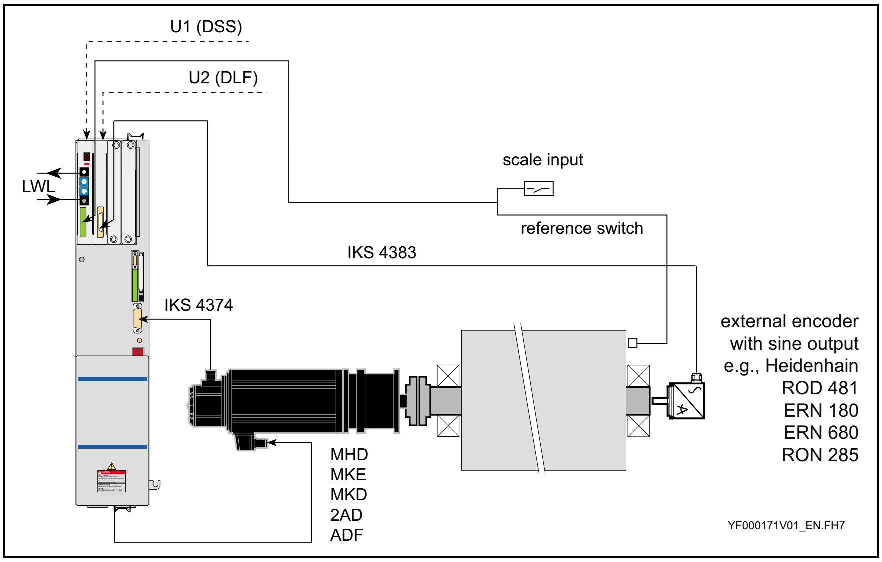

Fig. 5-13: Drive with step-down gear and direct incremental position detection (Diax 04)

Drive with step-down gear and direct absolute position detection

Feature:

- Precision is determined by gear error (generally four angle minutes)
- encoder is integrated into motor
- motor encoder multiturn absolute encoder
- load angle directly detected via absolute external encoder
- gear error statically compensated

Usable motors

IndraDrive

- MHD
- MKD
- MKE
- 2AD with HSF
- ADF with HSF
- MAD with HSF
- MAF with HSF
- MBW with HSF
- MBT with HSF
- MBS with HSF

DKR

- 2AD with HSF
- ADF with HSF
- MAD with HSF
- MAF with HSF

Diax 04

- MHD
- MKD
- MKE
- 2AD with HSF
- ADF with HSF
- MAD with HSF
- MAF with HSF

Basic drive configuration with EN1 and EN2 option (IndraDrive)

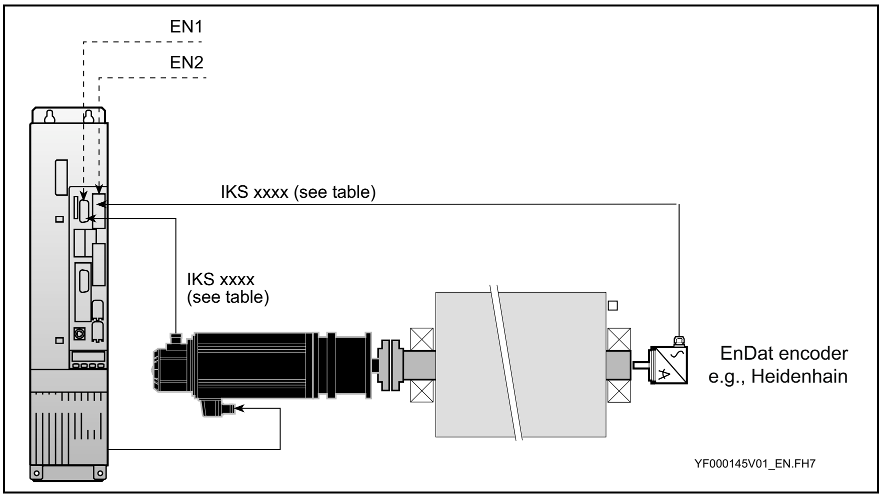

Fig. 5-14: Drive with step-down gear and direct absolute position detection (IndraDrive)

Motor type	Straight connector at IndraDrive	Bent connector at IndraDrive
MKD, MHD, 2AD, ADF, MAD, MAF, MBW, MBT, MBS with connector	IKS4042	IKS4044
MKD with terminal box	IKS4043	-
MKE with terminal box	IKS0223	-

Fig. 5-15: Encoder cable at EN1 option slot

Encoder type	Straight connector at IndraDrive	Bent connector at IndraDrive
EnDat encoder (EnDat 2.1, 5 Volt)	IKS4038	-

Fig. 5-16: Encoder cable at EN2 option slot

Basic drive configuration BE45 (DKR)

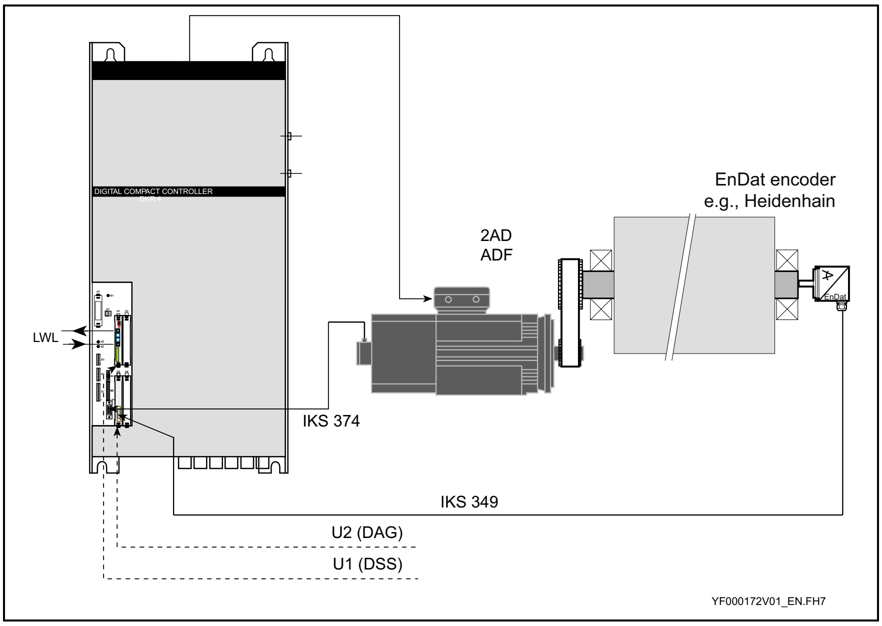

Fig. 5-17: Drive with step-down gear and direct absolute position detection (DKR)

Basic drive configuration HS45 (Diax 04)

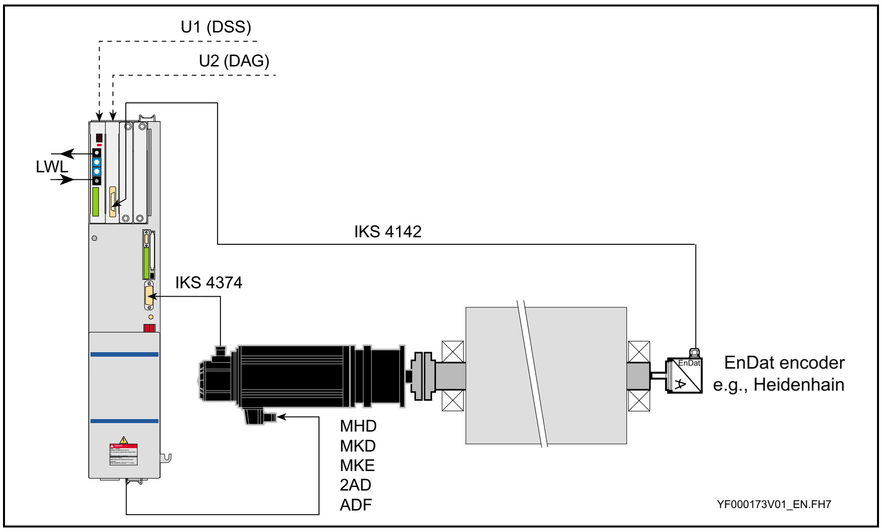

Fig. 5-18: Drive with step-down gear and direct absolute position detection (Diax 04)

Drive with indirect position detection

Features:
- no gear between motor and cylinder
- high level of precision can be achieved
- encoder is externally mounted

Usable motors

DKR
- 1MB

Diax 04
- 1MB

Basic drive configuration BE37 (DKR)

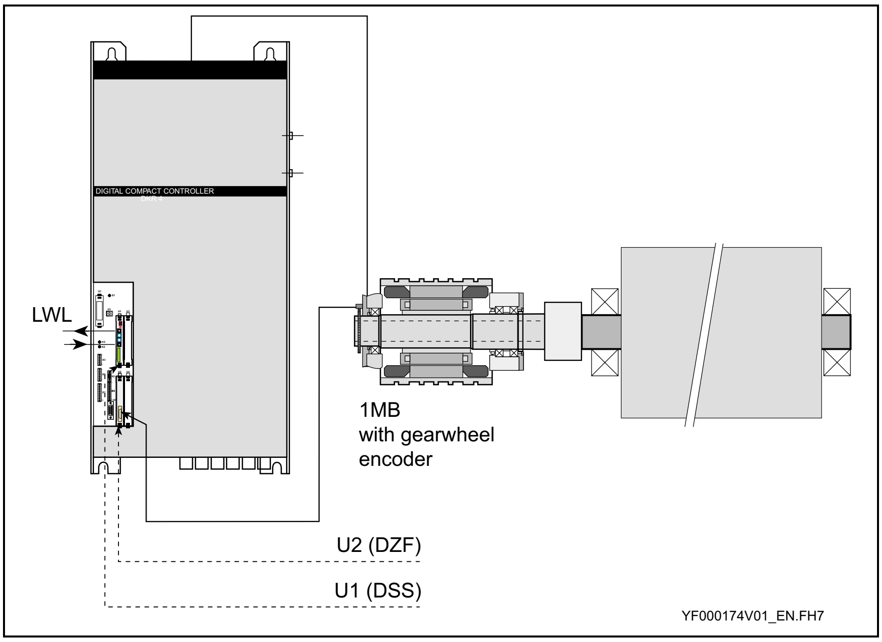

Fig. 5-19: Drive with 1MB motor with indirect position detection (DKR)

Basic drive configuration HS37 (Diax 04)

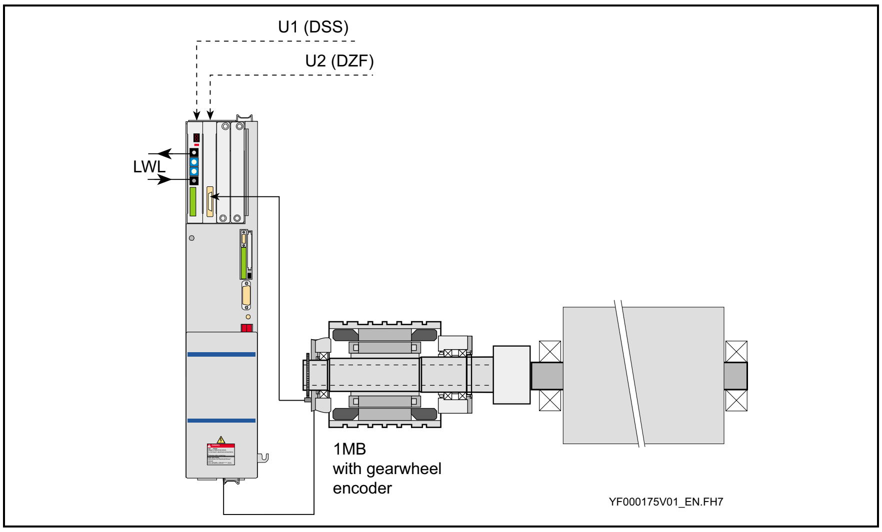

Fig. 5-20: Drive with 1MB motor with indirect position detection (Diax 04)

Drive with direct incremental position detection

Features:

- no gear between motor and cylinder
- high level of precision can be achieved
- load angle directly determined via incremental external encoder
- gear error statically compensated
- **With MHD, MKE, MKD, MBS and MBT motors:**
  - motor encoder for commutation is needed (MBS and MBT external)
  - absolute position detection via motor encoder
- **With MBW, 1MB, 2AD, ADF, MAD and MAF motors:**
  - no separate motor encoder
  - no absolute position detection
- **With MBW and 1MB motors:**
  - rigid coupling between motor and cylinder, resulting in highest level of static and dynamic stiffness

Usable motors

IndraDrive

- MBW (without motor encoder)
- 1MB (without motor encoder)
- 2AD (without motor encoder)
- ADF (without motor encoder)
- MAD (without motor encoder)
- MAF (without motor encoder)
- MBS (only in combination with external motor encoder)
- MBT (only in combination with external motor encoder)

DKR

- MBW (without motor encoder)
- 1MB (without motor encoder)
- 2AD (without motor encoder)
- ADF (without motor encoder)
- MAD (without motor encoder)
- MAF (without motor encoder)
- MBS (only in combination with external motor encoder)
- MBT (only in combination with external motor encoder)

Diax 04

- 2AD (without motor encoder)
- ADF (without motor encoder)
- MAD (without motor encoder)
- MAF (without motor encoder)
- MHD (only in combination with external motor encoder)
- MKD (only in combination with external motor encoder)
- MKE (only in combination with external motor encoder)
- MBS (only in combination with external motor encoder)
- MBT (only in combination with external motor encoder)

Basic drive configuration with EN2 option (IndraDrive)

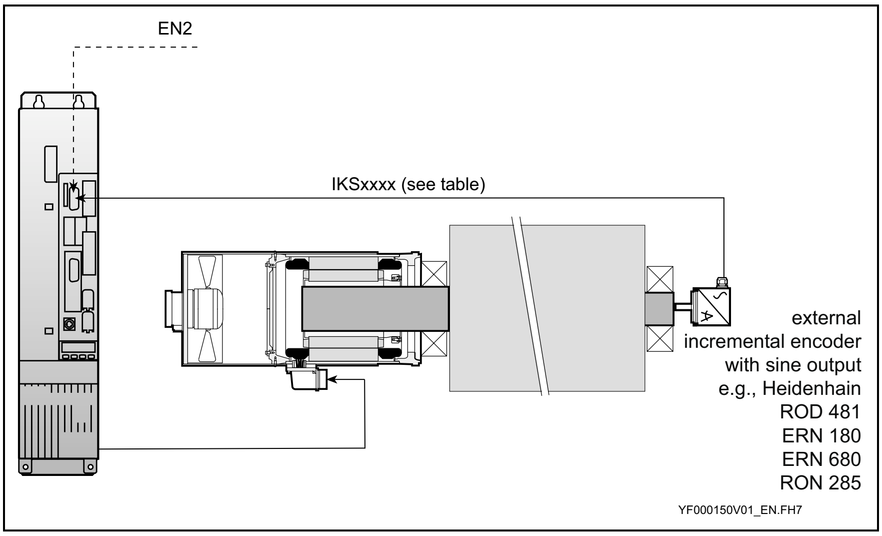

Fig. 5-21: Drive with direct incremental position detection (IndraDrive)

Encoder type	Straight connector at IndraDrive	Bent connector at IndraDrive
Sine encoder 1Vss	IKS4040	-

Fig. 5-22: Encoder cable at EN2 option slot

Basic drive configuration BE32 (DKR)

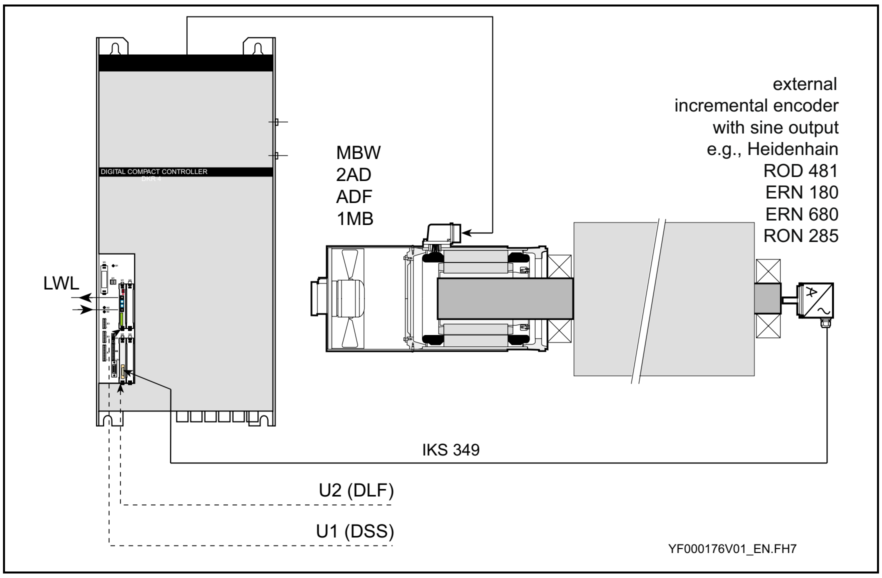

Fig. 5-23: Drive with MBW, 2AD or 1MB motor with direct incremental position detection (DKR)

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Basic drive configuration BE32 (DKR)

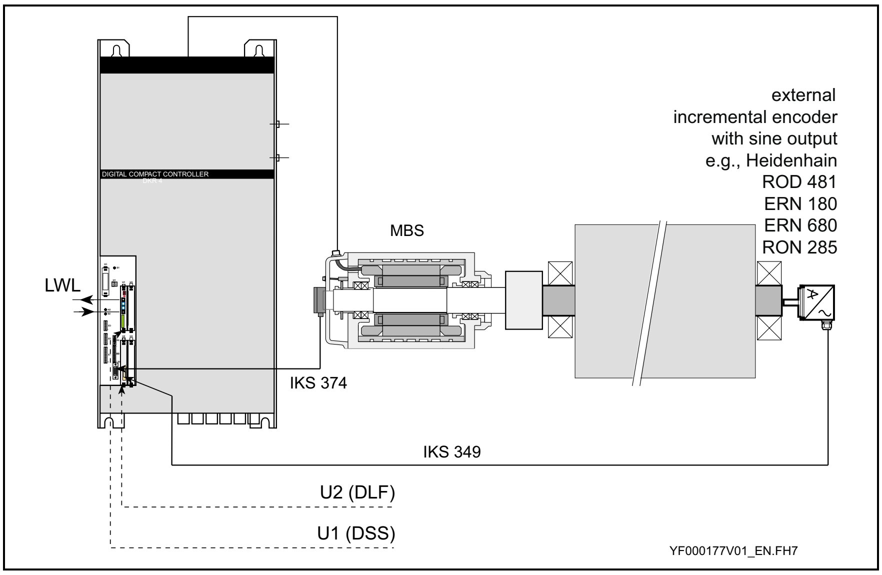

Fig. 5-24: Drive with MBS motor with direct incremental position detection (DKR)

Basic drive configuration HS32 (Diax 04)

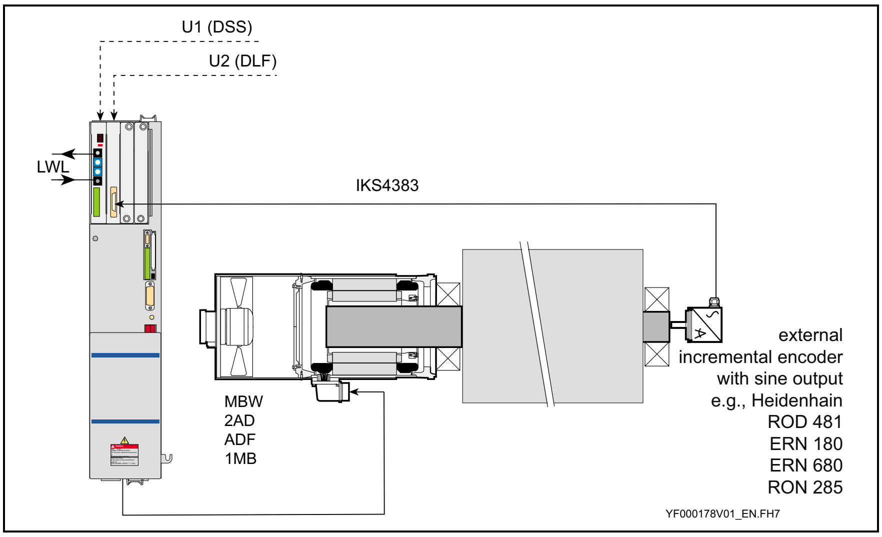

Fig. 5-25: Drive with MBW, 2AD, ADF or 1MB motor with direct incremental position detection (Diax 04)

Basic drive configuration HS32 (Diax 04)

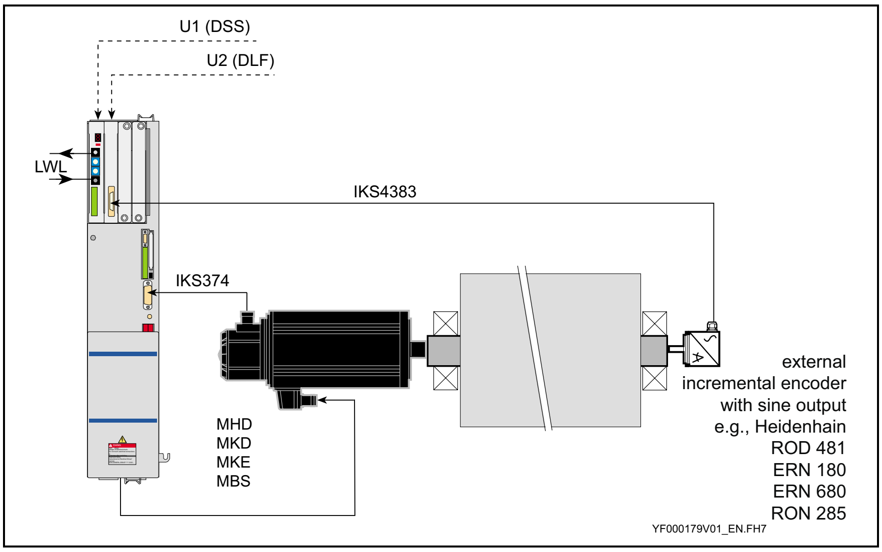

Fig. 5-26: Drive with MHD, MKD, MKE or MBS motor with direct incremental position detection (Diax 04)

Drive with direct absolute position detection

Features:

- no gear between motor and cylinder
- high level of precision an be achieved
- load angle directly detected via absolute external encoder
- gear error statically compensated
- **With MHD, MKD, MKE, MBS and MBT motors:**
  - motor encoder for commutation is needed (MBS and MBT external)
  - absolute position detection via external encoder
- **With MBW, 1MB, 2AD, ADF, MAD and MAF motors:**
  - no separate motor encoder
  - absolute position detection
- **With MBW and 1MB motors:**
  - rigid coupling between motor and cylinder, meaning highest level of static and dynamic stiffness

Usable motors

IndraDrive

- MBW (without motor encoder)
- 1MB (without motor encoder)
- 2AD (without motor encoder)
- ADF (without motor encoder)
- MAD (without motor encoder)
- MAF (without motor encoder)
- MBS (only in combination with external motor encoder)
- MBT (only in combination with external motor encoder)

DKR

- MBW (without motor encoder)
- 1MB (without motor encoder)
- 2AD (without motor encoder)
- ADF (without motor encoder)
- MAD (without motor encoder)
- MAF (without motor encoder)
- MBS (only in combination with external motor encoder)
- MBT (only in combination with external motor encoder)

Diax 04

- MBW (without motor encoder)
- 1MB (without motor encoder)
- 2AD (without motor encoder)
- ADF (without motor encoder)
- MAD (without motor encoder)
- MAF (without motor encoder)
- MHD (only in combination with external motor encoder)
- MKD (only in combination with external motor encoder)
- MKE (only in combination with external motor encoder)
- MBS (only in combination with external motor encoder)
- MBT (only in combination with external motor encoder)

Basic drive configuration with EN2 option (IndraDrive)

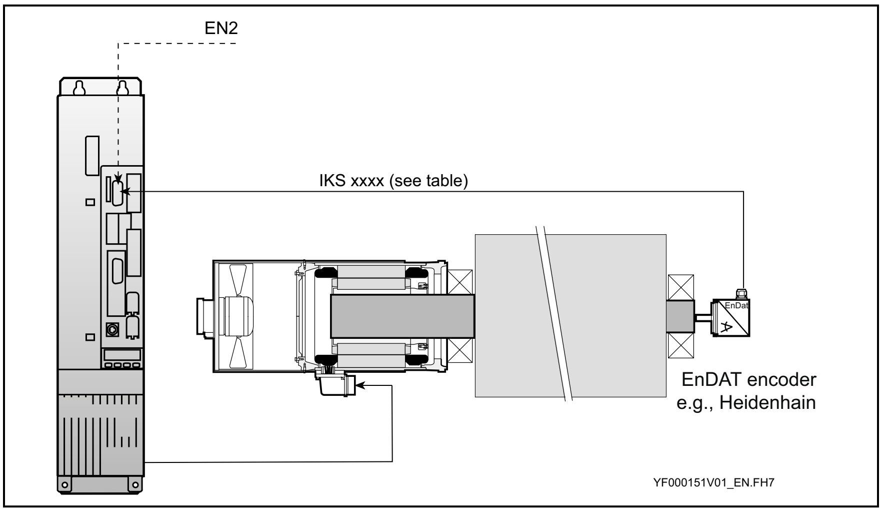

Fig. 5-27: Drive with direct absolute position detection (IndraDrive)

Encoder type	Straight connector at IndraDrive	Bent connector at IndraDrive
EnDat encoder (EnDat 2.1, 5 Volt)	IKS4038	-

Fig. 5-28: Encoder cable at EN2 option slot

Basic drive configuration BE45 (DKR)

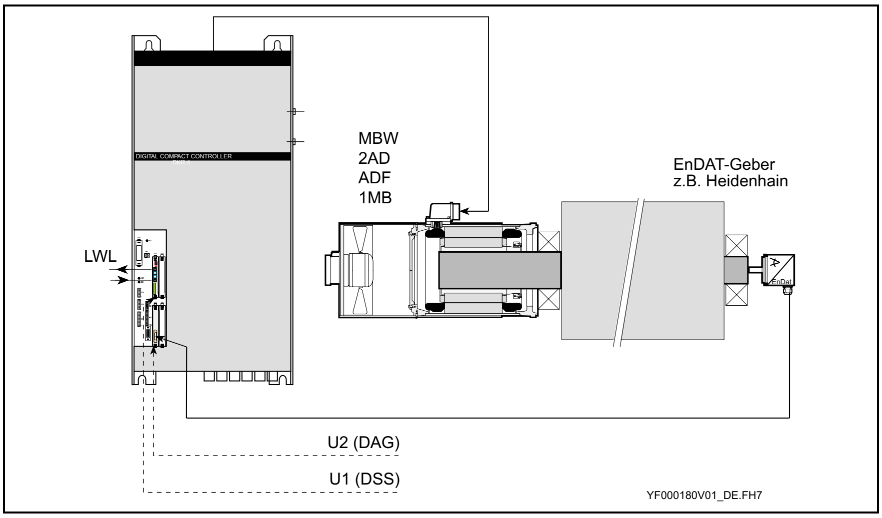

Fig. 5-29: Drive with MBW, 2AD, ADF or 1MB motor with direct absolute position detection (DKR)

Basic drive configuration BE32 (DKR)

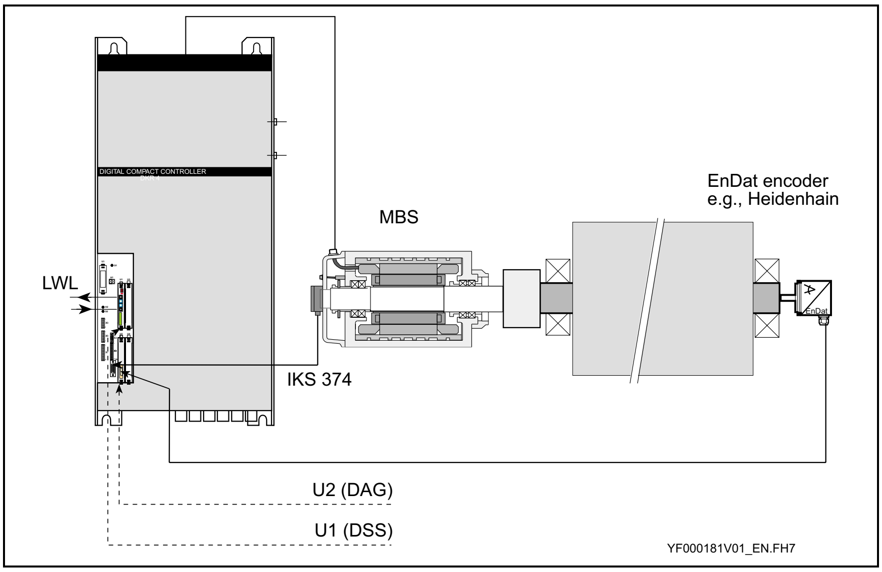

Fig. 5-30: Drive with MBS motor with direct absolute position detection (DKR)

Basic drive configuration HS45 (Diax 04)

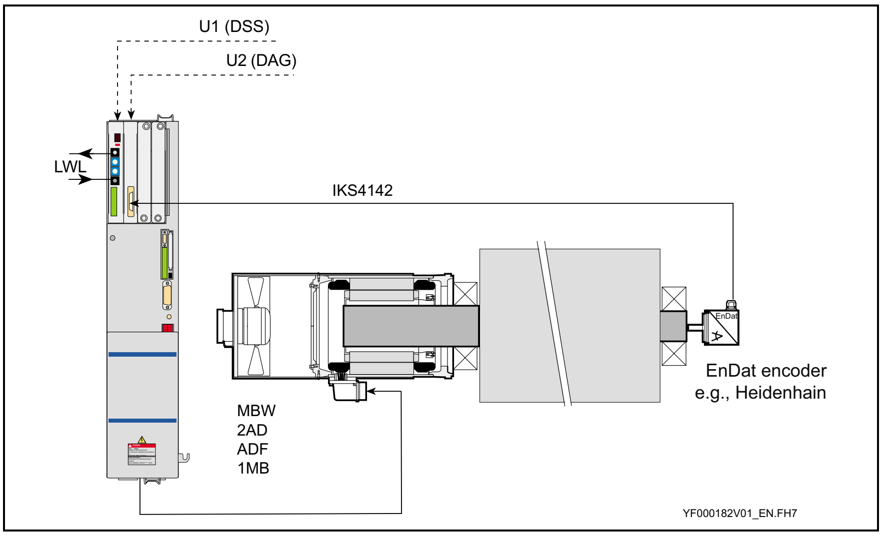

Fig. 5-31: Drive with MBW, 2AD, ADF or 1MB motor with direct absolute position detection (Diax 04)

Basic drive configuration HS32 (Diax 04)

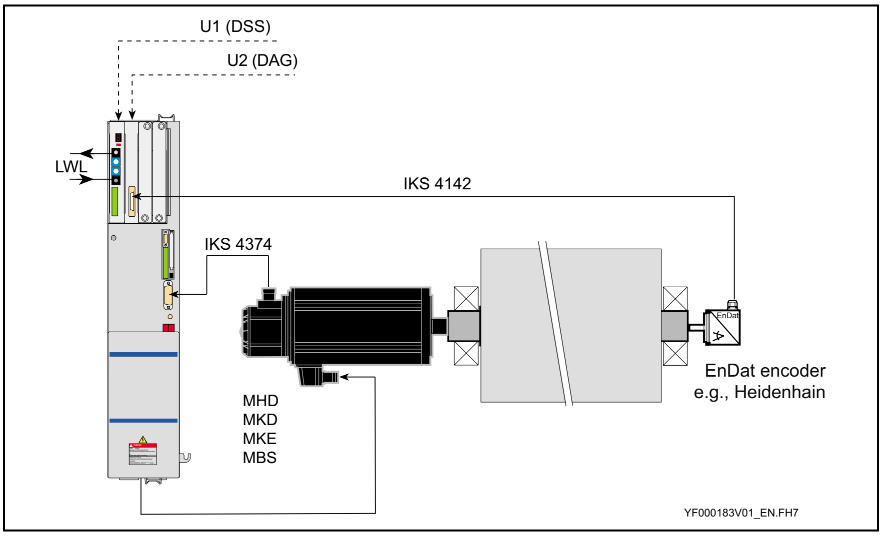

Fig. 5-32: Drive with MHD, MKD, MKE or MBS motor with direct absolute position detection (Diax 04)

5.3 Linear axes

Drive with indirect position detection

Features:

- accuracy determined by spindle and gear errors
- encoder is integrated into motor
- motor encoder either with singleturn or multiturn absolute encoder

Usable motors

IndraDrive

- MHD
- MKD
- MKE
- 2AD with HSF
- ADF with HSF
- MAD with HSF
- MAF with HSF
- MBW with HSF
- MBT with HSF
- MBS with HSF

DKR

- 2AD with HSF
- ADF with HSF
- MAD with HSF
- MAF with HSF

Diax 04

- MHD
- MKD
- MKE
- 2AD with HSF
- ADF with HSF
- MAD with HSF
- MAF with HSF

Basic drive configuration with EN1 option (IndraDrive)

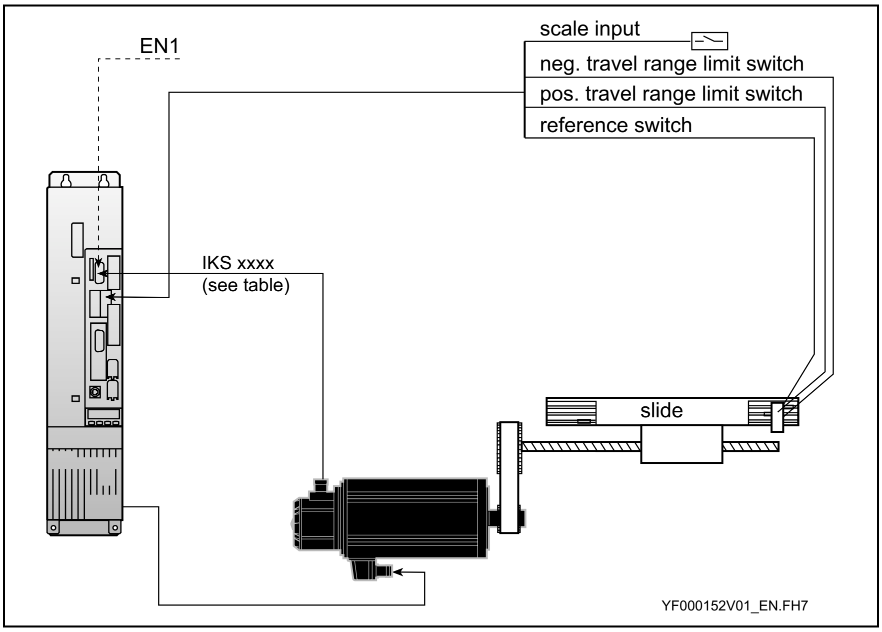

Fig. 5-33: Drive with indirect position detection (IndraDrive)

Motor type	Straight connector at IndraDrive	Bent connector at IndraDrive
MKD, MHD, 2AD, ADF, MAD, MAF, MBW, MBT, MBS with connector	IKS4042	IKS4044
MKD with terminal box	IKS4043	-
MKE with terminal box	IKS0223	-

Fig. 5-34: Encoder cable at EN1 option slot

Basic drive configuration BE12 (DKR)

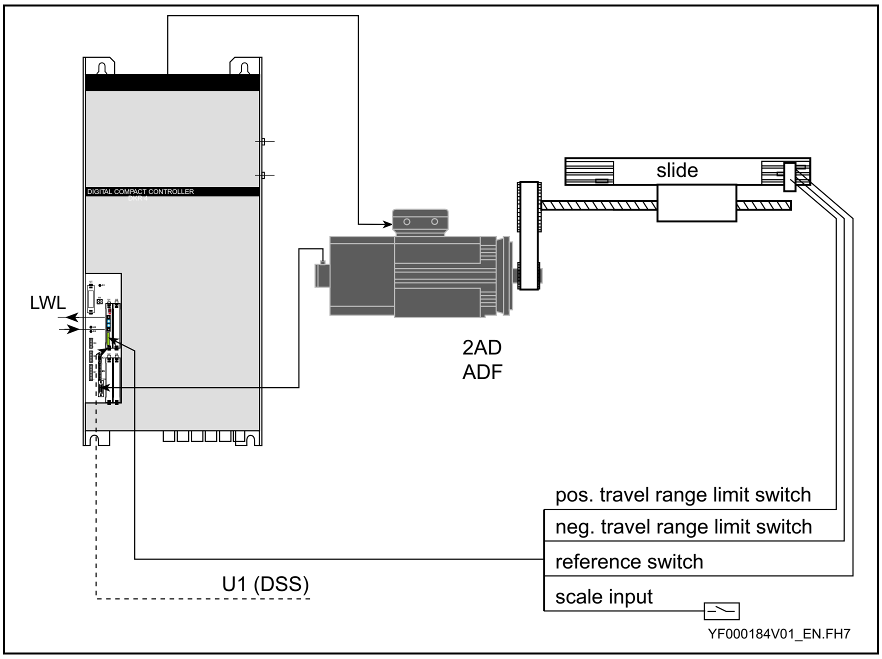

Fig. 5-35: Drive with 2AD or ADF motor with DSF and indirect position detection (DKR)

Basic drive configuration HS12 (Diax 04)

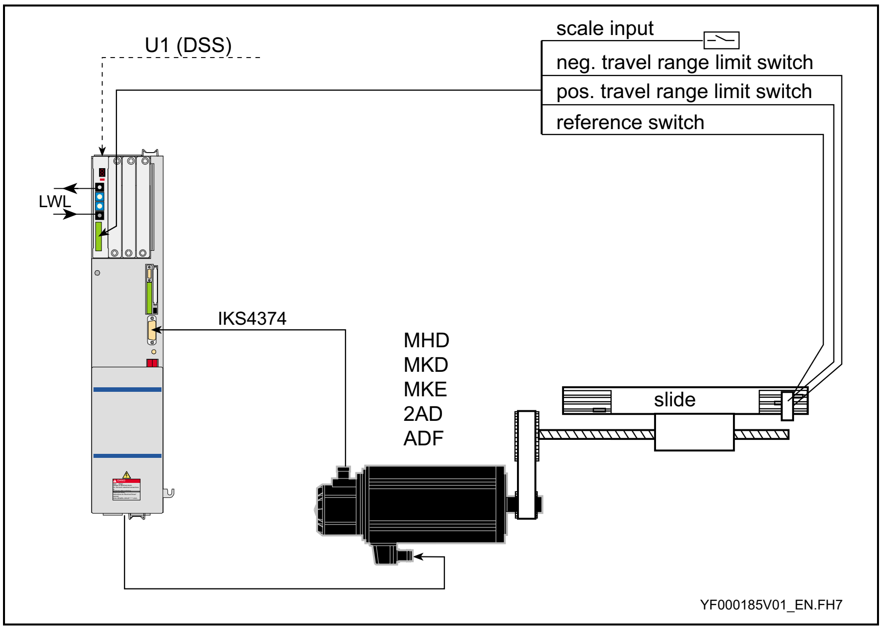

Fig. 5-36: Drive with MHD, MKD, MKE, 2AD or ADF motor with DSF and indirect position detection (Diax 04)

Drive with direct incremental position detection

Features:

- motor encoder with either singleturn or multiturn absolute encoder
- load position directly detected via incremental external encoder
- gear error statically compensated

Usable motors

IndraDrive

- MHD
- MKD
- MKE
- 2AD with HSF
- ADF with HSF
- MAD with HSF
- MAF with HSF
- MBW with HSF
- MBT with HSF
- MBS with HSF

DKR

- 2AD with HSF
- ADF with HSF
- MAD with HSF
- MAF with HSF

Diax 04

- MHD
- MKD
- MKE
- 2AD with HSF
- ADF with HSF
- MAD with HSF
- MAF with HSF

Basic drive configuration with EN1 and EN2 option (IndraDrive)

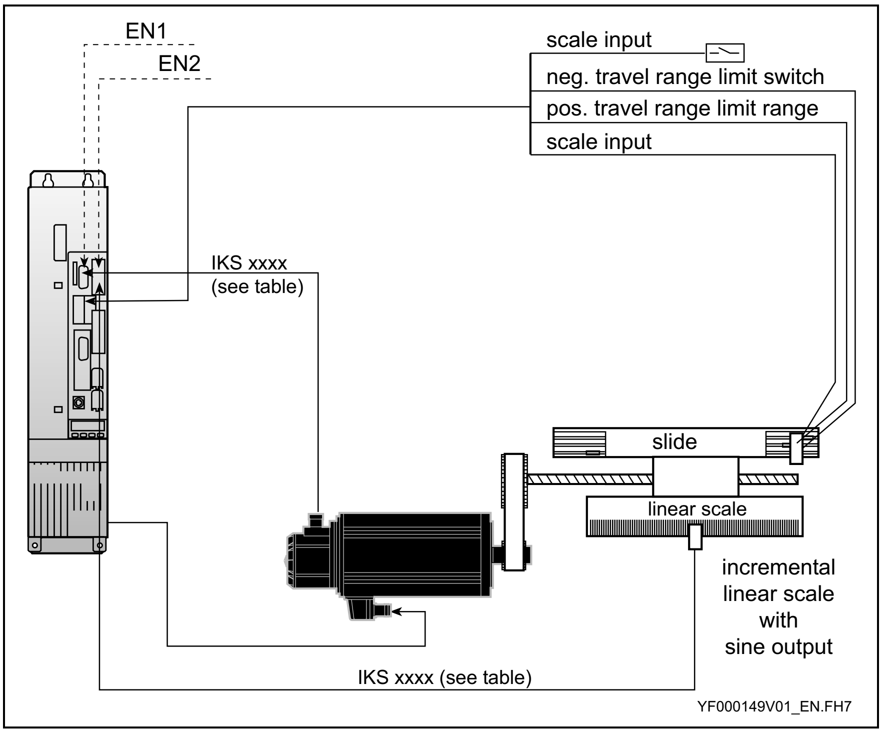

Fig. 5-37: Drive with direct incremental position detection (IndraDrive)

Motor type	Straight connector at IndraDrive	Bent connector at IndraDrive
MKD, MHD, 2AD, ADF, MAD, MAF, MBW, MBT, MBS with connector	IKS4042	IKS4044
MKD with terminal box	IKS4043	-
MKE with terminal box	IKS0223	-

Fig. 5-38: Encoder cable at EN1 option slot

Encoder type	Straight connector at IndraDrive	Bent connector at IndraDrive
Sine encoder 1Vss	IKS4040	-

Fig. 5-39: Encoder cable at EN2 option slot

Basic drive configuration BE32 (DKR)

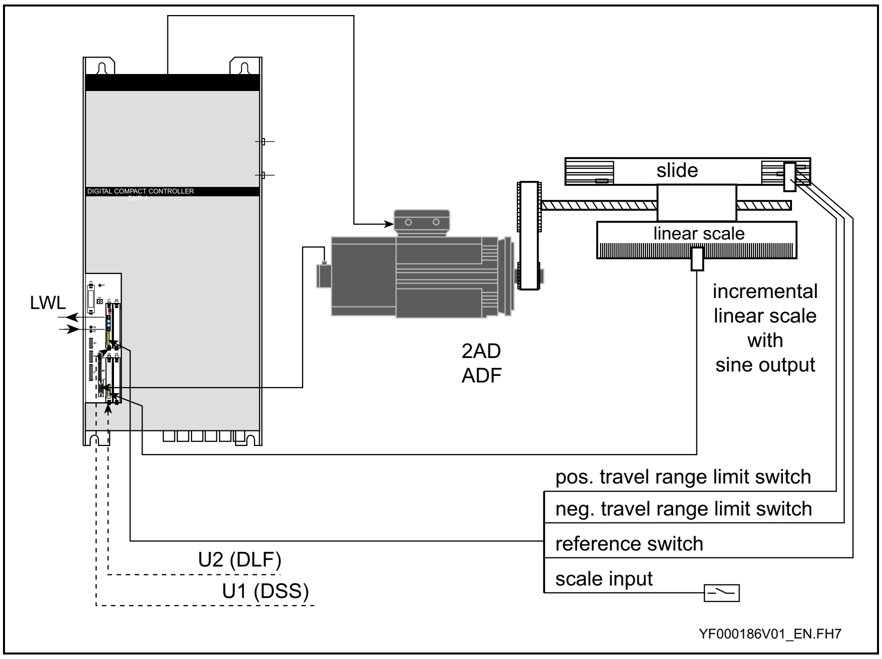

Fig. 5-40: Drive with 2AD or ADF motor with DSF with direct incremental position detection (DKR)

Basic drive configuration BE32 (Diax 04)

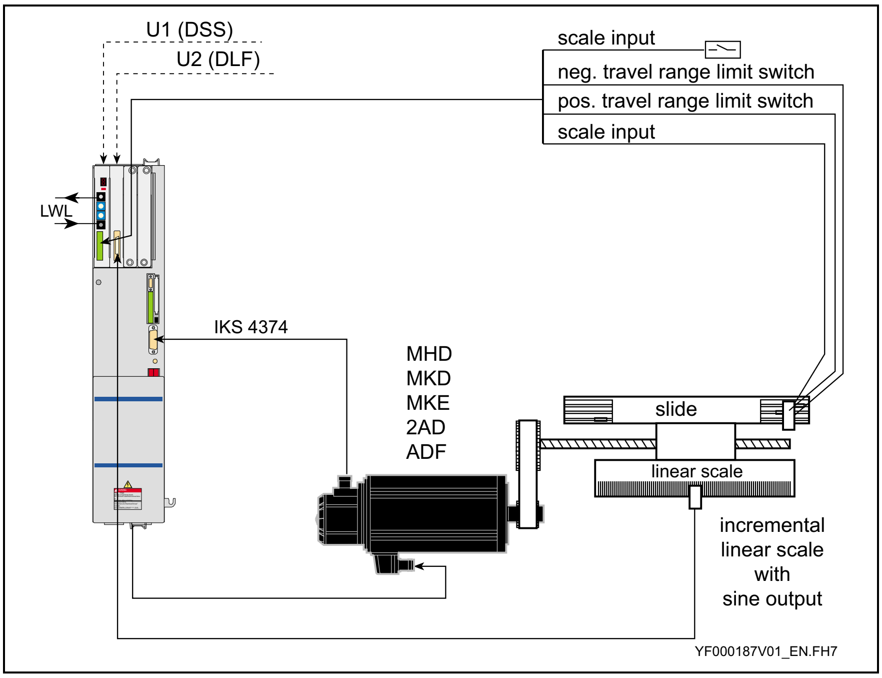

Fig. 5-41: Drive with MHD, MKD, MKE, 2AD or ADF motor with DSF with direct incremental position detection (DKR)

Drive with direct absolute position detection

Features:

- gearwheel encoder as motor encoder
- load position directly detected via absolute external encoder
- gear error statically compensated

Usable motors

IndraDrive

- MHD
- MKD
- MKE
- 2AD with HSF
- ADF with HSF
- MAD with HSF
- MAF with HSF
- MBW with HSF
- MBT with HSF
- MBS with HSF

DKR

- 2AD with HSF
- ADF with HSF
- MAD with HSF
- MAF with HSF

Diax 04

- 2AD with gearwheel encoder
- ADF with gearwheel encoder

Basic drive configuration with EN1 and EN2 option (IndraDrive)

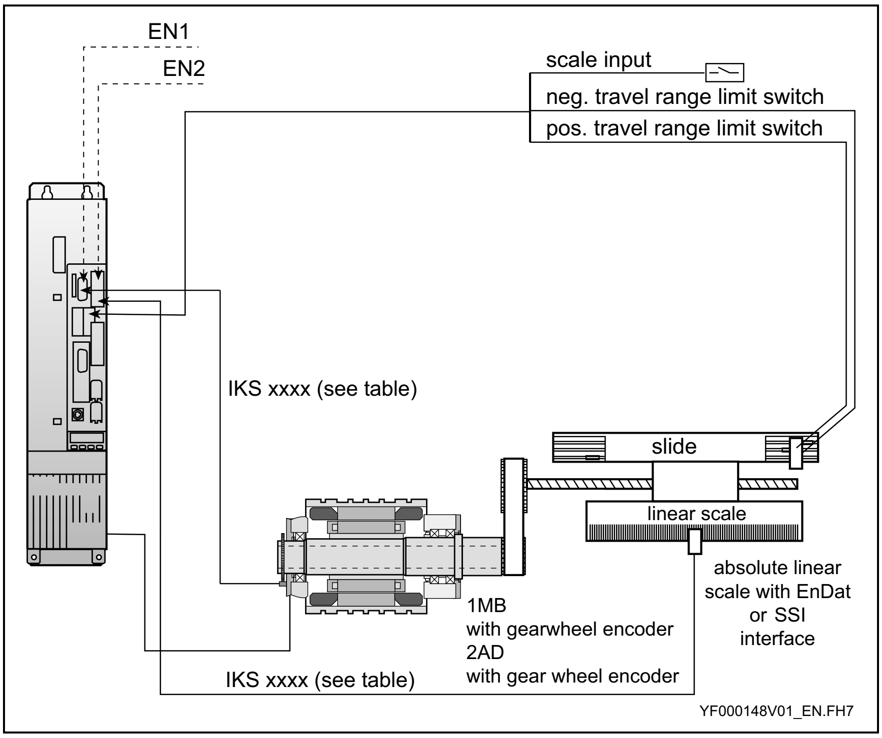

Fig. 5-42: Drive with direct absolute position detection (IndraDrive)

Motor type	Straight connector at IndraDrive	Bent connector at IndraDrive
MKD, MHD, 2AD, ADF, MAD, MAF, MBW, MBT, MBS with connector	IKS4042	IKS4044
MKD with terminal box	IKS4043	-
MKE with terminal box	IKS0223	-

Fig. 5-43: Encoder cable at EN1 option slot

Encoder type	Straight connector at IndraDrive	Bent connector at IndraDrive
EnDat encoder (EnDat 2.1, 5 Volt)	IKS4038	-

Fig. 5-44: Encoder cable at EN2 option slot

Basic drive configuration BE45 (DKR)

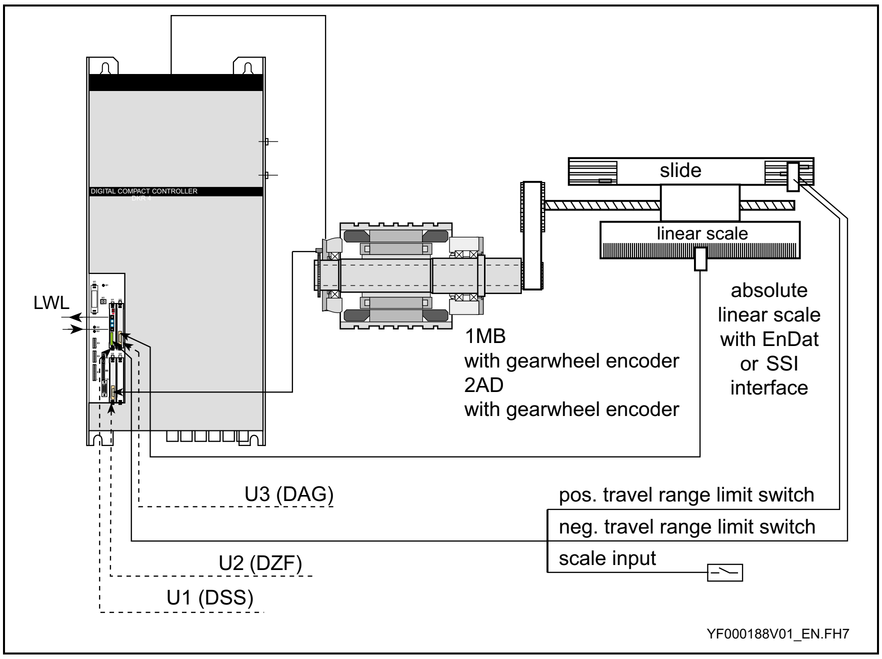

Fig. 5-45: Drive with 1MB or 2AD motor with gearwheel encoder with direct absolute position detection (DKR)

Basic drive configuration HS45 (Diax 04)

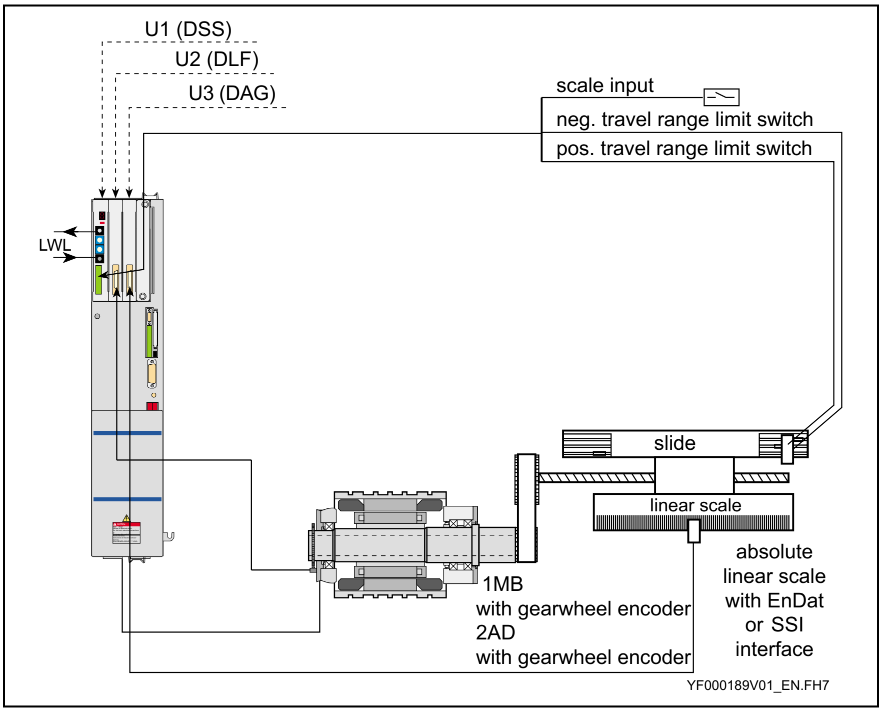

Fig. 5-46: Drive with 1MB or 2AD motor with gearwheel encoder with direct absolute position detection (Diax 04)

Drive with linear motor and incremental position detection

Features:

- incremental position detection via external linear scale with sinusoidal output
- Direct Drive
- highest possible degree of static and dynamic precision
- high achievable acceleration of up to 100 m/s²

Usable motors

IndraDrive

- MLF

DKR

- LAF
- LSF

Diax 04

- LAF
- LSF

Basic drive configuration with EN2 option (IndraDrive)

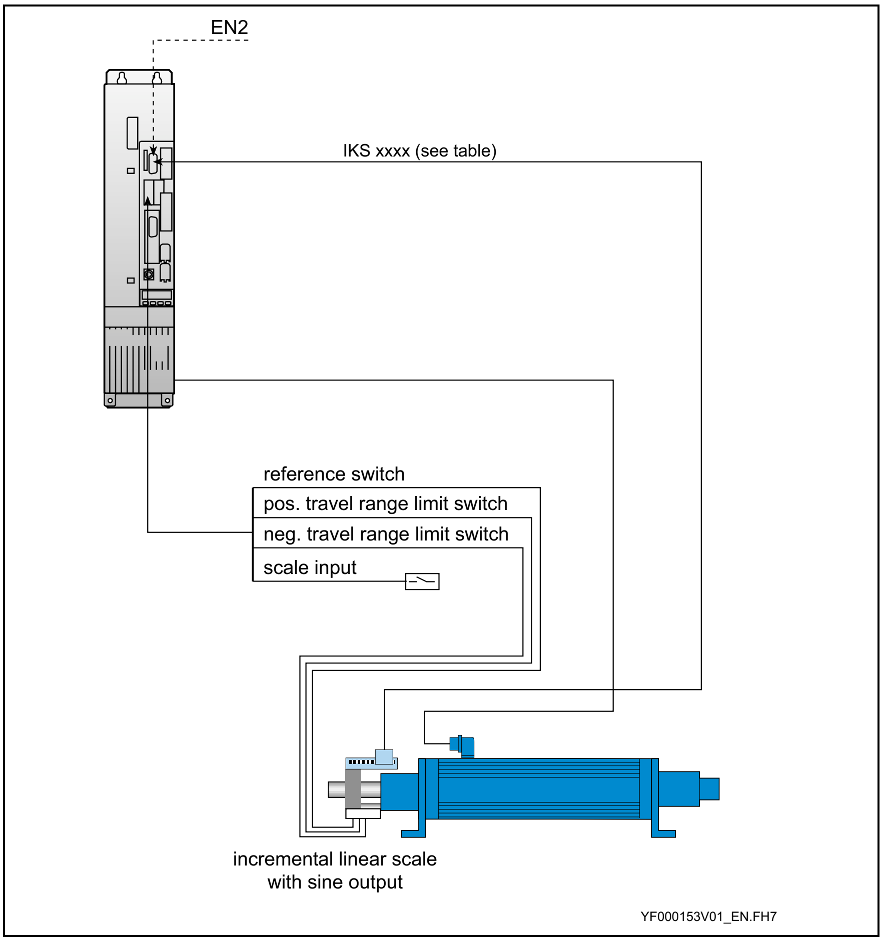

Fig. 5-47: Drive with linear motor and incremental position detection (IndraDrive)

Encoder type	Straight connector at IndraDrive	Bent connector at IndraDrive
Sine encoder 1Vss	IKS4040	-

Fig. 5-48: Encoder cable at EN2 option slot

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Basic drive configuration BE32 (DKR)

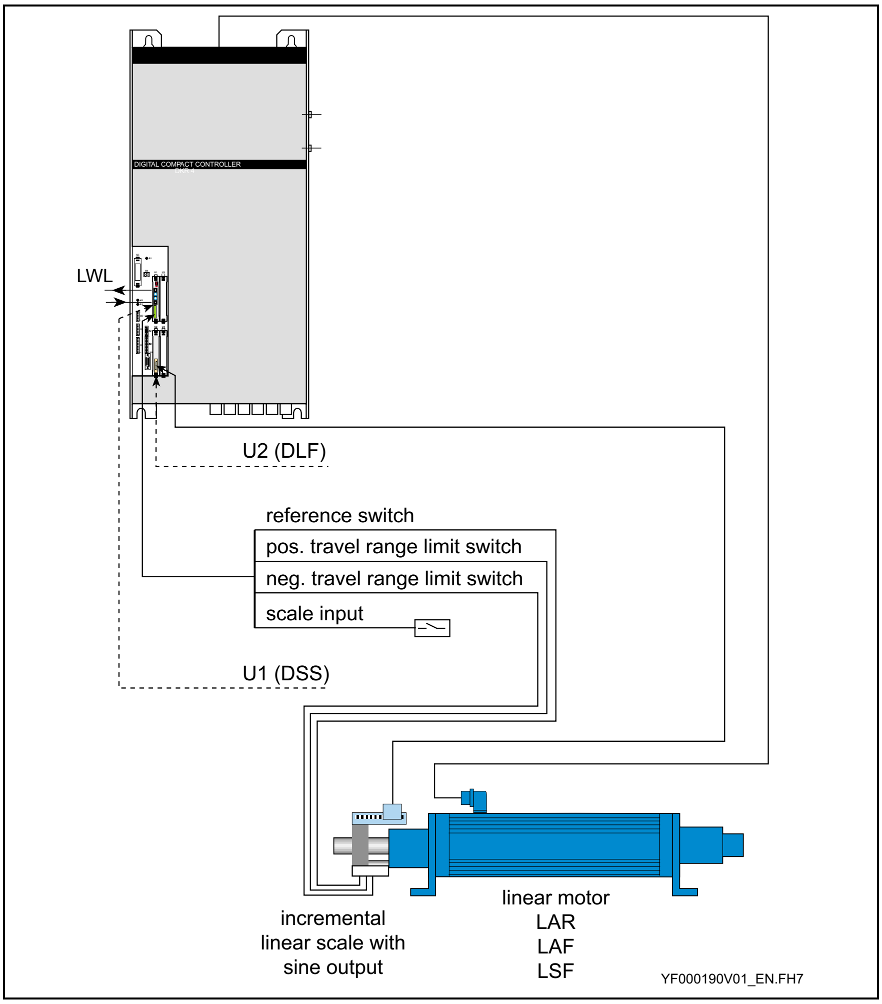

Fig. 5-49: Drive with linear motor LAF or LSF and incremental position detection (DKR)

Basic drive configuration HS32 (Diax 04)

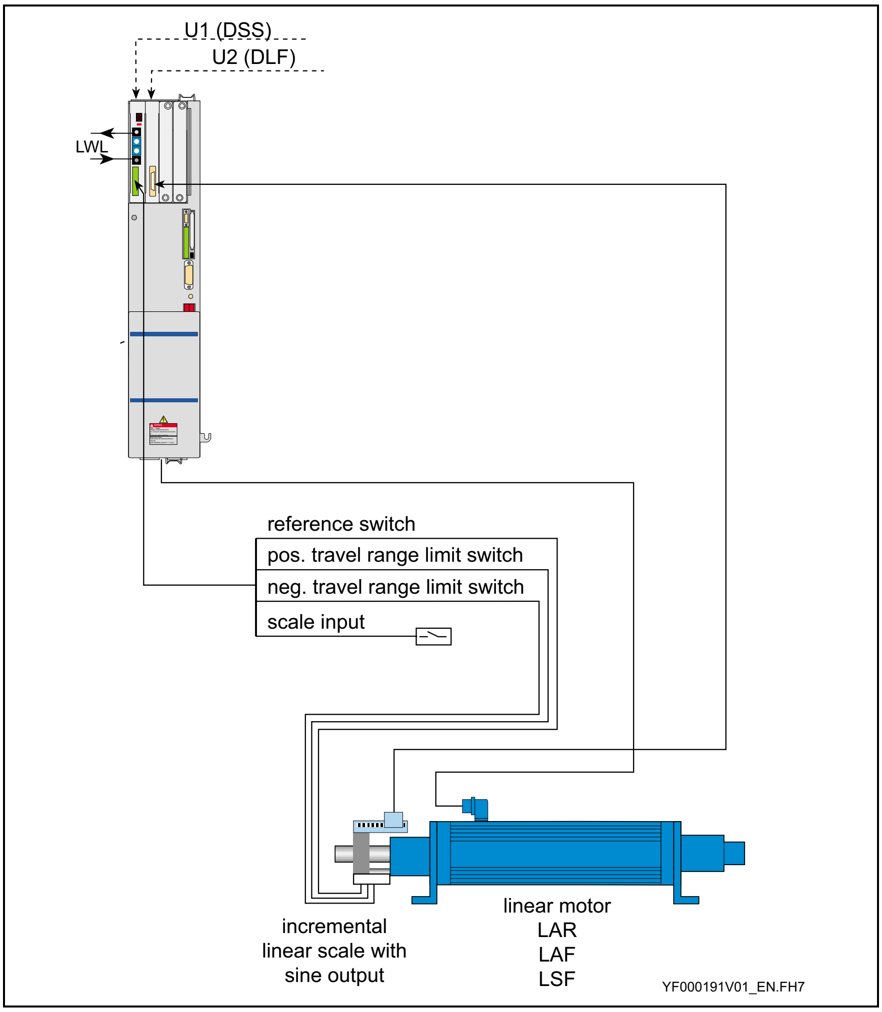

Fig. 5-50: Drive with linear motor LAF or LSF and incremental position detection (Diax 04)

Drive with linear motor and absolute position detection

Features:

- absolute position detection via external linear scale with EnDat interface
- DirectDrive
- highest possible degree of static and dynamic precision
- high achievable acceleration of up to 100 m/s²

Usable motors

IndraDrive

- MLF

DKR

- LAF
- LSF

Diax 04

- LAF
- LSF

Basic drive configuration with EN2 option (IndraDrive)

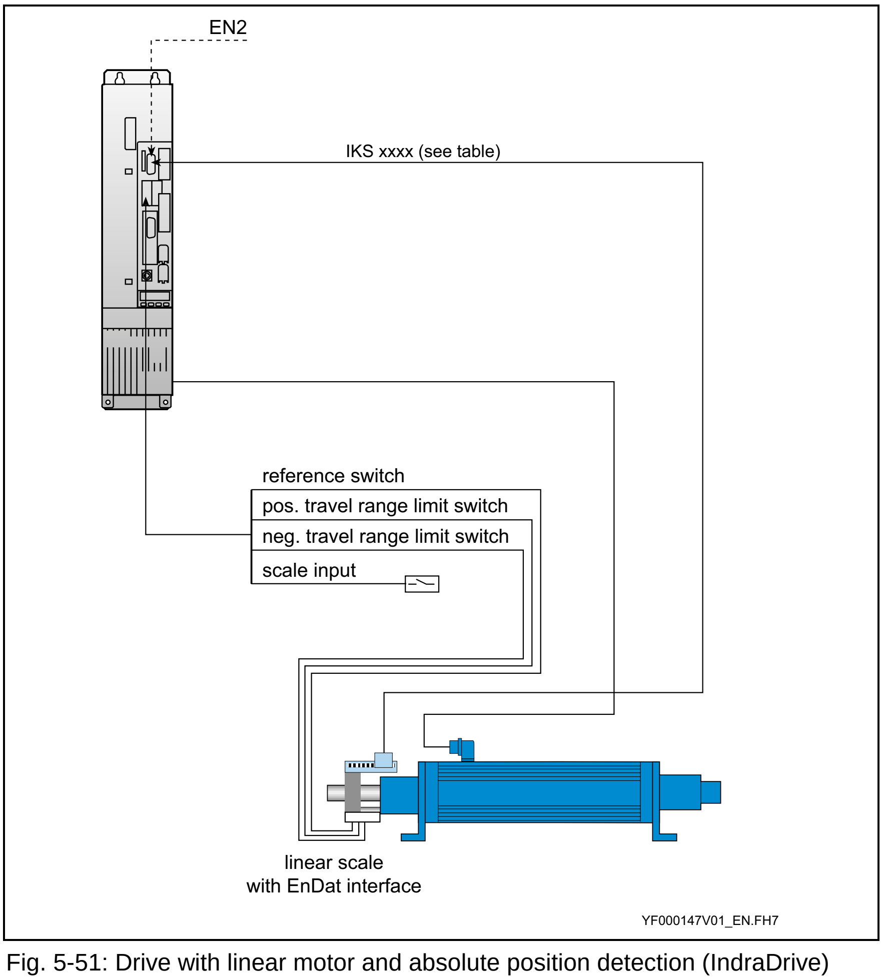

Fig. 5-51: Drive with linear motor and absolute position detection (IndraDrive)

Encoder type	Straight connector at IndraDrive	Bent connector at IndraDrive
EnDat encoder (EnDat 2.1, 5 Volt)	IKS4038	-

Fig. 5-52: Encoder cable at EN2 option slot

Basic drive configuration BE45 (DKR)

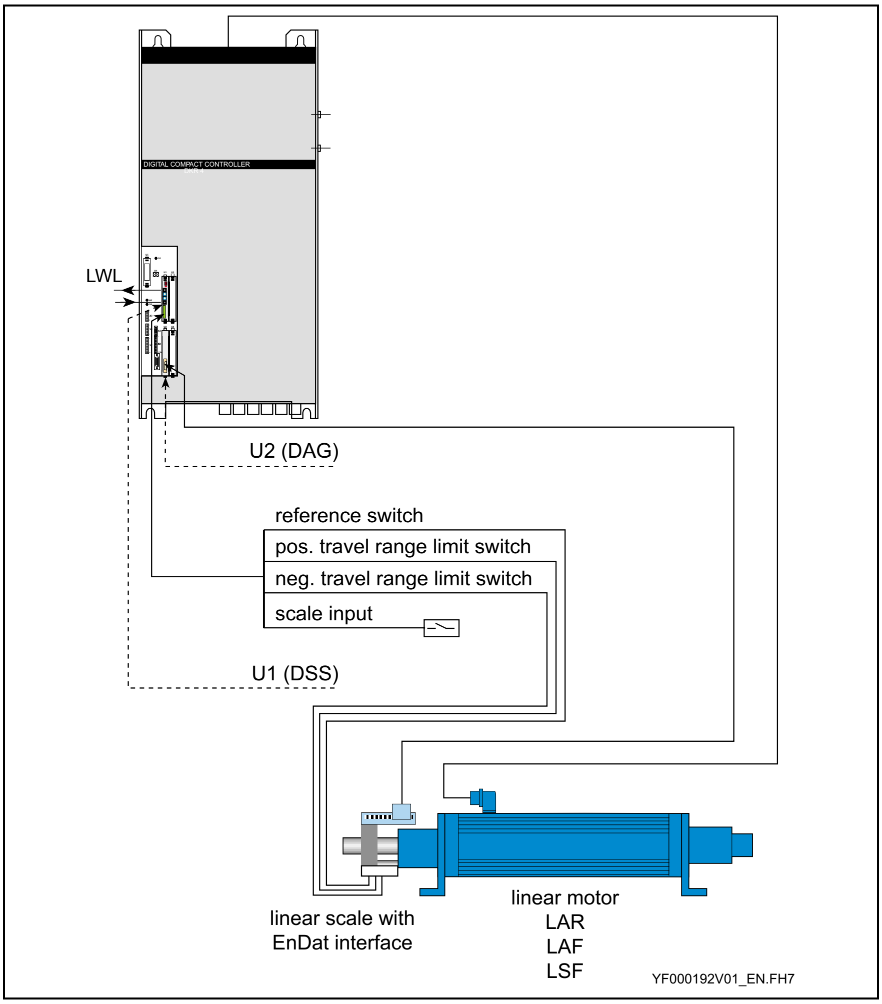

Fig. 5-53: Drive with linear motor LAF or LSF and absolute position detection (DKR)

Basic drive configuration HS45 (Diax 04)

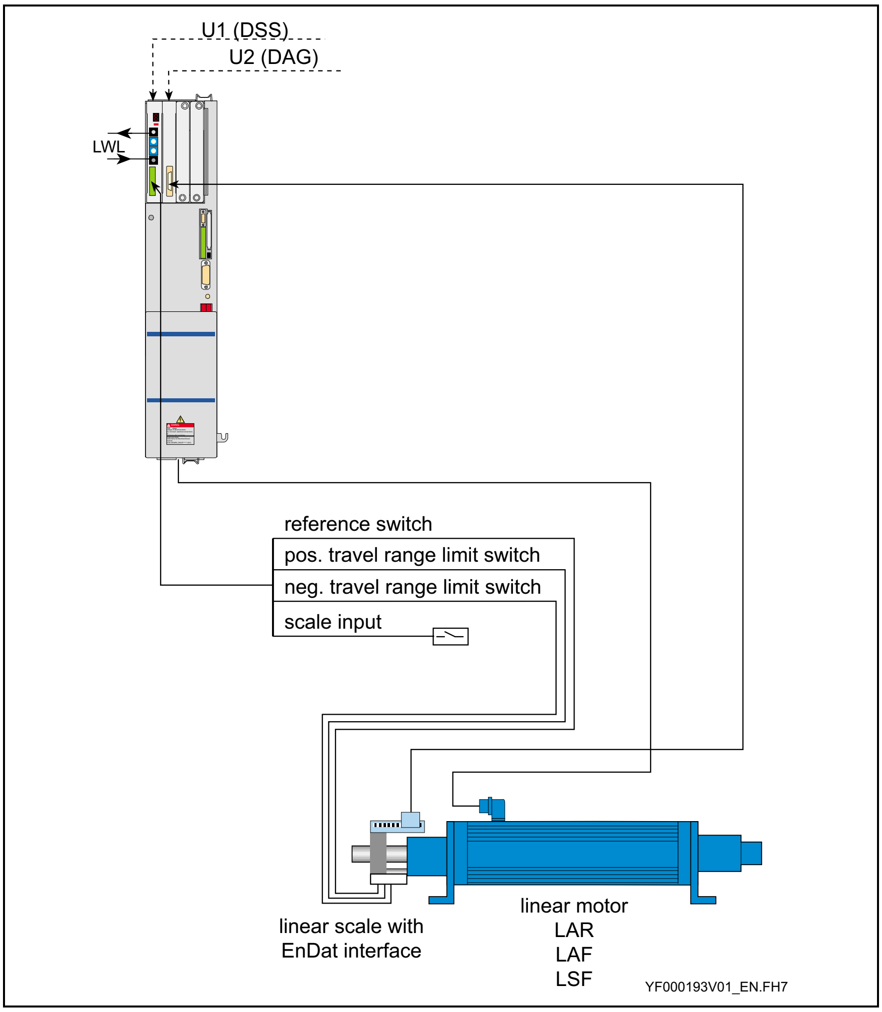

Fig. 5-54: Drive with linear motor LAF or LSF and absolute position detection (Diax 04)

5.4 Determining the control-related I/O option

Determining parallel I/Os (IndraDrive with option MD1)

In the IndraDrive a parallel I/O option card HEA01 can be used (option MD1).

Binary signals can be exchanged with this card between the PPC and a PLC. The voltage level equals 24 volts. The inputs and outputs are opto-decoupled.

HEA01 12 inputs and 8 outputs are available.

The signals applied to this I/O are transmitted via the SERCOS fibre-optics cable link to the PPC.

Determining parallel I/Os (Diax)

DEA04 or DEA08 parallel I/O cards can be inserted into DKR and HDS controllers.

Binary signals can be exchanged with this card between the PPC and a PLC. The voltage level equals 24 volts. The inputs and outputs are opto-decoupled.

DEA04 Fifteen inputs (the 16th input monitors the 24 V power source) and 16 outputs are available. The 16th input can be used as a watchdog or a regular output.

DEA08 32 inputs, 24 outputs and a watchdog output are available.

The signals applied to this I/O are transmitted via the SERCOS fibre-optics cable link to the PPC.

