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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Table of Contents

Table of Contents

Table of Contents

Page

Table of Contents

Table of Contents

Page

Table of Contents

1 System Overview

1.1 Brief Description

1.1.1 General

The IndraMotion MTX is a customized configurable CNC control system that can be used with both single machines and complex high-throughput systems for automatic production. With its uniform hardware and software, the IndraMotion MTX can be individually scaled in terms of performance and functions. Presently, 3 system variants are available:

- IndraMotion MTX compact, based on the IndraControl L40 control module
- IndraMotion MTX standard, based on the IndraControl P40 control module
- IndraMotion MTX performance, based on the IndraControl P60 control module

All the control modules provide both CNC and PLC functions. The highest configuration provides CNC performance allowing activation of up to 64 axes in 12 independent CNC processing channels. The standard equipment of the control modules includes interfaces allowing the activation of I/Os via PROFIBUS-DP, of intelligent drives via the SERCOS interface and of peripheral assemblies via Ethernet. A high-speed interface permits the module to be supplemented by additional field buses (DeviceNet, CANOpen) or interfaces.

The IndraControl L40 control module in terminal format has been designed on a switch cabinet for top hat rail assembly. Control modules IndraControl P40 and IndraControl P60 are designed as PCI slot modules and are inserted into a free slot of an industrial PC.

Bosch Rexroth provides industrial PCs with various designs and screen sizes; these can be used with control modules IndraControl P40 and IndraControl P60. In their design and construction, the control panels of the industrial PCs have been adapted to further components (machine control panels and PC keyboards) so that they present an optimum solution for controlling, operating and visualizing a machine tool.

Inline modules to be installed in switch cabinets and Fieldline modules for installation in the vicinity of a machine provide scalable I/O systems with PROFIBUS-DP and DeviceNet.

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

1.1.2 Documentation References

Documentation	Type	Material number
Rexroth IndraControl VSP 16.1/40.1	DOK-SUPPL*-VSP*16/40**-PRxx-EN-P	R911308263
Rexroth IndraControl VDP 16.2/40.2	DOK-SUPPL*-VDP*XX.2***-PRxx-EN-P	R911313007
Rexroth IndraControl VPP 16.1/40.1/60.1	DOK-SUPPL*-VPP*XX.1***-PRxx-EN-P	R911311819
Rexroth IndraControl VCP 02	DOK-SUPPL*-VCP02******-PRxx-EN-P	R911299727
Rexroth IndraControl VCP 05	DOK-SUPPL*-VCP05******-PRxx-EN-P	R911299725
Rexroth IndraControl VCP 08	DOK-SUPPL*-VCP08******-PRxx-EN-P	R911299723
Rexroth IndraControl VCP 20	DOK-SUPPL*-VCP20******-PRxx-EN-P	R911299721
Rexroth IndraControl VCP 25	DOK-SUPPL*-VCP25******-PRxx-EN-P	R911299719

System Overview

Documentation	Type	Material number
Rexroth IndraControl L40	DOK-CONTRL-IC*L40*****-PRxx-EN-P	R911308428
Rexroth VSB 40.1	DOK-SUPPL*-VSB*40.1***-PRxx-EN-P	R911310078
Rexroth VPB 40.1	DOK-SUPPL*-VPB*40.1***-PRxx-EN-P	R911312596
Rexroth VAM 11.1/41.1	DOK-SUPPL*-VAM*11/41**-PRxx-EN-P	R911308617
Rexroth VAM 10.1/40.1	DOK-SUPPL*-VAM*10/40**-PRxx-EN-P	R911306780
Rexroth VAK 10.1/40.1	DOK-SUPPL*-VAK*40.1***-PRxx-EN-P	R911311649
Rexroth VAK 11/41	DOK-SUPPL*-VAK*11/41**-PRxx-EN-P	R911310335
Rexroth RECO Inline, PROFIBUS-DP	DOK-CONTRL-R-IL*PBSSYS-AWxx-EN-P	R911289596
Rexroth RECO Inline, PROFIBUS-DP Terminal and Module Power Supply	DOK-CONTRL-R-IL*PB*-BK-FKxx-EN-P	R911289586
Rexroth RECO Inline, Digital Input/Output Terminals	DOK-CONTRL-R-IL*DIO***-FKxx-EN-P	R911289588
Rexroth Fieldline, PROFIBUS Devices	DOK-CONTRL-RF-FLS-PB**-PRxx-EN-P	R911298517

Fig.1-1: Documentation references

1.2 Overview of Industrial PCs

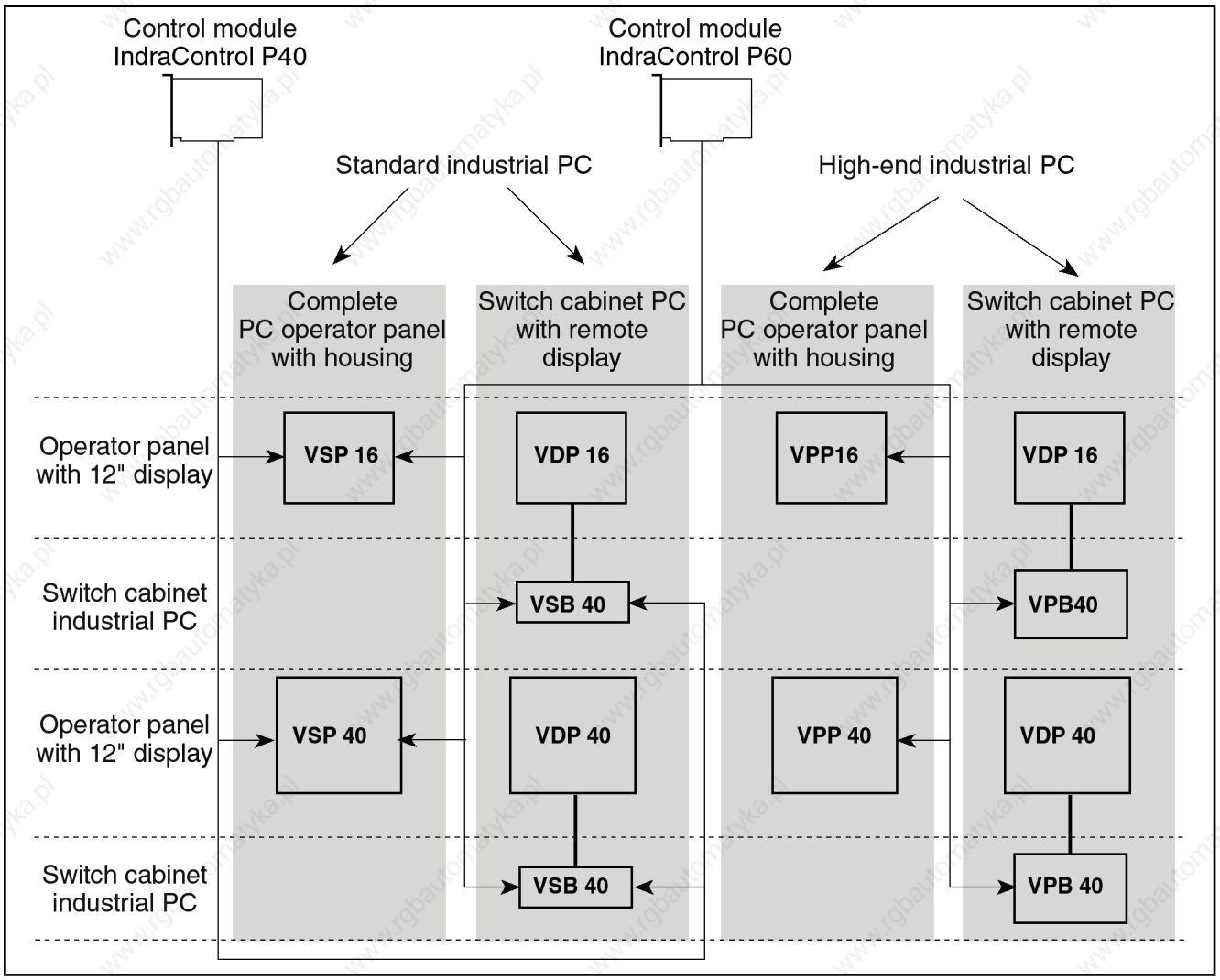

Fig. 1-2: Overview of Industrial PCs

1.3 Characteristics of Standard Industrial PCs

- 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 functions for at least 2 years)

1.4 Characteristics of High-end Industrial PCs

- 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 Instructions on Use

2.1 Intended Use

2.1.1 Introduction

Bosch Rexroth products are developed and manufactured according to the state of the art. Before delivery, they are checked for operational safety.

The products may only be used in the proper manner. If they are not used as intended, situations may arise which result in damage to personnel or material.

☞ Bosch Rexroth, as the manufacturer of the products, will not assume any warranty, liability or payment of damages in case of damage resulting from improper use of the products. If he fails to use the products as intended, the user will be solely responsible for any resulting risks.

Before using Bosch Rexroth products, the following prerequisites must be fulfilled to ensure that they are used as intended:

- Everyone who in any way deals with one of our products must read and understand the corresponding notes regarding safety and proper use.
- If the products are hardware, they must be kept in their original state, i.e. no constructional modifications may be made. Software products may not be decompiled; their source codes may not be modified.
- Damaged or improperly working products must not be installed or put into operation.
- It must be ensured that the products are installed according to the regulations mentioned in the documentation.

2.1.2 Areas of Application and Use

For the areas of use and application of each component , also see the associated documents (see chapter 1.1.2 "Documentation References" on page 1).

2.2 Improper 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 "improper use".

The device may not be used if

- it is exposed to operating conditions which do not correspond to the specified ambient conditions. For example, they must not be operated under water, under extreme temperature fluctuations, or in extreme maximum temperatures.
- Furthermore, the devices must not be used in any applications not expressly approved by Bosch Rexroth. In this connection, observance of the statements in the General Safety Notes is imperative!

3 Safety Instructions for Electric Drives and Controls

3.1 Safety Instructions - General Information

3.1.1 Using the Safety Instructions and Passing them on to Others

Do not attempt to install or commission this device without first reading all documentation provided with the product. Read and understand these safety instructions and all user documentation prior to working with the device. If you do not have the user documentation for the device, contact your responsible Bosch Rexroth sales representative. Ask for these documents to be sent immediately to the person or persons responsible for the safe operation of the device.

If the device is resold, rented and/or passed on to others in any other form, these safety instructions must be delivered with the device in the official language of the user's country.

WARNING

Improper use of these devices, 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!

Observe the safety instructions!

3.1.2 How to Employ the Safety Instructions

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

- 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 commissioning 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 device.
- Only assign trained and qualified persons to work with electrical installations:
  - Only persons who are trained and qualified for the use and operation of the device may work on this device or within its proximity. The persons are qualified if they have sufficient knowledge of the assembly, installation and operation of the product, as well as an understanding of all warnings and precautionary measures noted in these instructions.
  - Furthermore, they must be trained, instructed and qualified to switch electrical circuits and devices 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 devices have been designed for installation in industrial machinery.
- The ambient conditions given in the product documentation must be observed.
- Only use safety-relevant applications that are clearly and explicitly approved in the Project Planning Manual. If this is not the case, they are excluded. Safety-relevant are all such applications which can cause danger to persons and material damage.
- 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.
- Commissioning 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 section on EMC in the respective documentation (Project Planning Manuals of components and system).

  The machine or installation manufacturer is responsible for compliance with the limiting values as prescribed in the national regulations.
- Technical data, connection and installation conditions are specified in the product documentation and must be followed at all times.

National regulations which the user must take into account

- European countries: according to European EN standards
- United States of America (USA):
  – National Electrical Code (NEC)
  – National Electrical Manufacturers Association (NEMA), as well as local engineering regulations
  – regulations of the National Fire Protection Association (NFPA)
- Canada: Canadian Standards Association (CSA)
- Other countries:
  – International Organization for Standardization (ISO)
  – International Electrotechnical Commission (IEC)

3.1.3 Explanation of Warning Symbols and Degrees of Hazard Seriousness

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

Warning symbol	Signal word	Degree of hazard seriousness acc. to ANSI Z 535.4-2002
	Danger	Death or severe bodily harm will occur.
	Warning	Death or severe bodily harm may occur.
	Caution	Minor or moderate bodily harm or material damage may occur.

Fig.3-1: Hazard classification (according to ANSI Z 535)

3.1.4 Hazards by Improper Use

DANGER

High electric voltage and high working current! Risk of death or severe bodily injury by electric shock!

Observe the safety instructions!

DANGER

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

Observe the safety instructions!

WARNING

High electric voltage because of incorrect connection! Risk of death or bodily injury by electric shock!

Observe the safety instructions!

WARNING

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

Observe the safety instructions!

CAUTION

Hot surfaces on device housing! Danger of injury! Danger of burns!

Observe the safety instructions!

CAUTION

Risk of injury by improper handling! Risk of bodily injury by bruising, shearing, cutting, hitting or improper handling of pressurized lines!

Observe the safety instructions!

CAUTION

Risk of injury by improper handling of batteries!

Observe the safety instructions!

3.2 Instructions with Regard to Specific Dangers

3.2.1 Protection Against Contact with Electrical Parts and Housings

☞ This section concerns devices and drive components with voltages of **more than 50 Volt**.

Contact with parts conducting voltages above 50 Volts can cause personal danger and electric shock. When operating electrical equipment, it is unavoidable that some parts of the devices conduct dangerous voltage.

DANGER

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

- Only those trained and qualified to work with or on electrical equipment are permitted to operate, maintain and repair this equipment.
- Follow general construction and safety regulations when working on power installations.
- Before switching on the device, the equipment grounding conductor must have been non-detachably connected to all electrical equipment in accordance with the connection diagram.
- Do not operate electrical equipment at any time, even for brief measurements or tests, if the equipment grounding conductor is not permanently connected to the mounting points of the components provided for this purpose.
- Before working with electrical parts with voltage potentials higher than 50 V, the device must be disconnected from the mains voltage or power supply unit. Provide a safeguard to prevent reconnection.
- With electrical drive and filter components, observe the following:

  Wait **30 minutes** after switching off power to allow capacitors to discharge before beginning to work. Measure the electric 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. Do not remove or plug in connectors when the component has been powered.
- Install the covers and guards provided with the equipment properly before switching the device on. Before switching the equipment on, cover and safeguard live parts safely to prevent contact with those parts.
- A residual-current-operated circuit-breaker or r.c.d. cannot be used for electric drives! Indirect contact must be prevented by other means, for example, by an overcurrent protective device according to the relevant standards.
- Secure built-in devices from direct touching of electrical parts by providing an external housing, for example a control cabinet.

For electrical drive and filter components with voltages of **more than 50 volts**, observe the following additional safety instructions.

DANGER

High housing voltage and high leakage current! Risk of death or bodily injury by electric shock!

- Before switching on, the housings of all electrical equipment and motors must be connected or grounded with the equipment grounding conductor to the grounding points. This is also applicable before short tests.
- The equipment grounding conductor of the electrical equipment and the devices must be non-detachably and permanently connected to the power supply unit at all times. The leakage current is greater than 3.5 mA.
- Over the total length, use copper wire of a cross section of a minimum of 10 mm^2 for this equipment grounding connection!
- Before commissioning, also in trial runs, always attach the equipment grounding conductor or connect to the ground wire. Otherwise, high voltages may occur at the housing causing electric shock.

3.2.2 Protection Against Electric Shock by Protective Extra-Low Voltage

Protective extra-low voltage is used to allow connecting devices with basic insulation to extra-low voltage circuits.

All connections and terminals with voltages between 5 and 50 volts at Rexroth products are PELV systems. [1] It is therefore allowed to connect devices equipped with basic insulation (such as programming devices, PCs, notebooks, display units) to these connections and terminals.

WARNING

High electric voltage by incorrect connection! Risk of death or bodily injury by electric shock!

If extra-low voltage circuits of devices containing voltages and circuits of more than 50 volts (e.g. the mains connection) are connected to Rexroth products, the connected extra-low voltage circuits must comply with the requirements for PELV. [2]

3.2.3 Protection Against Dangerous Movements

Dangerous movements can be caused by faulty control of 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.

1) *"Protective Extra-Low Voltage"*

2) *"Protective Extra-Low Voltage"*

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 harm 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.

  These measures have to be provided for by the user according to the specific conditions within the installation and a hazard and fault analysis. The safety regulations applicable for the installation have to be taken into consideration. Unintended machine motion or other malfunction is possible if safety devices are disabled, bypassed or not activated.

To avoid accidents, bodily harm and/or material damage:

- 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.
- Mount the emergency stop switch in the immediate reach of the operator. Verify that the emergency stop works before startup. Don't operate the device if the emergency stop is not working.
- Isolate the drive power connection by means of an emergency stop circuit or use a safety related starting lockout to prevent unintentional start.
- Make sure that the drives are brought to a safe standstill before accessing or entering the danger zone.
- Additionally 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 or
  - 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 devices 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.

3.2.4 Protection Against Magnetic and Electromagnetic Fields During Operation and Mounting

Magnetic and electromagnetic fields generated by current-carrying conductors and permanent magnets in motors represent a serious personal danger to those 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 and metal implants are not permitted to enter following areas:
  - Areas in which electrical equipment and parts are mounted, being operated or commissioned.
  - Areas in which parts of motors with permanent magnets are being stored, repaired or mounted.
- If it is necessary for somebody with a pacemaker to enter such an area, a doctor must be consulted prior to doing so. The noise immunity of present or future implanted heart pacemakers differs greatly so that no general rules can be given.
- Those with metal implants or metal pieces, as well as with hearing aids, must consult a doctor before they enter the areas described above. Otherwise health hazards may occur.

3.2.5 Protection Against Contact with Hot Parts

CAUTION

Hot surfaces at motor housings, on drive controllers or chokes! Danger of injury! Danger of burns!

- Do not touch surfaces of device housings and chokes in the proximity of heat sources! Danger of burns!
- Do not touch housing surfaces of motors! Danger of burns!
- According to the operating conditions, temperatures can be **higher than 60 °C**, 140°F during or after operation.
- Before accessing motors after having switched them off, let them cool down for a sufficiently long time. Cooling down can require **up to 140 minutes**! Roughly estimated, the time required for cooling down is five times the thermal time constant specified in the Technical Data.
- After switching drive controllers or chokes off, wait 15 minutes to allow them to cool down before touching them.
- Wear safety gloves or do not work at hot surfaces.
- For certain applications, the manufacturer of the end product, machine or installation, according to the respective safety regulations, has to take measures to avoid injuries caused by burns in the end application. These measures can be, for example: warnings, guards (shielding or barrier), technical documentation.

