Electric Drives and Controls | Hydraulics | Linear Motion and Assembly Technologies | Pneumatics | Service

Rexroth Bosch Group

Rexroth IndraMotion MTX System Description

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Project Planning Manual

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Rexroth IndraMotion MTX
System Description

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Contents

1 System Overview

1.1 Brief Description

The control system MTX is based on the CNC control module CMP 60, which is used both in standard industrial PCs and in high-end industrial PCs. The CMP 60 provides both CNC and PLC functionalities. The powerful control module provides CNC performance allowing activation of up to 64 axes in 12 independent CNC processing channels.

In their design and construction, the operator panels of the industrial PCs have been adjusted to further components (machine control panels and PC keyboards) such that they present an optimum solution for controlling, operating and visualizing a machine tool.

Accessories also include cable assemblies allowing the control system MTX to be wired in no time.

Documentation References

Documentation	Type	Material number
Rexroth IndraControl VSP 16.1 / 40.1	DOK-SUPPL*-VSP*16/40**-PRxx-EN-P	R911308264
Rexroth IndraControl VDP 16.1 / 40.1 / 60.1	DOK-SUPPL*-VDP16/40/60-PRxx-EN-P	R911307654
Rexroth BTV 16.2 / 40.2 / 60.2	DOK-SUPPL*-BTV16/40/60-PRxx-EN-P	R911306443
Rexroth IndraControl VPP 16.1 / 40.1 / 60.1	DOK-SUPPL*-VPP*XX.1***-PRxx-EN-P	R911311820
Rexroth VSB 40.1	DOK-SUPPL*-VSB*40.1***-PRxx-EN-P	R911310079
Rexroth IPC 40.2	DOK-SUPPL*-IPC*40.2***-PRxx-EN-P	R911307652
Rexroth VAM 11.1 / 41.1	DOK-SUPPL*-VAM*11/41**-PRxx-EN-P	R911308619
Rexroth VAM 10.1 / 40.1	DOK-SUPPL*-VAM*10/40**-PRxx-EN-P	R911306781
Rexroth PCK 03.3 / VAK 10.1	DOK-SUPPL*-PCK03.3****-PRxx-EN-P	R911299770
Rexroth VAK 11 / 41	DOK-SUPPL*-VAK*11/41**-PRxx-EN-P	R911310336
Rexroth RECO Inline, PROFIBUS-DP	DOK-CONTRL-R-IL*PBSSYS-AWxx-EN-P	R911289597
Rexroth RECO Inline, PROFIBUS-DP Terminal and Module Supply	DOK-CONTRL-R-IL*PB*BK-FKxx-EN-P	R911289587
Rexroth RECO Inline, Digital I/O Terminals	DOK-CONTRL-R-IL*DIO***-FKxx-EN-P	R911289589
Rexroth Fieldline, PROFIBUS Devices	DOK-CONTRL-RF-FLS-PB**-PRxx-EN-P	R911298518

Fig. 1-1: Documentation references

1.2 Overview of Industrial PCs

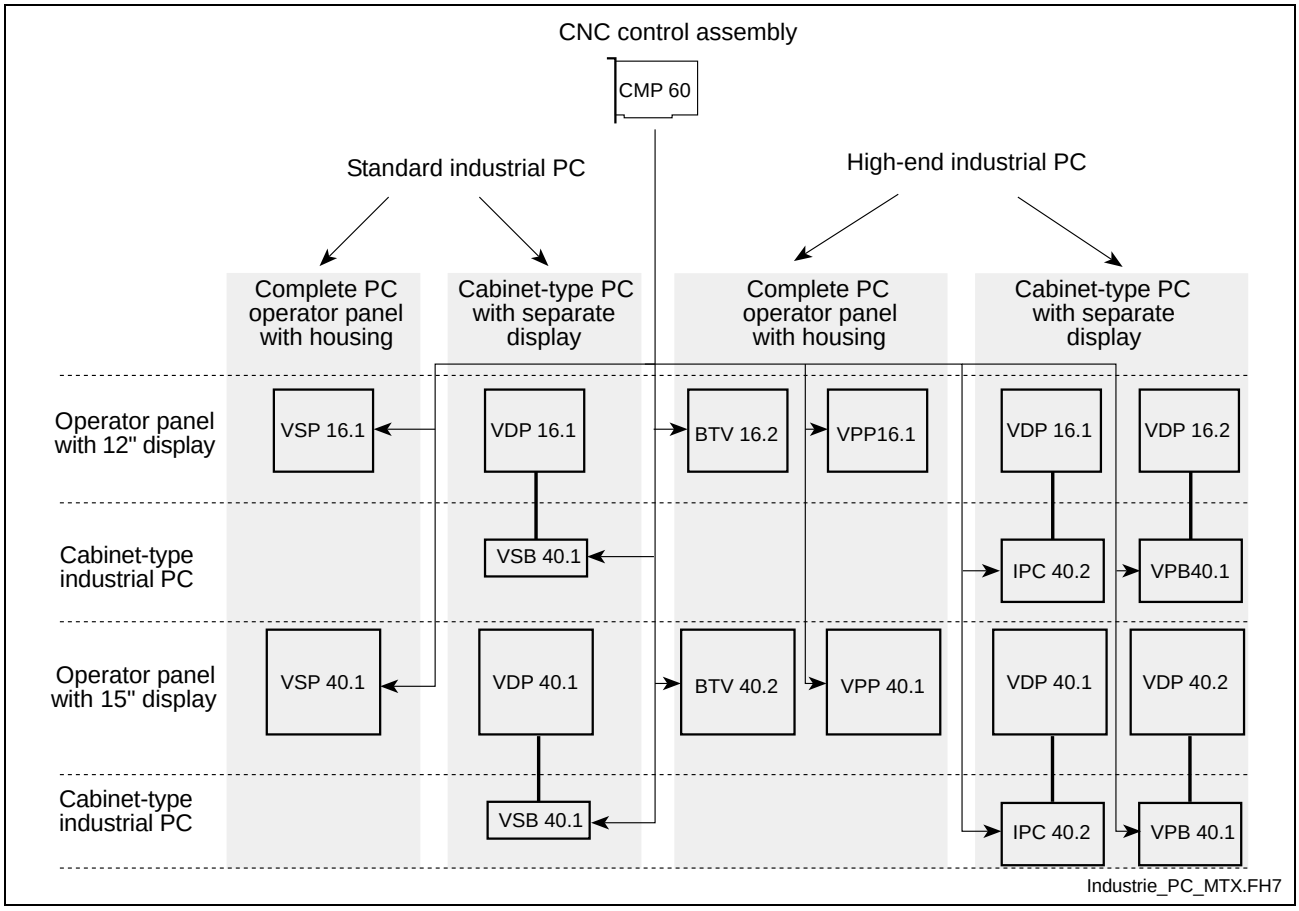


Fig. 1-2: Overview of industrial PCs

1.3 Features of a Standard Industrial PC

- Normal capability for industrial environments (vibration during operation: 0.25 g; shock load: 5 g)
- Standard investment reliability (high component innovation rate)
- Latest PC technology (current processors, motherboards, etc.; available with compatible functionality for at least 2 years)

1.4 Features of a High-End Industrial PC

- High capability for industrial environments (vibration: 1 g; shock load: 15 g)
- High investment reliability (high component continuity rate)
- Long-term availability of components (long-term availability of processors, motherboards, etc.; available with compatible software and functionality for at least 5 years)

2 Important Directions for Use

2.1 Appropriate Use

Introduction

Bosch 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 Bosch 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

For the areas of use and application of the respective component, see also the corresponding documentation (documentation reference see p. 1-1).

2.2 Inappropriate Use

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

The terminals may not be used if

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

3 Safety Instructions for Electric Drives and Controls

3.1 Introduction

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

Do not attempt to install or start up this equipment without first reading all documentation provided with the product. Read and understand these safety instructions and all user documentation of the equipment prior to working with the equipment at any time. If you do not have the user documentation for your equipment, contact your local 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)

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. If this is not the case, they are excluded.
  The following areas of use and application, for example, include safety features and applications: 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 in which electrical devices with vital functions can be electromagnetically disturbed, 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 thirty (30) 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 CNC Control Module CMP 60

4.1 Brief Description

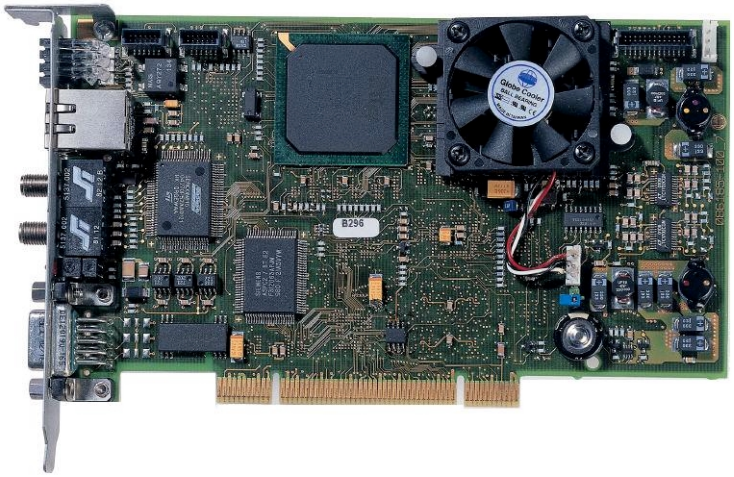


Fig. 4-1: CNC control module CMP 60

The CNC control module CMP 60 represents the central unit in the control system MTX. It provides CNC and PLC functionalities. It is installed in an unassigned PCI slot, either in industrial PCs from Bosch Rexroth or in foreign PCs. It also provides CNC performance allowing activation of up to 64 axes in 12 independent CNC processing channels. The standard equipment includes interfaces allowing the activation of intelligent drives via SERCOS interface, of I/Os via PROFIBUS-DP and peripheral assemblies via Ethernet. An optional high-speed I/O interface is available for 8 high-speed inputs and outputs.

4.2 Performance Data

Designation	Value
Number of axes	max. 64
Spindle therof	max. 8
Number of interpolated axes/channel	max. 8
Number NC channels	max. 12
SERCOS cycle time	min 250µs (in 8 axes configuration, 4 axis interpolation)
Block cycle time	min. 250 µs
PLC Processing time	60µs (for 1k)

Fig. 4-2: Performance data CMP 60

4.3 Technical Data

Processor	Celeron 650MHz with 265k byte second level Cache
Memory	SDRAM: 64 Mbyte SRAM: 1 Mbyte....8 MByte
Bus	universal (5V and 3,3V compatible) PCI-Bus Interface
Power supply	5V DC +/- 5%, max. 5A
Power consumption	Typical 21 W

Fig. 4-3: Technical data CMP 60

4.4 Handling

CAUTION

If touched, the fan will be destroyed!

⇒ The fan on the CMP 60 is highly sensible and must not be touched.

Resistance to Climatic Changes

Temperature

Storage temperature: - 20° C through + 70° C

Operating temperature: + 5° C through +55° C
(ambient temperature on chart)

Moisture

Climatic category 3K3 according to EN 60721, no moisture condensation allowed.

Corrosion/Chemical Resistance

Ambient air must be free from high concentrations of acids, alkaline solutions, corrosive agents, metal vapors or other conducting contaminants.