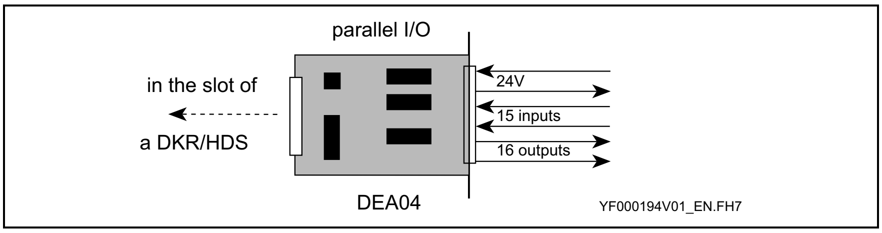

Fig. 5-55: Parallel I/O card DEA04

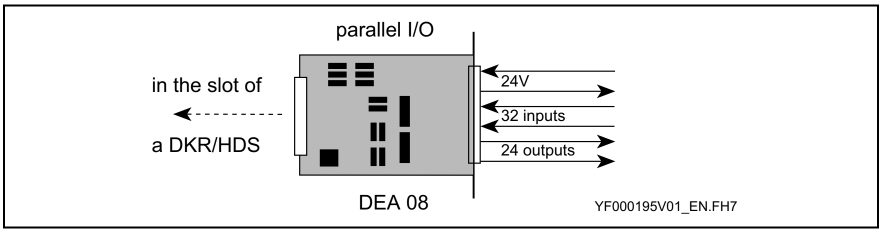

Fig. 5-56: Parallel I/O card DEA08

Combination options of the external I/O (drive internal)

In addition to the RECO I/O modules the following I/O variants are available drive internal:

- Drive option MD1 (HEA01)
- Drive plug-in card DEA04
- Drive plug-in card DEA08

These can be used for the following functions:

- I/O logic (VKL)
- cam switch 2 (cams)

The drive plug-in cards can also be used to output the binary value of a parameter or to read it in.

Note: For parameter output or reading one in, it is also possible to use the drive plug-in cards DEA05/DEA06 or DEA09/DEA10.

	DEA04	**DEA08**
Example A	inputs VKL, outputs 16 HS cams (32 cams with 2 * DEA04)	inputs VKL, outputs VKL
Example B	inputs VKL, outputs VKL	inputs VKL, outputs 24 cams
Example C	inputs VKL, parameter output	inputs VKL, outputs VKL
Example D	parameter input, outputs VKL	inputs VKL, parameter output

Fig. 5-57: Example configuration

The following combinations are not possible:

- Cams configured on a DEA card while simultaneously using the outputs of this card in the I/O logic or for parameter output.
- Parameter output via P-0-0124 (e.g., drive cams P-0-0135) on a DEA04 or DEA08 activated and the outputs used in the VKL or for cams.
- Parameter read in via P-0-0125 activated by DEA04 or DEA08 and the inputs used in the VKL.

Determining the master axis

If it is necessary that the slave drive of the electronic gears has reference to a real master axis, then a master axis encoder must be mounted to this master axis.

Note: The master axis encoder must be mounted so that one master axis revolution equals *one* machine cycle (1 product ejection). This can be reached when parameterize a electronic measuring gear if necessary (see DOK-SYNAX*-SY*-12VRS**-FK01-EN-P, section "Real master axis - electronic measuring gear")

Note: If the product cycle (C-0-0076) is greater than 1, a multiturn encoder must be used.

The master axis encoder is mounted to an encoder interface in the drive amplifier. The master axis position is generated from the encoder signals and transmitted via SERCOS interface to the PPC motion control.

EnDat/SSI encoder

It is possible to realize a real master axis using an EnDat/SSI encoder.

IndraDrive

In this case use encoder option EN2 (EnDat 2.1), EEN (EnDat 2.2) or ESS (SSI).

DKR, Diax 04

In this case use encoder interface DAG.

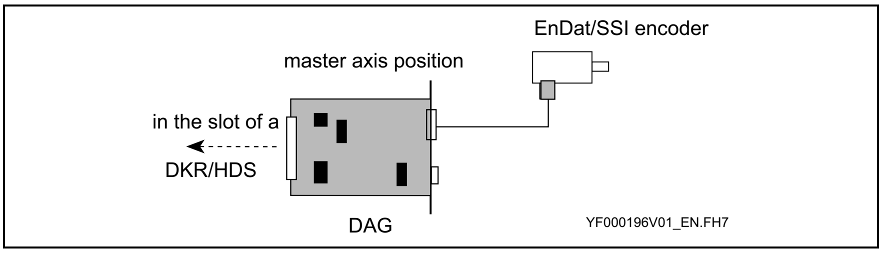

Fig. 5-58: EnDat and SSI encoder interface DAG

EcoDrive 03

The EnDat encoder is connected to the second interface X8. SSI encoders are not supported.

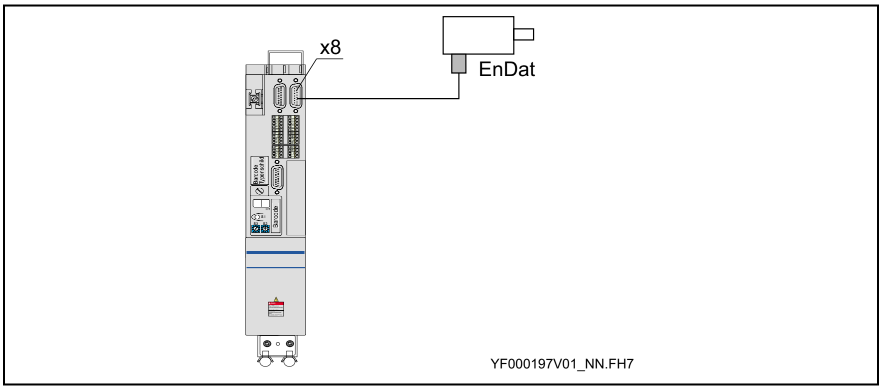

Fig. 5-59: EnDat encoder interface DKC

Note: Use only encoders with binary line numbers (2^n). Recommended type: encoder with 2048 number of lines.

Incremental encoder with sinusoidal signals 1Vss

It is also possible to connect a real master axis using an incremental encoder with sinusoidal signals 1Vss.

Note: Use only encoders with binary line numbers (2^n).

IndraDrive In this case use encoder option EN2.

DKR, Diax 04 In this case use encoder interface DLF.

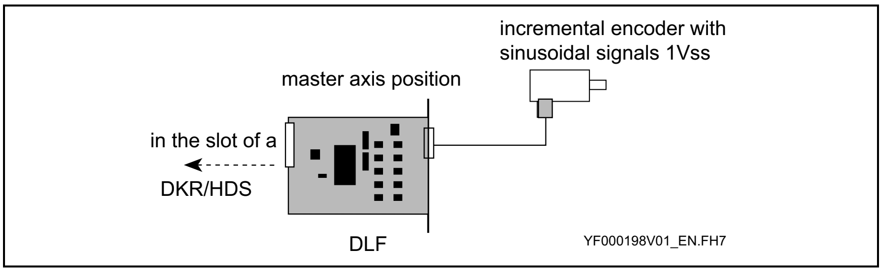

Fig. 5-60: Incremental encoder with sinusoidal signals 1Vss

Note: There is no zero impulse evaluation, that means that the master axis position has no absolute reference.

EcoDrive 03 The incremental encoder with sinusoidal signals 1Vss is connected to the second interface X8.

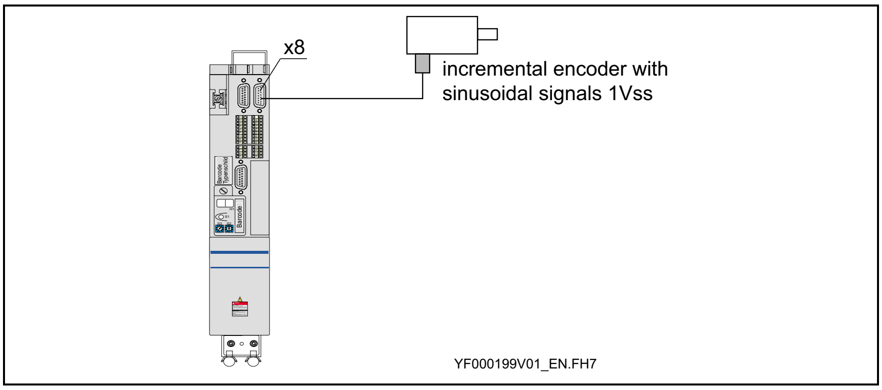

Fig. 5-61: Incremental encoder with sinusoidal signals 1Vss

Note: The evaluation of the zero impulse of EcoDrive 03 is parameterizable. If the zero impulse is evaluated, the master axis position changes immediately when registering the zero impulse. This must be considered for application.

Determining analog inputs

IndraDrive Two analog signals per drive can be detected via the analog interface option MA1 (HAS01).

DKR, Diax 04 Two analog signals per drive can be detected via the analog interface DAE.

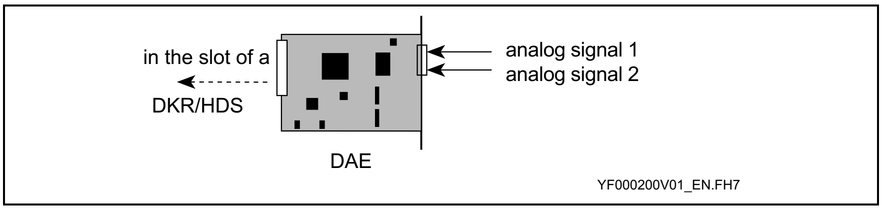

Fig. 5-62: Analog interface DAE

Analog signals are read by the drive and transmitted via the SERCOS fibre-optics ring to the PPC. The PPC processes and allocates the analog signals (e.g., actual values of the tension control).

Master axis position output

SSI emulation

IndraDrive The master axis position in SSI format can be generated via the SSI output option MEM.

DKR, Diax 04 The master axis position in SSI format can be generated via the SSI output interface DSA.

The DSA card can be placed in any drive in the fibre-optics ring for this purpose.

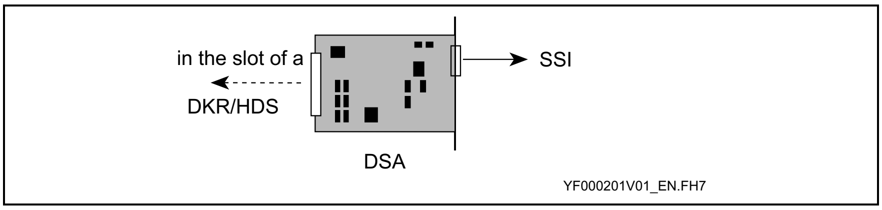

Fig. 5-63: Master axis position - SSI output interface DSA

EcoDrive 03 The master axis position in SSI format can be generated via the SSI output interface X9 in any drive in the fibre-optics ring.

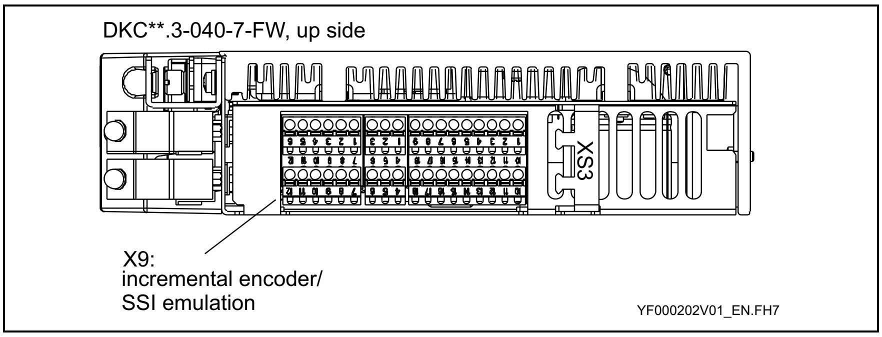

Fig. 5-64: Master axis position - SSI output interface on EcoDrive 03

Rexroth Bosch Group

Incremental encoder emulation

IndraDrive

The master axis position can be generated as an incremental signal via the incremental encoder emulation interface option MEM.

DKR, Diax 04

The master axis position can be generated as an incremental signal via the incremental encoder emulation interface DAE.

The DAE card can be placed in any drive in the fibre-optics ring for this purpose.

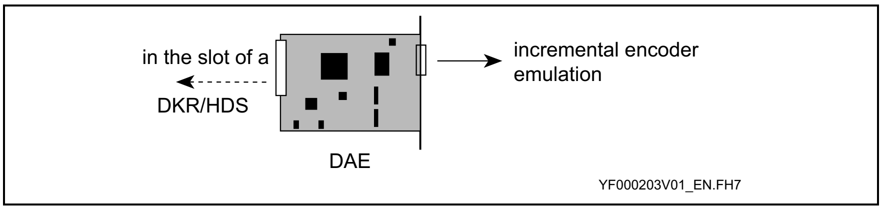

Fig. 5-65: Incremental encoder emulation DAE

EcoDrive 03

The master axis position can be generated as an incremental signal via the incremental encoder emulation interface X9 in any drive in the fibre-optics ring.

See Fig. 5-64: Master axis position - SSI output interface on EcoDrive 03.

Determining the safety options of IndraDrive

IndraDrive

The IndraDrive can be adopted to various safety options via the IndraDrive options L1 (HSI01) resp. S1 (HSI11) in option slot 4.

Possible are:

- Starting lock-out with Option L1
- Safety technology I/O with Option S1

Note: The IndraDrive option „Safety technology I/O“ must be combined with an encoder option (EN1 or EN2) in the option slot 1.

Encoder branching DGA 01.2 for encoders with sinusoidal voltage signals 1Vss

General

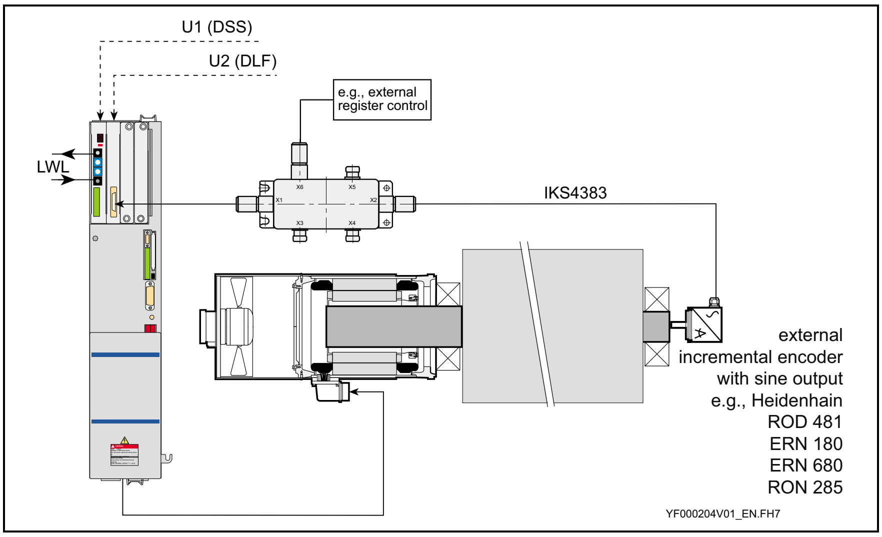

Fig. 5-66: Encoder branching DGA 01.2 example

The DGA makes it possible to distribute the signals of a measuring system to up to four measuring system inputs of different drive controllers. Possible applications of the DGA are:

- Parallel connection of linear motors using a measuring system
- Diverting position signals to external controls for the purpose of monitoring or as master axis positions

All measuring systems with sinusoidal output signals and a signal level of 1 V_{SS} can be used (Heidenhain voltage interface).

The DGA makes it possible to connect up to four drive controllers. There is also an output with square-wave signals.

Connection schematics DGA01.2 to DKR and Diax 04

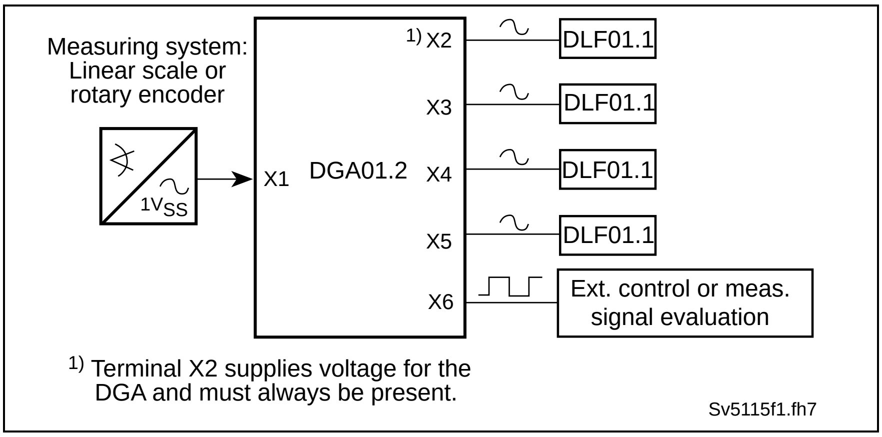

Fig. 5-67: Connection schematics DGA01.2

Rexroth
Bosch Group

Ready-made cable

Connection	Ready-made cable
from DGA01.2 (X2, X3, X4, X5) to DLF01.1	IKS4131
from DGA01.2 (X6) to DEF01.1	IKS4331

Fig. 5-68: Ready-made cable

Terminal diagram DGA01.2

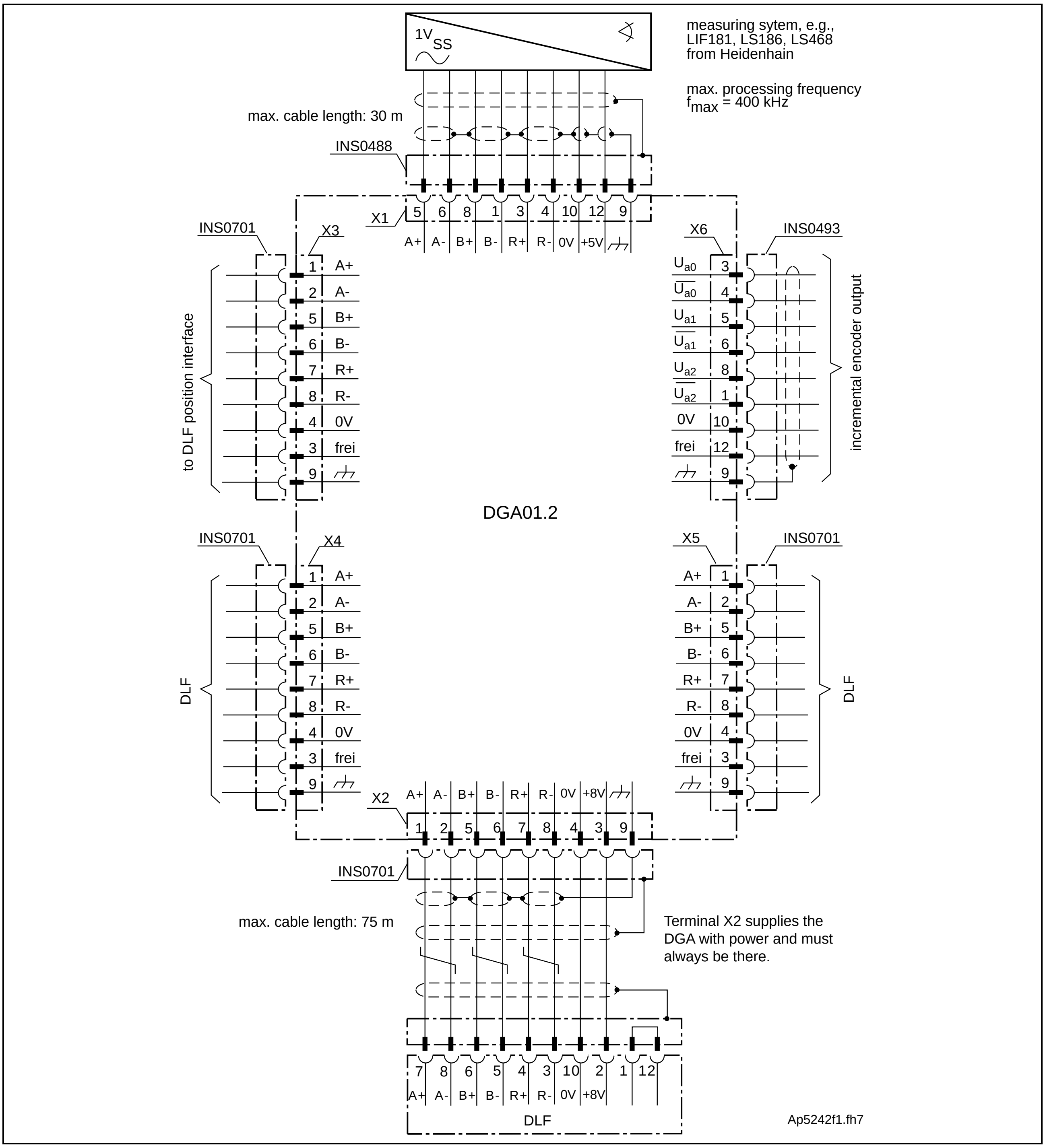

Fig. 5-69: Terminal diagram DGA01.2

Connection schematics Diax 04: 2AD motors with encoder "C"

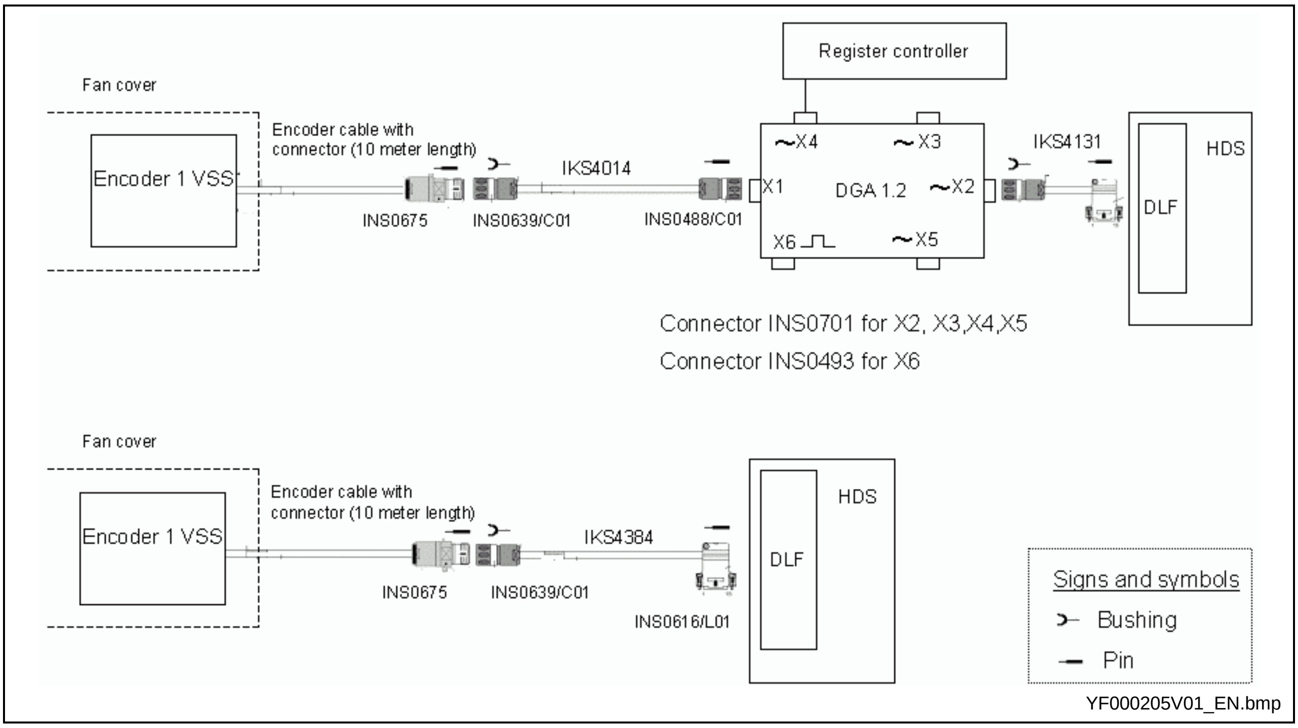

Fig. 5-70: Connection schematics Diax 04: 2AD motors with encoder "C"

Connection schematics Diax 04: 2AD motors with encoder "D"

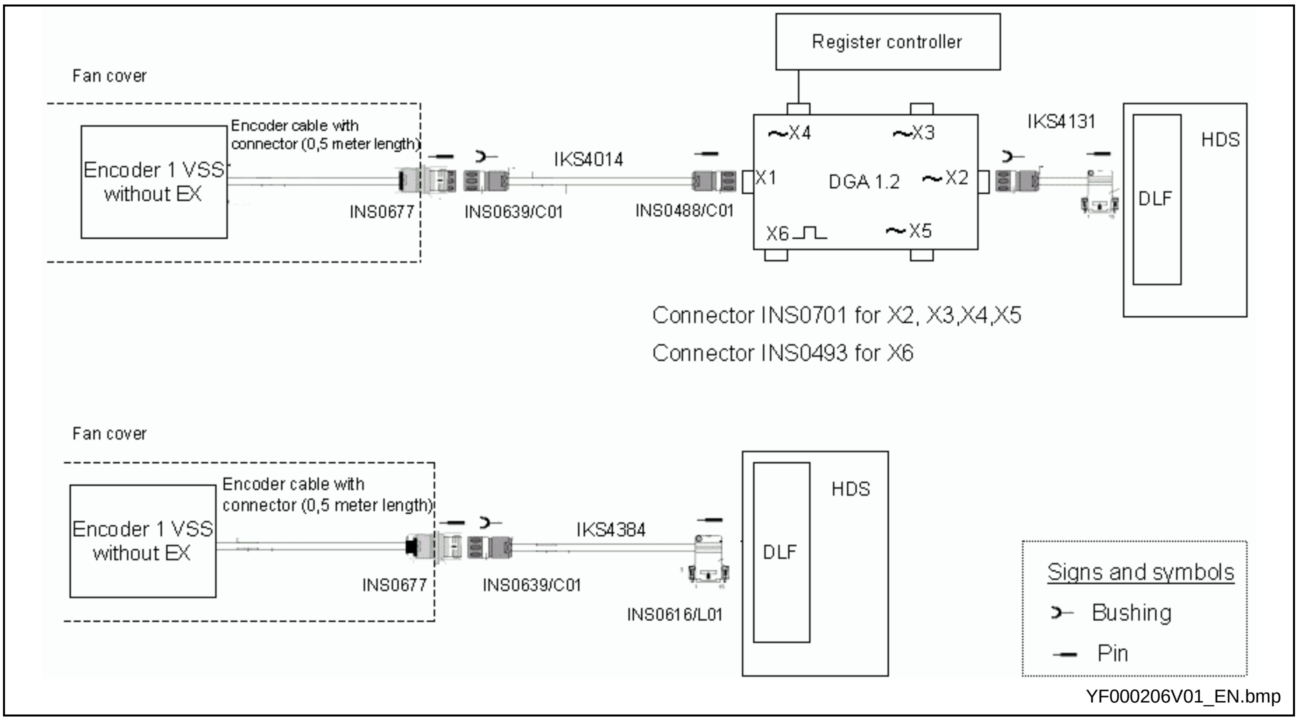

Fig. 5-71: Connection schematics Diax 04: 2AD motors with encoder "D"

Technical data external measuring system

Supply voltage for external measuring system	Output voltage X1/12:	DC +5 V (±5%)		
	Max. output load X1/12:	150 mA		
Signal form	Approximately sinusoidal signals			
Voltage signals	Signal voltage:	A, B, R	1	V_{SS}
	Max. frequency for measuring system signals:	A, B	400	kHz
	Max. frequency for reference signal:	R	15	kHz

Signal-input circuit

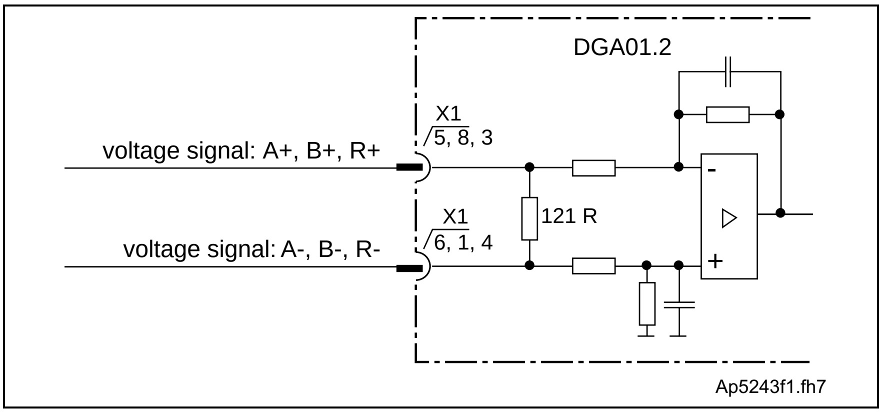

Fig. 5-72: Signal input circuit

Block diagram of the signal paths

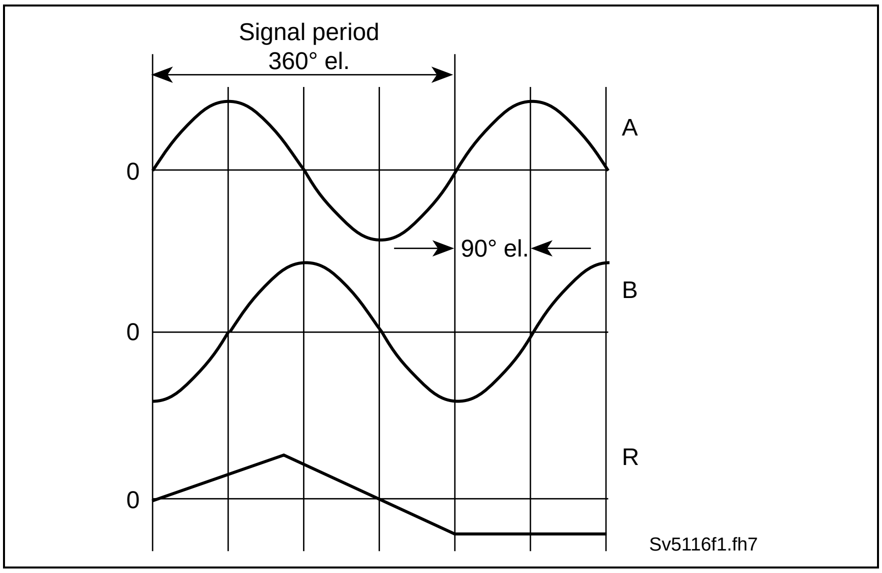

Fig. 5-73: Block diagram of the signal paths

Diverting measuring system signals to four connection

The signals from the measuring system are diverted to connections X2, X3, X4 and X5.

DGA01.2 supply

The DGA01.2 receives its power via terminal X2.

Connecting voltage X2/3: DC +8 V (±5%)

Maximum current consumption: 300 mA

Recommended signal input circuit

See Fig. 5-72: Signal input circuit.

Outputting measuring system signals as square-wave signals

Sinusoidal signals of the measuring system are generated via terminal X6 as square-wave incremental signals.

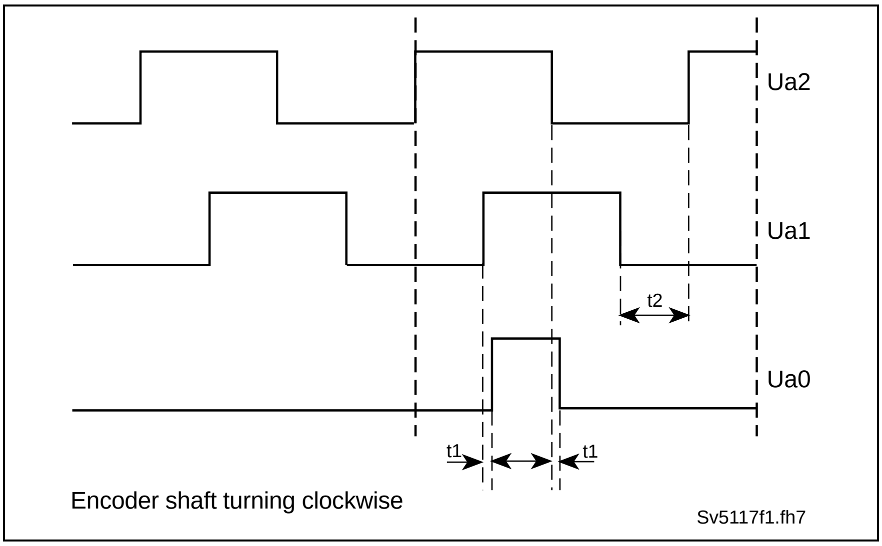

Fig. 5-74: Voltage level and phase position of incremental signals

Designation	Unit	min.	type / value	max.
Phase position Ua1	degree		0	
Phase position Ua2	degree		90	
Signal amplitude Ua-(/Ua)	V_{SS}		7	
Reference point delay t1	ns			50
Edge distance t2	ns	500		

Fig. 5-75: Incremental signal data

5.5 Drive configurations IndraDrive

The drive configurations of IndraDrive are determined by the type code. See chapter 9.9.

5.6 Drive configurations DKR/Diax 04

General information

The control related plug-in cards are now distributed to the free slots in the basic configuration.

Possible configurations are listed below.

The HDS02.1 controller is limited in its configuration to a DSS card plus two additional cards.

There is no card available for use with an HDD.

Drive configurations DKR based on the basic configuration BE12

Features	**DAG 01.2M**	**DEA 04.2M**	**DEA 08.1M**	**DEF 01.1M**	**DEF 02.1M**	**DFF 01.1M**	**DLF 01.1M**	**DAE 02.1M**	**DSA 01.1M**	**DZF 02.1M**	**DZF 03.1M**
analog input Incremental feedback emulation								X			
digital input/output		X									
ext. measurement system with Heidenhain sine encoder							X				
ext. measurement system with Heidenhain square-wave encoder				X	X						
ext., measurement system with DSF encoder						X					
ext. measurement system with SSI interface	X										
ext. measurement system with EnDat encoder	X										
ext. measurement system with gear wheel encoder (Bosch Rexroth)										X	
master axis encoder measure-ment with DSF encoder						X					
master axis encoder measure-ment with EnDat encoder	X										
master axis encoder measure-ment with SSI interface	X										
master axis position output									X		
plug-in modules determined:											

Fig. 5-76: Additional features based on basic configuration BE12

Configuration designation:	DAG 01.2M	DEA 04.2M	DEA 08.1M	DEF 01.1M	DEF 02.1M	DFF 01.1M	DLF 01.1M	DAE 02.1M	DSA 01.1M	DZF 02.1M	DZF 03.1M
BE09-01-FW						X					
BE10-01-FW		X							X		
BE12-01-FW											
BE23-01-FW		X									
BE25-01-FW		X				X			X		
BE30-01-FW		X				X					
BE47-01-FW						X			X		
BE54-01-FW									X		
BE56-01-FW								X			
BE59-01-FW						X		X			
BE60-01-FW				X				X			
BE73-01-FW		X				X		X			
BE76-01-FW				X							
BE78-00-FW		X		X							
BE79-01-FW											X
BE80-01-FW		X									X
BE84-01-FW		X						X			
BE86-01-FW		X		X				X			
BE91-01-FW									X		X
BE92-01-FW						X					X
BE94-01-FW						X			X		X
BE99-01-FW					X			X			X
BT08-01-FW		X						X			X
BT10-01-FW		X				X					X
BT13-01-FW		X							X		X
BT15-01-FW						X		X			X
BT20-01-FW			X								
BT52-01-FW			X	X							
BT53-01-FW			X			X					
BT56-01-FW			X								X
BT67-01-FW					X						X
BT68-01-FW			X		X						X
BT69-01-FW		X			X						X

Fig. 5-77: Drive configurations based on basic configuration BE12

Drive configurations DKR based on basic configuration BE32

Features:	DAG 01.2M	DEA 04.2M	DEA 08.1M	DEF 01.1M	DEF 02.1M	DFF 01.1M	DLF 01.1M	DAE 02.1M	DSA 01.1M	DZF 02.1M	DZF 03.1M
analog inputs							X	X			
digital input/output		X					X				
ext. measurement system with Heidenhain square-wave encoder					X		X				
ext. measurement system with DSF encoder (1)						X	X				
ext. measurement system with SSI interface	X						X				
ext. measurement system with EnDat encoder	X						X				
master axis encoder measure-ment with DSF encoder (1)						X	X				
master axis encoder measure-ment with EnDat encoder	X						X				
master axis encoder measure-ment with SSI interface	X						X				
master axis position output							X		X		
plug-in modules determined:							X				

Fig. 5-78: Additional features based on basic configuration BE32

(1) If the standard interface X4 is not used, then there is no need for the DFF module.

Configuration designation:	DAG 01.2M	DEA 04.2M	DEA 08.1M	DEF 01.1M	DEF 02.1M	DFF 01.1M	DLF 01.1M	DAE 02.1M	DSA 01.1M	DZF 02.1M	DZF 03.1M
BE08-01-FW						X	X				
BE28-01-FW		X				X	X				
BE32-01-FW							X				
BE33-01-FW		X					X				
BE55-01-FW		X					X		X		
BE57-01-FW						X	X		X		
BE58-01-FW							X	X			
BE62-01-FW							X		X		
BE68-01-FW		X					X	X			
BT01-01-FW	X						X				
BT02-01-FW	X	X					X				
BT03-01-FW	X						X	X			
BT04-01-FW					X		X				
BT05-01-FW		X			X		X				
BT06-01-FW					X		X	X			
BT07-01-FW						X	X	X			
BT54-01-FW			X				X				
BT57-01-FW			X		X		X				
BT58-01-FW	X		X				X				
BT66-01-FW			X			X	X				

Fig. 5-79: Drive configuration based on basic configuration BE32

Drive configuration DKR based on basic configuration BE37

Features:	DAG 01.2M	DEA 04.2M	DEA 08.1M	DEF 01.1M	DEF 02.1M	DFF 01.1M	DLF 01.1M	DAE 02.1M	DSA 01.1M	DZF 02.1M	DZF 03.1M
analog input								X		X	
digital input/output		X								X	
ext. measurement system with Heidenhain square-wave encoder					X					X	
ext. measurement system with DSF encoder (1)						X				X	
ext. measurement system with SSI interface	X									X	
ext. measurement system with EnDat encoder	X									X	
master axis encoder measure-ment with DSF encoder (1)						X				X	
master axis encoder measure-ment with EnDat encoder	X									X	
master axis encoder measure-ment with SSI interface	X									X	
master axis position output									X	X	
plug-in modules determined:										X	

Fig. 5-80: Additional features based on basic configuration BE37

(1) If the standard interface X4 is not used, then there is no need for the DFF02.1M module.

Configuration designation:	**DAG 01.2M**	**DEA 04.2M**	**DEA 08.1M**	**DEF 01.1M**	**DEF 02.1M**	**DFF 01.1M**	**DLF 01.1M**	**DAE 02.1M**	**DSA 01.1M**	**DZF 02.1M**	**DZF 03.1M**
BE02-02-FW	X					X				X	
BE03-02-FW	X	X								X	
BE04-02-FW	X									X	
BE19-01-FW								X		X	
BE22-01-FW		X				X				X	
BE26-01-FW				X						X	
BE27-01-FW						X				X	
BE36-01-FW		X		X						X	
BE37-01-FW										X	
BE38-01-FW		X								X	
BE63-01-FW		X							X	X	
BE65-01-FW						X			X	X	
BE67-01-FW		X						X		X	
BE70-01-FW									X	X	
BE72-02-FW	X								X	X	
BE88-01-FW						X		X		X	
BE89-01-FW					X			X		X	
BE90-01-FW	X							X		X	
BT55-01-FW			X							X	
BT59-01-FW					X					X	
BT60-01-FW			X							X	
BT61-01-FW			X		X					X	
BT62-01-FW		X			X					X	
BT63-01-FW	X		X							X	

Fig. 5-81: Drive configuration based on basic configuration BE37

Drive configuration DKR based on basic configuration BE45

Features	DAG 01.2M	DEA 04.2M	DEA 08.1M	DEF 01.1M	DEF 02.1M	DFF 01.1M	DLF 01.1M	DAE 02.1M	DSA 01.1M	DZF 02.1M	DZF 03.1M
analog inputs	X							X			
digital input/output	X	X									
ext. measurement system with Heidenhain sine encoder	X						X				
ext. measurement system with Heidenhain square-wave encoder	X			X	X						
ext. measurement system with DSF encoder (1)	X					X					
ext. measurement system with gear wheel encoder (Bosch Rexroth)	X									X	
master axis encoder measure-ment with DSF encoder (1)	X					X					
master axis position output	X								X		
plug-in modules determined:	X										

Fig. 5-82: Additional features based on basic configuration BE45

(1) If the standard interface X4 is not used, then there is no need for the DFF module.

Configuration designation:	**DAG 01.2M**	**DEA 04.2M**	**DEA 08.1M**	**DEF 01.1M**	**DEF 02.1M**	**DFF 01.1M**	**DLF 01.1M**	**DAE 02.1M**	**DSA 01.1M**	**DZF 02.1M**	**DZF 03.1M**
BE02-02-FW	X					X				X	
BE03-02-FW	X	X								X	
BE04-02-FW	X									X	
BE45-01-FW	X										
BE66-01-FW	X							X			
BE72-02-FW	X								X	X	
BE74-02-FW	X	X									
BE83-00-FW	X	X				X					
BE87-01-FW	X	X						X			
BE90-01-FW	X							X		X	
BE93-01-FW	X										X
BT01-01-FW	X						X				
BT02-01-FW	X	X					X				
BT03-01-FW	X						X	X			
BT09-01-FW	X							X			X
BT11-01-FW	X					X					X
BT12-01-FW	X	X									X
BT14-01-FW	X								X		X
BT18-01-FW	X							X			
BT24-01-FW	X			X							
BT51-01-FW	X		X								
BT58-01-FW	X		X				X				
BT63-01-FW	X		X							X	
BT64-01-FW	X		X								X
BT65-01-FW	X	X		X							

Fig. 5-83: Drive configuration based on basic configuration BE45

Drive configuration Diax 04 based on basic configuration HS12

Features	DAG 01.2M	DEA 04.2M	DEA 08.1M	DEF 01.1M	DEF 02.1M	DFF 01.1M	DLF 01.1M	DAE 02.1M	DSA 01.1M	DZF 02.1M	DZF 03.1M
analog input incremental feedback emulation								X			
digital input/output		X									
ext. measurement system with Heidenhain sine encoder							X				
ext. measurement system with Heidenhain square-wave encoder				X	X						
ext. measurement system with DSF encoder						X					
ext. measurement system with SSI interface	X										
ext. measurement system with EnDat encoder	X										
ext. measurement system with gear wheel encoder (Bosch Rexroth)										X	
master axis encoder measure-ment with DSF encoder						X					
master axis encoder measure-ment with EnDat encoder	X										
master axis encoder measure-ment with SSI interface	X										
master axis position output									X		
plug-in modules determined:											

Fig. 5-84: Additional features based on basic configuration HS12

Configuration designation:	DAG 01.2M	DEA 04.2M	DEA 08.1M	DEF 01.1M	DEF 02.1M	DFF 01.1M	DLF 01.1M	DAE 02.1M	DSA 01.1M	DZF 02.1M	DZF 03.1M
HS09-01-FW						X					
HS10-01-FW		X							X		
HS12-01-FW											
HS23-01-FW		X									
HS25-01-FW		X				X			X		
HS30-01-FW		X				X					
HS47-01-FW						X			X		
HS54-01-FW									X		
HS56-01-FW								X			
HS59-01-FW						X		X			
HS60-01-FW				X				X			
HS73-01-FW		X				X		X			
HS76-01-FW				X							
HS78-01-FW		X		X							
HS79-01-FW											X
HS80-01-FW		X									X
HS84-01-FW		X						X			
HS86-01-FW		X		X				X			
HS91-01-FW									X		X
HS92-01-FW						X					X
HS94-01-FW						X			X		X
HS99-01-FW					X			X			X
HT08-01-FW		X						X			X
HT10-01-FW		X				X					X
HT13-01-FW		X							X		X
HT15-01-FW						X		X			X
HT20-01-FW			X								
HT31-01-FW			X	X							
HT32-01-FW			X			X					
HT35-01-FW			X								X
HT46-01-FW					X						X
HT47-01-FW			X		X						X
HT48-01-FW		X			X						X
HT81-01-FW			X					X			

Fig. 5-85: Drive configuration based on basic configuration HS12

Drive configuration Diax 04 based on basic configuration HS32

Features:	DAG 01.2M	DEA 04.2M	DEA 08.1M	DEF 01.1M	DEF 02.1M	DFF 01.1M	DLF 01.1M	DAE 02.1M	DSA 01.1M	DZF 02.1M	DZF 03.1M
analog input							X	X			
digital input/output		X					X				
ext. measurement system with Heidenhain square-wave encoder					X		X				
ext. measurement system with DSF encoder (1)						X	X				
ext. measurement system with SSI interface	X						X				
ext. measurement system with EnDat encoder	X						X				
master axis encoder measurement with DSF encoder (1)						X	X				
master axis encoder measurement with EnDat encoder	X						X				
master axis encoder measurement with SSI interface	X						X				
master axis position output							X		X		
plug-in modules determined:							X				

Fig. 5-86: Additional features based on basic configuration HS32

(1) If the standard interface X4 is not used, then there is no need for the DFF module.

Configuration designation:	**DAG 01.2M**	**DEA 04.2M**	**DEA 08.1M**	**DEF 01.1M**	**DEF 02.1M**	**DFF 01.1M**	**DLF 01.1M**	**DAE 02.1M**	**DSA 01.1M**	**DZF 02.1M**	**DZF 03.1M**
HS08-01-FW						X	X				
HS28-01-FW		X				X	X				
HS32-01-FW							X				
HS33-01-FW		X					X				
HS55-01-FW		X					X		X		
HS57-01-FW						X	X		X		
HS58-01-FW							X	X			
HS62-01-FW							X		X		
HS68-01-FW		X					X	X			
HT01-01-FW	X						X				
HT02-01-FW	X	X					X				
HT03-01-FW	X						X	X			
HT04-01-FW					X		X				
HT05-01-FW		X			X		X				
HT06-01-FW					X		X	X			
HT07-01-FW						X	X	X			
HT33-01-FW			X				X				
HT36-01-FW			X		X		X				
HT37-01-FW	X		X				X				
HT45-01-FW			X			X	X				

Fig. 5-87: Drive configuration based on basic configuration HS32

Drive configuration Diax 04 based on basic configuration HS37

Features:	DAG 01.2M	DEA 04.2M	DEA 08.1M	DEF 01.1M	DEF 02.1M	DFF 01.1M	DLF 01.1M	DAE 02.1M	DSA 01.1M	DZF 02.1M	DZF 03.1M
analog input								X		X	
digital input/output		X								X	
ext. measurement system with Heidenhain square-wave encoder					X					X	
ext. measurement system with DSF encoder (1)						X				X	
ext. measurement system with SSI interface	X									X	
ext. measurement system with EnDat encoder	X									X	
master axis encoder measurement with DSF encoder (1)						X				X	
master axis encoder measurement with EnDat encoder	X									X	
master axis encoder measurement with SSI interface	X									X	
master axis position output									X	X	
plug-in modules determined:										X	

Fig. 5-88: Additional features based on basic configuration HS37

(1) If the standard interface X4 is not used, then there is no need for the DFF02.1M module.

Configuration designation:	DAG 01.2M	DEA 04.2M	DEA 08.1M	DEF 01.1M	DEF 02.1M	DFF 01.1M	DLF 01.1M	DAE 02.1M	DSA 01.1M	DZF 02.1M	DZF 03.1M
HS02-02-FW	X					X				X	
HS03-02-FW	X	X								X	
HS04-02-FW	X									X	
HS19-01-FW								X		X	
HS22-01-FW		X				X				X	
HS26-01-FW				X						X	
HS27-01-FW						X				X	
HS36-01-FW		X		X						X	
HS37-01-FW										X	
HS38-01-FW		X								X	
HS63-01-FW		X							X	X	
HS65-01-FW						X			X	X	
HS67-01-FW		X						X		X	
HS70-01-FW									X	X	
HS72-02-FW	X								X	X	
HS88-01-FW						X		X		X	
HS89-01-FW					X			X		X	
HS90-01-FW	X							X		X	
HT34-01-FW			X							X	
HT38-01-FW					X					X	
HT39-01-FW			X		X					X	
HT40-01-FW		X			X					X	
HT41-01-FW	X		X							X	

Fig. 5-89: Drive configuration based on basic configuration HS37

Drive configuration Diax 04 based on basic configuration HS45

Features	DAG 01.2M	DEA 04.2M	DEA 08.1M	DEF 01.1M	DEF 02.1M	DFF 01.1M	DLF 01.1M	DAE 02.1M	DSA 01.1M	DZF 02.1M	DZF 03.1M
analog input	X							X			
digital input/output	X	X									
ext. measurement system with Heidenhain sine encoder	X						X				
ext. measurement system with Heidenhain square-wave encoder	X			X	X						
ext. measurement system with DSF encoder (1)	X					X					
ext. measurement system with gear wheel encoder (Bosch Rexroth)	X									X	
master axis encoder measure-ment with DSF encoder (1)	X					X					
master axis position output	X								X		
plug-in modules determined:	X										

Fig. 5-90: Additional features based on basic configuration HS45

(1) If the standard interface X4 is not used, then there is no need for the DFF module.

Configuration designation:	**DAG 01.2M**	**DEA 04.2M**	**DEA 08.1M**	**DEF 01.1M**	**DEF 02.1M**	**DFF 01.1M**	**DLF 01.1M**	**DAE 02.1M**	**DSA 01.1M**	**DZF 02.1M**	**DZF 03.1M**
HS02-02-FW	X					X				X	
HS03-02-FW	X	X								X	
HS04-02-FW	X									X	
HS45-01-FW	X										
HS66-01-FW	X							X			
HS72-02-FW	X								X	X	
HS74-02-FW	X	X									
HS81-01-FW	X			X							
HS87-01-FW	X	X						X			
HS90-01-FW	X							X		X	
HS93-01-FW	X										X
HT01-01-FW	X						X				
HT02-01-FW	X	X					X				
HT03-01-FW	X						X	X			
HT09-01-FW	X							X			X
HT11-01-FW	X					X					X
HT12-01-FW	X	X									X
HT14-01-FW	X								X		X
HT18-01-FW	X							X			
HT24-01-FW	X			X							
HT30-01-FW	X		X								
HT37-01-FW	X		X				X				
HT41-01-FW	X		X							X	
HT42-01-FW	X		X								X
HT44-01-FW	X	X		X							
HT72-01-FW	X					X					

Fig. 5-91: Drive configuration based on basic configuration HS45

5.7 Example

The rotary press and folding machine of the plant shown in Fig. 5-92 should be equipped with the SYNAX 200 system.

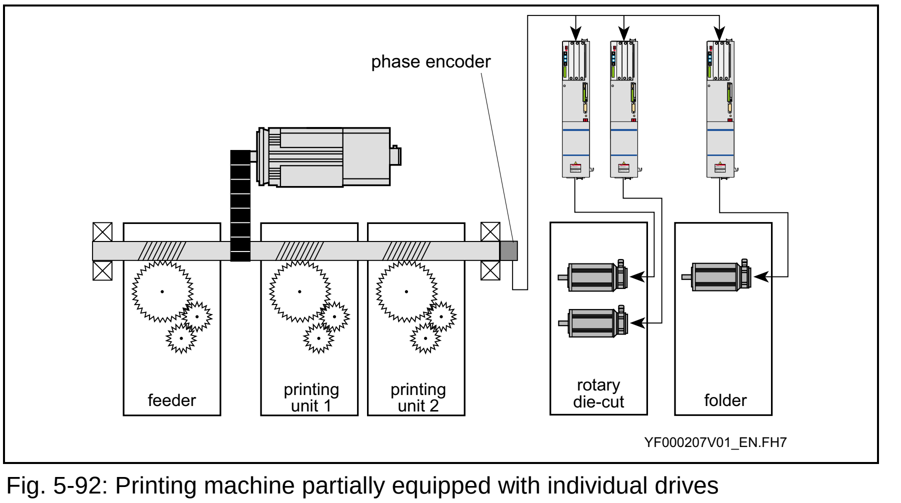

Fig. 5-92: Printing machine partially equipped with individual drives

Motion control configuration

The PPC-R is used as a motion control with 3 slots. One slot of the PPC-R is assigned with the ArcNet and the PPC link assembly (DAQ)

An input module RME with 16 inputs and an output module RMA with 16 outputs are used for I/O.

A mounting rack with 4 slots is used for taking up the motion control and the I/O modules.

How to order the motion control configuration

Pos. 1	motion control	PPC-R02.2N-N-Q1-NN-NN-FW
Pos. 1.1	relevant firmware	FWA-PPCR0*-SY*-12VRS-D0-XXXXXX
Pos. 2	input module	RME02.2-16-DC024
Pos. 3	output module	RMA02.2-16-DC024-200
Pos. 4	module carrier	RMB02.2-04

Drive configuration

The following equipment is needed for all three drives and is always based on both precision and power requirements:

Axis	Drive controller	Motor
Rotary die-cut	HDS03.2-W075	MHD
Anvil cylinder	HDS03.2-W075	MHD
Folding drive	HDS04.2-W200	2AD

Fig. 5-93: Drive equipment

The result is the basic drive configuration HS12-01 on section "Drive configuration Diax 04 based on basic configuration HS12", page 5-60. The selection of the control-related plug-in modules follows the guidelines of section "Determining the control-related ", page 5-39.

A DFF card is needed for the master axis circuit.

The drive configuration follows the guidelines in section 5.5.

This results the following drive configuration for example:

Axis	Configuration
Rotary die-cut	HS09 (with DFF01)
Anvil cylinder	HS12
Folding drive	HS12

Fig. 5-94: Drive configuration

For checking the reliability of the resulting drive configuration and for determining the relevant configuration number, see the table on page 5-52 ff.

How to order the drive controller

Pos.	1	drive controller	HDS03.2-W074-HS09-..-FW
Pos.	1.1	relevant firmware	FWA-DIAX04-ELS-06VRS-MS
Pos.	2	drive controller	HDS03.2-W075-HS12-..-FW
Pos.	2.1	relevant firmware	FWA-DIAX04-ELS-06VRS
Pos.	3	drive controller	HDS04.2-W200-HS12-..-FW
Pos.	3.1	relevant firmware	FWA-DIAX04-ELS-06VRS

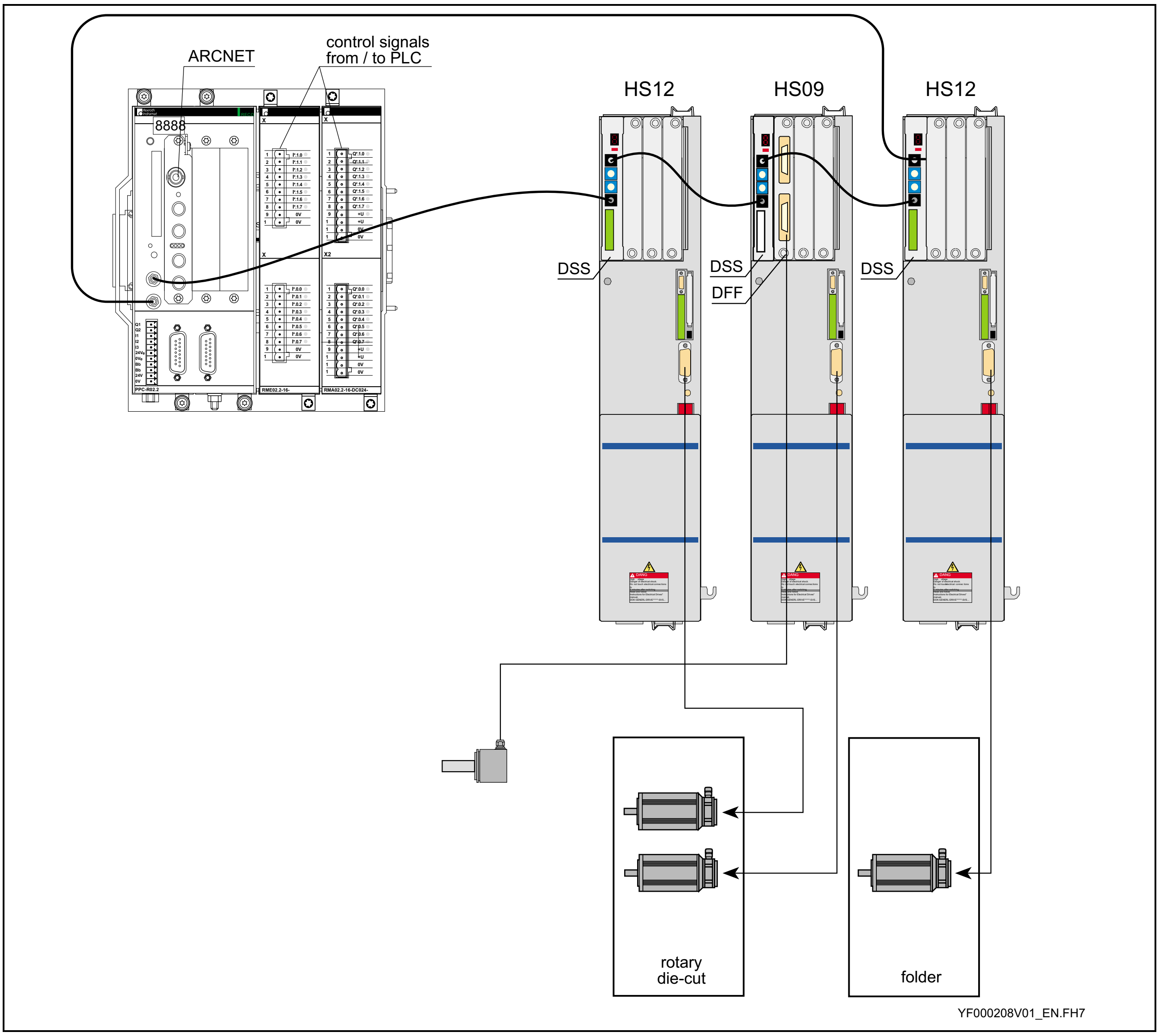

Fig. 5-95: System configuration for equipping SYNAX 200

6 Order data/reference lists

6.1 Motion control components

PPC-R: MotionControl

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Fig. 6-1: PPC-R22.1

Brief description PPC-R

The PPC-R unit is a powerful motion control in a small size in IP 20 rating.

The PPC-R unit exists with two enclosure versions of different width, a single-width version and a double-width version.

Depending on the application, the PPC-R has option modules fitted that, for example, can be used for open fieldbus interfaces, such as Profibus, DeviceNet, etc.

General specifications PPC-R

Protection rating	IP 20, EN 60529
Supply / rated voltage	24 V_{DC} -15% +20% as per EN61131-2: 1994
Max. current consumption (PPC-R21) (PPC-R22)	0,9 A (+ supply voltage for I/O modules up to 2,3 A) 1,2 A (+ supply voltage for I/O modules up to 2,3 A)
Operating temperature - environment	0 to 45°C
Storage and transport temperature	-25°C to 70°C
Enclosure dimensions (W x L x D) PPC-R21.1 PPC-R22.1	 41.5 x 192 x 150 83.7 x 192 x 150

Fig. 6-2: General specifications PPC-R

Rexroth
Bosch Group

Type code PPC-R22.1

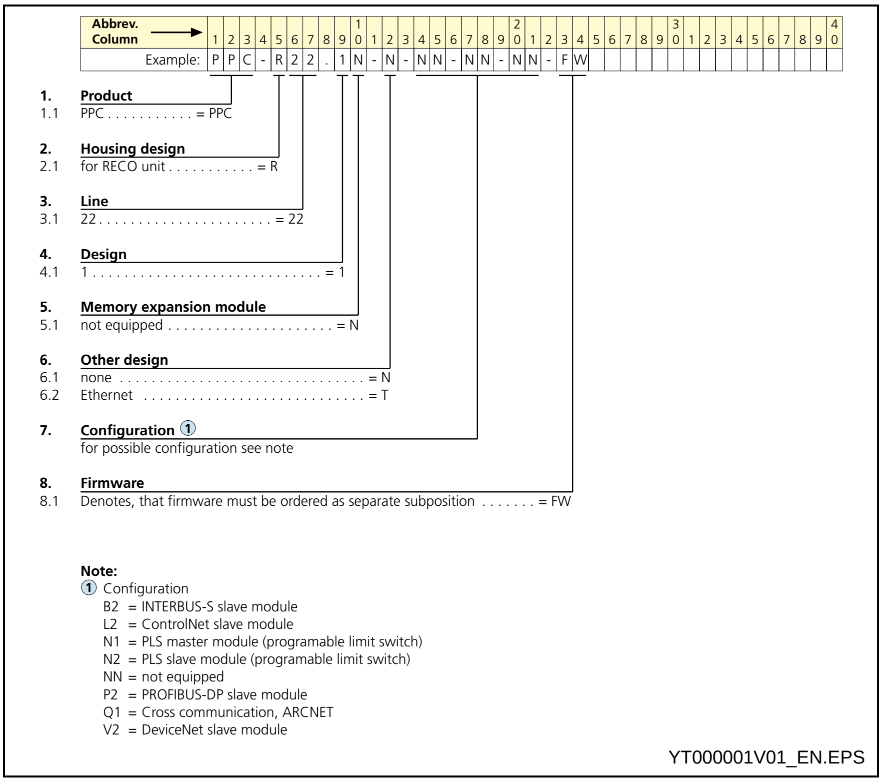


Fig. 6-3: Type code PPC-R22.1

PPC-P: MotionControl

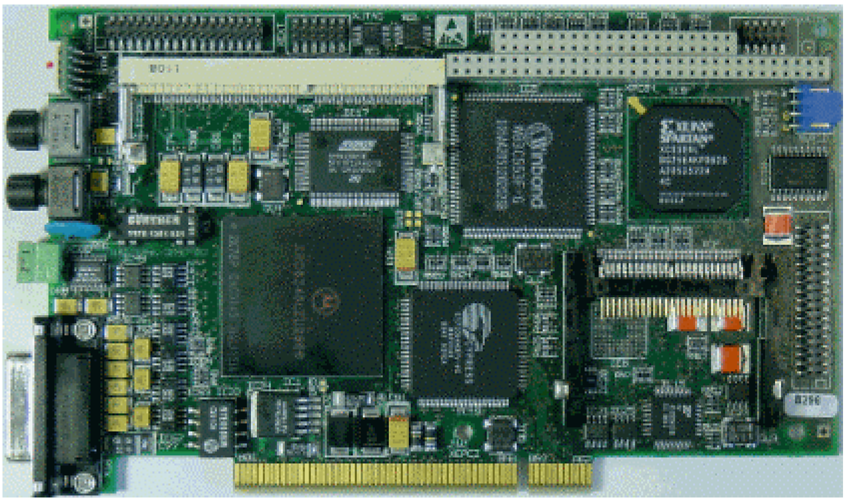

YG000003V01_NN.bmp

Fig. 6-4: MotionControl PPC-P11.1

Brief description PPC-P

The PPC-P unit is a powerful motion control as PC plug-in card in PCI format.

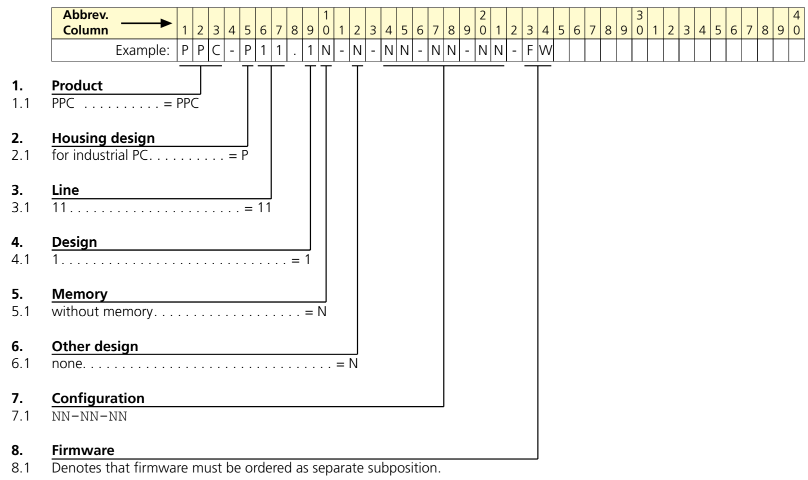
Depending on the application, the PPC-P has option modules fitted that, for example, can be used for open fieldbus interfaces, such as Profibus, DeviceNet, etc.

General specifications PPC-P

PC interface	PCI interface as per PCI spec. 2.2
Supply / rated voltage	5 V_{DC} -15% +20% as per EN61131-2: 1994
Max. current consumption	2,9 A at 5V; 1,4 A at 3,3V
Operating temperature - environment	0 to 45°C
Storage and transport temperature	-25°C to 70°C
Dimensions	"short card" as per PCI spec. 2.2

Fig. 6-5: General specifications PPC-P11.1

Type code PPC-P11.1



YT000002V01_en.eps

Fig. 6-6: Type code PPC-P11.1

Option cards based on the MotionControl

Interface DAQ03 (hardware option Q1)

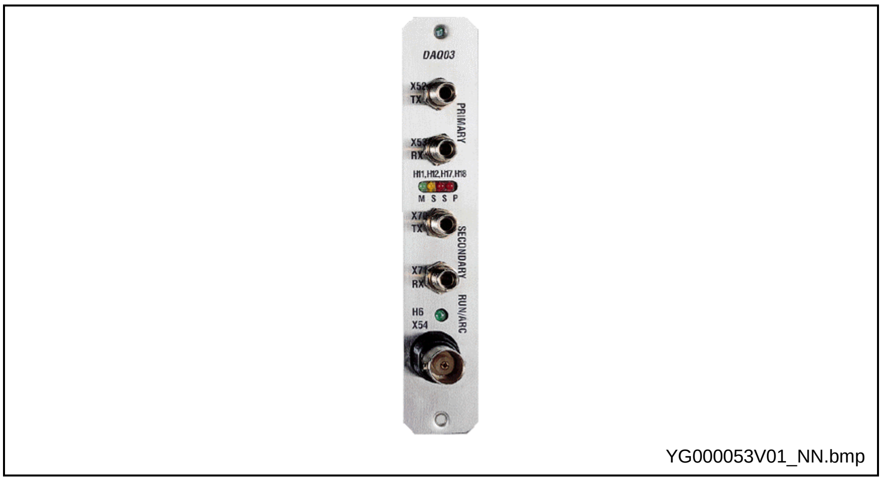


Fig. 6-7: Interface DAQ03

Brief description DAQ03

The DAQ card is an ARCNET slave interface and a PPC link interface.

The PPC link can be built as a single ring or a double ring.

Mixed operation with the DAQ04 is not possible.

General specifications DAQ03

ARCNET interface	coaxial connector, 92 Ohm
ARCNET transmission rate	2.5 Mbit/s
ARCNET max. number of participants	255 participants (via deviation/repeater)
PPC link	fibre-optics cable interface according SERCOS interface
Max. number of link participants	32

Fig. 6-8: General specifications DAQ03

Interface DAQ04 (hardware option Q2)

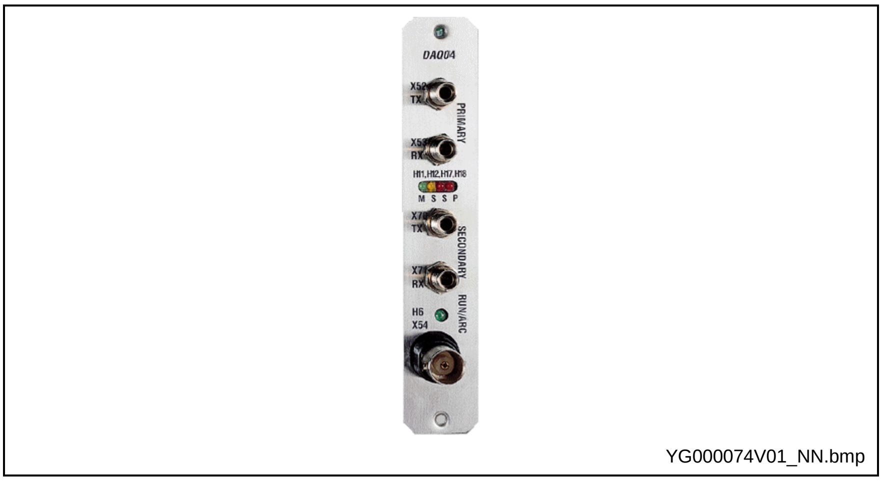


Fig. 6-9: Interface DAQ04

Brief description DAQ04

The DAQ card is an ARCNET slave interface and a PPC link interface.

The PPC link can be built as a single ring or a double ring.

Mixed operation with the DAQ03 is not possible.

General specifications DAQ04

ARCNET interface	coaxial connector, 92 Ohm
ARCNET transmission rate	2.5 Mbit/s
ARCNET max. number of participants	255 participants (via deviation/repeater)
PPC link	fibre-optics cable interface according SERCOS interface
Max. number of link participants	64

Fig. 6-10: General specifications DAQ04

Interface LAG (hardware option G2)

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Fig. 6-11: Interface LAG G2

Brief description LAG

The LAG card is a master encoder interface to connect master encoders to the PPC.

Up to two EnDat master encoders can be connected.

General specifications LAG

Encoder interface	Sub-D strip 15-way
Encoder types	EnDat
Power supply encoder	24V via 2-way Phoenix connector
Max. connectable encoders	2

Fig. 6-12: General specifications LAG G2

Profibus slave interface DPS01 (hardware option P2)

Fig. 6-13: Profibus slave interface DPS01

Brief description DPS01

The DPS card is a Profibus slave interface. The DPS card is provided with a free configurable process data channel up to 32 words in both data directions. The data consistency extends the whole bus length.

General specifications DPS01

Profibus interface	Profibus-DP as per DIN 19245-3
Max. transmission rate	12 Mbit/s
Max. bus length	32 words

Fig. 6-14: General specifications DPS01

DeviceNet slave interface DNS03 (hadware option V2)

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Fig. 6-15: DeviceNet slave interface DNS03

Brief description DNS03

The DNS card is a DeviceNet slave interface. The DNS card is provided with a free configurable process data channel up to 32 words in both data directions.

Explicit messaging makes parameter transmissions of all SYNAX parameters possible.

General specifications DNS03

DeviceNet interface	DeviceNet as per ODVA specification 1.3 with explicit message support
Max. transmission rate	500 kbit/s
Max. bus length	32 words

Fig. 6-16: General specifications DNS03

Ethernet interface ETH01 (hardware option T2)

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Fig. 6-17: Ethernet interface ETH01

Brief description ETH01

The ETH card is an Ethernet interface. It has the following functions:

- Ethernet/IP slave with one master or
- Ethernet slave with proprietary protocol with up to 4 master (configurable transmission with 4 UDP/IP channels and parameter transmission with 4 TCP/IP channels).

The free configurable process data channel can transmit up to 32 words in both data directions.

Also 7 channels for HMI or SynTop purposes are available for parameter transmissions (TCP/IP channels).

General specifications ETH01

Ethernet interface	twisted pair connection 10BaseT
Protocols	Ethernet/IP TCP/IP (non-cyclic data, proprietary) UDP/IP (cyclic data, proprietary)
Transmission rate	10 Mbit/s
Max. telegram data UDP	64 bytes
Max. telegram data TCP	272 bytes
Number of TCP channels (PLC)	Ethernet: 4 Ethernet/IP: 0
Number of TCP channels (HMI, SynTop)	7

Fig. 6-18: General specifications ETH01

Option cards based on the PLC

Profibus master interface DPM01 (hardware option P1)

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Fig. 6-19: Profibus master interface DPM01

Brief description DPM01

The DPM card is a Profibus master interface. The DPM card is provided with a free configurable process data channel up to 256 words in both data directions. The data consistency extends the whole bus length.

Documentation DPM01

A detailed description can be found in documentation "RECO-SPS ISP200-R - Project Planning Manual" (DOK-CONTRL-MTS-R0*.2**-PR01-EN-P).

General specifications DPM01

Profibus interface	Profibus-DP as per DIN 19245-3
Max. transmission rate	12 Mbit/s
Max. bus length	256 words
Diagnostic interface:	RS 232C, 9600 Baud

Fig. 6-20: General specifications DPM01

DeviceNet master interface DNM03 (hardware option V1)

YG000059V01_NN.bmp

Fig. 6-21: DeviceNet-Master Interface DNM03

Brief description DNM03

The DNM card is a DeviceNet master interface. The DNM card is provided with a free configurable process data channel up to 256 words in both data directions. The data consistency extends the whole bus length.

General specifications DNM03

DeviceNet interface	DeviceNet as per ODVA
Max. transmission rate	500 kbit/s
Max. bus length	256 words
Diagnostic interface	RS 232C, 9600 Baud

Fig. 6-22: General specifications DNM03

RMB02: Module carrier for PPC-R

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Fig. 6-23: RMB02.2-02 and RMB02.2-04

Brief description RMB02

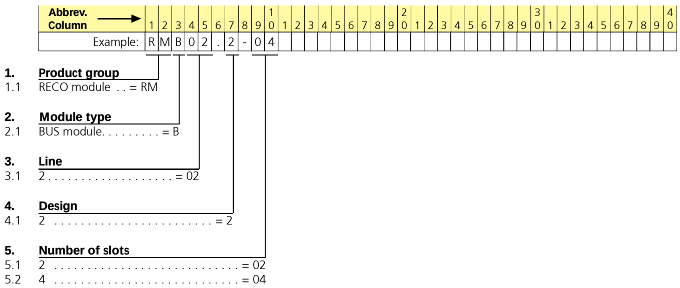
The module carrier RMB02 serves for accommodating up to 4 modules. Available are the modules: RME02, RMA02, RMC02 and PPC-R.