3.2.6 Protection During Handling and Mounting

In unfavorable conditions, handling and mounting certain parts and components in an improper way can cause injuries.

CAUTION

Risk of injury by improper handling! Bodily injury by bruising, shearing, cutting, hitting!

- Observe the general construction and safety regulations on handling and mounting.
- Use suitable devices for mounting and transport.
- Avoid jamming and bruising by appropriate measures.
- Always use suitable tools. Use special tools if specified.
- Use lifting equipment and tools in the correct manner.
- If necessary, use suitable protective equipment (for example safety goggles, safety shoes, safety gloves).
- Do not stand under hanging loads.
- Immediately clean up any spilled liquids because of the danger of skidding.

3.2.7 Battery Safety

Batteries consist of active chemicals enclosed in a solid housing. Therefore, improper handling can cause injury or material damage.

CAUTION

Risk of injury by improper handling!

- Do not attempt to reactivate low batteries by heating or other methods (risk of explosion and cauterization).
- Do not recharge the batteries as this may cause leakage or explosion.
- Do not throw batteries into open flames.
- Do not dismantle batteries.
- When replacing the battery/batteries do not damage electrical parts installed in the devices.
- Only use the battery types specified by the manufacturer.

☞ Environmental protection and disposal! The batteries contained in the product are considered dangerous goods during land, air, and sea transport (risk of explosion) in the sense of the legal regulations. Dispose of used batteries separate from other waste. Observe the local regulations in the country of assembly.

3.2.8 Protection Against Pressurized Systems

According to the information given in the Project Planning Manuals, motors cooled with liquid and compressed air, as well as drive controllers, can be partially supplied with externally fed, pressurized media, such as compressed air, hydraulics oil, cooling liquids and cooling lubricating agents. Improper handling of the connected supply systems, supply lines or connections can cause injuries or material damage.

CAUTION

Risk of injury by improper handling of pressurized lines!

- Do not attempt to disconnect, open or cut pressurized lines (risk of explosion).
- Observe the respective manufacturer's operating instructions.
- Before dismounting lines, relieve pressure and empty medium.
- Use suitable protective equipment (for example safety goggles, safety shoes, safety gloves).
- Immediately clean up any spilled liquids from the floor.

☞ Environmental protection and disposal! The agents used to operate the product might not be economically friendly. Dispose of ecologically harmful agents separately from other waste. Observe the local regulations in the country of assembly.

4 CNC Control Modules IndraControl P40 and IndraControl P60

4.1 Brief Description

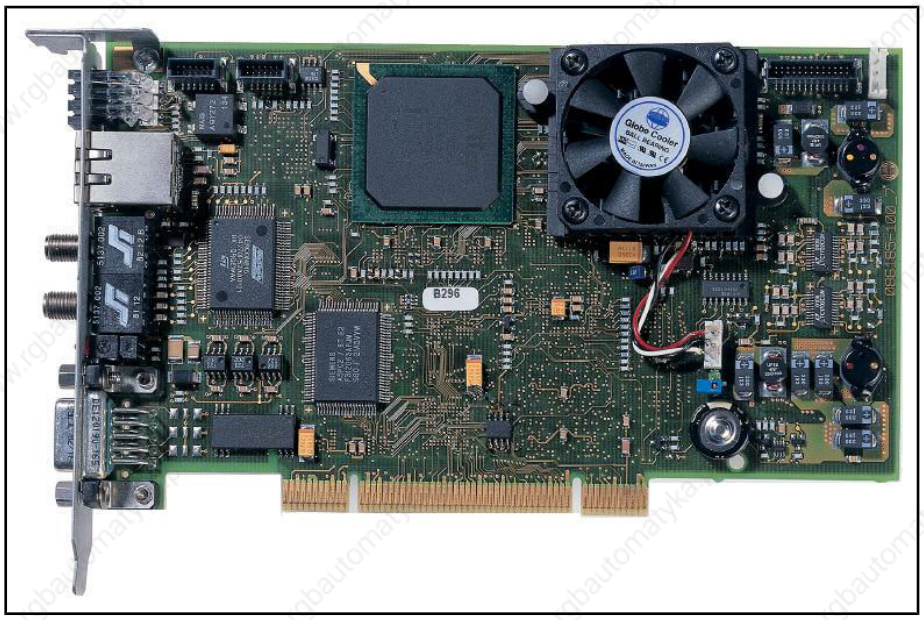

Fig.4-1: CNC control modules IndraControl P40/P60

CNC control modules IndraControl P40 and P60 are the main units in the IndraMotion MTX standard and MTX performance control systems. They have CNC and PLC functions. They are installed in an unassigned PCI slot, either in industrial PCs from Bosch Rexroth or in third-party PCs. The standard equipment includes interfaces allowing the activation of intelligent drives via the SERCOS interface, of I/Os via PROFIBUS-DP and of 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	MTX standard (IndraControl P40)	MTX performance (IndraControl P60)
Number of axes	max. 8	max. 64
thereof spindles	max. 2	max. 32
Number of interpolated axes/channel	max. 4	max. 8
Number of NC channels	max. 2	max. 12
SERCOS cycle time	min. 4 ms (for 8-axis configuration, 4-axis interpolation)	min. 250 µs (for 8-axis configuration, 4-axis interpolation)
Block cycle time	min. 4 ms	min. 250 µs

Fig.4-2: Performance data for IndraControl P40/P60

4.3 Technical Data

Processor	Celeron 650 MHz with 265 kB second-level cache
Storage	SDRAM: 64 MB SRAM: 1-8 MB
Bus	universal (5V- and 3.3V-compatible) PCI bus interface
Power supply	5V DC +/- 5%, max. 5A
Power consumption	Typically 21 W

Fig.4-3: Technical data for IndraControl P40/P60

4.4 Battery buffer time

Data on control units IndraControl P40/P60 will be buffered via an external connected battery. If the control units were installed in a standard industrial PC (VSP16, VSP40, VSB40), the external battery (3V/2.3Ah) is connected with a 3-pin cable. The buffer times are

- typical buffer time: 25 years
- worst case buffer time: 5.8 years

If the control units were installed into a high-end industrial PC (VPP16, VPP40, VPB40), the PC-internal battery (3V/1Ah) is connected with a ribbon cable. The buffer times are

- typical buffer time: 6.3 years
- worst case buffer time: 2 years

4.5 Handling

4.5.1 General

CAUTION

If touched, the fan will be destroyed!

The fan on the IndraControl P40/P60 is highly sensitive and must not be touched.

4.5.2 Resistance to Climate

Temperature

Storage temperature	-20° C to +70° C
Operating temperature	+5° C to +55° C (ambient temperature of card)

Fig.4-4: temperature

Humidity

Climatic category 3K3 according to EN 60721, non-condensing.

Corrosion / Resistance to Chemicals

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

4.5.3 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.

4.5.4 Service Concept

General

If the IndraControl P40/P60 is defective, the complete module must be replaced. On-site repairs of the modules are not permitted. Only the CPU fan of the module can be replaced.

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

Spare Parts

Designation	Type	Material number
IndraControl P40, complete	CMP40.2-SP-304-FN-NNNN-NW	R911170646
IndraControl P60, complete	CMP60.2-SP-304-FN-NNNN-NW	R911170645
CPU fan	CELERON P3 FAN	1070922552

Fig.4-5: Spare parts for IndraControl P40/P60

4.6 Display and Control Components

4.6.1 LEDs and External Watchdog Reset Button

General

The IndraControl P40/P60 has three dual LEDs (red and green activation in one LED) as well as one red LED (in the keypad).

CNC Control Modules IndraControl P40 and IndraControl P60

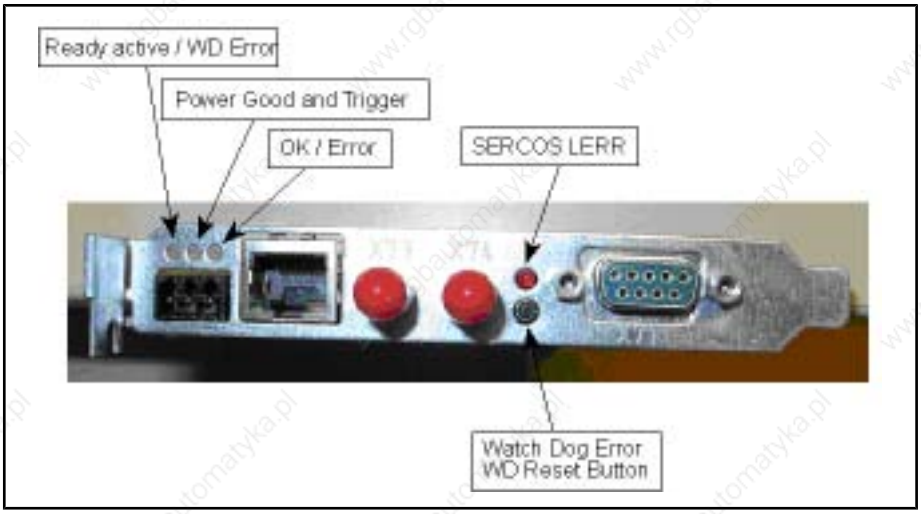

Fig.4-6: LEDs and external watchdog reset button

Ready Active / Watchdog Error LED

This dual LED indicates the following states:

1. **LED off** (with Power Good LED active)**:** watchdog not yet ready, 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:** at least one of the four onboard DC/DC transformers does not have the correct voltage => vector group defective or PC power pack defective or too weak.
2. **LED green:** all four voltages are correct.
3. **LED pulsing yellow:** approx. 200 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 for less than 1 ms.

SERCOS LERR LED

This red LED is directly activated by the SERCON816 controller (L_ERR#) and allows monitoring of the fiber-optic 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 canceling of any active PC NMI disable signal (see cs_dis_pc signal description). This actuation automatically "alerts" the watchdog logic. In addition, the "watch-

dog reset button" can be used to switch over to the RAM Boot (reset LED flashing) during power-on and LRESET.

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

4.7 Interfaces

4.7.1 SERCOS Interface X7S1, X7S2

Control module IndraControl P40/P60 permits operation of drives that are compatible with a "SERCOS interface". The connection to such drives is established by means of fiber-optics cables. A ring structure according to the SERCOS interface (IEC 1491) is used as the topology.

The SERCOS ring begins and ends at the IndraControl P40/P60 module. The optical output of the control (X7S1) is connected to the optical input of the first drive via a fiber-optics cable. 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 P40/P60 module (X7S2). The maximum transfer rate is 16 Mbaud.

4.7.2 PROFIBUS-DP Master Interface X7P

Control module IndraControl P40/P60 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 Mbaud.

4.7.3 Ethernet Interface X7E

Using Ethernet interface X7E, the IndraControl P40/P60 control module can be connected to a network.

The connection conditions described in IEE 802.3 for 100Base-T apply.

RJ45, socket, 8-pin	
Type	Ethernet 100Base-T
Line length	max. 100 m
Cable type	shielded, 2-wire, twisted
Transfer speed	10/100 MBit/s

Fig.4-7: Ethernet interface

The RJ45 socket contains 2 LEDs that show the connection status.

- LED (yellow): lights up when data are being transferred via the Ethernet connection
- LED (green): lights up at a transfer speed of 100 MBit/s; not lit at a transfer speed of 10 MBit/s.

Bosch Rexroth recommends using a STP cable of category 5.

4.7.4 Ready Contact

If control module IndraControl P40/P60 has not been started yet or if a watchdog error has occurred during operation, the ready contact opens. For this reason, it is a good idea to connect the contact in the emergency-stop chain of the machine. The maximum contact load is 60 V / 1 A.

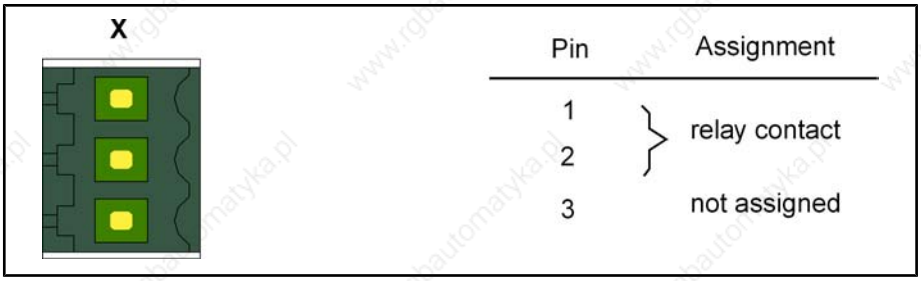

Fig.4-8: X - connection NC Ready

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

4.7.5 Optional High-speed I/O Interface

General

The high-speed I/O interface is an extension module for control module IndraControl P40/P60, with 8 high-speed inputs and 8 high-speed outputs. The module is assigned to a slot in the industrial PC, but does not have a PCI bus connection. The connection to the P40/P60 is established directly via two ribbon cables.

☞ To permit future retrofitting, the high-speed I/O interface may only be mounted to the right of the IndraControl P40/P60 on the component side (owing to the ribbon cables).

24 V DC Voltage Connection

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

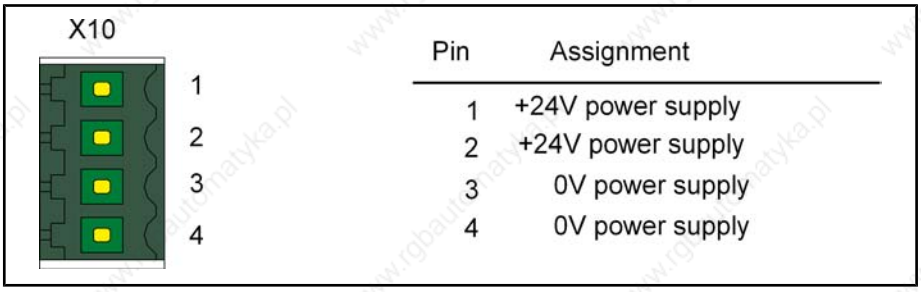

Fig.4-9: X10 – 24 V DC voltage connection

CAUTION

Dangerous electric voltage!

The 24 V DC input voltage must meet the requirements for "safe 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.

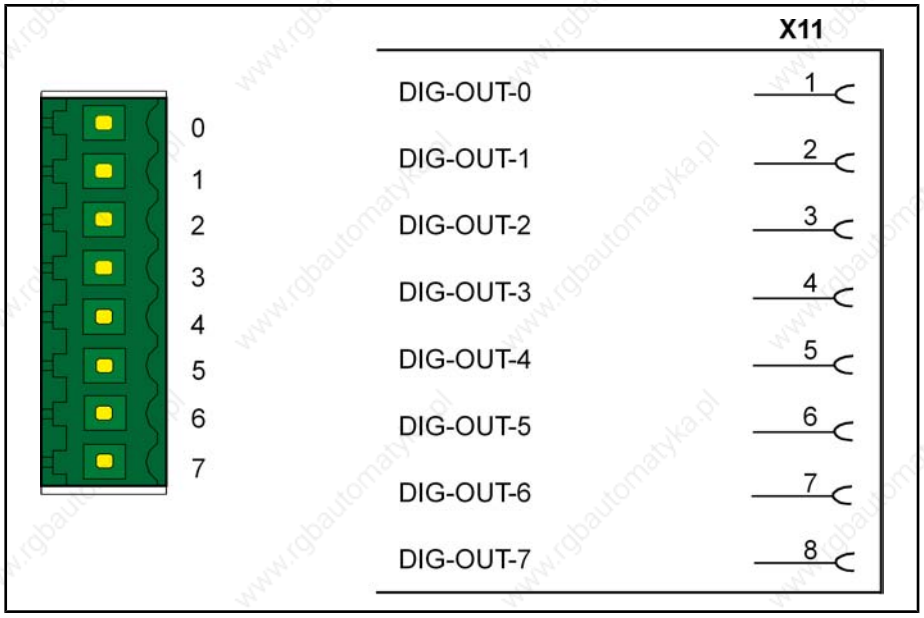

Fig.4-10: X11 – digital out

Technical data of the outputs

Current range in case of "1" signal at 24 V (continuous)	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.4-11: Working range of digital outputs

Measured switching times in no-load state:

- Startup delay 48 µs
- Shutdown delay 700 µs

Measured switching times under 0.5 A load:

- Startup delay 50 µs
- Shutdown 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 affected input, is located next to each of the pins of the connector.

CNC Control Modules IndraControl P40 and IndraControl P60

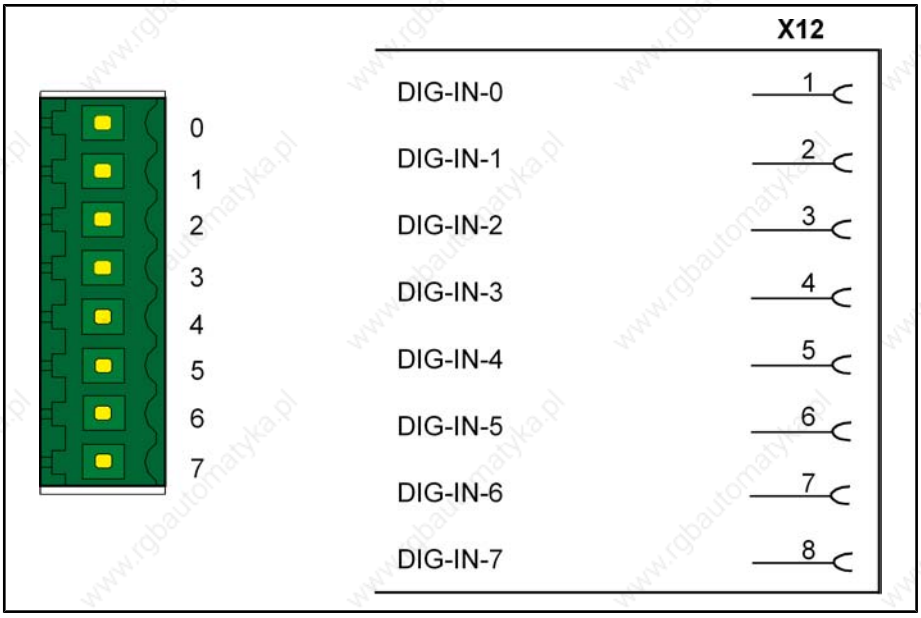

Fig.4-12: X12 – digital in

Technical data of the inputs

Limit value	"0" status		Transition range		"1" status	
	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.4-13: Working range of digital inputs

Switching time: max. 100 µs

4.8 Order type

4.8.1 General

CNC control modules IndraControl P40 and IndraControl P60 are available as subitems of a Bosch Rexroth industrial PC (VSP, VSB, VPP, VPB). The various designs of the industrial PCs are executed in so-called control configurations (CFG-..).