Noise Radiation, Immunity (EMC)

Radio Interference Suppression

Radio interference suppression must be ensured in accordance with EN 50081-2.

Immunity

Radio immunity must be ensured in accordance with EN 50082-2. The connections for interface lines must be tested according to Table 3 of this standard (connections for process, measurement and control lines as well as long bus and control lines).

The criteria for operating quality mentioned in this standard are explained in the test plan.

Service Concept

If the CMP 60 is defective, the complete module must be replaced. On-site repairs at the CMP 60 are not intended. Only the CPU fan of the module can be replaced.

Note: Please consider the necessary precautionary measures during the utilization of electrostatic discharge-endangered modules (EN 61340-5-1; EN 61340-5-2) during replacing the fan or the complete module.

Spare parts

Designation	Type	Material number
CMP 60 complete	CMP60.1-SP-304-FN-NNNN-NW	R911307078
CPU fan	Fan Celeron P3	1070922532

Fig. 4-4: Spare parts CMP 60

4.5 Control and Indicator Components

LEDs and External Watchdog Reset Button

The CMP 60 is provided with three dual LEDs (red and green activation in one LED) as well as one red LED (in the keypad).

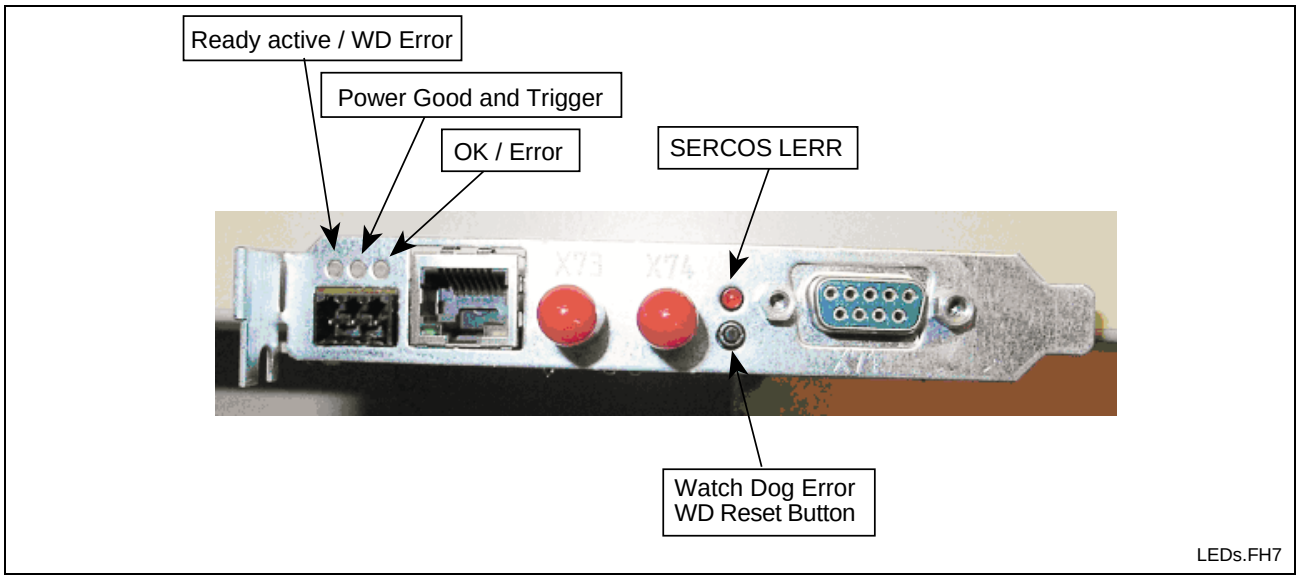


Fig. 4-5: LEDs and external watchdog reset button

Ready active / watchdog error LED

This dual LED indicates the following states:

1. **LED off** (with power good LED being active): watchdog not yet alert, or ready contact opened by the software (the watchdog, however, is still triggered internally).
2. **LED green:** ready contact closed, watchdog triggered.
3. Red LED flashing at high frequency: the local CPU is in the reset state, i.e. has not been started yet.

4. **Red LED emitting steady light:** a ready error has occurred, and the watchdog(s) has/have responded.

Power Good / Trigger LED

This dual LED indicates the following states:

1. **LED off:** the voltage of at least one of the four on-board DC-DC converters is incorrect. => vector group defective, or PC power supply unit too weak or defective.
2. **LED green:** all four voltages are correct.
3. **LED pulsating yellow:** approx. 300 msec trigger pulse for debugging purposes, generated by “cs_trig_led”.

OK / error LED

This dual LED can be used by software as desired.

The red LED is automatically activated by the EPLD on power-down. Thereafter, any access to the SRAM is disabled. Usually, this state is not indicated visually, since the voltages are preserved even for less than 1 msec.

SERCOS LERR LED

This red LED is directly activated by the SERCON816 controller (L_ERR#) and allows monitoring of the FO receiving quality to a limited degree. This LED should not be on.

Watchdog Reset Button

If actuated, this button allows resetting of a pending watchdog error and cancelling of any active PC NMI disable signal (see cs_dis_pc signal description). This actuation automatically “alerts” the watchdog logic. In addition, the “watchdog reset button” can be used to switch over to the RAM Boot (reset LED flashing) on power-on and LRESET.

Actuation of this button does not have any further effect on the remaining logic.

4.6 Interfaces

SERCOS interface X7S1, X7S2

The control module CMP 60 permits operation of drives that are compatible with a SERCOS interface. The connection to such drives is established by means of FO cables. A ring structure according to SERCOS interface (IEC 1491) is used as the topology.

The SERCOS ring begins and ends at the CMP 60 module. The optical output of the control (X7S2) is connected to the optical input of the first drive via an optical fiber. The output of the first drive is connected to the input of the next drive, etc. The output of the last drive is connected to the input of the CMP 60 module (X7S1). The maximum transfer rate is 16 Mbauds.

PROFIBUS-DP Master Interface X7P

The control module CMP 60 exchanges data with the operator panels (VAM…) and the sensor and actuator level (Inline/Fieldline modules) via the PROFIBUS-DP interface. This is achieved by means of cable assemblies of variable lengths. The maximum transfer rate is 12 Mbauds.

Ethernet Interface

The control module CMP 60 exchanges data with the master computer level via an Ethernet interface. The interface is realized by means of an RJ45 connector and allows a maximum transfer rate of 100 Mbauds.

Ready Contact

If the control module CMP 60 has not been started up yet or if a watchdog error has occurred during operation, the ready contact opens. For that reason, it is appropriate to connect the contact in the emergency-stop chain of the machine. The maximum contact load is 60 V / 1 A.

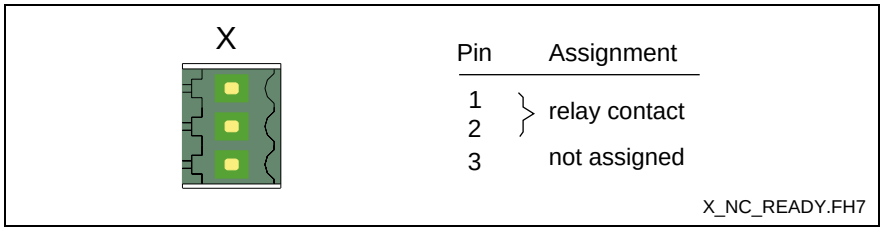


Fig. 4-6: X - connection NC Ready

Note: Improper shielding may cause malfunctions! Only use shielded cables and metallic or conducting connector or coupler housings with large-area shield application.

Optional Highspeed I/O Interface

The highspeed I/O interface is an extension module for the control module CMP 60, with 8 highspeed inputs and 8 highspeed outputs. The module is assigned to a slot in the industrial PC, but does not have a PCI bus connection. The connection to the CMP 60 is established directly via two ribbon cables.

Note: To permit future retrofitting, the highspeed I/O interface may only be mounted to the right of the CMP 60 on the component side (owing to the ribbon cables).

24-V-DC Voltage Connection

The inputs and outputs of the highspeed I/O interface are supplied with 24 V DC via a 4-pin clamp-type terminal. Pins 1 and 2 as well as pins 3 and 4 respectively are connected to each other on the printed circuit board. Two LEDs are provided next to the connector. These LEDs emit light once 24 V DC is applied.

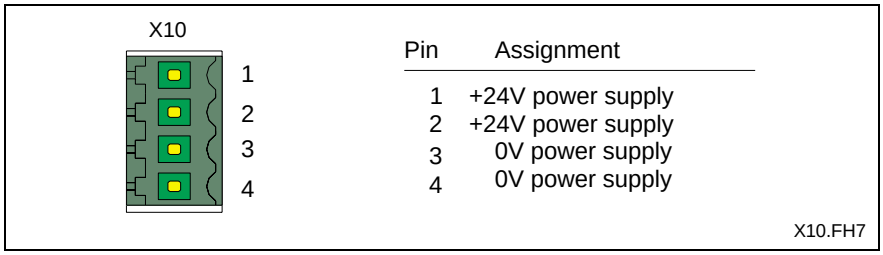


Fig. 4-7: X10 – 24-V-DC voltage connection

CAUTION

Dangerous electric voltage!

⇒ The 24-V-DC input voltage must meet the requirements for “safety separation”.

Digital Outputs

The digital outputs are provided on the 8-pin connector X11. A light-emitting diode, which is lit if high level is applied to the output, is located next to each of the pins of the connector.

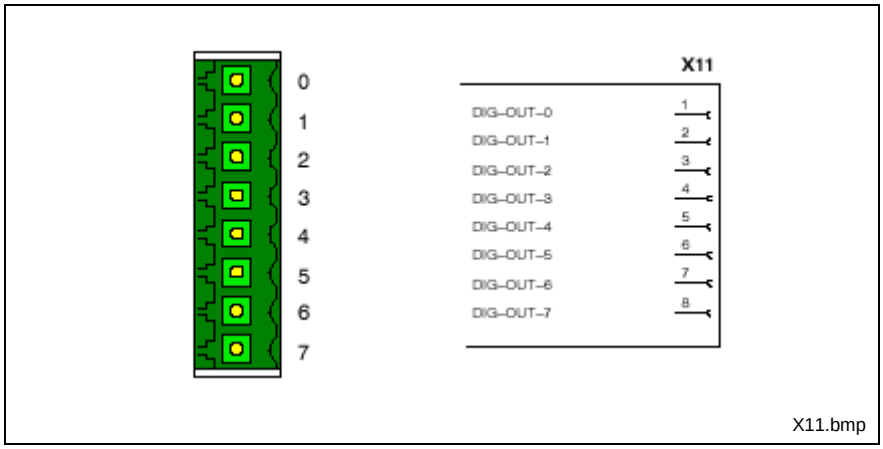


Fig. 4-8: X11 – Digital Out

Technical data of the outputs

Current range in case of 1-signal at 24 V (permanently)	max. 500 mA
Voltage drop at 600 mA	max. 3 V
Leakage current (0-signal) / with VN340SP	max. 2 mA
Short-circuit current with overtemperature	max. 2.5 A
Switching time	max. 300 µs

Fig. 4-9: Working range of digital outputs

Measured switching times in no-load state:

- ON delay 48 µs
- OFF delay 700 µs

Measured switching times under 0.5 A load:

- ON delay 50 µs
- OFF delay 135 µs

Digital Inputs

The digital inputs are provided on the 8-pin connector X12. A light-emitting diode, which is lit if high level is applied to the particular input, is located next to each of the pins of the connector.