General specifications RMB02

	RMB02.2-02	RMB02.2-04
Capacitance of modules	2	4
Dimensions (W x L x D)	98 x 217 x 56 mm	182 x 217 x 56 mm

Fig. 6-24: General specifications RMB02.2

Type code RMB02.2



YT000003V01_EN.wmf

Fig. 6-25: Type code RMB02.2

Rexroth Bosch Group

RECO02: Local I/O components

Input module RME02.2-16-DC024

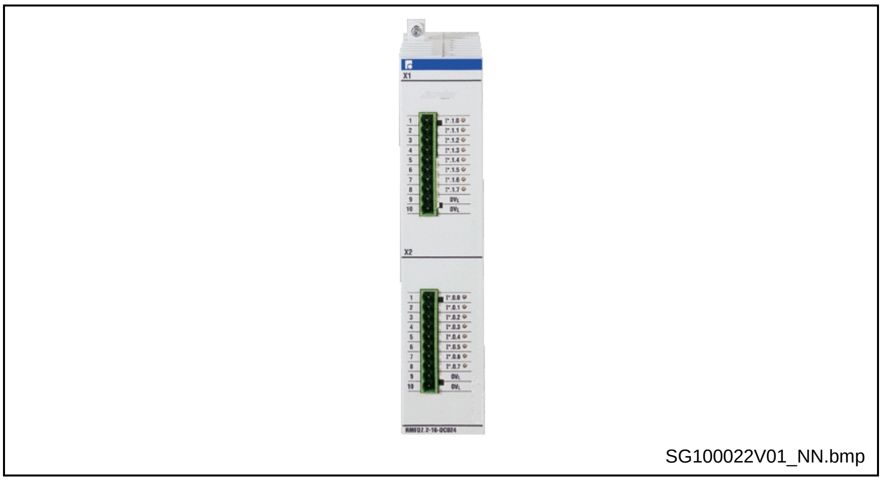


Fig. 6-26: RME02.2-16-DC024

Brief description RME02.2-16-DC024

The digital 24 VDC input modules are designed for connecting digital control signals that are produced by pushbuttons, limit switches or electronic proximity switches. The 16 inputs are arranged in 2 isolated potential groups.

Documentation RME02.2-16-DC024

A detailed description can be found in documentation "SERCOS I/O Unit RECO02.2 - Project Planning Manual" (DOK-CONTRL-RECO02.2***-PRJ1-EN-P).

General specifications RME02.2-16-DC024

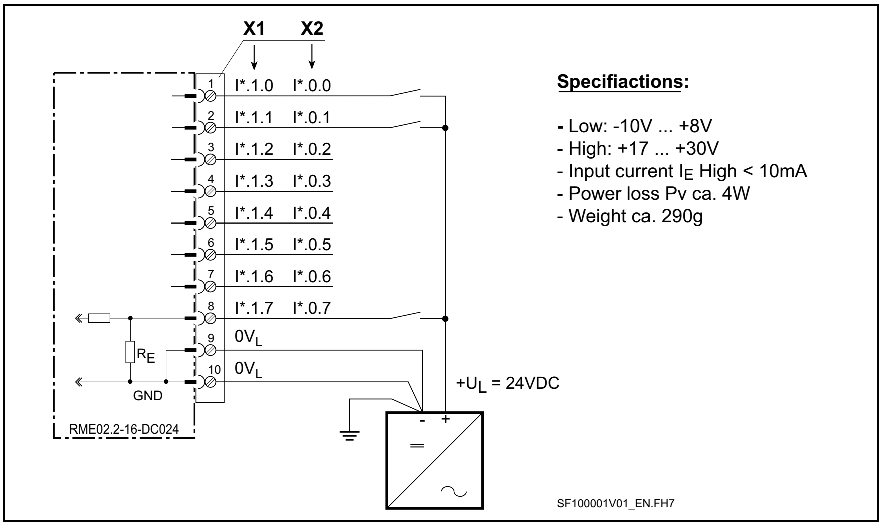


Fig. 6-27: General specifications and pin assignments RME02.2-16-DC024

Type code RME02.2-16-DC024

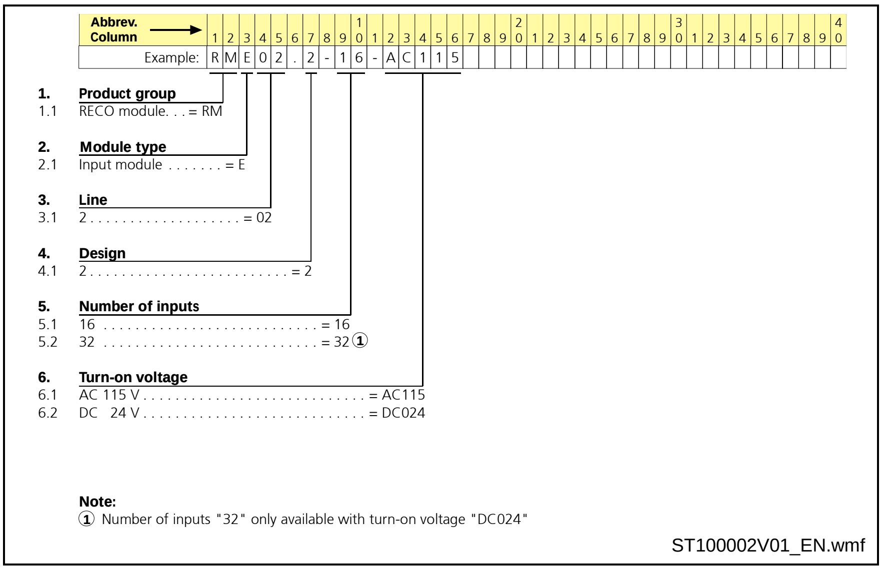


Fig. 6-28: Type code RME02.2-16-DC024

Input module RME02.2-32-DC024

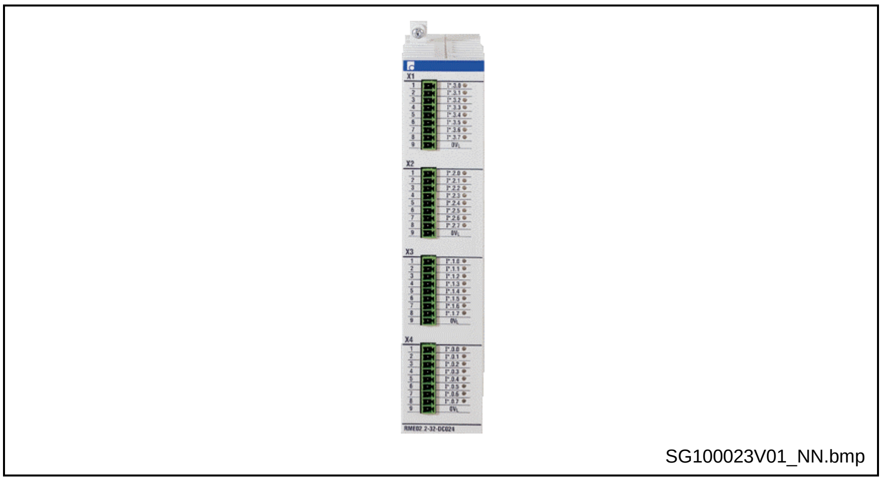


Fig. 6-29: RME02.2-32-DC024

Brief description RME02.2-32-DC024

The digital 24 VDC input modules are designed for connecting digital control signals that are produced by pushbuttons, limit switches or electronic proximity switches. The 32 inputs are arranged in 4 isolated potential groups.

Documentation RME02.2-32-DC024

A detailed description can be found in documentation "SERCOS I/O Unit RECO02.2 - Project Planning Manual" (DOK-CONTRL-RECO02.2***-PRJ1-EN-P).

General specifications RME02.2-32-DC024

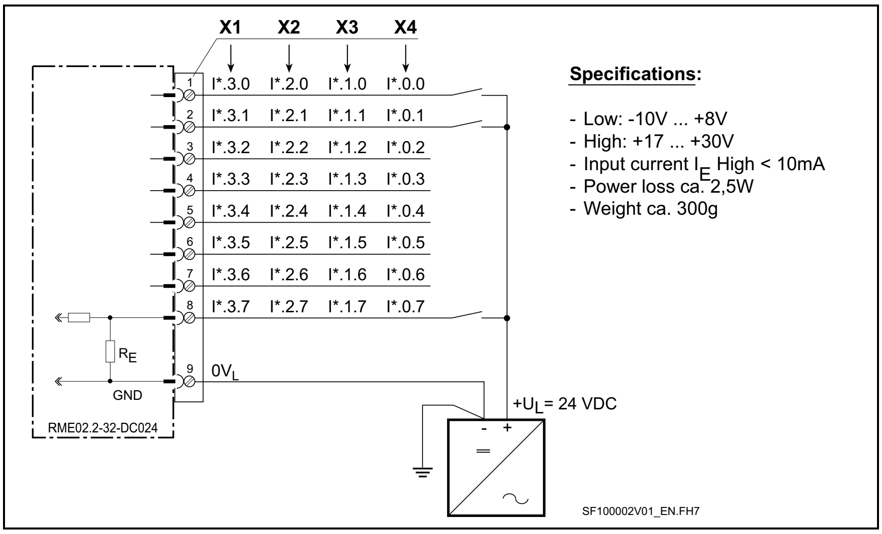


Fig. 6-30: General specifications and pin assignments RME02.2-32-DC024

Type code RME02.2-32-DC024

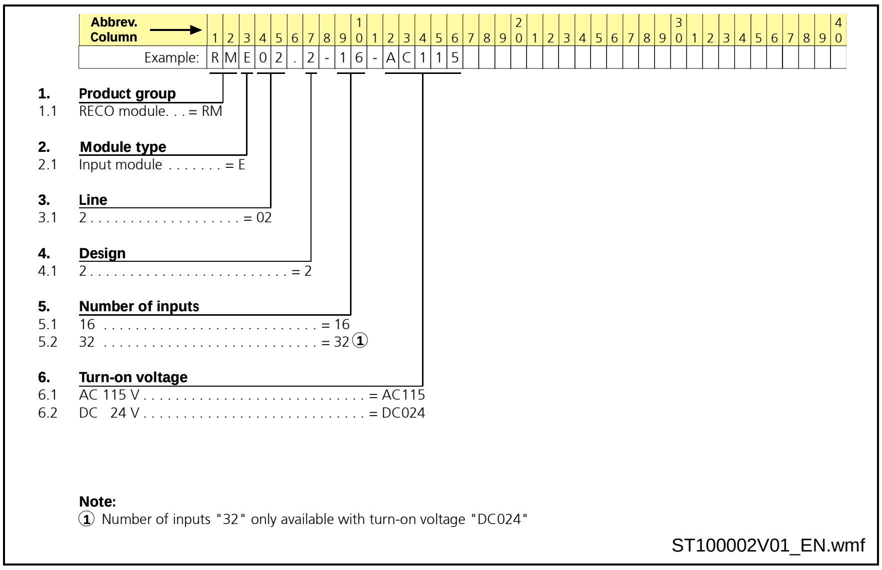


Fig. 6-31: Type code RME02.2-32-DC024

Input module RME02.2-16-AC115

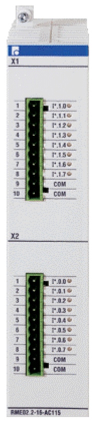


Fig. 6-32: RME02.2-16-AC115

Brief description RME02.2-16-AC115

AC sources of a maximum rating of 120VAC / 60Hz can directly be connected to the digital 115VAC input modules. The 16 AC inputs are arranged in 2 isolated potential groups.

Documentation RME02.2-16-AC115

A detailed description can be found in documentation "SERCOS I/O Unit RECO02.2 - Project Planning Manual" (DOK-CONTRL-RECO02.2***-PRJ1-EN-P).

General specifications RME02.2-16-AC115

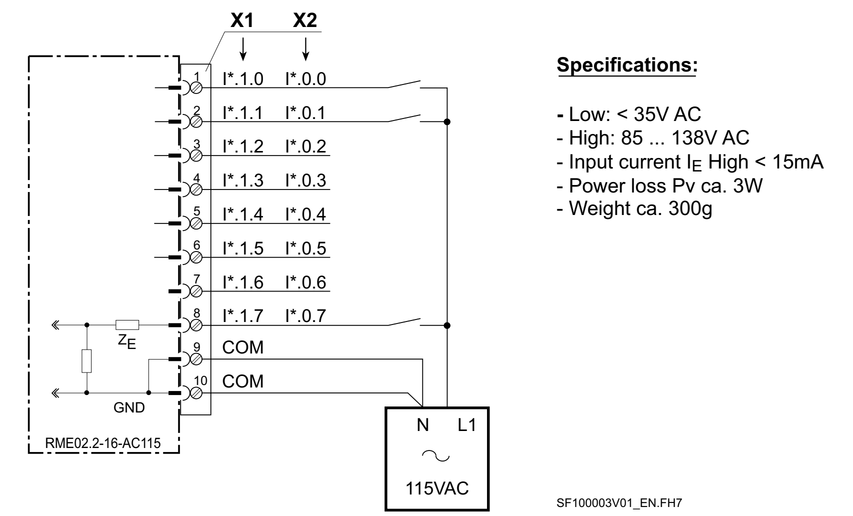


Fig. 6-33: General specifications and pin assignments RME02.2-16-AC115

Type code RME02.2-16-AC115

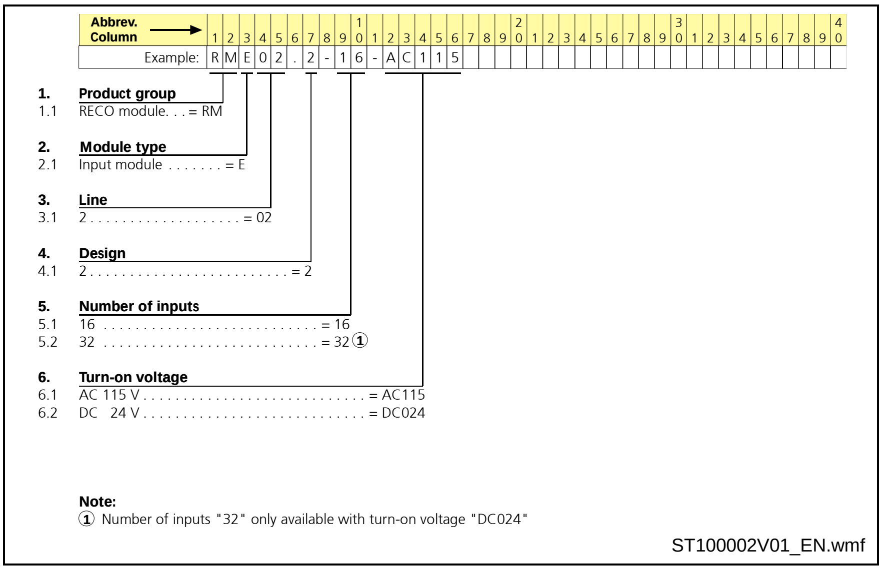


Fig. 6-34: Type code RME02.2-16-AC115

Output module RMA02.2-16-DC024-200

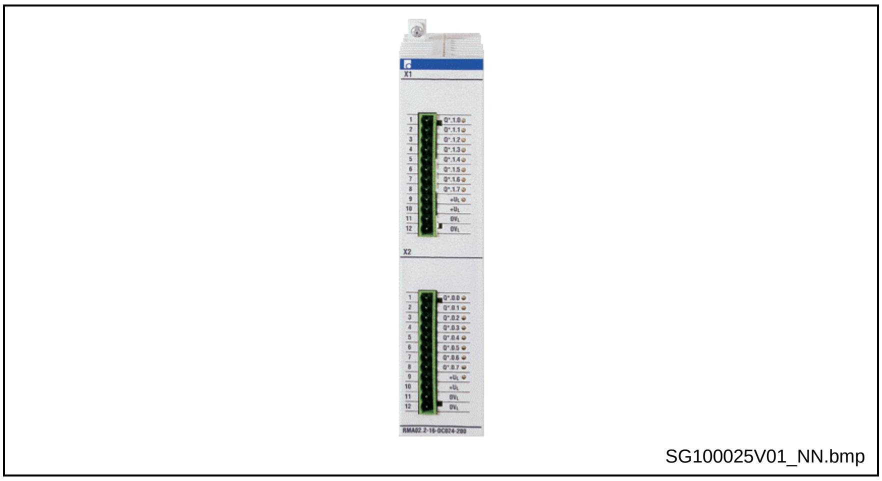


Fig. 6-35: RMA02.2-16-DC024-200

Brief description RMA02.2-16-DC024-200

The digital 24VDC output modules are designed for the connection of digital actuators, such as solenoid valves, contactors, or indicator lights. The 16 outputs are FET transitor switches (active 1 switching) that are arranged in 2 isolated groups of 8 outputs each. Each 24V output can source loads up to 2 A.

Documentation RMA02.2-16-DC024-200

A detailed description can be found in documentation "SERCOS I/O Unit RECO02.2 - Project Planning Manual" (DOK-CONTRL-RECO02.2***-PRJ1-EN-P).

General specifications RMA02.2-16-DC024-200

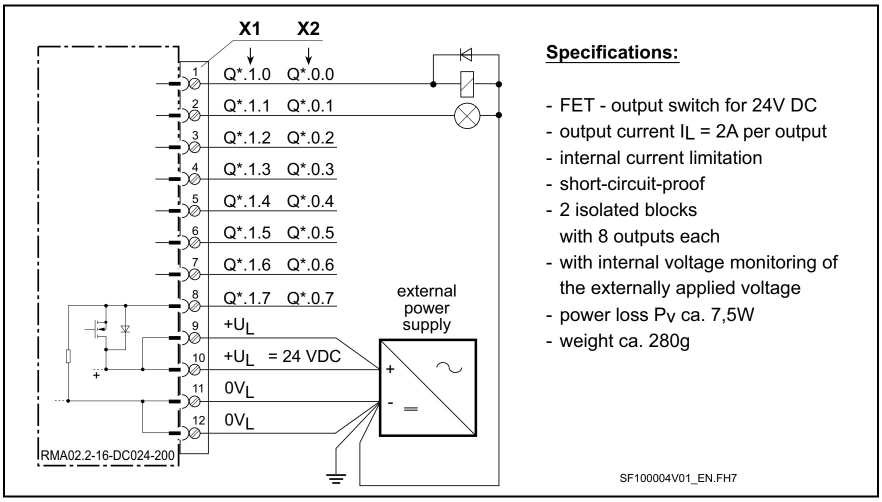


Fig. 6-36: General specifications and pin assignments RMA02.2-16-DC024-200

Type code RMA02.2-16-DC024-200

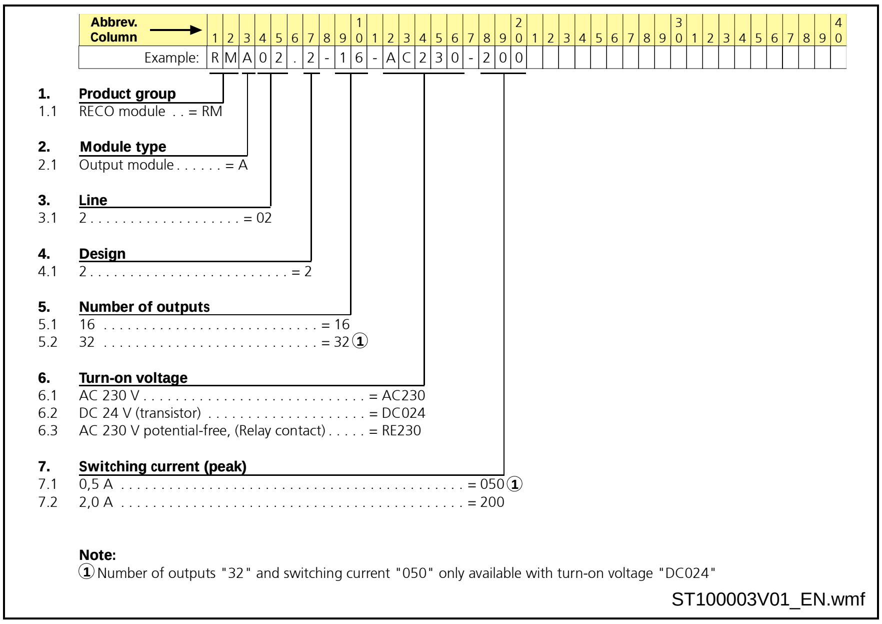


Fig. 6-37: Type code RMA02.2-16-DC024-200

Output module RMA02.2-32-DC024-050

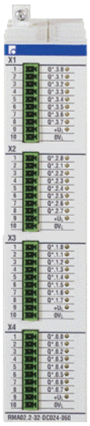

SG100026V01_NN.bmp

Fig. 6-38: RMA02.2-32-DC024-050

Brief description RMA02.2-32-DC024-050

The digital 24VDC output modules are designed for the connection of digital actuators, such as solenoid valves, contactors, or indicator lights. The 32 outputs are FET transitor switches (active 1 switching) that are arranged in 4 isolated groups of 8 outputs each. Each 24V output can source loads up to 500 mA.

Documentation RMA02.2-32-DC024-050

A detailed description can be found in documentation "SERCOS I/O Unit RECO02.2 - Project Planning Manual" (DOK-CONTRL-RECO02.2***-PRJ1-EN-P).

General specifications RMA02.2-32-DC024-050

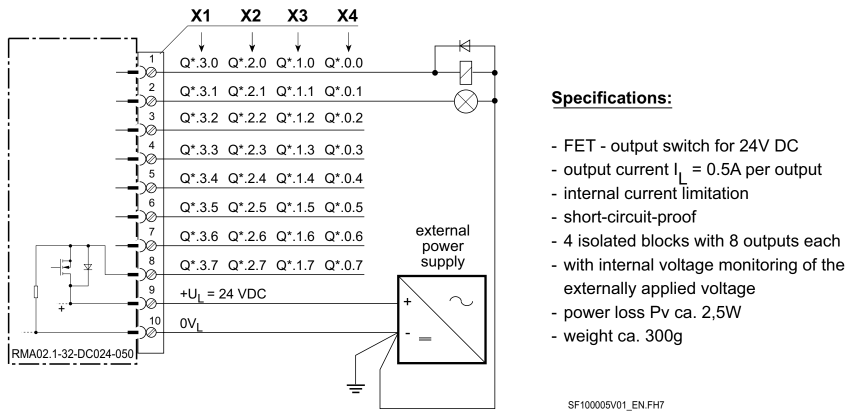


Fig. 6-39: General specifications and pin assignments RMA02.2-32-DC024-050

Type code RMA02.2-32-DC024-050

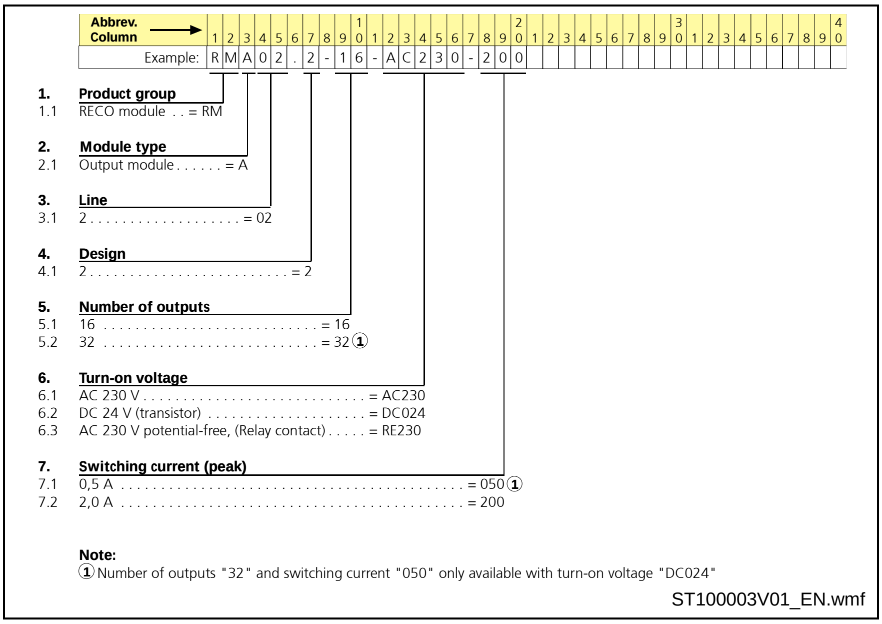


Fig. 6-40: Type code RMA02.2-32-DC024-050

Output module RMA02.2-16-AC230-200

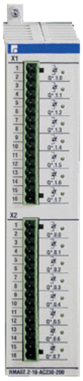

SG100027V01_NN.bmp

Fig. 6-41: RMA02.2-16-AC230-200

Brief description RMA02.2-16-AC230-200

The digital AC output modules are designed for the connection of digital actuators that operate on the mains voltage. The 16 active 1 switching outputs are arranged in 2 isolated groups of 8 outputs each. Each 230V AC output is able to source up to 2A.

Documentation RMA02.2-16-AC230-200

A detailed description can be found in documentation "SERCOS I/O Unit RECO02.2 - Project Planning Manual" (DOK-CONTRL-RECO02.2***-PRJ1-EN-P).

General specifications RMA02.2-16-AC230-200

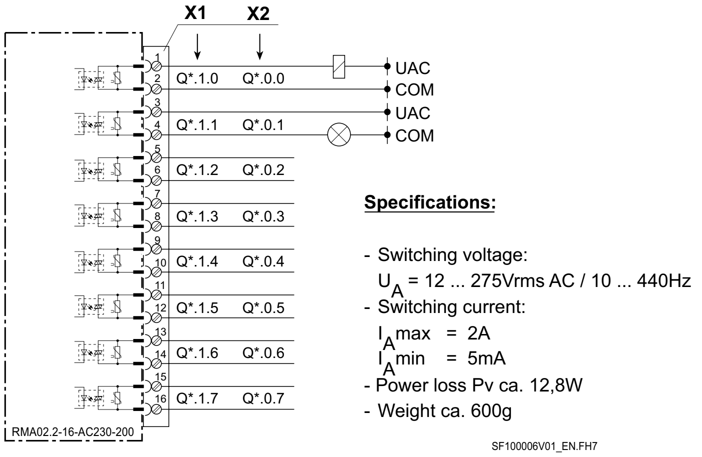


Fig. 6-42: General specifications and pin assignments RMA02.2-16-AC230-200

Type code RMA02.2-16-AC230-200

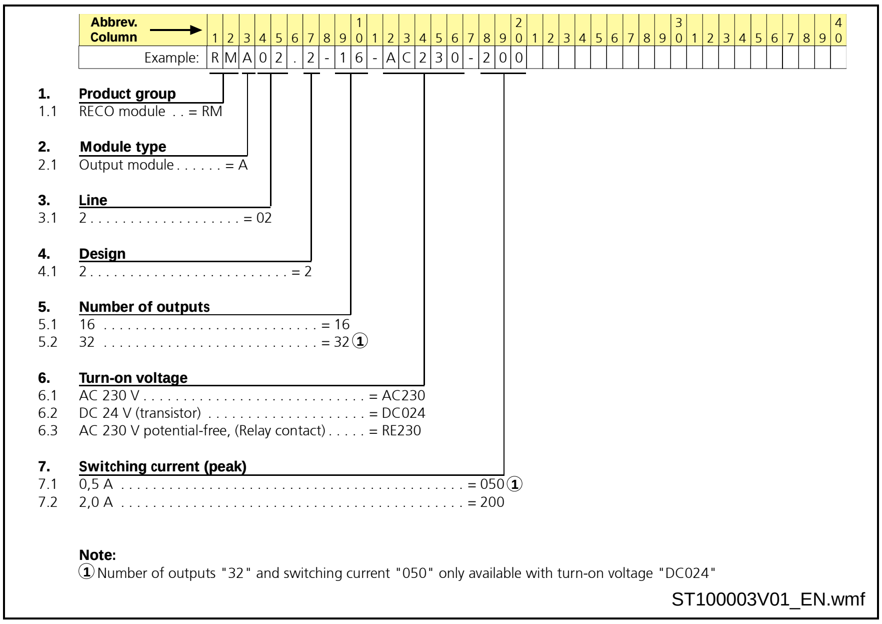
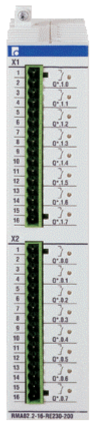


Fig. 6-43: Type code RMA02.2-16-AC230-200

Output module RMA02.2-16-RE230-200



SG100028V01_NN.bmp

Fig. 6-44: RMA02.2-16-RE230-200

Brief description RMA02.2-16-RE230-200

The digital relay output modules are designed as floating switching contacts for AC and DC. The 16 active 1 switching outputs are arranged in 2 isolated groups of 8 outputs each. Depending on the load, the maximum switching capacity of each output is between 50W and 200W.

Documentation RMA02.2-16-RE230-200

A detailed description can be found in documentation "SERCOS I/O Unit RECO02.2 - Project Planning Manual" (DOK-CONTRL-RECO02.2***-PRJ1-EN-P).

General specifications RMA02.2-16-RE230-200

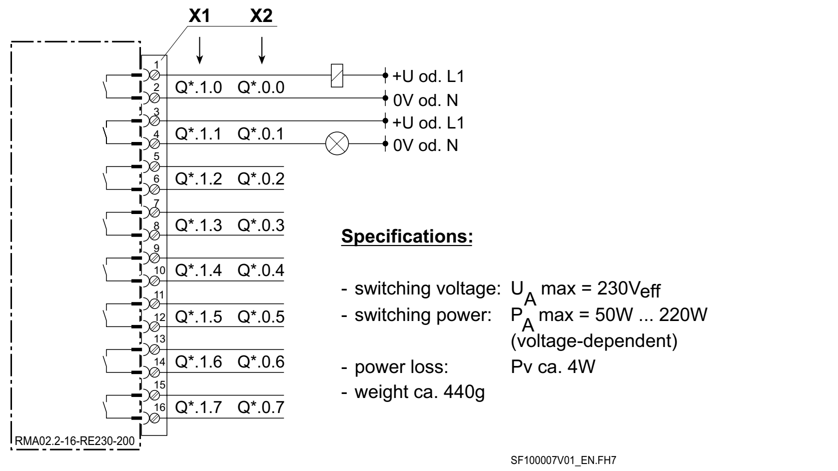


Fig. 6-45: General specifications and pin assignments RMA02.2-16-RE230-200

Type code RMA02.2-16-RE230-200

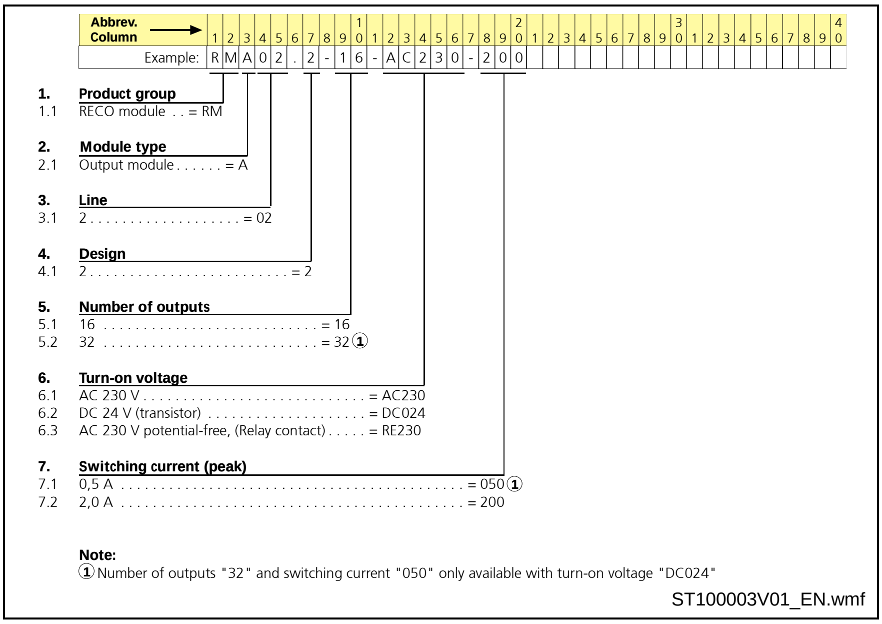


Fig. 6-46: Type code RMA02.2-16-RE230-200

Analog module RMC02.2-2E-1A

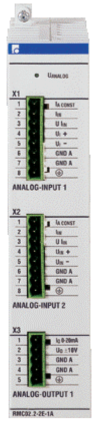


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Fig. 6-47: RMC02.2-2E-1A

Brief description RMC02.2-2E-1A

The RECO module RMC02.2-2E-1A is an analog I/O module for the RECO system.

The module possesses 2 isolated input channels and one isolated output channel. 2- and 3-wire actuators and 2-/3- and 4-wire sensors can be connected to this outputs. Each input has a separate constant current source (2.5 mA) that eliminates the need for an external power supply for most sensors.

The analog output is available in parallel as a +/- 10V voltage and 0 - 20 mA current output. Each input and output has its own connector.

Documentation RMC02.2-2E-1A

A detailed description can be found in documentation "SERCOS I/O Unit RECO02.2 - Project Planning Manual" (DOK-CONTRL-RECO02.2***-PRJ1-EN-P).

General specifications RMC02.2-2E-1A

Input ranges	
Bipolar input voltage range	±0.5V; ±1V; ±5V; ±10V
Bipolar input current range	±20mA
Resistance measurement	0 - 2000Ω (internal current source) 0 < 20KΩ (external voltage source)
Temperature measurement	Pt 100: -100°C....+850°C
Output ranges	
Bipolar output voltage range	±10V
Bipolar output current ranges	0 - 20mA

Fig. 6-48: General specifications RMC02.2-2E-1A

Type code RMC02.2-2E-1A

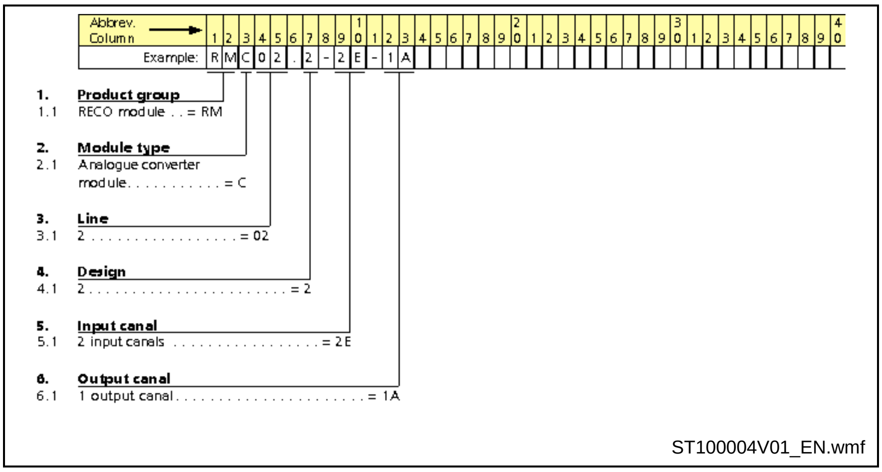

Fig. 6-49: Type code RMC02.2-2E-1A

Rexroth Inline: Decentralized I/O components

Rexroth Inline - PROFIBUS-DP bus clamp R-IL DP-V1 BK

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Fig. 6-50: Bus clamp R-IL DP-V1 BK

Brief description R-IL DP-V1 BK

The bus clamp couples a Rexroth Inline station to a PROFIBUS-DP remote bus and initializes the supply voltages for the connected participants.

General specifications

Designation	Value	Remarks
Power supply – nominal value	24 V DC	
Current consumption	approximately 90 mA	without connected I/O modules

Fig. 6-51: General specifications bus clamp R-IL DP-V1 BK

Rexroth Inline - DeviceNet bus clamp R-IL DN BK

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Fig. 6-52: Bus clamp R-IL DN BK

Brief description R-IL DN BK

The bus clamp couples a Rexroth inline station to a DeviceNet remote bus and initializes the supply voltages for the connected participants.

General specifications

Designation	Value	Remarks
Power supply – nominal value	24 V DC	
Current consumption	approximately 90 mA	without connected I/O modules

Fig. 6-53: General specifications bus clamp R-IL DN BK

Rexroth Inline - digital inputs R-IB IL 24 DI 2

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Fig. 6-54: Digital inputs R-IB IL 24 DI 2

Brief description R-IB IL 24 DI 2

This input clamp makes two digital inputs in 2, 3 and 4 conductor connection system available.

General specifications

Designation	Value	Remarks
Inputs Number Input current consumption	 2 5 mA at 24 V DC	
Connection system	2, 3, 4 conductor	

Fig. 6-55: General specifications R-IB IL 24 DI 2-2

Rexroth Inline - digital inputs R-IB IL 24 DI 4

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Fig. 6-56: Digital inputs R-IB IL 24 DI 4

Brief description R-IB IL 24 DI 4

This input clamp makes four digital inputs in 2 and 3 conductor connection system available.

General specifications

Designation	Value	Remarks
Inputs Number Input current consumption	 4 5 mA at 24 V DC	
Connection system	2, 3 conductor	

Fig. 6-57: General specifications R-IB LI 24 DI 4

Rexroth Inline - digital inputs R-IB IL 24 DI 8

Fig. 6-58: Digital inputs R-IB IL 24 DI 8

Brief description R-IB IL 24 DI 8

This input clamp makes eight digital inputs in 2, 3 and 4 conductor connection system available.

General specifications

Designation	Value	Remarks
Inputs Number Input current consumption	 8 5 mA at 24 V DC	
Connection system	2, 3, 4 conductor	

Fig. 6-59: General specifications R-IB IL 24 DI 8

Rexroth Inline - digital inputs R-IB IL 24 DI 16

Fig. 6-60: Digital inputs R-IB IL 24 DI 16

Brief description R-IB IL 24 DI 16

This input clamp makes sixteen digital inputs in 2 and 3 conductor connection system available.

General specifications

Designation	Value	Remarks
Inputs Number Input current consumption	 16 5 mA at 24 V DC	
Connection system	2, 3 conductor	

Fig. 6-61: General specifications R-IB IL 24 DI 16

Rexroth Inline - digital inputs R-IB IL 24 DI 32/HD

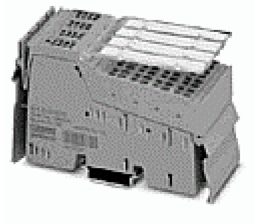

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Fig. 6-62: Digital inputs R-IB IL 24 DI 32/HD{ XE "R-IB IL 24 DI 32/HD " }{ XE "R-IB IL 24 DI 32/HD - Brief description" }{ XE "Digital inputs R-IB IL 24 DI 32/HD " }

Brief description R-IB IL 24 DI 32/HD

This input clamp makes 32 digital inputs in 1 conductor connection system available.

General specifications

Designation	Value	Remarks
Inputs Number Input current consumption	 32 3 mA at 24 V DC	
Connection system	1 conductor	

Fig. 6-63: General specifications R-IB IL 24 DI 32/HD { XE "R-IB IL 24 DI 32/HD General specifications" }

Rexroth Inline - digital inputs R-IB IL 24 EDI 2-DES

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Fig. 6-64: Digital inputs R-IB IL 24 EDI 2-DES

Brief description R-IB IL 24 EDI 2-DES

This input clamp makes two digital inputs and two diagnostic inputs in 2 and 3 conductor connection system available.

General specifications

Designation	Value	Remarks
Inputs Number Input current consumption	 2 digital inputs 2 diagnostic inputs 5 mA at 24 V DC	
Connection system	2, 3 conductor	

Fig. 6-65: General specifications R-IB IL 24 EDI 2-DES

Rexroth Inline - digital outputs R-IB IL 24 DO 2-2A

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Fig. 6-66: Digital outputs R-IB IL 24 DO 2-2A

Brief description R-IB IL 24 DO 2-2A

This output clamp makes two digital outputs in 2, 3 and 4 conductor connection system available.

General specifications

Designation	Value	Remarks
Outputs Number Output current consumption	 2 max. 2 A at 24 V DC / per channel	 peripheral supply inclusive
Connection system	2, 3, 4 conductor	

Fig. 6-67: General specifications R-IB IL 24 DO 2-2

Rexroth Inline - digital outputs R-IB IL 24 DO 4

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Fig. 6-68: Digital outputs R-IB IL 24 DO 4

Brief description R-IB IL 24 DO 4

This output clamp makes four digital outputs in 2 and 3 conductor connection system available.

General specifications

Designation	Value	Remarks
Outputs Number Output current consumption	 4 max. 0,5 A at 24 V DC / per channel	 peripheral supply inclusive
Connection system	2, 3 conductor	

Fig. 6-69: General specifications R-IB IL 24 DO 4

Rexroth Inline - digital outputs R-IB IL 24 DO 8

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Fig. 6-70: Digital outputs R-IB IL 24 DO 8

Brief description R-IB IL 24 DO 8

This output clamp makes eight digital outputs in 2, 3 and 4 conductor connection system available.

General specifications

Designation	Value	Remarks
Outputs Number Output current consumption	 8 max. 0,5 A at 24 V DC / per channel	 peripheral supply inclusive
Connection system	2, 3, 4 conductor	

Fig. 6-71: General specifications R-IB IL 24 DO 8

Rexroth Inline - digital outputs R-IB IL 24 DO 8-2A

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Fig. 6-72: Digital outputs R-IB IL 24 DO 8-2A

Brief description R-IB IL 24 DO 8-2A

This output clamp makes eight digital outputs in 2, 3 and 4 conductor connection system available.

General specifications

Designation	Value	Remarks
Outputs Number Output current consumption	 8 max. 2 A at 24 V DC / per channel	 total current max. 8A
Connection system	2, 3, 4 conductor	

Fig. 6-73: General specifications R-IB IL 24 DO 8-2A

Rexroth Inline - digital outputs R-IB IL 24 DO 16

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Fig. 6-74: Digital outputs R-IB IL 24 DO 16

Brief description R-IB IL 24 DO 16

This output clamp makes sixteen digital outputs in 2 and 3 conductor connection system available.

General specifications

Designation	Value	Remarks
Outputs Number Output current consumption	 16 max. 0,5 A at 24 V DC / per channel	 peripheral supply inclusive
Connection system	2, 3 conductor	

Fig. 6-75: General specifications R-IB IL DO 16

Rexroth Inline - digital outputs R-IB IL 24 DO 32/HD

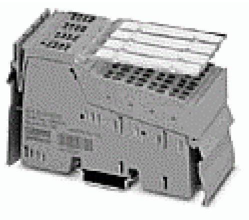

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Fig. 6-76: Digital outputs R-IB IL 24 DO 32/HD

Brief description R-IB IL 24 DO 32/HD

This output clamp makes 32 digital outputs in 1 conductor connection system available.

General specifications

Designation	Value	Remarks
Outputs Number Output current consumption	 32 max. 0,5 A at 24 V DC / per channel	 peripheral supply inclusive
Connection system	1 conductor	

Fig. 6-77: General specifications R-IB IL DO 32/HD

Rexroth Inline - digital outputs R-IB IL 24/230 DOR 1/W

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Fig. 6-78: Digital outputs R-IB IL 24/230 DOR 1/W

Brief description R-IB IL 24/230 DOR 1/W

This clamp makes a potential-free relay contact (changeover contact) available.

General specifications

Designation	Value	Remarks
Outputs Number Current consumption	 1 changeover contact max. 3 A	 note derating

Fig. 6-79: General specifications R-IB IL 24/230 DOR 1/W

Rexroth Inline - digital outputs R-IB IL 24/230 DOR 4/W

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Fig. 6-80: Digital outputs R-IB IL 24/230 DOR 4/W

Brief description R-IB IL 24/230 DOR 4/W

This clamp makes four potential-free relay contact (changeover contacts) available.

General specifications

Designation	Value	Remarks
Outputs Number Current consumption	 4 changeover contacts max. 3 A per contact	 note derating

Fig. 6-81: General specifications R-IB IL 24/230 DOR 4/W

Rexroth Inline - terminal set R-IB IL DOR LV-SET

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Fig. 6-82: Terminal set R-IB IL DOR LV-SET

Brief description R-IB IL DOR LV-SET

The terminal set R-IB IL DOR LV-SET is designed for use within an RECO Inline station. It is used to isolate relay terminal R-IB IL 24/230 DOR 1/W when voltages that are not present in the segment, e.g. 230 V in a 24 V segment, are to be switched. They provide the required voltage spacing.

General specifications

Clearances and creepage distances (according to EN 50178, VDE 0109, VDE 0110)			
Isolating distance	**Clearance**	**Creepage distance**	**Testing voltage**
Relay contact / bus logic	≥ 5,5 mm	≥ 5,5 mm	4 kV, 50 Hz, 1 min

Fig. 6-83: General specifications R-IB IL DOR LV-SET

Rexroth Inline - analog inputs R-IB IL 24 AI 2/SF

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Fig. 6-84: Analog inputs R-IB IL 24 AI 2/SF

Brief description R-IB IL 24 AI 2/SF

This analog clamp makes two analog single-ended signal inputs for optional connection of current or voltage signals in 2 and 3 conductor connection system available.

General specifications

Designation	Value	Remarks
Inputs		
Number	2, single ended	
Connection system	2, 3 conductor	shielded
Input range	0-10 V, +- 10 V	voltage
	0-20 mA, +-20 mA. 4-20 mA	current

Fig. 6-85: General specifications R-IB IL 24 AI 2/SF

Rexroth Inline - analog inputs R-IB IL 24 TEMP 2 RTD

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Fig. 6-86: Analog inputs R-IB IL 24 TEMP 2 RTD

Brief description R-IB IL 24 TEMP 2 RTD

This analog clamp makes two analog signal inputs for connection of resistive temperature sensors in 2, 3 and 4 conductor connection system available.

General specifications

Designation	Value	Remarks
Inputs Number Connection system Sensor types Characteristics standard	 2, for resistive temperature measuring 2, 3, 4 conductor Pt, Ni, Cu, KTY as per DIN, as per SAMA	 shielded sensor conduction

Fig. 6-87: General specifications R-IB IL 24 TEMP 2 RTD

Rexroth Inline - analog inputs R-IB IL AI 8/SF

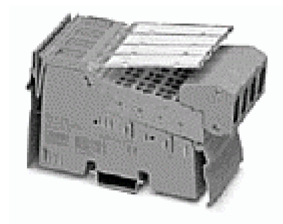

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Fig. 6-88: Analog inputs R-IB IL AI 8/SF

Brief description R-IB IL AI 8/SF

This analog clamp makes eight analog single-ended signal inputs for optional connection of current or voltage signals in 2 conductor connection system available.

General specifications

Designation	Value	Remarks
Inputs Number Connection system Input range	 8, single ended 2 conductor 0-5V, +- 5V, 0-10 V, +- 10 V 0-25V, +- 25V, 0-50 V 0-20 mA, +-20 mA, 4-20 mA 0-40 mA, +-40 mA	 shielded voltage current

Fig. 6-89: General specifications R-IB IL 24 AI 2/SF

Rexroth Inline - analog inputs R-IB IL AI 8/IS

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Fig. 6-90: Analog inputs R-IB IL AI 8/IS

Brief description R-IB IL AI 8/IS

This analog clamp makes eight analog single-ended signal inputs for connection of current signals in 2 and 3 conductor connection system available.

General specifications

Designation	Value	Remarks
Inputs Number Connection system Input range	8, single ended 2, 3 conductor 0-20 mA, +-20 mA, 4-20 mA 0-40 mA, +-40 mA	shielded current

Fig. 6-91: General specifications R-IB IL 24 AI 2/IS

Rexroth Inline - analog outputs R-IB IL A0 1/SF

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Fig. 6-92: Analog outputs R-IB IL A0 1/SF

Brief description R-IB IL A0 1/SF

This analog clamp makes one analog single-ended signal output for optional connection of current or voltage signals in 2 conductor connection system available.

General specifications

Designation	Value	Remarks
Outputs Number Connection system Output ranges optional or	1 2 conductor 0-10 V, 0-20 mA, 4-20 mA	shielded voltage or current

Fig. 6-93: General specifications R-IB IL AO 1 SF

Rexroth Inline - analog outputs R-IB IL AO 2 U/BP

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Fig. 6-94: : Analog outputs R-IB IL AO 2 U/BP

Brief description R-IB IL AO 2 U/BP

This analog clamp makes two analog bipolar voltage outputs in 3 conductor connection system available.

General specifications

Designation	Value	Remarks
Outputs Number Connection system Output ranges optional	 2 3 conductor 0-10 V, +- 0-10 V,	 shielded voltage

Fig. 6-95: General specifications R-IB IL 2/U/BP

Rexroth Inline - function clamp R-IB IL CNT

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Fig. 6-96: Function clamp R-IB IL CNT

Brief description R-IB IL CNT

This function clamp makes the following functions available:

- event metering
- frequency measuring
- time measuring
- impulse generator

General specifications

Designation	Value	Remarks
Basic functions	frequency measuring, time measuring, pulse count, pulse encoder.	alternative
type connection of the 24 V sensors	2 and 3 conductor	
type connection of the 5 V sensors	2 conductor with shield	ext. 5 V voltage required
output (pulse generator)	24 V DC, max. 0,5 A	

Fig. 6-97: General specifications R-IB IL CNT

Rexroth Inline - supply voltage clamp R-IB IL 24 PWR IN

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Fig. 6-98: Supply voltage clamp R-IB IL 24 PWR IN

Brief description R-IB IL 24 PWR IN

This clamp makes the supply of the module and segment voltage possible.

General specifications

Designation	Value	Remarks
Supply Voltage Current	 24 V DC 8 A max.	extern fusing

Fig. 6-99: General specifications R-IB IL 24 PWR IN

Rexroth Inline - supply voltage clamp R-IB IL 24 SEG/F

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Fig. 6-100: Supply voltage clamp R-IB IL 24 SEG/F

Brief description R-IB IL 24 SEG/F

This clamp makes the fused transfer of the module voltage in the segment voltage possible.

General specifications

Designation	Value	Remarks
Supply Voltage Current	 24 V DC 8 A max.	extern fusing

Fig. 6-101: General specifications R-IB IL 24 SEG/F

Rexroth Inline - Profibus-DP block I/O module R-ILB PB 24 DI16 DO16


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Fig. 6-102: Profibus-DP block I/O module R-ILB PB 24 DI16 DO16

Brief description R-ILB PB 24 DI16 DO16

The compact module combines a Profibus-DP coupler with 16 digital inputs and 16 digital outputs in 2 and 3 conductor connection system.

The module saves costs compared with modular stations, but can not be expanded by further I/Os.

General specifications

Designation	Value	Remarks
Supply Voltage Current	 24 V DC a maximum of 8 A	
Connection system	2 , 3 conductor	

Fig. 6-103: General specifications R-ILB PB 24 DI16 DO16

Rexroth Inline - DeviceNet block I/O module R-ILB DN 24 DI16 DO16


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Fig. 6-104: DeviceNet block I/O module R-ILB DN 24 DI16 DO16

Brief description R-ILB DN 24 DI16 DO16

The compact module combines a DeviceNet coupler with 16 digital inputs and 16 digital outputs in 2 and 3 conductor connection system.

The module saves costs compared with modular stations, but can not be expanded by further I/Os.

General specifications

Designation	Value	Remarks
Supply Voltage Current	 24 V DC a maximum of 8 A	
Connection system	2 , 3 conductor	

Fig. 6-105: General specificationsR-ILB DN 24 DI16 DO16

Type code RECO Inline

Abbrev. Column → 1 2 3 4 5 6 7 8 9 10 1 2 3 4 5 6 7 8 9 20 1 2 3 4 5 6 7 8 9 30 1 2 3 4 5 6 7 8 9 40

Example: R - I B   I L   S C N - 6   S H I E L D - T W I N

1. Product

1.1 Inline module = R-

2. Type of module

	Field bus coupling modules	Code
2.1.1	Supply terminal, DC 24 V	**IB IL 24 PWR IN**
2.1.2	Segment terminal INTERBUS, DC 24 V, with fuse	**IB IL 24 SEG/F**
2.1.3	Bus terminal, INTERBUS, DC 24 V, with DSUB plug-in connector	**IBS IL 24 BK-DSUB**
2.1.4	Bus terminal, INTERBUS, DC 24 V, copper	**IBS IL 24 BK-T**
2.1.5	Bus terminal, INTERBUS, DC 24 V, copper, no ID change with remote bus	**IBS IL 24 BK-T/U**
2.1.6	Remote bus, INTERBUS, DC 24 V, copper	**IBS IL 24 RB-T**
2.1.7	Bus terminal, CANopen	**IL CAN BK-TC**
2.1.8	Bus terminal, PROFIBUS-DP	**IL PB BK**
2.1.9	Bus terminal, PROFIBUS-DP/V1	**IL PB BK DP/V1**
2.1.10	Bus terminal, SERCOS	**IL SE BK**
2.1.11	Bus terminal, DeviceNet	**IL DN BK**

2.2	Input modules	Code
2.2.1	1 digital input, AC 120 V	**IB IL 120 DI 1**
2.2.2	1 digital input, AC 230 V	**IB IL 230 DI 1**
2.2.3	2 digital inputs, DC 24 V	**IB IL 24 DI 2**
2.2.4	2 digital inputs, DC 24 V, negative Logic	**IB IL 24 DI 2-NPN**
2.2.5	4 digital inputs, DC 24 V	**IB IL 24 DI 4**
2.2.6	8 digital inputs, DC 24 V	**IB IL 24 DI 8**
2.2.7	8 digital inputs, DC 24 V, type 2	**IB IL 24 DI 8/T2**
2.2.8	16 digital inputs, DC 24 V	**IB IL 24 DI 16**
2.2.9	32 digital inputs, DC 24 V	**IB IL 24 DI 32/HD**
2.2.10	2 digital inputs, DC 24 V, 2 diagnostic inputs DC 24 V	**IB IL 24 EDI 2-DES**
2.2.11	2 analogue inputs, 0-20 mA, 4-20 mA, +/- 20 mA, 0-10 V	**IB IL AI 2/SF**
2.2.12	2 analogue inputs, 0-20 mA, 4-20 mA, +/- 20 mA, 0-10 V, 230 Hz	**IB IL AI 2/SF-230**
2.2.13	2 analogue inputs, 0-25 mA, 4-20 mA, HART function	**IB IL AI 2 HART**
2.2.14	8 analogue inputs, 0-5 V, 0-10 V, 0-25 V, 0-50 V, +/-5 V, +/-10 V, +/-25 V 0-20 mA, 4-20 mA, 0-40 mA, +/-20mA, +/-40mA	**IB IL AI 8/SF**
2.2.15	8 analogue inputs, 0-20 mA, 4-20 mA, 0-40 mA, +/- 20 mA, +/- 40 mA	**IB IL AI 8/IS**
2.2.16	2 analogue inputs, RTD (resistor sensing device)	**IB IL TEMP 2 RTD**
2.2.17	2 analogue inputs, UTH (thermocouple)	**IB IL TEMP 2 UTH**

2.3	Output modules	Code
2.3.1	1 Relais-switch contact, AC 5-253 V, 3.0 A	**IB IL 24/230 DOR1/W**
2.3.2	4 Relais-switch contact, AC 5-253 V, 3.0A	**IB IL 24/230 DOR4/W**
2.3.3	2 digital outputs, DC 24 V, 0.5 A	**IB IL 24 DO 2**
2.3.4	2 digital outputs, DC 24 V, 2.0 A	**IB IL 24 DO 2-2A**
2.3.5	2 digital outputs, DC 24 V, 0.5 A, negative Logic	**IB IL 24 DO 2-NPN**
2.3.6	4 digital outputs, DC 24 V, 0.5 A	**IB IL 24 DO 4**
2.3.7	8 digital outputs, DC 24 V, 0.5 A	**IB IL 24 DO 8**
2.3.8	8 digital outputs, DC 24 V, 2.0 A	**IB IL 24 DO 8-2A**
2.3.9	16 digital outputs, DC 24 V, 0.5 A	**IB IL 24 DO 16**
2.3.10	32 digital outputs, DC 24 V, 0,5 A	**IB IL 24 DO 32/HD**
2.3.11	2 digital outputs, DC 24 V, 0,5 A, extended diagnostic	**IB IL 24 EDO 2**
2.3.12	1 analogue output, 0-20 mA, 4-20 mA, 0-10 V	**IB IL AO 1/SF**
2.3.13	1 analogue output, 0-10 V	**IB IL AO 1/U/SF**
2.3.14	2 analogue outputs, 0-20 mA, 4-20 mA, 0-10 V	**IB IL AO 2/SF**
2.3.15	2 analogue outputs, 0-10 V, +/- 10 V	**IB IL AO 2/U/BP**
2.3.16	1 analogue outputs, AC 12-253 V, 0,5 A	**IB IL DO 1 AC**
2.3.17	insulation terminal set for relais-switch contact IB IL 24/230 DOR1/W	**IB IL DOR LV-SET**

2.4	Function terminal	Code
2.4.1	1 counter input, 1 control input, 1 output, DC 24 V, 0.5 A	**IB IL CNT**
2.4.2	1 incremental encoder input, 4 digital inputs and outputs, DC 24 V	**IB IL INC**
2.4.3	1 incremental encoder input, 2 digital inputs, DC 24 V	**IB IL INC-IN**
2.4.4	1 serial input and output channel, RS232	**IB IL RS 232**
2.4.5	1 serial input and output channel, RS485/422	**IB IL RS 485/422**
2.4.6	1 absolute encoder input, 4 digital inputs and outputs, DC 24 V	**IB IL SSI**
2.4.6	6 inputs for resistance thermometer, 6 outputs, DC 24 V	**IB IL TEMPCON RTD**
2.4.7	8 inputs for thermocouples, 8 outputs, DC 24 V	**IB IL TEMPCON UTH**

2.5	Inline Block IO	Code
2.5.1	Inline Block IO, Profibus, 16 digital inputs and 16 outputs with 0,5 A	**ILB PB 24 DI16 DO16**
2.5.2	Inline Block IO, DeviceNet, 16 digital inputs and 16 outputs with 0,5 A	**ILB DN 24 DI16 DO16**
2.5.3	Inline Block IO, INTERBUS, 16 digital inputs and 16 outputs with 0,5 A	**ILB IB 24 DI16 DO16**

2.6	Connector	Code
2.6.1	Connector set AO and CNT	**IB IL AO/CNT-PLSET**
2.6.2	Connector set bus terminal	**IB IL BK-PLSET**
2.6.3	Connector set S01 for CML (DI 8 / DO 8, PWR)	**IB IL CML S01-PLSET**
2.6.4	Connector set DI 32 and DO 32	**IB IL DI/DO8-PLSET**
2.6.5	Connector set for insulation terminals	**IB IL DOR LV-PLSET**
2.6.6	Shield connector for one cable	**IB IL SCN-6 SHIELD**
2.6.7	Shield connector for two cables	**IB IL SCN-6 SHIELD-TWIN**
2.6.8	Connector, short, not printed	**IB IL SCN-8**
2.6.9	Connector relais-terminal	**IB IL SCN-8-AC-REL**
2.6.10	Connector, short, printed	**IB IL SCN-8-CP**
2.6.11	Connector, long, printed, input	**IB IL SCN-12-ICP**
2.6.12	Connector, long, printed, output	**IB IL SCN-12-OCP**
2.6.13	Supply connector, printed	**IB IL SCN-PWR IN-CP**
2.6.14	Connector set for SSI and INC	**IB IL SSI/INC-PLSET**

2.7	Label fields	Code
2.7.1	Label field, narrow	**IB IL FIELD 2**
2.7.2	Label field, wide	**IB IL FIELD 8**

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Fig. 6-106: Type code Rexroth Inline

Documentation Rexroth Inline

A detailed description and more technical data can be found in the documentations:

- "Rexroth Inline Profibus DP - Functional Description"
  (DOK-CONTRL-R-IL*PB*-BK-FK02-EN-P)
- "Rexroth Inline Profibus DP - Application Manual"
  (DOK-CONTRL-R-IL*PBSSYS-AW02-EN-P)
- "Rexroth Inline Digital I/O Terminals - Functional Description"
  (DOK-CONTRL-R-IL*DIO***-FK03-EN-P)
- "Rexroth Inline Analog I/O Terminals - Project Planning Manual"
  (DOK-CONTRL-R-IL*AIO***-FK02-EN-P)
- "Rexroth Inline Counter Terminal - R-IB IL CNT"
  (DOK-CONTRL-R-IL*CNT***-AW02-EN-P)

Rexroth Fieldline: Decentralized I/O components IP65

Rexroth Fieldline - module with 8 digital inputs

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Fig. 6-107: Rexroth Fieldline - module with 8 digital inputs

Brief description Rexroth Fieldline - module with 8 digital inputs

This stand alone device is used for digital signal acquisition.

The following constructions are available:

- Connection to Profibus DP: RF-FLS PB M12 DI 8 M12-2A
- Connection to DeviceNet: RF-FLS DN M12 DI 8 M12-2A

General specifications

Housing dimensions (width x height x depth)	60 mm x 160 mm x 44.5 mm (2.362 in. x 6.299 in. x 1.752 in.)	
Weight	310 g, approx.	
Operating mode	Process data operation with 8 bits	
Type of sensor connection	2-, 3- or 4-wire technology	
Permissible temperature	Operation	-25 °C to +60 °C (-13 °F to +140 °F)
	Storage/transport	-25 °C to +85 °C (-13 °F to +185 °F)
Permissible humidity	Storage/transport	95 %
Permissible air pressure	Operation	80 kPa to 106 kPa (up to 2000 m [6562 ft.] above sea level)
	Storage/transport	70 kPa to 106 kPa (up to 3000 m [9843 ft.] above sea level)
Degree of protection	IP 65 / IP 67 according to IEC 60529	
Class of protection	Class 3 according to VDE 0106, IEC 60536	
Nominal value	24 V DC	
Range	18 V DC to 30 V DC	
Current consumption U_L at 24 V DC	35 mA, typical (100 mA, maximum)	
Current consumption U_S at 24 V DC	4.5 mA, typical + sensor current (700 mA, maximum)	
Number of digital inputs/outputs	8 inputs	

Fig. 6-108: General specifications - Rexroth Fieldline module with 8 digital inputs

Rexroth Fieldline - module with 8 digital outputs

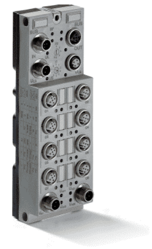
SG100034V01_NN.tif

Fig. 6-109: Rexroth Fieldline - module with 8 digital outputs

Brief description Rexroth Fieldline - module with 8 digital outputs

This stand alone device is used to output digital signals.

The following constructions are available:

- Connection to Profibus DP: RF-FLS PB M12 DO 8 M12-2A
- Connection to DeviceNet: RF-FLS DN M12 DO 8 M12-2A

General specifications

Housing dimensions (width x height x depth)	60 mm x 178 mm x 49.3 mm (2.362 in. x 7.008 in. x 1.941 in.)	
Weight	350 g, approx.	
Operating mode	Process data operation with 8 bits	
Type of actuator connection	2- or 3-wire technology	
Permissible temperature	Operation	-25 °C to +60 °C (-13 °F to +140 °F)
	Storage/transport	-25 °C to +85 °C (-13 °F to +185 °F)
Permissible humidity	Storage/transport	95 %
Permissible air pressure	Operation	80 kPa to 106 kPa (up to 2000 m [6562 ft.] above sea level)
	Storage/transport	70 kPa to 106 kPa (up to 3000 m [9843 ft.] above sea level)
Degree of protection	IP 65 / IP 67 according to IEC 60529	
Class of protection	Class 3 according to VDE 0106, IEC 60536	
Nominal value	24 V DC	
Range	18 V DC to 30 V DC	
Current consumption U_L at 24 V DC	40 mA, typical (100 mA, maximum)	
Current consumption U_S at 24 V DC	3 mA, typical	
Current consumption U_{AAX} at 24 V DC	12 mA, typical + actuator current (4 A, maximum)	
Number of digital inputs/outputs	8 outputs	

Fig. 6-110: General specifications - Rexroth Fieldline module with 8 digital outputs

Rexroth Bosch Group

Rexroth Fieldline - module with 4 digital outputs and inputs


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Fig. 6-111: Rexroth Fieldline - module with 4 digital outputs and inputs

Brief description Rexroth Fieldline - module with 4 digital outputs and inputs

This stand alone device is used for digital signal acquisition and output.

The following constructions are available:

- Connection to Profibus DP: RF-FLS PB M12 DIO 4/4 M12-2A
- Connection to DeviceNet: RF-FLS DN M12 DIO 4/4 M12-2A

General specifications

Housing dimensions (width x height x depth)	60 mm x 178 mm x 49.3 mm (2.362 in. x 7.008 in. x 1.941 in.)	
Weight	340 g, approx.	
Operating mode	Process data operation with 8 bits	
Type of sensor connection	2-, 3- or 4-wire technology	
Type of actuator connection	2- or 3-wire technology	
Permissible temperature	Operation	-25 °C to +60 °C (-13 °F to +140 °F)
	Storage/transport	-25 °C to +85 °C (-13 °F to +185 °F)
Permissible humidity	Storage/transport	95 %
Permissible air pressure	Operation	80 kPa to 106 kPa (up to 2000 m [6562 ft.] above sea level)
	Storage/transport	70 kPa to 106 kPa (up to 3000 m [9843 ft.] above sea level)
Degree of protection	IP 65 / IP 67 according to IEC 60529	
Class of protection	Class 3 according to VDE 0106, IEC 60536	
Nominal value	24 V DC	
Range	18 V DC to 30 V DC	
Current consumption U_L at 24 V DC	40 mA, typical (100 mA, maximum)	
Current consumption U_S at 24 V DC	4.5 mA, typical, + sensor current (700 mA, maximum)	
Current consumption U_{AAX} at 24 V DC	6 mA, typical, + actuator current (4 A, maximum)	
Number of digital inputs/outputs	4 inputs / 4 outputs	

Fig. 6-112: General specifications - Rexroth Fieldline module with 4 digital outputs and inputs

Rexroth Fieldline - module with 8 digital outputs and inputs

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Fig. 6-113: Rexroth Fieldline - module with 8 digital outputs and inputs

Brief description Rexroth Fieldline - module with 8 digital outputs and inputs

This stand alone device is used for digital signal acquisition and output.

The following construction is available:

- Connection to Profibus DP: RF-FLS PB M12 DIO 8/8 M12

General specifications

Housing dimensions (width x height x depth)	60 mm x 178 mm x 49.3 mm	
Weight	340 g, approx.	
Operating mode	Process data operation with 8 bit	
Type of sensor connection	2-, 3- or 4-wire technology	
Type of actuator connection	2- or 3-wire technology	
Permissible temperature	Operation	-25 °C to +60 °C
	Storage/transport	-25 °C to +85 °C
Permissible humidity	Storage/transport	95 %
Permissible air pressure	Operation	80 kPa to 106 kPa (up to 2000 m [6562 ft.] above sea level)
	Storage/transport	70 kPa to 106 kPa (up to 3000 m [6562 ft.] above sea level)
Degree of protection	IP 65 / IP 67 according to IEC 60529	
Class of protection	Class 3 according to VDE 0106, IEC 60536	
Nominal value	24 V DC	
Range	18 V DC to 30 V DC	
Current consumption U_L at 24 V DC	40 mA typical (100 mA, maximum)	
Current consumption U_S at 24 V DC	10 mA typical + sensor current (500 mA, maximum)	
Current consumption U_{AAX} at 24 V DC	6 mA. typical + actuator current (4 A, maximum)	
Number of digital inputs/outputs	8 inputs / 8 outputs	

Fig. 6-114: General specifications - Rexroth Fieldline - module with 8 digital outputs and inputs

Type code Rexroth Fieldline

Abbrev. Column	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1	2	3	4	5	6	7	8	9	40
Example:	R	F	-	F	L	S		D	N		M	1	2		D	I	O		4	/	4		M	1	2	-	2	A												

1. Product

1.1 RECO Fieldline
Stand-Alone System = RF-

2. Type of module

2.1	**DeviceNet**	**Code**
2.1.1	Plug-in connector M12 8 digital inputs	**FLS DN M12 DI 8 M12**
2.1.2	Plug-in connector M12 8 digital outputs output nominal current 2A	**FLS DN M12 DO 8 M12-2A**
2.1.3	Plug-in connector M12 4 digital inputs/4 outputs output nominal current 2A	**FLS DN M12 DIO 4/4 M12-2A**

2.2	**INTERBUS**	**Code**
2.2.1	Plug-in connector M12 8 digital inputs	**FLS IB M12 DI 8 M12**
2.2.2	Plug-in connector M12 8 digital outputs output nominal current 2A	**FLS IB M12 DO 8 M12-2A**
2.2.3	Plug-in connector M12 4 digital inputs/4 outputs output nominal current 2A	**FLS IB M12 DIO 4/4 M12-2A**

2.3	**PROFIBUS**	**Code**
2.3.1	Plug-in connector M12 8 digital inputs	**FLS PB M12 DI 8 M12**
2.3.2	Plug-in connector M12 8 digital outputs output nominal current 2A	**FLS PB M12 DO 8 M12-2A**
2.3.3	Plug-in connector M12 4 digital inputs/ 4 outputs output nominal current 2A	**FLS PB M12 DIO 4/4 M12-2A**

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Fig. 6-115: Type code Rexroth Fieldline

Documentation Rexroth Fieldline

A detailed description and more technical data can be found in the documentations:

- "Rexroth Fieldline PROFIBUS Devices- Project Planning Manual" (DOK-CONTRL-RF-FLS-PB**-PR01-EN-P)
- "Rexroth Fieldline PROFIBUS Devices- Application Manual" (DOK-CONTRL-RF-FLS-PB**-AW01-EN-P)

6.2 Visualization units BTV, VSP, IPC, VDP, VPP

BTV 16 and BTV 40

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Fig. 6-116: BTV 16 and BTV 40

Brief description BTV 16/40

The control terminals BTV 16 and BT V40 are PC based machine control terminals. Depending on the application or configuration they also serve for motion control functionality.

The number of the integrated plug-in cards depends on the specification and the PC box that is used. At the moment three or four slots are available.

Documentation BTV 16/40

A detailed description and more technical data can be found in documentation "Rexroth BTV 16.2/40.2/60.2 - Project Planning Manual" (DOK-SUPPL*-BTV16/40/60-PR01-EN-P).

General specifications BTV 16/40

The following devices are applicable

- BTV16.2BB (Touch screen) and
- BTV40.2BE (Touch screen).

	BTV 16	**BTV 40**
Display	12“ TFT	15“ TFT
Touch screen	yes	yes
PC box	type A, C	type A, C

Fig. 6-117: Differentiating factors BTV 16 ,BTV 40

The BTV 16 and the BTV 40 are fitted with a PC box type A or type C. The essential features are:

PC box	Type A	Type C
Free slots	3	4
Power supply	85 ... 264 VAC or 24 VDC	
Integrated UPS	integrated UPS_ Logic, accumulator must be connected external	

Fig. 6-118: PC box, type A and C

Type code BTV 16

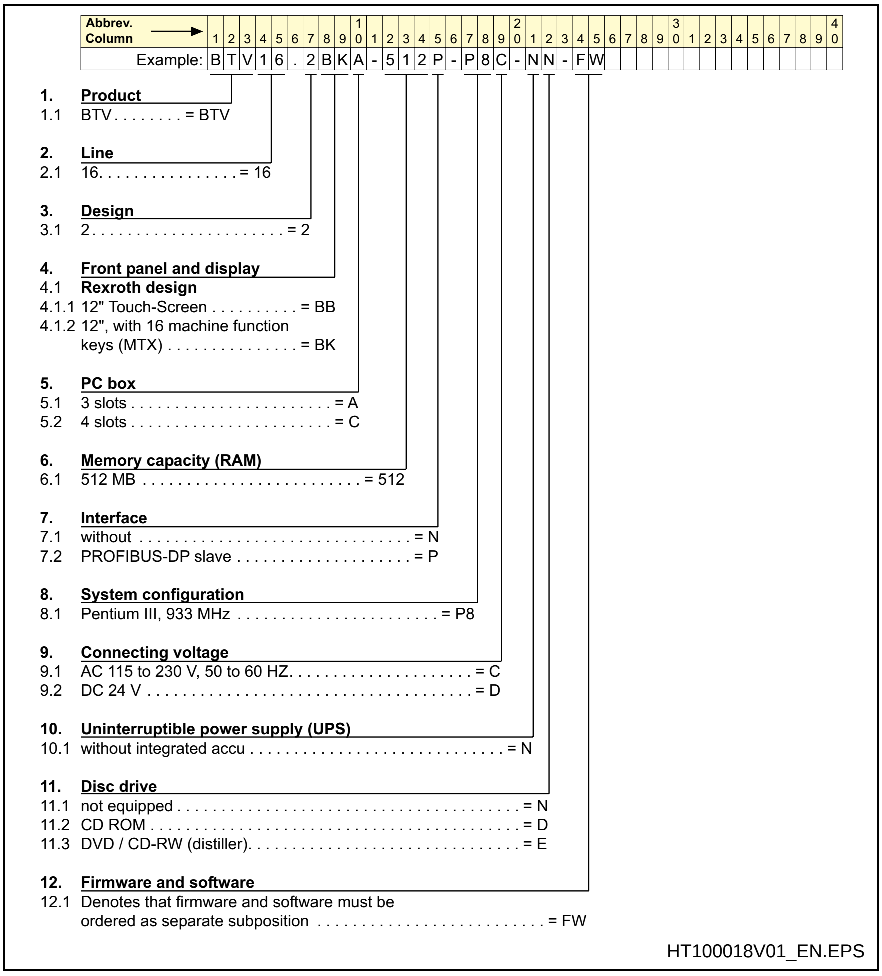

Fig. 6-119: Type code BTV 16

Type code BTV 40

Abbrev. Column	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1	2	3	4	5	6	7	8	9	40
Example:	B	T	V	4	0	.	2	B	I	A	-	5	1	2	P	-	P	8	C	-	N	N	-	F	W															

1. Product
1.1 BTV . . . . = BTV

2. Line
2.1 40 . . . . = 40

3. Design
3.1 2 . . . . = 2

4. Front panel and display
4.1 **Rexroth design**
4.1.1 15" Touch-Screen . . . . = BE
4.1.2 15", with 16 machine function keys (MTX) . . . . = BI

5. PC box
5.1 3 slots . . . . = A
5.2 4 slots . . . . = C

6. Memory capacity (RAM)
6.1 512 MB . . . . = 512

7. Interface
7.1 without . . . . = N
7.2 PROFIBUS-DP slave . . . . = P

8. System configuration
8.1 Pentium III, 933 MHz. . . . . = P8

9. Connecting voltage
9.1 AC 115 to 230 V, 50 to 60 Hz . . . . = C
9.2 DC 24 V . . . . = D

10. Uninterruptible power supply (UPS)
10.1 without integrated accu . . . . = N

11. Disc drive
11.1 not equipped . . . . = N
11.2 CD ROM . . . . = D
11.3 DVD / CD-RW (distiller) . . . . = E

12. Firmware and software
12.1 Denotes that firmware and software must be ordered as separate subposition. . . . . = FW

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Fig. 6-120: Type code BTV 40

VSP 16 and VSP 40

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Fig. 6-121: VSP 16 and VSP 40

Brief description VSP 16/40

The control terminals VSP 16 and VSP 40 are PC based low cost machine control terminals. Depending on the application or configuration they also serve for motion control functionality.

