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

Rexroth Bosch Group

Rexroth IndraControl VAK 10.1/40.1 Drawer Keyboards

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1 System Presentation

1.1 Brief Description of the VAK 10.1 and the VAK 40.1

The drawer keyboards VAK 10.1 and VAK 40.1 are PC keyboards with 86 keys and an integrated mouse function. The two devices only differ in the front panel width.

Function and design are optimized for the IndraControl V series of Bosch Rexroth.

The integrated mouse with its mouse keys allows comfortable navigation on the graphical user interfaces.

The keyboard can be inserted as far in a drawer via guiding rails as the lock latches in.

1.2 Drawer Keyboard VAK 10.1

The drawer keyboard is used together with BTV 16, VPP 16, VSP 16 and VDP 16. The front panel is matched to the size of the drawer keyboard.

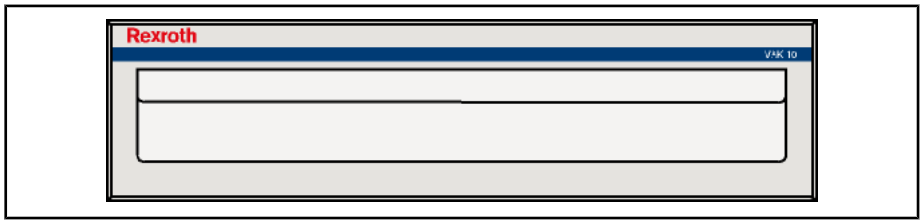


Fig.1-1: VAK 10.1 - Drawer Keyboard

1.3 Drawer Keyboard VAK 40.1

The drawer keyboard is used together with BTV 20/30, BTV 40, VSP 40, VPP 40 and VDP 40. The front panel is matched to the size of the drawer keyboard.

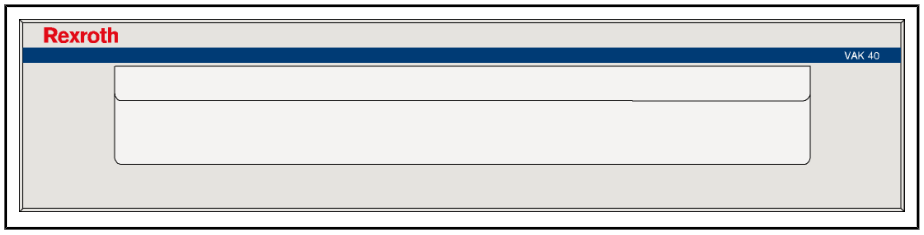


Fig.1-2: VAK 40.1 - Drawer Keyboard

2 Important Instructions on Use

2.1 Appropriate Use

2.1.1 Introduction

Rexroth products represent state-of-the-art developments and manufacturing. They are tested prior to delivery to ensure operational safety and reliability.

Therefore the products may only be used for the intended purpose. If they are not used as intended, situations causing personal injury as well as material damage can occur.

☞ Bosch Rexroth disclaims as manufacturer any warranty, liability or damages occurring due to inappropriate use of the products. Furthermore, Bosch Rexroth is not paying any compensation. The user is responsible for any risks resulting from inappropriate use of the products.

Before using Bosch Rexroth products, the following requirements must be met to ensure appropriate use of the products:

- Anyone handling one of the Rexroth products in any way has to read and understand the respective safety-related guidelines as well as the instructions on appropriate use.
- Hardware products have to remain in their original state, i.e. no modification regarding the design is allowed. Software products must not be decompiled and their source codes must not be modified.
- Damaged or faulty products must not be implemented or put into operation.
- It must be ensured that the products are installed as specified in the documentation.

2.1.2 Areas of Use and Application

The VAK 10.1 and the VAK 40.1 are drawer keyboards that are used together with the visualization units of Bosch Rexroth. These drawer keyboards are designed for use in the following cases:

- To operate graphical user interfaces
- To navigate within graphical user interfaces

☞ The drawer keyboards VAK 10.1 and VAK 40.1 may exclusively be used with the accessories and add-on components specified in this documentation. Components that are not mentioned explicitly must neither be mounted nor connected. The same applies for cables and wires.

An operation may only be carried out in the hardware component configurations and combinations specified and with the software and firmware specified in this documentation and in the corresponding functional description.

Typical areas of application of the VAK 10.1 and the VAK 40.1 are in conjunction of the Bosch Rexroth industrial PCs.

The drawer keyboards VAK 10.1 and VAK 40.1 may only be operated under the assembly conditions and installation conditions, in the specified position of

application and under the specified ambient conditions (temperature, degree of protection, humidity, EMC etc.) given in this documentation.