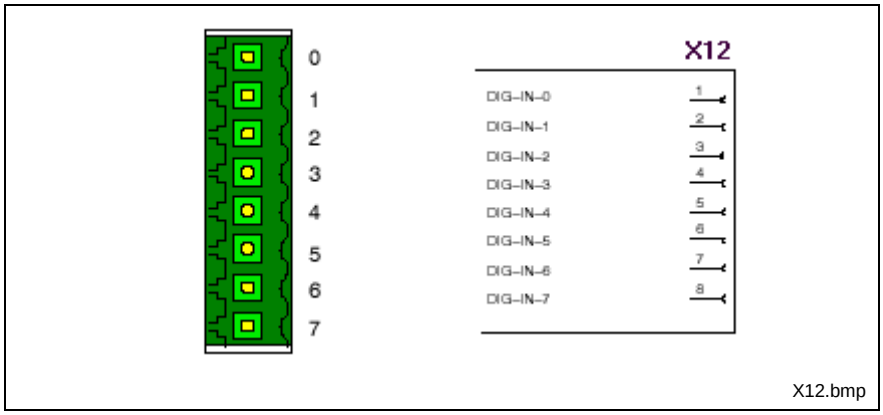


Fig. 4-10: X12 – Digital In

Technical data of the inputs

Limit value	0-state		Transition range		1-state	
	UL/V	IL/mA	UT/V	IT/mA	UH/V	IH/mA
Max.	5	30	11	30	30	30
Min.	-3	ND	5	2	11	5,0

Fig. 4-11: Working range of digital inputs

Switching time: max. 100 µs

4.7 Order Type

The CNC control module CMP 60 is available as subitem of an industrial PC from Bosch Rexroth (VSP, VSB, BTV, VPP, IPC, VPB). The various designs of the industrial PCs are filed in so-called control configurations (CFG-..).

Order Codes in Industrial PCs from Bosch Rexroth

Industrial PC	Control Configuration	Type
VSP 16/40, VSB 40	CFG-VSN01E1-EC-NN-NN-NN-NN-NN	with CMP 60
	CFG-VSN01E1-EC-IC-NN-NN-NN-NN	with CMP 60 and I/O interface for 8 inputs and 8 outputs
BTV 16/40, IPC 40	CFG-BTV16.1AN-EC-NN-NN	with CMP 60
	CFG-BTV16.1AN-EC-IC-NN	with CMP 60 and I/O interface for 8 inputs and 8 outputs
VPP 16/40, VPB 40	CFG-VPN01A1-EC-NN-NN	with CMP 60
	CFG-VPN01A1-EC-IC-NN	with CMP 60 and I/O interface for 8 inputs and 8 outputs

Fig. 4-12: Control configurations with CMP 60

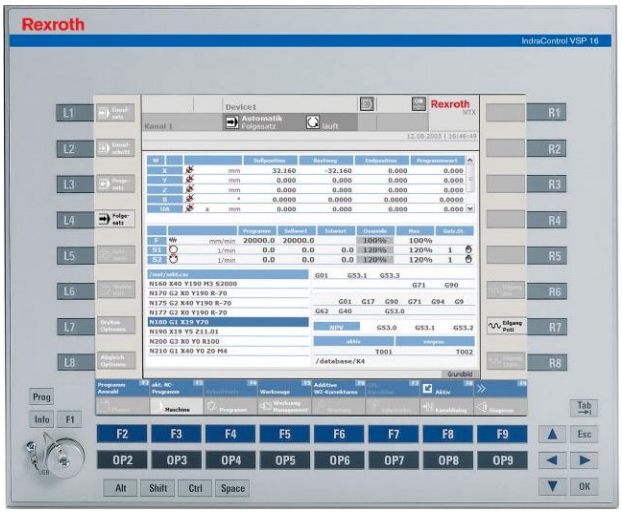
The control configuration (CFG-..) contains the control module CMP 60 and all accessories required for installation of an industrial PC from Bosch Rexroth.

4.8 Documentation

Documentation providing a detailed description of the CNC control module is available.

5 Standard Industrial PC VSP

5.1 Brief Description



VSP 16.jpg

Fig. 5-1: VSP 16.1 with 12“ color display

VSP 40.jpg

Fig. 5-2: VSP 40.1 with 15“ color display

Standard industrial PCs VSP are PC-based control and visualization systems for normal ambient conditions with tested capability for industrial environments. These PCs are mainly installed in an operator console or in a switch cabinet wall. By installation of a CNC control module CMP 60 in the attached PC box, the operator panels fulfill control functions.

5.2 Field of Application

The control and visualization terminals are used in industrial environments with normal vibration and shock requirements.

5.3 Technical Data

	VSP 16.1	VSP 40.1
Display	12“ color display	15“ color display
Front panel design	16 machine function keys	
PC box	6 slots (PCI)	
Processor	Celeron, 2 GHz	
RAM	512 MB RAM	
Line voltage	115..230 V AC or 24 V DC	

Fig. 5-3: Technical data of VSP 16/40

5.4 Types

The following types of the standard industrial PC VSP 16/40 are available:

Type	Comment
VSP16.1BKE-512NN-C1C-AN-NN-FW	Line voltage 115..230 V AC; without CD-ROM drive
VSP16.1BKE-512NN-C1C-AD-NN-FW	Line voltage 115..230 V AC; with CD-ROM drive
VSP40.1BIE-512NN-C1C-AN-NN-FW	Line voltage 115..230 V AC; without CD-ROM drive
VSP40.1BIE-512NN-C1C-AD-NN-FW	Line voltage 115..230 V AC; with CD-ROM drive
VSP40.1BIE-512NN-C1D-AN-NN-FW	Line voltage 24 V DC; without CD-ROM drive

Fig. 5-4: VSP 16/40 order types

5.5 Control Configuration

If the standard industrial PC VSP 16/40 is equipped with a control module CMP 60, the following control configurations (CFG..) are available:

Type	Comment
CFG-VSN01E1-EC-NN-NN-NN-NN-NN	with control module CMP 60
CFG-VSN01E1-EC-IC-NN-NN-NN-NN	with control module CMP 60 and I/O interface for 8 inputs and 8 outputs

Fig. 5-5: Control configuration for VSP 16/40

5.6 Accessories

Connectors and Cable Assemblies

Type	Comment
B-AC STECKER NETZ 230V	230-V power plug, angular flange socket
BKS-U-N-NTZKAB-IPCRHO-002,5-P	230-V power cord with female flange socket, angular, cable length 2.5 m

Fig. 5-6: Connectors and cables

5.7 Documentation

The following documentation provides a detailed description of the VSP 16/40 operator panels:

DOK-SUPPL*-VSP*16/40**-PRxx-EN-P

6 Standard Industrial PC VSB with Operator Panel VDP

6.1 Brief Description

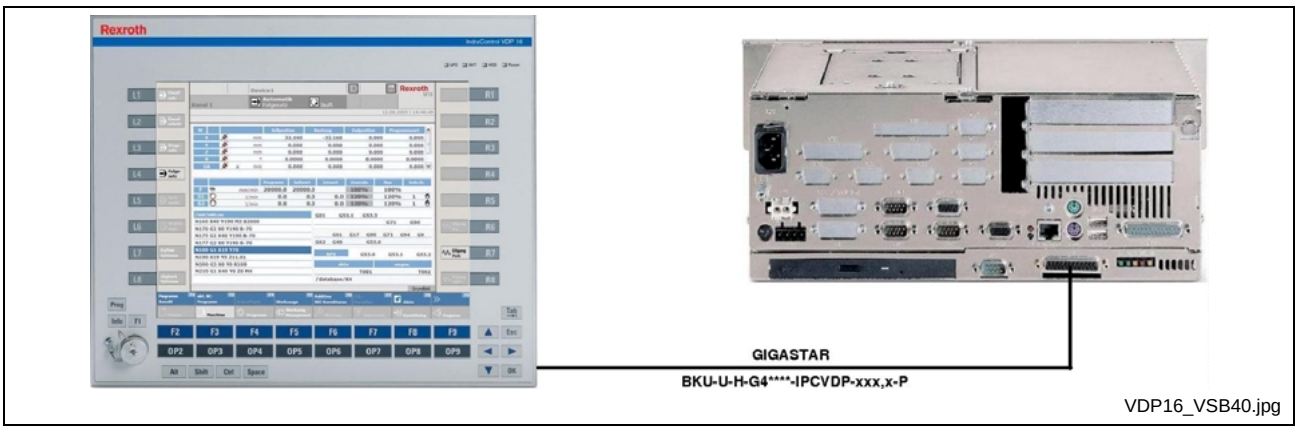


Fig. 6-1: Standard industrial PC VSB 40.1 with operator panel VDP 16.1

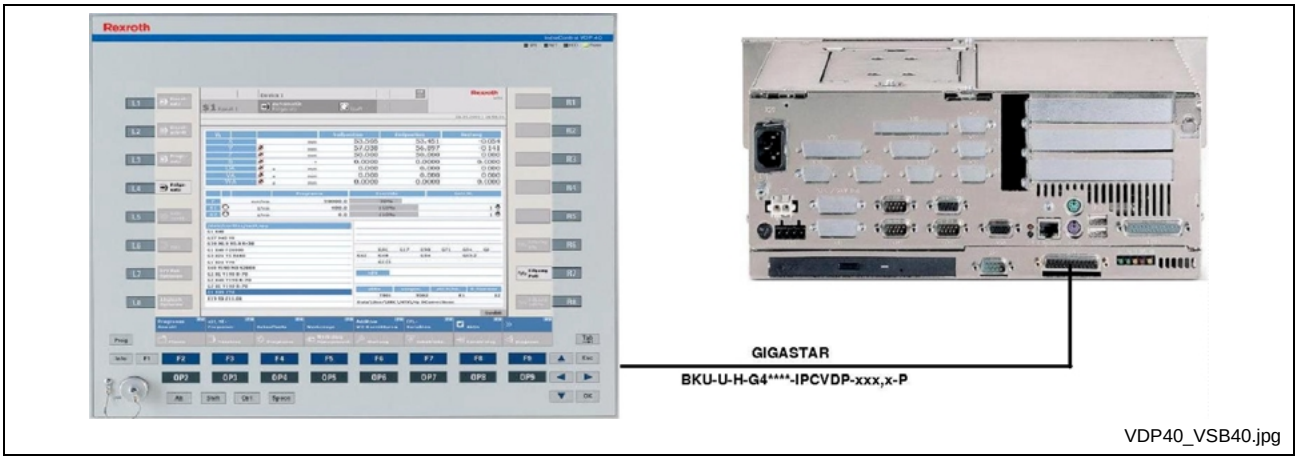


Fig. 6-2: Standard industrial PC VSB 40.1 with operator panel VDP 40.1

The VSB 40.1 is an industrial PC which, in connection with the passive operator panels VDP 16.1 or VDP 40.1, represents a PC-based control and visualization terminal with normal capability for industrial environments. The VSP 40.1 is intended to be installed in a switch cabinet. The operator panels VDP 16.1 and VDP 40.1 are designed to be installed in an operator console or in a switch cabinet wall. The connection between VDP and VSP is established via a GIGASTAR interface. If equipped with a CNC control module CMP 60, the VSB 40.1 fulfills PC control functions.