Six slots are available for expansions.

Documentation VSP 16/40

A detailed description and more technical data can be found in documentation "Rexroth IndraControl VSP 16/40 - Project Planning Manual" (DOK-SUPPL*-VSP*16/40**-PR01-EN-P).

General specifications VSP 16/40

The following devices are applicable

- VSP16.1DBE-512NN-C1 (Touch-Gerät)
- VSP40.1DEE-512NN-C1 (Touch-Gerät)

	VSP 16	**VSP 40**
Display	12“ TFT	15“ TFT
Touch screen	yes	yes
PC box	type E	type E
CD drive	only AD identifier	only AD identifier

Fig. 6-122: Differentiating factors VSP 16 ,VSP 40

The VSP 16/40 is fitted with a PC box type E. The essential features are:

PC box	Type E
Free slots	6
Power supply	115 ... 230 VAC

Fig. 6-123: PC box, type E

Type code VSP 16

Abbrev. Column: 1 2 3 4 5 6 7 8 9 10 1 2 3 4 5 6 7 8 9 20 1 2 3 4 5 6 7 8 9 30 1 2 3 4 5 6 7 8 9 40

Example: VSP16.1BKE-512NN-C1C-AD-NN-FW

1. **Product**
1.1 VSP . . . . = VSP

2. **Line**
2.1 16. . . . . = 16

3. **Design**
3.1 1 . . . . = 1

4. **Front panel and display**
4.1 **Rexroth design**
4.1.1 12", with 16 machine function keys (MTX) . . . . = BK
4.1.2 12", Touch-Screen (universal) = DB
4.2 **Customized design**
4.2.1 Bosch: 12", Touch-Screen (suitable for food industry) . . . = AK

5. **PC-Box**
5.1 6 slots, PCI . . . . = E

6. **Memory capacity (RAM)**
6.1 512 MB . . . . = 512

7. **Interface**
7.1 without special interface . . . . = NN

8. **System configuration**
8.1 Celeron, min. 2GHz. . . . . = C1

9. **Supply voltage**
9.1 AC 115 to 230 V, 50 to 60 Hz. . . . . = C
9.2 DC 24 V . . . . = D

10. **Hard disc (HD)**
10.1 3.5", mind. 20 GB . . . . = A

11. **Disc drive**
11.1 without . . . . = N
11.2 CD-ROM . . . . = D
11.3 CD-RW (Multiformat CD writer drive) . . . . = E

12. **Other design**
12.1 without. . . . . = NN

13. **Firmware and software**
13.1 Denotes that firmware and software must be ordered as separate subposition = FW

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Fig. 6-124: Type code VSP 16

Type code VSP 40

Abbrev. Column	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1	2	3	4	5	6	7	8	9	40
Example:	V	S	P	4	0	.	1	B	I	E	-	5	1	2	N	N	-	C	1	C	-	A	D	-	N	N	-	F	W											

1. **Product**
1.1 VSP. . . . . = VSP

2. **Line**
2.1 40 . . . . = 40

3. **Design**
3.1 1 . . . . = 1

4. **Front panel and display**
4.1 **Rexroth design**
4.1.1 15", with 16 machine function keys (MTX) . . . . = BI
4.1.2 15", Touch-Screen (universal) = DE
4.2 **Customized design**
4.2.1 Bosch: 15", Touch-Screen (suitable for food industry) . . . = AL

5. **PC-Box**
5.1 6 slots, PCI . . . . = E

6. **Memory capacity (RAM)**
6.1 512 MB . . . . = 512

7. **Interface**
7.1 without special interface . . . . = NN

8. **System configuration**
8.1 Celeron, min. 2GHz. . . . . = C1

9. **Supply voltage**
9.1 AC 115 to 230 V, 50 to 60 Hz. . . . . = C
9.2 DC 24 V . . . . = D

10. **Hard disc (HD)**
10.1 3.5", mind. 20 GB . . . . = A

11. **Disc drive**
11.1 without . . . . = N
11.2 CD-ROM. . . . . = D
11.3 CD-RW (Multiformat CD writer drive) . . . . = E

12. **Other design**
12.1 without. . . . . = NN

13. **Firmware and software**
13.1 Denotes that firmware and software must be ordered as separate subposition = FW

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Fig. 6-125: Type code VSP 40

IPC 40/VSB 40 with VDP 16 or VDP 40

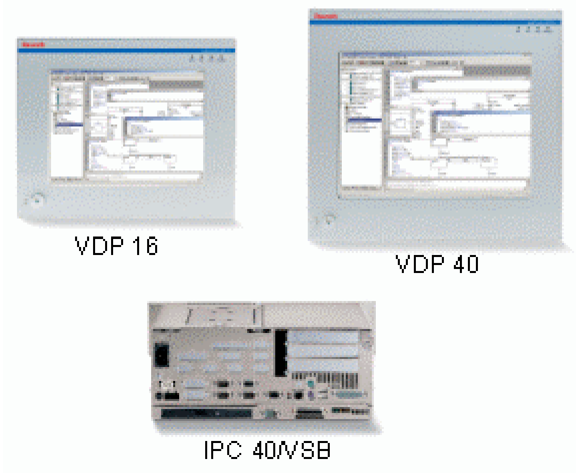

Fig. 6-126: PC boxes IPC 40/VSB 40 with VDP 16 or VDP 40

The combination IPC or VSB (PC boxes) with VDP 16/40 (displays) serve for the operation of a visualization with remote display.

Brief description IPC 40/VSB 40

IPC 40/VSB 40 are PC boxes that also serve for motion control functionality depending on the application or configuration. The displays VDP are connected to this PC box.

The number of the integrated plug-in cards depends on the specification and the PC box that is used. At the moment three or four (IPC 40) or 6 (VSB 40) slots are available.

Documentation IPC 40/VSB 40

A detailed description and more technical data can be found in documentation "Rexroth IPC 40.2 - Project Planning Manual" (DOK-SUPPL*-IPC*40.2***-PR01-EN-P).

General specifications IPC 40/VSB 40

The following PC boxes are applicable :

- IPC40.2G4 und
- VSB40.1G4

	IPC 40	**VSB 40**
Processor specification	Pentium III, at least 933 MHz	Celeron, at least 2 GHz
Distance PC box to display	a maximum of 30 m	
PC box	type A, C	type E

Fig. 6-127: PC box IPC 40, VSB 40

PC box	**Type A**	**Type C**	**Type E**
Free slots	3	4	6
Power supply	85 ... 264 VAC or 24 VDC		115 .. 230 VAC or 24 VDC
Integrated UPS	integrated UPS_Logic, accumulator must be connected external		no UPS

Fig. 6-128: PC box, type A, C and E

Rexroth Bosch Group

Brief description VDP 16 or VDP 40

The displays VDP 16 and VDP 40 are touch displays that are connected to the PC boxes VSB or IPC.

Documentation VDP 16 or VDP 40

A detailed description and more technical data can be found in documentation "Rexroth IndraControl VDP 16/40/60 - Project Planning Manual" (DOK-SUPPL*-VDP16/40/60-PR01-EN-P).

General specifications VDP 16 or VDP 40

The following displays are applicable:

- VDP16.2DBN-G4-NN-NN (touch front)
- VDP40.2DEN-G4-NN-NN (touch front)

	VDP 16	VDP 40
Display	12“ TFT	15“ TFT
Touch screen	yes	yes
Distance PC box to display	a maximum of 30 m	a maximum of 30 m

Fig. 6-129: Differentiating factors VDP 16, VDP 40

Type code IPC 40

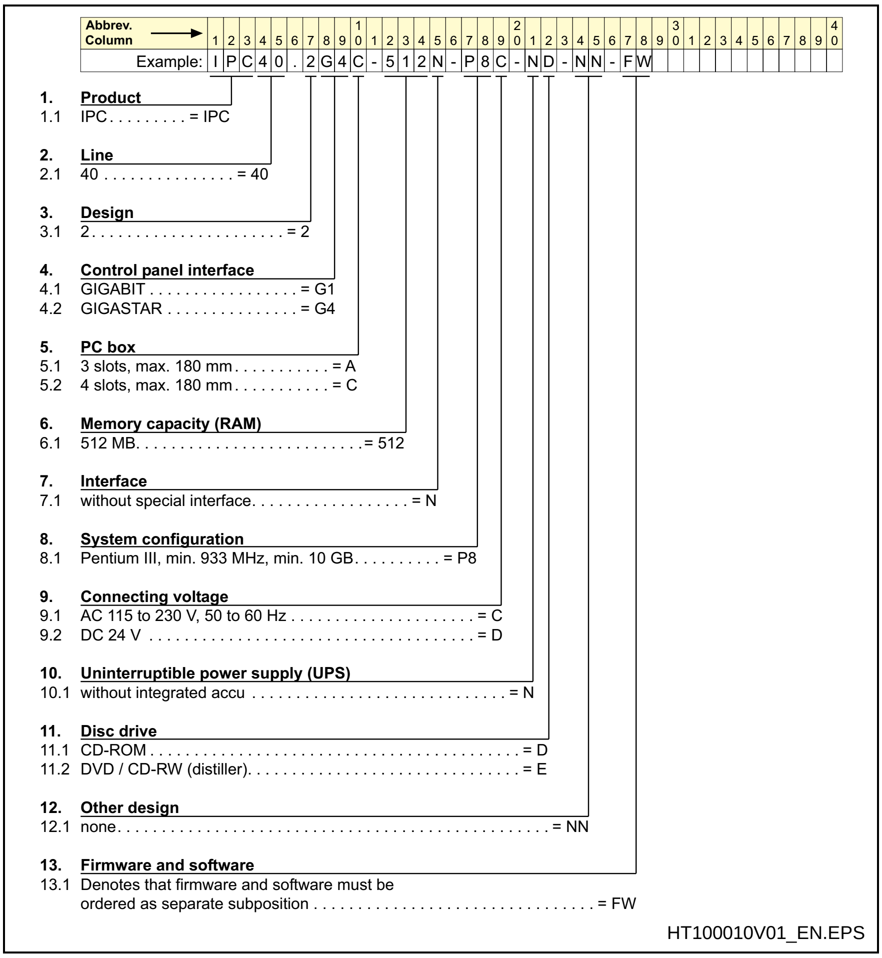

Fig. 6-130: Type code IPC 40

Type code VSB 40

Abbrev. Column → 1 2 3 4 5 6 7 8 9 10 1 2 3 4 5 6 7 8 9 20 1 2 3 4 5 6 7 8 9 30 1 2 3 4 5 6 7 8 9 40

Example: V S B 4 0 . 1 G 4 E - 5 1 2 N N - C 1 C - A D - N N - F W

1. Product
1.1 VSB. . . . . = VSB

2. Line
2.1 40 . . . . = 40

3. Design
3.1 1 . . . . = 1

4. Control panel interface
4.1 GIGASTAR . . . . = G4

5. PC box
5.1 6 slots, PCI . . . . = E

6. Memory capacity (RAM)
6.1 512 MB . . . . = 512

7. Interface
7.1 without special interface . . . . = NN

8. System configuration
8.1 Celeron, min. 2GHz. . . . . = C1

9. Connecting voltage
9.1 AC 115 to 230 V, 50 to 60 Hz . . . . = C
9.2 DC 24 V . . . . = D

10. Hard disc (HD)
10.1 3.5", mind. 20 GB . . . . = A

11. Disc drive
11.1 without. . . . . = N
11.2 CD-ROM . . . . = D
11.3 CD-RW (Multiformat CD writer drive) . . . . = E

12. Other design
12.1 without . . . . = NN
12.2 Disc drive in connector direction . . . . = LS

13. Firmware and software
13.1 Denotes that firmware and software must be ordered as separate subposition = FW

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Fig. 6-131: Type code VSB 40

Type code VDP 16

Abbrev. Column → 1 2 3 4 5 6 7 8 9 10 1 2 3 4 5 6 7 8 9 20 1 2 3 4 5 6 7 8 9 30 1 2 3 4 5 6 7 8 9 40

Example: V D P 1 6 . 2 B K N - G 4 - P S - N N

1. Product
1.1 VDP. . . . . = VDP

2. Line
2.1 16. . . . . = 16

3. Design
3.1 2 . . . . = 2

4. Front panel and display
4.1 **Rexroth Design**
4.1.1 12", with 16 machine function keys (MTX) . . . . = BK
4.1.2 12", Touch-Screen (universal) = DB
4.2 **Customized design**
4.2.1 Bosch: 12", Touch-Screen (suitable for food industry) . . . = AK

5. Additional option
5.1 without . . . . = N

6. Control panel interface
6.1 GIGASTAR . . . . = G4

7. Interface
7.1 without. . . . . = NN
7.2 PROFIBUS-DP slave . . . . = PS ①

8. Other design
8.1 without . . . . = NN

Note:
① Interface "PS" is not available with front panel "DB" and "AK" (Touch-Screen)

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Fig. 6-132: Type code VDP 16

Type code VDP 40

Abbrev. Column	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1	2	3	4	5	6	7	8	9	40
Example:	V	D	P	4	0	.	2	B	I	N	-	G	4	-	P	S	-	N	N																					

1. Product
1.1 VDP. . . . . = VDP

2. Line
2.1 40. . . . . = 40

3. Design
3.1 2. . . . . = 2

4. Front panel and display
4.1 **Rexroth design**
4.1.1 15", with 16 machine function keys (MTX). . . . . = BI
4.1.2 15", Touch-Screen (universal) = BE
4.2 **Customized design**
4.2.1 Bosch: 15", Touch-Screen (suitable for food industry) . . . = AL

5. Additional option
5.1 without . . . . = N

6. Control panel interface
6.1 GIGASTAR . . . . = G4

7. Interface
7.1 without. . . . . = NN
7.2 PROFIBUS-DP slave . . . . = PS ①

6. Other design
6.1 without . . . . = NN

Note:
① Interface "PS" is not available with front panel "DE" and "AL" (Touch-Screen)

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Fig. 6-133: Type code VDP 40

VPP 21

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Fig. 6-134: VPP 21

Brief description VPP 21

The control terminal VPP 21 is a PC based embedded machine control terminal. Depending on the application or configuration it also can serve for motion control functionality.

Documentation VPP 21

A detailed description and more technical data can be found in documentation "Rexroth IndraControl VPP 21.1 - Project Planning Manual" (DOK-SUPPL*-VPP*21.1***-PR01-EN-P).

General specifications VPP 21

The following device is applicable

- VPP21.1BPD-512D-P7D-NNNN (touch device)

Type code VPP 21

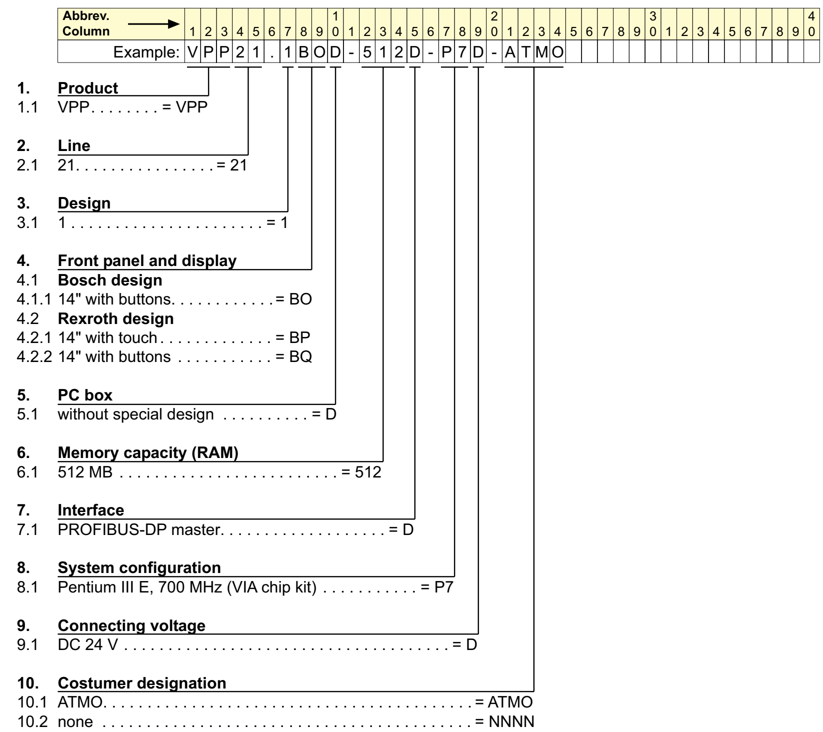

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Fig. 6-135: Type code VPP 21

6.3 Visualization units VEP

VEP 30, VEP 40 and VEP 50

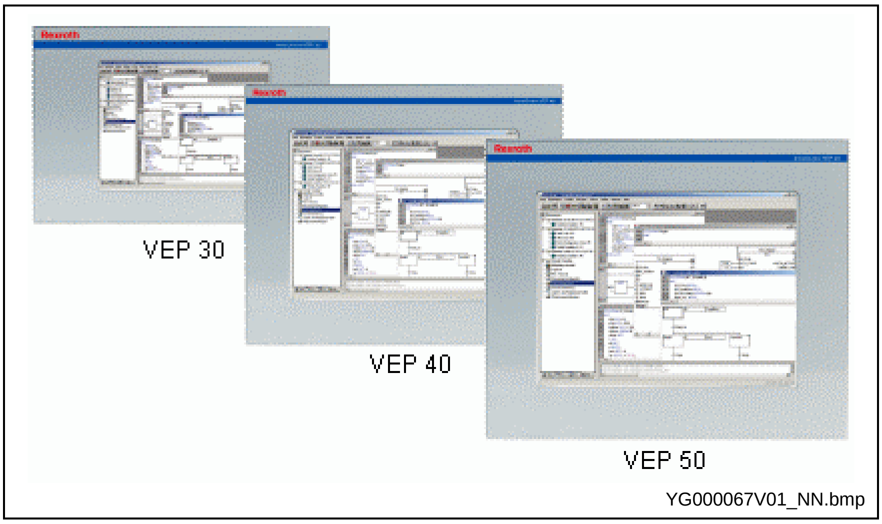


Fig. 6-136: VEP 30, 40 and 50

Brief description VEP 30/40/50

The control terminals VEP 30, VEP 40 and VEP 50 are Windows CE based machine control terminals. Depending on the application or configuration they also serve for motion control functionality.

Documentation VEP 30/40/50

A detailed description and more technical data can be found in documentation "Rexroth VEP 20/30/40 - Project Planning Manual" (DOK-SUPPL*-VEP20/30/40-PR01-EN-P).

General specifications VEP 30/40/50

The following devices are applicable

- VEP30.1CCU-064NN-G3D-064-EC-FW,
- VEP40.1CEU-064NN-G3D-064-EC-FW and
- VEP50.1CHU-064NN-G3D-064-EC-FW.

	VEP 30	**VEP 40**	**VEP 50**
Display	8,4“ TFT	12“ TFT	15" TFT
Touch screen	yes		
Operating system	Windows CE .net 4.2		
Power supply	24 V DC		
Protection rating front panel	IP 65		
UPS	integrated short-time UPS		

Fig. 6-137: Differentiating factors VEP 30, VEP 40, VEP 50

Type code VEP 30

Abbrev. Column	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1	2	3	4	5	6	7	8	9	40
Example:	V	E	P	3	0	.	1	C	C	N	-	0	6	4	N	N	-	G	3	D	-	0	6	4	-	N	N	-	F	W										

1. Product
1.1 VEP. . . . . = VEP

2. Line
2.1 30 . . . . = 30

3. Design
3.1 1 . . . . = 1

4. Front plate and display
4.1 **Rexroth design**
4.1.1 8.4", Touch-Screen (suitable for food industry) . . . = CC
4.1.2 8.4", Touch-Screen; Housing with 5 keys . . . . = CG
4.2 **customized design**
4.2.1 Bosch: 8.4", Touch-Screen (suitable for food industry) . . . = CD

5. Additional option
5.1 none . . . . = N
5.2 Short time UPS. . . . . = U

6. Memory capacity (RAM)
6.1 64 MB . . . . = 064

7. Interface (1)
7.1 NN-NN, not equipped . . . . = NN
7.2 P1-NN . . . . = NA

8. System configuration
8.1 Geode, min. 300 MHz. . . . . = G3

9. Supply voltage
9.1 DC 24 V. . . . . = D

10. Compact Flash size
10.1 64 MB. . . . . = 064
10.2 not equipped . . . . = NNN

11. Other design
11.1 without. . . . . = NN
11.2 base for external Compact Flash module . . . . = EC

12. Firmware and software
12.1 Denotes that firmware and software must be ordered as separate subposition = FW
12.2 without Firmware . . . . = NW

Note:
(1) Interface
NN = not equipped
P1 = PROFIBUS-DP master module

HT100015V01_EN.EPS

Fig. 6-138: Type code VEP 30

Type code VEP 40

Abbrev. Column → 1 2 3 4 5 6 7 8 9 10 1 2 3 4 5 6 7 8 9 20 1 2 3 4 5 6 7 8 9 30 1 2 3 4 5 6 7 8 9 40

Example: V E P 4 0 . 1 C E N - 0 6 4 N N - G 3 D - 0 6 4 - N N - F W

1. Product
1.1 VEP. . . . . = VEP

2. Line
2.1 40 . . . . = 40

3. Design
3.1 1 . . . . = 1

4. Front plate and display
4.1 **Rexroth design**
4.1.1 12.1", Touch-Screen
(suitable for industry food) . . . = CE
4.2 **customized design**
4.2.1 Bosch: 12.1", Touch-Screen
(suitable for industry food) . . . = CF

5. Additional option
5.1 none . . . . = N
5.2 Short time UPS. . . . . = U

6. Memory capacity (RAM)
6.1 64 MB . . . . = 064

7. Interface ①
7.1 NN-NN, not equipped . . . . = NN
7.2 P1-NN . . . . = NA

8. System configuration
8.1 Geode, min. 300 MHz. . . . . = G3

9. Connecting voltage
9.1 DC 24 V. . . . . = D

10. Compact Flash size
10.1 64 MB. . . . . = 064
10.2 not equipped . . . . = NNN

11. Other design
11.1 without. . . . . = NN
11.2 base for external Compact Flash module . . . . = EC

12. Firmware and software
12.1 Denotes that firmware and software must be ordered as separate subposition. . . . . = FW
12.2 without Firmware . . . . = NW

Note:
① Interface
NN = not equipped
P1 = PROFIBUS-DP master module

HT100016V01_EN.EPS

Fig. 6-139: Type code VEP 40

Type code VEP 50

Abbrev. Column	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1	2	3	4	5	6	7	8	9	40
Example:	V	E	P	5	0	.	1	C	H	N	-	0	6	4	N	N	-	G	3	D	-	0	6	4	-	N	N	-	F	W										

1. Product
1.1 VEP. . . . .= VEP

2. Line
2.1 50 . . . . = 50

3. Design
3.1 1 . . . . = 1

4. Front plate and display
4.1 Rexroth design
4.1.1 15", Touch-Screen (suitable for industry food) . . . = CH

5. Additional option
5.1 none . . . . = N
5.2 Short time UPS. . . . . = U

6. Memory capacity (RAM)
6.1 64 MB . . . . = 064

7. Interface ①
7.1 NN-NN, not equipped . . . . = NN
7.2 P1-NN . . . . = NA

8. System configuration
8.1 Geode, min. 300 MHz. . . . . = G3

9. Connecting voltage
9.1 DC 24 V . . . . = D

10. Compact Flash size
10.1 64 MB. . . . . = 064
10.2 not equipped . . . . = NNN

11. Other design
11.1 without. . . . . = NN
11.2 base for external Compact Flash module . . . . = EC

12. Firmware and software
12.1 Denotes that firmware and software must be ordered as separate subposition. . . . . = FW
12.2 without Firmware . . . . = NW

Note:
① Interface
NN = not equipped
P1 = PROFIBUS-DP master module

HT100017V01_EN.EPS

Fig. 6-140: Type code VEP 50

6.4 Miniature control terminals

Miniature control terminal VCP 01

YG000073V01_NN.bmp

Fig. 6-141: VCP 01

Brief description VCP 01

The miniature control terminal VCP 01 provides an graphical user interface for machine handling.

A serial interface for upload/download or programming purposes and for communication to the PLC are available.

The communication interface is a serial interface. Fieldbus interfaces are not supported.

Documentation VCP 01

A detailed description and more technical data can be found in documentation "Rexroth VCP 01 - Project Planning Manual" (DOK-SUPPL*-VCP*01*****-PR01-EN-P).

General specifications VCP 01

Basic device VCP 01	
Supply voltage	24 V (20...30 V) DC
Current consumption	a maximum of 180 mA (typ. 30 mA)
Display	LCD graphical, 64 x 128 pixels, black-and-white, back lighting visible area 35 x 17 mm
Keypad	short stroke key pad 4 function keys 4 cursor keys
Application memory	256 kB application, 100 kB variable memory
Enclosure material	plastic
Protection rating	IP 65 front panel IP 20 backside
Temperature range	0...+45°C (operation) -20°...+70°C (storage)
Max. relative humidity	10% to 95% average (operation and storage) no condensation
Dimensions	installation disruption: 66 x 66 mm (LxW) installation depth: 80 mm without connector

Fig. 6-142: General specifications VCP 01

Type code VCP 01

Abbrev. Column	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Example:	V	C	P	0	1	.	1	B	W	A	-	R	S	-	N	N	-	F	W																					

1. Product
1.1 VCP. . . . . = VCP

2. Line
2.1 1. . . . . = 01

3. Design
3.1 1 . . . . = 1

4. Front panel and display
4.1 Graphic display, 128 x 64 pixel;
8 keys. . . . . = BW

5. Expansion option
5.1 Comfort operator terminal /
Clip-on module for drives . . . . = A
5.2 Small operator terminal /
Built-in device . . . . = E

6. Interface
6.1 Serial (RS232) . . . . = RS ①
6.2 Serial TTL interface . . . . = TS ②

7. Additional design
7.1 none . . . . = NN

8. Firmware
8.1 with preloaded firmware . . . . = PW
8.2 Denotes that firmware must be ordered
as separate subposition . . . . = FW

Note:
① only available with expansion option "E"
② only available with expansion option "A"

HT100020V01_EN.EPS

Fig. 6-143: Type code VCP 01

Miniature control terminal VCP 02

HG100000V01_NN.bmp

Fig. 6-144: VCP 02

Brief description VCP 02

The miniature control terminal VCP 02 provides a graphical user interface for machine handling.

A serial up-/download interface for programming purposes and a communication interface to the PLC are available.

The communication interface can be a serial interface or a fieldbus interface.

The user can program the function of four keys. Insert strips permit these keys to be labeled as required.

Documentation VCP 02

A detailed description and more technical data can be found in documentation "Rexroth VCP 02 - Project Planning Manual" (DOK-SUPPL*-VCP02******-PR01-EN-P).

General specifications VCP 02

Supply voltage	24 V (20...30 V) DC
Current consumption	300 mA
Display	LCD alpha numeric, 4 x 20 characters, black-and-white, back lighting, visible area 74 x 23 mm
Keypad	short stroke key pad, 7 system keys, 4 function keys, 6 keys with integrated LED, 4 function keys with insert strips
Application memory	256 kB
Enclosure material	aluminum/steel plate
Protection rating	IP 65 front panel IP 20 backside
Temperature range	0...+50°C (operation) -25°...+60°C (storage)
Max. relative humidity	10% - 95% (operation and storage) no condensation
Weight	approximately 0.4 kg
Dimensions	installation disruption: 82 x 138 mm (LxW) installation depth: 42 mm without connector

Fig. 6-145: General specifications VCP 02

Type code VCP 02

Abbrev. Column	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1	2	3	4	5	6	7	8	9	40
Example:	V	C	P	0	2	.	1	B	R	N	-	R	S	-	N	N	-	F	W																					

1.	**Product**	
1.1	VCP. . . . . = VCP	
2.	**Line**	
21	02. . . . . = 02	
3.	**Design**	
3.1	1 . . . . = 1	
4.	**Front plate and display**	
4.1	Display with 4 x 20 signs; 11 keys . . . . = BR	
5.	**Upgrade option**	
5.1	none . . . . = N	
6.	**Interface**	
6.1	PROFIBUS-DP . . . . = PB	
6.2	Serial (RS232/485, TTY 20mA) . . . . . = RS	
7.	**Additional design**	
7.1	none . . . . = NN	
8.	**Firmware**	
8.1	Denotes that firmware must be ordered as separate subposition = FW	

HT100000V01_EN.EPS

Fig. 6-146: Type code VCP 02

Miniature control terminal VCP 05


HG100001V01_NN.bmp

Fig. 6-147: VCP 05

Brief description VCP 05

The miniature control terminal VCP 05 provides an alpha numeric user interface for machine handling.

A serial up-/download interface for programming purposes and a communication interface to the PLC are available.

The communication interface can be a serial interface or a fieldbus interface.

The user can program the function of eight keys. Insert strips permit these keys to be labeled as required.

Documentation VCP 05

A detailed description and more technical data can be found in documentation "Rexroth VCP 05 - Project Planning Manual" (DOK-SUPPL*-VCP05******-PR01-EN-P).

General specifications VCP 05

Supply voltage	24 V (20...30 V) DC
Current consumption	300 mA
Display	LCD alpha numeric, 4 x 20 characters, black-and-white, back lighting, visible area 74 x 23 mm
Keypad	foil key pad, 22 system keys, 8 function keys, 8 function keys with integrated LED, 6 function keys with insert strip
Application memory	256 kB
Enclosure material	aluminum/steel plate
Protection rating	IP 65 front panel IP 20 backside
Temperature range	0...+50°C (operation) -20°...+70°C (storage)
Max. relative humidity	10% - 95% (operation and storage) no condensation
Weight	approximately 0,5 kg
Dimensions	installation disruption: 160 x 112 mm (LxW) installation depth: 40 mm without connector (standard device) 58 mm without connector (fieldbus device)

Fig. 6-148: General specifications VCP 05

Type code VCP 05

Abbrev. Column	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1	2	3	4	5	6	7	8	9	40
Example:	V	C	P	0	5	.	1	B	S	N	-	R	S	-	N	N	-	F	W																					

1. Product
1.1 VCP. . . . . = VCP

2. Line
21 05. . . . . = 05

3. Design
3.1 1 . . . . = 1

4. Front plate and display
4.1 Display, 4 x 20 signs;
30 keys . . . . = BS

5. Upgrade option
5.1 none . . . . = N

6. Interface
6.1 PROFIBUS-DP . . . . = PB
6.2 Serial (RS232/485, TTY 20mA) . . . . . = RS

7. Additional design
7.1 none . . . . = NN

8. Firmware
8.1 Denotes that firmware must be ordered as separate subposition = FW

HT100001V01_EN.EPS

Fig. 6-149: Type code VCP 05

Miniature control terminal VCP 08

HG100002V01_NN.bmp

Fig. 6-150: VCP 08

Brief description VCP 08

The miniature control terminal VCP 08 provides a full graphic user interface for machine handling.

A serial up-/download interface for programming purposes and a communication interface to the PLC are available.

The communication interface can be a serial interface or a fieldbus interface.

The user can program the function of twelve keys. Insert strips permit these keys to be labeled as required.

Documentation VCP 08

A detailed description and more technical data can be found in documentation "Rexroth VCP 08 - Project Planning Manual" (DOK-SUPPL*-VCP08******-PR01-EN-P).

General specifications VCP 08

Supply voltage	24 V (20...30 V) DC
Current consumption	max. 500 mA (typ. 300 mA)
Display	graphic display (LC display), 4x20 characters, 120x32 pixel, back lighting, visible area 119 x 38 mm
Keypad	short stroke key pad, 22 system keys, 14 function keys, 16 keys with integrated LED, 12 function keys with insert strip
Application memory	256 kB
Enclosure material	aluminum/steel plate
Protection rating	IP 65 front panel IP 20 backside
Temperature range	0...+50°C (operation) -20°...+70°C (storage)
Max. relative humidity	10% - 95% (operation and storage) no condensation
Weight	approximately 0,8 kg
Dimensions	installation disruption: 199 x 139 mm (LxW) installation depth: 58 mm without connector

Fig. 6-151: General specifications VCP 08

Type code VCP 08

Abbrev. Column	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20
Example:	V	C	P	0	8	.	1	B	T	N	-	R	S	-	N	N	-	F	W	

1. Product
1.1 VCP. . . . . = VCP

2. Line
21 08. . . . . = 08

3. Design
3.1 1 . . . . = 1

4. Front plate and display
4.1 graphics capability, 120 x 32 dots;
36 keys . . . . = BT

5. Additional option
5.1 none . . . . = N

6. Interface
6.1 PROFIBUS-DP . . . . = PB
6.2 Serial (RS232/485, TTY 20mA) . . . . . . = RS

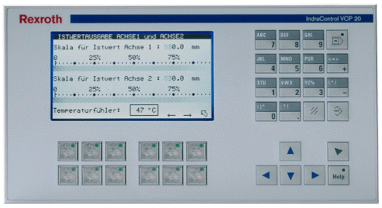
7. Additional design
7.1 none . . . . = NN

8. Firmware
8.1 Denotes that firmware must be ordered as separate subposition = FW

HT100002V01_EN.EPS

Fig. 6-152: Type code VCP 08

Miniature control terminal VCP 20



HG100003V01_NN.bmp

Fig. 6-153: VCP 20

Brief description VCP 20

The miniature control terminal VCP 20 provides a full graphic user interface for machine handling.

A serial up-/download interface for programming purposes and a communication interface to the PLC are available.

The communication interface can be a serial interface or a fieldbus interface.

The user can program the function of twelve keys. Insert strips permit these keys to be labeled as required.

Documentation VCP 20

A detailed description and more technical data can be found in documentation "Rexroth VCP 20 - Project Planning Manual" (DOK-SUPPL*-VCP20*****-PR01-EN-P).

General specifications VCP20

Supply voltage	24 V (20...30 V) DC
Current consumption	max. 3 A (typ. 0,7 A)
Display	graphic display (LC display), 16x40 or 8x20 characters, 240x128 pixel back lighting, visible area 131 x 72 mm
Keypad	short stroke key pad, 22 system keys, 12 function keys, 14 keys with integrated LED 12 function keys with insert strip
Application memory	768 kB
Enclosure material	aluminum/steel plate
Protection rating	IP 54 front panel IP 20 backside
Temperature range	0...+50°C (operation) -25°...+60°C (storage)
Max. relative humidity	10% - 95% (operation and storage) no condensation
Weight	approximately 1.1 kg
Dimensions	installation disruption: 152 x 292 mm (LxW) installation depth: 60 mm without connector 106 mm with connector

Fig. 6-154: General specifications VCP 20

Type code VCP 20

Abbrev. Column → 1 2 3 4 5 6 7 8 9 10 1 2 3 4 5 6 7 8 9 20 1 2 3 4 5 6 7 8 9 30 1 2 3 4 5 6 7 8 9 40

Example: V C P 2 0 . 1 B U N - 2 5 6 R S - N N - F W

1. Product
1.1 VCP. . . . . = VCP

2. Line
21 20. . . . . = 20

3. Design
3.1 1 . . . . = 1

4. Front plate and display
4.1 graphics capability, 240 x 128 dots;
34 keys . . . . = BU

5. Upgrade option
5.1 keine . . . . = N

6. Application memory capacity
6.1 256 kB . . . . = 256
6.2 768 kB . . . . = 768

7. Interface
7.1 PROFIBUS-DP . . . . = PB
7.2 Serial (RS232/485, TTY 20mA) . . . . = RS

8. Additional design
8.1 none . . . . = NN

9. Firmware
9.1 Denotes that firmware must be ordered as separate subposition = FW

HT100003V01_EN.EPS

Fig. 6-155: Type code VCP 20

Miniature control terminal VCP 25

HG100004V01_NN.bmp

Fig. 6-156: VCP 25

Brief description VCP 25

The miniature control terminal VCP 25 provides a full graphic user interface for machine handling. The color display has a touch user interface.

A serial up-/download interface for programming purposes and a communication interface to the PLC are available.

The communication interface can be a serial interface or a fieldbus interface.

Documentation VCP 25

A detailed description and more technical data can be found in documentation "Rexroth VCP 25 - Project Planning Manual" (DOK-SUPPL*-VCP25******-PR01-EN-P).

General specifications VCP 25

Supply voltage	24 V (20...30 V) DC
Current consumption	400 mA
Display	STN color display, touch (analog/resistive), 320 x 240 pixel, 20x40 characters, 256 colors, visible area 120 x 90 mm
Application memory	3 MB
Enclosure material	aluminum/steel plate
Protection rating	IP 65 front panel IP 20 backside
Temperature range	0...+50°C (operation) -25°...+60°C (storage)
Relative humidity	10% .. 95% (operation and storage) no condensation
Weight	approximately 1,1 kg
Dimensions	installation disruption: 140 x 196 mm (LxW) installation depth: 48 mm without connector (standard device) 70 mm without connector (fieldbus device)

Fig. 6-157: General specifications VCP 25

Type code VCP 25

Abbrev. Column	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1	2	3	4	5	6	7	8	9	40
Example:	V	C	P	2	5	.	1	B	V	N	-	0	0	3	R	S	-	N	N	-	F	W																		

1. Product
1.1 VCP. . . . . = VCP

2. Line
21 25. . . . . = 25

3. Design
3.1 1 . . . . = 1

4. Front plate and display
4.1 5,7", Touch-Screen . . . . = BV

5. Upgrade option
5.1 keine . . . . = N

6. Application memory capacity
6.1 3 MB. . . . . = 003

7. Interface
7.1 PROFIBUS-DP . . . . = PB
7.2 Serial (RS232/485, TTY 20mA) . . . . = RS

8. Additional design
8.1 none . . . . = NN

9. Firmware
9.1 Denotes that firmware must be ordered as separate subposition = FW

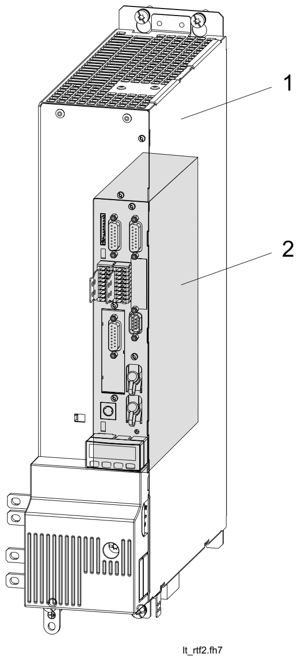
HT100004V01_EN.EPS

Fig. 6-158: Type code VCP 25

6.5 Drive components

Drive package IndraDrive

Basic structure of the drive controllers



1: Power section
2: Control section

Fig. 6-159: Basic structure

The drive controllers IndraDrive M and IndraDrive C consists of two essential parts:

- Power section
- Control section

Control section IndraDrive M and IndraDrive C

The control section is a separate section which is inserted into the power section. The drive controller is supplied ex works complete with control section. The control section must only be replaced by a qualified service engineer.

Documentation control section

Description and technical data can be found in drive documentation "Rexroth IndraDrive – Drive Controllers – Control Section" (DOK-INDRV*-CSH********-PR02-EN-P).

Type code control section CSH

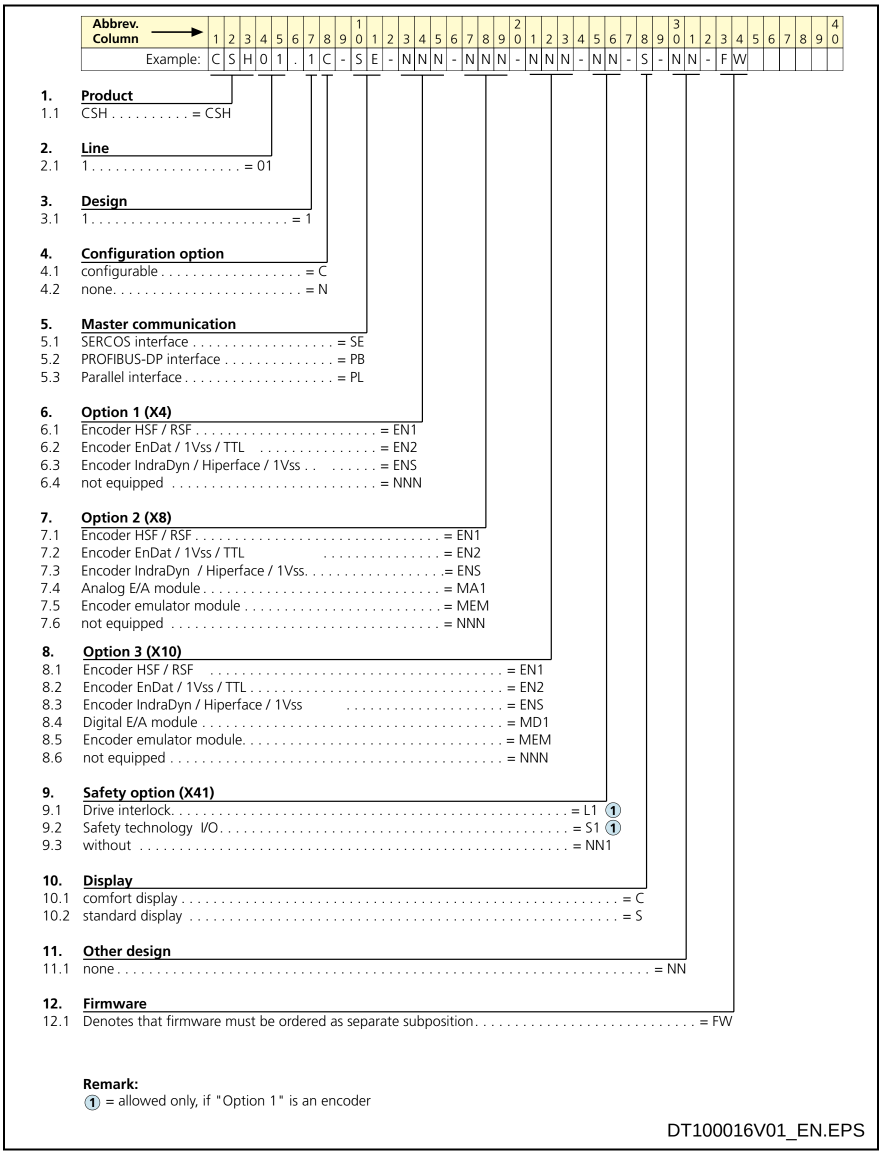


Fig. 6-160: Type code control section CSH

Rexroth Bosch Group

Type code control section CSB

Abbrev. Column	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1	2	3	4	5	6	7	8	9	40
Example:	C	S	B	0	1	.	1	N	-	S	E	-	E	N	S	-	N	N	N	-	N	N	-	S	-	N	N	-	F	W										

1. Product
1.1 CSB. . . . . = CSB

2. Line
2.1 1 . . . . = 01

3. Design
3.1 1 . . . . = 1

4. Configuration option
4.1 configurable. . . . . = C
4.2 fixed configurated . . . . = N

5. Master communication
5.1 Frequency converter interface. . . . = FC ①
5.2 Analogue interface. . . . . = AN ①
5.3 Profibus-DP interface. . . . . = PB
5.4 SERCOS interface. . . . . = SE

6. Option 1
6.1 Encoder IndraDyn / HIPERFACE® / 1Vss = ENS ②
6.2 not equipped . . . . = NNN ③

7. Option 2 ④
7.1 Encoder HSF / RSF . . . . = EN1
7.2 Encoder EnDat / 1Vss / TTL. . . . . = EN2
7.3 Encoder IndraDyn / HIPERFACE® / 1Vss . . . . = ENS
7.4 Analogue I/O module . . . . = MA1
7.5 Encoder emulator module . . . . = MEM
7.6 not equipped. . . . . = NNN

8. Safety option
8.1 Starting lock-out. . . . . = L1 ②
8.2 without . . . . = NN

9. Display
9.1 Standard display . . . . = S

10. Other design
10.1 none . . . . = NN

11. Firmware
11.1 Denotes that firmware must be ordered as separate subposition. . . . . = FW

Note:
① only if configuration option "N"
② not available if master communication "FC"
③ only available for master communication "FC"
④ "NNN" at option 2 is only available if configuration option "N"

DT100017V01_EN.EPS

Fig. 6-161: Type code control section CSB

Type code control section CDB

Abbrev. Column →	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1	2	3	4	5	6	7	8	9	40
Example:	C	D	B	0	1	.	1	C	-	S	E	-	N	N	N	-	N	N	N	-	N	N	N	-	E	N	1	-	N	N	-	S	-	N	N	-	F	W		

1. Product
1.1 CDB. . . . . = CDB

2. Line
2.1 1. . . . . = 01

3. Design
3.1 1 . . . . = 1

4. Configuration option
4.1 configurable. . . . . = C

5. Master communication
5.1 Profibus-DP interface. . . . . = PB
5.2 SERCOS interface. . . . . = SE

6. Option 1 (X4.1)
6.1 Encoder HSF / RSF. . . . . = EN1
6.2 Encoder EnDat / 1Vss / TTL . . . . = EN2
6.3 Encoder IndraDyn / HIPERFACE® / 1Vss = ENS
6.4 not equipped . . . . = NNN

7. Option 2 (X4.2)
7.1 Encoder HSF / RSF . . . . = EN1
7.2 Encoder EnDat / 1Vss / TTL . . . . = EN2
7.3 Encoder IndraDyn / HIPERFACE® / 1Vss . . . . = ENS
7.4 not equipped . . . . = NNN

8. Option 3 (X8.1)
8.1 Encoder HSF / RSF. . . . . = EN1
8.2 Encoder EnDat / 1Vss / TTL. . . . . = EN2
8.3 Encoder IndraDyn / HIPERFACE / 1Vss. . . . . = ENS
8.4 Analog I/O module. . . . . = MA1
8.5 Encoder emulator module. . . . . = MEM
8.6 not equipped . . . . = NNN

9. Option 4 (X8.2)
9.1 Encoder HSF / RSF . . . . = EN1
9.2 Encoder EnDat / 1Vss / TTL . . . . = EN2
9.3 Encoder IndraDyn / Hiperface / 1Vss . . . . = ENS
9.4 Analogue I/O module . . . . = MA1
9.5 Encoder emulator module . . . . = MEM
9.6 not equipped . . . . = NNN

10. Safety option (X41.1 / X42.1)
10.1 Starting lock-out . . . . = L1
10.2 without. . . . . = NN
10.3 Safety technology I/O . . . . = S1 (1)

11. Display
11.1 comfort display . . . . = C
11.2 standard display . . . . = S

12. Other design
12.1 none. . . . . = NN

13. Firmware
13.1 Denotes that firmware must be ordered as separate subposition . . . . = FW

Note:
(1) = only allowed if "Option 1" and "Option 2" have been equipped with an encoder

DT100018V01_EN.EPS

Fig. 6-162: Type code control section CDB

Supply unit HMV

The supply unit

- supplies IndraDrive M drive controllers with the required DC bus voltage,
- loops the 24 V control voltage of an external 24 V power supply through to the drive,
- communicates with the drive controllers via a module bus.

The supply units can be used for realizing a multitude of drive tasks in most diverse applications.

For these purposes there are 2 different device types (regenerative, non-regenerative) with graduated supply power available.

Main features

- design **with regeneration back to the mains** (HMV01.1R-Wxxxx) and **without regeneration back to the mains** (HMV01.1E-Wxxxx)
- external **24 V supply** required (signal processing not supplied from DC bus)
- external **24 V supply** required (signal processing not supplied from DC bus))
- integrated **mains contactor** for E-Stop
- integrated **braking resistor** (bleeder) for feeding supply units (HMV01.1E-Wxxxx)
- integrated **emergency braking resistor** for regenerative supply units (HMV01.1R-Wxxxx)

Documentation supply units

Description and technical data can be found in drive documentation "Rexroth IndraDrive - Supply Units" (DOK-INDRV*-HMV-*******-PR01-EN-P).

Type code supply unit

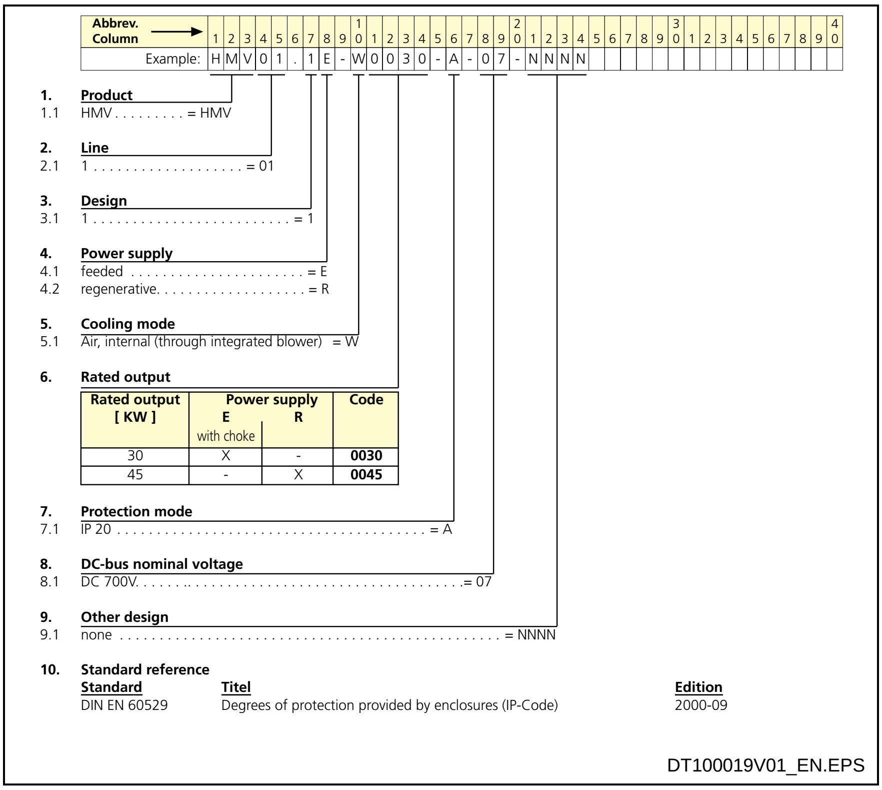


Fig. 6-163: Type code supply unit (HMV)

Power section IndraDrive M

The following is connected to the power section:

- Power supply (DC bus voltage)
- 24 V power supply
- Motor

Documentation power section IndraDrive M

Description and technical data can be found in drive documentation "Rexroth IndraDrive M - Drive Controllers - Power Section" (DOK-INDRV*-HMD+HMS****-PR02-EN-P).

Type code power section IndraDrive M

Abbrev. Column 1 2 3 4 5 6 7 8 9 10 1 2 3 4 5 6 7 8 9 20 1 2 3 4 5 6 7 8 9 30 1 2 3 4 5 6 7 8 9 40

Example: H M S 0 1 . 1 N - W 0 0 2 0 - A - 0 7 - N N N N

1. **Product**
   1.1 HMS . . . . = HMS

2. **Line**
   2.1 1. . . . . = 01

3. **Design**
   3.1 1 . . . . = 1

4. **Power suppyl**
   4.1 without . . . . = N

5. **Cooling mode**
   5.1 Air, internal (through integrated blower) = W

6. **Maximum current**
   6.1 20 A. . . . . = 0020
   6.2 36 A. . . . . = 0036
   6.3 54 A. . . . . = 0054
   6.4 70 A. . . . . = 0070
   6.5 150 A. . . . . = 0150
   6.6 210 A . . . . = 0210

7. **Protection mode**
   7.1 IP 20. . . . . = A

8. **DC-bus nominal voltage**
   8.1 DC 700 V. . . . . = 07

9. **Other design**
   9.1 none . . . . = NNNN

10. **Standard reference**

Standard	Title	Edition
DIN EN 60529	Degrees of protection provided by enclosures (IP-Code)	2000-09

DT100006V01_en.EPS

Fig. 6-164: Type code power section (HMS)

Power section IndraDrive C

The following is connected to the power section:

- Power supply
- 24 V power supply
- motor (with optional motor holding brake and motor temperature)
- DC bus (not for HCS02.1-W0012)
- module bus (for cross communication in the case of DC bus connection with other devices; not for HCS02.1-W0012)
- braking resistor (optional; not for HCS02.1-W0012 and -W0028)

Documentation power section IndraDrive C

Description and technical data can be found in drive documentation "Rexroth IndraDrive C Drive Controllers Power Section HCS02.1" (DOK-INDRV*-HCS02.1****-PR01-EN) or "Rexroth IndraDrive C Drive Controllers Power Section HCS03.1" (DOK-INDRV*-HCS03.1****-PR01-EN-P).

Type code power section HCS02.1

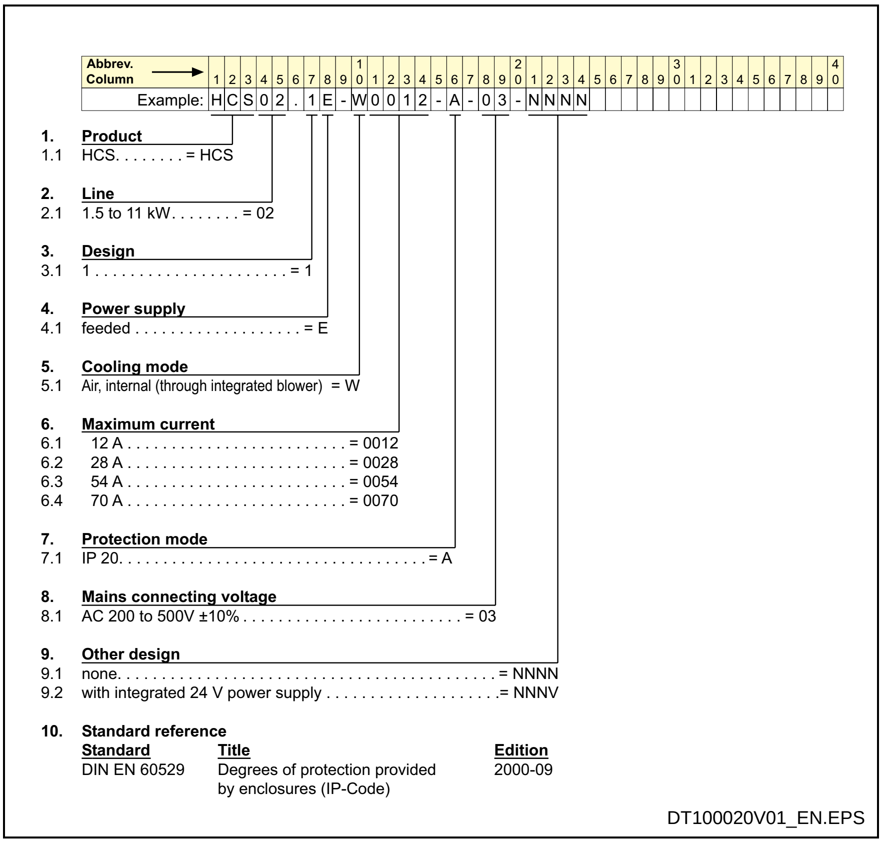


Fig. 6-165: Type code power section (HCS02.1)

Type code power section HCS03.1

Abbrev. Column	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1	2	3	4	5	6	7	8	9	40
Example:	H	C	S	0	3	.	1	E	-	W	0	0	7	0	-	A	-	0	5	-	N	N	N	N																

1. Product
1.1 HCS. . . . . = HCS

2. Line
2.1 1.5 to 11 kW. . . . . = 03

3. Design
3.1 1 . . . . = 1

4. Power supply
4.1 feeded . . . . = E

5. Cooling mode
5.1 Air, internal (through integrated blower) = W

6. Maximum current
6.1 70 A . . . . = 0070
6.2 100 A . . . . = 0100
6.3 150 A . . . . = 0150
6.4 210 A . . . . = 0210

7. Protection mode
7.1 IP 20. . . . . = A

8. Mains connecting voltage
8.1 AC 400 to 500V +10% -15%. . . . .= 05

9. Other design
9.1 integrated brake resistor. . . . .= NNBN
9.2 none . . . .= NNNN

10. Standard reference

Standard	Title
DIN EN 60529	Degrees of protection provided by enclosures (IP-Code)

DT100021V01_EN.EPS

Fig. 6-166: Type code power section (HCS03.1)

Drive package DKR

Drive controller DKR02

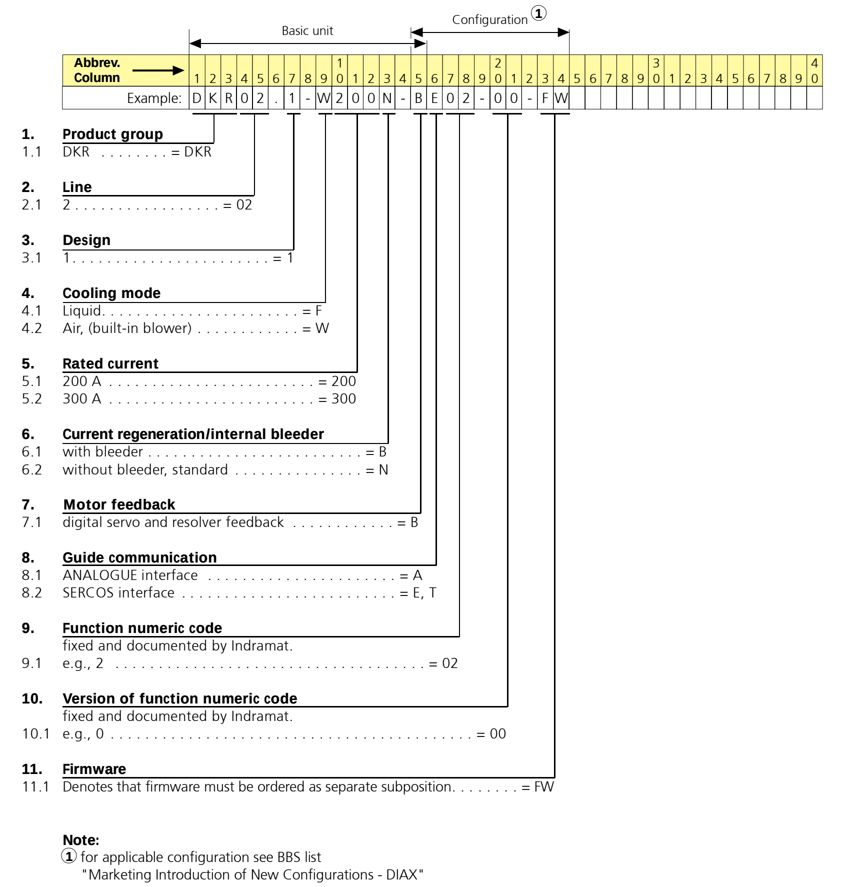
DG10005V01_NN.bmp

Fig. 6-167: DKR02

Documentation DKR02

Description and technical data can be found in drive documentation DOK-DIAX03-DKR********-PR02-EN-P.

Type code DKR02.1



DT100008V01_EN.wmf

Fig. 6-168: Type code DKR02.1

Drive controller DKR03

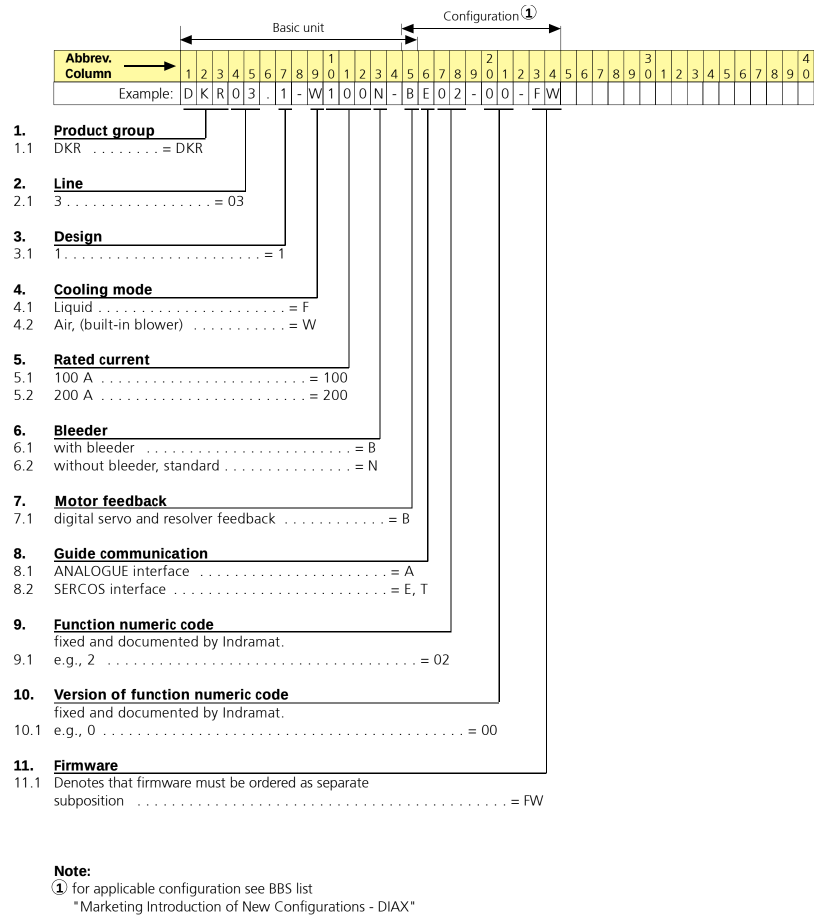
DG10006V01_NN.bmp

Fig. 6-169: DKR03

Documentation DKR03

Description and technical data can be found in drive documentation DOK-DIAX03-DKR********-PR02-EN-P.

Type code DKR03.1



DT100009V01_EN.wmf

Fig. 6-170: Type code DKR03.1

Drive controller DKR04

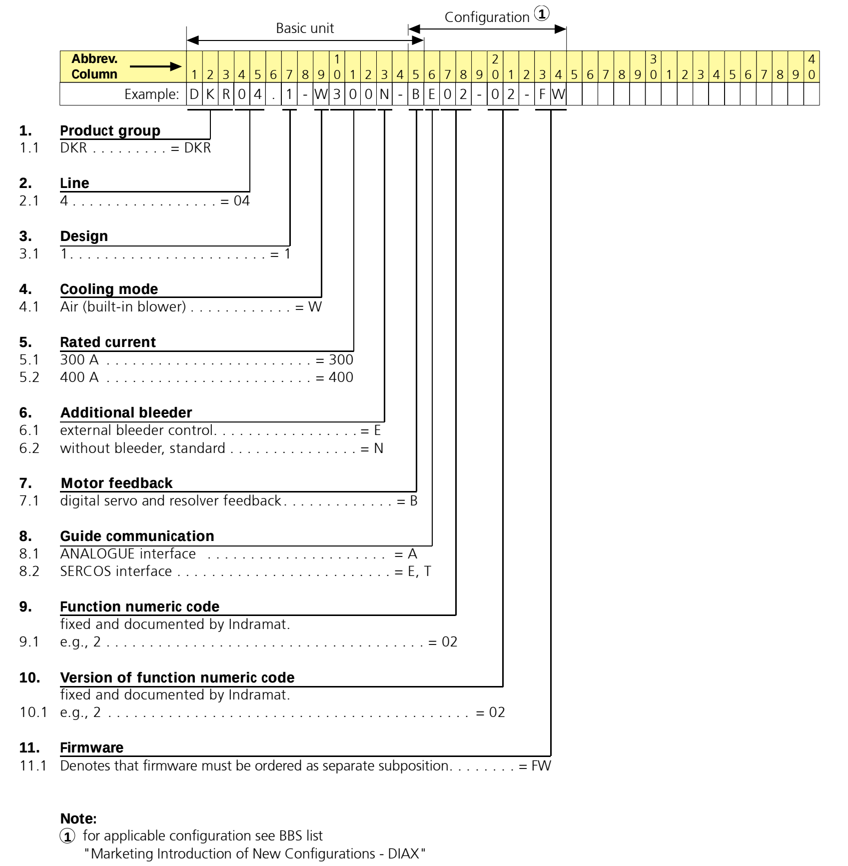
DG100007V01_NN.bmp

Fig. 6-171: DKR04

Documentation DKR04

Description and technical data can be found in drive documentation DOK-DIAX03-DKR********-PR02-EN-P.

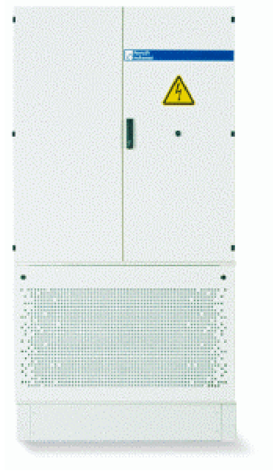
Type code DKR04.1



DT100010V01_EN.wmf

Fig. 6-172: Type code DKR04.1

Drive controller DKR05



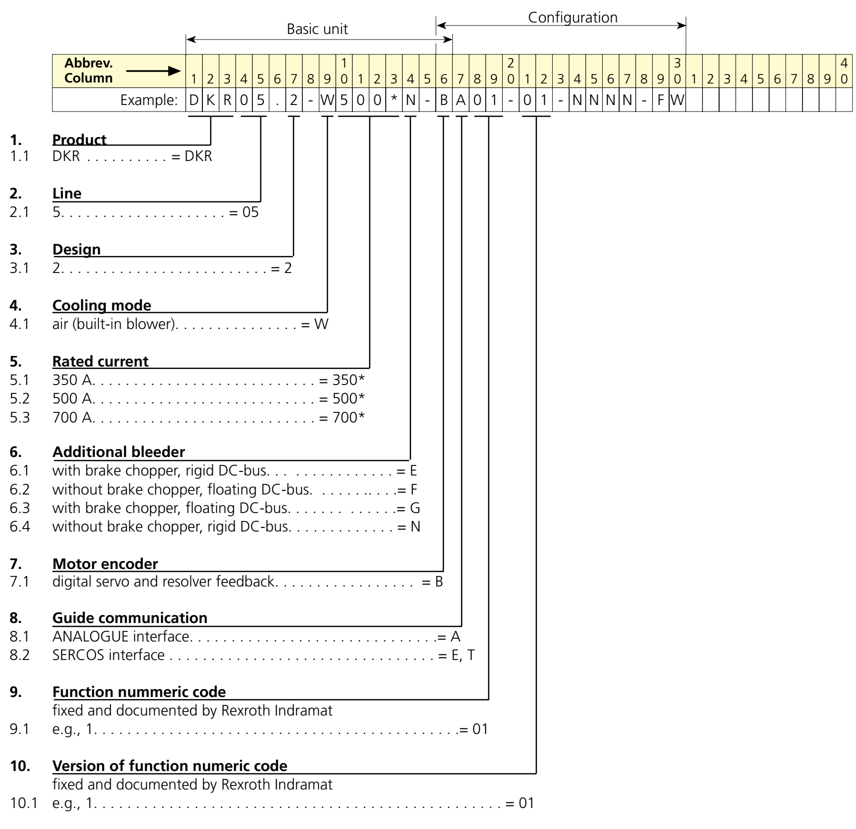
DG100008V01_NN.tif

Fig. 6-173: DKR05

Documentation DKR05

Description and technical data can be found in drive documentation DOK-DIAX03-DKR05.2****-PR01-EN-P.

Type code DKR05.2



DT100010V01_EN.FH7

Fig. 6-174: Type code DKR05.2

Drive package Diax 04

Drive packages Diax 04 consists of

- power supply units HVE, HVR
- drive controller HDS, HDD
- additional components as e.g., additional capacity HZB.

Further documentation about the additional components can be found in the project planning manual of the power supply units (DOK-POWER*-HVE+HVR**G2-AW07-EN-P).

Power supply unit HVE02.2, HVE03.2, HVE04.2

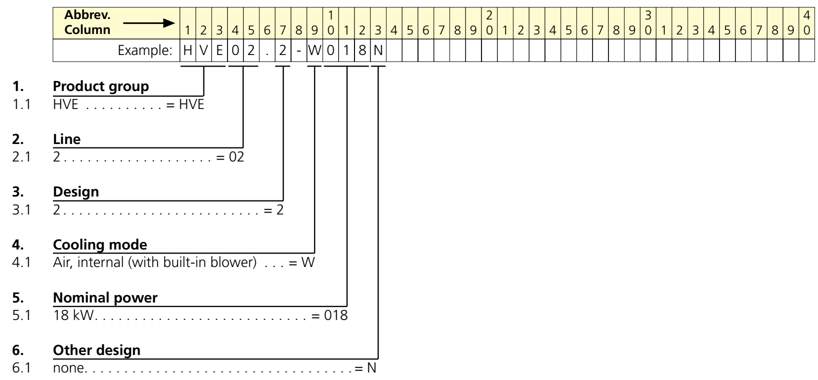
DG100003V01_NN.bmp

Fig. 6-175: HVE02.2, HVE03.2, HVE04.2

Documentation HVE

Description and technical data can be found in drive documentation DOK-POWER*-HVE+HVR**G2-AW07-EN-P.

Type code HVE02.2



DT100001V01_EN.EPS

Fig. 6-176: Type code HVE02.2

Type code HVE03.2

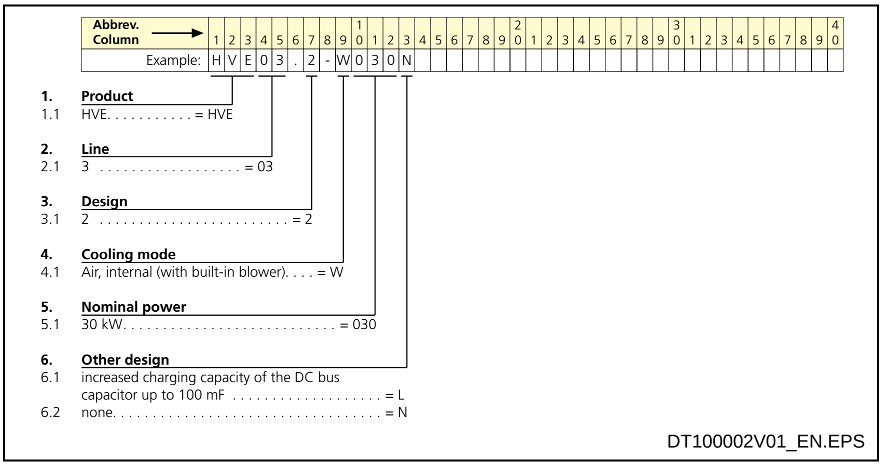


Fig. 6-177: Type code HVE03.2

Type code HVE04.2

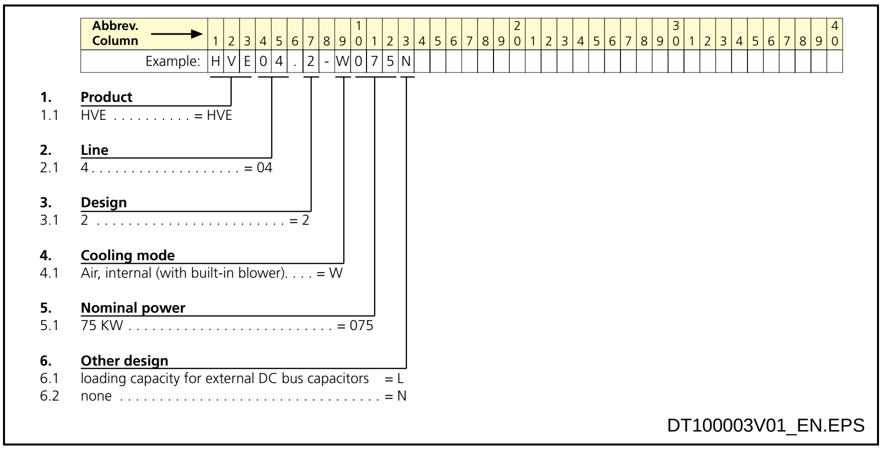


Fig. 6-178: Type code HVE04.2

Power supply unit HVR02.2, HVR03.2

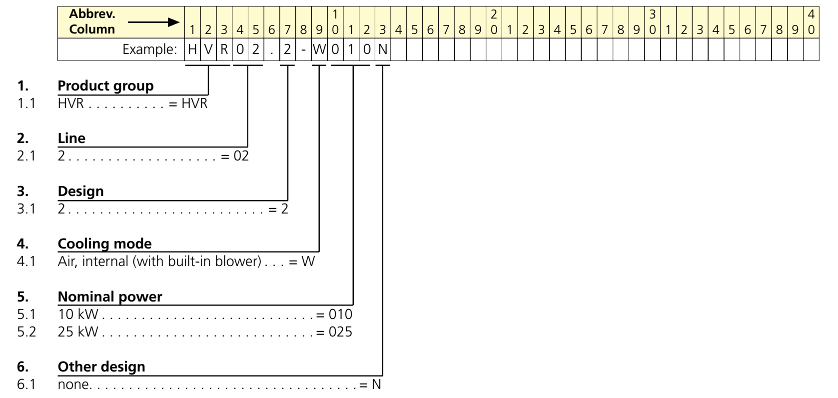

DG100002V01_NN.bmp

Fig. 6-179: HVR02.2, HVR03.2

Documentation HVR

Description and technical data can be found in drive documentation DOK-POWER*-HVE+HVR**G2-AW07-EN-P.