☞ Control module IndraControl P40 is allowed to be used only in Bosch Rexroth standard industrial PCs. IndraControl P60 can be used in all Bosch Rexroth industrial PCs, including high-end industrial PCs.

4.8.2 Order Codes in Industrial PCs from Bosch Rexroth

The control configuration (CFG-..) contains control module IndraControl P40 or P60 and all accessories required for installation of an industrial PC from Bosch Rexroth.

Industrial PC	Control Configuration	Execution
VSP 16/40, VSB 40	CFG-VSN01E1-HC-NN-NN-NN-NN-NN	with IndraControl P40
	CFG-VSN01E1-HC-IC-NN-NN-NN-NN	with IndraControl P40 and I/O interface for 8 inputs and 8 outputs
	CFG-VSN01E1-GC-NN-NN-NN-NN-NN	with IndraControl P60
	CFG-VSN01E1-GC-IC-NN-NN-NN-NN	with IndraControl P60 and I/O interface for 8 inputs and 8 outputs
VPP 16/40, VPB 40	CFG-VPN01A1-GC-NN-NN	with IndraControl P60
	CFG-VPN01A1-GC-IC -NN	with IndraControl P60 and I/O interface for 8 inputs and 8 outputs

Fig.4-14: Control configurations with IndraControl P40 and P60

5 CNC Control Module IndraControl L40

5.1 Brief Description

Fig.5-1: CNC control module IndraControl L40

The IndraControl L40 is a space-saving control module to be installed in a switch cabinet on a top hat rail. With the help of the existing interfaces as well as 8 digital I/Os on board, the IndraControl L40 provides CNC performance for controlling up to 8 axes and PLC functions in an ultra-compact terminal format. By switching the function modules with special interfaces or functions in series using the integrated function module bus (FM bus) as well as additional Inline I/O modules, the control can be individually adapted to any job.

5.2 Performance data

Designation	MTX compact (IndraControl L40)
Number of axes	max. 8
thereof spindles	max. 2
Number of interpolating axes	max. 4
SERCOS cycle time	min. 6 ms (for 8-axis configuration, 4-axis interpolation)
Block cycle time	min. 6 ms

Fig.5-2: Performance data, IndraControl L40

5.3 Technical Data

Processor	AMD LX800, 500 MHz
RAM	64 MB DRAM and 128 kB NvRAM

Interfaces	• Bosch Rexroth PC104Plus • Rexroth Inline interface • Ethernet connection (RJ45, 10/100 Base-T) • RS232 interface • PROFIBUS DP master interface • SERCOS master interface • NC Ready contact
Inputs and outputs	• 8 electrically isolated digital inputs • 8 electrically isolated digital outputs

Fig.5-3: Technical data, IndraControl L40

5.4 Power Supply

The IndraControl L40 is supplied with 24 V. The following values for the operating voltage apply according to DIN EN 61131-2:

Rated value	24 V DC
Tolerance	-15% / +20% (without residual ripple)
Residual ripple	+/-5 %
U_{max}	30 V
U_{min}	19.2 V

Fig.5-4: Operating voltage according to DIN EN 61131-2

Three operating voltages must be applied to the IndraControl L40. The power consumption from these voltages is:

Power consumption from U_{LS}	max. 3 A
Power consumption from U_M and U_S	Total: max. 8 A

Fig.5-5: Power consumption

The power for the IndraControl L40, any connected function modules and the I/O components is supplied by a feed module on the right side of L40, slot 5. The three voltages are fed on this slot using a black clamp terminal (PWR IN).

- U_{LS} 24 V logic voltage
- U_S 24 V segment voltage
- U_M 24 V main voltage

Feed terminal (PWR IN)

Terminal	Signal
1.1	+ 24 V DC segment voltage (U_S)
1.2	+ 24 V DC power supply voltage (U_{LS})
1.3	LGND (ground power supply voltage)
1.4 and 2.4	FE (function earth)
2.1 and 2.2	+ 24 V DC main voltage (U_M)
2.3	PGND (ground main and segment voltage)

Fig.5-6: Plug assignment on feed module

5 light-emitting diodes are arranged on the feed module (slot 5). They have the following meanings:

LED U_M	Meaning
Off	24 V main circuit supply (U_M) missing
Green	24 V main circuit supply (U_M) exists

Fig.5-7: Diagnostic LED of the main circuit supply

LED U_S	Meaning
Off	24 V segment circuit supply (U_S) missing
Green	24 V segment circuit supply (U_S) exists

Fig.5-8: Diagnostic LED of the segment circuit supply

LED U_L	Meaning
Off	24 V logic circuit supply (U_{LS}) missing
Green	24 V logic circuit supply (U_{LS}) exists

Fig.5-9: Diagnostic LED of the logic circuit supply

LEDs FS and FN currently have no functions.

☞ The 7.5 V Inline voltage and the U_{ANA} 24 V analog voltage are drawn off from the U_{LS} external 24 V voltage.

5.5 Ambient Conditions

	During operation	Storage/transport
Max. ambient temperature	+5 to +55° C If the load is higher or if the ambient temperature >45° C, use the fan (available as an option)	-25°C to +70°C
Relative humidity	RH-2; 5% to 95% acc. to DIN EN 61131-2. Condensation is not permitted.	
Atmospheric pressure	up to 2,952.76 yd above sea level acc. to DIN 60204	up to 3000 m above sea level acc. to DIN 60204
Mechanical strength	• Max. vibration: Frequency range: 10 to 150 Hz • Deflection: 0.003 in at 10 to 57 Hz • Acceleration: 1 g at 57 to 150 Hz Acc. to EN 60068-2-6	Max. shock: 15 g acc. to EN 60068-2-27, no malfunctions

Fig.5-10: Ambient conditions

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

Dust-free ambient air is required. The housing and the installation spaces must satisfy at least protection class IP 54 according to DIN VDE 0470-1.

CAUTION

Danger of destruction due to overheating

- Ensure that the ambient temperature remains below 45° C.
- If the ambient temperature is between 45° C and 55° C, use the fan (available as an option).

  An integrated fan control with hysteresis switches the fan on when a critical interior temperature has been attained and off again when the temperature drops below the critical level.
- If the temperature attains 75° C, the control automatically switches to a stand-by mode to avoid damage. The outputs then go into the safe state and the display shows the warning "Temp !!!".
- A Lib function can be used to read out the interior temperature of the IndraControl L40 with the user program to trigger further reactions.

Operation without a fan can be considered if all of the following conditions have been fulfilled:

- Ambient temperature < 45° C
- Load on the 7.5 V Inline supply (U_L) < 1 A
- Load by the onboard outputs < 1A
- Load by the function modules < 10 W

5.6 Display and Control Components

5.6.1 General

For display and control purposes, a one-line display with four control keys, as well as an LED and a Reset button, are located on the front of the IndraControl L40.

5.6.2 Display and Control Buttons

Display

The display is an LCD with 8 characters (5 x 10 point matrix).

Fig.5-11: Display with four control buttons

Control buttons

The four control buttons below the display have the following functions:

- Esc

  Go back one level

  (Note: any changes made in the menu that you exit by pressing Esc are not saved)
- Arrow down

  Move downwards within a menu or decrement parameters to be set
- Up arrow

  Move upwards within a menu or increment parameters to be set

- Enter

  Confirm an entry or call the next menu level

5.6.3 Reset Button and LED

The Reset button and a red LED are located below the display.

Reset button

The Reset button can be pressed only with the help of a tool, such as the tip of a pencil.

When the Reset button is pressed, the entire module is reset and a forced restart is activated without having to switch off the power supplies. At the same time, the Ready contact is opened.

☞ When the Reset button is pressed, the running program is terminated.

LED

The LED is used to display the diagnostics/status.

5.7 Interfaces

5.7.1 SERCOS Interface X7S1, X7S2

Control module IndraControl L40 permits operation of drives that are compatible with a "SERCOS interface". The connection to such drives is established by means of fiber-optics cables. A ring structure according to the SERCOS interface (IEC 1491) is used as the topology.

The SERCOS ring begins and ends at the L40 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 L40 module (X7S1). The maximum transfer rate is 2-16 Mbaud.

5.7.2 PROFIBUS-DP Master Interface X7P

Control module IndraControl L40 exchanges data with the operator panels (VAM…) and the sensor and actuator level (Inline/Fieldline modules) via the PROFIBUS-DP interface according to DIN EN 50170, part 2. This is achieved by means of cable assemblies of variable lengths. The maximum transfer rate is 12 Mbaud.

A "Send" LED is located above the PROFIBUS interface. When it lights up, the L40 is outputting data.

5.7.3 Ethernet Interface X7E

Using Ethernet interface X7E, the IndraControl L40 control module can be connected to a network.

The connection conditions described in IEE 802.3 for 100Base-T apply.

RJ45, socket, 8-pin	
Type:	Ethernet 100Base-T
Cable length:	max. 100 m
Cable type:	shielded, 2-wire, twisted
Transfer speed:	10/100 MBit/s

Fig.5-12: Ethernet interface

The RJ socket contains 2 LEDs that show the connection status.

- LED (yellow): lights up when data are being transferred via the Ethernet connection
- LED (green): lights up at a transfer speed of 100 MBit/s; not lit at a transfer speed of 10 MBit/s.

Bosch Rexroth recommends using a STP cable of category 5.

5.7.4 Ready Contact X2R

General

The Ready contact is opened when in the idle state. It is closed when the module starts up. It opens again if one of the states listed below occurs:

- The 24 V supply drops below the permitted limit.
- The internal 5 V and 3.3 V supplies drop below the permitted limit.
- The Ready watchdog elapses.
- The Reset button is pressed.

It is a good idea to connect the Ready contact to the emergency stop chain of the machine.

X2R Connection Assignment

Terminal	Signal
1	Relay contact
2	Relay contact
3	(not assigned)

Fig.5-13: Plug assignment of the Ready contact

Contact Characteristics

Switching capacity	1 A, 60 V DC
Ramp-down time	0.3 ms
Bounce time	none
Watchdog time (analog watchdog only)	50 ms +/- 25%

Fig.5-14: Characteristics of the Ready contact

The LED located next to the Ready contact is a dual LED in red and green. It can have the following states:

Meaning of the LEDs

LED "Ready"	Meaning
Off	Watchdog not yet started or Ready contact opened by the software (the watchdog, however, is still triggered internally)
Green	Ready contact closed; watchdogs will be triggered
Red	Ready error; at least one watchdog has been triggered

Fig.5-15: Ready LED

5.7.5 Interface for Compact Flash Card

Compact Flash

The IndraControl L40 has a slot for a Compact Flash card. The memory card with the firmware is inserted here. In addition, data and programs are stored on this card. Operation without a flash card is not possible.

DANGER

Uncontrolled movement due to operation without a Compact Flash card!

⇒ Never remove the Compact Flash card if the L40 is in operation!

5.7.6 Inline Bus

The IndraControl L40 can be supplemented with additional Rexroth Inline modules. Such modules can be used to increase the I/O unit up to 32-byte inputs and 32-byte outputs.

A maximum of 63 Rexroth Inline modules can be connected.

You can find additional information about connecting Rexroth Inline modules in the documentation DOK-CONTRL-R-IL*DIO***-FKxx-EN-P.

5.7.7 Function Module Plug

Extension modules can be connected to the left side of the IndraControl L40 using the function module plug (FM bus) located there.

This 120-pin plug is a Bosch Rexroth PC104^{Plus} plug to which the PC104 signals and other system-specific signals are applied.

5.8 Function Modules

5.8.1 SRAM Function Module CFL01.1-Y1

General

Fig.5-16: SRAM function module CFL01.1-Y1

Brief Description

SRAM function module CFL01.1-Y1, with an 8 MB memory, is also required to operate the IndraControl L40. The CFL01.1 is placed to the left of the L40 on a top hat rail on the control module and is electrically connected with the L40 using the FM bus. The function module has an easily replaceable buffer battery (buffer time = 5 years) with a battery monitor. The battery must be replaced while the control is switched on. This prevents a loss of data in the SRAM.

CNC Control Module IndraControl L40

Technical Data

Terminal	Signal
SRAM (battery-buffered)	8 MByte
Power supply	3.3 V
Power consumption	300 mA
Power consumption	1 W

Fig.5-17: Technical data, SRAM function module

Addressing the function module

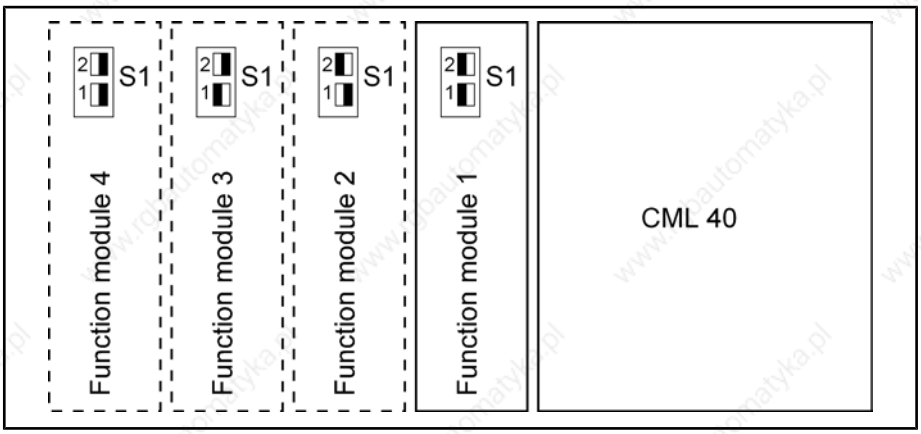

Fig.5-18: Addressing the function module

5.9 Execution

The IndraControl L40 is available under the following type code:

Type	Comment
CML40.2-SP-330-NA-NNNN-NW	Processor AMD LX800 500 MHz, 64 MB DRAM, 128 kB NvRAM

Fig.5-19: Order designation, IndraControl L40

5.10 Accessory

5.10.1 SRAM Function Module CFL01.1-Y1

The following SRAM function module is required for the IndraMotion L40:

Type	Comment
CFL01.1-Y1	8 MB SDRAM memory module with battery buffering

Fig.5-20: Order designation: CFL01.1-Y1

5.10.2 Fan

The IndraControl L40 can be optionally equipped with a fan module.

Type	Comment
CAL01.1-F1	Auxiliary fan for IndraControl L40

Fig.5-21: Order designation: CAL01.1-F1

5.10.3 Plug Set

The following plug set is available for the power supply of the IndraControl L40 and for the Inline onboard I/Os:

Type	Comment
R-IB IL CML S01-PLSET	Plug set for IndraControl L40

Fig.5-22: Plug set R-IB IL CML S01-PLSET

5.10.4 Labels

The following labels to mark the Inline plugs are available:

Type	Comment
R-IB IL FIELD 2	Labels for Inline plugs

Fig.5-23: Labels R-IB IL FIELD 2

5.10.5 Replacement battery

The replacement battery for SRAM function module CFL01.1Y1 can be obtained under the following designation:

Type	Material number
BATTERY LITHIUM CR 2450	1070923243

Fig.5-24: Replacement battery

5.11 Documentation

The following documentation provides a detailed description of the IndraControl L40:

DOK-CONTRL-IC*L40*****-PRxx-EN-P

6 VSP Standard Industrial PC

6.1 Brief Description

Fig.6-1: VSP 16.1 with 12" color display

Fig.6-2: VSP 40.1 with 15" color display

VSP standard industrial PCs are PC-based control and visualization systems for normal ambient conditions with a tested capability for industrial environments. These PCs are mainly installed in an operator console or in a switch cabinet wall. By installing a CNC control module IndraControl P40 or IndraControl P60 in the attached PC box, the operator panels fulfill control functions.

6.2 Field of Application

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

VSP Standard Industrial PC

6.3 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	1 GB RAM	
Line voltage	115-230 V AC or 24 V DC	

Fig.6-3: Technical data, VSP 16/40

6.4 Wear Parts

The standard industrial VSP16/40 PC contains parts that have a limited lifetime and which are not covered by the warranty. The following components are affected:

- Hard disk
- CMOS battery
- Fan
- Backlighting

The lifetime of the individual components is described in the documentation DOK-SUPPL*-VSP*16/40**-PRxx-EN-P.