6.2 Field of Application

The standard industrial PCs are used in industrial environments with normal vibration and shock requirements.

6.3 Technical Data

VSB 40.1

PC box	6 slots (PCI)
Processor	Celeron, 2 GHz
RAM	512 MB RAM
Line voltage	115..230 V AC or 24 V DC

Fig. 6-3: Technical data of VSB 40.1

VDP 16/40

	VDP 16.1	**VDP 40.1**
Display	12“ color display	15“ color display
Front panel design	16 machine function keys	
Line voltage	via GIGASTAR interface (24 V DC)	

Fig. 6-4: Technical data of VDP 16/40

6.4 Types

The following types of the standard industrial PC VSB 40 are available:

Type	**Remarks**
VSB40.1G4E-512NN-C1C-AN-NN	Line voltage 115..230 V AC; without CD-ROM drive
VSB40.1G4E-512NN-C1C-AD-NN	Line voltage 115..230 V AC; with CD-ROM drive

Fig. 6-5: VSB 40.1 types

The following types of the operator panel VDP 16/40 are available:

Type	**Remarks**
VDP16.1BKN-G4-PS-NN	Operator panel with 12” color display
VDP40.1BIN-G4-PS-NN	Operator panel with 15” color display

Fig. 6-6: VDP 16/40 types

6.5 Control Configuration

If the standard industrial PC VSB 40 is equipped with a control module CMP 60, the following control configurations (CFG..) are available:

Type	**Remarks**
CFG-VSN01E1-EC-NN-NN-NN-NN-NN	with control module CMP 60
CFG-VSN01E1-EC-IC-NN-NN-NN-NN	with control module CMP 60 and I/O interface for 8 inputs and 8 outputs

Fig. 6-7: Control configurations for VSB 40.1

6.6 Accessories

Connection Cables (GIGASTAR Interface)

The following cable assemblies are available for establishing the connection between the industrial PC VSB 40 and the operator VDP 16/40:

Type	Remarks
BKS-U-H-G4****-IPCVDP-001,0-P	VSB–VDP connection cable, highly flexible, 1 m
BKS-U-H-G4****-IPCVDP-005,0-P	VSB–VDP connection cable, highly flexible, 5 m
BKS-U-H-G4****-IPCVDP-010,0-P	VSB–VDP connection cable, highly flexible, 10 m
BKS-U-N-G4****-IPCVDP-020,0-P	VSB–VDP connection cable, flexible, 20 m
BKS-U-H-G4****-IPCVDP-030,0-P	VSB–VDP connection cable, highly flexible, 30 m

Fig. 6-8: Connection Cables

Fastening Angles

To mount the industrial PC VSB 40 vertically, the following angles are available:

Type	Comment
WINKEL PCBOX-IPC	Angle for VSB 40

Fig. 6-9: Fastening angles

6.7 Documentation

The following documentation providing a detailed description of the standard industrial PC VSB 40 is available:

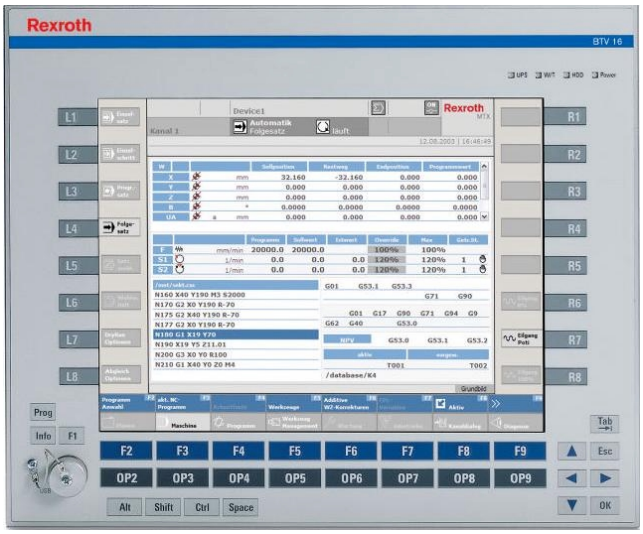
DOK-SUPPL*-VSB*40.1***-PRxx-EN-P

The following documentation provides a detailed description of the VDP 16/40 operator panels:

DOK-SUPPL*-VDP16/40/60-PRxx-EN-P

7 High-End Industrial PC BTV / VPP

7.1 Brief Description



BTV 16.jpg

Fig. 7-1: High-end industrial PC BTV 16.2 / VPP 16.1 with 12“ color display

BTV 40.jpg

Fig. 7-2: High-end industrial PC BTV 40.2 / VPP 40.1 with 15“ color display

The operator panels BTV 16/40 and VPP 16/40 are active PC-based control and visualization terminals with high capability for industrial environments. These PCs are mainly installed in an operator console or in a switch cabinet wall. By installation of a CNC control module CMP 60 in the attached PC box, the operator panels fulfill control functions.

7.2 Field of Application

The high-end industrial PCs are used in industrial environments with increased vibration and shock requirements.

7.3 Technical Data

	BTV 16.2	BTV 40.2	VPP 16.1	VPP 40.1
Display	12“ color display	15“ color display	12“ color display	15“ color display
Front panel design	16 machine function keys			
PC box	3 slots (2 x PCI, 1 x PCI/ISA)			
Processor	Pentium III, 933 MHz		Celeron M, min. 1,3GHz	
RAM	512 MB RAM			
Line voltage	115..230 V AC or 24 V DC			

Fig. 7-3: Technical data BTV 16/40 and VPP 16/40

7.4 Types

The following types of the high-end industrial PC BTV 16/40 and VPP 16/40 are available:

Type	Remarks
BTV16.2BKA-512P-P8C-NN-FW	Line voltage 115..230 V AC; without CD-ROM drive
VPP16.1BKA-512NN-M1C-BN-NN-FW	Line voltage 115..230 V AC; without CD-ROM drive
BTV40.2BIA-512P-P8C-NN-FW	Line voltage 115..230 V AC; without CD-ROM drive
BTV40.2BIA-512P-P8D-NN-FW	Line voltage 24 V DC; without CD-ROM drive
VPP40.1BIA-512NN-M1C-BN-NN-FW	Line voltage 115..230 V AC; without CD-ROM drive

Fig. 7-4: BTV 16/40 and VPP 16/40 versions

7.5 Control Configuration

If the high-end industrial PC BTV 16/40 and VPP 16/40 is equipped with a control module CMP 60, the following control configurations (CFG..) are available:

Device	Type	Remarks
BTV 16/40	CFG-BTV16.1AN-EC-NN-NN	with control module CMP 60
	CFG-BTV16.1AN-EC-IC-NN	with control module CMP 60 and I/O interface for 8 inputs and 8 outputs
VPP 16/40	CFG-VPN01A1-EC-NN-NN	with control module CMP 60
	CFG-VPN01A1-EC-IC-NN	with control module CMP 60 and I/O interface for 8 inputs and 8 outputs

Fig. 7-5: Controller configurations for BTV 16/40 and VPP 16/40

7.6 Accessories

Connectors and Cable Assemblies

Type	Remarks
B-AC STECKER NETZ 230V	230-V power plug, angular flange socket
BKS-U-N-NTZKAB-IPCRHO-002,5-P	230-V power cord with female flange socket, angular, cable length 2.5 m

Fig. 7-6: Connectors and cables

7.7 Documentation

The following documentation provides a detailed description of the BTV 16/40 high-end industrial PCs:

DOK-SUPPL*-BTV16/40/60-PRxx-EN-P

DOK-SUPPL*-VPP*XX.1***-PRxx-EN-P

8 High-End Industrial PC IPC 40 and VPB 40 with Operator Panel VDP

8.1 General Information

IPC 40.2 and VPB 40.1 are high-end industrial PCs which, in connection with the passive operator panels VDP 16 or VDP 40, represent a PC-based control and visualization terminal with normal capability for industrial environments. The IPC 40 and VPB 40 are intended to be installed in a switch cabinet. The operator panels VDP 16 and VDP 40 are designed to be installed in an operator console or in a switch cabinet wall. The connection between VDP and IPC or VPB is established via a GIGASTAR interface. If equipped with a CNC control module CMP 60, the IPC 40.2 and VPB 40.1 fulfill PC control functions.

8.2 Types

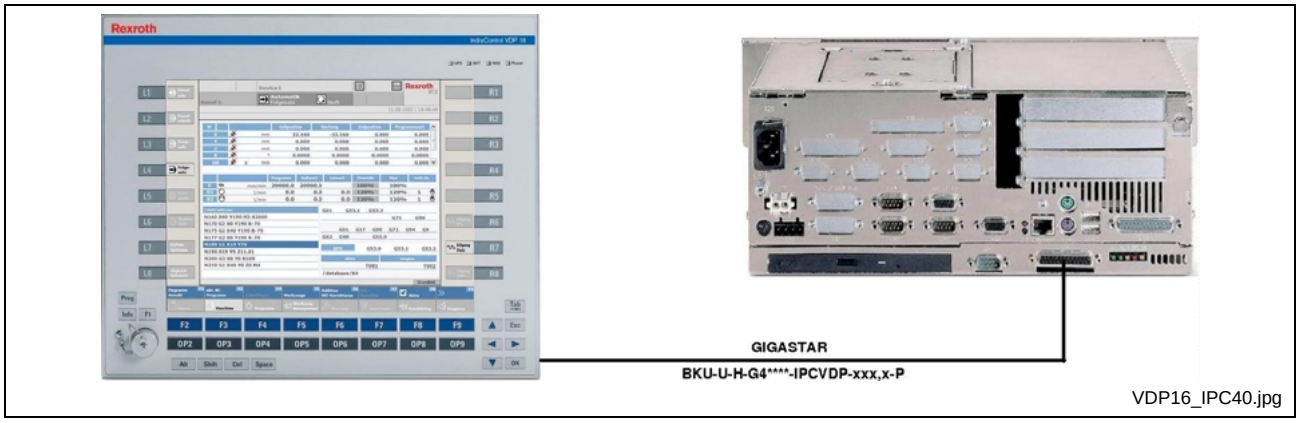


Fig. 8-1: High-end industrial PC IPC 40.2/VPB 40.1 with operator panel VDP 16.x

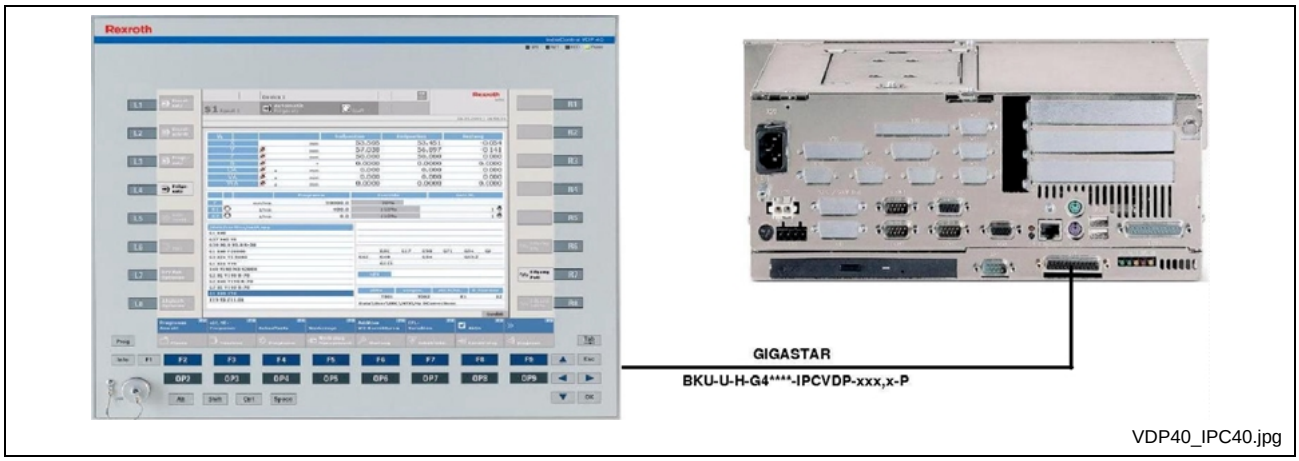


Fig. 8-2: High-end industrial PC IPC 40.2/VPB 40.1 with operator panel VDP 40.x

8.3 Field of Application

The high-end industrial PCs are used in industrial environments with increased vibration and shock requirements.