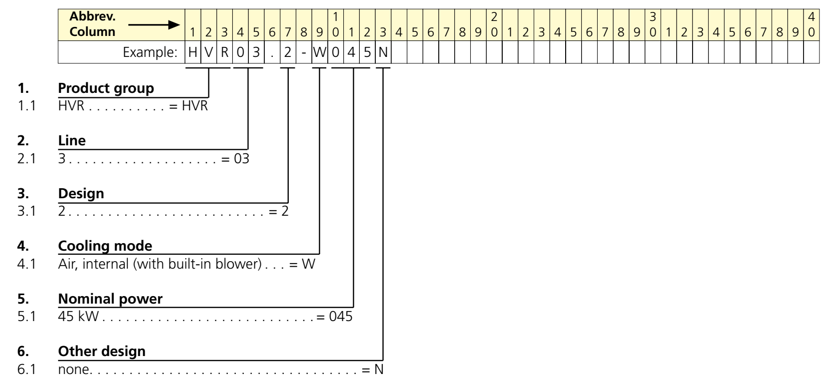
Type code HVR02.2



DT100004V01_EN.EPS

Fig. 6-180: Type code HVR02.2

Type code HVR03.2



DT100005V01_EN.EPS

Fig. 6-181: Type code HVR03.2

Drive controller HDD02.2

DG100009V01_NN.bmp

Fig. 6-182: HDD02.2

Documentation HDD02.2

Description and technical data can be found in drive documentation DOK-DIAX04-HDD+HDS**G2-PR05-EN-P.

Type code HDD02.2

Basic unit | Configuration

Example: H D D 0 2 . 2 - W 0 4 0 N - H D 3 2 - 0 1 - F W

1. Product
1.1 HDD . . . . = HDD

2. Line
2.1 2 . . . . = 02

3. Design
3.1 2 . . . . = 2

4. Cooling mode
4.1 Air, internal (with built-in blower) . . . . . = W

5. Rated current
5.1 16 A . . . . = 016
5.2 40 A . . . . = 040

6. Other design
6.1 none . . . . = N

7. Drive controller family
7.1 DIAX04 . . . . = H

8. Guide communication
8.1 SERCOS interface . . . . = D

9. Function nummeric code
fixed and documented by Rexroth
9.1 e.g., 32 . . . . = 32

10. Version of function numeric code
fixed and documented by Rexroth
10.1 e.g., 1 . . . . = 01

11. Firmware
11.1 Denotes that firmware must be ordered as separate subposition . . . . = FW
11.2 without firmware. . . . . = NW

DT100012V01_EN.FH7

Fig. 6-183: Type code HDD02.2

Drive controller HDS02.2

DG100010V01_NN.bmp

Fig. 6-184: HDS02.2

Documentation HDS02.2

Description and technical data can be found in drive documentation DOK-DIAX04-HDD+HDS**G2-PR05-EN-P.

Drive controller HDS03.2

DG100011V01_NN.bmp

Fig. 6-185: HDS03.2

Documentation HDS03.2

Description and technical data can be found in drive documentation DOK-DIAX04-HDD+HDS**G2-PR05-EN-P.

Drive controller HDS04.2

Fig. 6-186: HDS04.2

Documentation HDS04.2

Description and technical data can be found in drive documentation DOK-DIAX04-HDD+HDS**G2-PR05-EN-P.

Drive controller HDS05.2

Fig. 6-187: HDS05.2

Documentation HDS05.2

Description and technical data can be found in drive documentation DOK-DIAX04-HDD+HDS**G2-PR05-EN-P.

Type code HDS

Type code HDS

Basic unit | Configuration no.

Example H D S 0 2 . 2 - W 0 4 0 N - H S 0 1 - 0 1 - F W

1. Product group
1.1 HDS . . . .= HDS

2. Line
2 . . . . = 02
3 . . . . = 03
4 . . . . = 04
5 . . . . = 05

3. Version
2 . . . . = 2

4. Cooling
4.1 air, internal (with built-in blower) = W

5. Rated current
40 A . . . . = 040
75 A . . . . = 075
100 A . . . . = 100
200 A. . . . . = 200
300 A. . . . . = 300

6. Other versions
6.1 none . . . . = N

7. Controller family
7.1 DIAX04 . . . . = H

8. Command communication
8.1 ANALOG interface . . . . = A
8.2 SERCOS interface . . . . = S, T

9. Function id code
Determined and documented by Indramat.
9.1 e.g.: 1 . . . .= 01

10. Version of function id
Determined and documented by Indramat.
10.1 e.g.: 1 . . . . = 01

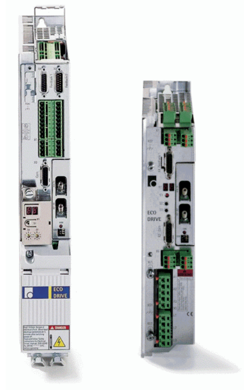
11. Firmware
11.1 Indicator showing that firmware must be ordered as separate subitem
. . . . = FW

TL0208F1.FH7

Fig. 6-188: Type code HDS

Drive package EcoDrive

Drive controller DKC02.3/DKC22.3



DG100014V01_NN.bmp

Fig. 6-189: DKC02.3/DKC22.3

Documentation DKC02.3/DKC22.3

Description and technical data can be found in drive documentation DOK-ECODR3-DKC**.3****-PR05-EN-P.

Type code DKC02.3

Abbrev. Column	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1	2	3	4	5	6	7	8	9	40
Example:	D	K	C	0	2	.	3	-	0	4	0	-	7	-	F	W																								

1. Product
1.1 DKC . . . . = DKC

2. Line
2.1 2 . . . . = 02

3. Design
3.1 3 . . . . = 3

4. Rated current
4.1 16 A . . . . = 016
4.2 40 A . . . . = 040
4.3 100 A . . . . = 100
4.4 200 A . . . . = 200

5. DC-bus nominal voltage
5.1 DC 700 V. . . . .= 7

6. Firmware
6.1 Denotes that firmware must be ordered as separate subposition = FW

DT100013V01_EN.eps

Fig. 6-190: Type code DKC02.3

Rexroth Bosch Group

Drive controller EcoDrive Cs (DKC02.3)


DG100004V01_NN.bmp

Fig. 6-191: EcoDrive Cs

Brief description EcoDrive Cs (DKC02.3)

EcoDrive Cs is a new generation of system-compatible AC servo drives in the lower power range of 100 to 750 W. The drive controllers and motors have a specifically compact design.

There are four motor sizes (100 W, 200 W, 400 W, 750 W) with minimum dimensions that are adapted to the drive controllers.

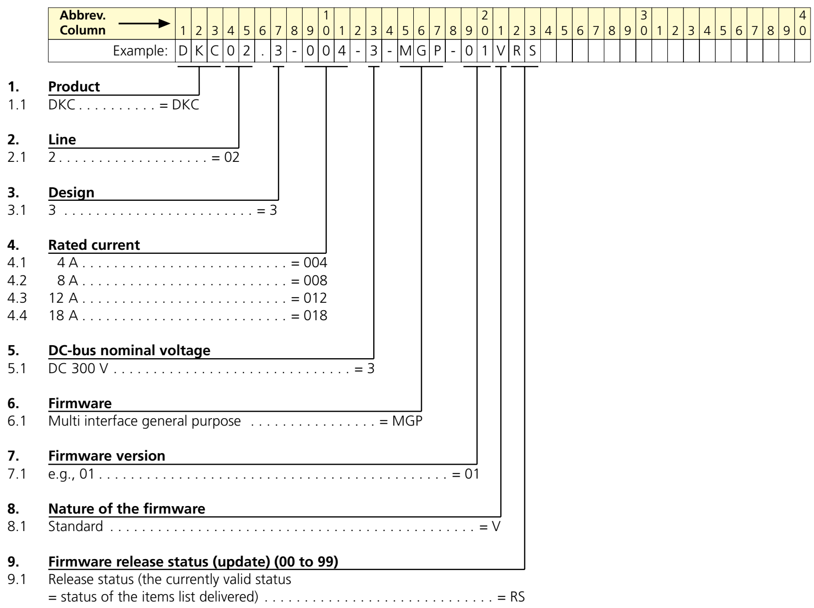
The following options are available for the motors:

- integrated holding brake
- drive shaft with key
- absolute encoder for detecting the current position of the load without travelling to reference point

Documentation EcoDrive Cs (DKC02.3)

Description and technical data can be found in drive documentation DOK-ECODR3-DKC**.3-CS*-PR01-EN-P.

Type code EcoDrive Cs (DKC02.3)



DT100000V01_EN.EPS

Fig. 6-192: Type code EcoDrive Cs

Type code MSM020

Abbrev. Column → 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

Example: M S M 0 2 0 B - 0 3 0 0 - N N - C 0 - C G 1

1. Product
1.1 MSM. . . . . = MSM

2. Size
2.1 020 . . . . = 020

3. Length
3.1 Length . . . . = B

4. Windings
4.1 MSM020B . . . . = 0300

5. Cooling mode
5.1 natural convection, without blower . . . . = NN

6. Encoder
6.1 Incremental encoder with 1.024 increments . . . . = C0
6.2 Multiturn absolute encoder with 512 increments . . . . = M0

7. Electrical connection
7.1 cable tail . . . . = C

8. Shaft
8.1 key with shaft sealing ring per DIN 6885-1 . . . . = C
8.2 plain shaft with shaft sealing ring . . . . = G

9. Holding brake
9.1 without holding brake . . . . = 0
9.2 electrical release 0.29 Nm . . . . = 1

10. Standard reference

Standard	Title	Edition
DIN 6885-1	Drive Type with Fastenings without Taper Action; Parallel Keys, Keyways, Deep Pattern	1968-08

MT100000V01_EN.EPS

Fig. 6-193: Type code MSM020

Type code MSM030

Abbrev. Column → 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

Example: M S M 0 3 0 B - 0 3 0 0 - N N - C 0 - C G 1

1. Product
1.1 MSM. . . . . = MSM

2. Size
2.1 030 . . . . = 030

3. Length
3.1 Lengths . . . . = B, C

4. Windings
4.1 MSM030B . . . . = 0300
4.2 MSM030C . . . . = 0300

5. Cooling mode
5.1 natural convection, without blower . . . . = NN

6. Encoder
6.1 Incremental encoder with 1.024 increments . . . . = C0
6.2 Multiturn absolute encoder with 512 increments . . . . = M0

7. Electrical connection
7.1 cable tail . . . . = C

8. Shaft
8.1 key with shaft sealing ring per DIN 6885-1 . . . . = C
8.2 plain shaft with shaft sealing ring . . . . = G

9. Holding brake
9.1 without holding brake . . . . = 0
9.2 electrical release 1.27 Nm . . . . = 1

10. Standard reference

Standard	Title	Edition
DIN 6885-1	Drive Type with Fastenings without Taper Action; Parallel Keys, Keyways, Deep Pattern	1968-08

MT100001V01_EN.EPS

Fig. 6-194: Type code MSM030

Type code MSM040

Abbrev. Column	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1	2	3	4	5	6	7	8	9	40
Example:	M	S	M	0	4	0	B	-	0	3	0	0	-	N	N	-	C	0	-	C	G	1																		

1. Product
1.1 MSM. . . . . = MSM

2. Size
2.1 040 . . . . = 040

3. Length
3.1 Length . . . . = B

4. Windings
4.1 MSM040B . . . . = 0300

5. Cooling mode
5.1 natural convection, without blower . . . . = NN

6. Encoder
6.1 Incremental encoder with 1.024 increments . . . . = C0
6.2 Multiturn absolute encoder with 512 increments . . . . = M0

7. Electrical connection
7.1 cable tail . . . . = C

8. Shaft
8.1 key with shaft sealing ring per DIN 6885-1 . . . . = C
8.2 plain shaft with shaft sealing ring . . . . = G

9. Holding brake
9.1 without holding brake . . . . = 0
9.2 electrical release 2.45 Nm . . . . = 1

10. Standard reference

Standard	Title	Edition
DIN 6885-1	Drive Type with Fastenings without Taper Action; Parallel Keys, Keyways, Deep Pattern	1968-08

MT100002V01_EN.EPS

Fig. 6-195: Type code MSM040

6.6 Reference list firmware/software

Note: The software with suffix -COPY may be copied.

Motion control firmware

SYNAX 200 MotionControl PPC-R2x and PPC-P without PLC

Product:	Product firmware (order designation):	Printed board firmware (flash module labelling):
PPC-R2x or PPC-P	FWA-PPCPR*-SY*-12VRS-D0-XXXXXX	FWC-PFM01*-SY*-12VRS-D0
PPC-R2x or PPC-P + Profibus slave	FWA-PPCPR*-SY*-12VRS-D0-P2XXXX	FWC-PFM01*-SY*-12VRS-D0 FWC-DPS01*-PHP-02VRS-NN
PPC-R2x or PPC-P + DeviceNet slave	FWA-PPCPR*-SY*-12VRS-D0-V2XXXX	FWC-PFM01*-SY*-12VRS-D0 FWC-DNS01*-PHV-01VRS-NN

Fig. 6-196: SYNAX 200 MotionControl PPC-R2x or PPC-P without PLC

SYNAX 200 MotionControl PPC-R2x and PPC-P with PLC (MotionLogic)

Product:	Product firmware (order designation):	Printed board firmware (flash module labelling):
PPC-R2x or PPC-P	FWA-PPCPR*-SL*-12VRS-D0-XXXXXX	FWC-PFM01*-SL*-12VRS-D0
PPC-R2x or PPC-P + Profibus slave	FWA-PPCPR*-SL*-12VRS-D0-P2XXXX	FWC-PFM01*-SL*-12VRS-D0 FWC-DPS01*-PHP-02VRS-NN
PPC-R2x or PPC-P + DeviceNet slave	FWA-PPCPR*-SL*-12VRS-D0-V2XXXX	FWC-PFM01*-SL*-12VRS-D0 FWC-DNS01*-PHV-01VRS-NN
PPC-R2x or PPC-P + Profibus master	FWA-PPCPR*-SL*-12VRS-D0-P1XXXX	FWC-PFM01*-SL*-12VRS-D0 FWC-DPM01*-PHP-02VRS-NN
PPC-R2x or PPC-P + DeviceNet master	FWA-PPCPR*-SL*-12VRS-D0-V1XXXX	FWC-PFM01*-SL*-12VRS-D0 FWC-DNM03*-PHV-01VRS-NN
PPC-R2x or PPC-P + Profibus master + Profibus slave	FWA-PPCPR*-SL*-12VRS-D0-P1P2XX	FWC-PFM01*-SL*-12VRS-D0 FWC-DPM01*-PHP-02VRS-NN FWC-DPS01*-PHP-02VRS-NN
PPC-R2x or PPC-P + DeviceNet master + DeviceNet slave	FWA-PPCPR*-SL*-12VRS-D0-V1V2XX	FWC-PFM01*-SL*-12VRS-D0 FWC-DNM03*-PHV-01VRS-NN FWC-DNS01*-PHV-01VRS-NN

Fig. 6-197: SYNAX 200 MotionControl PPC-R2x with PLC (MotionLogic)

SYNAX 200 MotionControl PPC-R2x and PPC-P with PLC (MotionLogic eco)

Product:	Product firmware (order designation):	Printed board firmware (flash module labelling):
PPC-R2x or PPC-P	FWA-PPCPR*-SLE-12VRS-D0-XXXXXX	FWC-PFM01*-SLE-12VRS-D0
PPC-R2x or PPC-P + Profibus slave	FWA-PPCPR*-SLE-12VRS-D0-P2XXXX	FWC-PFM01*-SLE-12VRS-D0 FWC-DPS01*-PHP-02VRS-NN
PPC-R2x or PPC-P + DeviceNet slave	FWA-PPCPR*-SLE-12VRS-D0-V2XXXX	FWC-PFM01*-SLE-12VRS-D0 FWC-DNS01*-PHV-01VRS-NN

Fig. 6-198: SYNAX 200 MotionControl PPC-R2x with PLC (MotionLogic eco)

Drive firmware

Full versions: firmware for synchronous axis with all auxiliary modes

Product:	Product firmware (order designation):	Printed board firmware (EPROM/flash module labelling):
Drive family IndraDrive	FWA-INDRV*-MPH-03VRS-D5-1-SNC-NN	FWC-CSH1.1-MPH-03VRS-MS FWC-HSI11*-SST-01VRS-MS
Drive family IndraDrive + all packages	FWA-INDRV*-MPH-03VRS-D5-1-ALL-NN	FWC-CSH1.1-MPH-03VRS-MS FWC-HSI11*-SST-01VRS-MS
Drive family IndraDrive + PLC	FWA-INDRV*-MPH-03VRS-D5-1-SNC-ML	FWC-CSH1.1-MPH-03VRS-MS FWC-HSI11*-SST-01VRS-MS
Drive family IndraDrive + all packages + PLC	FWA-INDRV*-MPH-03VRS-D5-1-ALL-ML	FWC-CSH1.1-MPH-03VRS-MS FWC-HSI11*-SST-01VRS-MS
Drive family IndraDrive Basic	FWA-INDRV*-MPB-03VRS-D5-1-SNC-NN	FWC-CSB1.1-MPB-03VRS-MS FWC-HSI11*-SST-01VRS-MS
Drive family IndraDrive Basic + PLC	FWA-INDRV*-MPB-03VRS-D5-1-SNC-ML	FWC-CSB1.1-MPB-03VRS-MS FWC-HSI11*-SST-01VRS-MS
Drive family IndraDrive Basic + all packages	FWA-INDRV*-MPB-03VRS-D5-1-ALL-NN	FWC-CSB1.1-MPB-03VRS-MS FWC-HSI11*-SST-01VRS-MS
Drive family IndraDrive Basic + all packages + PLC	FWA-INDRV*-MPB-03VRS-D5-1-ALL-ML	FWC-CSB1.1-MPB-03VRS-MS FWC-HSI11*-SST-01VRS-MS
Drive family IndraDrive Basic Double Axis	FWA-INDRV*-MPD-03VRS-D5-1-SNC-NN	FWC-CDB1.1-MPD-03VRS-MS FWC-HSI11*-SST-01VRS-MS
Drive family IndraDrive Basic Double Axis + all packages	FWA-INDRV*-MPD-03VRS-D5-1-ALL-NN	FWC-CDB1.1-MPD-03VRS-MS FWC-HSI11*-SST-01VRS-MS
Drive family EcoDrive03	FWA-DRIVE*-SGP-20VRS-MS	FWC-ESM2.2-SGP-20VRS-MS
Drive family DKR	FWA-DIAX03-ELS-06VRS-MS	FWC-DSM2.3-ELS-06VRS-MS
Drive family Diax 04	FWA-DIAX04-ELS-06VRS-MS	FWC-HSM1.1-ELS-06VRS-MS

Fig. 6-199: Drive firmware (synchronization, positioning mode, idle mode)

Firmware for positioning mode and idle mode

Product:	Product firmware (order designation):	Printed board firmware (EPROM/flash module labelling):
Drive family IndraDrive	FWA-INDRV*-MPH-03VRS-D5-1-NNN-NN	FWC-CSH1.1-MPH-03VRS-MS FWC-HSI11*-SST-01VRS-MS
Drive family IndraDrive + PLC	FWA-INDRV*-MPH-03VRS-D5-1-NNN-ML	FWC-CSH1.1-MPH-03VRS-MS FWC-HSI11*-SST-01VRS-MS
Drive family IndraDrive Basic	FWA-INDRV*-MPB-03VRS-D5-1-NNN-NN	FWC-CSB1.1-MPB-03VRS-MS FWC-HSI11*-SST-01VRS-MS
Drive family IndraDrive Basic + PLC	FWA-INDRV*-MPB-03VRS-D5-1-NNN-ML	FWC-CSB1.1-MPB-03VRS-MS FWC-HSI11*-SST-01VRS-MS
Drive family IndraDrive Basic Double Axis	FWA-INDRV*-MPD-03VRS-D5-1-NNN-NN	FWC-CDB1.1-MPD-03VRS-MS FWC-HSI11*-SST-01VRS-MS
Drive family EcoDrive Cs	FWA-ECODR3-MGP-01VRS-MS	FWC-ECODR3-MGP-01VRS-MS
Drive family Diax	FWA-DIAX03-SSE-03VRS-MS FWA-DIAX04-SSE-03VRS-MS	FWC-DSM2.3-SSE-03VRS-MS FWC-HSM1.1-SSE-03VRS-MS
Drive family EcoDrive 03	FWA-ECODR3-SMT-02VRS-MS	FWC-ESM2.1-SMT-02VRS-MS

Fig. 6-200: Drive firmware (positioning and idle mode)

Firmware for speed synchronous and speed-controlled axis without encoder (speed synchronization and idle mode)

Product:	Product firmware (order designation):	Printed board firmware (EPROM/flash module labelling):
Drive family IndraDrive	FWA-INDRV*-MPH-03VRS-D5-0-SNC-NN	FWC-CSH1.1-MPH-03VRS-MS FWC-HSI11*-SST-01VRS-MS
Drive family IndraDrive + PLC	FWA-INDRV*-MPH-03VRS-D5-0-SNC-ML	FWC-CSH1.1-MPH-03VRS-MS FWC-HSI11*-SST-01VRS-MS
Drive family IndraDrive Basic	FWA-INDRV*-MPB-03VRS-D5-0-SNC-NN	FWC-CSB1.1-MPB-03VRS-MS FWC-HSI11*-SST-01VRS-MS
Drive family IndraDrive Basic + PLC	FWA-INDRV*-MPB-03VRS-D5-0-SNC-ML	FWC-CSB1.1-MPB-03VRS-MS FWC-HSI11*-SST-01VRS-MS
Drive family IndraDrive Basic Double Axis	FWA-INDRV*-MPD-03VRS-D5-0-SNC-NN	FWC-CDB1.1-MPD-03VRS-MS FWC-HSI11*-SST-01VRS-MS

Fig. 6-201: Drive firmware (speed synchronization and idle mode)

Firmware for speed-controlled axis without encoder (idle mode)

Product:	Product firmware (order designation):	Printed board firmware (EPROM/flash module labelling):
Drive family IndraDrive	FWA-INDRV*-MPH-03VRS-D5-0-NNN-NN	FWC-CSH1.1-MPH-03VRS-MS FWC-HSI11*-SST-01VRS-MS
Drive family IndraDrive + PLC	FWA-INDRV*-MPH-03VRS-D5-0-NNN-ML	FWC-CSH1.1-MPH-03VRS-MS FWC-HSI11*-SST-01VRS-MS
Drive family IndraDrive Basic	FWA-INDRV*-MPB-03VRS-D5-0-NNN-NN	FWC-CSB1.1-MPB-03VRS-MS FWC-HSI11*-SST-01VRS-MS
Drive family IndraDrive Basic + PLC	FWA-INDRV*-MPB-03VRS-D5-0-NNN-ML	FWC-CSB1.1-MPB-03VRS-MS FWC-HSI11*-SST-01VRS-MS
Drive family IndraDrive Basic Double Axis	FWA-INDRV*-MPD-03VRS-D5-0-NNN-NN	FWC-CDB1.1-MPD-03VRS-MS FWC-HSI11*-SST-01VRS-MS

Fig. 6-202: Drive firmware (idle mode)

Commissioning interface / PLC programming interface

Product:	Product software (order designation):	CD labelling
Parameterization and PLC programming interface SynTop and IndraLogic	SWA-SYNAX*-INB-12VRS-D0-CD650-COPY	SWD-SYNAX*-INB-12VRS-D0-CD650

Fig. 6-203: Commissioning software

Firmware download

Product:	Product software (order designation):	Disk labelling
DOLFI tool for download of firmware	SWA-DOL*PC-INB-01VRS-MS-C1,44-COPY	SWD-DOL*PC-INB-01VRS-MS-C1,44

Fig. 6-204: Firmware download

Note: DOLFI can be found on the CD SWA-SYNAX*-INB-12VRS-D0-CD650-COPY.

Cam tool

Product:	Product software (order designation):	CD labelling
CamBuilder	SWA-CAM*PC-INB-01VRS-D0-CD650	SWD-CAM*PC-INB-01VRS-D0-CD650
CamBuilder (demo version)	SWA-CAM*PC-INB-01DRS-D0-CD650	SWD-CAM*PC-INB-01DRS-D0-CD650

Fig. 6-205: Cam tool

HMI software

Product:	Product software (order designation):	Product software (CD labelling):
Engineering		
HMI for SYNAX 200	SWA-SYNAX*-HMI-12VRS-D0-CD650	SWD-SYNAX*-HMI-12VRS-D0-CD650
License for WinStudio programming interface	SWS-WINSTU-RUD-06VRS-D0-64K	64000 variables, 1024 array size, 64 class members, target system WinNT/2000/XP/CE
License for WinStudio programming interface	SWS-WINSTU-RUD-06VRS-D0-4K	4000 variables, 512 array size, 32 class members target system WinNT/2000/XP/CE
License for WinStudio programming interface	SWS-WINSTU-RUD-06VRS-D0-1K5	1500 variables, 256 array size, 32 class members target system WinNT/2000/XP/CE
Runtime licenses (PC)		
Runtime license for WinStudio-HMI	SWS-WINSTU-RUN-06VRS-D0-64K	64000 variables, 1024 array size, 64 class members target system WinNT/2000/XP
Runtime license for WinStudio-HMI	SWS-WINSTU-RUN-06VRS-D0-4K	4000 variables, 512 array size, 32 class members target system WinNT/2000/XP
Runtime license for WinStudio-HMI	SWS-WINSTU-RUN-06VRS-D0-1K5	1500 variables, 256 array size, 32 class members target system WinNT/2000/XP

Fig. 6-206: HMI software

Visualization units of VEP series

Product:	Product software/firmware (order designation):	Description
VEP firmware		
VEP 30/40/50	FWA-VE**01-CWL-01VRS-D0	Windows CE 4.2 .NET with WinStudio
Runtime licenses		
Runtime license for WinStudio-HMI at Windows CE	SWS-WINSTU-RUN-06VRS-D0-WCE4K	4000 variables, 512 array size, 32 class members target system Windows CE
Runtime license for WinStudio-HMI at Windows CE	SWS-WINSTU-RUN-06VRS-D0-WCE1K5	1500 variables, 256 array size, 32 class members target system Windows CE

Fig. 6-207: Visualization units VEP

Visualization units of VCP series

Product:	Product software/firmware (order designation):	Disk labelling/ Printed board firmware (EPROM/flash module labelling)
Project planning software VI-Composer	SWA-VIC*PC-INB-01VRS-D0-CD650	SWD-VIC*PC-INB-01VRS-D0-CD650
Download tool for VCP devices	DOK-SUPPL*-VCP*VID*V01-IB04-D0-D0650	

Fig. 6-208: Visualization units VCP

System documentation

Additional information of the components described can be found int he following documentations.

Motion control components

Order designation	Title
DOK-SYNAX*-SY*-12V*1/2-FK01-EN-P	Rexroth SYNAX 200 - Functional Description
DOK-SYNAX*-SY*-12V*2/2-FK01-EN-P	Rexroth SYNAX 200 - Interfaces Description
DOK-SYNAX*-SY*-12VRS**-PA01-EN-P	Rexroth SYNAX 200 - Parameter Description
DOK-SYNAX*-SY*-12VRS**-PR01-EN-P	Rexroth SYNAX 200 - Project Planning Manual
DOK-SYNAX*-SY*-12VRS**-WA01-EN-P	Rexroth SYNAX 200 - Troubleshooting Guide
DOK-SYNAX*-SY*-12VRS**-FV01-EN-P	Rexroth SYNAX 200 - Version Notes
DOK-SYNAX*-SY*-12VRS**-4001-EN-P	Rexroth SYNAX 200 - Box 40-12V
SWA-SYNAX*-INB-12VRS-D0-CD650-COPY	General help for Rexroth SYNAX 200 - version 12VRS
DOK-SYNAX*-SY*-12VRS**-IB01-EN-P	Rexroth SYNAX 200 Version 12 - System Installation - First steps - Commissioning Manual
DOK-SYNAX*-IL*-12VRS**-AW01-EN-P	Rexroth SYNAX 200 - MotionLogic Version 12 - Application Manual
DOK-SYNAX*-IL*-12VRS**-4101-EN-P	Rexroth SYNAX 200 - MotionLogic - Box 41-12V
DOK-CONTRL-IL**PRO*V01-AW01-EN-P	PLC Programming with Rexroth IndraLogic 1.0 - Operating and Programming Guide
DOK-CONTRL-R-IL*PB*-BK-FK02-EN-P	Rexroth Inline Profibus DP - Functional Description
DOK-CONTRL-R-IL*PBSSYS-AW02-EN-P	Rexroth Inline Profibus DP - Application Manual
DOK-CONTRL-R-IL*DIO***-FK03-EN-P	Rexroth Inline Digital I/O Terminals - Functional Description
DOK-CONTRL-R-IL*AIO***-FK02-EN-P	Rexroth Inline Analog I/O Terminals - Project Planning Manual
DOK-CONTRL-R-IL*CNT***-AW02-EN-P	Rexroth Inline Counter terminal - R-IB IL CNT
DOK-CONTRL-RF-FLS-PB**-PR02-EN-P	Rexroth Fieldline PROFIBUS Devices- Project Planning Manual
DOK-CONTRL-RF-FLS-PB**-AW01-EN-P	Rexroth Fieldline PROFIBUS Devices- Application Manual

Fig. 6-209: Documentation: motion control components

Drive components

Order designation	Title
DOK-DIAX03-DKR********-PR02-EN-P	DKR02, DKR03 and DKR04 Drive Controllers - Project Planning Manual
DOK-DIAX03-DKR05.2****-PR02-EN-P	DKR05.2 Drive controller - Project Planning Manual
DOK-DIAX03-ELS-06VRS**-IF01-EN-P	DIAX 03 - Brief Description
DOK-DIAX04-HDD+HDS**G2-PR05-EN-P	Diax 04 HDD and HDS Controllers 2nd Generation - Project Planning Manual
DOK-DIAX04-PLUG*IN*MOD-PR03-EN-P	Diax 04 Plug-in modules for Digital Intelligent Drive Controllers - Project Planning Manual
DOK-DIAX04-ELS-06VRS**-6001-EN-P	Diax 04 - Box 60-06V
DOK-POWER*-HVE+HVR**G2-AW07-EN-P	Diax 04 HVE and HVR 2nd Generation Power Supply Units - Application Description
DOK-INDRV*-HMD+HMS****-PR02-EN-P	Rexroth IndraDrive M - Drive controllers - Power Section
DOK-INDRV*-CSH********-PR02-EN-P	Rexroth IndraDrive - Drive controllers - Control Section
DOK-INDRV*-MP*-03VRS**-8101-EN-P	Rexroth IndraDrive - Box 81-03V
DOK-ECODR3-DKC**.3****-PR05-DE-P	EcoDrive 03 -Project Planning Manual
DOK-ECODR3-DKC**.3-CS*-PR01-EN-P	Rexroth Ecodrive Cs - Project Planning Manual
DOK-DRIVE*-SGP-20VRS**-7201-EN-P	Rexroth EcoDrive 03 - Box 72-01V
DOK-INDRV*-HCS02.1****-PR01-EN-P	Rexroth IndraDrive C Drive Controllers Power Sections HCS02.1 - Project Planning Manual
DOK-INDRV*-HCS03.1****-PR01-EN-P	Rexroth IndraDrive C Drive Controllers Control Section HCS03.1 - Project Planning Manual
DOK-GENERL-EMV********-PR02-EN-P	Electromagnetic Compatibility (EMC) in Drive and Control Systems - Project Planning Manual

Fig. 6-210: Documentation: Drive components

Visualization units PC based

Order designation	Title
DOK-SUPPL*-BTV16/40/60-PR01-EN-P	Rexroth BTV 16.2/40.2/60.2 - Project Planning Manual
DOK-SUPPL*-IPC*40.2***-PR01-EN-P	Rexroth IPC 40.2 - Project Planning Manual
DOK-SUPPL*-VSB*40*****-PR01-EN-P	Rexroth VSB 40.1 - Project Planning Manual
DOK-SUPPL*-VDP16/40/60-PR01-EN-P	Rexroth IndraControl VDP 16/40/60 - Project Planning Manual
DOK-SUPPL*-VSP*16/40**-PR01-EN-P	Rexroth IndraControl VSP 16/40 - Project Planning Manual
DOK-SUPPL*-VPP*21.1***-PR01-EN-P	Rexroth IndraControl VPP21.1 - Project Planning Manual

Fig. 6-211: Documentation: Visualization units

Visualization units Windows CE based

Order designation	Title
DOK-SUPPL*-VEP20/30/40-PR01-EN-P	Rexroth VEP 20/30/40 - Project Planning Manual

Fig. 6-212: Documentation: Visualization units

Miniature control terminals VCP

Order designation	Title
DOK-SUPPL*-VCP*01*****-PR01-EN-P	Rexroth VCP 01 - Project Planning Manual
DOK-SUPPL*-VCP02******-PR02-EN-P	Rexroth VCP 02 - Project Planning Manual
DOK-SUPPL*-VCP05******-PR02-EN-P	Rexroth VCP 05 - Project Planning Manual
DOK-SUPPL*-VCP08******-PR02-EN-P	Rexroth VCP 08 - Project Planning Manual
DOK-SUPPL*-VCP20******-PR02-EN-P	Rexroth VCP 20 - Project Planning Manual
DOK-SUPPL*-VCP25******-PR02-EN-P	Rexroth VCP 25 - Project Planning Manual
DOK-SUPPL*-VIC*BEDIEN-AW01-EN-P	VCP operator concept - Application Manual

Fig. 6-213: Documentation: Miniature control terminals VCP

7 Fibre-optics cable connections

7.1 Data Transmission with fibre-optics cable

General safety guidelines

DANGER

High-energy light
Risk of blindness and eye injury
= Do not look into the light (transmitter output or fiber optic cable end)

CAUTION

Error during mounting or when handling
fiber optic cable components could be mechanically damaged
⇒ Do not screw fiber optic cable connector in too tightly

CAUTION

Error during mounting or when handling
fiber optic cable could be damaged
⇒ Mechanical limit values must be maintained

Ring structure of the optical transmission in the drive ring

The connection between the motion control (PPC) and the digital drives is conducted with help of fibre-optics cables (LWL).

SERCOS interface (IEC 61491 or EN 61491)

A ring structure as defined in SERCOS interface (IEC 61491 or EN 61491) is used.

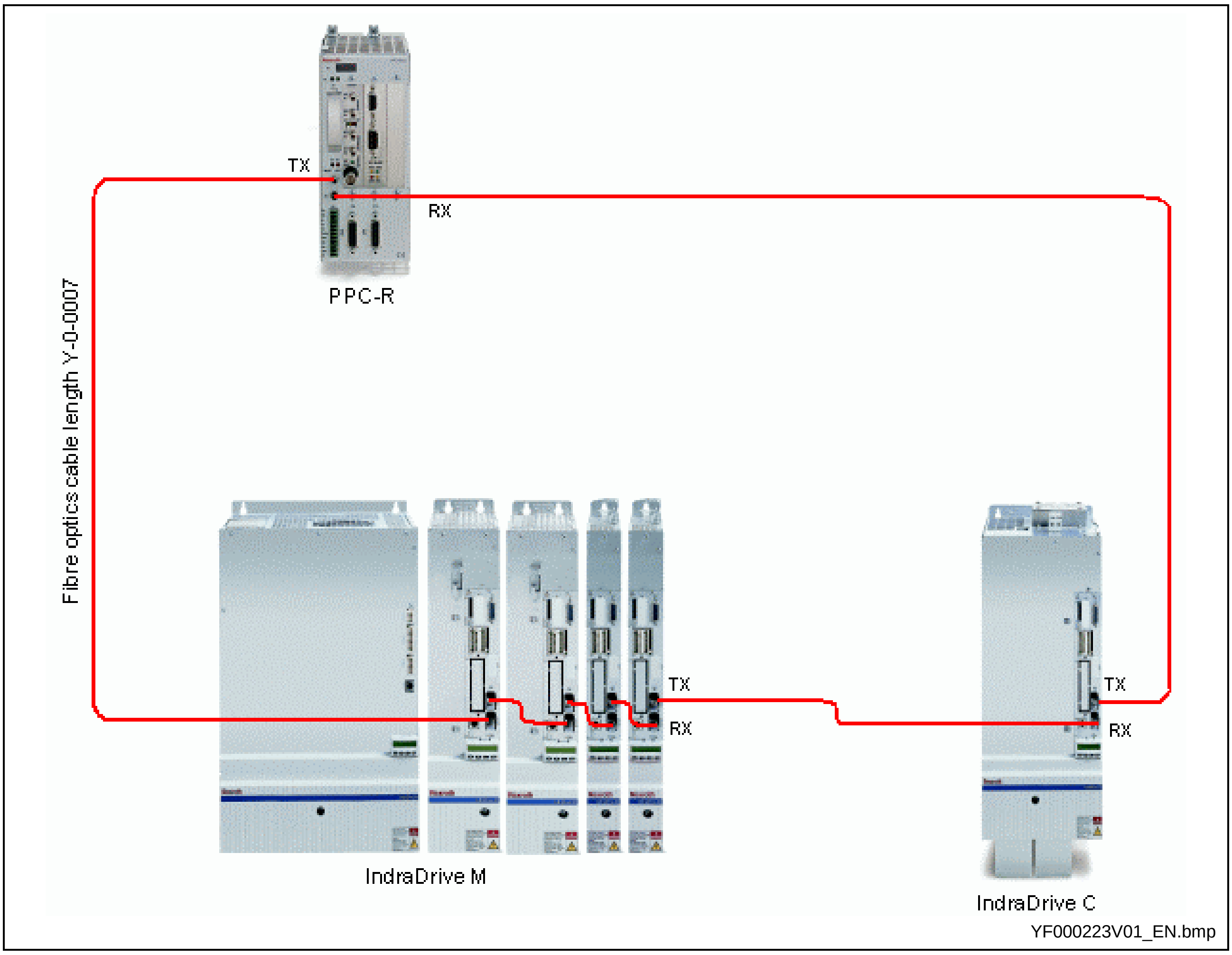


Fig. 7-1: Ring structure drive ring

The ring starts and ends at the motion control. The optical output of the motion control is connected with the optical input of the first drive. Its output is connected to the input of the next drive and so on. The output of the final drive is connected to the input of the motion control.

Drive address

Each drive is assigned its own drive address. It can be selected independently of the position within the fibre-optics cable ring. The drive address is set at the communications board (e.g., DSS 2.1) using a rotary switch.

Ring structure of the optical transmission in the PPC link

Several PPC motion controls can be combined to create one PPC link with which the following axes can be assigned to different master axes.

This combination of PPC motion controls is accomplished with the help of PPC plug-in card DAQ. All DAQ boards are connected with a fibre-optics cable (LWL) ring thereby creating the PPC link.

Link address Each PPC needs a different link address.

Single/ double ring The PPC link can be built on a simple or double fibre-optics cable ring.

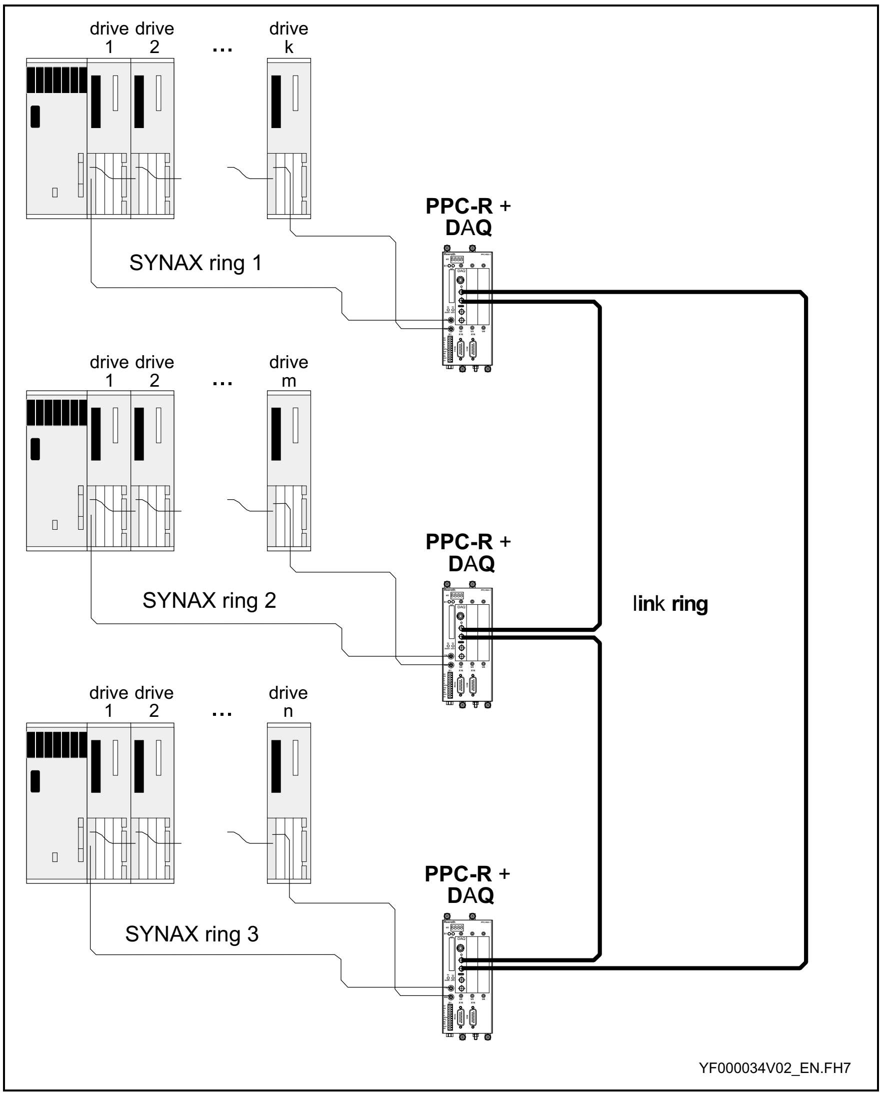


Fig. 7-2: PPC link with single ring

Constructing the transmission path

A transmission path starts at a transmitter output and ends at a receiver input.

Fibre-optics cable isolating points

The transmission path is made up of fibre-optics cables and fibre-optics cable leadthroughs. These serve as, for example, coupling units for wall leadthroughs.

FSMA standard (IEC 874-2)

The plug-in connectors correspond to FSMA standards (IEC 874-2).

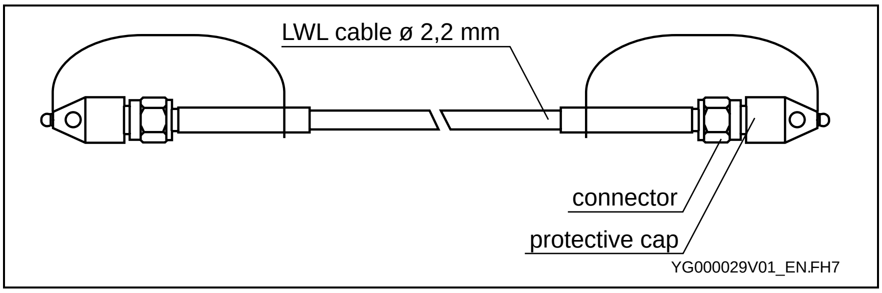


Fig. 7-3: Structure of a transmission path

Types of fibre-optics cables

Plastic fibre-optics cables can be used for transmission length of up to 50 m and glass fibre-optics cables for lengths up to 500 m.

There are three different types of fibre-optics cables:

Plastic fibre-optics cable 2,2 mm

Plastic fibre-optics cables for internal control cabinet use with a diameter of 2.2 mm.

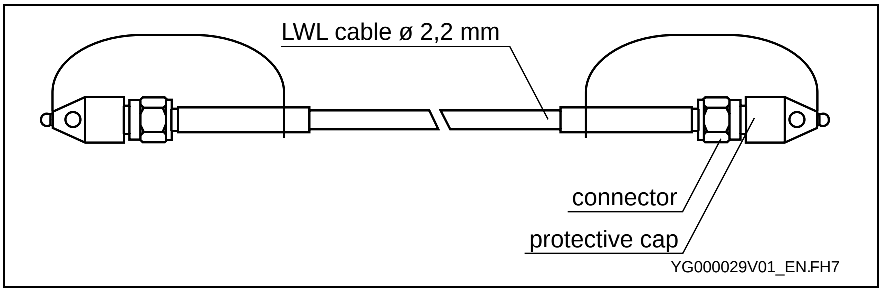


Fig. 7-4: Plastic fibre-optics cable 2.2 mm (IKO 982)

Plastic fibre-optics cable 6 mm

Plastic fibre-optics cables for internal and external control cabinet use with reinforced casings. The diameter of this fibre-optics cable equals 6 mm.

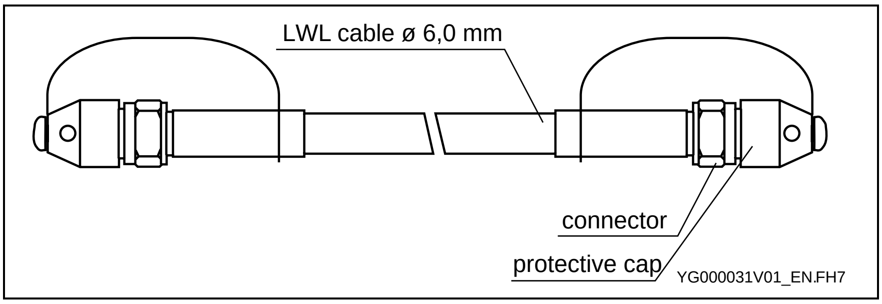


Fig. 7-5: Plastic fibre-optics cable 6 mm (IKO 985)

Glass fibre-optics cable 3 mm

Glass fibre-optics cable for internal and external control cabinet use with reinforced casing. The diameter of this fibre-optics cable equals 3 mm.

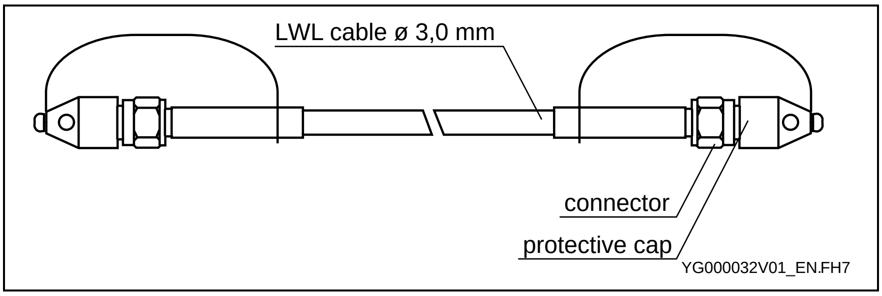


Fig. 7-6: Glass fibre-optics cable 3 mm (IKO 001)

Order information

Type of fiber optic cable	Part number
plastic fibre-optics cable, 2,2 mm	IKO0982/xx
plastic fibre-optics cable, 6 mm	IKO0985/xx
glass fibre-optics cable, 3 mm	IKO0001/xx

Fig. 7-7: Part numbers of fibre-optics cable types (xx: lengths in meters)

Fibre-optics cable accessories

Accessories of the fibre-optics cables are:

- fibre-optics cable leadthroughs
- wrench for FSMA connector

Fig. 7-8: Fibre-optics cable leadthroughs

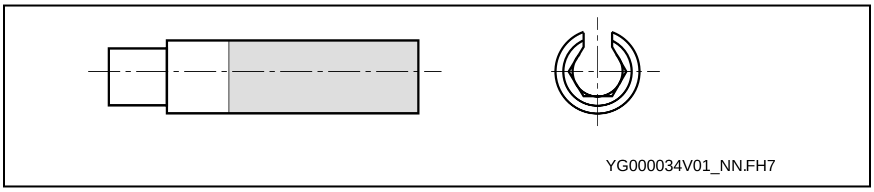


Fig. 7-9: Wrench for FSMA connector

Name	Order Designation
fibre-optics cable leadthrough	STECK-LWL DF*** 01 UNS
wrench fibre-optics cable FSMA	WERKZ-STECKSCHLUESSEL LWL-FSMA

Fig. 7-10: Fibre-optics cable accessories

7.2 Project planning notes

General notes

Note the following when planning the project:

Length of transmission path

The length of the transmission path is limited. Isolating points decrease the maximum length of a fibre-optics cable stretch.

Mixing fibre-optics cable types

Between transmitter and receiver either only plastic fibre-optics cables (IKO0982 or IKO0985) or only glass fibre-optics cables (IKO0001) may be used. There may be no change from plastic to glass or vice versa at isolating points.

Mechanical limit values

The mechanical limit values of fibre-optics cables (e.g., bend radius, tension, cross tension, alternate bends) must be maintained.

Thermal limit values

Thermal limit values of the fibre-optics cables may not be exceeded.

Maximum lengths of the fibre-optics cables

Fibre-optics cable type	Without isolating point	1 isolating point	2 isolating points
plastic fibre-optics cables	50 m	40 m	30 m
glass fibre-optics cables	500 m	400 m	300 m

Fig. 7-11: Maximum fibre-optics cable lengths

Technical data of available fibre-optics cables

	IKO0982	IKO0985	IKO0001
Outer casing	polyamide (PA)	polyurethane (PUR)	polyurethane (PUR)
Outer diameter	2,2 mm ±0,07 mm	6,0 mm ±0,2 mm	3,0 mm
Bend radius	> 50 mm	> 80 mm	> 25 mm
Bend radius in cable trailing install.	--	> 100 mm	--
Tension resistance - short-term	150 N	150 N	330 N
Tension resistance - continuous	100 N	100 N	110 N
Cross tension resistance	450 N/cm	450 N/cm	1000 N/cm
Alternating bend endurance	> 8000 cycles ±90°	> 100000 cycles ±90°	> 10000 cycles ±90°
Temperature range - storage	-40 °C .. +85 °C	-20 °C .. +80 °C	-40 °C .. +85 °C
Temperature range - operations	-40 °C .. +85 °C	-20 °C .. +80 °C	-40 °C .. +85 °C
Core diameter of optic cable	1000 µm	1000 µm	200 µm
Specific opt. damping	< 250 dB/km	< 250 dB/km	< 8 dB/km
Available preferred lengths	0,15 / 0,25 / 0,3 / 0,5 m	5,0 / 10,0 / 15,0 / 20,0 m	50,0 / 75,0 / 100,0 m

Fig. 7-12: Fibre-optics cable technical data

Handling

Connecting the fibre-optics cables

Connections transmitter side

Fibre-optics cables are connected as follows at the transmitter
TX (PPC-R, PPC-P)
X10 (DSS 2.1 in Diax 03 or Diax 04 and EcoDrive)
X20 (IndraDrive, EcoDrive 03, EcoDrive Cs).

Connections receiver side

Fibre-optics cables are connected as follows at the receiver
RX (PPC-R, PPC-P)
X11 (DSS 2.1 in Diax 03 or Diax 04 and EcoDrive)
X21 (IndraDrive, EcoDrive 03, EcoDrive Cs).

Storage

When storing the fibre-optics cables, please note that

- the protective caps must be in place
- the mechanical limit values are maintained
- the thermal limit values are maintained.

Routing and mounting

When routing and mounting the fibre-optics cables, please note that the specific load data do not damage the fibre-optics cables.

Bend radius

The minimum bend radius may not be exceeded (e.g., when routing around corners).

Cross stress

The maximum cross stress may not be exceeded (e.g., when routing around corners). In cable channels, please note that the fibre-optics cable is not subjected to excessive cross stress. This can be caused for example by the weight of power cables.

Routing over sharp edges or pointy, uneven surfaces must be avoided. Any cuts or mechanical damage could cause interference.

Do not twist fibre-optics cable

Avoid twisting the fibre-optics cable when routing. There may be no tension in the final position of the fibre-optics cable.

Connections of the fibre-optics cables at motion control or drive

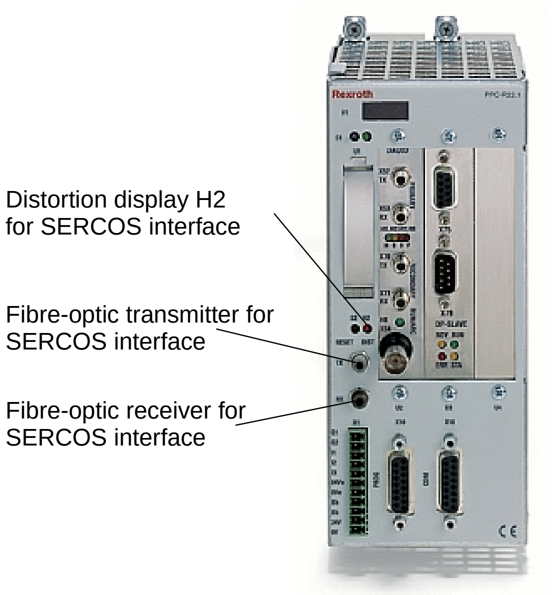


Fig. 7-13: Connections of the PPC-R2x

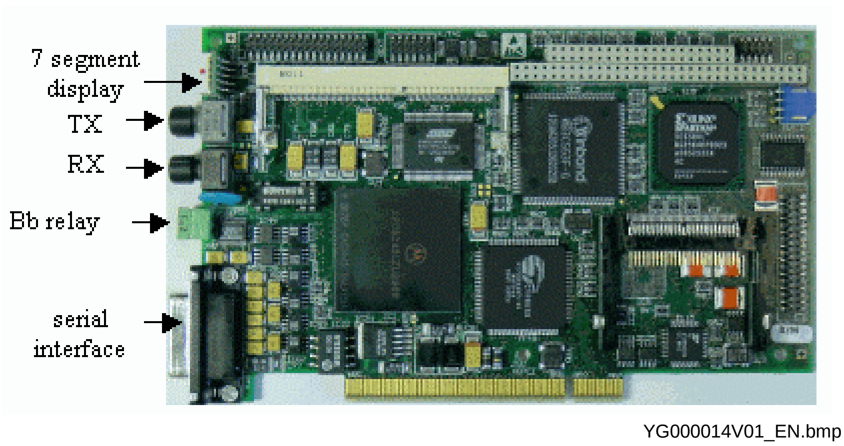


Fig. 7-14: Connections PPC-P

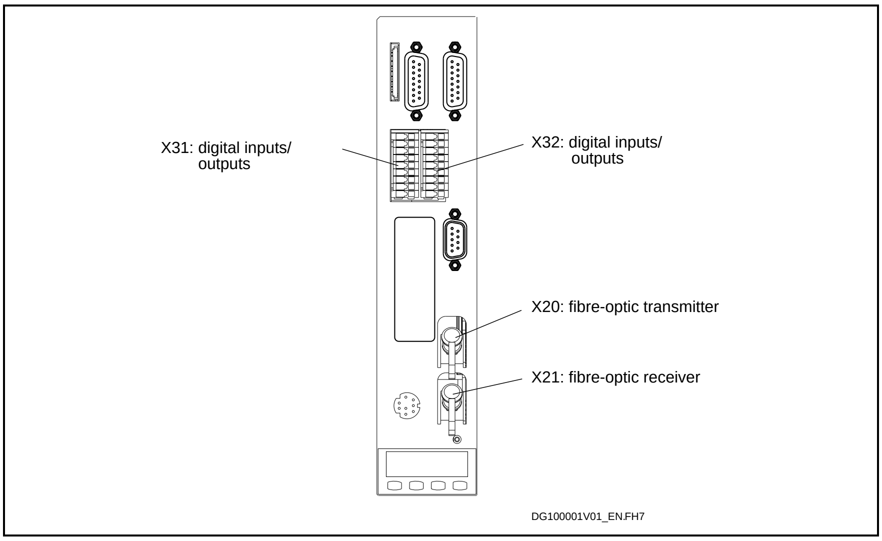


Fig. 7-15: Connections CSH01.1 (IndraDrive)

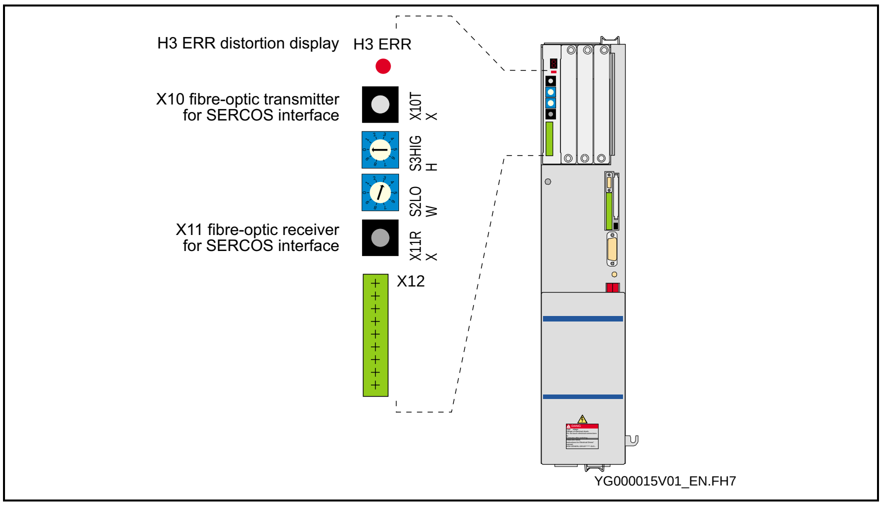


Fig. 7-16: Connections of the DSS 2.1 (Diax 03/Diax 04)

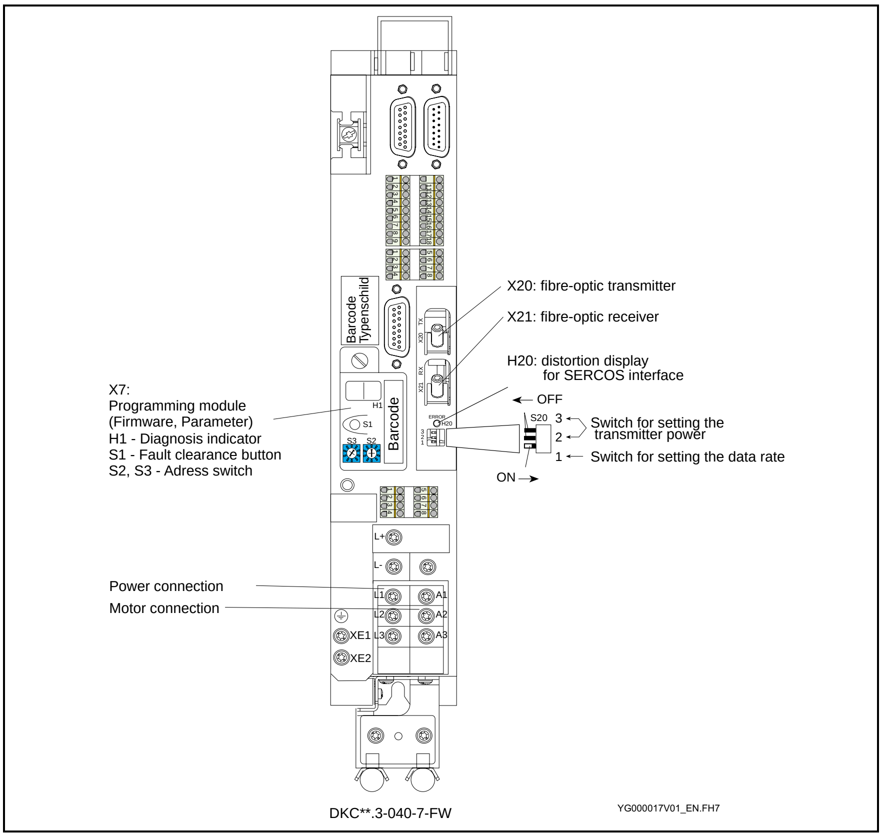


Fig. 7-17: Connections of the DKC02.3 (EcoDrive 03)

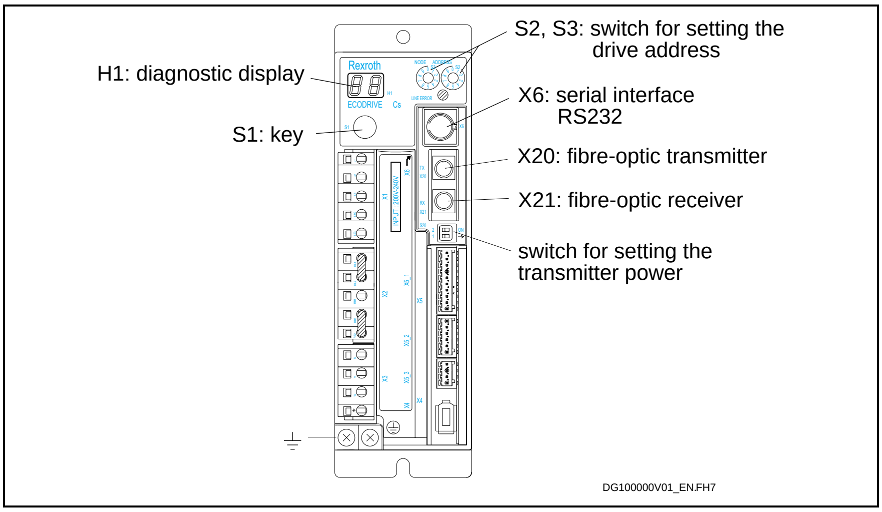


Fig. 7-18: Connections DKC02.3 (EcoDrive Cs)

7.3 Examples for the fibre-optics cable ring structure

Example 1: Drive ring

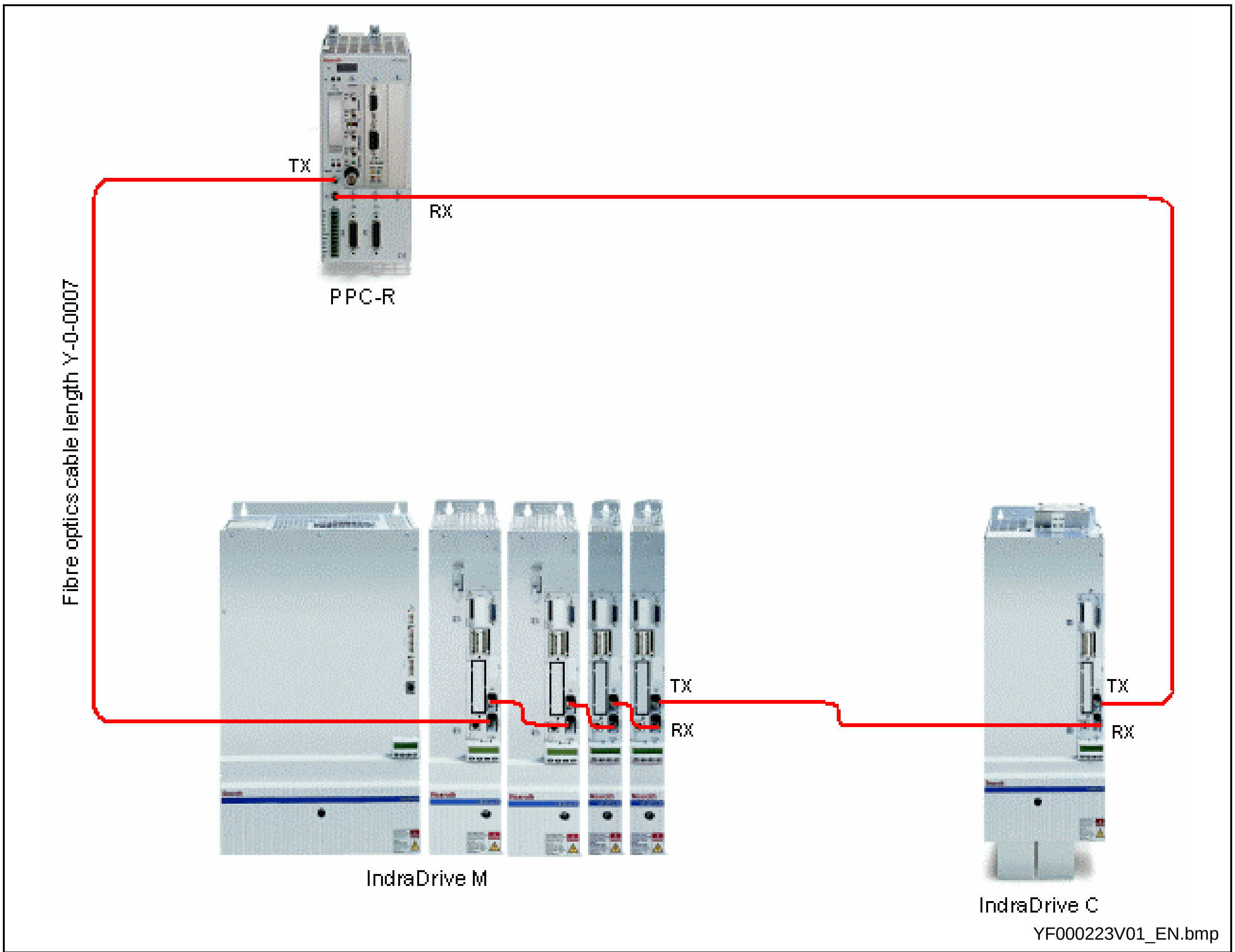


Fig. 7-19: Ring structure drive ring

Example 2: PPC link single ring

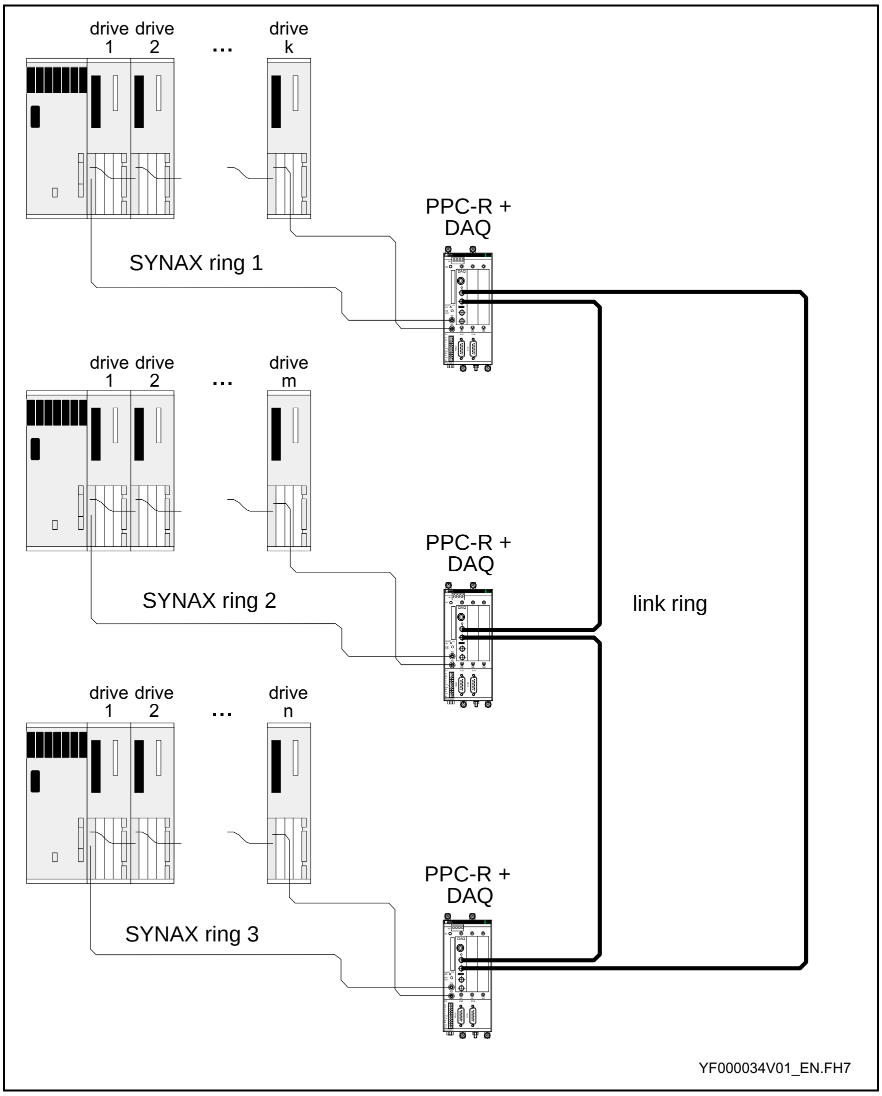


Fig. 7-20: PPC link with single ring

Single ring: primary ring

A simple ring only uses the primary ring. The secondary ring is not built.

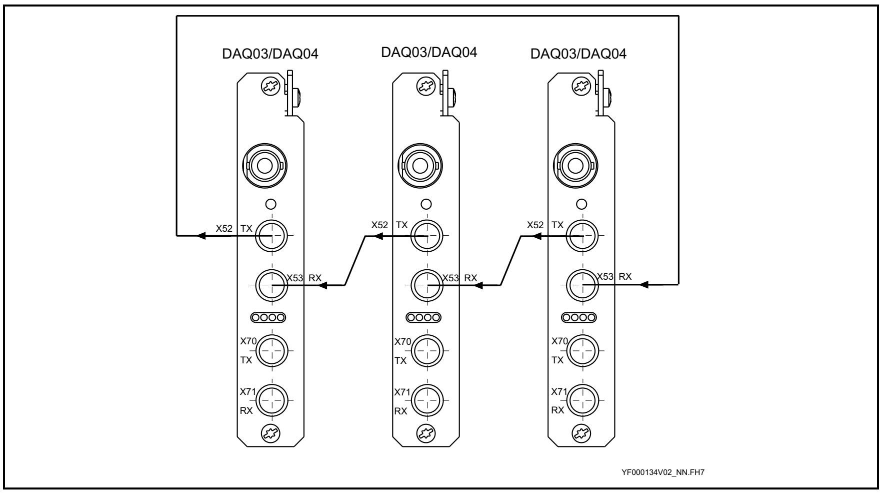


Fig. 7-21: Fibre-Optics cable link in a simple ring

Example 3: PPC link double ring

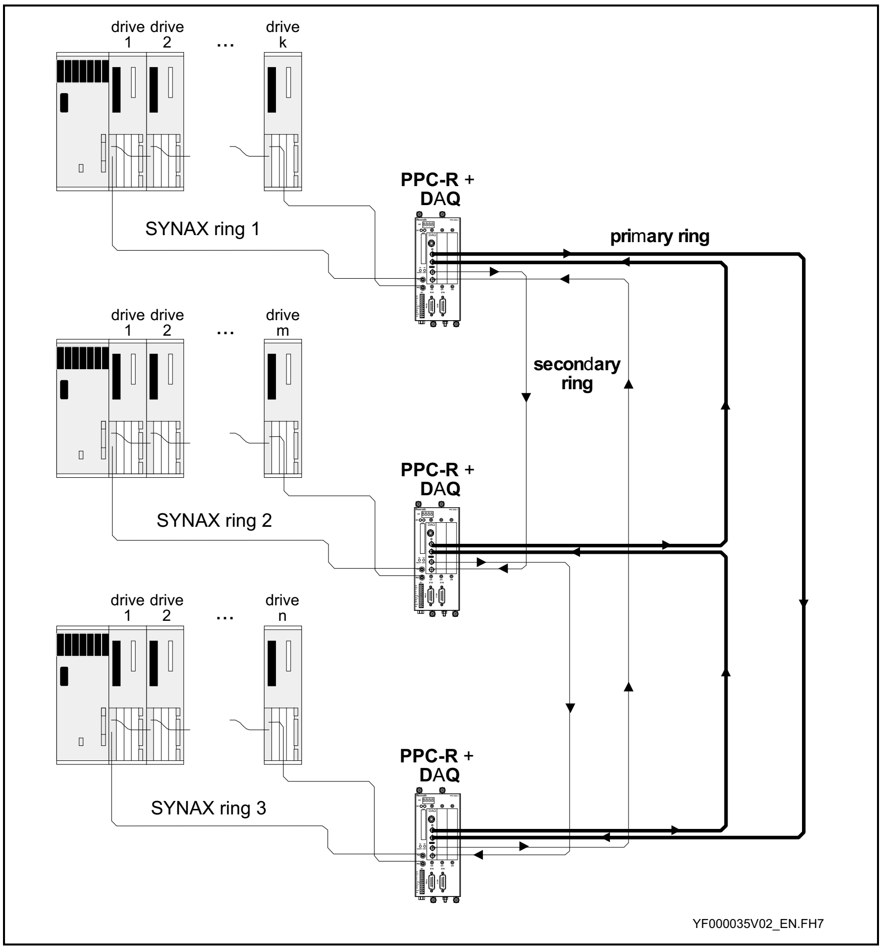


Fig. 7-22: PPC link with double ring

Primary ring, secondary ring

The primary ring is generally used for communication. The secondary ring only transmits diagnostic signals.

Note: The secondary ring must be connected - as shown - in a counter direction.

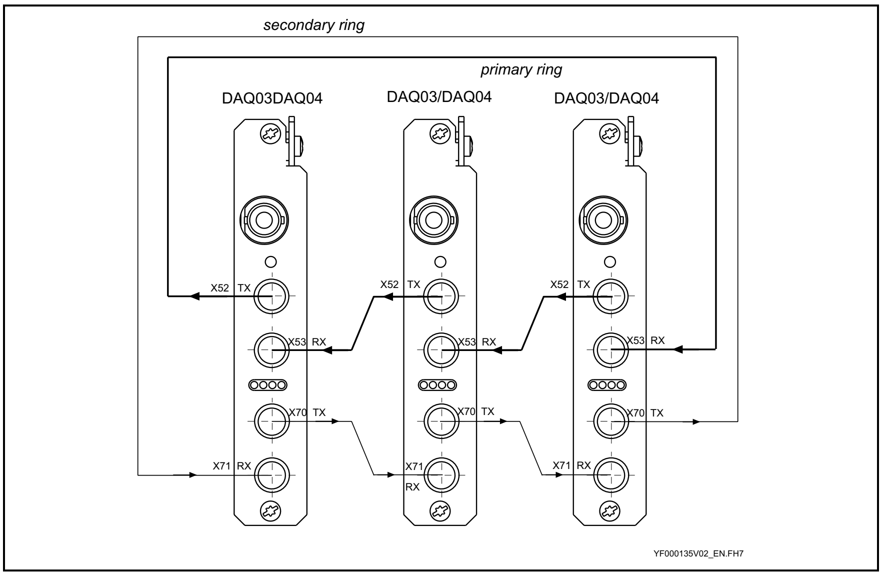


Fig. 7-23: Fibre-optics cable connection in a double ring

8 Set-Up interfaces (SynTop, DOLFI)

8.1 General information

The PC set-up software SynTop is connected to the PPC by means of a serial interface. This uses the PPC interface X10 or X16. The choice of the interface can be made using a parameter. The interface X10 is galvanic separated and therefore it should be used preferably.