6.5 Types

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

Type	Comment
VSP16.1BKE-1G0NN-C1C-AN-NN-FW	Line voltage 115-230 V AC; 1 GB RAM; without CD-ROM drive
VSP16.1BKE-1G0NN-C1C-AD-NN-FW	Line voltage 115-230 V AC; 1 GB RAM; with CD-ROM drive
VSP40.1BIE-1G0NN-C1C-AN-NN-FW	Line voltage 115-230 V AC; 1 GB RAM; without CD-ROM drive
VSP40.1BIE-1G0NN-C1C-AE-NN-FW	Line voltage 115-230 V AC; 1 GB RAM; with DVD (R/W) drive

Fig.6-4: VSP 16/40 order types

6.6 Control Configuration

If the high-end industrial PC BTV 16/40 is equipped with an IndraControl P40 or IndraControl P60 control module, the following control configurations (CFG..) are available:

Type	Comment
CFG-VSN01E1-HC-NN-NN-NN-NN-NN	with IndraControl P40 (CMP40)
CFG-VSN01E1-HC-IC-NN-NN-NN-NN	with IndraControl P40 (CMP40) and I/O interface for 8 inputs and 8 outputs
CFG-VSN01E1-HC-NN-NN-NN-NN-S3	with IndraControl P40 (CMP40) + COM interface

Type	Comment
CFG-VSN01E1-HC-IC-NN-NN-NN-S3	with IndraControl P40 (CMP40) and I/O interface for 8 inputs and 8 outputs + COM interface
CFG-VSN01E1-GC-NN-NN-NN-NN-NN	with IndraControl P60 (CMP60)
CFG-VSN01E1-GC-IC-NN-NN-NN-NN	with IndraControl P60 (CMP60) and I/O interface for 8 inputs and 8 outputs
CFG-VSN01E1-V1-GC-NN-NN-NN-NN	with IndraControl P60 (CMP60) + DeviceNet
CFG-VSN01E1-V1-GC-IC-NN-NN-NN	with IndraControl P60 (CMP60) and I/O interface for 8 inputs and 8 outputs + DeviceNet
CFG-VSN01E1-GC-NN-NN-NN-NN-S3	with IndraControl P60 (CMP60) + COM interface
CFG-VSN01E1-GC-IC-NN-NN-NN-S3	with IndraControl P60 (CMP60) and I/O interface for 8 inputs and 8 outputs + COM interface
CFG-VSN01E1-V1-GC-NN-NN-NN-S3	with IndraControl P60 (CMP60) + DeviceNet + COM interface
CFG-VSN01E1-V1-GC-IC-NN-NN-S3	with IndraControl P60 (CMP60) and I/O interface for 8 inputs and 8 outputs + DeviceNet + COM interface

Fig.6-5: Control configuration for VSP 16/40

6.7 Accessory

6.7.1 Connectors and Cable Assemblies

Type	Comment
B-AC PLUG NET 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.6-6: Connectors and cables

6.8 Documentation

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

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

7 VSB Standard Industrial PC with VDP Operator Panel

7.1 Brief Description

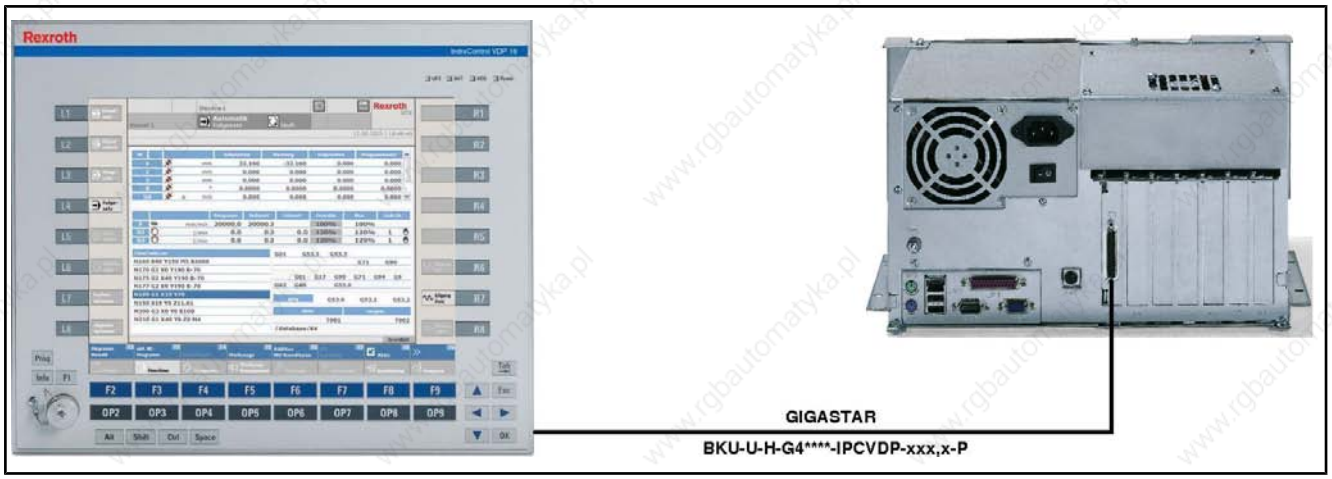

Fig.7-1: VSB 40 standard industrial PC with VDP 16 operator panel

Fig.7-2: VSB 40 standard industrial PC with VDP 40 operator panel

The VSB 40 is an industrial PC which, in connection with the passive operator panels VDP 16 or VDP 40, represents a PC-based control and visualization terminal with normal capability for industrial environments. The VSB 40 is intended to be installed in a switch cabinet. Operator panels VDP 16 and VDP 40 are designed to be installed in an operator console or a switch cabinet wall. The connection between VDP and VSP is provided by a GIGASTAR interface. If the VSB 40 is equipped with an IndraControl P40 or IndraControl P60 CNC control module, the PC fulfills control functions.

7.2 Field of Application

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

VSB Standard Industrial PC with VDP Operator Panel

7.3 Technical Data

7.3.1 VSB 40.1

PC box	6 slots (PCI)
Processor	Celeron, 2 GHz
RAM	512 MB or 1 GB
Line voltage	115-230 V AC or 24 V DC

Fig.7-3: Technical data of VSB 40

7.3.2 VDP 16/40

	VDP 16.1	VDP 40.1
Display	12” color display	15” color display
Front panel design	16 machine function keys	
Power supply	via GIGASTAR interface (24 V DC)	

Fig.7-4: Technical data, VDP 16/40

7.4 Wear Parts

The standard industrial VSB40 PC and the VDP16/40 operator panel contain parts that have a limited lifetime and which are not covered by the warranty. The following components are affected:

- Hard disk
- CMOS battery
- Fan
- Backlighting

The lifetime of the individual components is described in the documentation DOK-SUPPL*-VSB*40.1***-PRxx-EN-P and DOK-SUPPL*-VDP*XX.2***-PRxx-EN-P.

7.5 Types

The following type of the standard industrial PC VSB 40 is available:

Type	Remarks
VSB40.1G4E-1G0NN-C1C-AN-NN-FW	Line voltage 115-230 V AC; 1 GB RAM; without CD-ROM drive

Fig.7-5: VSB 40 types

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

Type	Remarks
VDP16.2BKN-G4-PS-NN	Operator panel with 12" color display
VDP40.2BIN-G4-PS-NN	Operator panel with 15" color display
VDP40.2DFN-G4-PS-NN	Operator panel with 15” color display and touch-screen

Fig.7-6: VDP 16/40 types

7.6 Control Configuration

If the standard industrial PC VSB 40 is equipped with an IndraControl P40 or IndraControl P60 control module, the following control configurations (CFG..) are available:

Type	Comment
CFG-VSN01E1-HC-NN-NN-NN-NN-NN	with IndraControl P40 (CMP40)
CFG-VSN01E1-HC-IC-NN-NN-NN-NN	with IndraControl P40 (CMP40) and I/O interface for 8 inputs and 8 outputs
CFG-VSN01E1-HC-NN-NN-NN-NN-S3	with IndraControl P40 (CMP40) + COM interface
CFG-VSN01E1-HC-IC-NN-NN-NN-S3	with IndraControl P40 (CMP40) and I/O interface for 8 inputs and 8 outputs + COM interface
CFG-VSN01E1-GC-NN-NN-NN-NN-NN	with IndraControl P60 (CMP60)
CFG-VSN01E1-GC-IC-NN-NN-NN-NN	with IndraControl P60 (CMP60) and I/O interface for 8 inputs and 8 outputs
CFG-VSN01E1-V1-GC-NN-NN-NN-NN	with IndraControl P60 (CMP60) + DeviceNet
CFG-VSN01E1-V1-GC-IC-NN-NN-NN	with IndraControl P60 (CMP60) and I/O interface for 8 inputs and 8 outputs + DeviceNet
CFG-VSN01E1-GC-NN-NN-NN-NN-S3	with IndraControl P60 (CMP60) + COM interface
CFG-VSN01E1-GC-IC-NN-NN-NN-S3	with IndraControl P60 (CMP60) and I/O interface for 8 inputs and 8 outputs + COM interface
CFG-VSN01E1-V1-GC-NN-NN-NN-S3	with IndraControl P60 (CMP60) + DeviceNet + COM interface
CFG-VSN01E1-V1-GC-IC-NN-NN-S3	with IndraControl P60 (CMP60) and I/O interface for 8 inputs and 8 outputs + DeviceNet + COM interface

Fig.7-7: Control configuration for VSB 40.1

7.7 Accessory

7.7.1 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-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, 10.94 yd
BKS-U-H-G4****-IPCVDP-020,0-P	VSB–VDP connection cable, highly flexible, 21.87 yd
BKS-U-H-G4****-IPCVDP-030,0-P	VSB–VDP connection cable, highly flexible, 32.81 yd

Fig.7-8: Connection Cable

7.7.2 Fastening Bracket

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

Type	Comment
ANGLE PCBOX-IPC	Bracket for VSB 40

Fig.7-9: Fastening bracket

VSB Standard Industrial PC with VDP Operator Panel

7.8 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*-VDP*XX.2***-PRxx-EN-P

8 VPP High-End Industrial PC

8.1 Brief Description

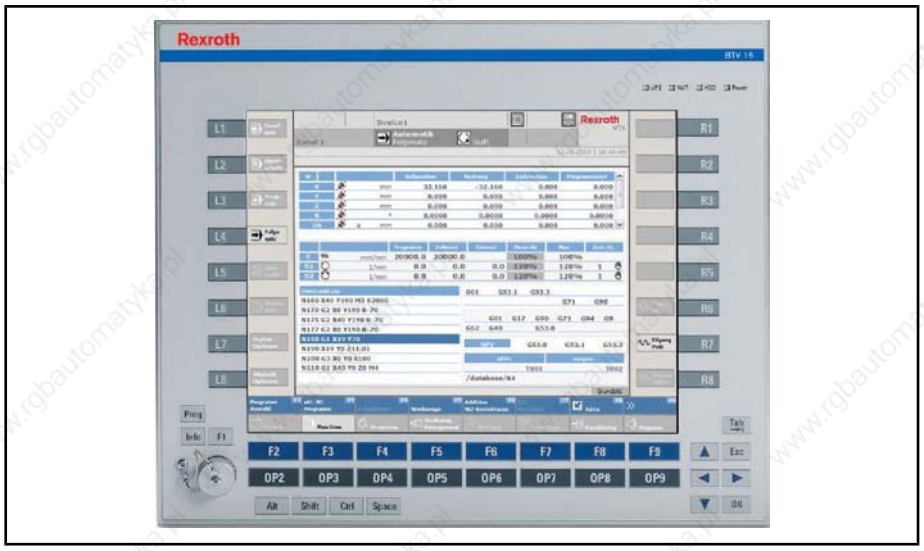

Fig.8-1: VPP 16 high-end industrial PC with 12" color display

Fig.8-2: VPP 40 high-end industrial PC with 15" color display

VPP 16/40 operator panels are active PC-based control and visualization terminals with a high capability for industrial environments. These PCs are mainly installed in an operator console or in a switch cabinet wall. By installing an IndraControl P60 CNC control module in the attached PC box, the operator panels fulfill control functions.

8.2 Field of Application

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

VPP High-End Industrial PC

8.3 Technical Data

	VPP16.1	VPP40.1
Display	12" color display	15” color display
Front panel design	16 machine function keys	
PC box	3 slots (2x PCI, 1x PCI/ISA)	
Processor	Celeron M, at least 1.3 GHz	
RAM	1 GB RAM	
Line voltage	115-230 V AC or 24 V DC	

Fig.8-3: Technical data, VPP 16/40

8.4 Wear parts

The high-end industrial VPP16/40 PC contains parts that have a limited lifetime and which are not covered by the warranty. The following components are affected:

- Hard disk
- CMOS battery
- Fan
- Backlighting

The lifetime of the individual components is described in the documentation DOK-SUPPL*-VPP*XX.1***-PRxx-EN-P.

8.5 Types

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

Type	Remarks
VPP16.1BKA-1G0NN-M1C-BN-NN-FW	Line voltage 115-230 V AC; 1 GB RAM
VPP40.1BIA-1G0NN-M1C-BN-NN-FW	Line voltage 115-230 V AC; 1G0 RAM
VPP40.1BIA-1G0NN-M1D-BN-NN-FW	Line voltage 24 V DC; 1G0 MB RAM

Fig.8-4: VPP 16/40 models

8.6 Control Configuration

If the VPP 16/40 high-end industrial PC is equipped with an IndraControl P60 control module, the following control configurations (CFG..) are available:

Type	Slots	Remarks
CFG-VPN01A1-GC-NN-NN	3	with IndraControl P60 (CMP60)
CFG-VPN01A1-GC-IC -NN	3	with IndraControl P60 (CMP60) and I/O interface for 8 inputs and 8 outputs
CFG-VPN01A1-V1-GC-NN	3	with IndraControl P60 (CMP60) + DeviceNet
CFG-VPN01A1-V1-GC-IC	3	with IndraControl P60 (CMP60) + DeviceNet + I/O interface for 8 inputs and 8 outputs

Fig.8-5: Control configurations for VPP 16/40

8.7 Accessory

8.7.1 Connectors and Cable Assemblies

Type	Remarks
B-AC PLUG NET 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.8-6: Connectors and cables

8.8 Documentation

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

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

9 VPB 40 High-End Industrial PC with VDP Operator Panel

9.1 General

The VPB 40 is a high-end industrial PC that, together with the passive VDP 16 or VDP 40 operator panels, provides a PC-based operation and visualization terminal with a high capability for industrial environments. The VPB 40 is intended to be installed in a switch cabinet. Operator panels VDP 16 and VDP 40 are designed to be installed in an operator console or a switch cabinet wall. The connection between the VDP and the VPB is established via a GIGASTAR interface. If the VPB 40 is equipped with an IndraControl P60 CNC control module, the PC fulfills control functions.

9.2 Types

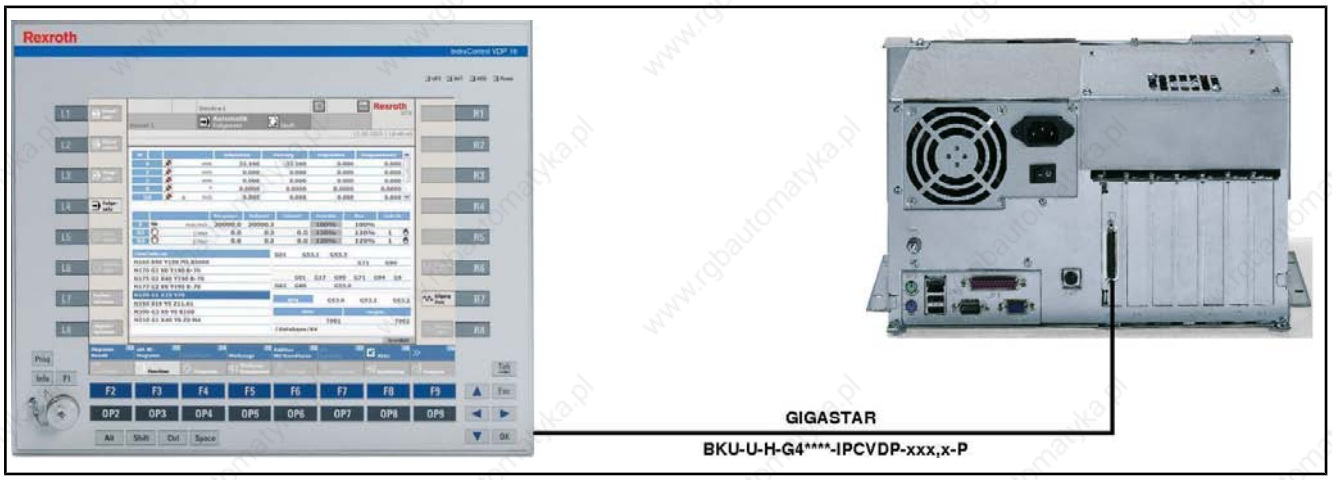

Fig.9-1: VPB 40 high-end industrial PC with VDP 16 operator panel

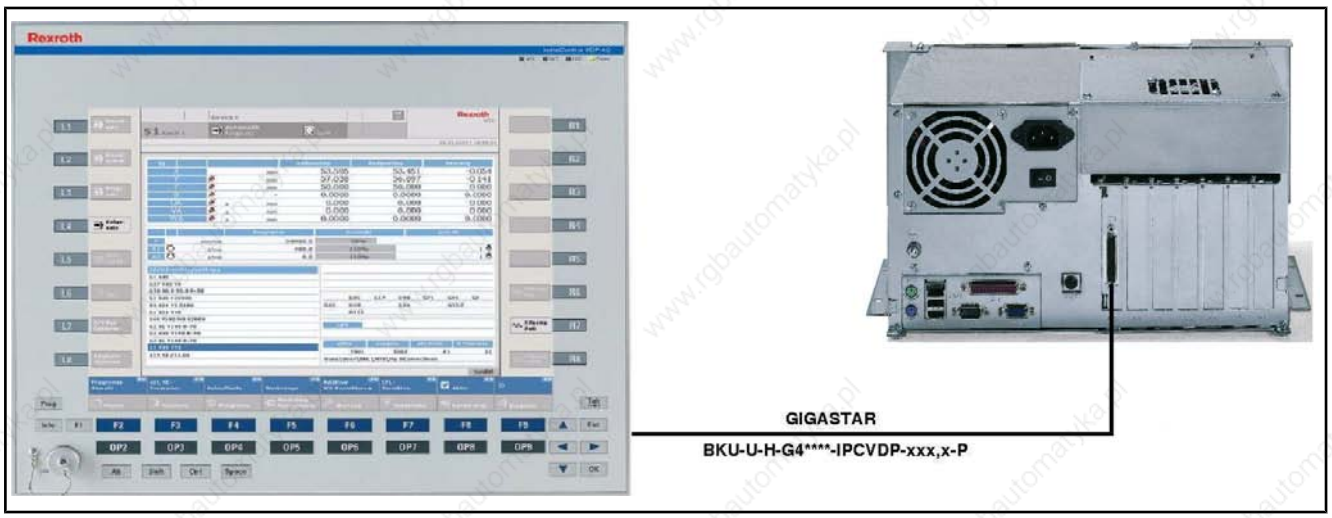

Fig.9-2: VPB 40 high-end industrial PC with VDP 40 operator panel

9.3 Field of Application

The VPB 40 high-end industrial PC is used in industrial environments with increased vibration and shock requirements.

VPB 40 High-End Industrial PC with VDP Operator Panel

9.4 Technical Data

9.4.1 VPB 40

Designation	VPB 40
PC box	3 or 4 slots
Processor	Celeron M, minimum 1.3 GHz
RAM	512 MB or 1 GB
Line voltage	115-230 V AC or 24 V DC

Fig.9-3: Technical data, VPB 40

9.4.2 VDP 16/40

	VDP 16	VDP 40
Display	12” color display	15” color display
Front panel design	16 machine function keys	
Power supply	via GIGASTAR interface (24 V DC)	

Fig.9-4: Technical data, VDP 16/40

9.5 Wear parts

The high-end industrial VPB40 PC and the VDP16/40 operator panel contain parts that have a limited lifetime and which are not covered by the warranty. The following components are affected:

- Hard disk
- CMOS battery
- Fan
- Backlighting

The lifetime of the individual components is described in the documentation DOK-SUPPL*-VPB*40.1***-PRxx-EN-P and DOK-SUPPL*-VDP*XX.2***-PRxx-EN-P.