8.4 Technical Data

IPC 40.2 and VPB 40.1

	IPC 40.2	VPB 40.1
PC box	3 slots (2 x PCI, 1 x PCI/ISA)	
Processor	Pentium III, 933 MHz	Celeron M, min. 1,3 GHz
RAM	512 MB RAM	
Line voltage	115..230 V AC or 24 V DC	

Fig. 8-3: Technical data IPC 40.2 and VPB 40.1

VDP 16/40

	VDP 16.x	VDP 40.x
Display	12“ color display	15“ color display
Front panel design	16 machine function keys	
Line voltage	via GIGASTAR interface (24 V DC)	

Fig. 8-4: Technical data of VDP 16/40

8.5 Types

The following types of the high-end industrial PC IPC 40.2 and VPB 40.1 are available:

Type	Remarks
IPC40.2G4A-512N-P8C-ND-NN-FW	Line voltage 115..230 V AC; with CD-ROM drive
IPC40.2G4A-512N-P8D-ND-NN-FW	Line voltage 24 V DC; with CD-ROM drive
VPB40.1G4A-512NN-M1C-BD-NN-FW	Line voltage 115..230 V AC; with DVD-ROM drive
VPB40.1G4A-512NN-M1D-BD-NN-FW	Line voltage 24 V DC; with DVD-ROM drive

Fig. 8-5: Selection IPC 40.2 and VPB 40.1

The following types of the operator panel VDP 16/40 are available:

Type	Remarks
VDP16.1BKN-G4-PS-NN	Operator panel with 12“ color display (utilization in connection with IPC 40.2)
VDP40.1BIN-G4-PS-NN	Operator panel with 15“color display (utilization in connection with IPC 40.2)
VDP16.2BKN-G4-PS-NN	Operator panel with 12“color display (utilization in connection with VPB 40.1)
VDP40.2BIN-G4-PS-NN	Operator panel with 15“color display (utilization in connection with VPB 40.1)
VDP40.2DFN-G4-PS-NN	Operator panel with 15“color display with touch-screen (utilization in connection with VPB 40.1)

Fig. 8-6: VDP 16/40 types

8.6 Control Configurations

If the high-end industrial PCs IPC 40 and VPB 40 are equipped with a control module CMP 60, the following control configurations (CFG..) are available:

Device	Type	Remarks
IPC 40.2	CFG-BTV16.1AN-EC-NN-NN	with control module CMP 60
	CFG-BTV16.1AN-EC-IC-NN	with control module CMP 60 and I/O interface for 8 inputs and 8 outputs
VPB 40.1	CFG-VPN01A1-EC-NN-NN	with control module CMP 60
	CFG-VPN01A1-EC-IC-NN	with control module CMP 60 and I/O interface for 8 inputs and 8 outputs

Fig. 8-7: Controller configuration for IPC 40.2 and VPB 40.1

8.7 Accessories

Connection Cables (GIGASTAR Interface)

The following cable assemblies are available for establishing the connection between the industrial IPC 40 / VPB 40 and the operator panel VDP 16/40:

Type	Remarks
BKS-U-H-G4****-IPCVDP-001,0-P	IPC–VDP connection cable, highly flexible, 1 m
BKS-U-H-G4****-IPCVDP-005,0-P	IPC–VDP connection cable, highly flexible, 5 m
BKS-U-H-G4****-IPCVDP-010,0-P	IPC–VDP connection cable, highly flexible, 10 m
BKS-U-N-G4****-IPCVDP-020,0-P	IPC–VDP connection cable, flexible, 20 m
BKS-U-H-G4****-IPCVDP-030,0-P	IPC–VDP connection cable, highly flexible, 30 m

Fig. 8-8: Connection Cables

Fastening Angles

To mount the industrial PCs IPC 40 and VPB 40 vertically, the following fastening angle is available:

Type	Comment
WINKEL PCBOX-IPC	Angle for IPC 40 / VPB 40

Fig. 8-9: Fastening angles

8.8 Documentation

The following documentations provide a detailed description of the high-end industrial PC IPC 40.2 and the operator panels BTV 16/40:

DOK-SUPPL*-IPC*40.2***-PRxx-EN-P

DOK-SUPPL*-VPB*40.1***-PRxx-EN-P

DOK-SUPPL*-VDP16/40/60-PRxx-EN-P

9 Uninterruptible Power System UPS

9.1 Brief Description

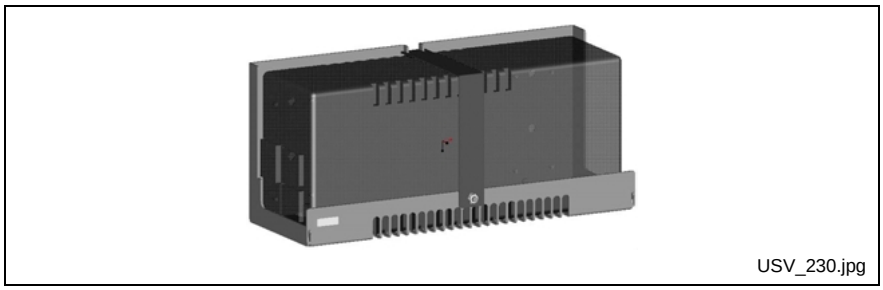


Fig. 9-1: Uninterrupted power supply

The uninterruptible power system UPS is able to override brief voltage dips. In case of longer voltage dips, it initiates and facilitates proper powering down of the operating system. For that reason, we recommend to always install a UPS in order to avoid data losses.

The UPS is connected to the voltage supply line and communicates with the standard industrial PC via the serial interface COM1.

9.2 Type

The uninterruptible power system is available under the following type code:

Type	Comment
VAU01.1S-230-230-255-NN	UPS for 230 V AC

Fig. 9-2: UPS order type

9.3 Accessories

Holder

Available accessories include a holder for mounting the UPS. It can be engaged in a top-hat rail or can be fastened to a mounting plate of a switch cabinet with two M6 screws.

Type	Comment
SUP-M01-VAU01.1S-230	UPS holder

Fig. 9-3: UPS order type

9.4 Documentation

The projecting instructions DOK-SUPPL*-VSP*16/40**-PRxx-EN-P, Chapter 8.2, provide a detailed description of how to use the UPS.

10 External Battery Pack

10.1 Brief Description

Akku-Pack.jpg

Fig. 10-1: External battery pack

To prevent data from being lost in case of a power failure, a battery pack for installation in a switch cabinet is available for high-end industrial PCs. The battery pack is connected to the industrial PC by means of the connection cable IKL0264.

10.2 Type

The battery pack is available under the following type code:

Type	Comment
SUP-E01-BTV16/40	Battery pack

Fig. 10-2: Battery pack order type

10.3 Accessories

Connection Cables

The following cable assemblies are available for establishing the connection between the industrial PC and the battery pack:

Type	Comment
IKL0264/001,0	Connection cable, 1.0 m long
IKL0264/003,0	Connection cable, 3.0 m long

Fig. 10-3: Order types of connection cables

10.4 Documentation

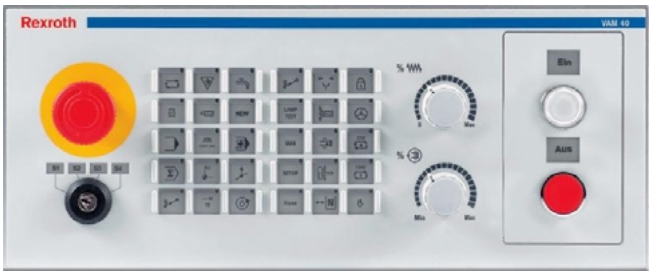
The projecting instructions DOK-SUPPL*-BTV16/4060-PRxx-EN-P, Chapter 8.4, provide a detailed description of how to use the battery pack.

11 Machine Control Panel VAM

11.1 Brief Description

VAM 10.jpg

Fig. 11-1: Machine control panel VAM 10



VAM 40.jpg

Fig. 11-2: Machine control panel VAM 40

VAM 11.jpg

Fig. 11-3: Machine control panel VAM 11

VAM 41.jpg

Fig. 11-4: Machine control panel VAM 41

The machine control panels VAM 10, VAM 40, VAM 11 and VAM 41 permit selection of operating modes as well as manual operation of the machine. They contain the necessary control elements, such as keys with LED indicators, rotary switches for feed and spindle override, E-STOP pushbuttons, key switches, and machine buttons. In their function and design, they are matching the operator panels VSP, VDP, BTV and VPP in an optimum manner. On their rear, the panels are provided with a connector for connecting a handwheel and a manual operator panel as well as connectors for 16 digital 24-V inputs and 8 digital 24-V outputs. Communication with the master control is achieved via PROFIBUS-DP.

11.2 Types

The machine control panels VAM 10/40 will be primarily used in the CNC operation. The following versions are available:

Type	Comment
VAM10.1-PB-NA-TA-TA-VB-1608-NN	Suitable for VSP 16, VDP 16, BTV 16, VPP 16
VAM40.1- PB-NA-TA-TA-VB-MA-1608-NN	Suitable for VSP 40, VDP 40, BTV 40, VPP 40

Fig. 11-5: VAM 10/40 types

The machine control panels VAM 11/41 will be primarily used for the automated production area. The following versions are available:

Type	Comment
VAM11.1-PB-NA-NN-TA-VB-1608-NN	Suitable for VSP 16, VDP 16, BTV 16, VPP 16
VAM41.1-PB-NA-NN-TA-VB-BA-1608-NN	Suitable for VSP 40, VDP 40, BTV 40, VPP 40

Fig. 11-6: VAM 11/41 types

11.3 Accessories

Connection Cables (PROFIBUS Interface)

The machine control panels VAM exchange data with the control module CMP 60 via PROFIBUS-DP. The following cable assemblies are available:

Type	Comment
IKB0033/000,0	Connection between CMP 60 and VAM; cables ready-made at either end; variable length
IKB0034/000,0	Connection between VAM and further Profibus users; cable ready-made at one end; variable length

Fig. 11-7: PROFIBUS connection cables

11.4 Documentation

The following documentation provides a detailed description of the machine control panels VAM:

DOK-SUPPL*-VAM*10/40**-PRxx-EN-P

DOK-SUPPL*-VAM*11/41**-PRxx-EN-P

12 PC Keyboards VAK and PCK

12.1 General Information

Slide-out or built-in keyboards with touch panels are available for operation of the industrial PCs as required.