8.2 Serial connection of the PPC

Use the standard control cable IKB0005 to connect the PPC.

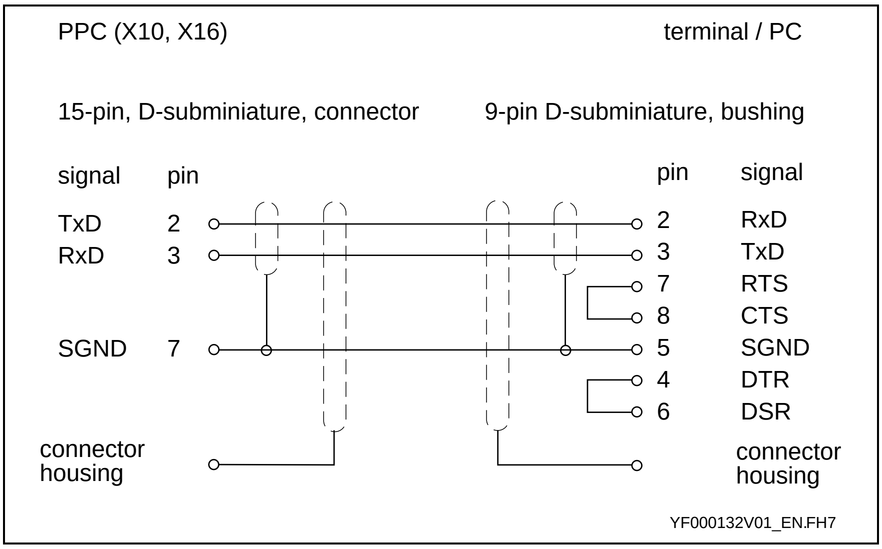


Fig. 8-1: IKB0005

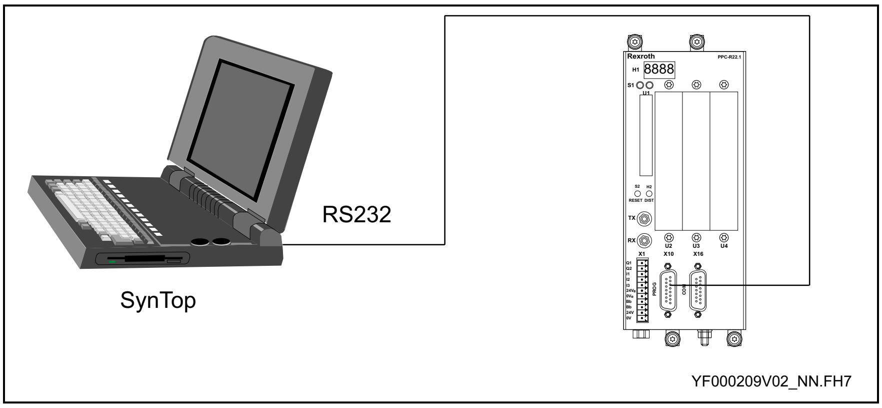


Fig. 8-2: Connecting SynTop to the PPC

8.3 RS485 link

SynTop can communicate with several PPCs using an RS485 link.

Up to 20 PPCs can be connected (driver rating of the RS485 driver of the PPC). If there are more PPCs operated in one RS485 link, then RS485 repeater have to be installed at suitable positions.

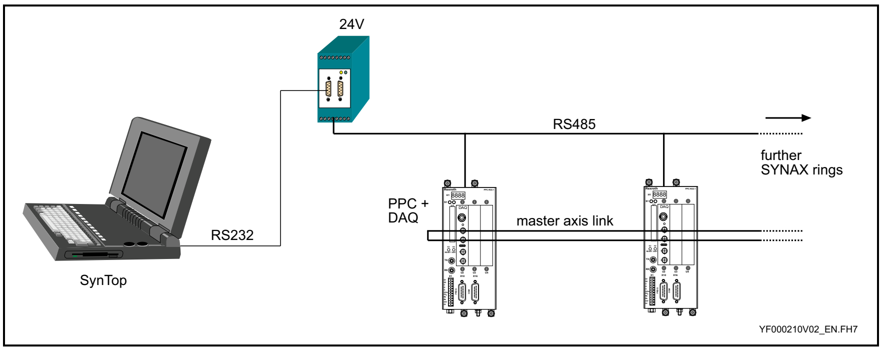


Fig. 8-3: RS485 link of SynTop to several PPCs

This necessitates couplers from RS485 to RS232 for the connection of the PC to the RS485 link.

An example are the coupler interface modules PSM-EG-RS232/RS485-P/2D or PSM-ME-RS232/RS485-P made by Phoenix Contact.

Interface module PSM-ME-RS232/RS485-P

Fig. 8-4: Interface module PSM-ME-RS232/RS485-P

Switch settings:

1. 180R Bus-End ON (only at the bus end)
2. Dip switch 1 and 3 ON for baudrate 19,2; rest OFF
3. RS232 Device type at DTE

With switch 180R BUS-END a matching resistor 180R and each 470R against +5V and GND can be connected to the bus end.

The voltage supply for the interface modules comes from 24 V which is connected via the intended screw-in clamps.

Interface module PSM-EG-RS232/RS485-P/2D

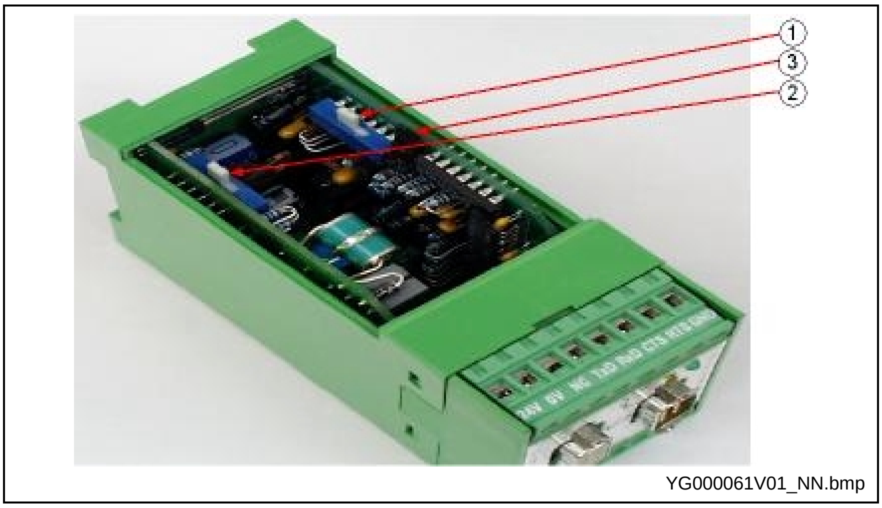


Fig. 8-5: Interface module PSM-EG-RS232/RS485-P/2D

Switch settings:

1. 180R BUS-END ON (only at the bus end)
2. S1 to DTE
3. RTS/CTS high-active (bridge jumper X6 from pin 3 to pin 4)

The RS485 directional switches of the module uses the RTS signal. With these cables the TxD of the sender is connected to the RTS of the module, i.e. with each 1 bit there is a switch to transmit.

With switch 180R BUS-END a matching resistor 180R and each 470R against +5V and GND can be connected to the bus end.

The voltage supply for the interface modules comes from 24 V which is connected via the intended screw-in clamps.

Cable from the PC to the converter

The cable from the PC to the interface module is constructed as follows:

Cable valid for PSM-EG and PSM-ME

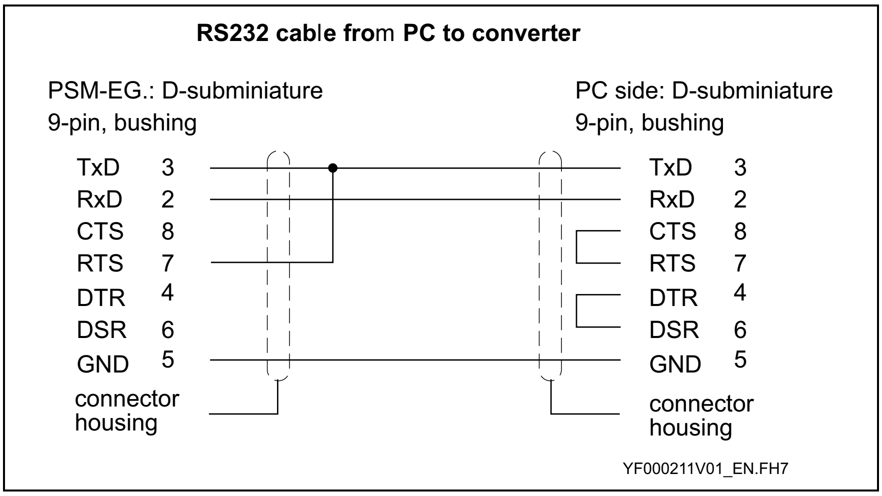


Fig. 8-6: Cable from PC to converter (valid for PSM-EG-RS232/RS485-P/2D and PSM-ME-RS232/RS485-P)

Note: The connection from pin 3 to pin 7 at the side of the converter at the PSM-ME-RS232/RS485-P is not necessary. If you use mixed service between PSM-EG-RS232/RS485-P/2D and PSM-ME-RS232/RS485P the connection from pin 3 to pin 7 should be installed because otherwise it's only possible to get a communication between PC and PSM-ME-RS232/RS485-P converter.

Cable only valid for PSM-ME

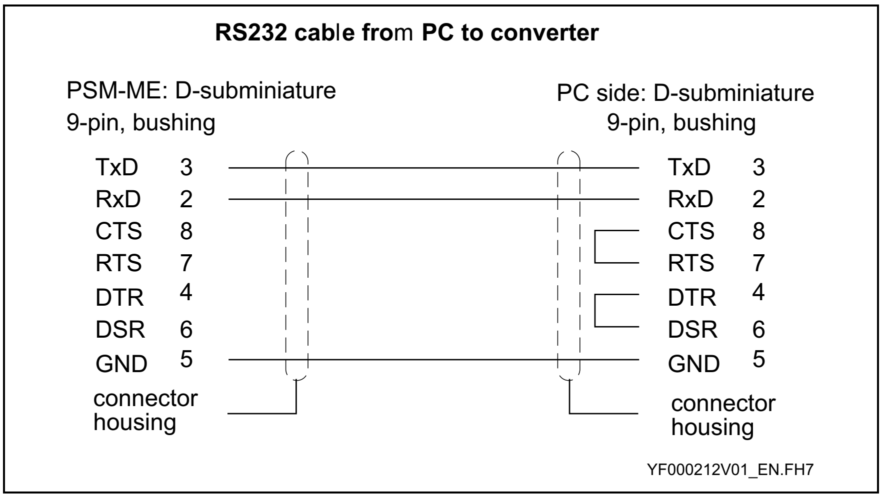


Fig. 8-7: Cable from PC to converter (only valid for PSM-ME-RS232/RS485-P)

RS485 connection of the PPCs

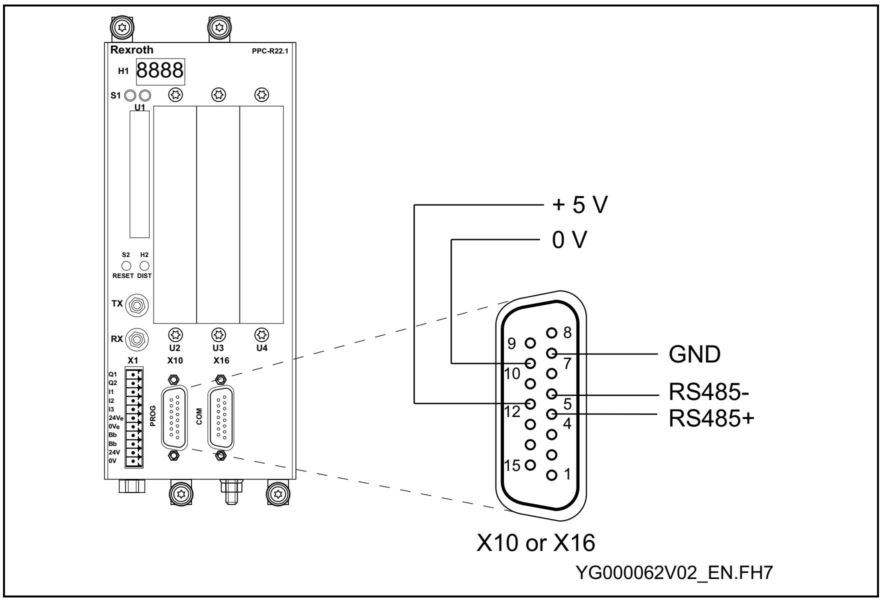


Fig. 8-8: RS485 connection of the PPC

RS485 connection of the interface module

On RS485, the D(A) and D(B) are twisted in pairs and connected. GND is also connected. These can be connected to the interface module using either screw-in clamps or male D-subminiature 9-pin connectors (bushing is on the module).

Connector: D(A) data negative pin 8, D(B) data positive pin 3, GND pin2.

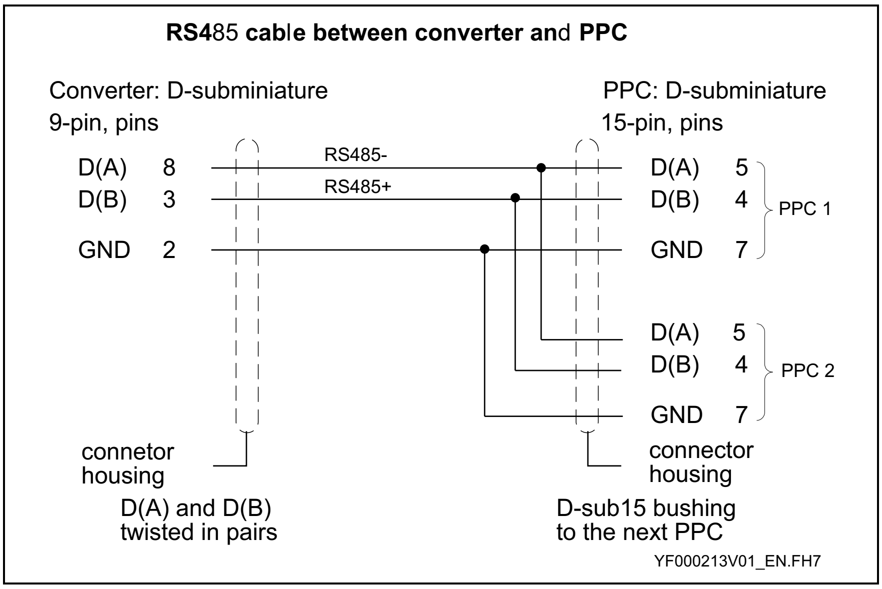


Fig. 8-9: RS485 cable between converter and PPC

RS485 cable

The RS485 bus cable should be shielded and twisted in pairs. The diameter should equal at least $0.22mm^2$, with a characteristic impedance of 100-120Ω.

The shield is applied at both ends of the transmission path. If equipotential currents are expected, then one side is directly grounded and the other is grounded via a 15nF capacitor.

The order designation of the cables can be found in section 9.9 "List of connectors and ready-made cables".

Bus matching

The bus matching must be effected on both bus ends. If a bus end is constructed with RS485 coupler above, then the bus matching in the coupler can be connected via switch in the coupler.

Power supply of the bus matching can also be received by the PPC.

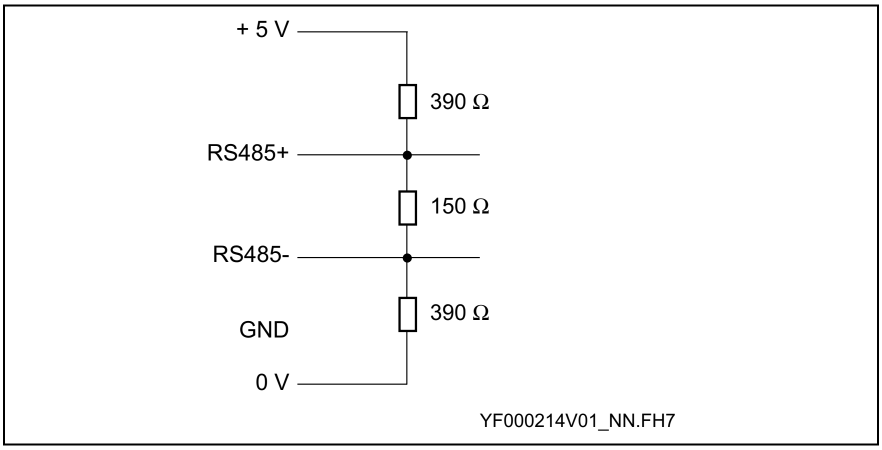


Fig. 8-10: Power supply of the bus matching via PPC

8.4 Connection of the PPC with Ethernet

ETH01 only with PPC-P11

To use the Ethernet connection an Ethernet card (ETH01) must be available as an option module. Ethernet connection to SynTop is not explicit activated, but it is automatically activated, if an Ethernet card is available.

The Ethernet address, the subnet mask and the default gateway must be entered on the PPC. The settings can be done via serial connection or with the S1 menu.

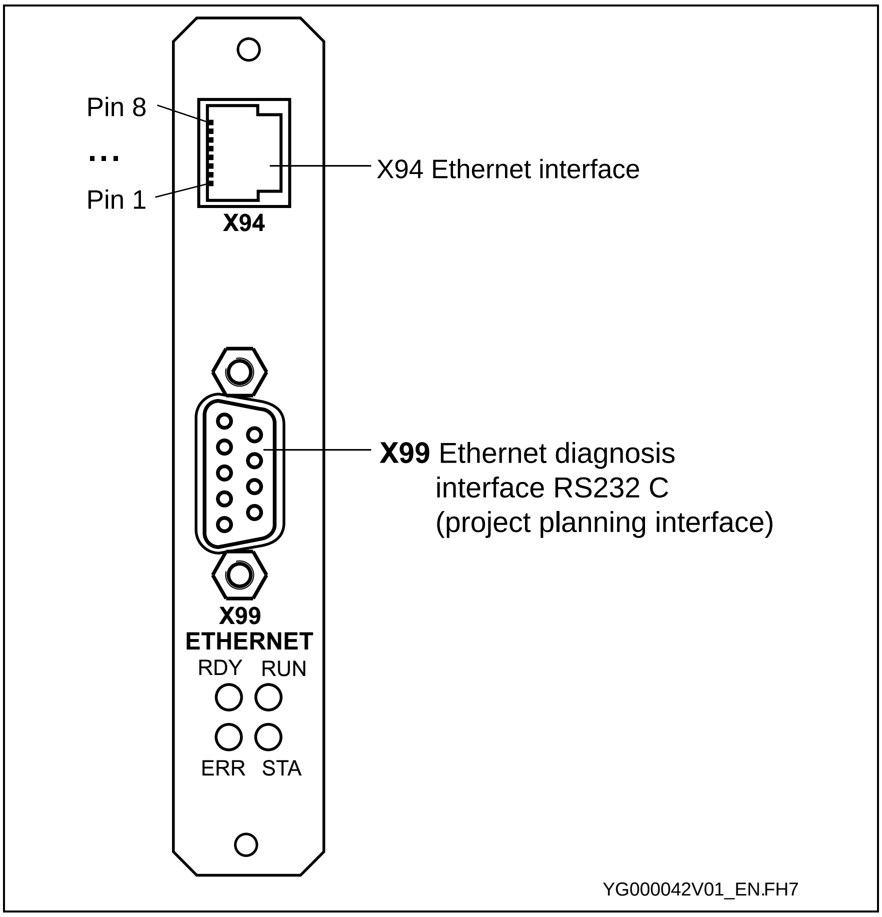


Fig. 8-11: Ethernet interface

pin	signal	
1	Transmitter data P	TX+
2	Transmitter data N	TX-
3	Receiver data P	RX+
6	Receiver data N	RX-

Fig. 8-12: Pin assignment RJ45 Ethernet bushing

Ethernet on-board with PPC-R21 and PPC-R22

With PPC-R21 and the PPC-R22 the Ethernet interface is on-board.

The same features are supported as with interface option ETH01, 10/100 MBit/s is supported as transmission rate.

8.5 Firmware update (DOLFI)

With the help of the windows program DOLFI version 01VRS (from 01V08) or 02VRS (from 02V07) firmware updates can be made.

DOLFI version 01VRS

DOLFI version 01VRS offers the possibility to make updates with the help of

- the serial interface.

The following devices are supported:

- PPC-R and PPC-P
- IndraDrive
- EcoDrive (03 and Cs)

DOLFI version 01VRS supports the following operating systems:

- Microsoft Windows 95
- Microsoft Windows 98
- Microsoft Windows ME
- Microsoft Windows NT 4.0
- Microsoft Windows 2000

DOLFI version 01VRS can be bought once and may be copied as often as you like (copy license -COPY).

Order designation DOLFI version 01

SWA-DOL*PC-INB-01VRS-MS-C1,44-COPY

DOLFI version 02VRS

DOLFI version 02VRS offers the possibility to make updates with the help of

- the serial interface and
- a PC card drive (e.g., notebook PC card slot or SCM swap-box).

The following devices are supported:

- PPC-R and PPC-P
- IndraDrive
- EcoDrive (03 and Cs)
- Diax (03 and 04)

DOLFI version 02VRS only supports the following operating system:

- **Microsoft Windows NT 4.0**

DOLFI version 02VRS must be bought separately for every installation because of cardware license specifications and may not be copied.

Order designation DOLFI version 02

SWA-DOL*PC-INB-02VRS-MS-CD600-WIN*NT

9 Appendix

9.1 Dimensional sheets, terminal diagrams control components

PPC-R21.1 and PPC-R22.1

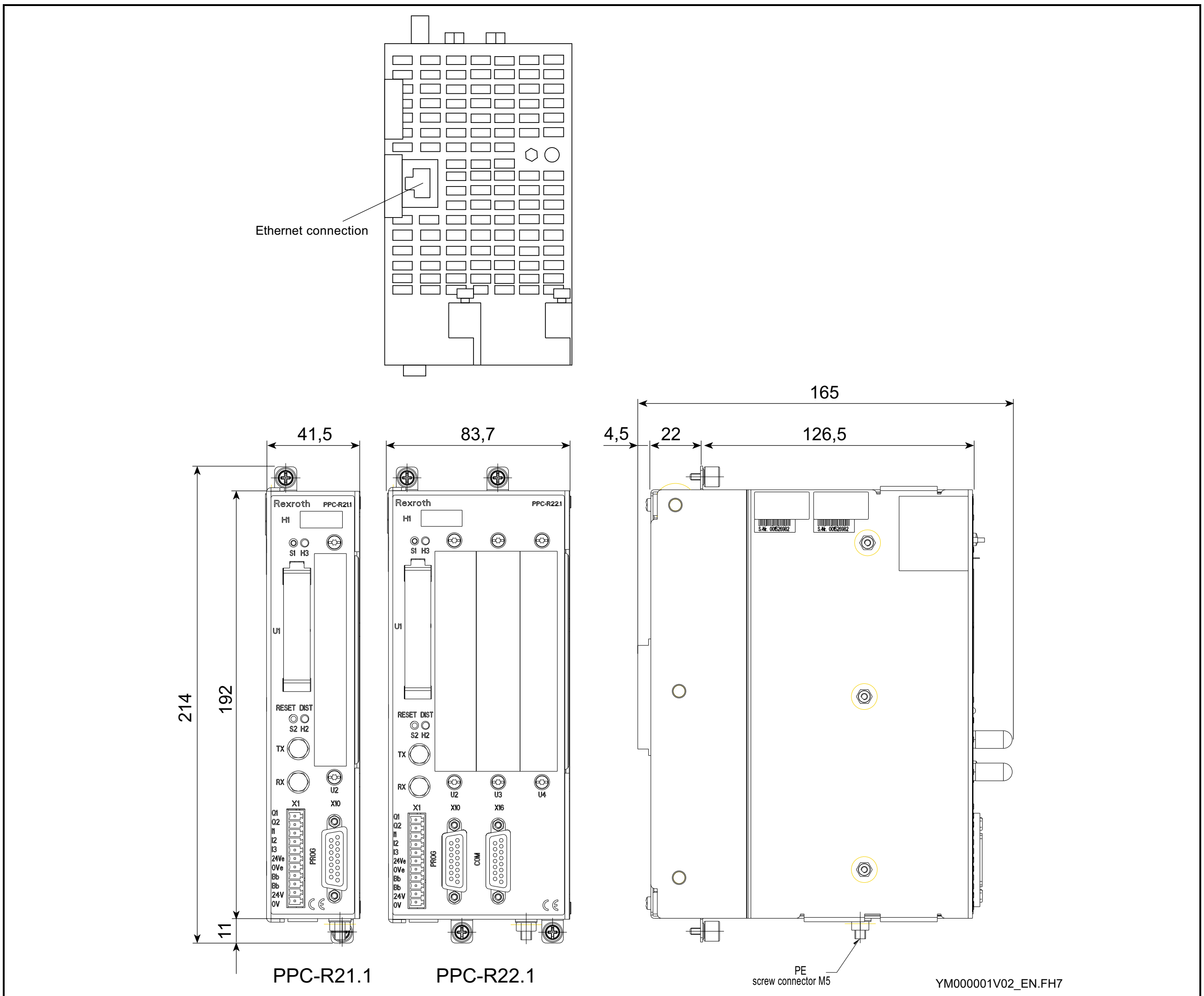


Fig. 9-1: Dimensional sheet PPC-R21.1 and PPC-R22.1

Rexroth
Bosch Group

Option cards based on the MotionControl (for the PPC)

DAQ03.1R

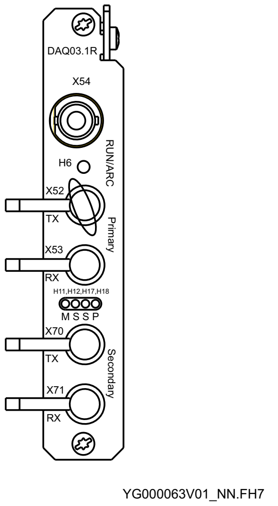


Fig. 9-2: DAQ03.1R

DAQ04.1R

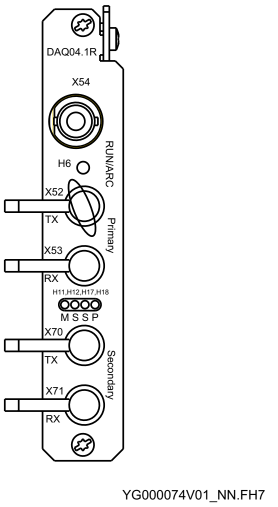


Fig. 9-3: DAQ04.1R

LAG

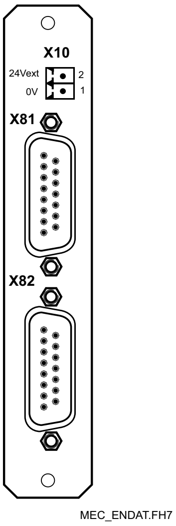


Fig. 9-4: LAG

Profibus slave interface DPS01

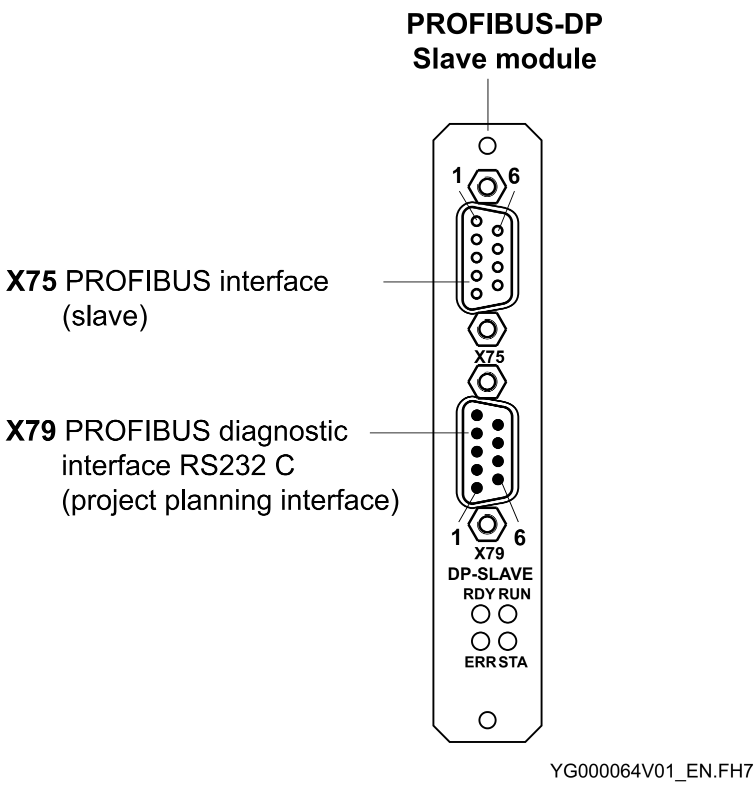


Fig. 9-5: Profibus slave interface DPS01

DeviceNet slave interface DNS03

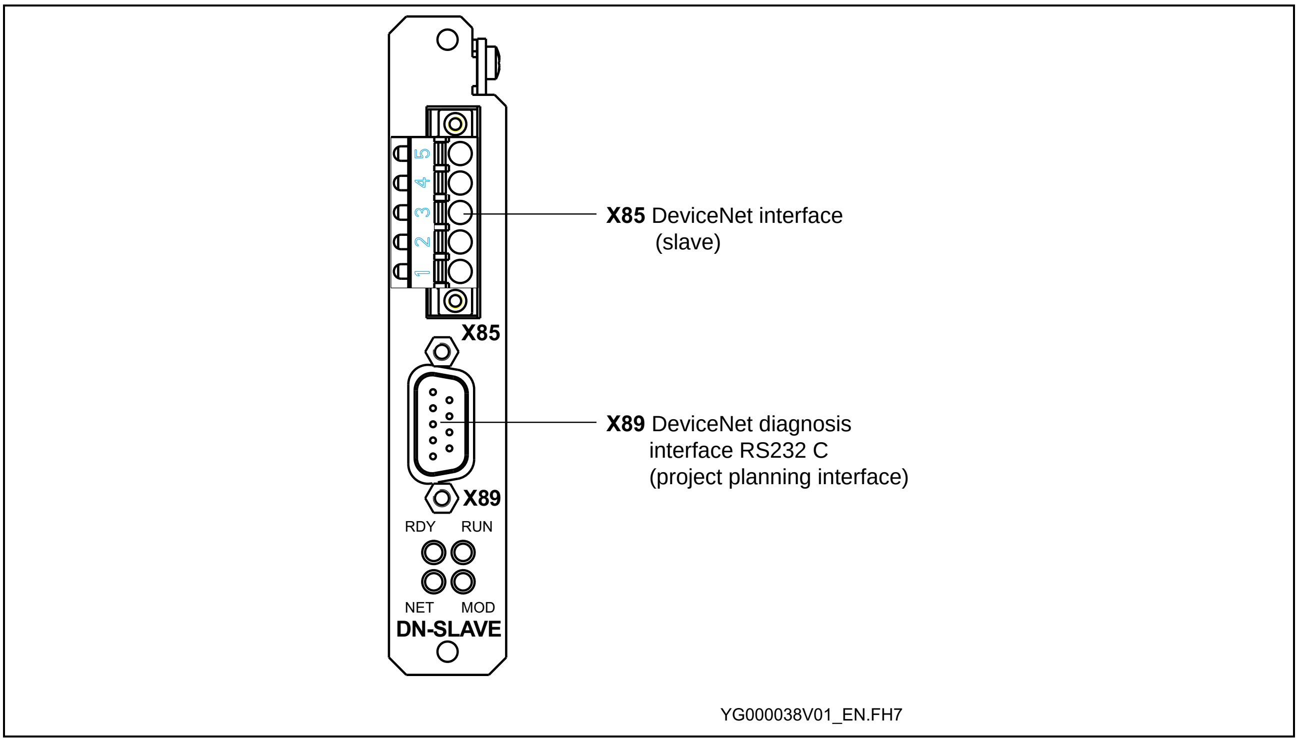


Fig. 9-6: DeviceNet slave interface DNS03

Ethernet interface ETH

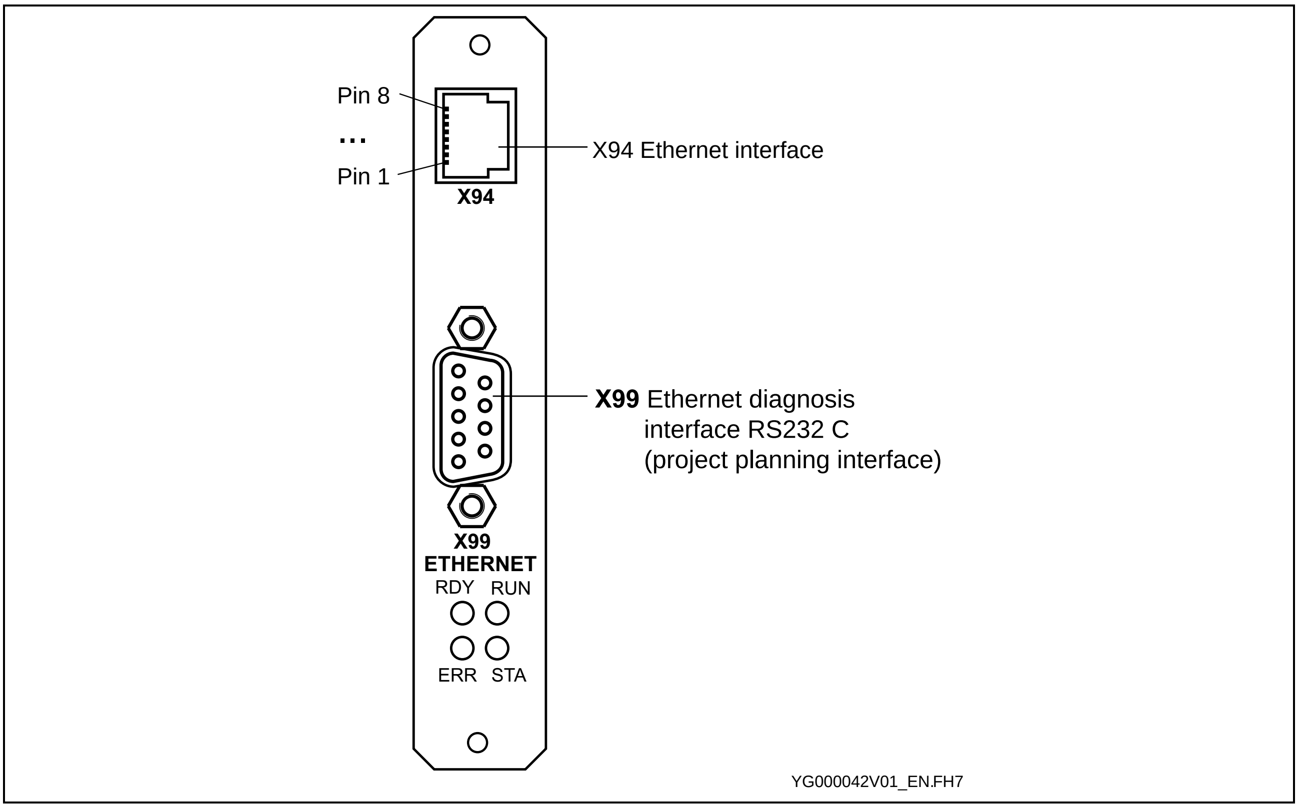


Fig. 9-7: Ethernet interface ETH

Option cards based on the PLC (for the PPC)

Profibus master interface DPM01

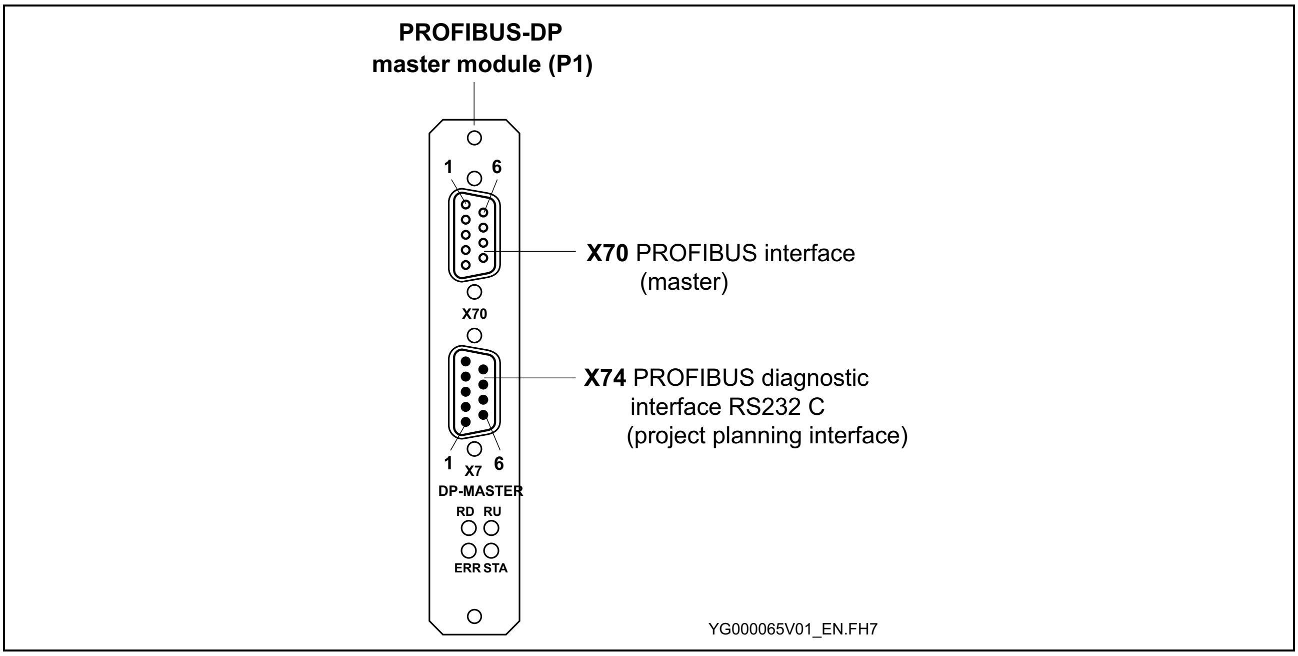


Fig. 9-8: Profibus master interface DPM01

DeviceNet master interface DNM03

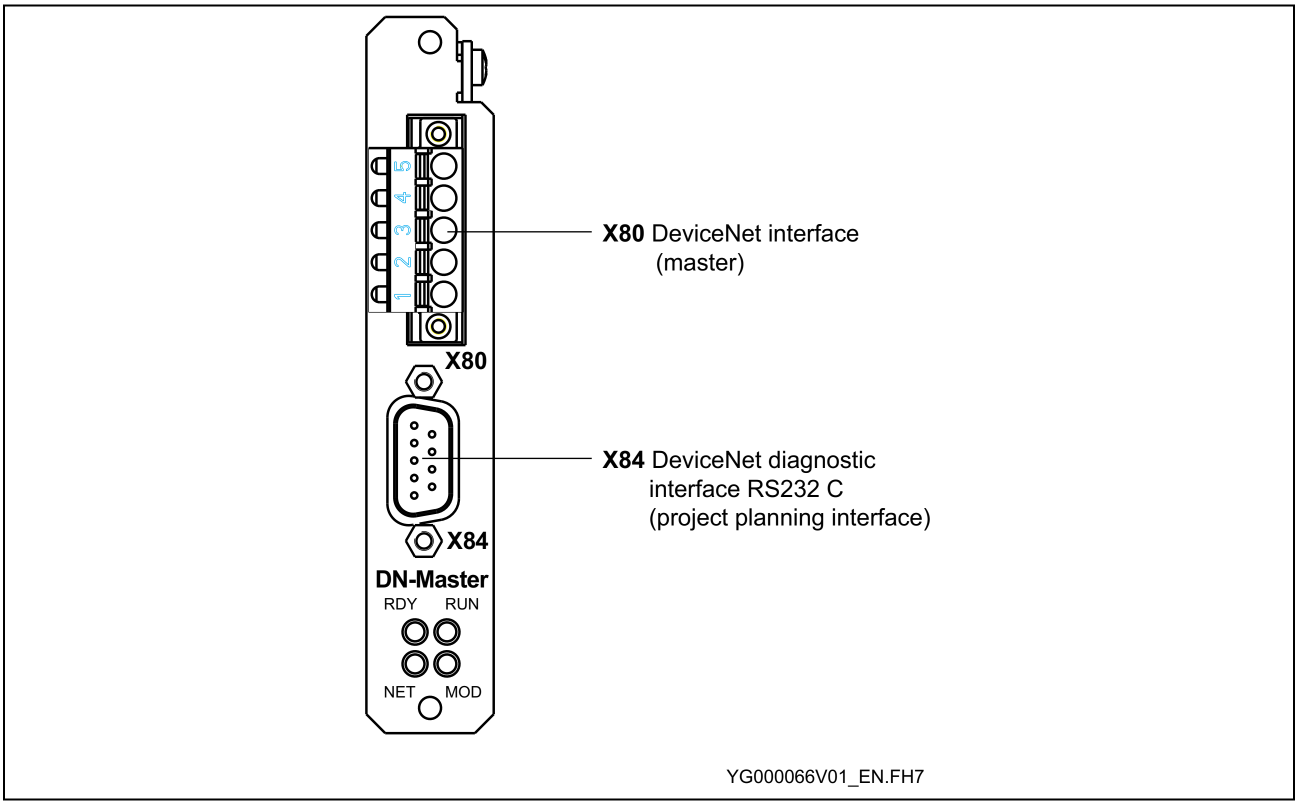


Fig. 9-9: DeviceNet master interface DNM03

Mounting dimensions module carrier RMB02.2-02 and RMB02.2-04

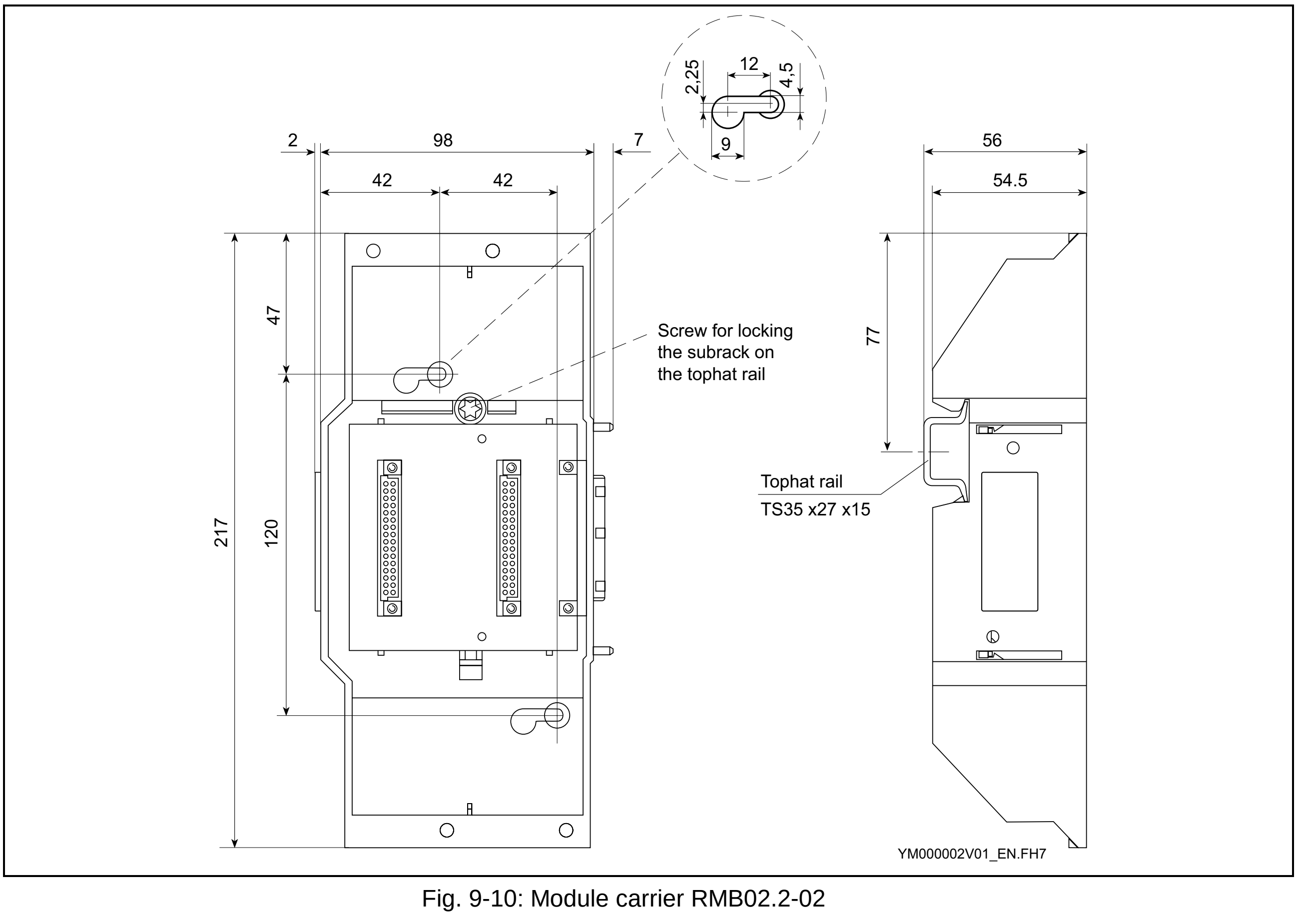


Fig. 9-10: Module carrier RMB02.2-02

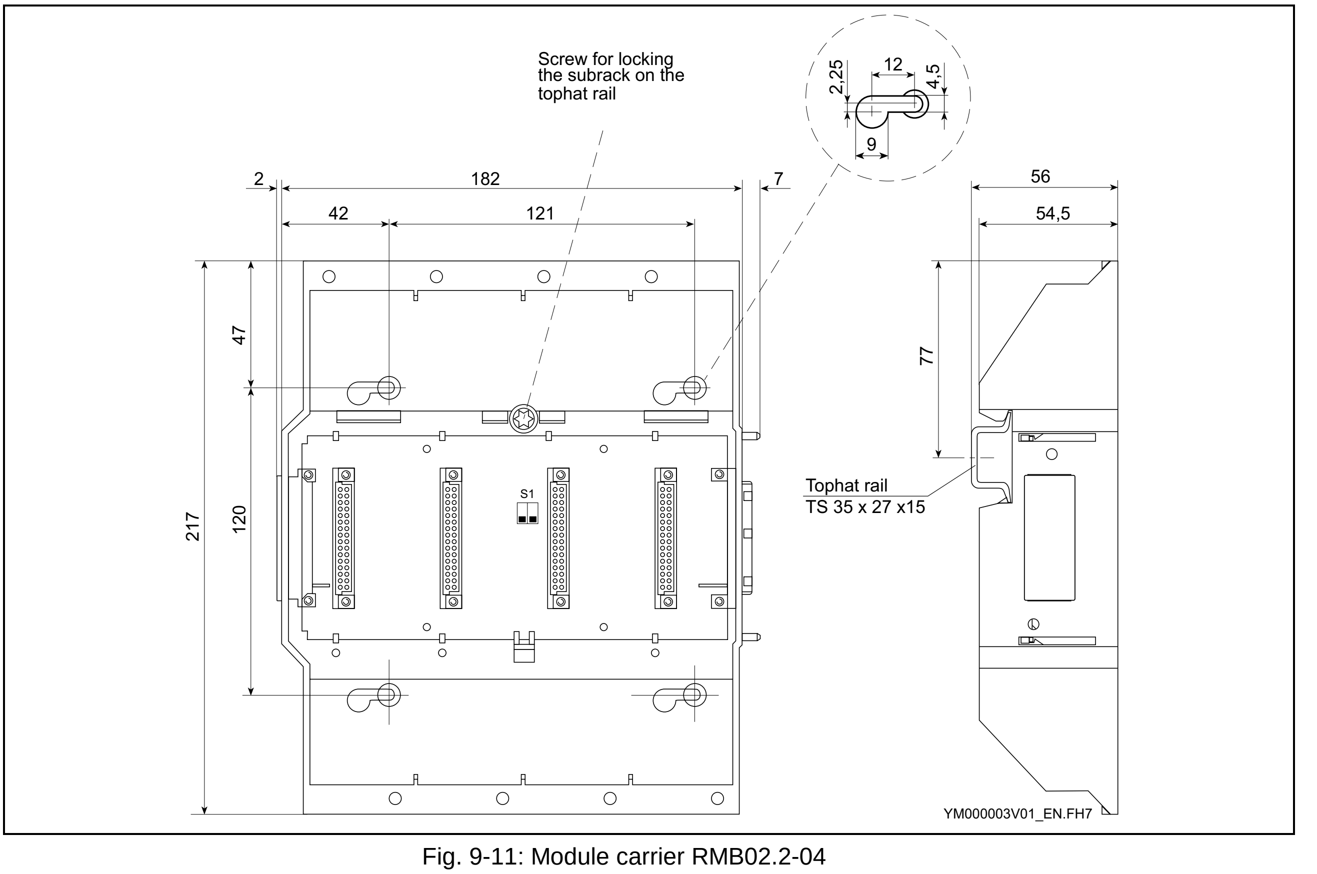


Fig. 9-11: Module carrier RMB02.2-04

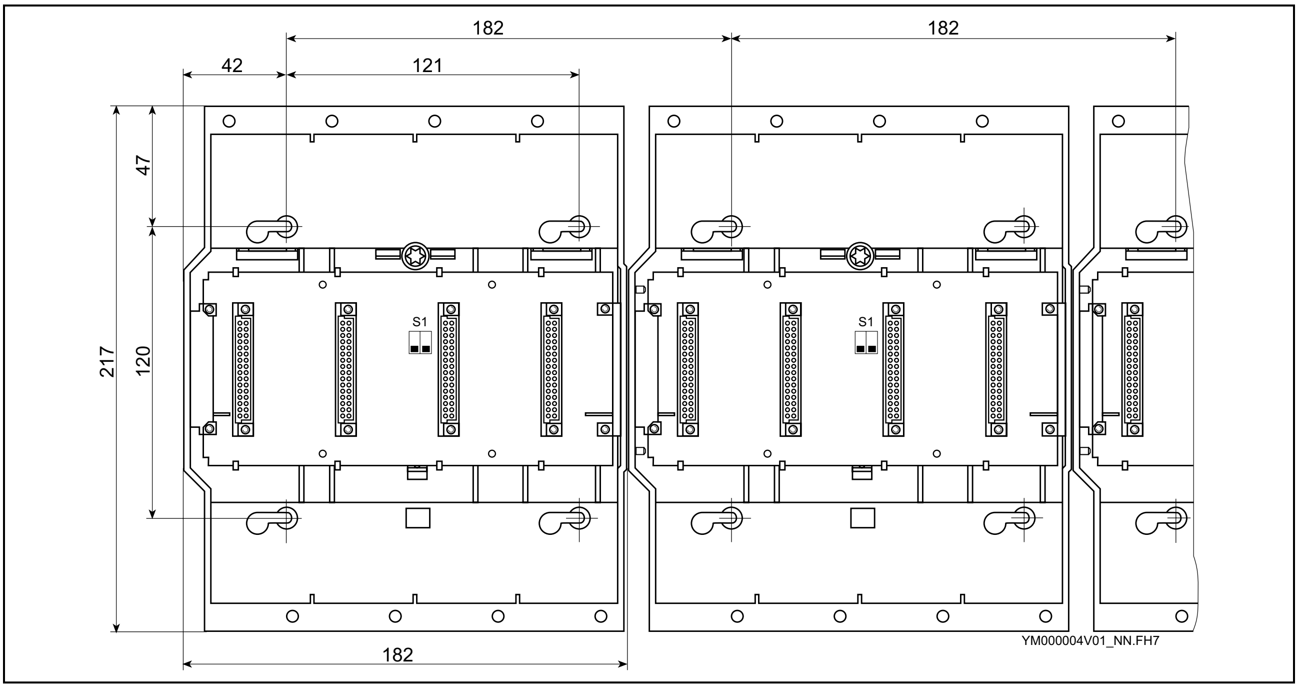


Fig. 9-12: Side-by-side installation of several RMB02.2-04 module carriers

9.2 Dimensional sheets, terminal diagrams RECO

Input module RME02.2-16-DC024

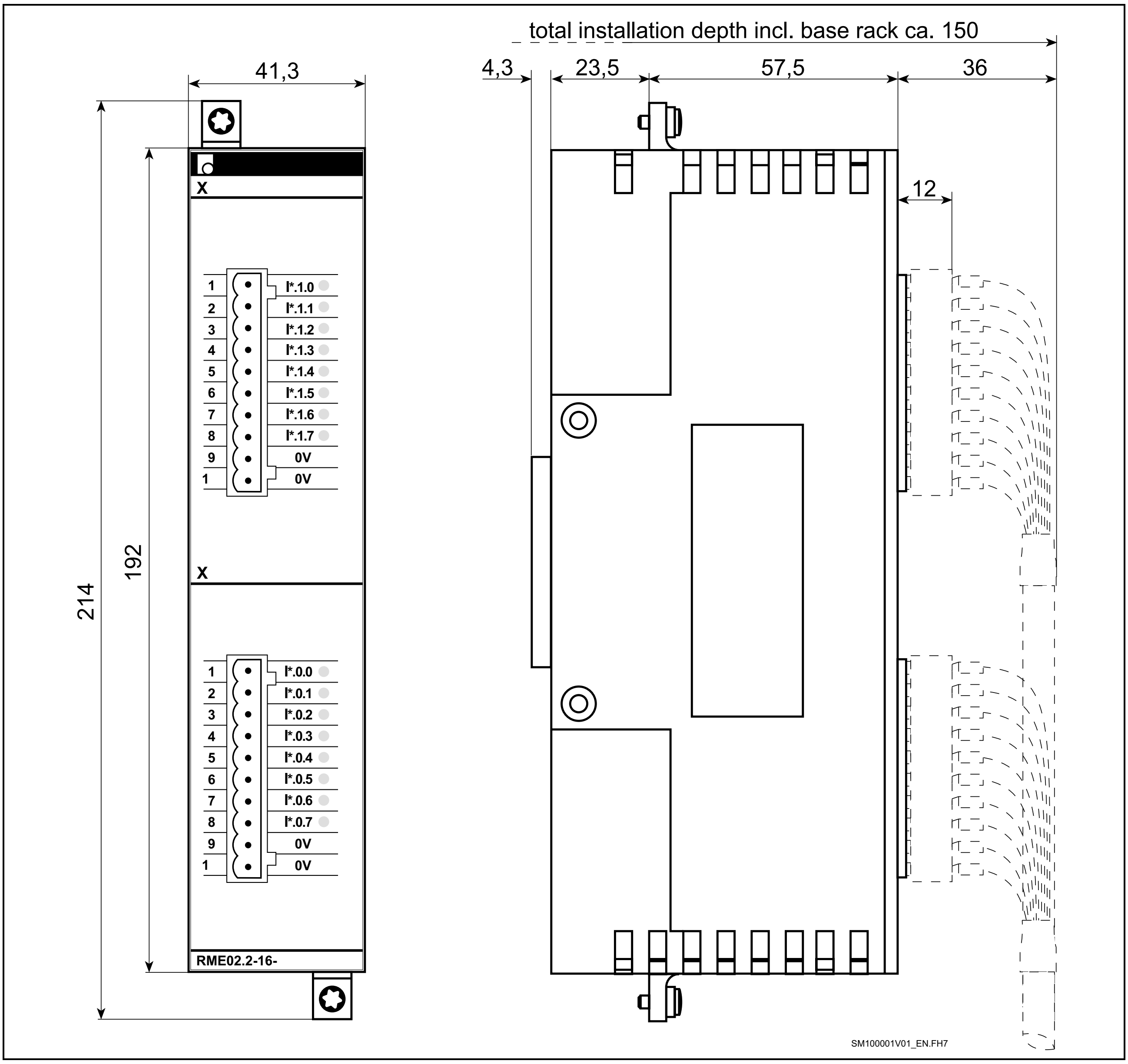


Fig. 9-13: Dimensional sheet RME02.2-16-DC024

Input module RME02.2-32-DC024

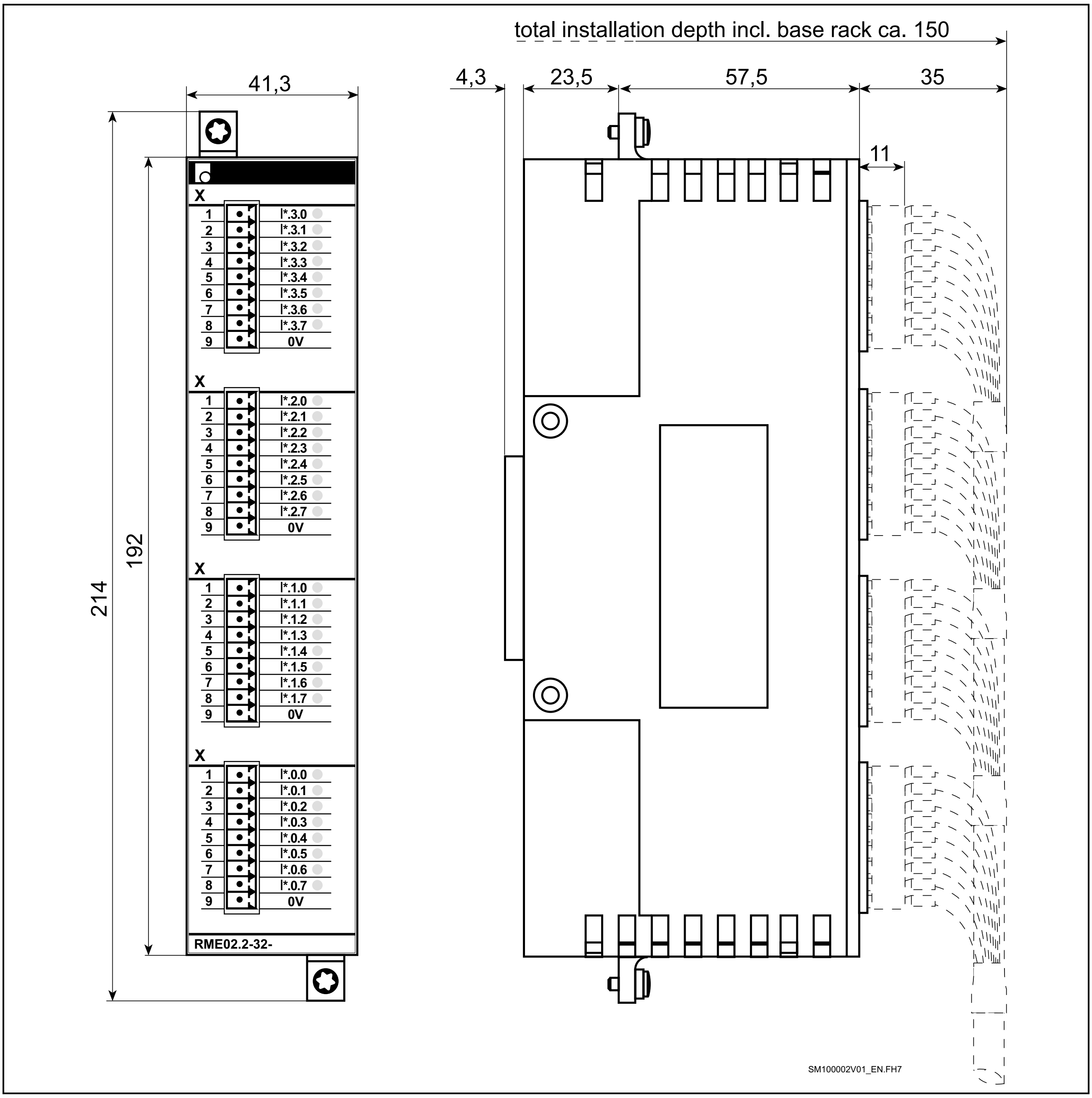


Fig. 9-14: Dimensional sheet RME02.2-32-DC024

Rexroth Bosch Group

Input module RME02.2-16-AC115

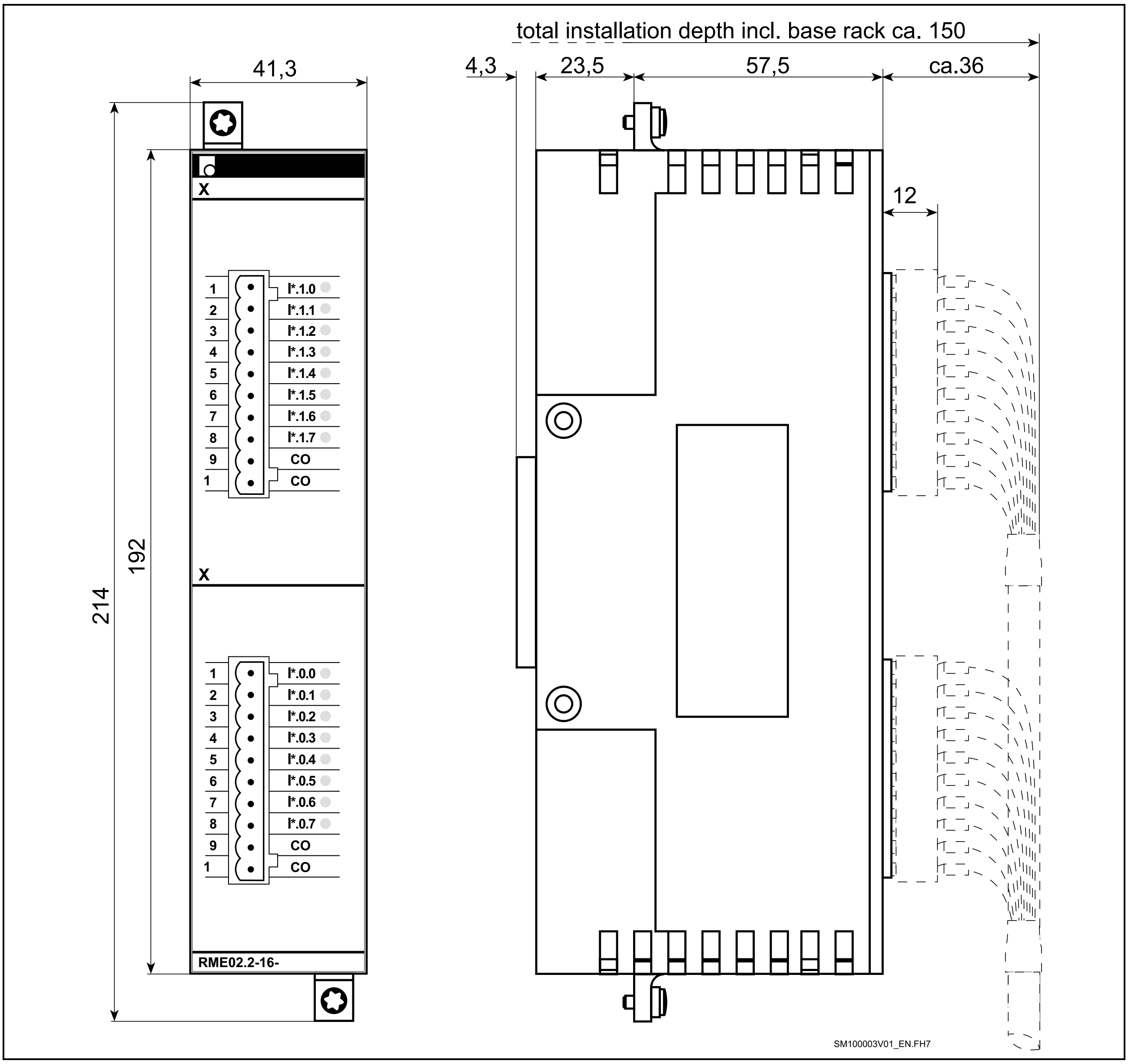


Fig. 9-15: Dimensional sheet RME02.2-16-AC115

Output module RMA02.2-16-DC024-200

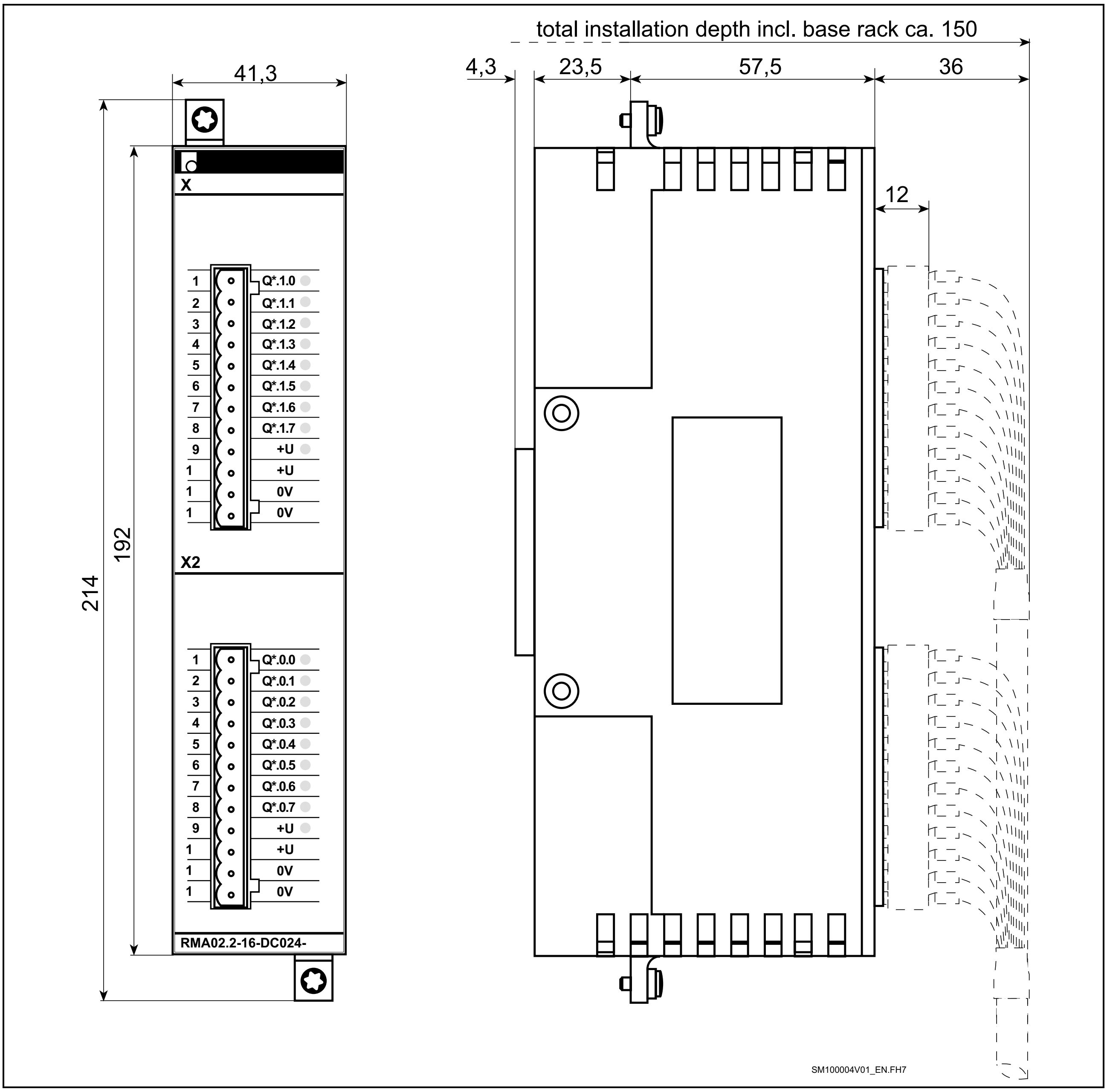


Fig. 9-16: Dimensional sheet RMA02.2-16-DC024-200

Output module RMA02.2-32-DC024-050

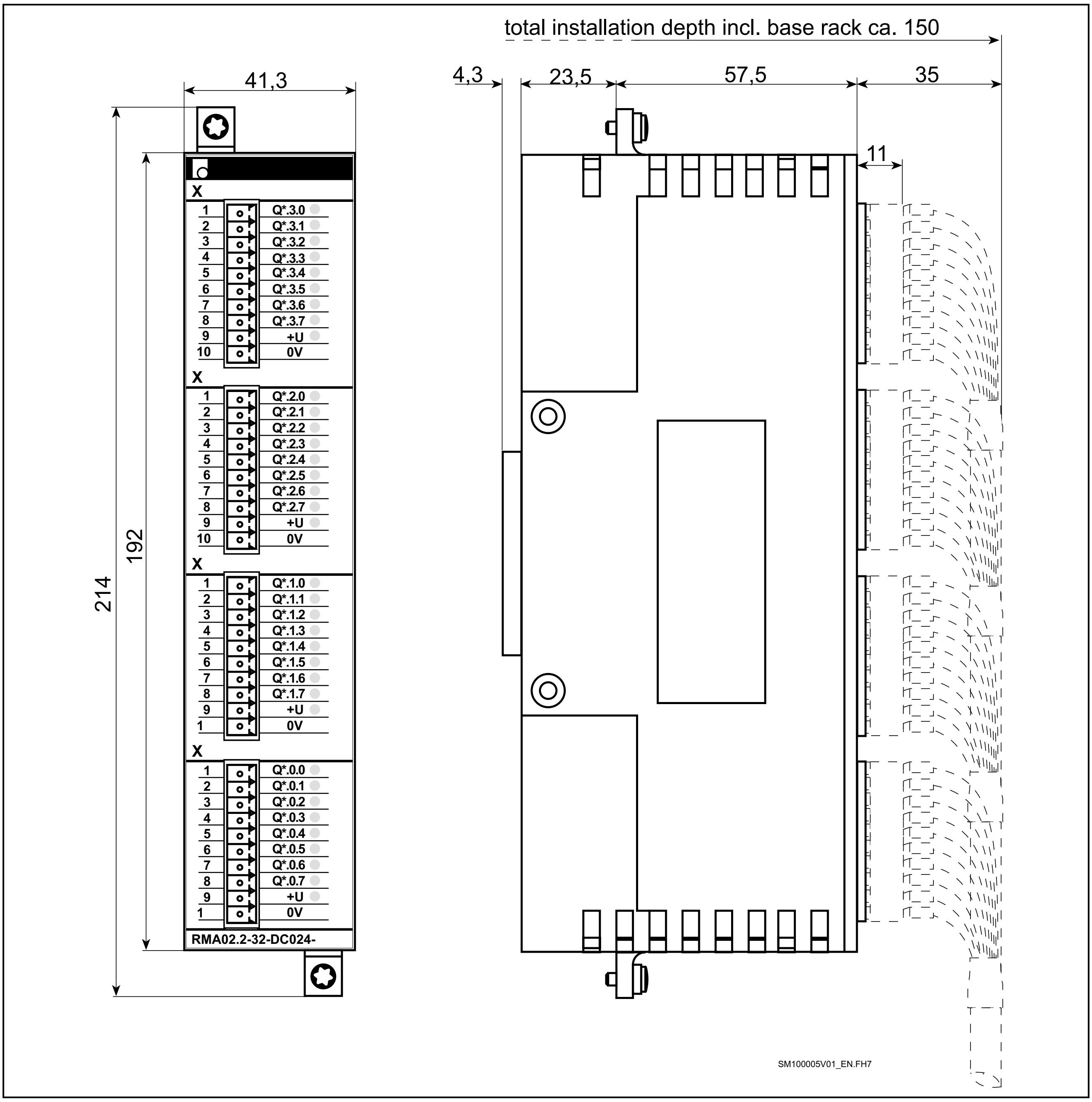


Fig. 9-17: Dimensional sheet RMA02.2-32-DC024-050

Output module RMA02.2-16-AC230-200

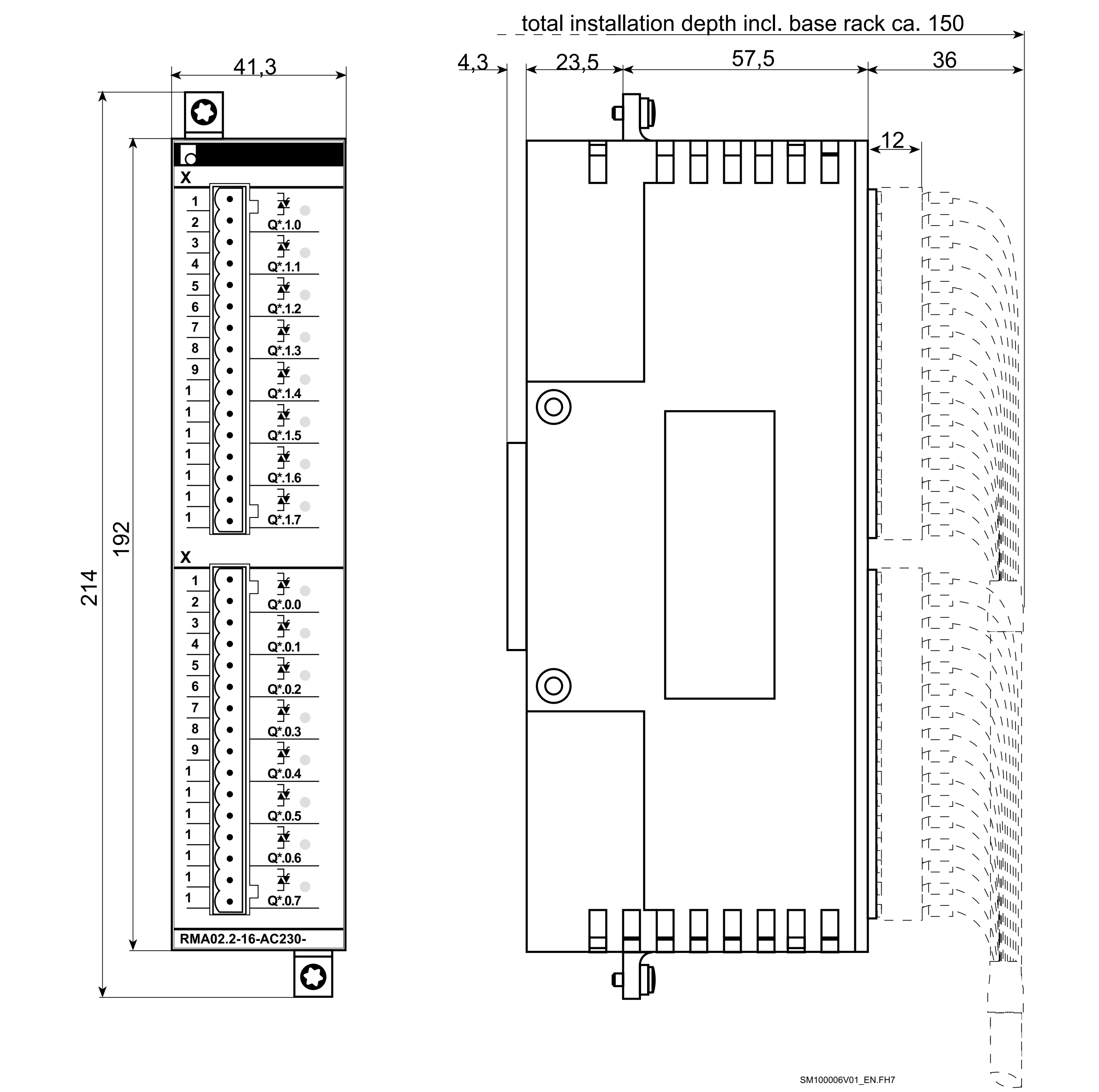


Fig. 9-18: Dimensional sheet RMA02.2-16-AC230-200

Output module RMA02.2-16-RE230-200

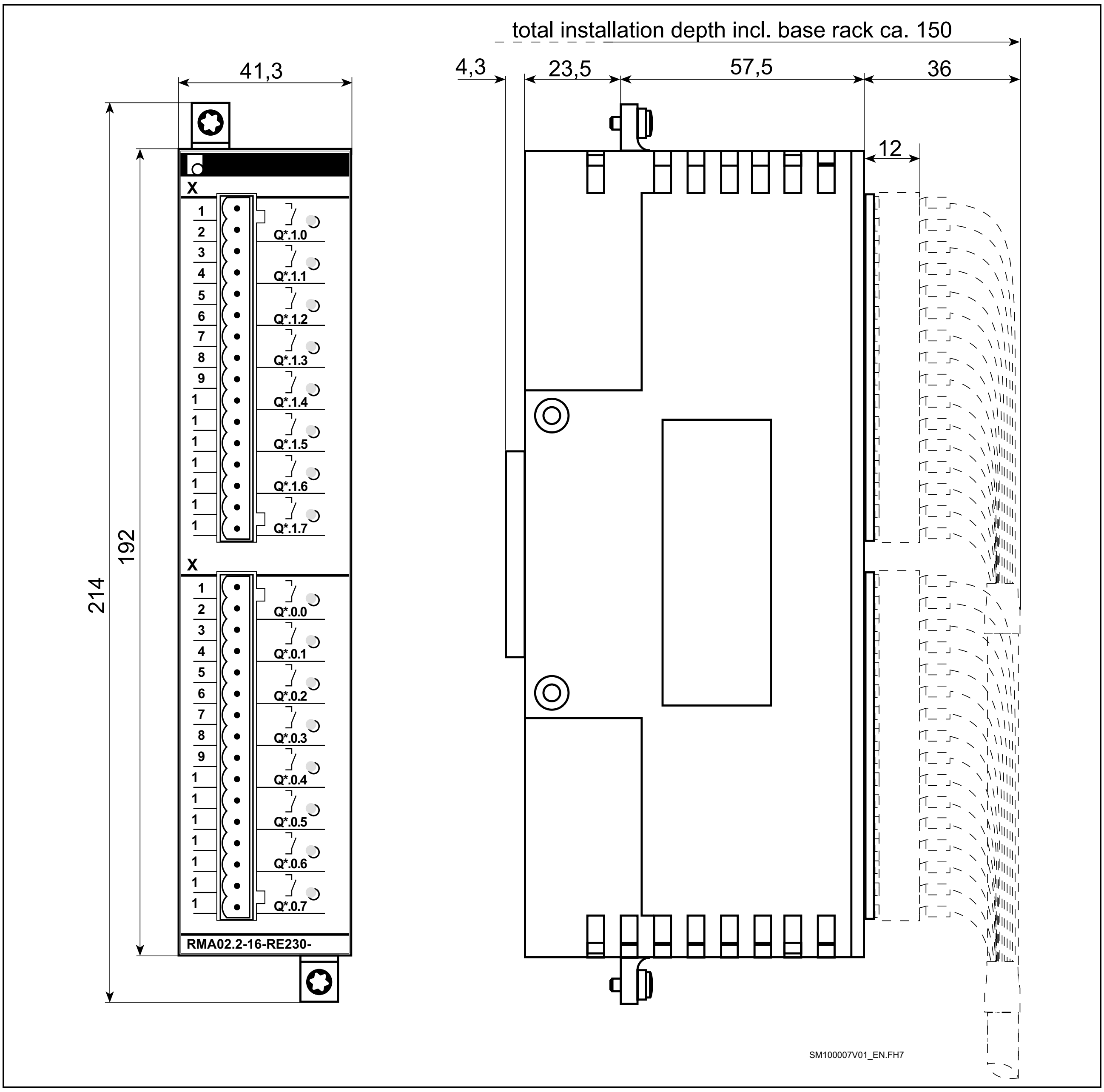


Fig. 9-19: Dimensional sheet RMA02.2-16-RE230-200

Analog module RMC02.2-2E-1A

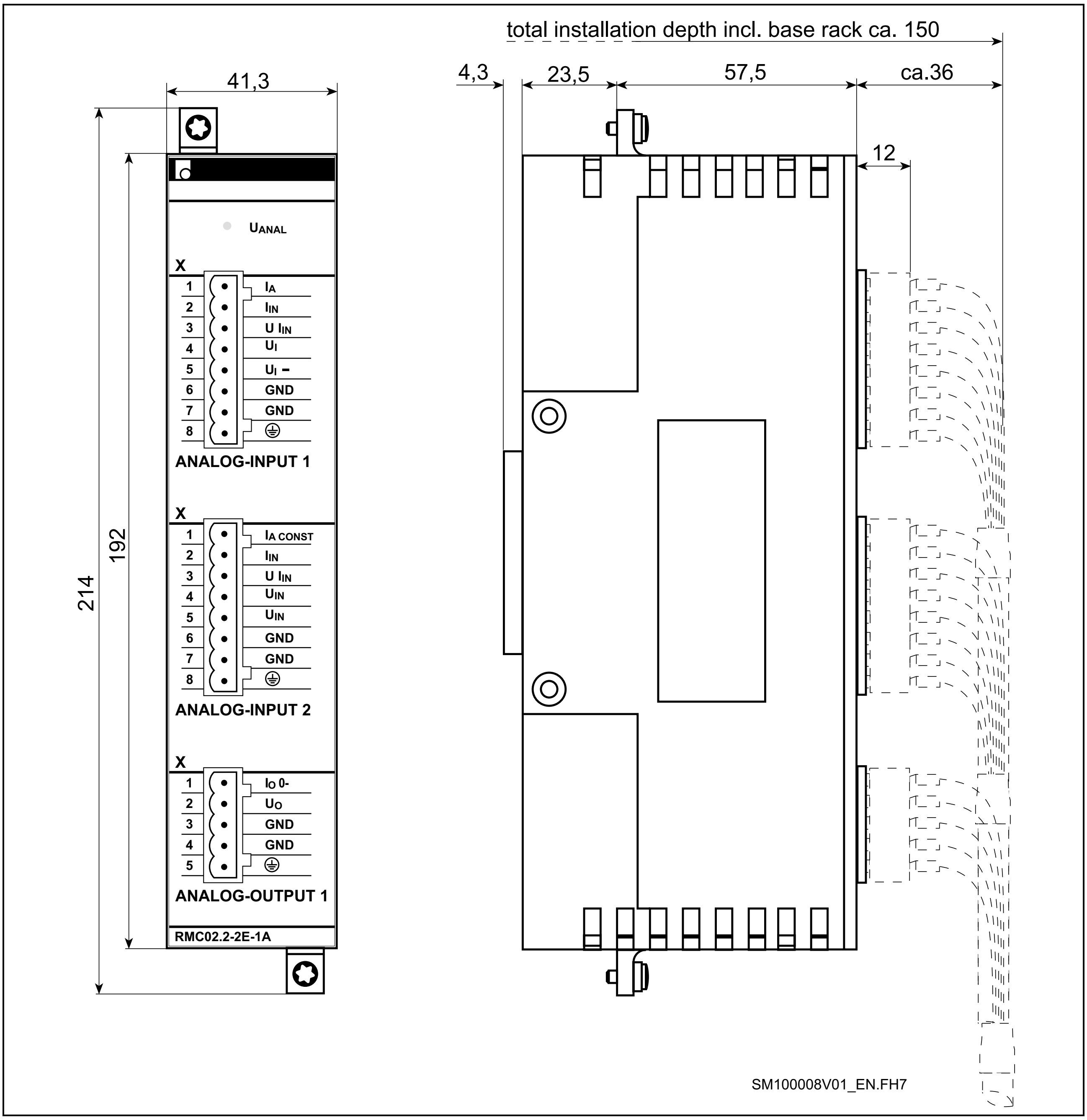


Fig. 9-20: Dimensional sheet RMC02.2-2E-1A

9.3 Dimensional sheets Rexroth Inline

The enclosure dimensions of a clamp are defined of the dimensions of the electronic socket and the dimensions of the connector.