9.6 Types

The following types of high-end industrial PCs and VPB 40 are available:

Type	Slot	Remarks
VPB40.1G4A-1G0NN-M1C-BN-NN-FW	3	Line voltage 115-230 V AC; 1 GB RAM
VPB40.1G4A-1G0NN-M1C-BD-NN-FW	3	Line voltage 115-230 V AC; 1 GB RAM; CD-ROM drive
VPB40.1G4A-1G0NN-M1D-BN-NN-FW	4	Line voltage 24 V DC; 1 GB RAM
VPB40.1G4A-1G0NN-M1D-BD-NN-FW	3	Line voltage 24 V DC; 1 GB RAM; CD-ROM drive

Fig.9-5: VPB 40 models

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

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

Fig.9-6: VDP 16/40 types

9.7 Control Configurations

If the VPB 40 high-end industrial PC is equipped with an IndraControl P60 control module, the following control configurations (CFG..) are available:

Type	Slot	Remarks
CFG-VPN01A1-GC-NN-NN	3	with IndraControl P60 (CMP60)
CFG-VPN01A1-GC-IC -NN	3	with IndraControl P60 (CMP60) and I/O interface for 8 inputs and 8 outputs
CFG-VPN01A1-V1-GC-NN	3	with IndraControl P60 (CMP60) + DeviceNet
CFG-VPN01A1-V1-GC-IC	3	with IndraControl P60 (CMP60) + DeviceNet + I/O interface for 8 inputs and 8 outputs

Fig.9-7: Control configuration for VPB 40

9.8 Accessory

9.8.1 Connection Cables (GIGASTAR interface)

The following cable assemblies are available for connecting the VPB 40 industrial PC and the VDP 16/40 operator panel:

Type	Remarks
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, 10.94 yd
BKS-U-H-G4****-IPCVDP-015,0-P	IPC–VDP connection cable, highly flexible, 16.40 yd
BKS-U-H-G4****-IPCVDP-020,0-P	IPC–VDP connection cable, highly flexible, 21.87 yd
BKS-U-H-G4****-IPCVDP-030,0-P	IPC–VDP connection cable, highly flexible, 32.81 yd

Fig.9-8: Connection Cable

9.8.2 Fastening Bracket

To mount the VPB 40 industrial PC vertically, the following fastening bracket is available:

Type	Comment
ANGLE PCBOX-IPC	Bracket for VPB 40

Fig.9-9: Fastening bracket

9.9 Documentation

The following documentation provides a detailed description of the VPB 40 high-end industrial PC and the VDP 16/40 operator panels:

VPB 40 High-End Industrial PC with VDP Operator Panel

DOK-SUPPL*-VPB*40.1***-PRxx-EN-P
DOK-SUPPL*-VDP*XX.2***-PRxx-EN-P

10 External Battery Pack

10.1 Brief Description

Fig. 10-1: External battery pack

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

10.2 Technical Data

Nominal voltage	+12 V
Nominal current	10 A
Rated capacity	2.5 Ah
Internal resistance of the completely charged battery module	30 mOhm
Nominal short-circuit current of the charged battery module	400 A
Overpressure safety valves	3 bar
Atmospheric pressure range	vacuum to 8 bar
Fusing	FKS flat fuse, 20A/32V (MN 1070917667)
Dimensions (L x W x H)	148 mm x 50 mm x 177 mm

Fig. 10-2: Technical Data

DANGER

Danger of fire or explosion if the incorrect battery type is used!

- Replace the battery only using a type permitted by Bosch Rexroth.
- Keep the battery pack away from children.

DANGER

Injury due to improper handling of the battery!

The battery in this device can cause fire or corrosion if it is handled improperly.

- Do not charge the battery externally,open it, heat it above 80° C or burn it.

10.3 Ambient Conditions

	During operation[1]	Transport[2, 3]	Storage[3]
Max. ambient temperature	+5° C to +45° C	-20° C to +60° C	-20° C to +60° C
Max. temperature gradient	Temporal change in temperature: up to 3 K per minute		
Humidity	Min. rel. humidity: 5 % Max. rel. humidity: 85 % Min. abs. humidity: 0.04 oz/m³ Max. abs. humidity: 25 g/m³ Condensation not permitted		
	= climatic category 3K3 according to EN 60721-3-3	= climatic category 3K3 according to EN 60721-3-2	= climatic category 3K3 according to EN 60721-3-1
Atmospheric pressure	up to 2,187.23 yd above sea level acc. to DIN 61131-2	up to 3000 m above sea level acc. to DIN 61131-2	
Mechanical strength	Max. vibration: Frequency range: 10 - 150 Hz Deflection: 0.075 mm at 10 - 57 Hz Acceleration: 1 g at 57 - 150 Hz acc. to EN 60068-2-6	Max. shock: 15 g 11 ms acc. to EN 60068-2-27, no interference with functioning	
Degree of soiling	2		

Fig.10-3: Ambient conditions

[1] The lifetime of batteries depends on the number of charging cycles and the ambient temperature in which the battery is used. The ambient temperature is defined here as the temperature in the location of the battery module, e.g. the interior temperature of the switch cabinet.

The following table can be used as a guide:

Ambient temperature	Maintenance interval
+25° C	10 years
+35° C	5 years
+45° C	2.5 years

[2] The battery is established to be a non-leaking, lead-containing wet-cell battery filled with acid that can be transported on land, sea and in the air as non-hazardous freight.

[3] The recommended maximum storage time until the next charge is 24 months at 25° C or 12.0 volts, depending which occurs first. If the ambient temperature exceeds +25° C, the stock should be checked at an interval of 6 months or more often.

10.4 Execution

The battery pack is available under the following type code:

Type	Comment
SUP-E01-BTV16/40	Battery pack

Fig.10-4: Battery pack order type

10.5 Accessory

10.5.1 Connection Cable

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, 1.09 yd long
IKL0264/003,0	Connection cable, 3.0 m long

Fig.10-5: Order types of connection cables

10.6 Documentation

The project instructions DOK-SUPPL*-VPP*XX.1***-PRxx-EN-P provide a detailed description of how to use the battery pack.

11 UPS Uninterrupted Power Supply

11.1 Brief Description

Fig.11-1: Uninterrupted power supply

The UPS uninterruptible power system is able to override brief power dips. In case of longer power interruptions, it initiates and facilitates proper powering down of the operating system. For this reason, we recommend always installing 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 USB interface.

The standard industrial PC connected to the UPS may only be activated and deactivated via switching the 230 V supply. If the standard industrial PC is shut down via the operating system, the UPS must be switched off manually (at on/off switch of UPS)!

11.2 Execution

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

Type	Comment
VAU01.1S-230-230-300-NN	UPS for 230 V AC

Fig.11-2: UPS order type

11.3 Accessory

11.3.1 Holder

To mount the UPS, a holder is available as an accessory so that the device can be connected on a mounting plate of the switch cabinet.

Type	Comment
SUP-M02-VAU01.1S-230	UPS holder

Fig.11-3: Order designation, holder

11.4 Settings Operating System

11.4.1 General

To assure proper UPS functionality the following settings have to be checked or set in the power management of the operating system.

11.4.2 Setting "Idle state"

Path: Start - Settings - Control panel - Energy options - Tab "Idle state"

UPS Uninterrupted Power Supply

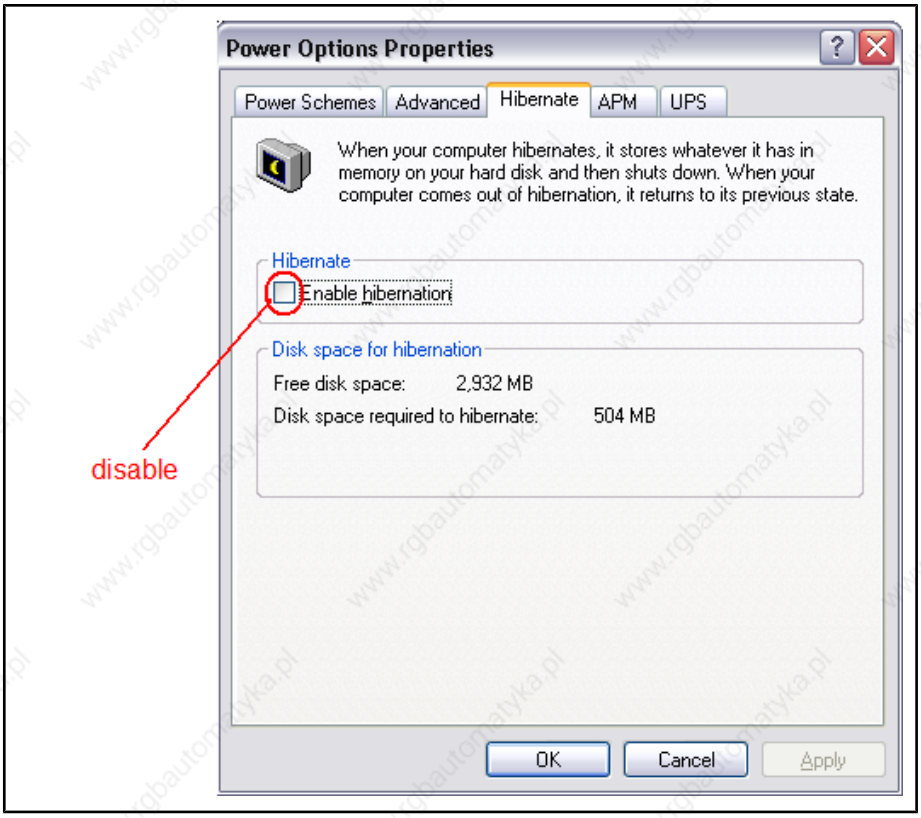

Fig.11-4: Setting "Idle state"

11.4.3 Setting APM

Path: Start - Settings - Control panel - Energy options - Tab "APM"

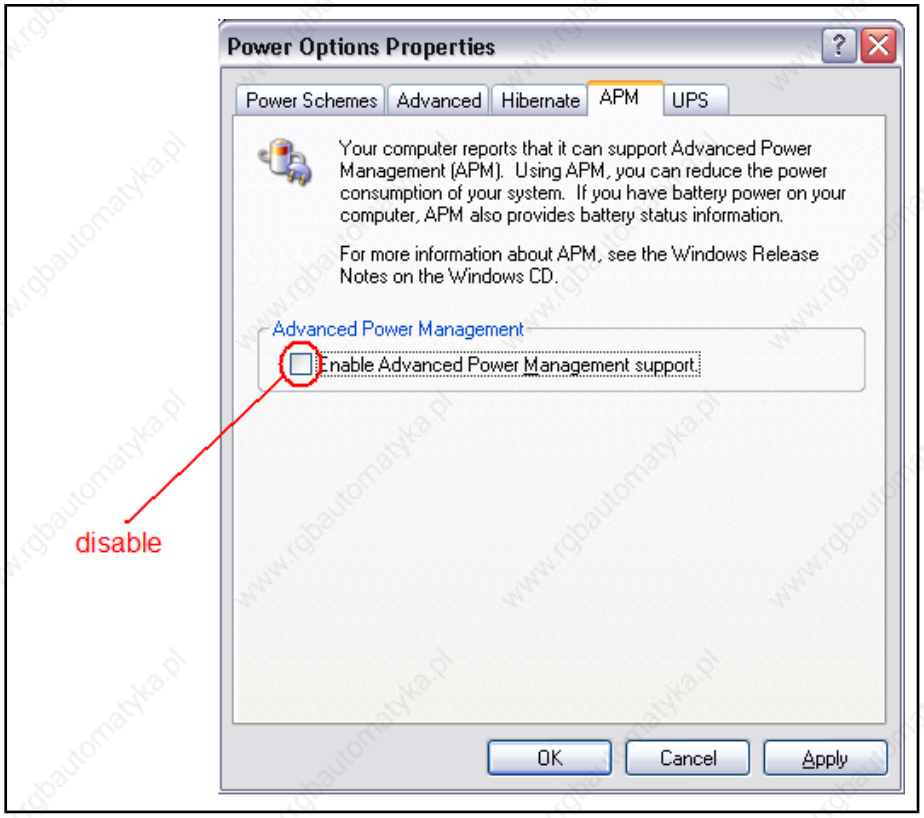

Fig. 11-5: Setting "APM"

11.5 Documentation

The UPS is supplied with an instruction leaflet in which the installation of USV software and the parameter settings are described. In the instruction leaflet, the modifications of APM and idle state settings are documented within Windows XP.

12 VAM Machine Control Panel

12.1 Brief Description

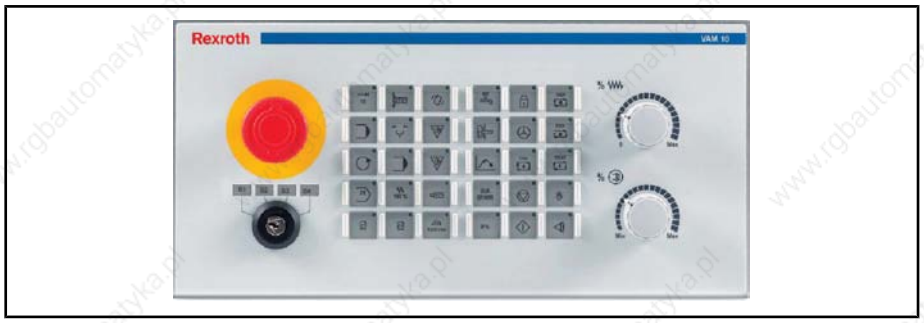

Fig. 12-1: VAM 10 machine control panel

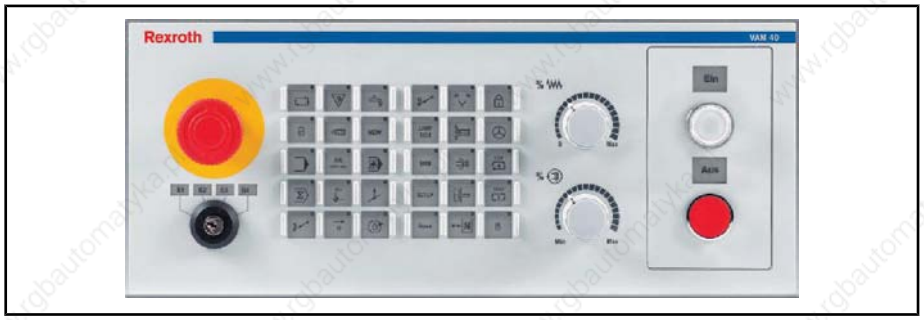

Fig. 12-2: VAM 40 machine control panel

Fig. 12-3: VAM 11 machine control panel

Fig. 12-4: VAM 41 machine control panel

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, emergency stop pushbuttons, key switches and machine buttons. Their functions and design are optimally attuned to control panels VSP, VDP and VPP. On their rear, the panels are provided with a connector for 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.

12.2 Types

VAM 10/40 machine control panels are used primarily in 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.12-5: VAM 10/40 types

VAM 11/41 machine control panels are used primarily in automated production. The following versions are available:

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

Fig.12-6: VAM 11/41 types

12.3 Accessory

12.3.1 Connection Cables (PROFIBUS Interface)

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

Type	Comment
IKB0033/000,0	Connection between IndraControl P40 (or P60) 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.12-7: PROFIBUS connection cables

12.4 Documentation

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

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

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

13 VAK PC Keyboards

13.1 General

Slide-out or built-in keyboards with touch panels, depending on requirements, are available for operation of the industrial PCs.

13.2 Slide-out Keyboards

Fig.13-1: VAK 10.1 slide-out keyboard

Fig.13-2: VAK 40.1 slide-out keyboard

Slide-out keyboards VAK 10.1 and VAK 40.1 are AT-compatible PS/2 keyboards with 86 keys and an integrated pointing device. The two keyboards differ only in the widths of their front panels. Their functions and design are optimally attuned to control panels VSP, VDP and the VPP series. The integrated mouse, with its mouse buttons, permits easy navigation within the graphic user interfaces. The drawer is provided with slide rails and a ball-type snap lock.

13.3 Built-in Keyboards

Fig.13-3: VAK 11.2 built-in keyboard

VAK PC Keyboards

Fig.13-4: VAK 41.2 built-in keyboard

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 widths of their front panels. Their functions and design are optimally attuned to control panels VSP, VDP and VPP and are characterized by an especially low installation depth.

13.4 Types

The following types of keyboards for industrial PCs are available:

Design	Type	Remarks
Slide-out keyboard	VAK10.1E-EN-P-MPNN	Suitable for VSP 16, VDP 16, VPP 16
	VAK40.1E-EN-P-MPNN	Suitable for VSP 40, VDP 40, VPP 40
	VAK40.1E-DE-P-MPNN	Suitable for VSP 40, VDP 40, VPP 40
Built-in keyboard (with touch panel)	VAK11.2F-EN-P-NNNN	Suitable for VSP 16, VDP 16, VPP 16
	VAK41.2F-EN-P-NNNN	Suitable for VSP 40, VDP 40, VPP 40

Fig.13-5: VAK 10/11/40/41 models

13.5 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, providing a detailed description of VAK 10/40 slide-out keyboards, is available:

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

14 RECO Inline Modules

14.1 Brief Description

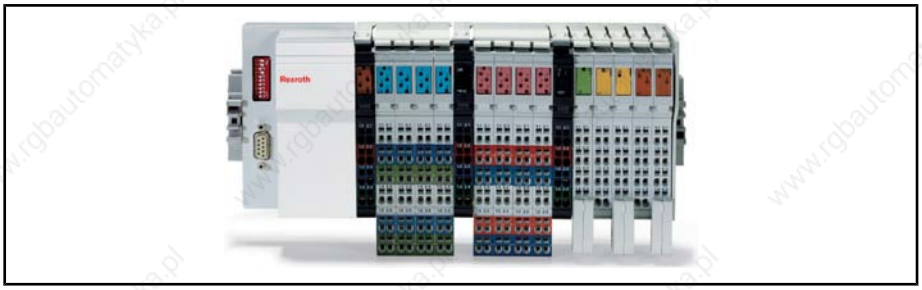

Fig. 14-1: RECO Inline system

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.

14.2 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
- Accessory

14.3 Documentation

The following documentation provides 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)

15 VCP Mini Control Panel

15.1 Brief Description

VCP mini control panels are control and visualization terminals to operate and monitor machines. The devices can be used for different purposes because of the compact design. The communication to the higher-level control is executed via a PROFIBUS interface.