2.2 Inappropriate Use

The application of the drawer keyboards VAK 10.1 and VAK 40.1 that are not within the specified areas of application or under operating conditions deviating from the operating conditions and technical data specified in the documentation is considered as "inappropriate".

The application may not be used if

- it is exposed to operating conditions that do not fulfill the ambient conditions specified. (for example, operation under water, under extreme temperature fluctuations or extreme maximum temperatures is not allowed).
- Bosch Rexroth has not explicitly released the intended applications. Please also note the general statements in the general safety-related guidelines.

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 Technical Data

4.1 General Technical Data

☞ As the two device variants provide the same hardware except for the front panel, the following technical data apply for the VAK 10.1 as well as for the VAK 40.1:

Weight	Approx. 2.6 kg
Keypad	86 keys
Status displays	3 LEDs
Plug-in Connector	PS/2 connector with combined assignment of the keyboard and mouse signals or USB tpye A connector
Voltage supply	5 V ±5 %
Current consumption	30 mA
Cable Length	1.0 m
Front Panel Surface	Aluminium varnished
Color	RAL 7035 light gray
Degree of protection	IP 65 acc. to EN 60 529

Fig.4-1: General Technical Data

4.2 Ambient Conditons and Standards

4.2.1 Ambient conditions

Ambient conditions	In operation	Transport	Storage
Max. ambient temperature	+5 °C up to +45 °C	-20 °C up to +60 °C	-20 °C up to +60 °C
Max. temperature gradient	Temporal temperature changes up to 3 K per minute	Temporal temperature changes up to 3 K per minute	Temporal temperature changes up to 3 K per minute
Humidity	Min. relative humidity: 5% Max. relative humidity: 85% Min. absolute humidity: 1 g/m^3 Max. absolute humidity: 25 g/m^3 Condensation not allowed Corresponds to climatic class 3K3 acc. to EN 60721-3-3	Min. relative humidity: 5 % Max. relative humidity: 75 % Min. absolute humidity: 1 g/m^3 Max. absolute humidity: 25 g/m^3 Condensation not allowed Corresponds to climatic class 2K2 acc. to EN 60721-3-2	Min. relative humidity: 5 % Max. relative humidity: 85 % Min. absolute humidity: 1 g/m^3 Max. absolute humidity: 25 g/m^3 Condensation not allowed Corresponds to climatic class 1K2 acc. to EN 60721-3-1
Air pressure	Up to 3000 m above sea level according to EN 61131-2	Up to 3000 m above sea level according to EN 61131-2	Up to 3000 m above sea level according to EN 61131-2

Technical Data

Ambient conditions	In operation	Transport	Storage
Mechanical strength	Max. vibration: Frequency range: 10 up to 150 Hz Excursion: 0.075 mm for 10 to 57 Hz Acceleration: 1 g for 57 to 150 Hz According to EN 60068-2-6	Max. shock: 15 g 11 ms according to EN 60068-2-27 No breakdown of the function	Max. shock: 15 g 11 ms according to EN 60068-2-27 No breakdown of the function
Degree of pollution	2	2	2
Overvoltage category	2	-	-

Fig.4-2: Ambient Conditions

4.2.2 Used standards

Standard	Meaning
EN 60 204-1	Electrical equipment of machines
EN 60 61000-6-4	Generic standard, noise immunity (industrial environment)
EN 60 61000-6-2	Generic standard, emitted interference (industrial environment)
EN 61558-2-6	Transformer for 24 V power supply unit, protective separation
EN 60664-1	Overvoltage category II
EN 61 131-2	Requirements regarding the 24 V outputs
EN 61 131-2	Requirements on the 24 V power supply
EN 60950	Clearances and creepage distances office (environment) and power units
ISO 13850	Machine safety, EMERGENCY STOP devices
EN 60 529	Degrees of protection (incl. housings and installation compartments)
EN 60 068-2-6	Vibration test
EN 60068-2-27	Shock test
EN 60721-3-3	Classification of ambient conditions
EN 60721-3-2	Classification of ambient conditions
EN 60721-3-1	Classification of ambient conditions
DIN EN 61 131-2	Programmable logic controllers Equipment requirements and tests
UL 508	Industrial Control Equipment

Fig.4-3: Used Standards

4.3 CE Marking

4.3.1 Declaration of Conformity

CE

The electronic products described in the project planning manual comply with the requirements and goals of the following EC guideline and with the agreed European standards:

EMC guideline 2004/108/EC

The electronic products described in the project planning manual comply with the requirements on the operation within the industrial environment:

Standard	Title	Edition
DIN EN 61000-6-4 (VDE 0839-6-4)	Electromagnetic compatibility (EMC) Volume: 6-4: Generic standards - Immunity for industrial environments (IEC 61000-6-4:2006)	September 2007
DIN EN 61000-6-2 (VDE 0839-6-2)	Electromagnetic compatibility (EMC) Volume: 6-2: Generic standards - emitted interference for industrial environments (IEC 61000-6-2:2005)	March 2006

Fig.4-4: Electromagnetic compatibility (EMC) standards

4.3.2 Note for the Machine Manufacturer

The electronic products described in this project planning manual do not fall under the machines listed in the EC guidelines. Therefore, explanations are not required for the 89/392/EMC guideline and do not exist.