The electronic sockets of the clamps are available in three

construction widths (12,2 mm, 24,4 mm and 48,8 mm).

Thereon one, two or four connectors with a width of 12,2 mm are plugged in.

With the plugged connector every clamp has a depth of 71,5 mm. The height depends on the used connector. The connectors are available in three different variants.

Two-fold enclosure

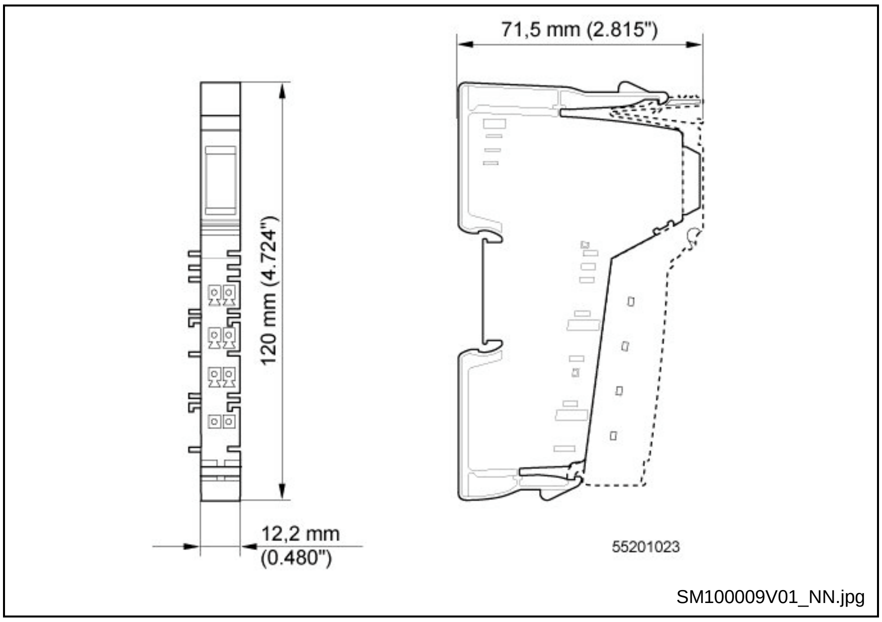


Fig. 9-21: Dimensions of the electronic sockets (two-fold enclosure)

Four-fold enclosure

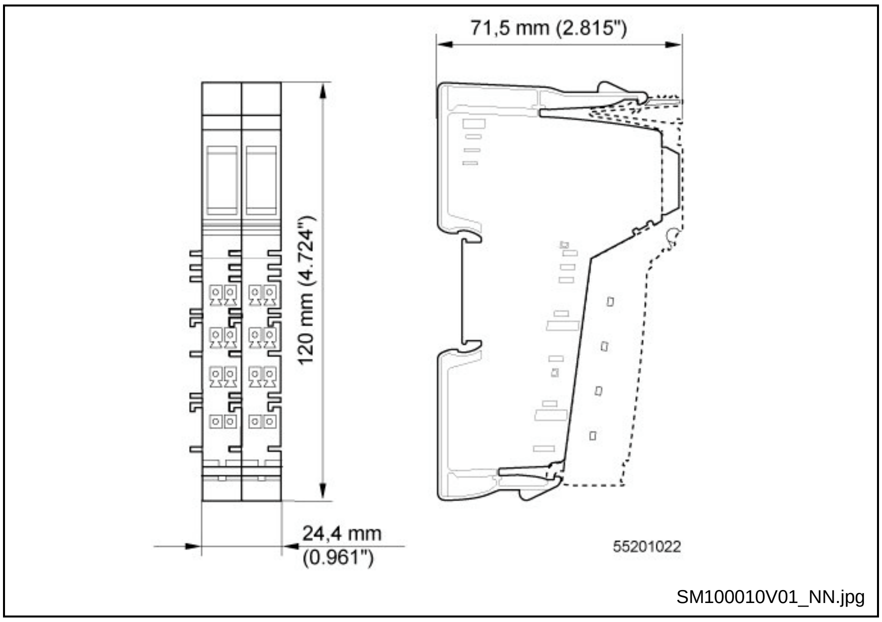


Fig. 9-22: Dimensions of the electronic sockets (four-fold enclosure)

Eight-fold enclosure

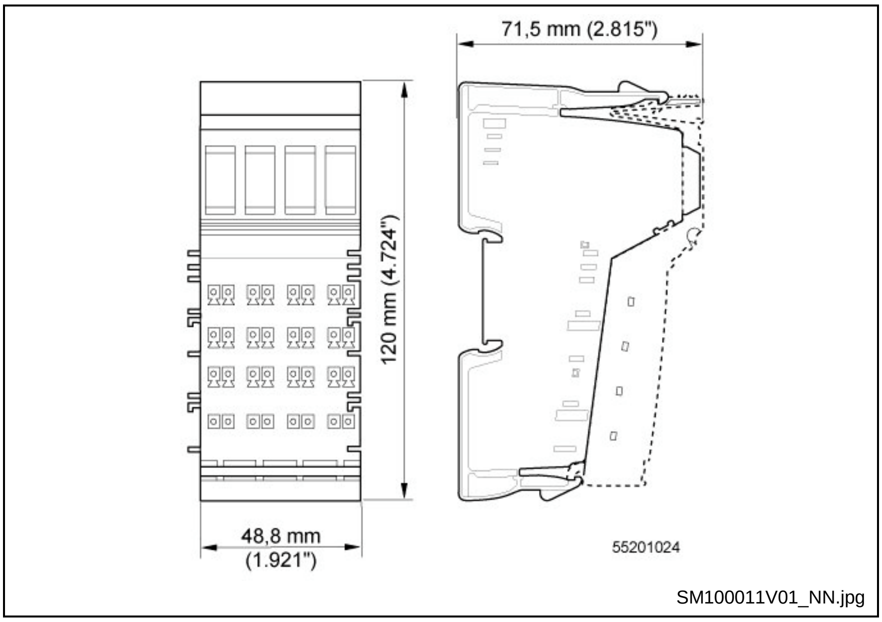
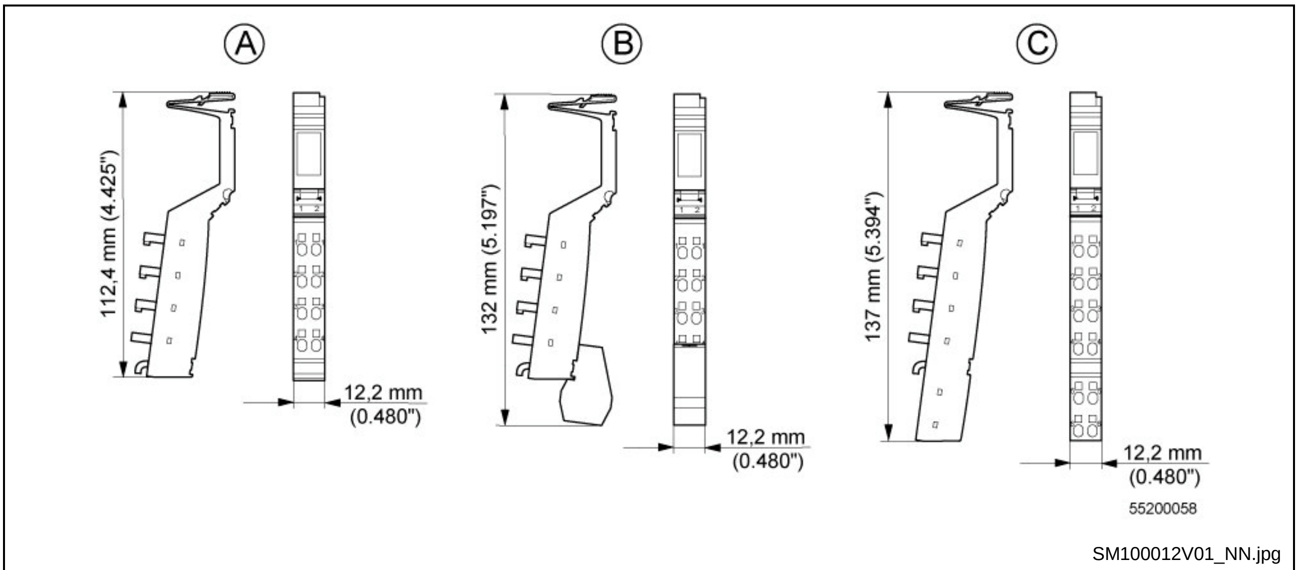


Fig. 9-23: Dimensions of the electronic sockets (eight-fold enclosure)

Connectors



L: A standard connector
B shield connector
C extended double signal connector

Fig. 9-24: Dimensions of the connectors

The depth of the connectors is not relevant, because it does not influence the depth of the complete module.

9.4 Dimensional sheets Rexroth Fieldline

Rexroth Fieldline modules RF-FLS PB M12 DI 8 M12, RF-FLS DN M12 DI 8 M12

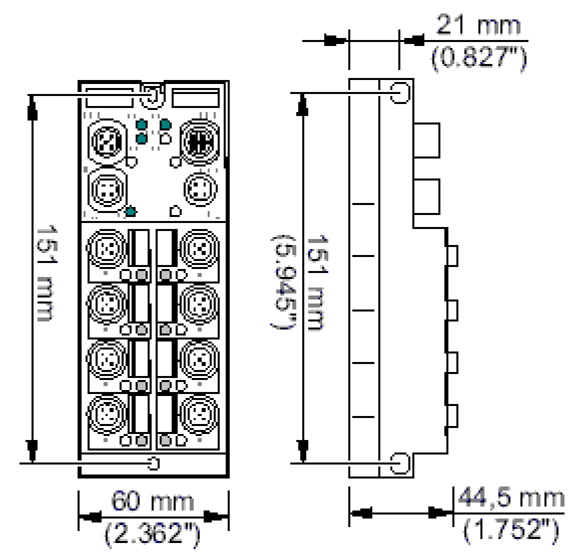


Fig. 9-25: Dimensional sheet Rexroth Fieldline module RF-FLS PB M12 DI 8 M12, RF-FLS DN M12 DI 8 M12

Rexroth Fieldline modules RF-FLS PB M12 DO 8 M12-2A, RF-FLS DN M12 DO 8 M12-2A

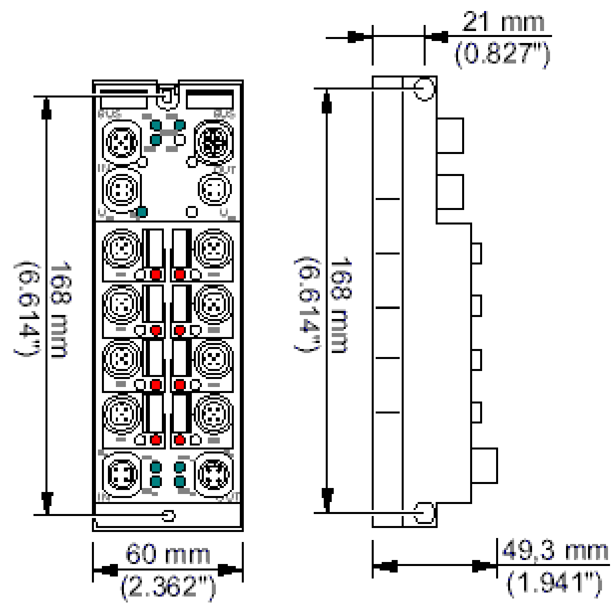


Fig. 9-26: Dimensional sheet Rexroth Fieldline module RF-FLS PB M12 DO 8 M12-2A, RF-FLS DN M12 DO 8 M12-2A

Rexroth Fieldline modules
RF-FLS PB M12 DIO 4/4 M12-2A, RF-FLS DN M12 DIO 4/4 M12-2A

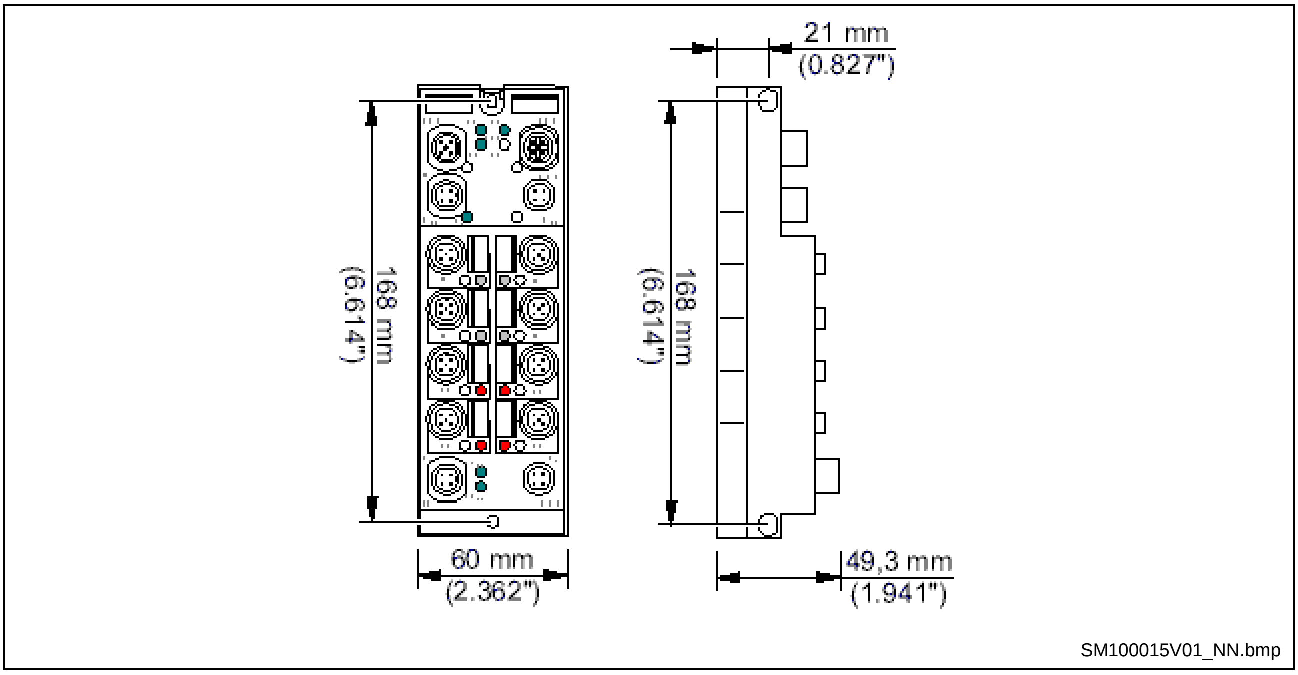
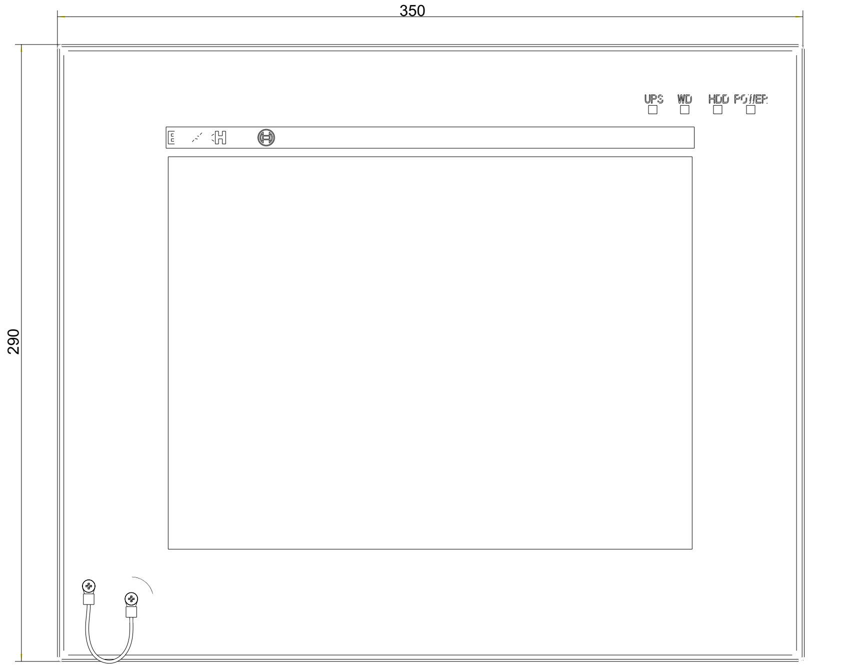


Fig. 9-27: Dimensional sheet Rexroth Fieldline module RF-FLS PB M12 DIO 4/4 M12-2A, RF-FLS DN M12 DIO 4/4 M12-2A

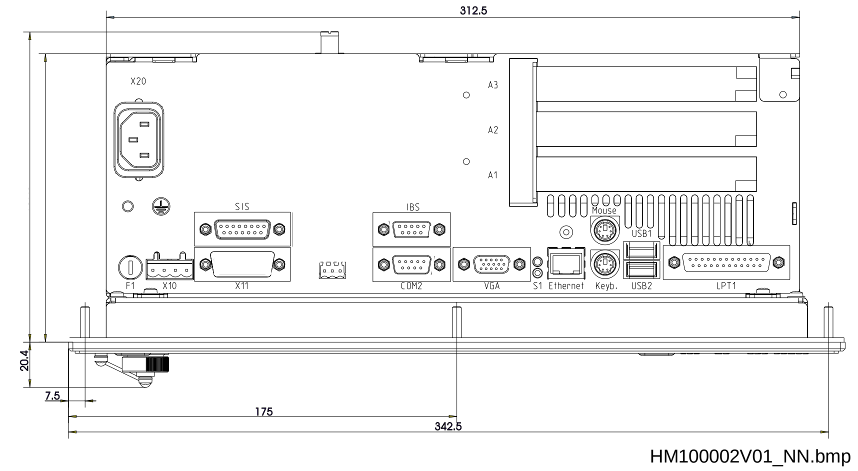
9.5 Dimensional sheets visualization units BTV/VSP/IPC/VDP/VPP

Visualization unit BTV 16



HM100001V01_NN.bmp

Fig. 9-28: Dimensions – front panel BTV 16.2BB



HM100002V01_NN.bmp

Fig. 9-29: Top view – connector panel BTV 16.2

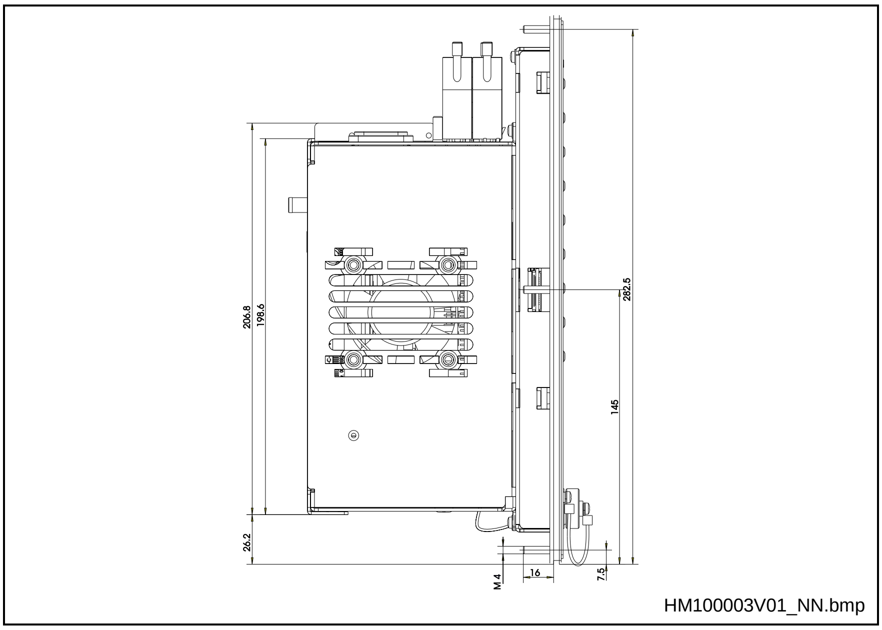


Fig. 9-30: Side view BTV 16.2BB (installation depth depending on the design)

Visualization unit BTV 40

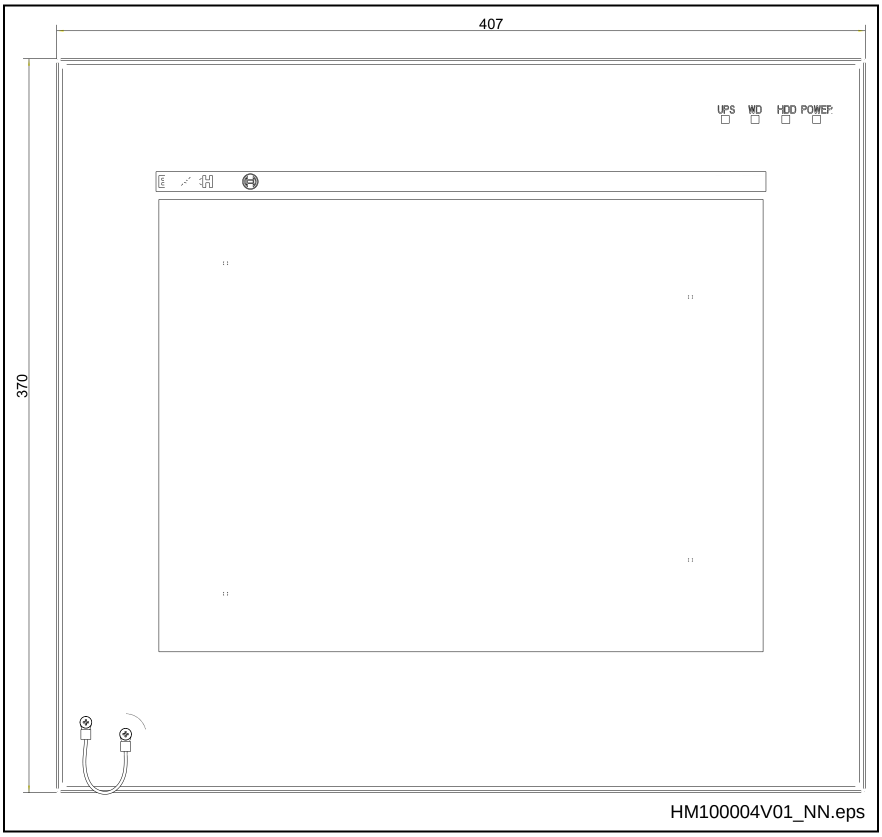


Fig. 9-31: Dimensions – front panel BTV 40.2BE

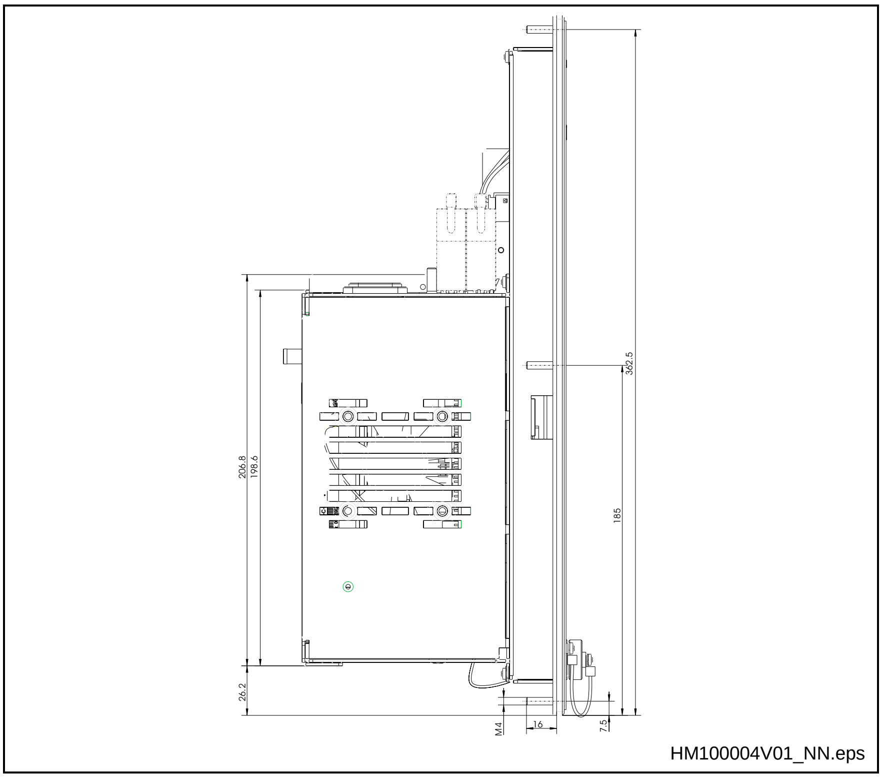


Fig. 9-32: Side view BTV 40.2BE (installation depth depending on the design)

Visualization unit VSP 16

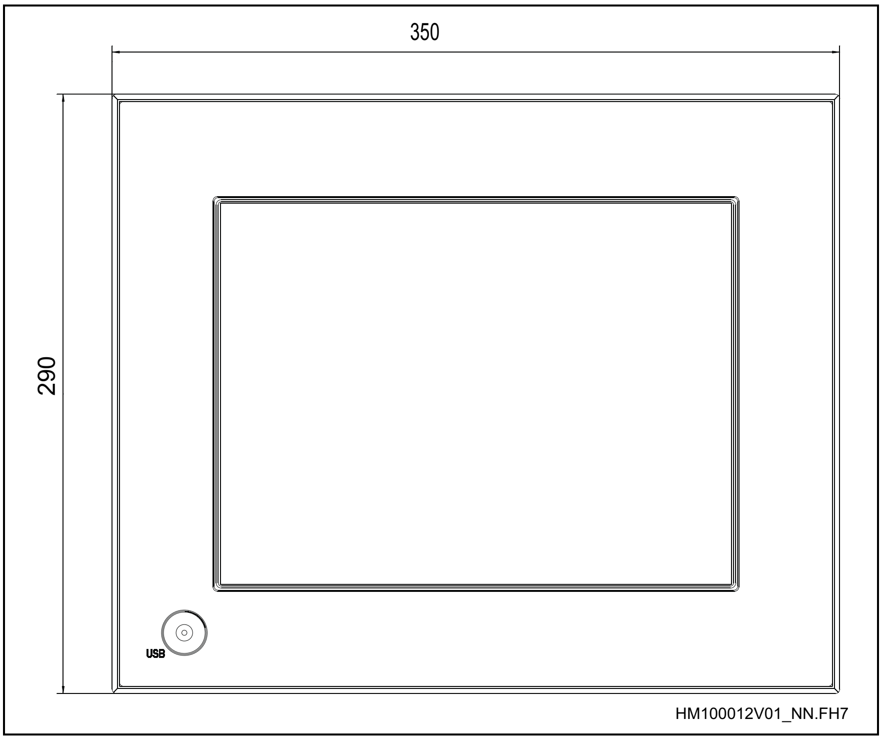


Fig. 9-33: Dimensions - Front panel VSP 16.1

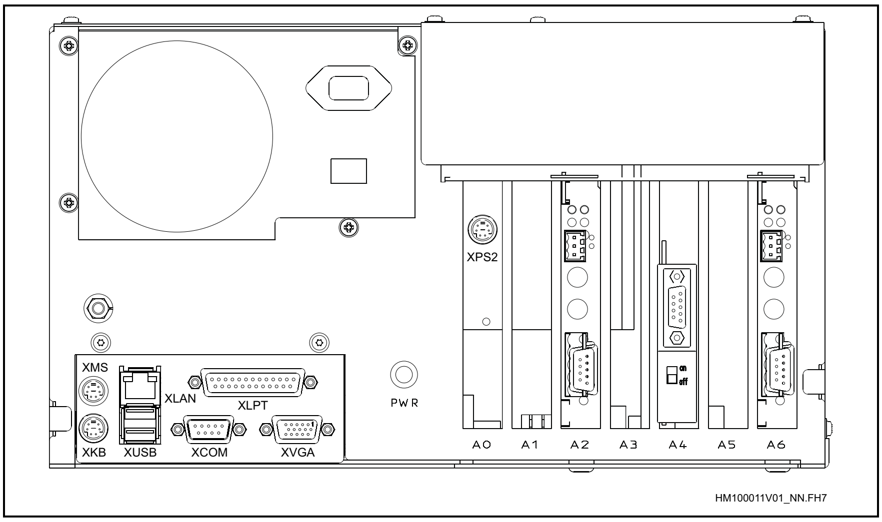


Fig. 9-34:Top view - connector panel VSP 16.1

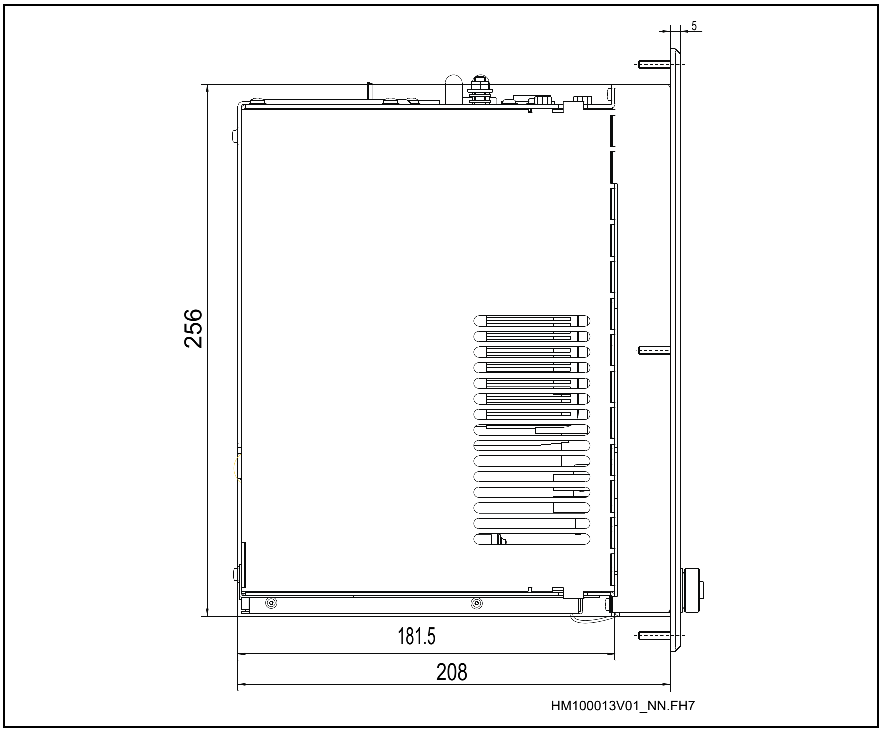


Fig. 9-35: Side view VSP 16.1

Visualization unit VSP 40

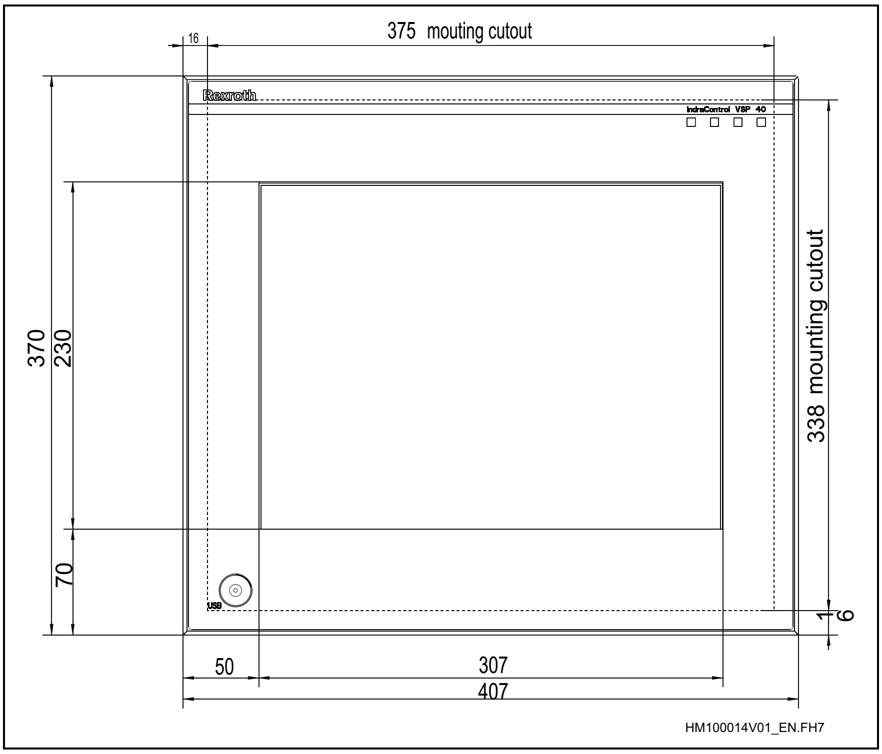


Fig. 9-36: Dimensions - Front panel VSP 40.1

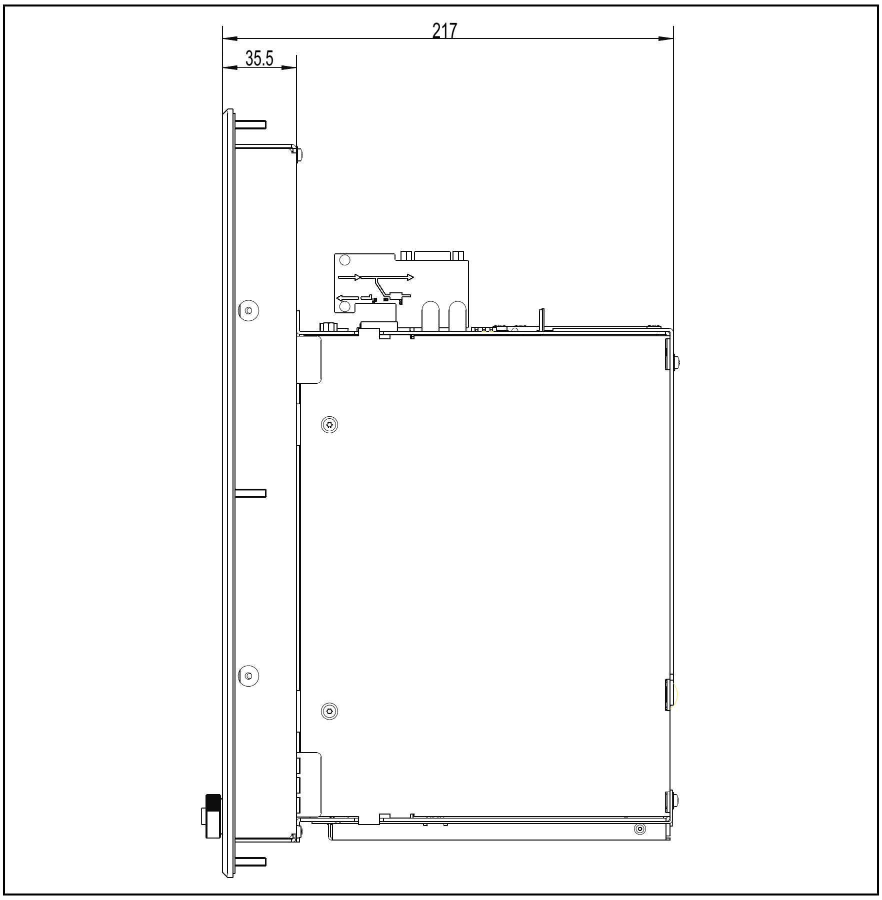


Fig. 9-37: Side view VSP 40.1

Rexroth Bosch Group

PC-Box IPC 40

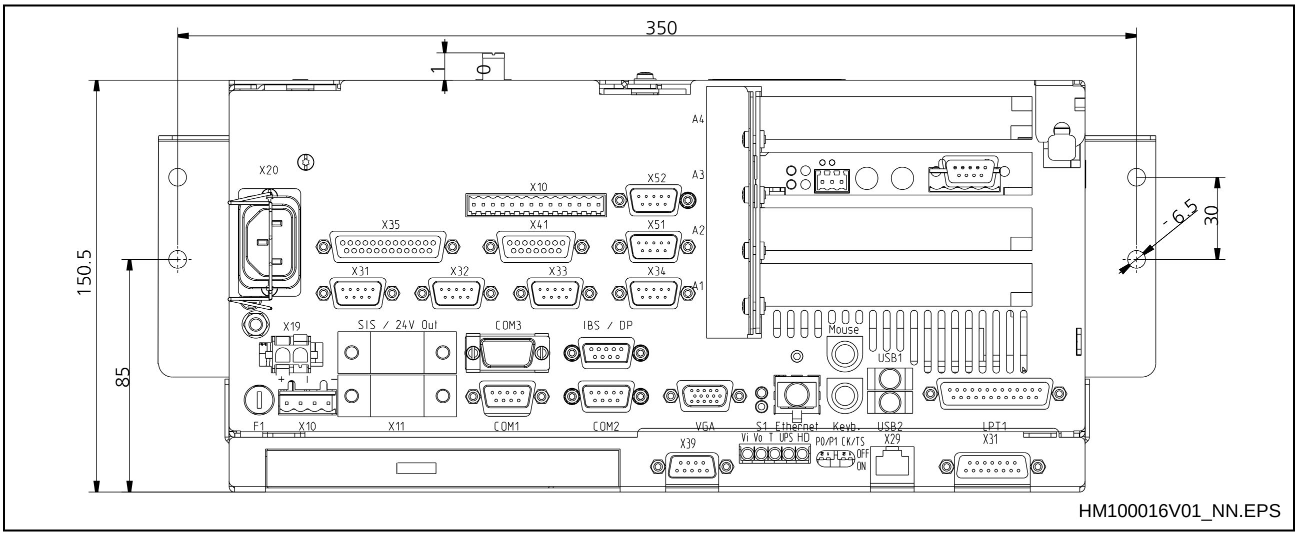


Fig. 9-38: Housing dimensions IPC 40

Remote display VDP 16

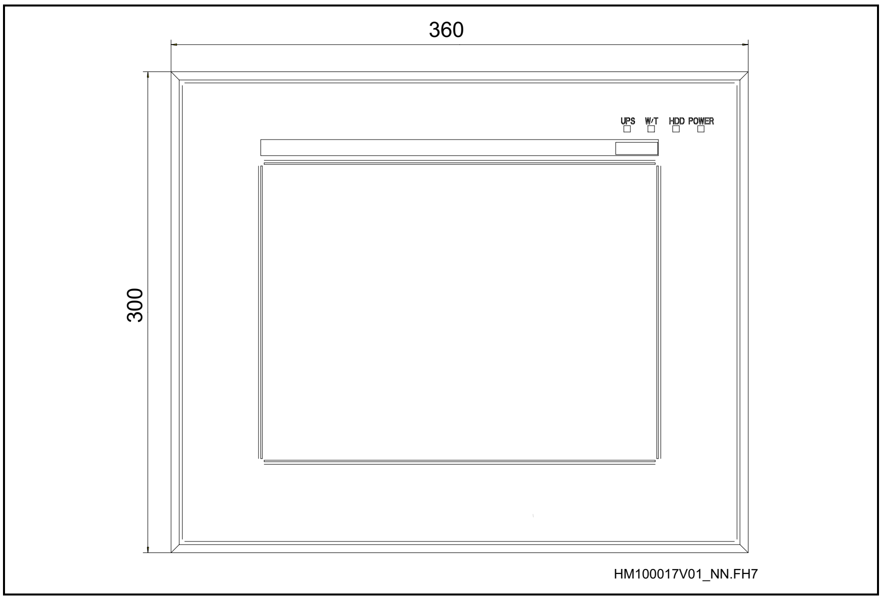


Fig. 9-39: Dimensions - Front panel VDP 16.1

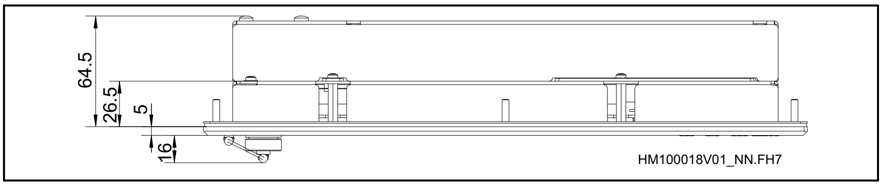


Fig. 9-40: Bottom view VDP 16.1

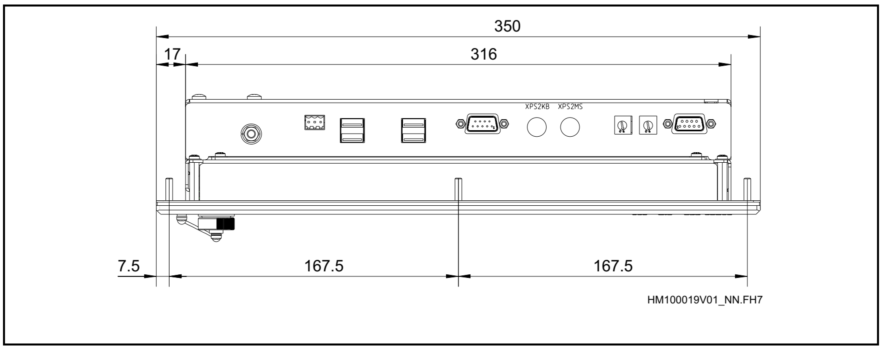


Fig. 9-41: Top view VDP 16.1

Remote display VDP 40

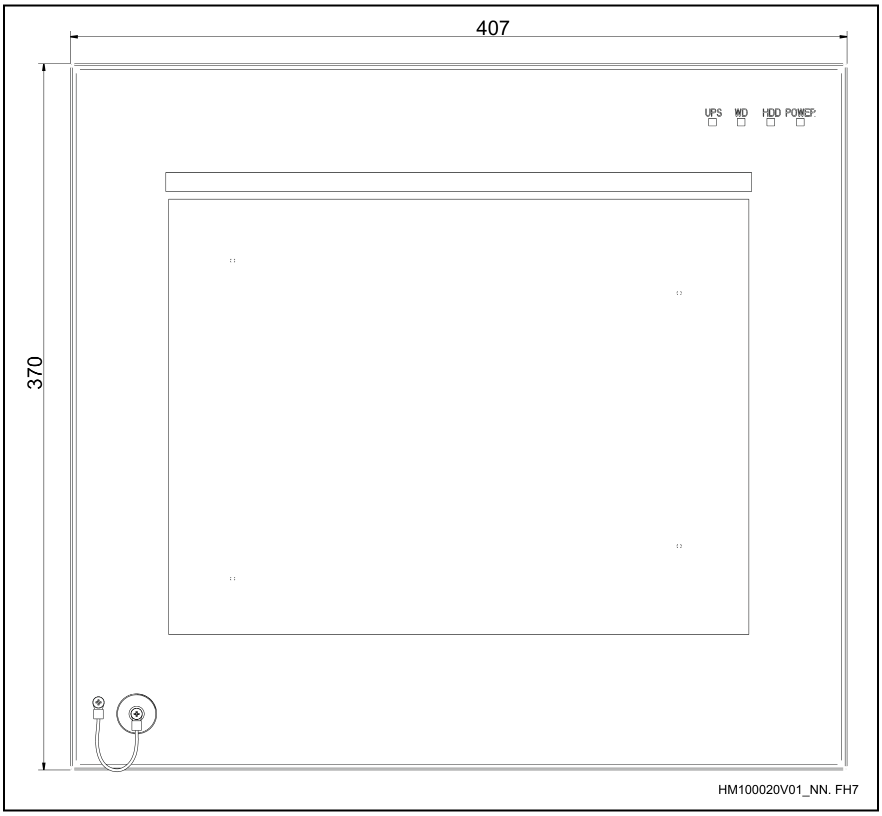


Fig. 9-42: Dimensions - Front panel VDP 40.1

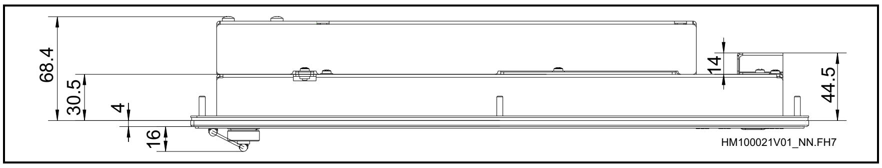


Fig. 9-43: Bottom view VDP 40.1

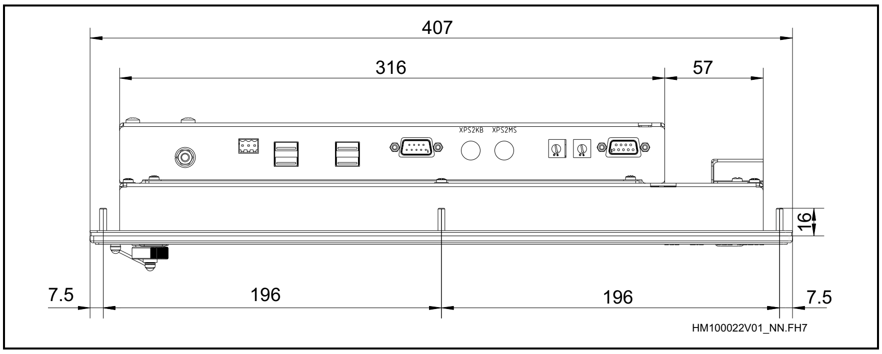


Fig. 9-44: Top view VDP 40.1

9.6 Dimensional sheets visualization units VEP

VEP 30

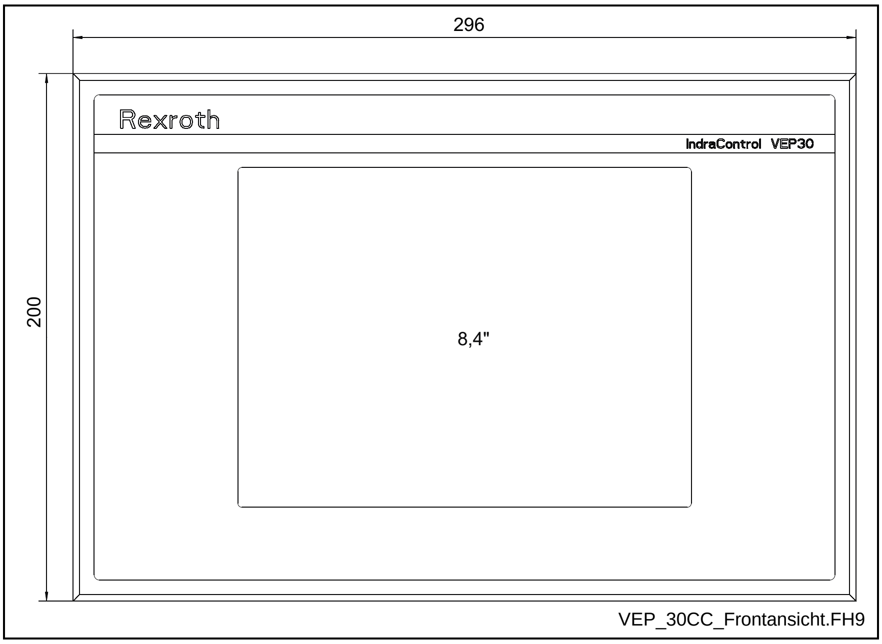


Fig. 9-45: Dimensions - Front panel VEP30.1CCU

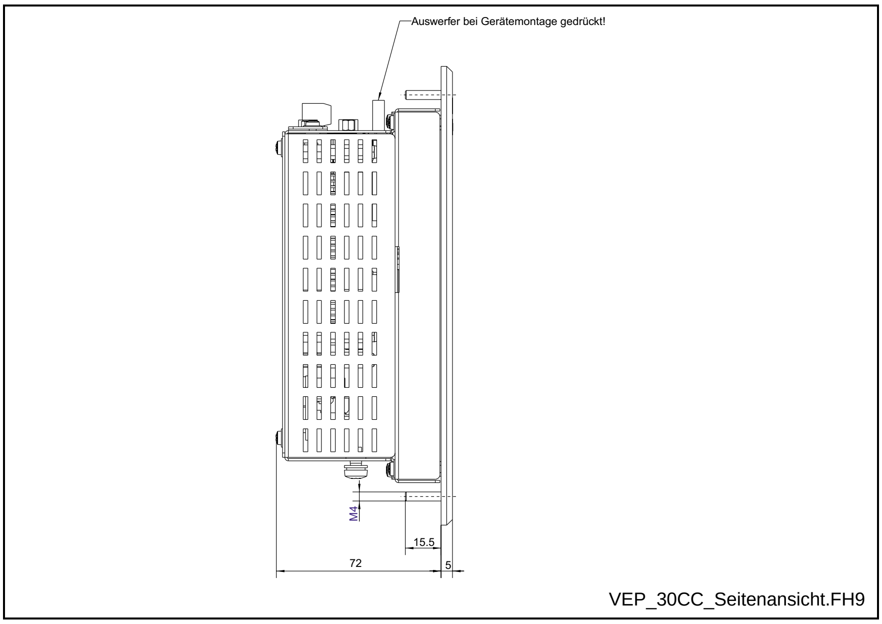


Fig. 9-46: Side view VEP 30.1CCU

VEP 40

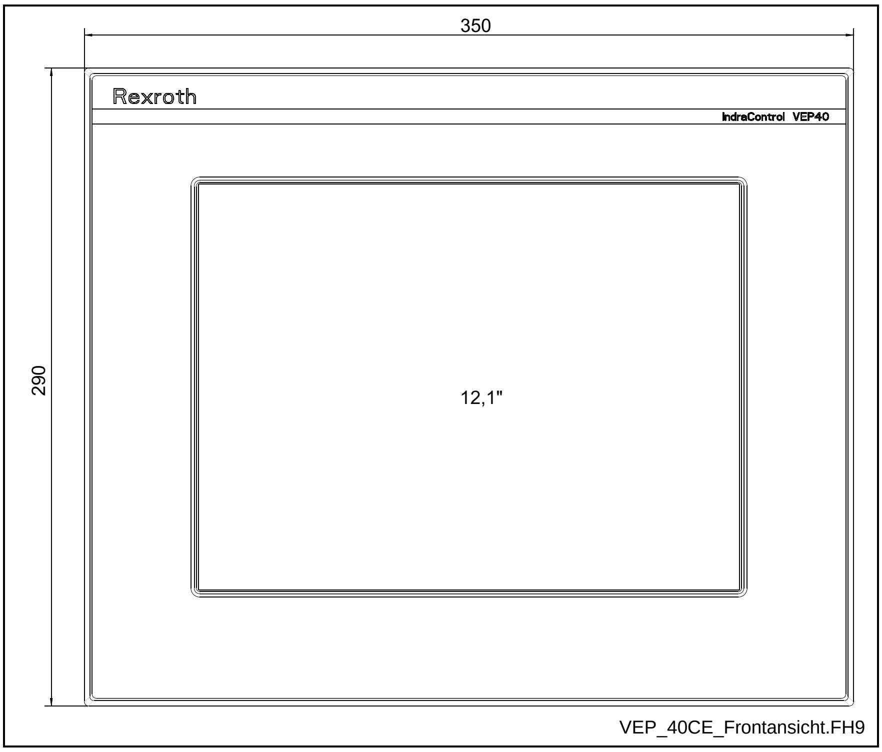


Fig. 9-47: Dimensions - Front panel VEP 40.1CEU

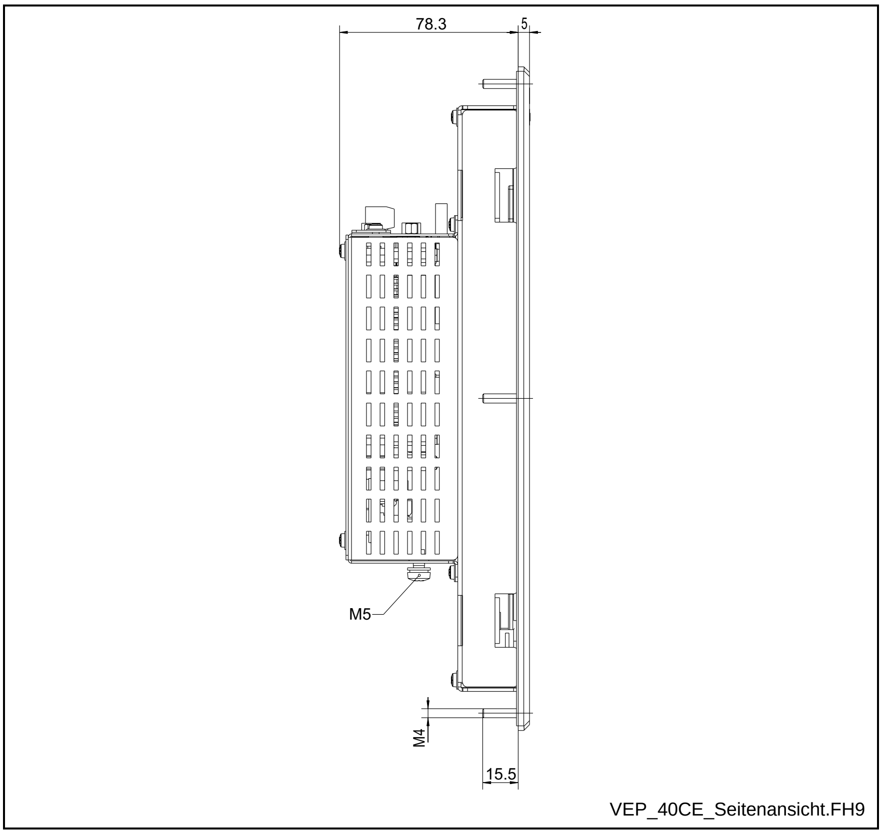


Fig. 9-48: Side view VEP 40.1CEU

VEP 50

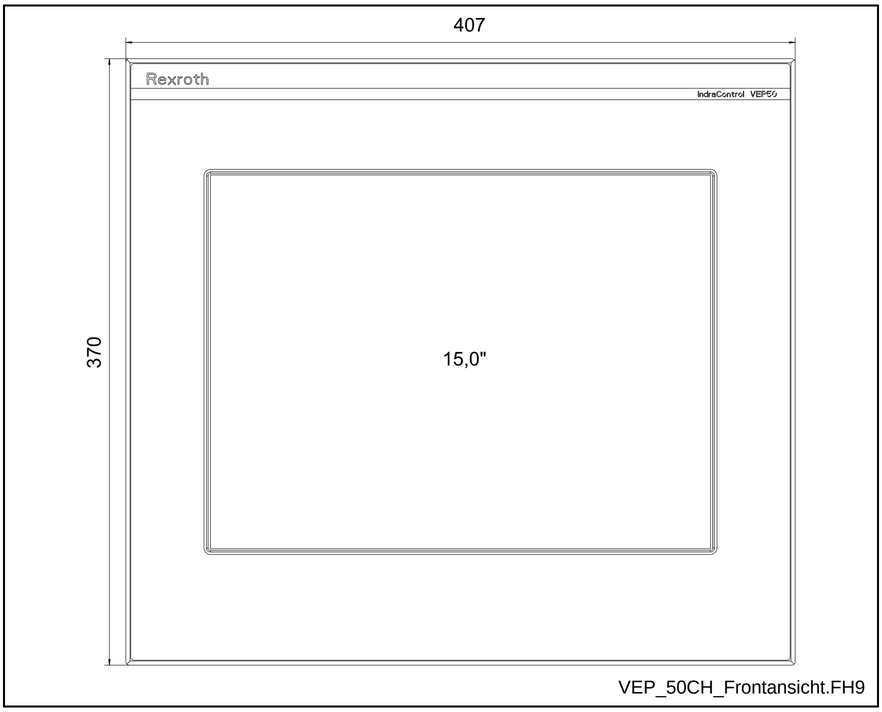


Fig. 9-49: Dimensions - Front panel VEP 50.1CHU

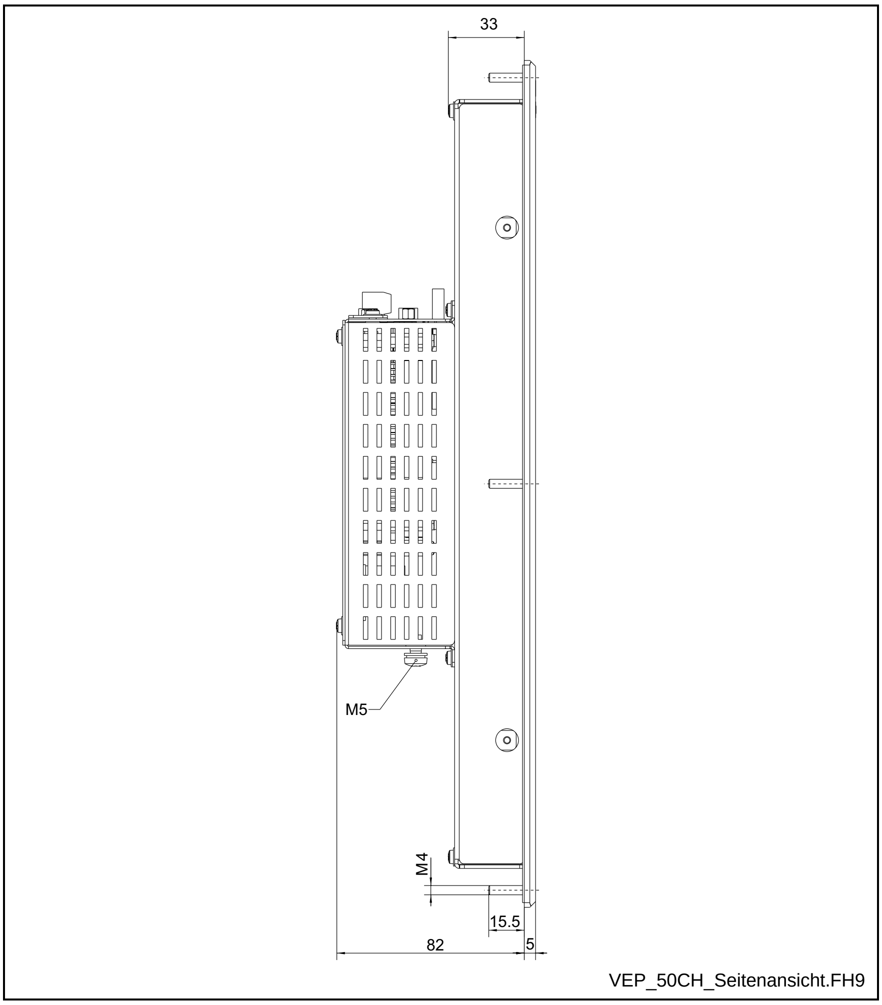


Fig. 9-50: Side view VEP 50.1CHU

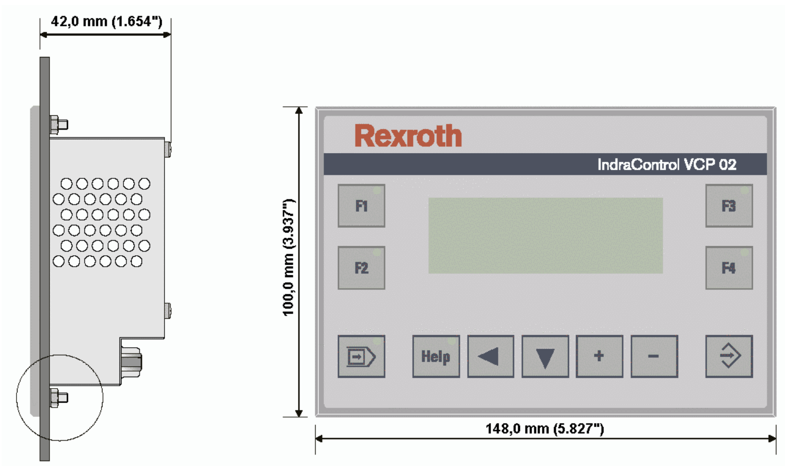
9.7 Dimensional sheets miniature control terminals