Fig. 15-1: VCP 02 mini control panel

Fig. 15-2: VCP 05 mini control panel

Fig. 15-3: VCP 08 mini control panel

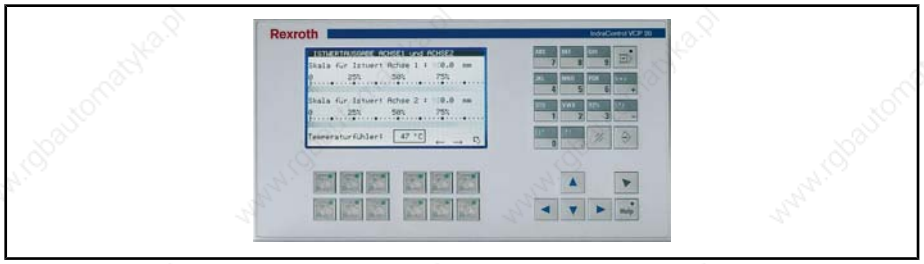

Fig. 15-4: VCP 20 mini control panel

VCP Mini Control Panel

Fig. 15-5: VCP 25 mini control panel

15.2 Technical Data

	VCP 02	VCP 05	VCP 08	VCP 20	VCP 25
Display	Text terminal with 4 x 20 characters		Graphics terminal with 4 x 20 characters	Graphics terminal with 16 x 40 / 8 x 20 characters	Touch terminal, 5.7"
Front plate (H x W)	100 x 5.83 in	168 x 4.72 in	159 x 8.23 in	160 x 11.81 in	180 x 234 mm
Keys	4 function and 7 system buttons	8 function and 22 system buttons	14 function and 22 system buttons	12 function and 22 system buttons	Touch
Interface	PROFIBUS-DP				
Processor	Z84; 10 MHz				32-bit RISC CPU; 74 MHz
Application memory	256 kB flash			256 / 768 kB flash	3 MB flash
RAM memory	128 kB static CMOS-RAM				512 kB static CMOS-RAM
Power supply	24 V DC; 0.3 A			24 V DC; 0.7 A	24 V DC; 0.4 A

Fig. 15-6: Technical data, VCP mini control panel

15.3 Types

The following types of VCP mini control panels are available:

Type	Comment
VCP02.1BRN-PB-NN-PW	
VCP05.1BSN-PB-NN-PW	
VCP08.1BTN-PB-NN-PW	
VCP20.1BUN-256PB-NN-PW	256 kB RAM
VCP20.1BUN-768PB-NN-PW	768 kB RAM
VCP25.1BVN-003PB-NN-PW	

Fig. 15-7: VCP models

15.4 Accessory

15.4.1 Connection Cables (PROFIBUS Interface)

The VCP mini control panels exchange data with control module IndraControl P40 or P60 via PROFIBUS-DP. The following cable assemblies are available:

Type	Comment
IKB0034/000,0	Connection between IndraControl P40/P60 / VAM and VCP; cables ready-made at one end; variable length
IKB0049/000,0	Connection between VCP and Rexroth Fieldline modules; ready-made at one end; M12 socket; variable length

Fig. 15-8: PROFIBUS connection cables

15.5 Documentation

The following documentation provides a detailed description of VCP mini control panels:

- DOK-SUPPL*-VCP02******-PRxx-EN-P
- DOK-SUPPL*-VCP05******-PRxx-EN-P
- DOK-SUPPL*-VCP08******-PRxx-EN-P
- DOK-SUPPL*-VCP20******-PRxx-EN-P
- DOK-SUPPL*-VCP25******-PRxx-EN-P

16 RECO Fieldline Modules

16.1 Brief Description

Fig. 16-1: 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.

16.2 Components

Three types of RECO Fieldline modules are available:

Type	Description
RF-FLS PB M12 DI 8 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. 16-2: Module selection