12.2 Slide-Out Keyboards

Fig. 12-1: Slide-out keyboard VAK 10.1

Fig. 12-2: Slide-out keyboard PCK 03.3

The slide-out keyboards VAK 10.1 and PCK 03.3 are AT-compatible PS/2 keyboards with 86 keys and integrated mouse pointer. The two keyboards differ only in the different width of their front panels. In their function and design, they are matching the operator panels of the VSP, VDP and BTV series in an optimum manner. The integrated mouse with its mouse buttons permits easy navigation within the graphical user interfaces. The drawer is provided with slide rails and a ball-type snap lock.

12.3 Built-In Keyboards

VAK 11.jpg

Fig. 12-3: Built-in keyboard VAK 11.2

VAK 41.jpg

Fig. 12-4: Built-in keyboard VAK 41.2

The built-in keyboards VAK 11 and VAK 41 are AT-compatible PS/2 touch panels with 106 keys. The two keyboards differ only in the different width of their front panels. In their function and design, they are matching the operator panels of the VSP, VDP and BTV series in an optimum manner and are characterized by a particularly low installation depth.

12.4 Types

The following types of keyboards for industrial PCs are available:

Design	Type	Remarks
Slide-out keyboard	VAK10.1E-EN-P-MPNN	Matching with VSP 16, VDP 16, BTV 16
	PCK03.3E-EN-P-MPNN	Matching with VSP 40, VDP 40, BTV 40
Built-in keyboard (with touch panel)	VAK11.2F-EN-P-NNNN	Matching with VSP 16, VDP 16, BTV 16
	VAK41.2F-EN-P-NNNN	Matching with VSP 40, VDP 40, BTV 40

Fig. 12-5: VAK 10/11/41 and PCK 03 types

12.5 Documentation

The following documentation providing a detailed description of the VAK 11/41 built-in keyboards is available:

DOK-SUPPL*-VAK*11/41**-PRxx-EN-P

The following documentation provides a detailed description of the VAK 10 and PCK 03 slide-out keyboards:

DOK-SUPPL*-PCK03.3****-PRxx-EN-P

13 RECO Inline Modules

13.1 Brief Description

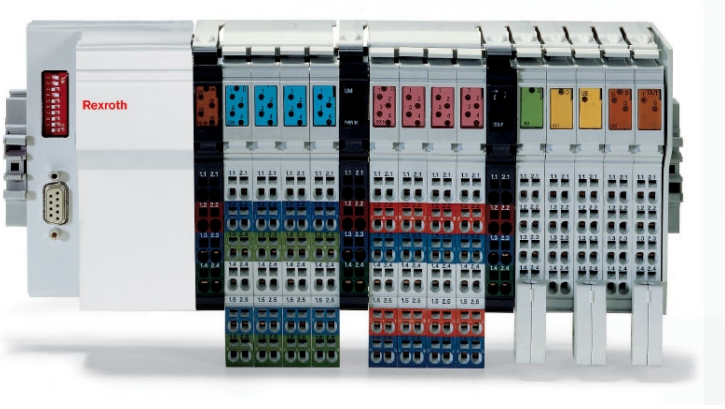


Fig. 13-1: RECO Inline system

The RECO Inline system is a flexible I/O system, which is designed to be mounted to a top-hat rail in a switch cabinet. It is a modular system, i.e. it can be adjusted to the particular application concerned. Communication with the master control is achieved via PROFIBUS-DP.

13.2 Components

The RECO Inline system comprises the following components:

- Field-bus coupling modules
- Feed modules
- 24-V input modules
- 24-V output modules
- Relay for output modules
- Analog modules
- Counter modules
- Accessories

13.3 Documentation

The following documentations provide a detailed description of the RECO Inline system:

- DOK-CONTRL-R-IL*PBSSYS-AWxx-EN-P
  (application description)
- DOK-CONTRL-R-IL*PB*BK-FKxx-EN-P
  (PROFIBUS-DP terminal and module supply)
- DOK-CONTRL-R-IL*DIO***-FKxx-EN-P
  (digital input and output terminals)

14 RECO Fieldline Modules

14.1 Brief Description

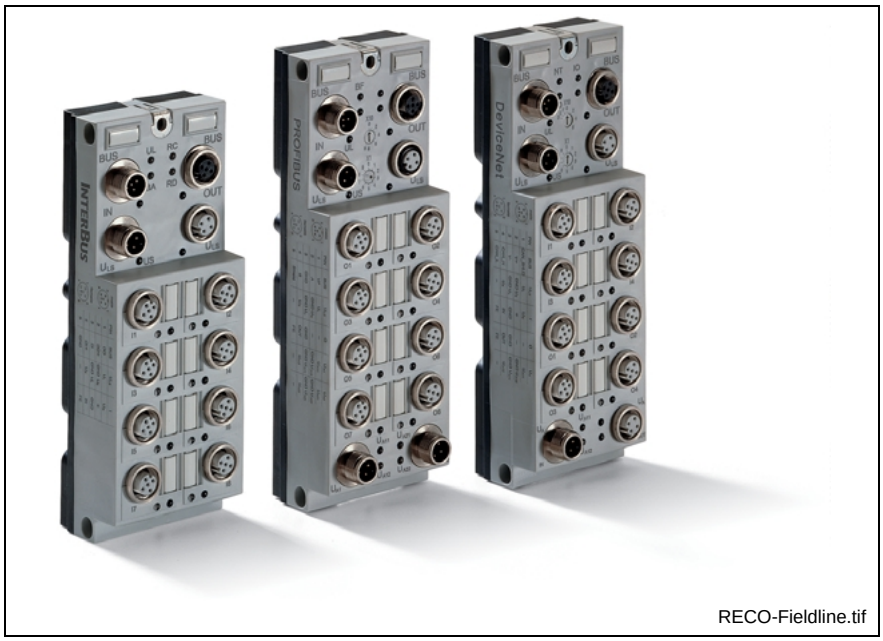


Fig. 14-1: RECO Fieldline modules

The input and output modules of the RECO Fieldline product family are designed for decentralized automation tasks under adverse ambient conditions. The modules comply with protection degree IP65 / IP67. They permit direct connection of sensors and actuators in an environment near the station. Communication with the master control is achieved via PROFIBUS-DP.

14.2 Components

Three types of RECO Fieldline modules are available:

Type	Description
RF-FLS PB M12 DI8 M12	8 24-V inputs
RF-FLS PB M12 DIO 4/4 M12-2A	4 24-V inputs; 4 24-V/2-A outputs
RF-FLS PB M12 DO 8 M12-2A	8 24-V/2-A outputs

Fig. 14-2: Module types

14.3 Documentation

The following documentation provides a detailed description of the RECO Fieldline system:

DOK-CONTRL-RF-FLS-PB**-PRxx-EN-P

15 Applications

15.1 Standard Industrial PC VSP 16.1

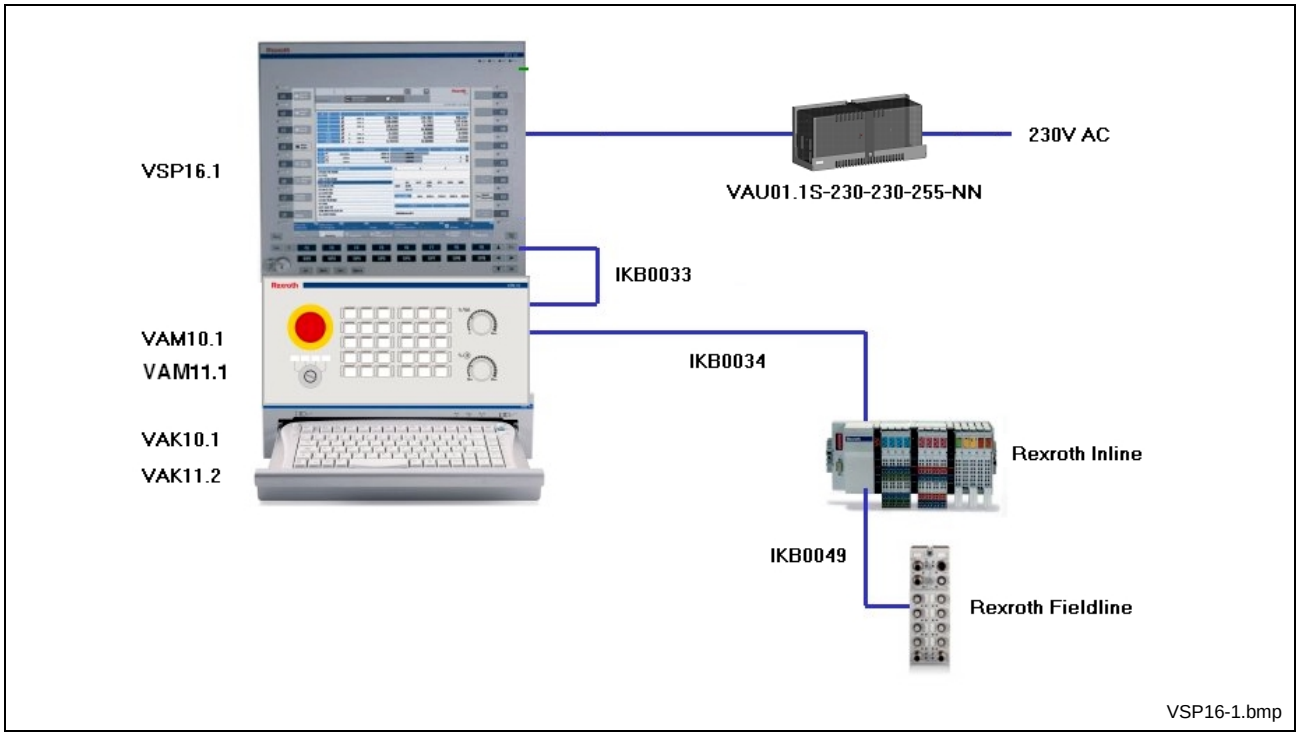


Fig. 15-1: VSP 16.1

15.2 Standard Industrial PC VSP 40.1

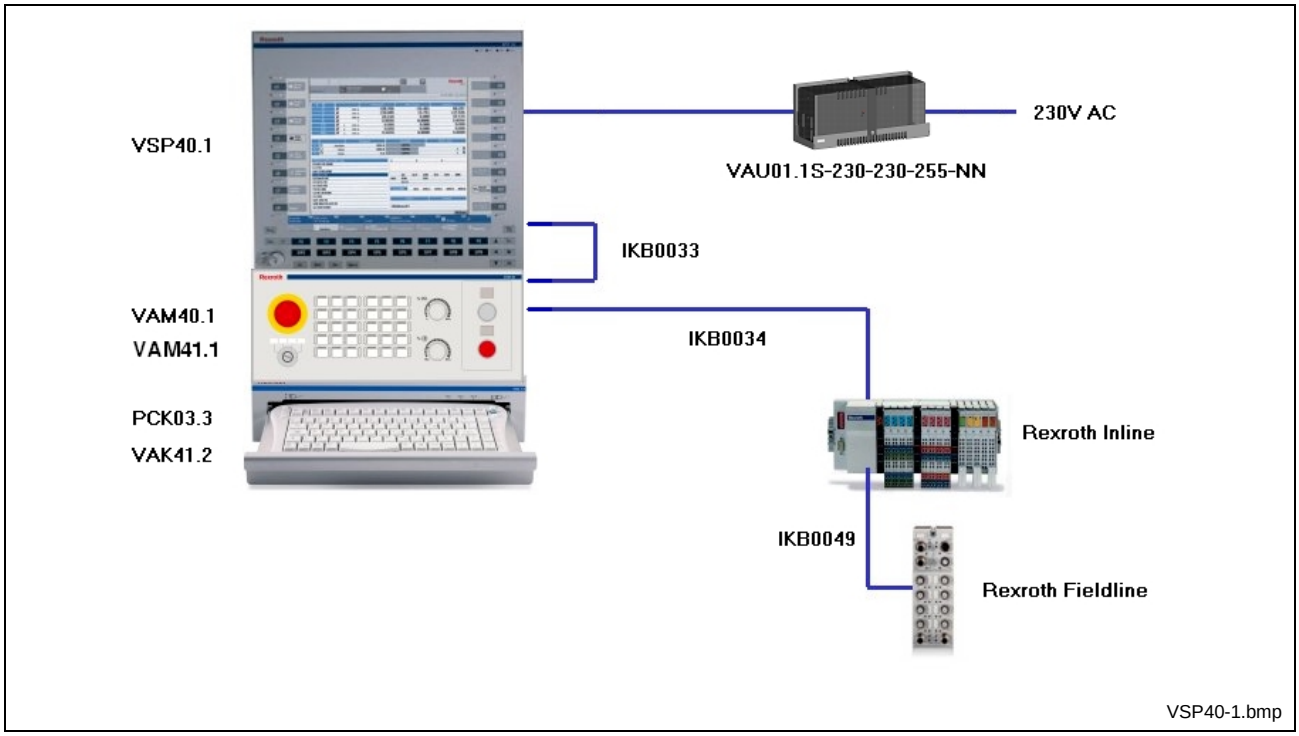


Fig. 15-2: VSP 40.1

15.3 Standard Industrial PC VSB 40.1 with Operator Panel VDP 16

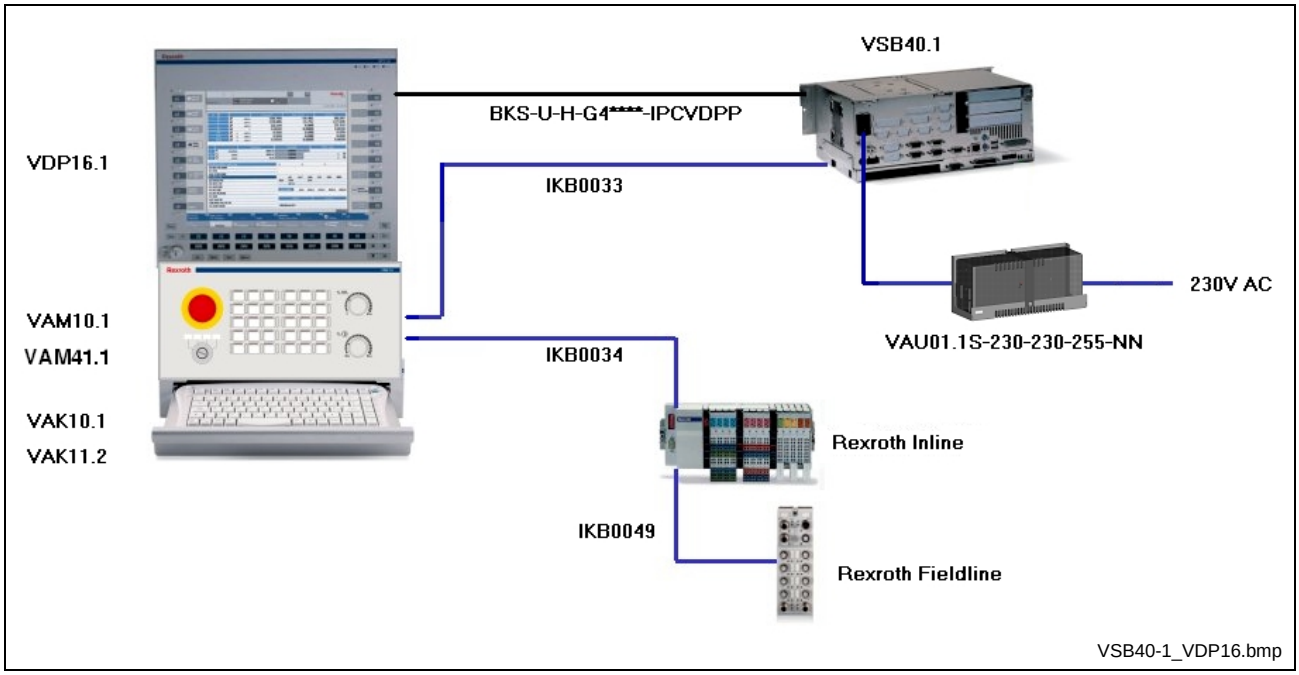


Fig. 15-3: VSB 40.1 with VDP 16

15.4 Standard Industrial PC VSB 40.1 with Operator Panel VDP 40

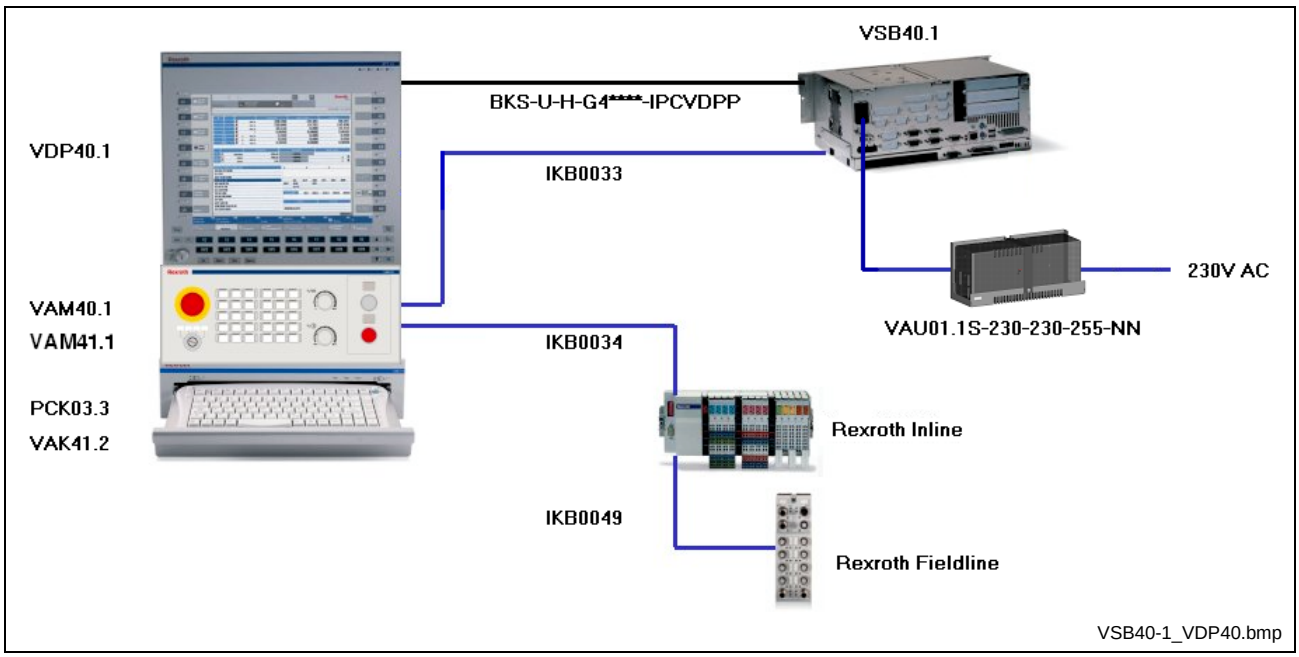


Fig. 15-4: VSB 40.1 with VDP 40

15.5 High-End Industrial PC BTV 16.2 / VPP 16.1

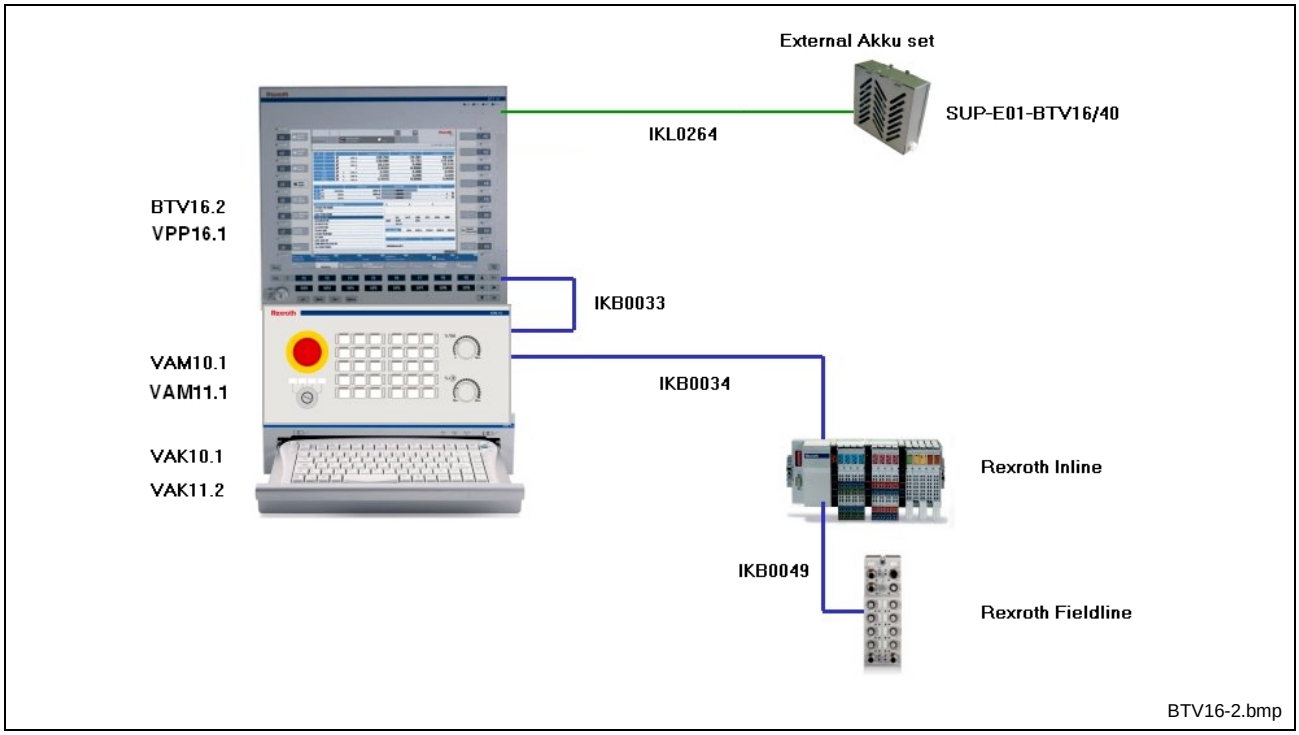


Fig. 15-5: BTV 16.2

15.6 High-End Industrial PC BTV 40.2 / VPP 40.1

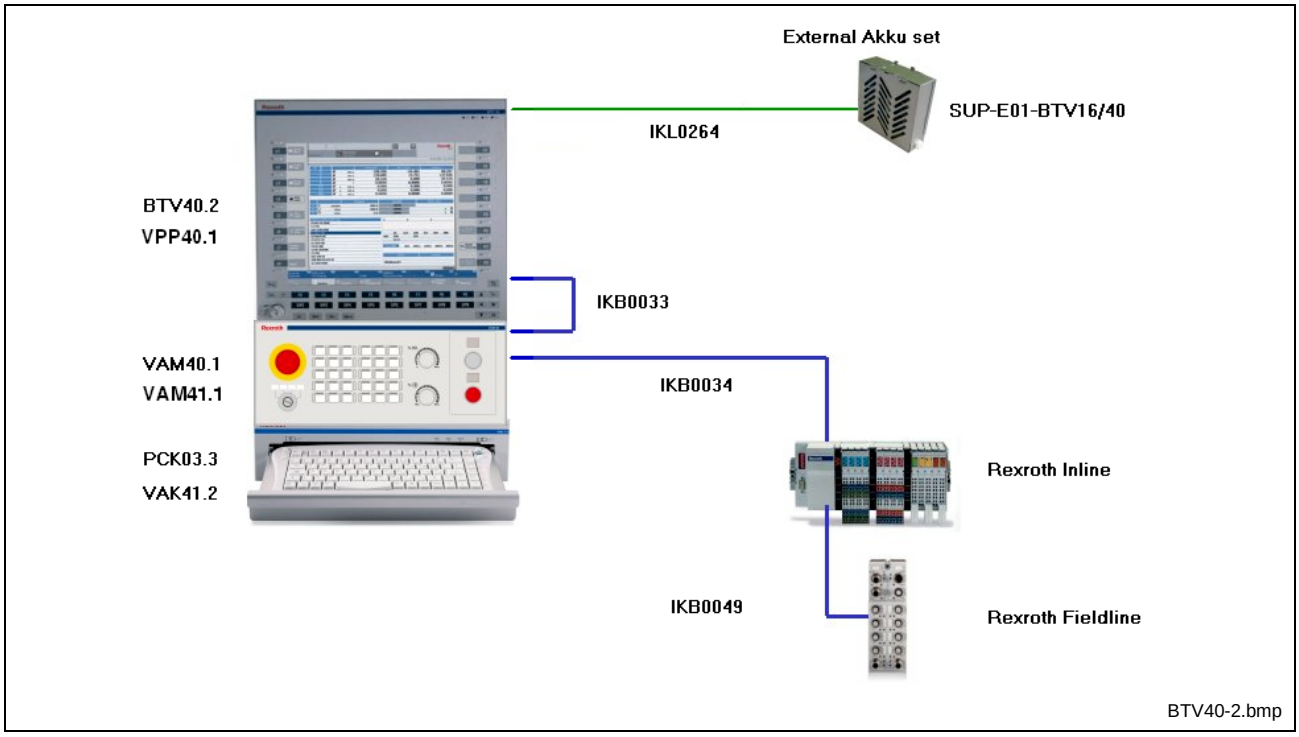


Fig. 15-6: BTV 40.2

15.7 High-End Industrial PC IPC 40.2 / VPB 40.1 with Operator Panel VDP 16

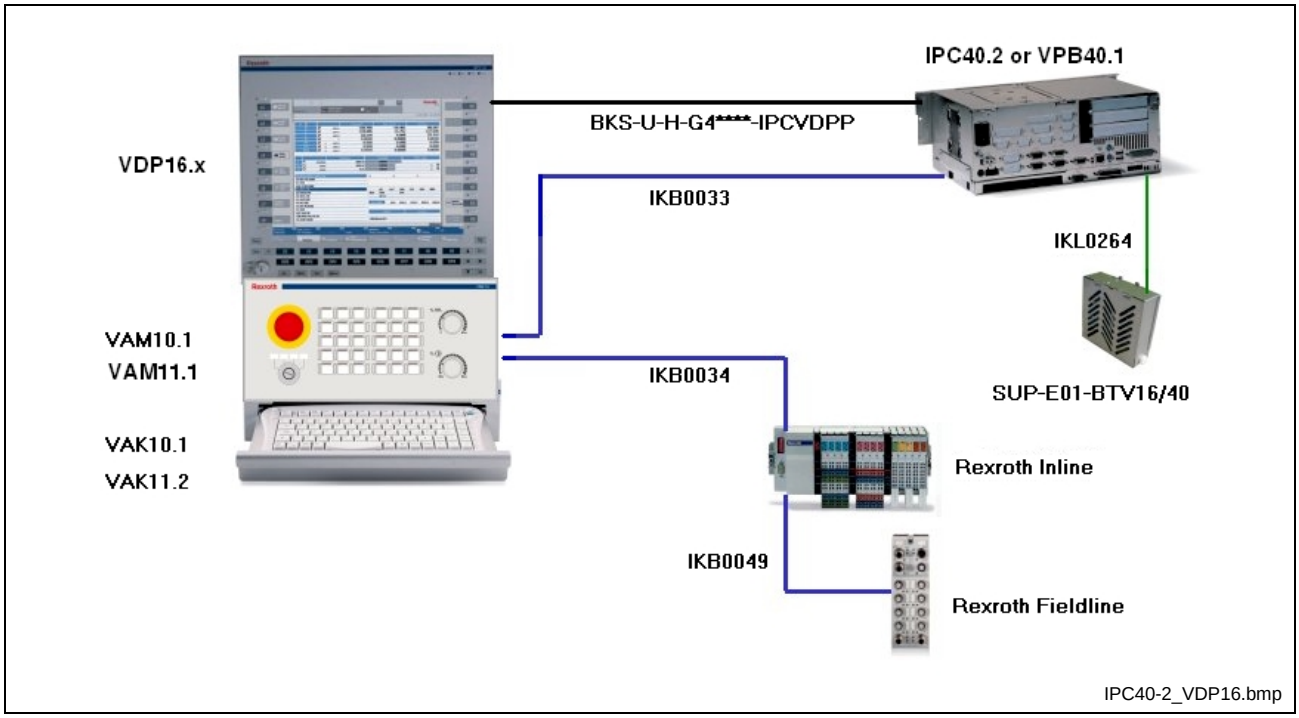


Fig. 15-7: IPC 40.2 / VPB 40.1 with VDP 16

15.8 High-End Industrial PC IPC 40.2 / VPB 40.1 with Operator Panel VDP 40

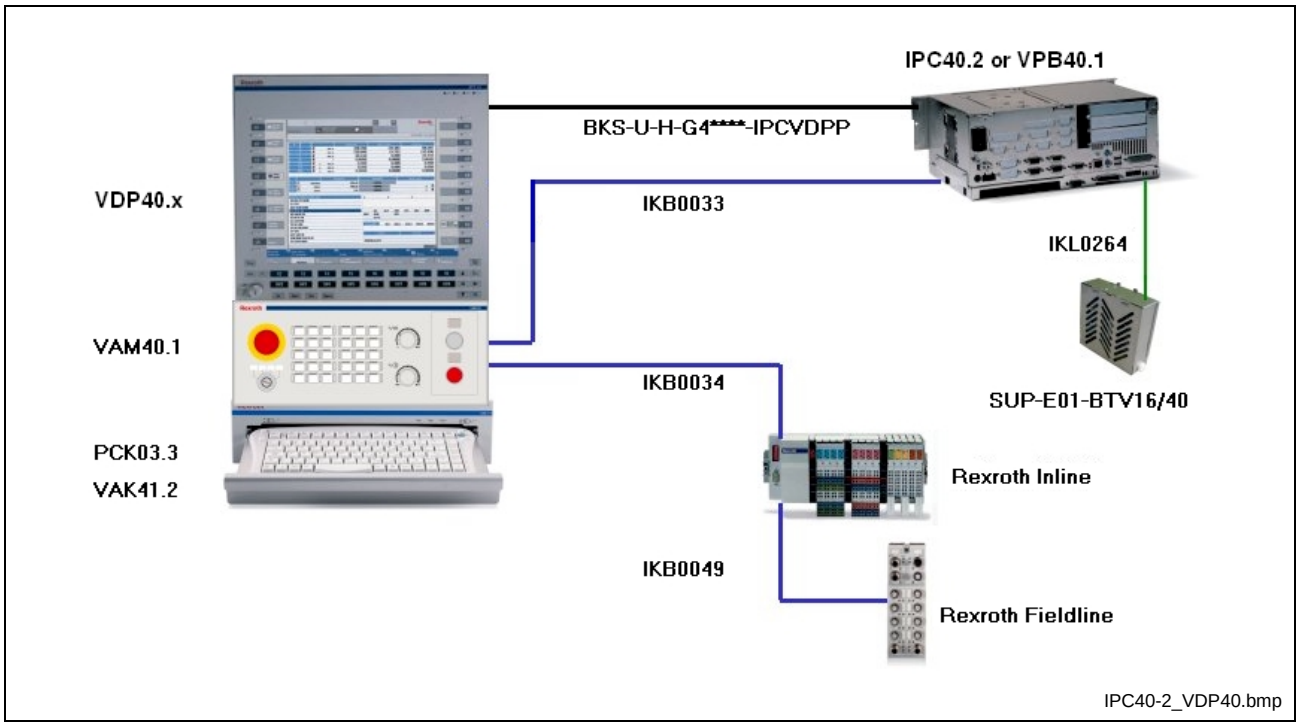


Fig. 15-8: IPC 40.2 / VPB 40.1 with VDP 40

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17 Service & Support

17.1 Helpdesk

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

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

- telefonisch - by phone: **+49 (0) 9352 40 50 60**
  über Service Call Entry Center Mo-Fr 07:00-18:00
  - via Service Call Entry Center Mo-Fr 7:00 am - 6:00 pm
- per Fax - by fax: **+49 (0) 9352 40 49 41**
- per e-Mail - by e-mail: **service.svc@boschrexroth.de**

17.2 Service-Hotline

Außerhalb der Helpdesk-Zeiten ist der Service direkt ansprechbar unter

After helpdesk hours, contact our service department directly at

+49 (0) 171 333 88 26

oder - or **+49 (0) 172 660 04 06**

17.3 Internet

Unter **www.boschrexroth.com** finden Sie ergänzende Hinweise zu Service, Reparatur und Training sowie die **aktuellen** Adressen *) unserer auf den folgenden Seiten aufgeführten Vertriebs- und Servicebüros.

☐ Verkaufsniederlassungen
▒ Niederlassungen mit Kundendienst

Außerhalb Deutschlands nehmen Sie bitte zuerst Kontakt mit unserem für Sie nächstgelegenen Ansprechpartner auf.

*) Die Angaben in der vorliegenden Dokumentation können seit Drucklegung überholt sein.

At **www.boschrexroth.com** you may find additional notes about service, repairs and training in the Internet, as well as the **actual** addresses *) of our sales- and service facilities figuring on the following pages.

☐ sales agencies
▒ offices providing service

Please contact our sales / service office in your area first.

*) Data in the present documentation may have become obsolete since printing.

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

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

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

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

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

17.5 Kundenbetreuungsstellen - Sales & Service Facilities

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

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