Miniature control terminal VCP 01.1

- in preparation -

Fig. 9-51: Miniature control terminal VCP 01.1

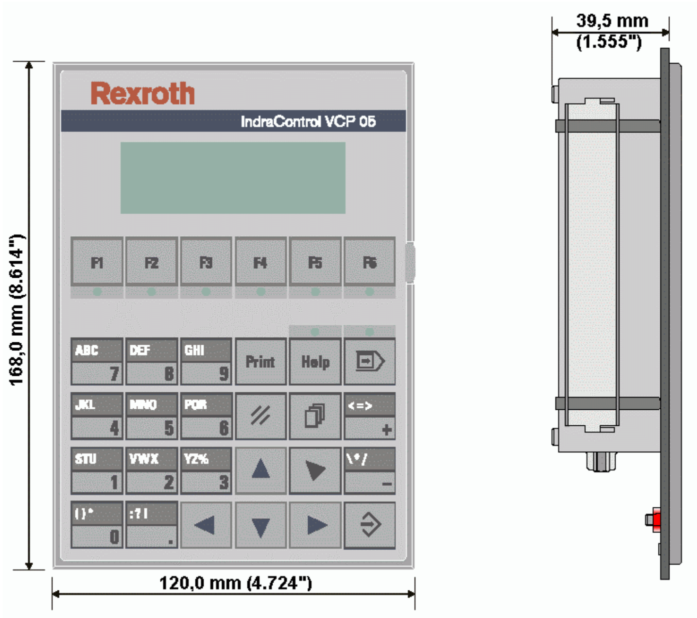
Miniature control terminal VCP 02.1



HM100006V01_NN.bmp

Fig. 9-52: Miniature control terminal VCP 02.1

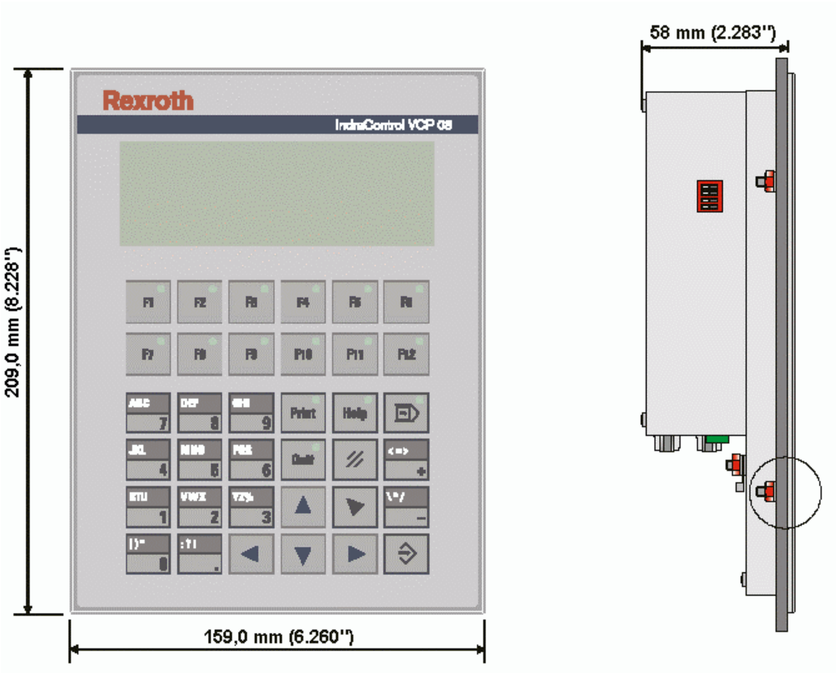
Miniature control terminal VCP 05.1



HM100007V01_NN.bmp

Fig. 9-53: Miniature control terminal VCP 05.1

Miniature control terminal VCP 08.1



HM100008V01_NN.bmp

Fig. 9-54: Miniature control terminal VCP 08.1

Miniature control terminal VCP 20.1

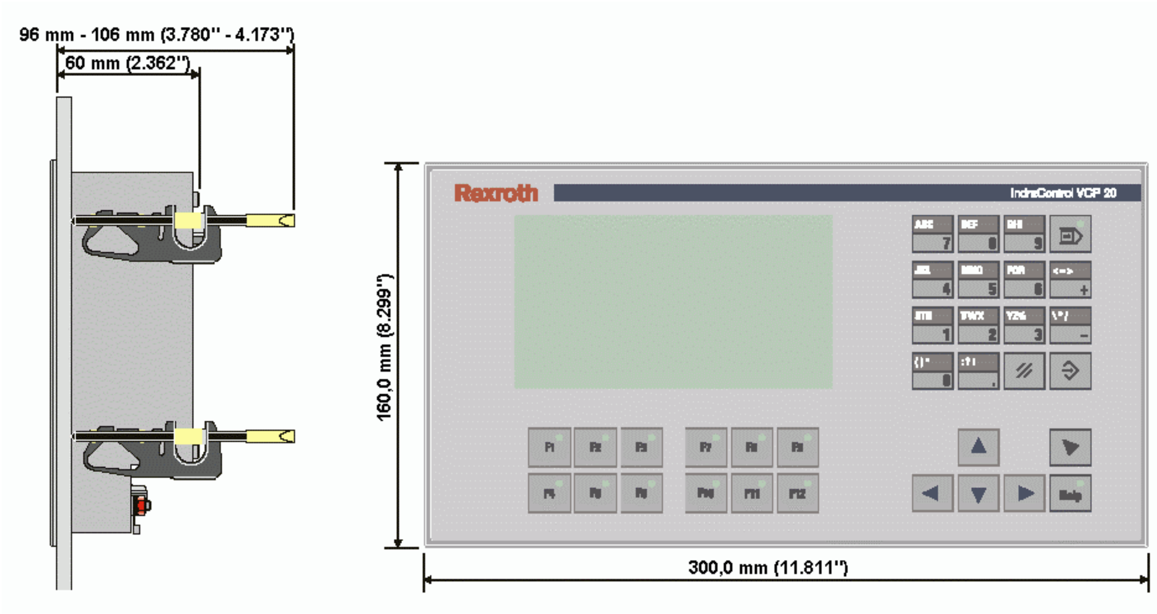


Fig. 9-55: Miniature control terminal VCP 20.1

Miniature control terminal VCP 25.1

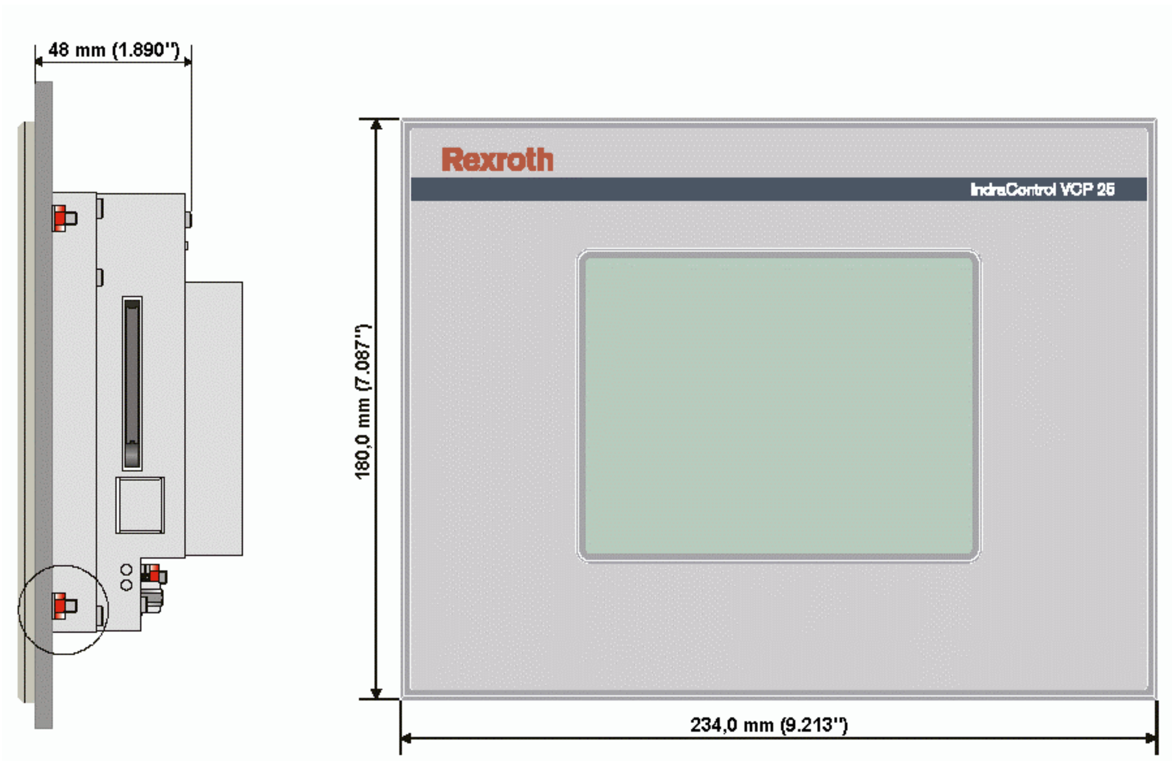


Fig. 9-56: Miniature control terminal VCP 25.1

9.8 Dimensional sheets, terminal diagrams drives

Option EN1: HSF, resolver

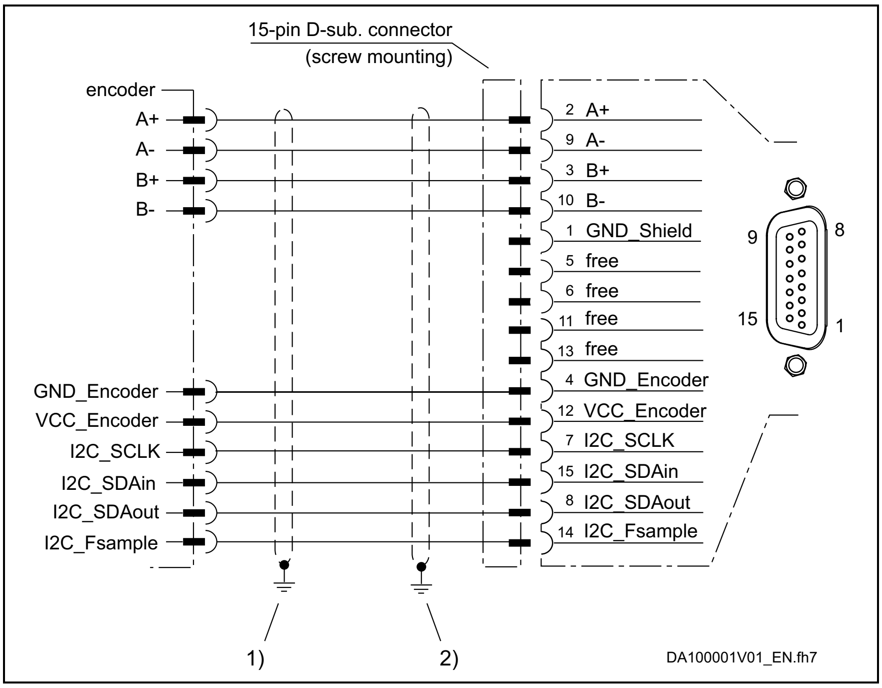


Fig. 9-57: Terminal diagram EN1

Option EN2: EnDAT2.1, 1 Vss, 5VTTL

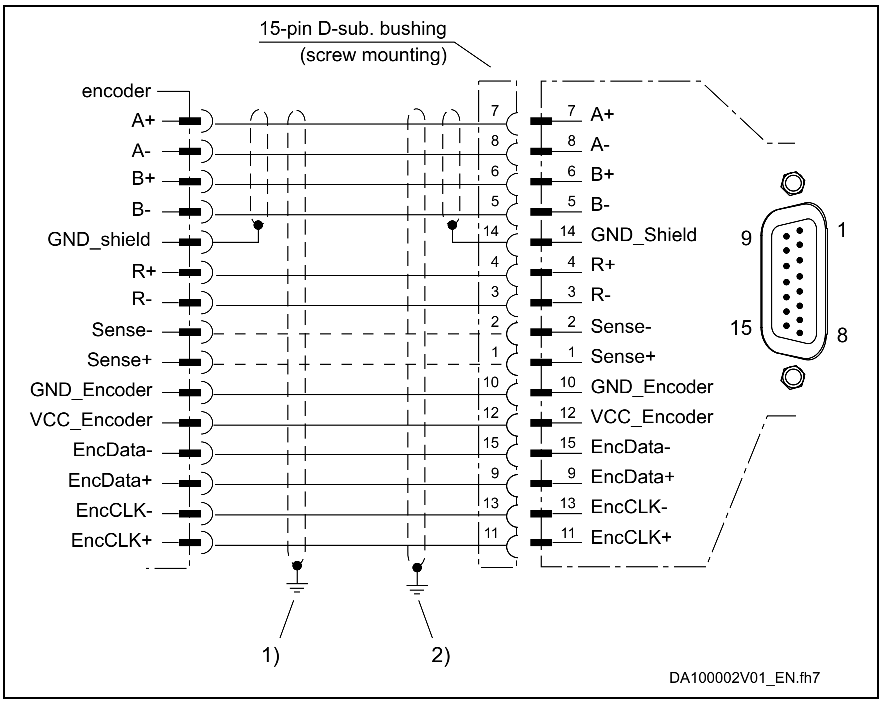


Fig. 9-58: Terminal diagram EN2 - EnDat encoder

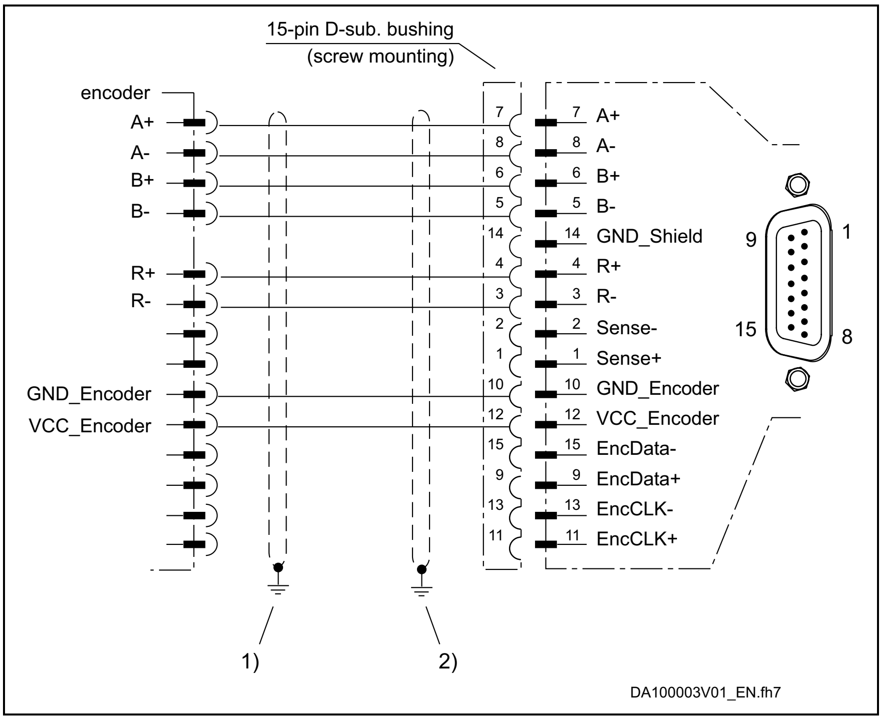


Fig. 9-59: Terminal diagram EN2 - square-wave encoder

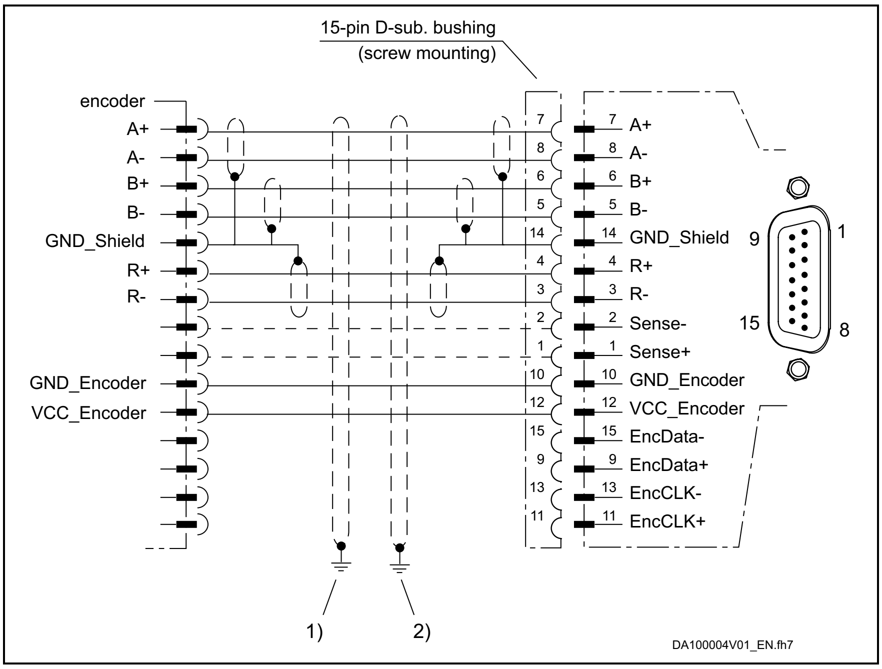


Fig. 9-60: Terminal diagram EN2 - sine encoder

Option L1: Starting lockout

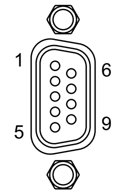


Fig. 9-61: L1 - D-Sub socket

Meaning	Signal	Pin
Controlling signal for starting lockout assignment A	AS-A	1
Inverted controlling signal for starting lockout	ASn	2
Controlling signal for starting lockout assignment B	AS-B	3
Supply for acknowledgment potential	ASQ	4
Acknowledgment	ASQ1	5
Inverted acknowledgment	ASQ2	6
not used	-	7
24 V supply voltage	+24 V_E	8
Reference potential of the 24 V supply voltage	0V_E	9

Fig. 9-62: L1 - D-Sub socket - connection assignment

Option S1: Safety technology I/O

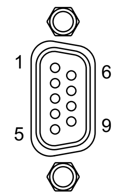


Fig. 9-63: S1 - D-Sub socket

Meaning	Signal	Pin
Input/output for forced dynamization	EA30	1
Input/output for acknowledgment	EA20	2
Input/output for diagnostic message/safety door locking device	EA10n	3
Inputs for operating mode selection	E1n	4
	E2n	5
	E3n	6
	E4n	7
24 V supply voltage	+24V_E	8
Reference potential of the 24 V supply voltage	0 V_E	9

Fig. 9-64: S1 - D-Sub socket - connection assignment

Option MD1: Digital I/O extension

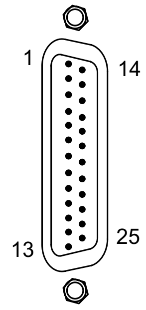


Fig. 9-65: MD1 - interface

Pin	I/O	Function	Pin	I/O	Function
1	O	Output 0	14	I	Input 0
2	O	Output 1	15	I	Input 1
3	-	24 V_{ext_0}	16	I	Input 2
4	O	Output 2	17	I	Input 3
5	O	Output 3	18	I	Input 4
6	-	GND_{ext}	19	I	Input 5
7	-	24 V_{ext_2}	20	I	Input 6
8	-	GND_{ext}	21	I	Input 7
9	O	Output 4	22	I	Input 8
10	O	Output 5	23	I	Input 9
11	-	24 V_{ext_1}	24	I	Input 10
12	O	Output 6	25	I	Input 11
13	O	Output 7			

Fig. 9-66: MD1 - connection assignment

Option MA1: Analog I/O extension

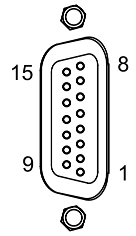


Fig. 9-67: MA1 - interface

Pin	Signal	E/A	Function
1	GND_{100}	-	Shield analog input AE1
2	+AE1	E	Analog input 1 (+)
3	GND_{100}	-	Shield analog input AE2
4	+AE2	E	Analog-input 2 (+)
5	AA1	A	Analog output 1 (+)
6	GNDA	-	Shield analog output AA1 (to be used optionally in case of extreme interferences)
7	GND_{100}	-	Shield analog input AA2
8	Erde	-	Connector housing
9	-AE1	E	Analog input 1 (-)
10	GNDA	-	Shield analog input AE1 (to be used optionally in case of extreme interferences)
11	-AE2	E	Analog input 2 (-)
12	GNDA	-	Shield analog output AE2 (to be used optionally in case of extreme interferences)
13	GND_{100}	-	Shield analog output AA1
14	AA2	A	Analog output 2 (+)
15	GNDA	-	Shield analog output AA2 (to be used optionally in case of extreme interferences)

Fig. 9-68: MA1 - connection assignment

SERCOS interface DSS02.1M

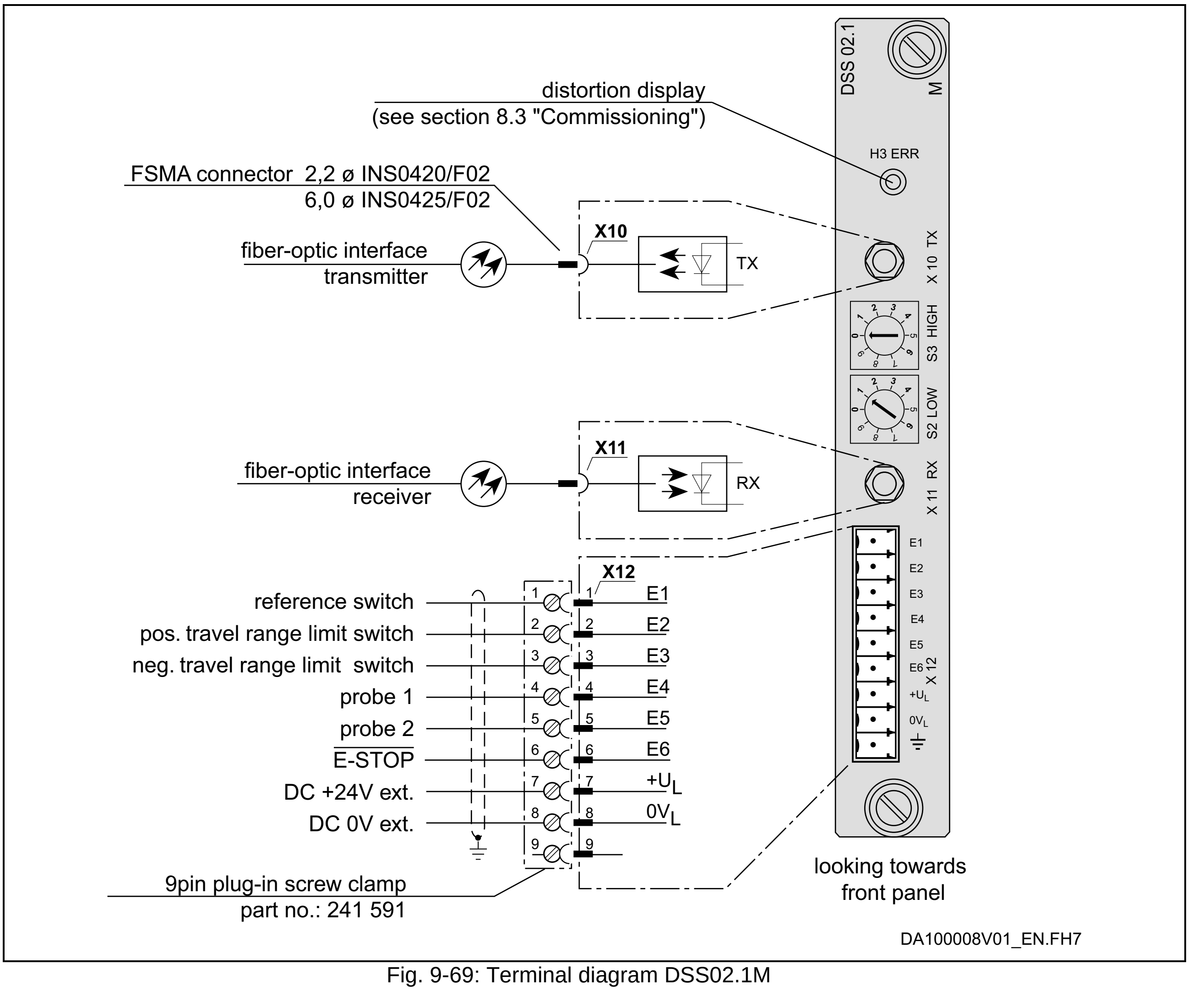


Fig. 9-69: Terminal diagram DSS02.1M

Rexroth Bosch Group

Input / output interface DEA

DEA04.2M, DEA05.2M, DEA06.2M

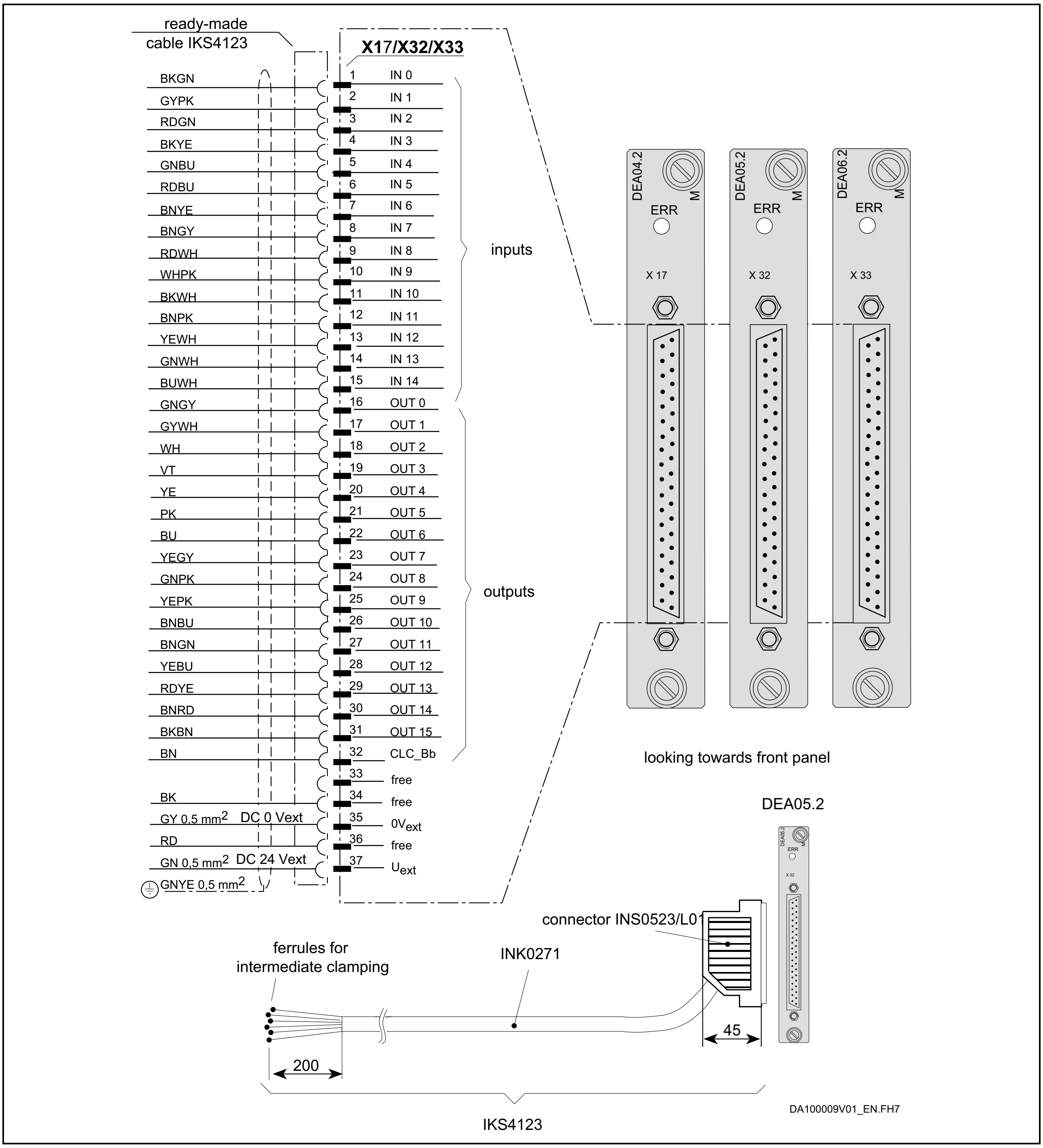


Fig. 9-70: Terminal diagram DEA04.2M, DEA05.2M, DEA06.2M

DEA08.1M, DEA09.1M, DEA10.1M

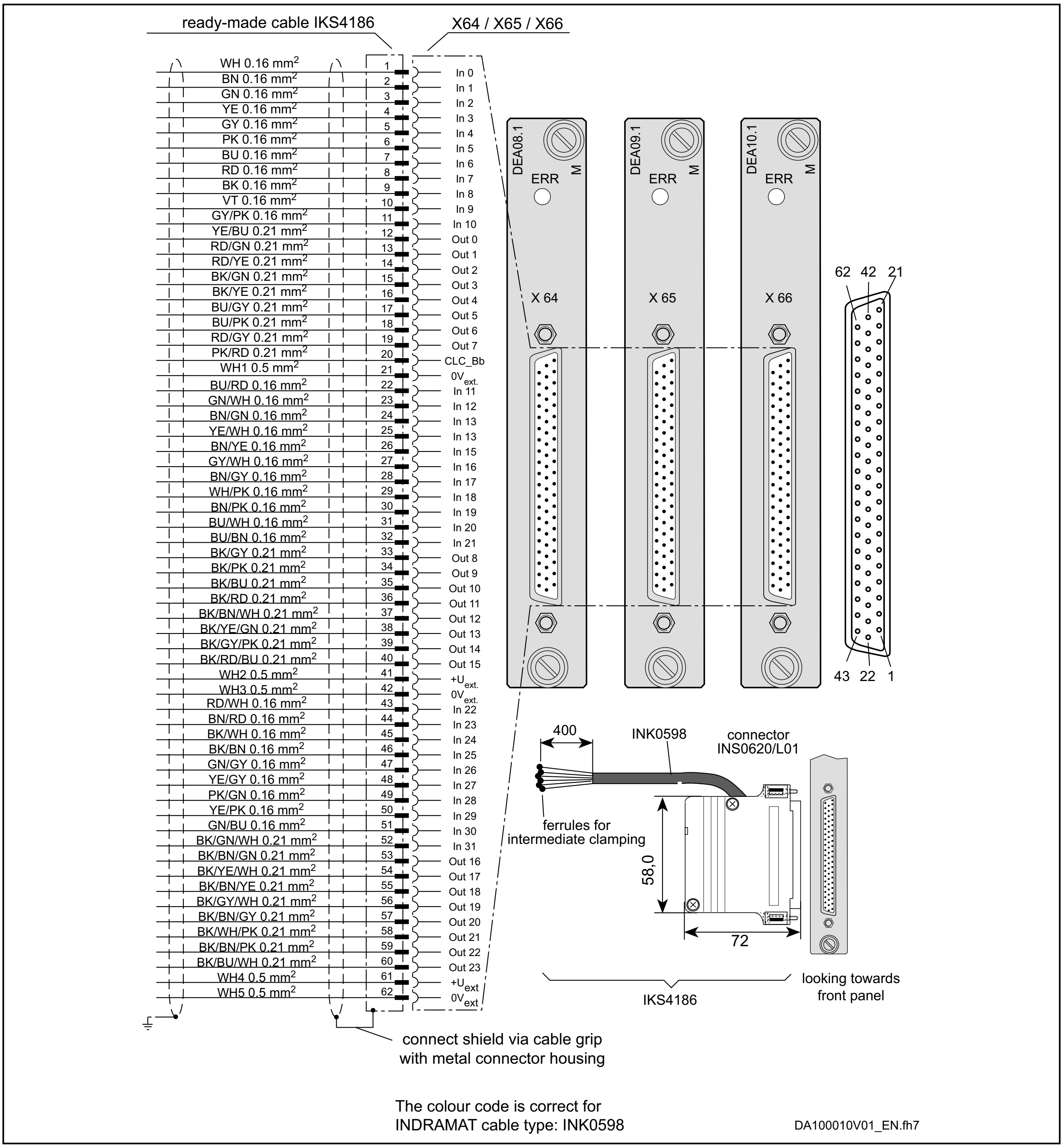


Fig. 9-71: Terminal diagram DEA08.1M, DEA09.1M, DEA10.1M

Encoder interface DAG01.2M (EnDat or SSI interface)

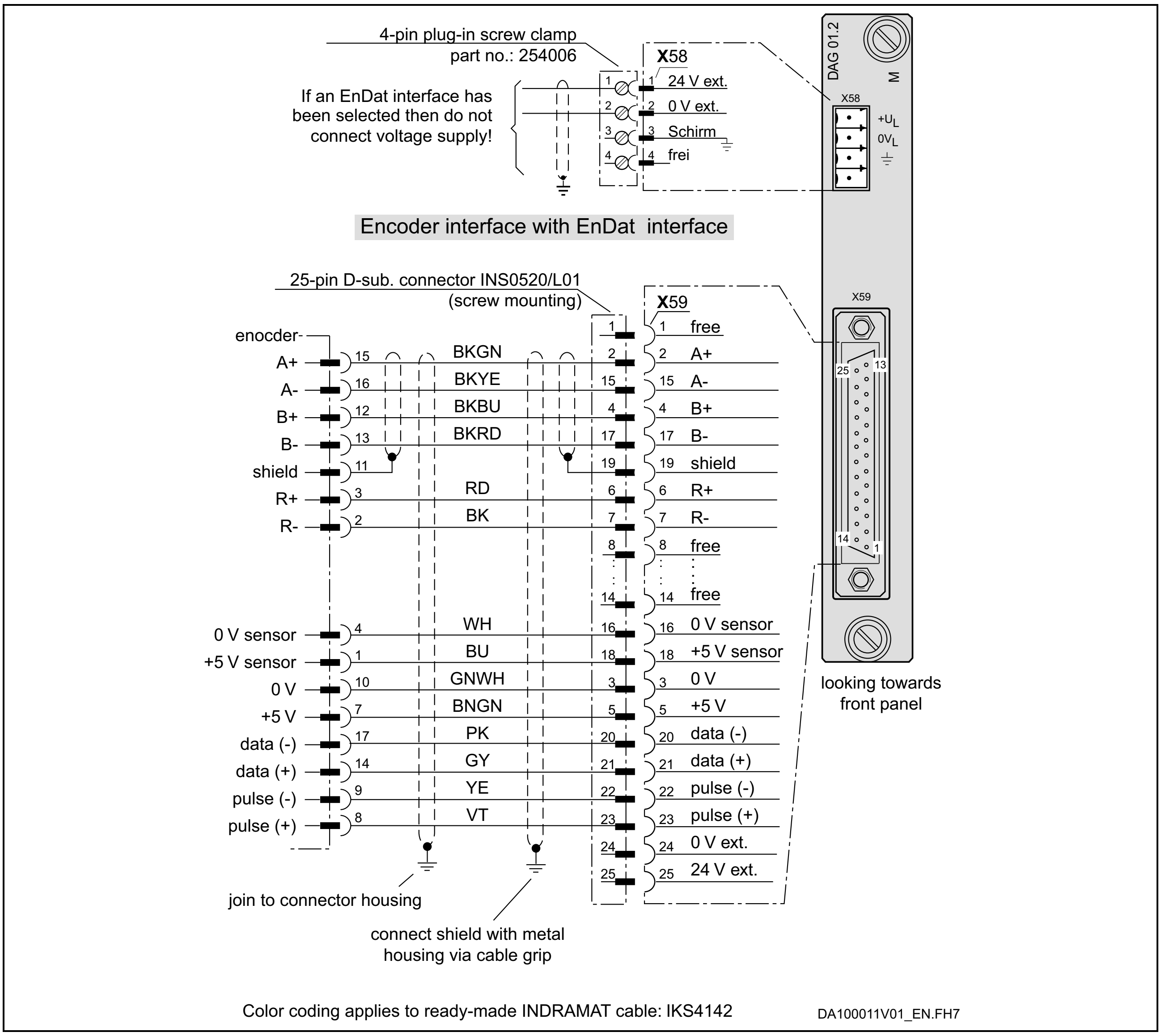


Fig. 9-72: Terminal diagram DAG01.2M

Analog interface with actual position value output DAE02.1M

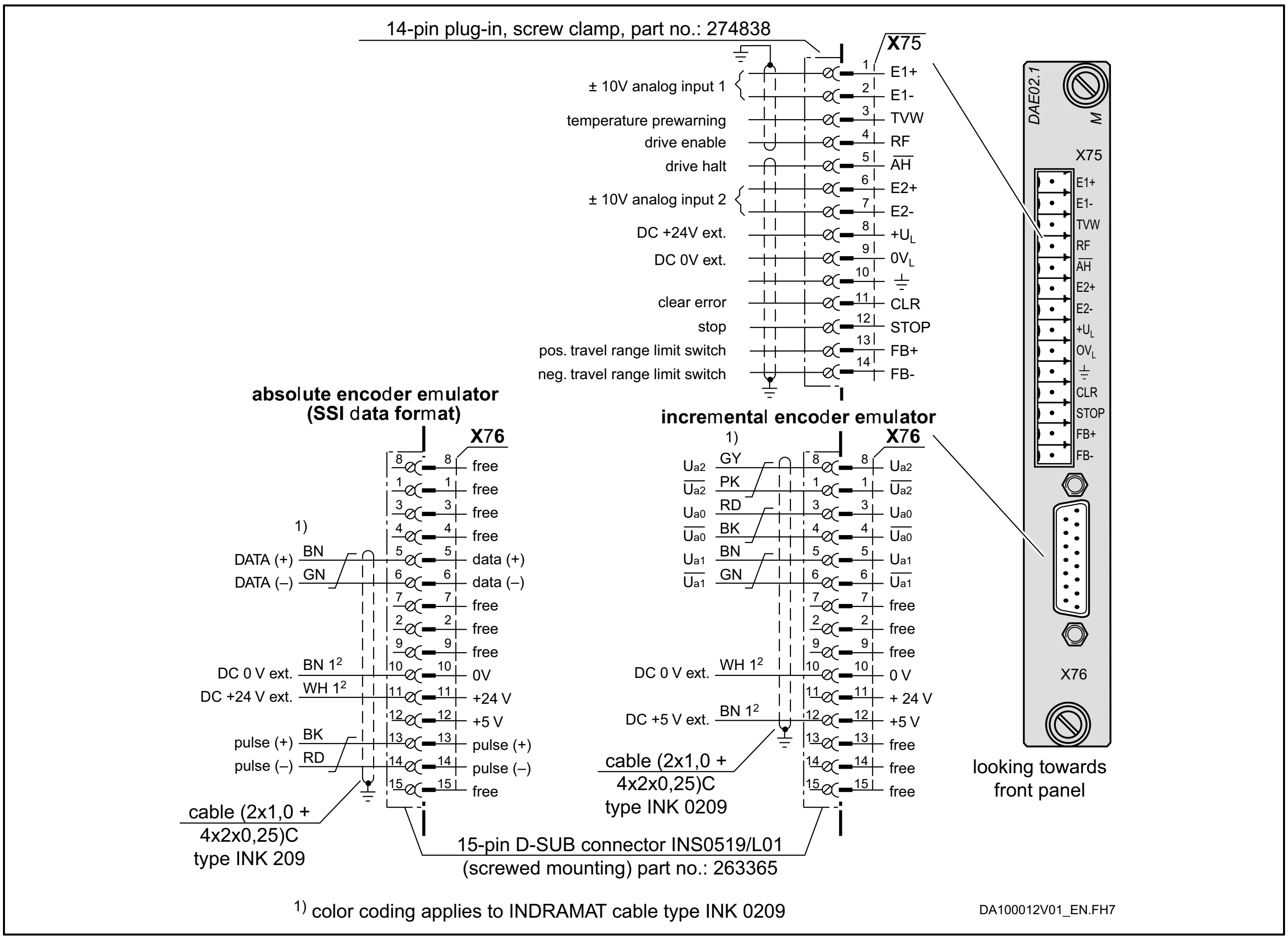


Fig. 9-73: Terminal diagram DAE02.1M

Rexroth
Bosch Group

Absolute encoder emulator DSA01.1M

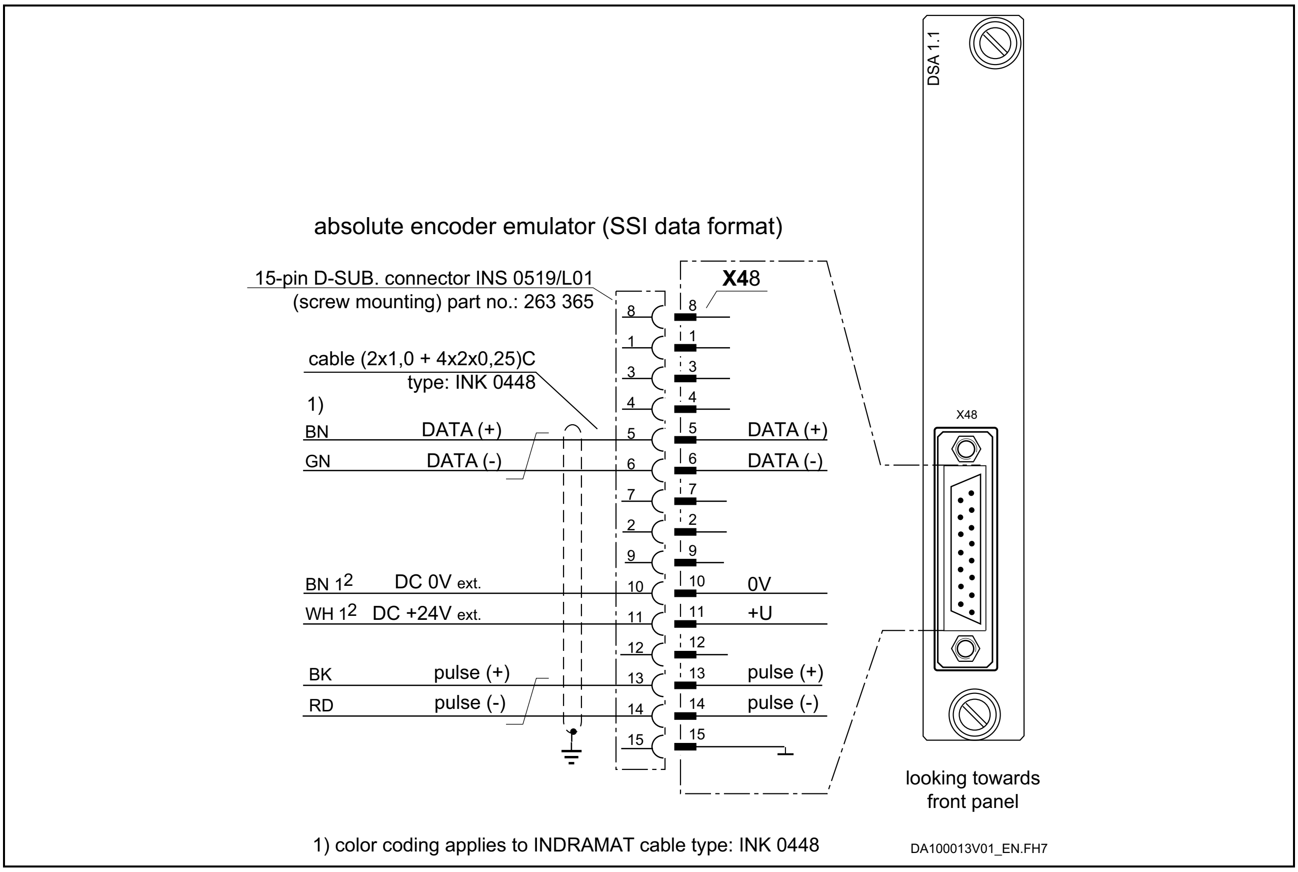


Fig. 9-74: Terminal diagram DSA01.1M

Position interface for square-wave signals DEF01.1M

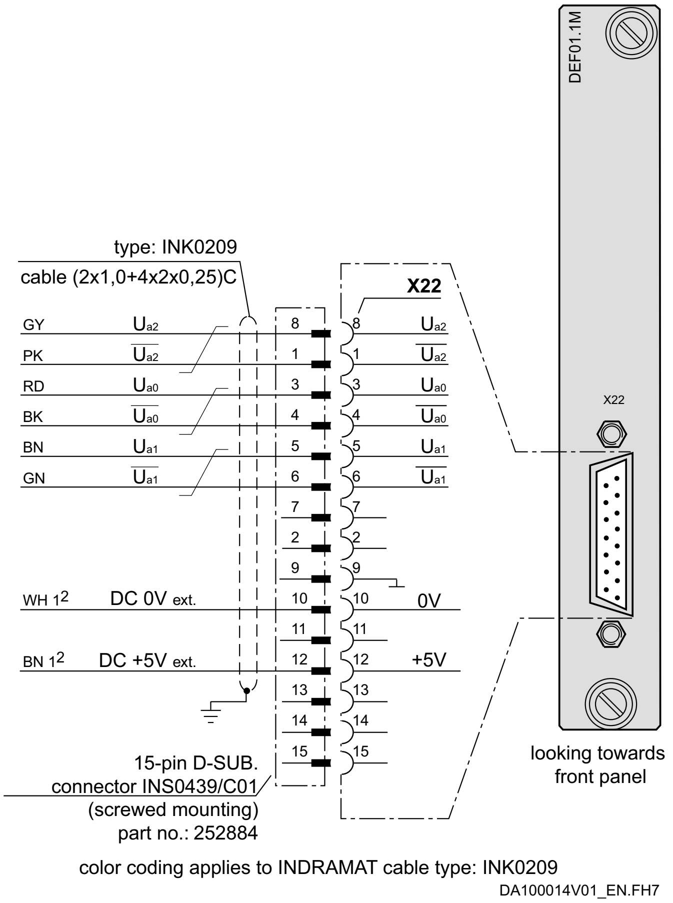


Fig. 9-75: Terminal diagram DEF01.1M

Encoder interface DFF01.1M

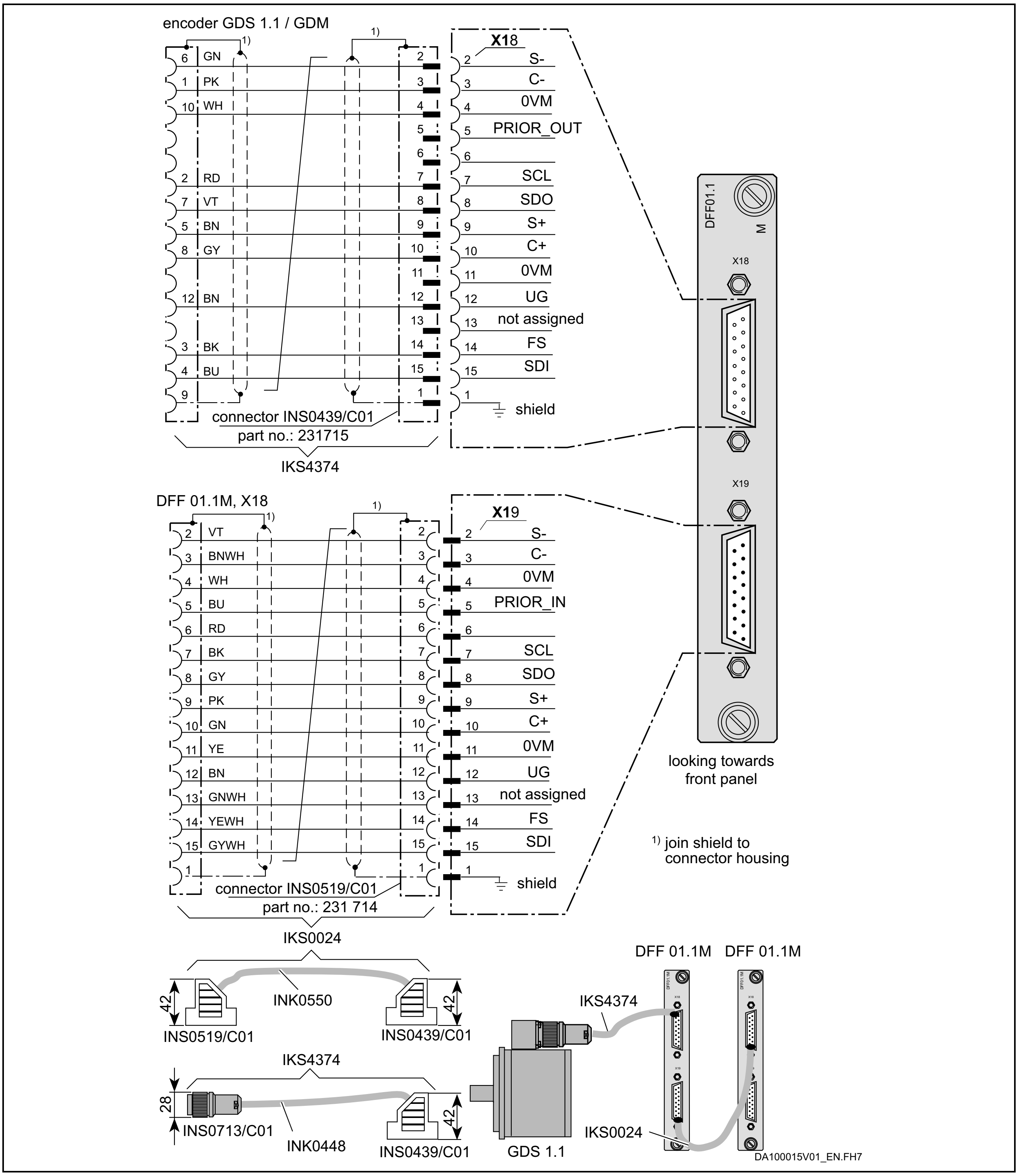


Fig. 9-76: Terminal diagram DFF01.1M

High-resolution position interface for sinusoidal signals DLF01.1M

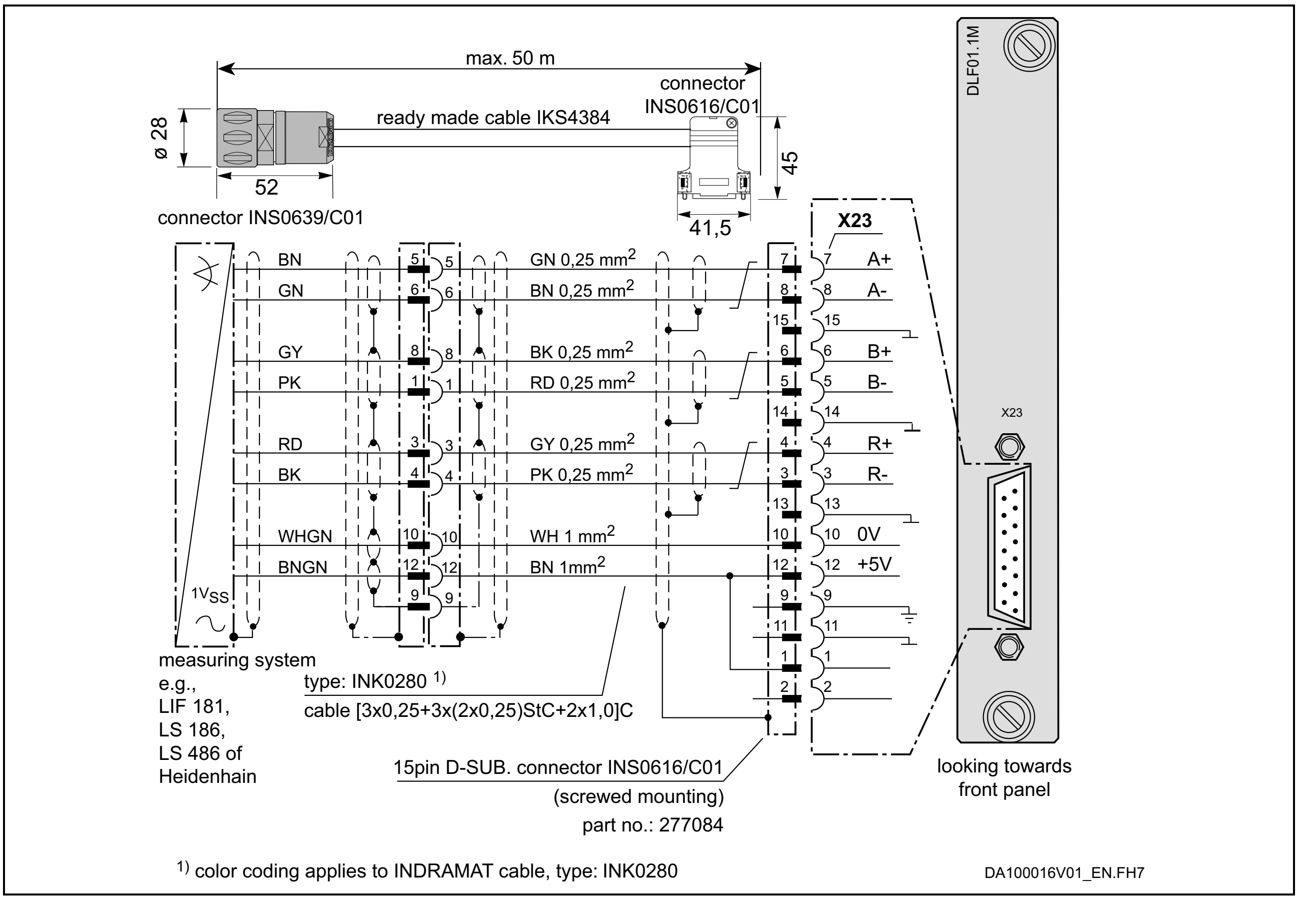


Fig. 9-77: Terminal diagram DLF01.1M

Gear wheel encoder interface DZF02.1M

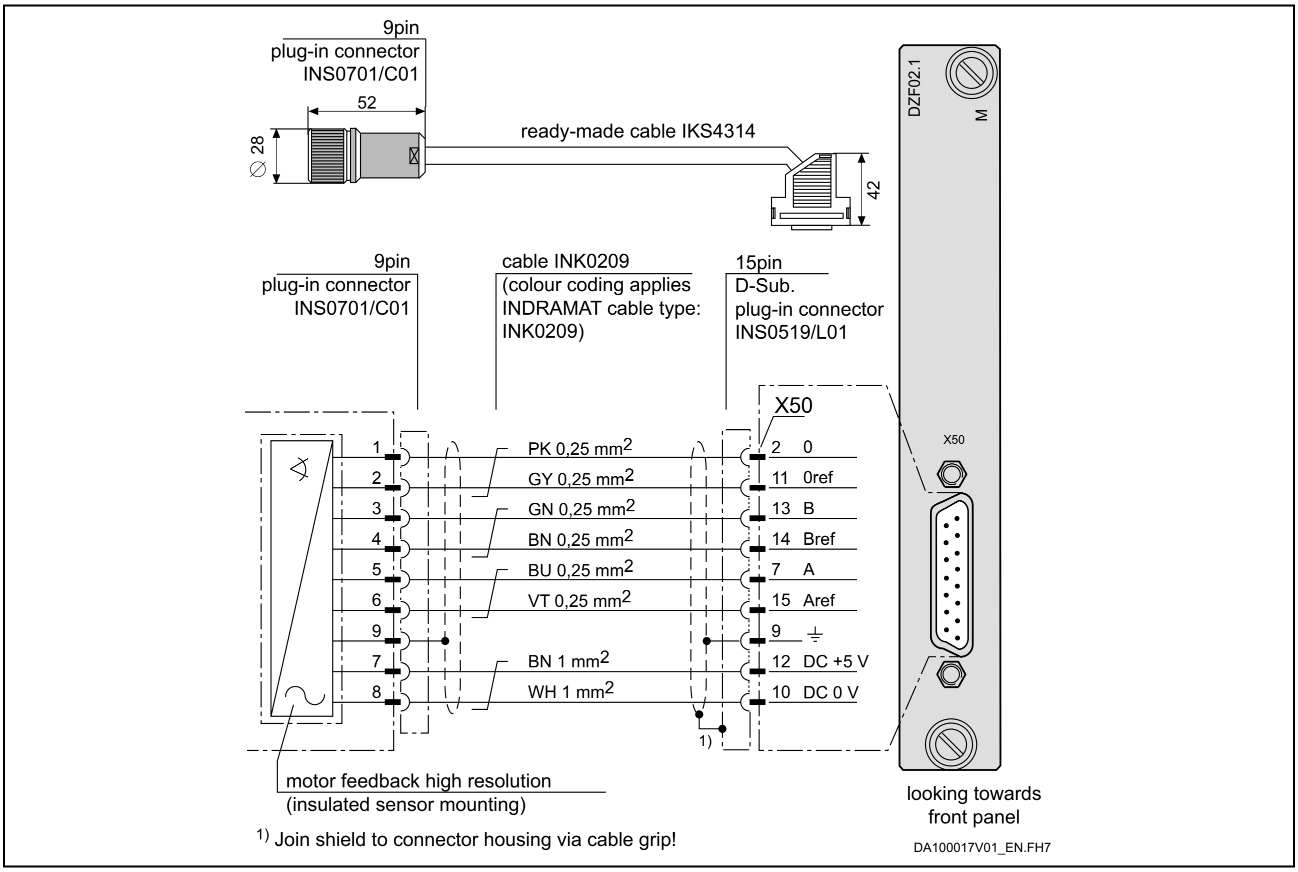


Fig. 9-78: Terminal diagram DZF02.1M

Gear wheel encoder interface DZF03.1M

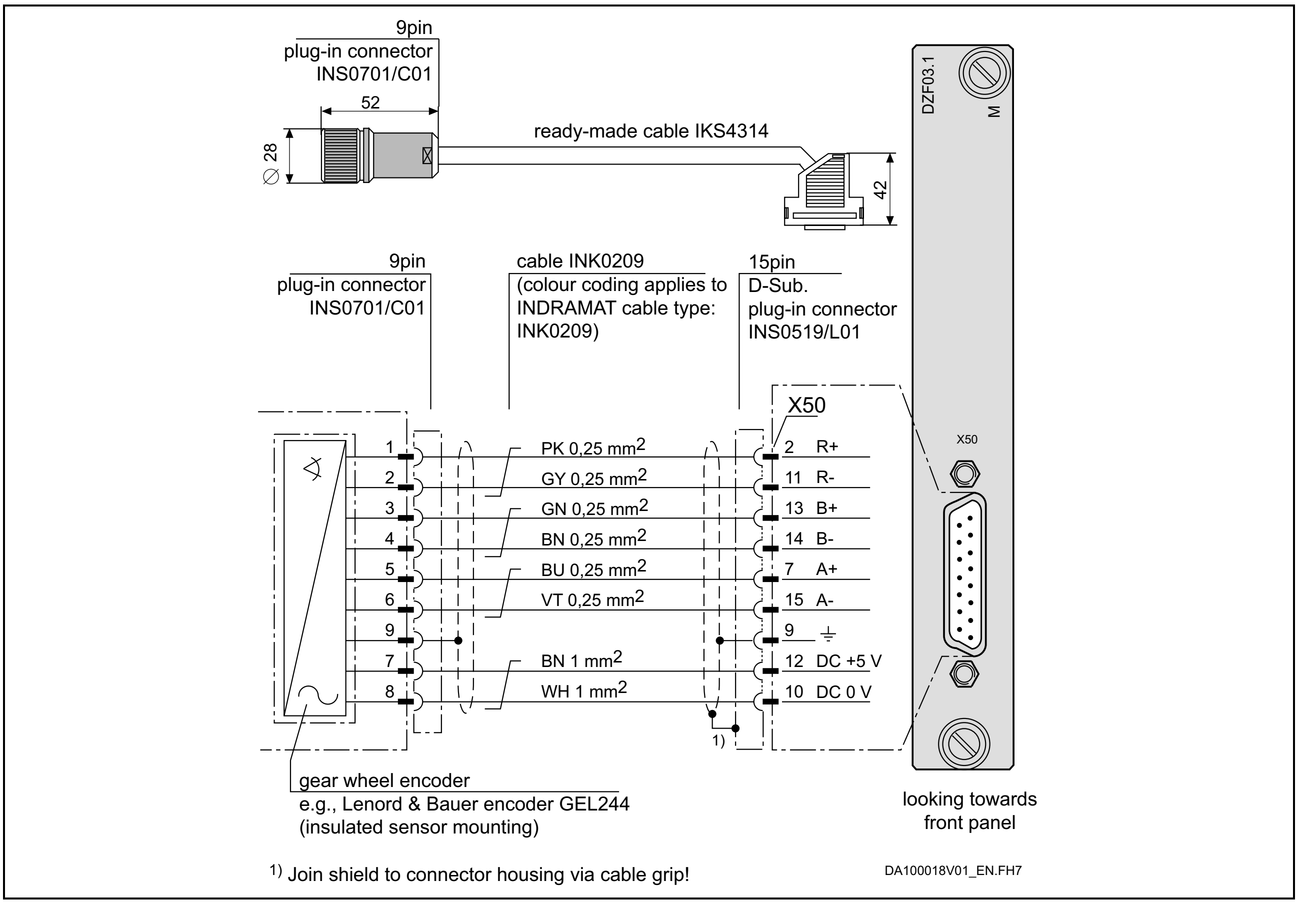


Fig. 9-79: Terminal diagram DZF03.1M

Encoder branching DGA01.2

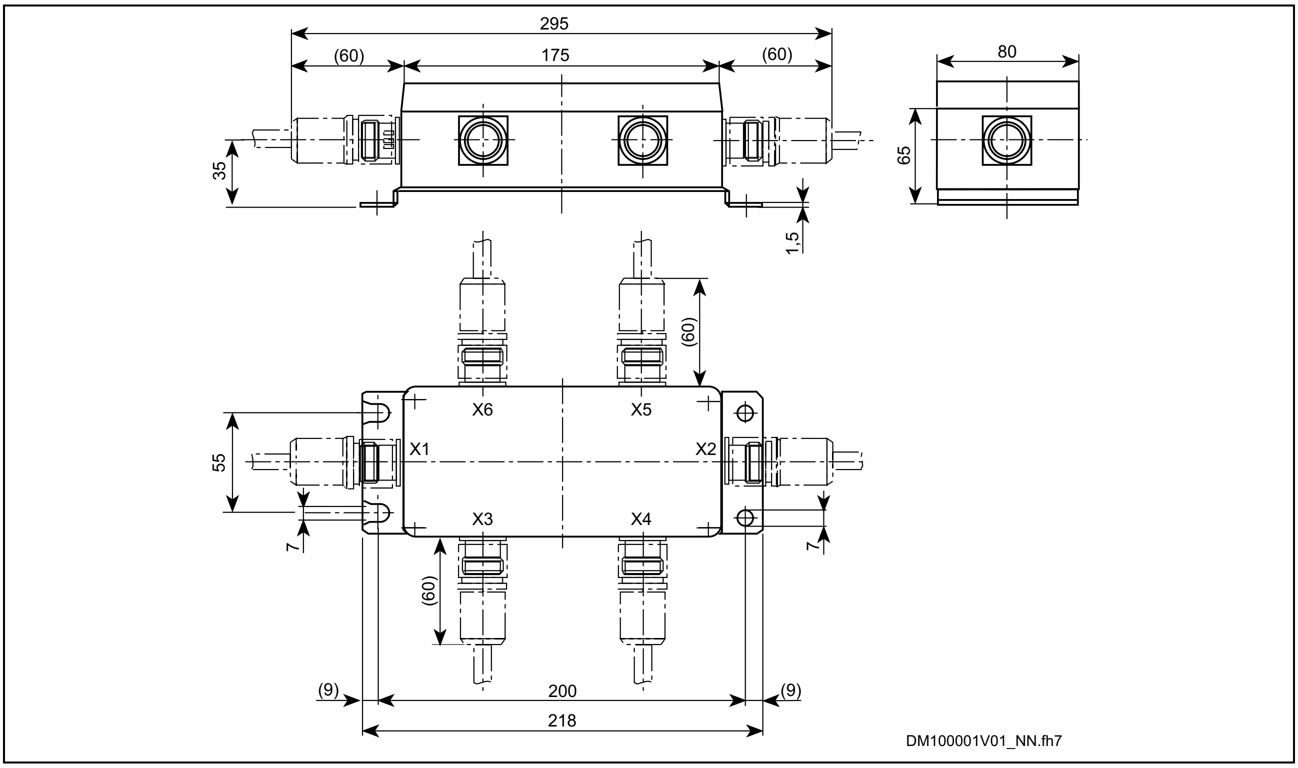


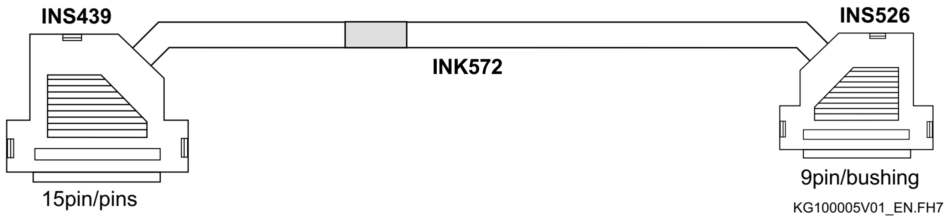
Fig. 9-80: Dimensional sheet encoder branching DGA01.2

9.9 List of connectors and ready-made cables

<table>
<tr><th>Order designation ready-made cable</th><th>Mating connector of the unit</th><th>Rexroth cable</th><th>Cable end</th></tr>
<tr><td>

IKB0005
Part no.: R911 278 141, 2m
Part no.: R911 278 144, 5m
Part no.: R911 278 142, 10m
Part no.: R911 278 143, 15m
(RS232, max. 15m)

</td><td colspan="3">



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IKB0012/000,0
Part no.: R911 281 715
(RS232, max. 15m)

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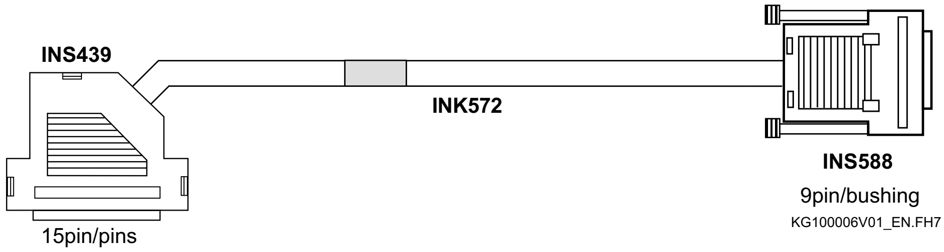
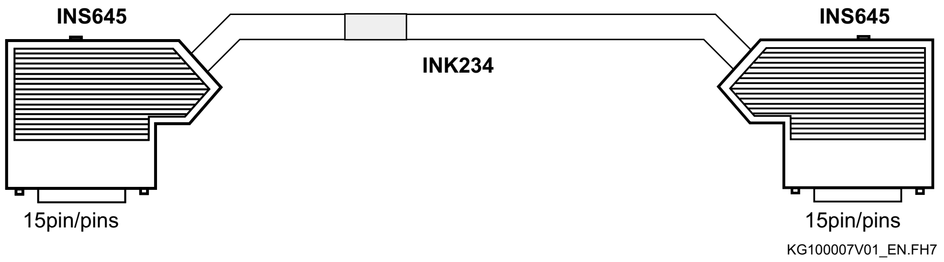


</td></tr>
<tr><td>

IKB0015/000,0
Part no.: R911 282 870
(RS422, max. 400m)

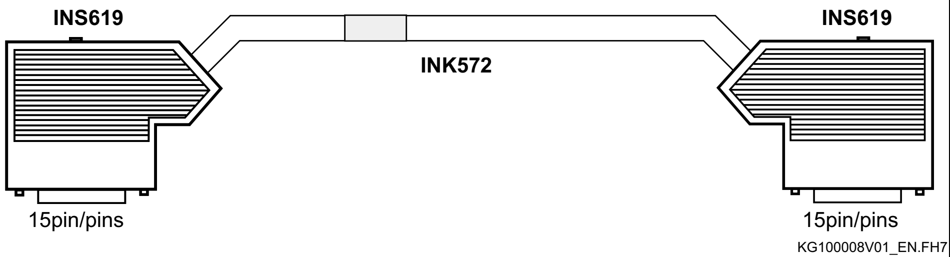
</td><td colspan="3">



</td></tr>
<tr><td>

IKB0017/000,0
Part no.: R911 282 872
(RS485, max. 400m)

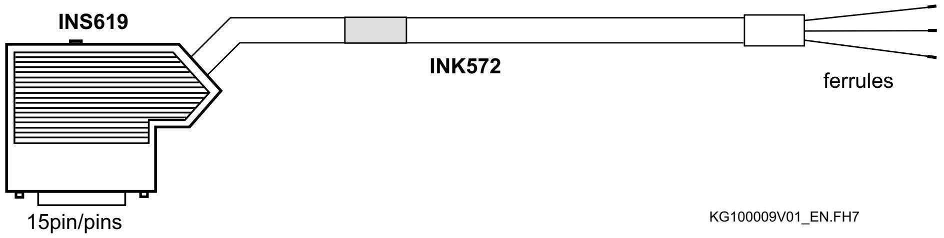
</td><td colspan="3">



</td></tr>
<tr><td>

IKB0019/000,0
Part no.: R911 282 875
(RS485, max. 400m)

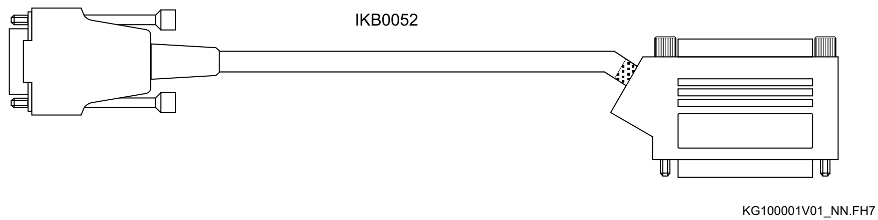
</td><td colspan="3">



</td></tr>
<tr><td>

IKB0053/003,0
MN: R911 305 271
(download cable for VCP)

</td><td colspan="3">



</td></tr>
</table>

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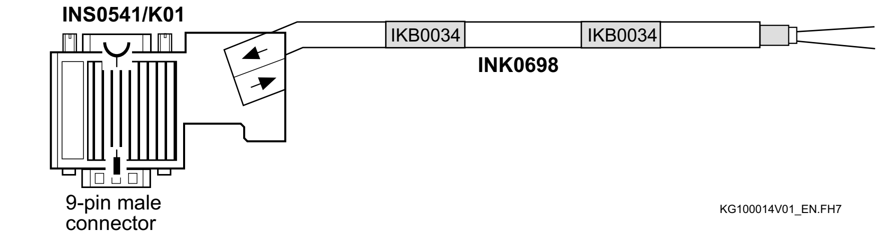
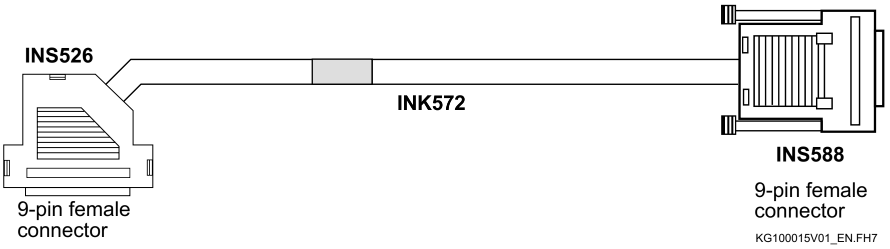
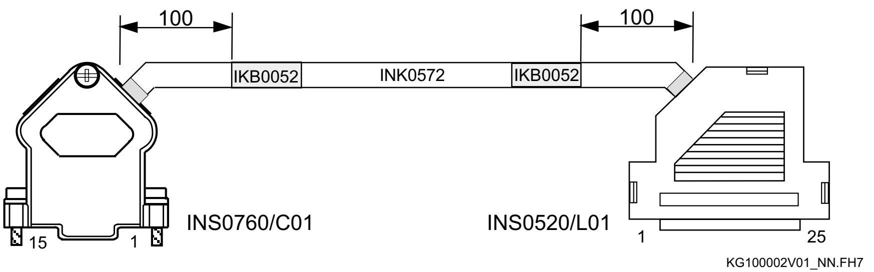
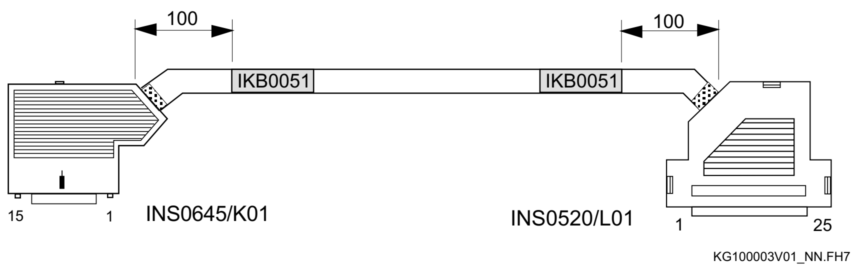
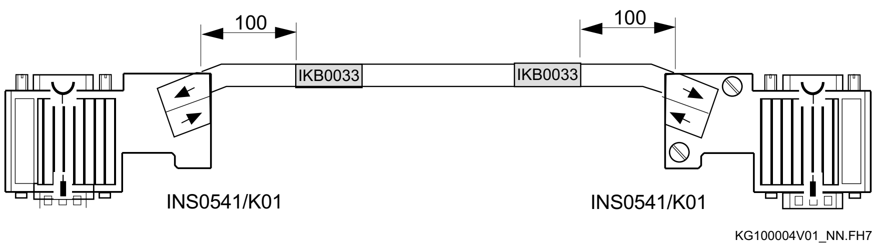
IKB0034/000,0 MN: R911 291 809 (PROFIBUS, max. 1000m)	
IKS0106/000,0 MN: R911 260 838 (RS232, max. 15m, Konfiguration PROFIBUS)	
IKB0052/000,0 MN: R911 305 090 (serial RS232 for VCP)	
IKB0051/000,0 MN: R911 305 089 (serial RS422 for VCP)	
IKB0033/000,0 MN: R911 291 808 (Profibus-DP for VCP)	

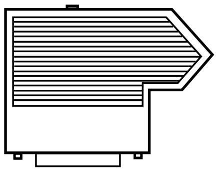
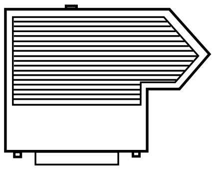
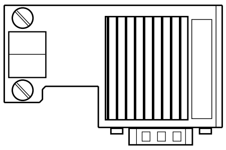
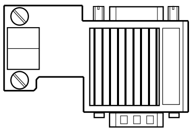
Connectors		
INS0619/K01 Part no.: R911 279 583	 **INS0619/RS485** (15pin/pins) KG100010V01_EN.FH7	Y connector for ready-made cables with active termination
INS0645/K01 Part no.: R911 282 040	 **INS0645/RS422** KG100011V01_NN.FH7	connector for ready-made cables with active termination
INS0540/K01 Part no.: R911 279 538	 **INS0540/Profibus** (pins) KG100012V01_EN.FH7	Profibus connector for ready-made cables with active termination
INS0541/K01 Part no.: R911 279 539	 **INS541/Profibus** (pins/bushing) KG100013V01_EN.FH7	Profibus connector for ready-made cables with active termination (mounting side-by-side possible)
Part no.: R911 279 788	Profibus connector: STECK-INS-FL-01-09-2-Z-GER-01-N-K-S-*	
Part no.: R911 281 461	DeviceNet connector: STECK-KL5,08 F FK FKC 2,5/5STF D 1-5	

Fig. 9-81: List of connectors and ready-made cables

9.10 Supplementary documentation

This document contains dimensional sheets and terminal diagrams of the components concerning SYNAX 200.

Supplementary documentation:

- "RECO-SPS ISP200-R Project Planning Manual“
(DOK-CONTRL-MTS-R0*.2**-PR01-EN-P)
- "SERCOS I/O Unit RECO02.2 Configuration“
(DOK-CONTRL-RECO02.2***-PR01-EN-P)
- "Rexroth Inline Short Description"
(DOK-CONTRL-R-IL*INLINE-KB02-EN-P)
- "Rexroth Fieldline PROFIBUS Devices - Project Planning Manual"
DOK-CONTRL-RF-FLS-PB**-PR01-EN-P
- "Rexroth BTV 16.2/40.2/60.2 - Project Planning Manual"
(DOK-SUPPL*-BTV16/40/60-PR01-EN-P)
- "Rexroth IndraControl VSP 16/40 - Project Planning Manual"
(DOK-SUPPL*-VSP*16/40**-PR01-EN-P)
- "Rexroth IPC 40.2 - Project Planning Mnaual"
(DOK-SUPPL*-IPC*40.2***-PR01-EN-P)
- "Rexroth IndraControl VDP 16/40/60 - Project Planning Manual"
(DOK-SUPPL*-VDP16/40/60-PR01-EN-P)
- "Rexroth VEP 20/30/40 - Project Planning Manual"
(DOK-SUPPL*-VEP20/30/40-PR01-EN-P)
- "Rexroth VCP 01 - Project Planning Manual"
(DOK-SUPPL*-VCP*01*****-PR01-EN-P)
- "Rexroth VCP 02 - Project Planning Manual"
(DOK-SUPPL*-VCP02******-PR02-EN-P)
- "Rexroth VCP 05 - Project Planning Manual"
(DOK-SUPPL*-VCP05******-PR02-EN-P)
- "Rexroth VCP 08 - Project Planning Manual"
(DOK-SUPPL*-VCP08******-PR02-EN-P)
- "Rexroth VCP 20 - Project Planning Manual"
(DOK-SUPPL*-VCP20******-PR02-EN-P)
- "Rexroth VCP 25 - Project Planning Manual"
(DOK-SUPPL*-VCP25******-PR02-EN-P)
- "DIAX03 Plug-in modules for digital intelligent drive controllers
Project Planning Manual"
(DOK-DIAX03-PLUG*IN*MOD-PR03-EN-P)
- "DIAX04 Plug-in modules for digital intelligent drive controllers
Project Planning Manual"
(DOK-DIAX04-PLUG*IN*MOD-PR03-EN-P)
- "Rexroth IndraDrive M Drive Controllers Power Section - Project Planning Manual"
(DOK-INDRV*-HMD+HMS****-PR01-EN-P)
- "Rexroth IndraDrive Drive Controllers Control Section - Project Planning Manual"
(DOK-INDRV*-CSH********-PR01-EN-P)
- "Rexroth EcoDrive Cs Drives - Project Planning Manual"
(DOK-ECODR3-DKC**.3-CS*-PR01-EN-P)
- "Connection Cables - Selection Data"
(DOK-CONNEC-CABLE*STAND-AU04-EN-P)

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oder - or **+49 (0) 172 660 04 06**

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