16.3 Documentation

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

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

17 Applications

17.1 VSP 16 Standard Industrial PC

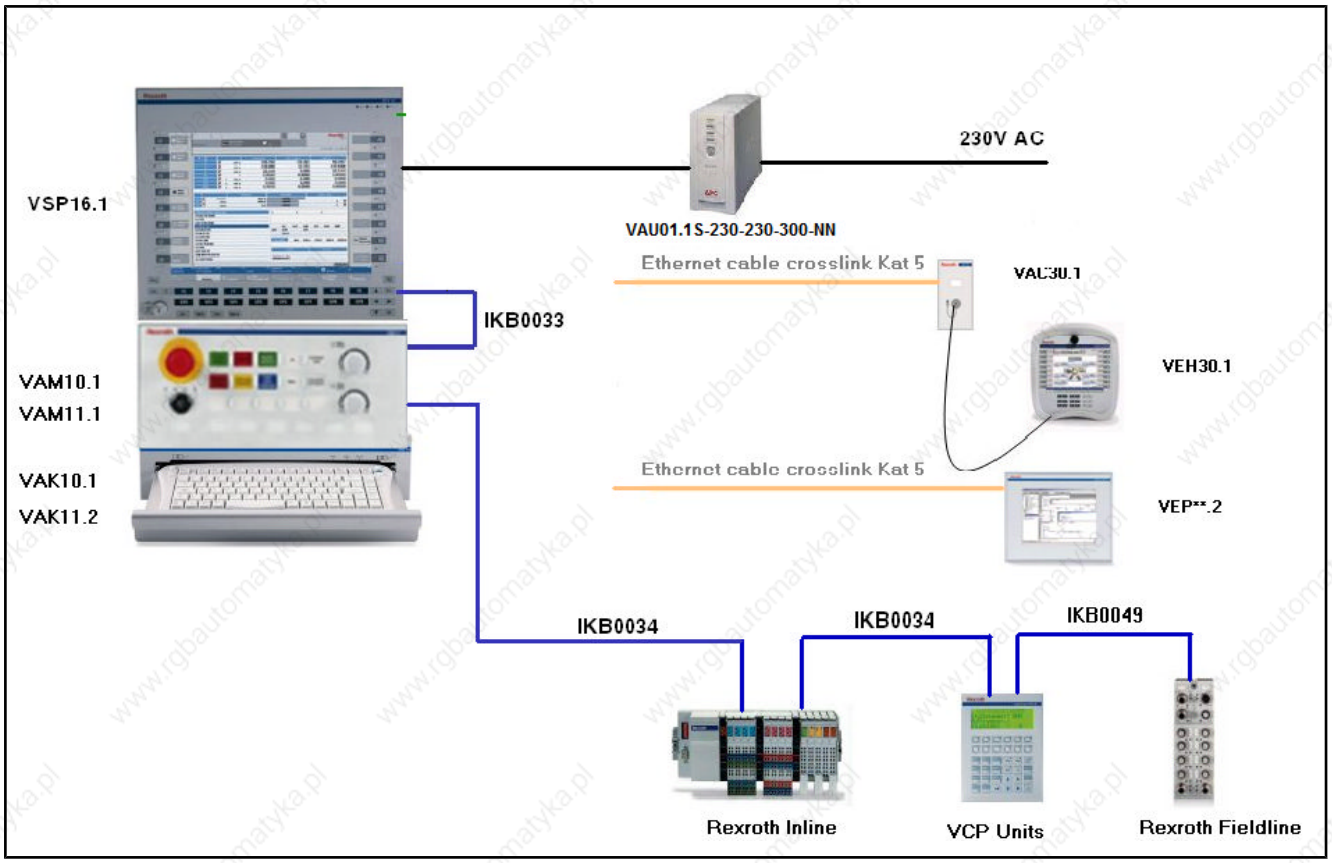

Fig.17-1: VSP 16

Applications

17.2 VSP 40 Standard Industrial PC

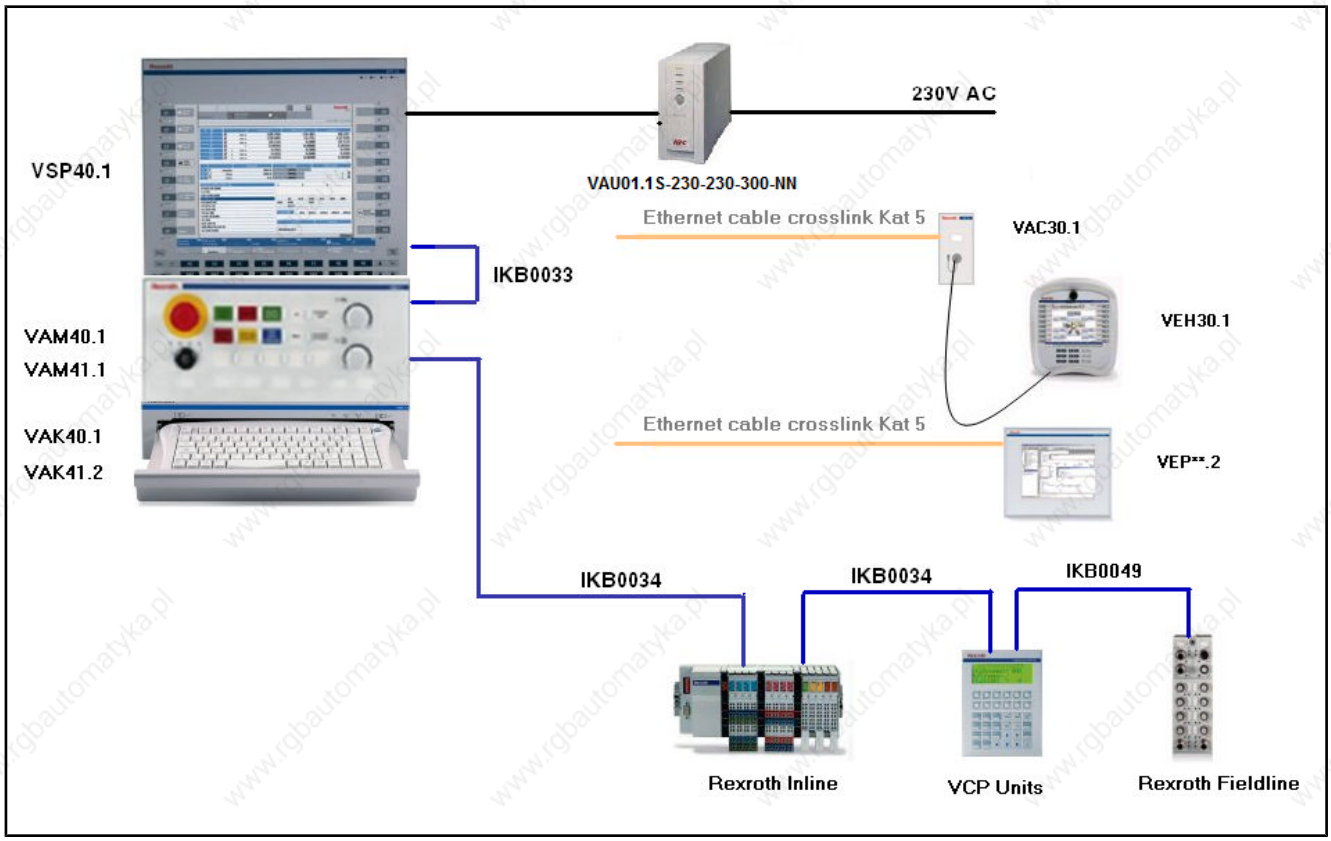

Fig.17-2: VSP 40

17.3 VSB 40 Standard Industrial PC with VDP 16 Operator Panel

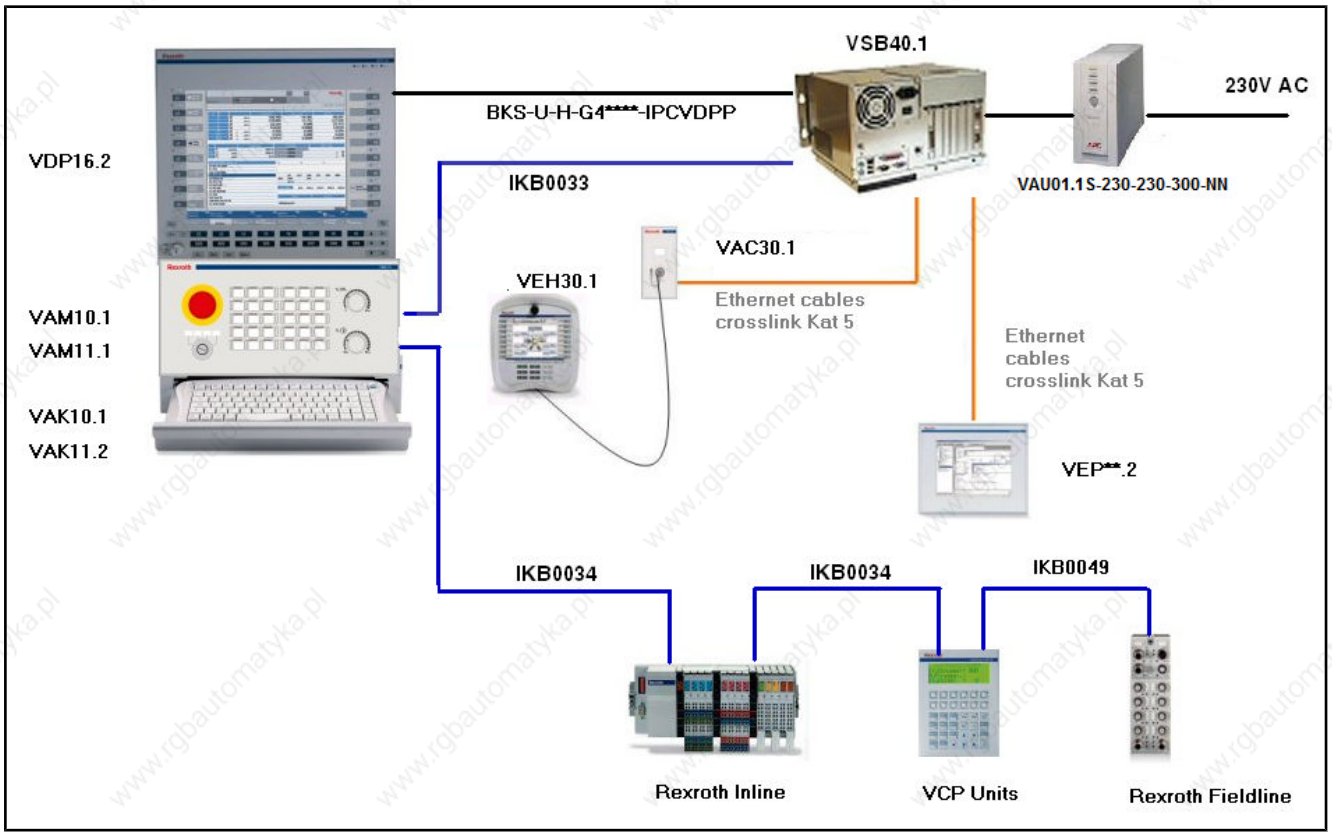

Fig.17-3: VSB 40 with VDP 16

Applications

17.4 VSB 40 Standard Industrial PC with VDP 40 Operator Panel

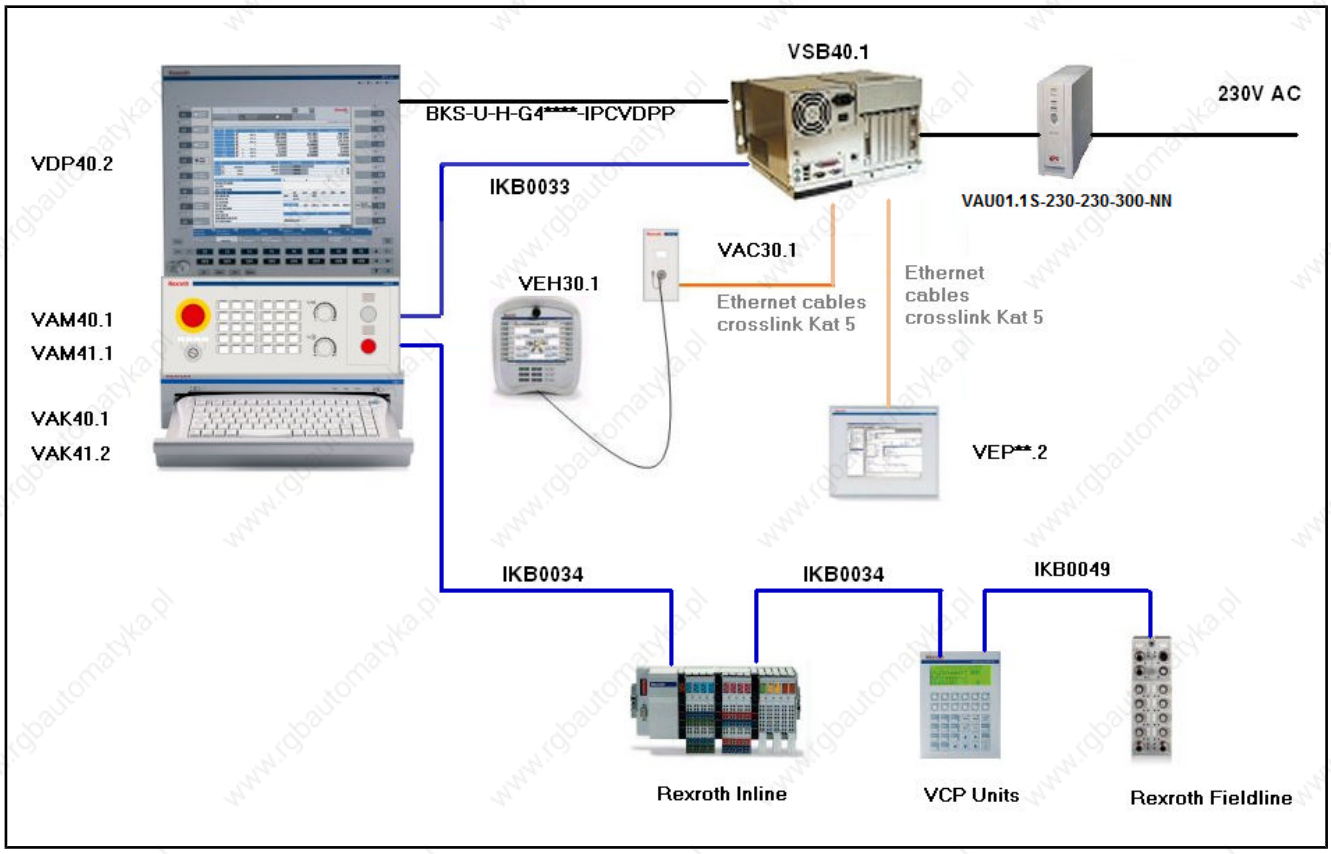

Fig.17-4: VSB 40 with VDP 40

17.5 VPP 16 High-end Industrial PC

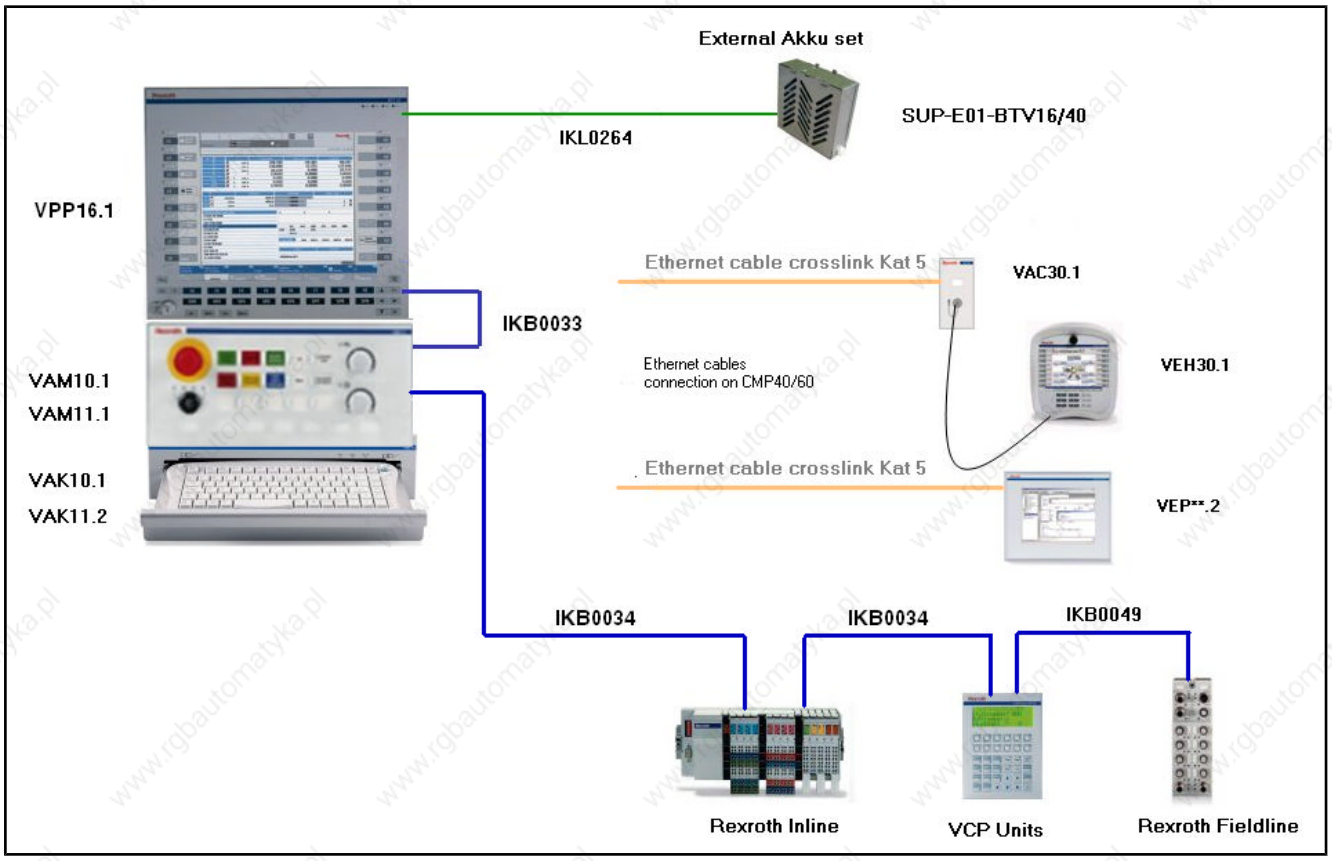

Fig.17-5: VPP 16

Applications

17.6 VPP 40 High-end Industrial PC

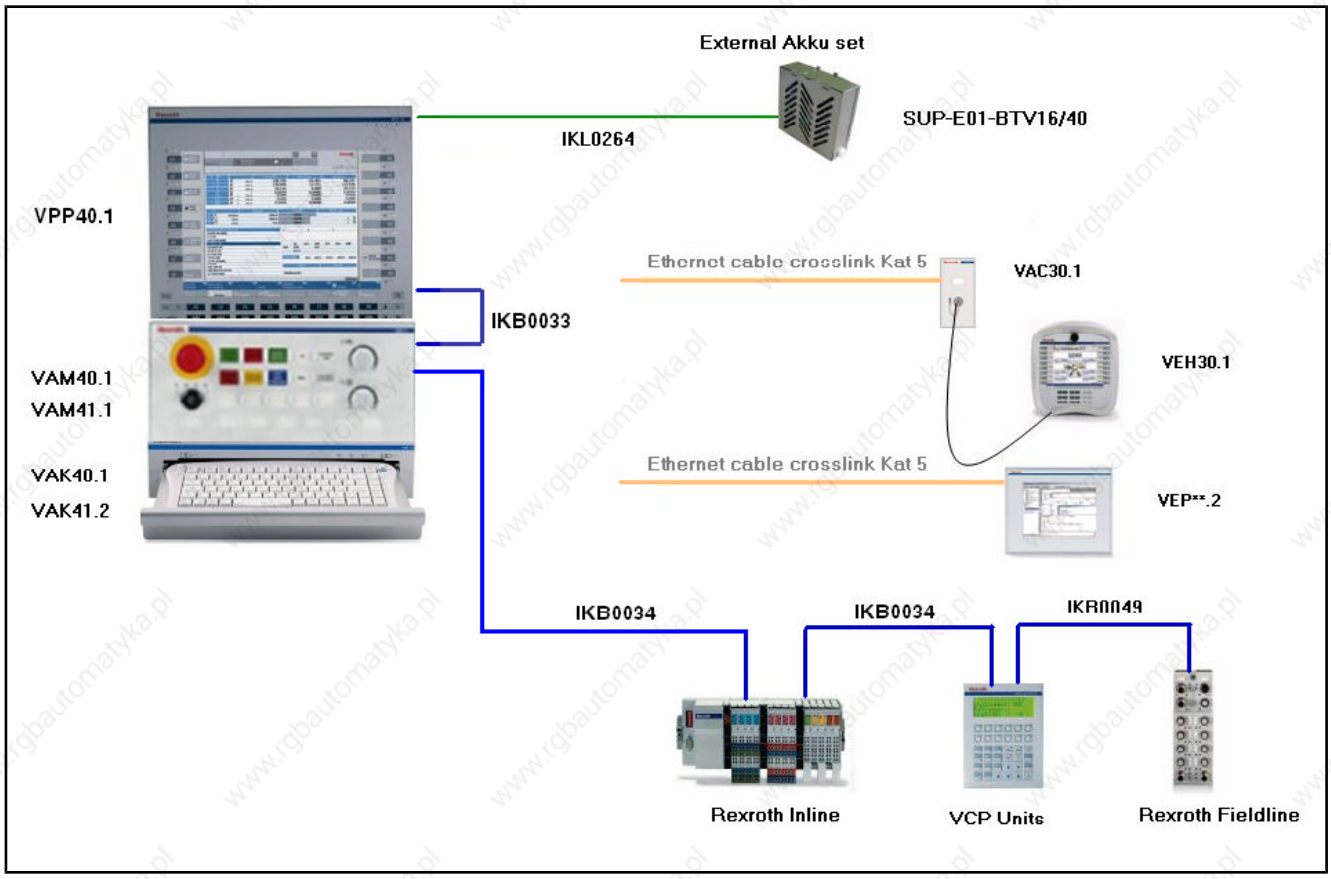

Fig. 17-6: VPP 40

17.7 VPB 40 High-end Industrial PC with VDP 16 Operator Panel

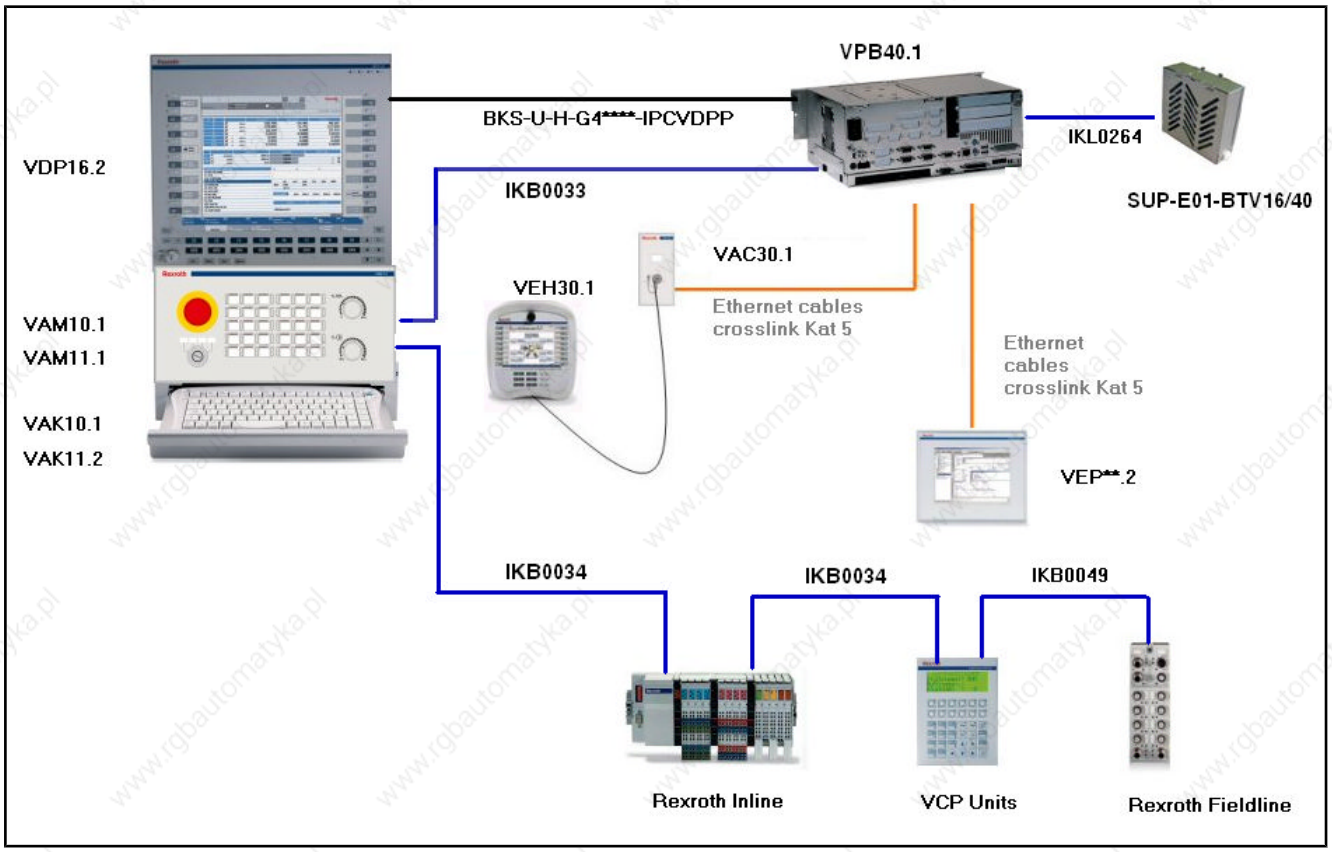

Fig.17-7: VPB 40 with VDP 16

Applications

17.8 VPB 40 High-end Industrial PC with VDP 40 Operator Panel

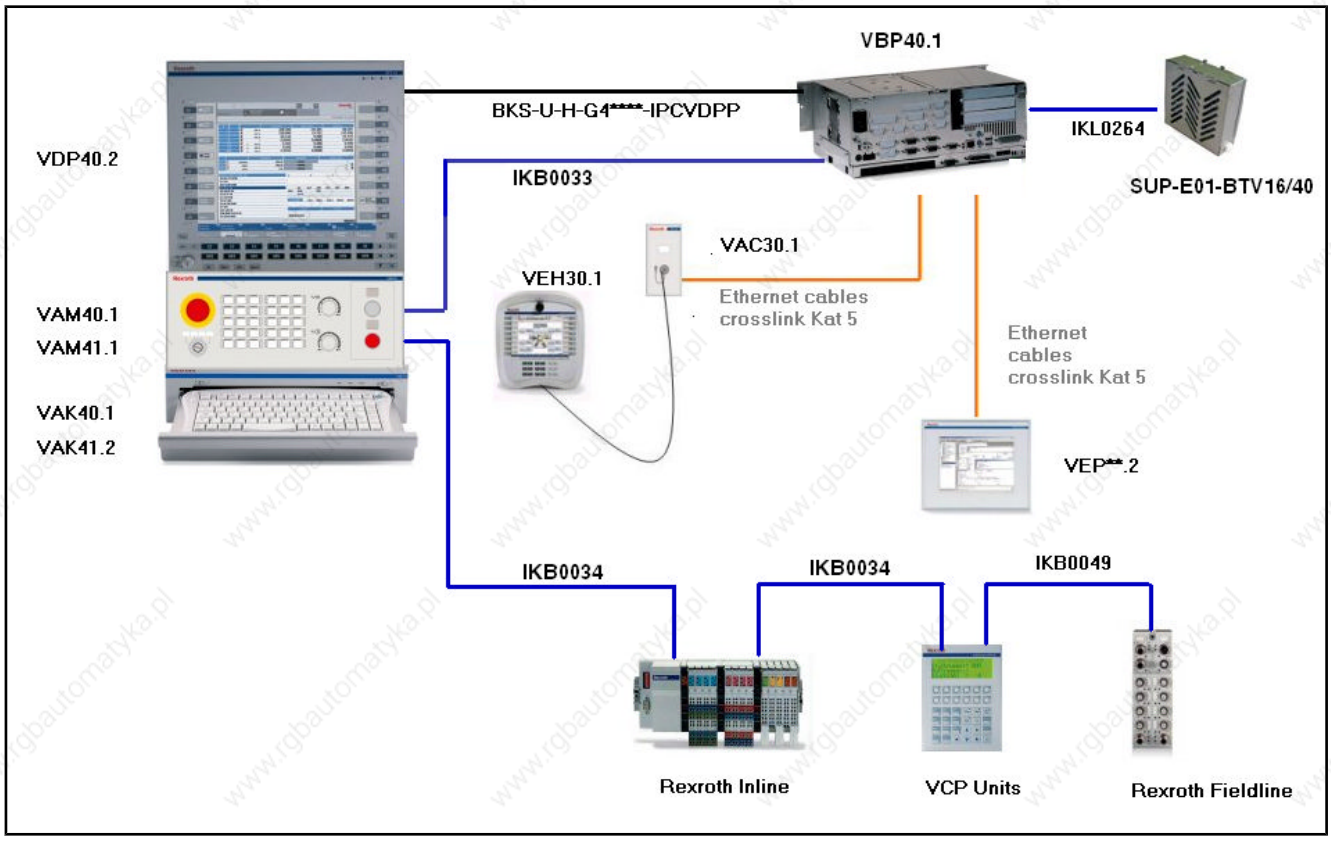

Fig.17-8: VPB 40 with VDP 40

18 Data Backup

18.1 Introduction

18.1.1 Overview

This chapter describes how to back up data on Rexroth PC operator terminals.

The data backup solution is used to back up and restore the operating system and the installed user programs (overall system) in the form of a partition or hard disk image, but not to back up user data "selectively". To back up user data, an additional mechanism is provided under IndraWorks.

18.1.2 Why Back Up Data?

EDP systems are not static systems. Data are continuously created, modified, moved or deleted. Components are added or removed, updates are carried out and settings are modified. There are many reasons for carrying out a data backup:

- Saving data in case of a hardware failure
- Restoring the system environment after incorrect operation
- Saving main system settings
- Archiving a system state before carrying out an update
- Providing an identical system environment

18.1.3 Definition of Hardware and Software Requirements

Rexroth industrial PC

The data backup is contained in all PC-based control and HMI systems such as MTX, MLC and IL as of Windows XP Service Pack 2.

The Acronis True Image software used for this purpose is installed and additionally archived on partition C:\ of the industrial PC. The license key for a new installation is visible on the device or is contained in the license documentation.

Backup media

- PC in the network (backup server)
- USB HDD
- Required memory space per unit to be backed up for a full disk backup is at least 3 GB.

Network

- 10/100 Mbit network
- TCP/IP network protocol
- DHCP server in the network

18.2 Introduction to the System

18.2.1 General

The Acronis True Image software is used as the tool to carry out the data backup. The software can be started by clicking a desktop icon in Windows, using the Recovery Manager by pressing F11 (see chapter 18.3 "Acronis Secure Zone and Startup Recovery Manager" on page 83) or as a boot-capable rescue medium (see chapter 18.9 "Creating Bootable Rescue Media" on page 90). The main program window illustrated below appears. Under Windows, only the functions "Disk Clone", "Add New Disk" and "Schedule Task" are provided.

Data Backup

Fig.18-1: Main Acronis True Image window

18.2.2 Acronis True Image

Acronis True Image is a tool that provides backup functions for hard disks or partitions. It creates an exact image of the hard disk or single partitions for a full backup and allows the restoration of all the contents, including the operating systems, all programs as well as personal data and settings. In case of software or hardware problems, it restores hard disks and partitions, even if the conventional data backup software or the operating system of the computer does not work.

Images can be saved on the hard disk, writable CD media and network resources. Wizards designed in Windows XP style can be intuitively operated, explaining step-by-step the necessary actions.

Image files can be incrementally extended. During the restoration of hard disks or partitions, different backup states can be selected.

18.2.3 Archive Files

Archive files have the extension **.tib**. These files contain the copies of the partitions or hard disks. They contain the data of the partitions or hard disk and information about restoring. An archive file can consist of images of several partitions or hard disks.

The saved data can be compressed. The image archive files can be automatically divided into several parts or split up according to a template. Division of the archive file is usually required if it is to be saved on removable media.

☞ Archiving images directly to removable media such as CDs is not recommended because the flow control of the data is missing due to direct writing to CD.

Furthermore, it is recommended that you divide the image archive during its creation into the corresponding size and to transmit the files after the backup process to the removable media.

Images of partitions contain all files and directories, independent of their properties (hidden, system, etc.), the Master Boot Record (MBR), the File Allocation Table (FAT) and the Root directory.

In a partition image, only the hard disk sectors containing user data are saved. The image archives can be protected by a password.

18.2.4 Incremental Backup

An image archive contains one or more images. Images are identical copies of partitions or entire hard disks; they are usually compressed. It is not only possible to record several partitions or hard disks in an archive file and to restore them separately - the data of an image archive can also be updated. To achieve this, a technology is used that is similar to incremental data backup. Thereby, only the data modified since the last image creation are saved. This process saves time and memory space. Please consider that a full disk backup must always have been carried out before an incremental backup can be made. Therefore, the software first checks whether an incremental backup is possible. If a full disk backup does not exist, it is always created first.

A further advantage of this procedure: the restoration of a partition from the image archive is possible with different states generated from different image creation times. Not only the image of the last backup, but also e.g. the image created at a certain time in the past can be restored.

18.3 Acronis Secure Zone and Startup Recovery Manager

18.3.1 General

Acronis Secure Zone

In the case that local partitions are damaged and e.g. cannot boot anymore, but the HDD is still OK, it is possible to restore images locally from the Acronis Secure Zone.

The Acronis Secure Zone is a zone on the hard disk that is inaccessible to ordinary Windows applications. Image archives for quick restoration of partitions or hard disks can be safely archived in this especially protected hard disk partition. Additionally, the Acronis Secure Zone includes parts of the Acronis Startup Recovery Manager, with which Acronis True Image can be activated in case of a malfunction before starting the operating system and with which a corrupted system partition can be restored. Thus, partitions can be restored even if the Windows operating system does not start anymore. Also, the rescue media to start Acronis True Image is not required, because the information to execute the program is integrated in the Acronis Startup Recovery Manager.

☞ The Acronis Secure Zone is created as a logical drive in the extended partition. The used file system is FAT32. It cannot be accessed via a drive letter. Furthermore, there is no direct access to the image archives stored there, except for Acronis True Image itself.

Acronis Startup Recovery Manager

The Acronis Startup Recovery Manager is a boot manager with a mini operating system, with which Acronis True Image can be started by pressing the F11 key, independent of the installed Windows system, before a possibly damaged operating system boots. The main task of the Acronis Startup Recovery Manager is to restore damaged operating system partitions. Naturally, other partitions can be restored, and system partitions that are not in operation can be saved. Acronis True Image, which is started from Acronis Startup Recovery Manager, offers all the functions that are also possible by starting rescue media.

18.3.2 Creating the Acronis Secure Zone

When a Rexroth industrial PC (as of Windows XP Service Pack 2) is delivered, the Acronis Secure Zone has already been created. However, if a saved hard disk image is restored after the hard disk is replaced, it may be necessary to recreate the Secure Zone.

The creation of the Acronis Secure Zone is started in the main program window via icon **Manage Acronis Secure Zone**. The wizard for managing the Acronis Secure Zone opens.

- **Start window**
- **Choose the desired action**

  In this case, choose **Create Acronis Secure Zone**.
- **Storage location for the Acronis Secure Zone**

  Select a partition where storage space can be used for the Acronis Secure Zone.

It is urgently recommended that you use this memory space in data partitions (usually D:\), and not in the operating system partition.

- **Size of the Acronis Secure Zone**

  Enter the size of the Acronis Secure Zone using the sliders or via direct entry. The proposed value can be applied; the size can be modified at any time in the future.

To have enough memory space for a basic backup and supplementary incremental backups, a size of 10 GB is recommended for the Acronis Secure Zone. This size also corresponds to the status upon delivery.

- **Acronis Startup Recovery Manager**

  Activate Acronis Startup Recovery Manager here.
- **Exit the wizard**

  After you exit the wizard, the Acronis Secure Zone is created.

18.3.3 Resizing the Acronis Secure Zone

If the size selected during the creation turns out to be unfavorable, the size of the Acronis Secure Zone can be subsequently modified.

The modification of the Acronis Secure Zone's size is started in the main program window by pressing icon **Manage Acronis Secure Zone**. The wizard for managing the Acronis Secure Zone opens.

- **Start window**
- **Choose the desired action**

  In this case, choose Manage Acronis Secure Zone.

- **Adapt the Acronis Secure Zone**

  You can increase or decrease the size of the Acronis Secure Zone here.

  – When the size is increased, unallocated memory space on the hard disk is used for the extension of the Acronis Secure Zone. If there is not enough unallocated memory space, you can select from which partition the required memory space is to be taken.

  – To decrease the memory space, you must select a partition to which the newly available memory is allocated. Otherwise the added memory is released randomly.

- **Size**

  Here, you can enter the new size of the Acronis Secure Zone via a slider or via direct input.

- **Exit the wizard**

  After you exit the wizard, the size is changed.

18.3.4 Reactivating Acronis Startup Recovery Manager

When Rexroth industrial PCs are delivered, Startup Recovery Manager is activated. However, if a saved hard disk image is restored after a hard disk is replaced, it might be necessary to reactivate Startup Recovery Manager.

You can activate Startup Recovery Manager by clicking the **Activate Acronis Startup Recovery Manager** icon in the main program window. The wizard for activating Startup Recovery Manager opens.

The complete activation consists of only two windows. Activation is started by pressing the "Proceed" button.

18.4 Creating Image Archives

☞ Before creating an image, you must ensure that there is enough space on the target data carrier to store the image archive.

☞ Data may be backed up only if the Windows operating system and the machine control are running and after explicit release of the respective control system (MTX, MLC, IL).

Generally, it is recommended that you back up Windows system partitions via Acronis Startup Recovery Manager when the Windows operating system is not running.

The main program window contains the **Create Image** icon. After double-clicking this icon, the wizard for image creation starts.

- **Start window**
- **Select the partition(s) to back up**

  Checkboxes can be used to select the partition(s) to be backed up.

☞ During the selection of the partition(s) to be backed up, the Acronis Secure Zone is also displayed. If this partition or the complete hard disk 1 that includes the Acronis Secure Zone is selected for backup, a note appears indicating that an image of this zone is not recommended because it contains only backed-up images.

If you do not select the Acronis Secure Zone for a backup, the images, including the incremental images archived in this zone, will be lost.

- **Selecting storage locations and file names**

  Select the storage location and file name for the image archive. Two buttons are available in this window.

  – Create a new folder.

  – File name. Creates a file name for the image archive.

- **Full/incremental image archive**

  Select whether a full image archive is to be created or if an existing image archive is to be incrementally extended.

- **Splitting the image archive file**

  The splitting of the image archive file can be set here. The setting "Automatic" is recommended. To archive the split image archive on removable media, enter the appropriate file size here.

- **Compression level**

  The higher the compression level, the smaller the memory space requirement for the image archive file. However, the required time to create and restore the image archive file is higher. The "Normal" compression level is recommended.

- **Protecting the image archive**

  The image archive can be protected against unauthorized viewing/restoring.

- **Comment**

  You can enter a meaningful comment about the image archive file here. This comment will simplify the identification of the image archive file at a later time.

- **Finish**

  Finish the wizard for image creation and start image creation.

To finish the creation of an image archive file, it is strongly recommended that you check it by using function "Check Image" in the main window.

18.5 Checking Image Archives

Image archives are used to back up or archive data. Thus, data integrity is the most important property of an image archive. Therefore, take time to check image archives after their creation.

For this purpose, you will find the command **Check Image** in the main program window of Acronis True Image under Tools.

The only step after the start window is to select the image archive file to be checked. Acronis True Image automatically highlights the file containing the last backup.

After clicking **Proceed**, Acronis True Image starts to check the archive.

At the end of the check, a message appears indicating the success of the action.

If Acronis True Image finds an error, image creation should be repeated. Thereby, it is recommended that you select another data carrier for the image location.

Generally, as described beforehand, it is recommended that you check the image archive directly after its creation.

18.6 Updating and Extending Image Archives

It is not necessary to execute a full backup after each modification of the original partitions. For this, incremental image creation can be executed. Furthermore, it can be used to extend an image archive in such a manner that a further partition can be additionally imaged in it.

During incremental image creation, only the sectors of the partitions or hard disk are saved that have been changed since the last complete image creation. This information is saved as part of the image archive in a new file in the directory of the image archive. The name of the new file is the file name of the image archive in conjunction with a running number. Incremental image creation is reasonable only on hard disks or network drives because a full disk backup that is executed when using removable media is no longer available when writing the incremental file.

The incremental backup is started in the main program window with the **Create Image** icon. The wizard for creating the image opens.

- **Start window**
- **Select the partition(s) to back up**

  Checkboxes can be used to select the partition(s) to be backed up.
- **Selecting storage locations and file names**

  Select the image archive file that is to be updated/extended.
- **Full/incremental image archive**

  Select an existing image archive in order to extend it incrementally. To do this, you must select **Add Incremental Image to Archive** as the mode for image creation. If the image archive selected under 3 is password-protected, it must be entered here.

WARNING

If the option "Overwrite image archive with full image" is activated here, the image archive will be completely recreated. Any existing former incremental backups will be lost!

The further steps correspond to the procedure described under "Create image archives".

If you add a comment during an incremental backup, it overwrites the comment to the image archive existing beforehand.

If you want to describe the single incremental backup states in the comment, you must enter the comment of the preceding backup once more and extend this comment with information on the current backup.

18.7 Restoring Image Archives

Restoring images may be required for various reasons. The most frequent causes are hard disk defects, a virus, restoration after a program test or a defect of the operating system, e.g. due to work with the registration editor.

The restoration of one or more partitions from an image archive is started in the main program window via the **Restore Image** icon. The wizard for restoring the image starts.

☞ It is recommended that you restore image archives only with the Startup Recovery Manager or rescue media.

Windows system partitions can be restored only with the Startup Recovery Manager or rescue media.

- **Start window**
- **Selecting the image archive**

  Select the image archive that is to be restored.

  If the image archive is password-protected, it must be entered here.

  If the image archive is an incrementally extended image, the date of the desired status must be selected here. The restored data correspond to the status of the selected creation time.
- **Checking the archive before restoring**

  The image archive can be checked again before restoring here. Since the recommended procedure is to check the backup after creating the image archive, the default setting is "No, I don't want to verify".
- **Restoring the partition or hard disk**

  The partitions/hard disks backed up in the image archive are shown here. The hard disk or partition to be restored must be selected here.

☞ It is recommended that you select only one partition. If you continue using the wizard, it is possible to select further partitions separately for restoration. Thus, the size of the individual partitions can be adapted to a new hard disk if it is switched.

If you select the complete hard disk 1 for restoration, the partition sizes are automatically adapted as follows:

- **Target hard disk is smaller than the hard disk from which the image was created:**

  All partitions, including the Acronis Secure Zone, are automatically compressed. Manual adaptation of the partition sizes is not possible.
- **Target hard disk is identical to the hard disk from which the image was created:**

  All partitions, including the Acronis Secure Zone, retain their original size. Manual adaptation of the partition sizes is not possible.
- **Target hard disk is larger than the hard disk from which the image was created:**

  All partitions, including the Acronis Secure Zone, retain their original size. Manual adaptation of the partition sizes is not possible.

- **Storage location for the restored partition**

  Select the location where the partition is to be restored.

☞ The target zone is to be carefully selected so that the wrong hard disk zone is not overwritten.

- If you select a target hard disk or a target partition, the selected target hard disk or partition is overwritten.
- If a non-partitioned sector of the hard disk is specified as the target sector, a new partition is created.

Backup while the Windows operating system is running

If an existing partition is selected as the restoration target, it is locked after confirming with "Next". If files of this partition are opened, Acronis True Image opens the selection box "Confirmation".

- **Click more...** opens a list of the opened files.
- **Dismount** automatically closes all opened files on this drive.
- **Retry** is selected after all opened files are closed manually.
- **Reboot**. Acronis True Image shuts the computer down and restarts it. Before the operating system is started, Acronis True Image activates itself via the Recovery Manager; it is possible to restore the image without the need for the files to be opened. This option is necessary if, for example, an operating system partition or a partition with cyclic data access must be restored.
- **Choose another disk**. Choose another disk.
- **Selecting the partition type**

  The original partition type of the image is selected by default. An exception is the case if the image is to be created on an unallocated hard disk memory. Then, a logic drive is preset in the extended partition. In the description box, the following display appears: Note: The original partition type is set if the original partition type was selected.

  – **Operating system partition:** Active
  – **Data partition:** Logical
  – **Secure Zone:** Logical
- **File system**

  In the case of partition images in a FAT16 or a FAT32 file system, a step follows with which the file system of the restored partition can be modified. For all other file systems, the original file system is preset. Always select FAT32 for the Acronis Secure Zone.
- **Partition size**

  Input of the desired size in which the partition is to be restored. The partition size is set either by moving the slider bar or by manually inputting the desired values.
- **Drive letter**

  In this step, the drive letter for the restored partition can be selected.

☞ The proposed drive letter should only be changed if the corresponding partition is a data partition. Otherwise, only the proposed original drive letter should be used.

- **File system check**

  Select whether the file system should be checked after its restoration. It is recommended that this check be executed.
- **Restoring additional partitions**

As described beforehand, it is possible to select further partitions for restoration.

- **Exit the wizard**

  Exit the wizard and start the restore procedure.

☞ After the restoration of all partitions on a new hard disk, it is necessary to reactivate Startup Recovery Manager (see chapter 18.3.4 "Reactivating Acronis Startup Recovery Manager" on page 85).

18.8 Searching Image Archives

18.8.1 General

It is possible to allocate drive letters to partition images. It is then possible to search the archive with Windows Explorer and to open and copy files from the archive systematically.

18.8.2 Connecting an Image Archive as a Drive

Searching of an image file is started in the main program window with the **Explore Image** icon. The wizard for searching images starts.

- **Start window**
- **Selecting an image archive file**

  Select the image archive file that is to be searched.

- **Assigning a drive letter**

  Select a drive letter under which the partition contained in the image file is to be assigned.

- **Exit the wizard**

  Exit the wizard and assign the drive letter.

☞ If an image archive consists of several partial archives, they must all be available to assign the contained images.

Therefore, it is not possible to integrate images distributed on CDs. If this should be necessary, all partial archives must be copied to a common directory on the hard disk.

18.8.3 Cancelling the Drive Connection

After searching the image, Acronis True Image must be used to cancel the assignment of the temporary drive letters.

With a double-click on the **Unplug Image** icon, the wizard starts to disconnect images. It appears with a start screen.

This wizard offers only one step to make settings: in the step **Logical drive unplugging**, the drive to be disconnected is selected by clicking the corresponding check box. After clicking **Proceed** in the following step, the assignment of the drive letter is canceled: a dialog box will then inform you about the success of the action.

18.9 Creating Bootable Rescue Media

In the case of irreparable hard disks or after the installation of a new hard disk, the computer can be started with Acronis True Image via bootable rescue media on an external data carrier.

The bootable rescue media can be created on the following data carriers:

- **CD**. An installed or a USB CD-R drive is required.
- **Disk set** consisting of seven 1.44 MB 3.5" disks. An installed or a USB FDD drive is required.

The creation of the bootable rescue media is started in the main program window via the **Create Bootable Rescue Media** icon. The wizard for creating bootable rescue media opens.

- **Start window**
- **Message window**. If there is currently no device connected to the drive or if no CD/R drive is connected, a message window appears.
- **Rescue media content**.
  - Full version (recommended): this contains a large number of drivers.
  - Safe version (not recommended): should be used only if problems occur when using the "Full version".
- **Removable disk drive selection**. The existing removable disk drives are displayed in a list for selection.
- **Insert data carrier**. A request to insert a corresponding data carrier in the selected drive appears. Creation is started by pressing the "Proceed" button.
- **Exit the wizard**. The successful creation of the bootable rescue media is indicated here. The wizard is exited by pressing the "OK" button.

18.10 Network Support

18.10.1 Windows Software

No settings are necessary for Windows software. The existing Windows network is used.

18.10.2 Bootable Rescue Media or Recovery Manager

Network with DHCP Server

In networks with a DHCP server, it is not necessary to make settings, neither in the bootable rescue media nor after starting Acronis True Image via the Recovery Manager.

Network without DHCP server

In networks without a DHCP server, it is not necessary to enter data manually after starting the bootable rescue media or after starting Acronis True Image via the Recovery Manager.

The network adapter (eth0) can be configured via Tools – Options. At least the IP address, the subnet mask and the default gateway must be entered.

Network adapters	Display of the network adapter
Hardware address	Display of the MAC address
DHCP	Display if used / not used.
IP address	Display of the IP address
Subnet mask	Input of the subnet mask
DNS suffix	Optional
Default gateway	Display of the default gateway's IP address

Network adapters	Display of the network adapter
DNS server	Optional
WNS server	Optional

Fig.18-2: Manual network configuration of the rescue media

If the network settings are manually input, sometimes no network resources are indicated after double-clicking **Computers near me**. The UNC path name must then be entered in the file name box (e.g. \\server\Enable\ or \\<ip_address>\enable\). When accessing another computer in the network, the user name and the password are requested. To log in to a Windows domain, place the name of the domain followed by a backslash before the user name (e.g. domain\user).

18.11 Scheduling a Task

To automatically keep the backups as up-to-date as possible, you can create tasks (time-controlled backup jobs).

It is recommended that you specify that such tasks are executed at times when the control systems are not in productive operation.

Tasks can only be created in the main program window under Windows. The procedure is the same as for "Create image archives", extended by the time settings.

- **Start window**
- **Select partitions to image**
- **Select the storage location and file name**
- **Full/incremental image archive**
- **Enter the password**
- **Splitting the image archive file**
- **Compression level**
- **Comment**
- **Start time**

  Here, it is possible to assign a certain execution time to the task:

  – **Do not start automatically**

    Do not start the task automatically. If required, the task can be manually started via "Execute".

  – **Daily**

    Set the start time. Furthermore, you can select whether the task is to be executed daily, on weekdays or every X days.

  – **Weekly**

    Set the start time, the sequence (every X weeks) and the weekday (s) when the task is to be executed.

  – **Monthly**

    Set the start time and the day of the month on which the task is to be executed.

19 Service and Support

19.1 Helpdesk

Our service helpdesk at our headquarters in Lohr, Germany, will assist you with all kinds of inquiries.

Contact us:

- By phone through the Service Call Entry Center,
  Monday to Friday 7:00 am - 6:00 pm CET
  +49 (0) 9352 40 50 60
- By fax
  +49 (0) 9352 40 49 41
- By e-mail: service.svc@boschrexroth.de

19.2 Service Hotline

Out of helpdesk hours please contact our German service department directly:

+49 (0) 171 333 88 26

or

+49 (0) 172 660 04 06

Hotline numbers for other countries can be found in the addresses of each region (see below).

19.3 Internet

Additional notes regarding service, maintenance and training, as well as the current addresses of our sales and service offices can be found on

http://www.boschrexroth.com

Outwith Germany please contact our sales/service office in your area first.

19.4 Helpful Information

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

- Detailed description of the fault and the circumstances
- Information on the type plate of the affected products, especially type codes and serial numbers
- Your phone and fax numbers as well as your e-mail address so we can contact you in case of questions

Index

Notes

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