89/392/EMC, the EC guideline for machines, specifies the requirements on a machine. In this guideline, a machine is defined as a combination of the components or mechanisms combined with each other. The described products belong to the electrical equipment of a machine. Therefore, they are to be included in the declaration of conformity of the machine manufacturer.

The standard EN 60204-1 (safety of machinery, general requirements on the electrical equipment of the machines) can be used for the electrical equipment of the machines.

☞ The CE marking is only valid for the device in its delivery status (ex works). After modifying the device, e.g. after plugging additional extension cards, CE compliance must be checked.

4.4 UL/CSA Certified

c UL us LISTED

The devices of the IndraControl VAK10.1/VAK40.1 family are certificated according to

- **UL508** (Industrial Control Equipment) and
- **C22.2 no. 142-M1987** (CSA)

But there can be combination or extension stages with limited or missing certification. Thus, the registration is to be verified according to the UL marking on the device.

☞ To guarantee an UL/CSA-compliant operation, the following conditions have to be fulfilled:

- Use 60/75 C insulated copper wire only.

☞ The UL/CSA marking is only valid for the device in its delivery status (ex works). After modifying the device, e.g. after plugging additional extension cards, UL compliance must be checked.

4.5 Compatibility Test

All Rexroth controls and drives are developed and tested according to the latest state-of-the-art of technology.

As it is impossible to follow the continuing development of all materials (e. g. lubricants in machine tools) which may interact with our controls and drives, it cannot be completely ruled out that any reactions with the materials used by Bosch Rexroth might occur.

For this reason, before using the respective material a compatibility test has to be carried out for new lubricants, cleaning agents etc. and our housings / our housing materials.

5 Dimensions

5.1 Housing Dimensions VAK 10.1

5.1.1 VAK 10.1: Front View

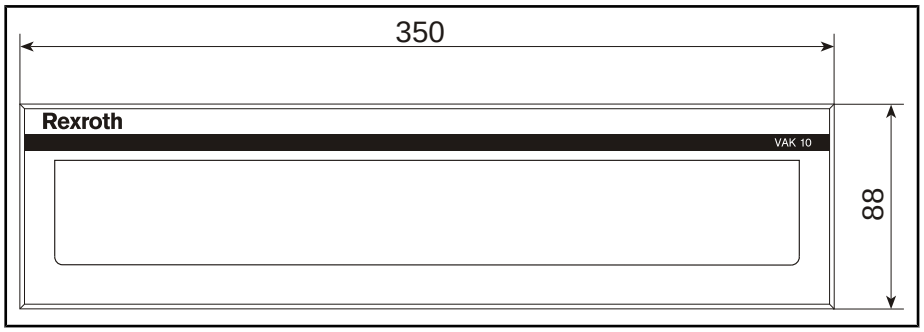


Fig.5-1: Front view VAK 10.1

5.1.2 VAK 10.1: Side View

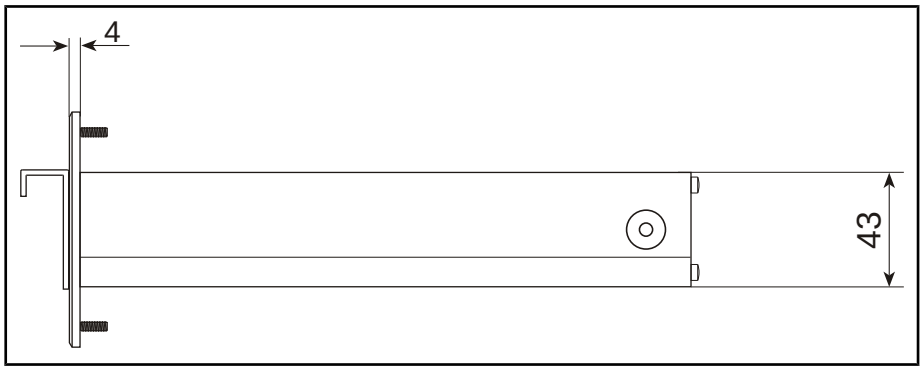
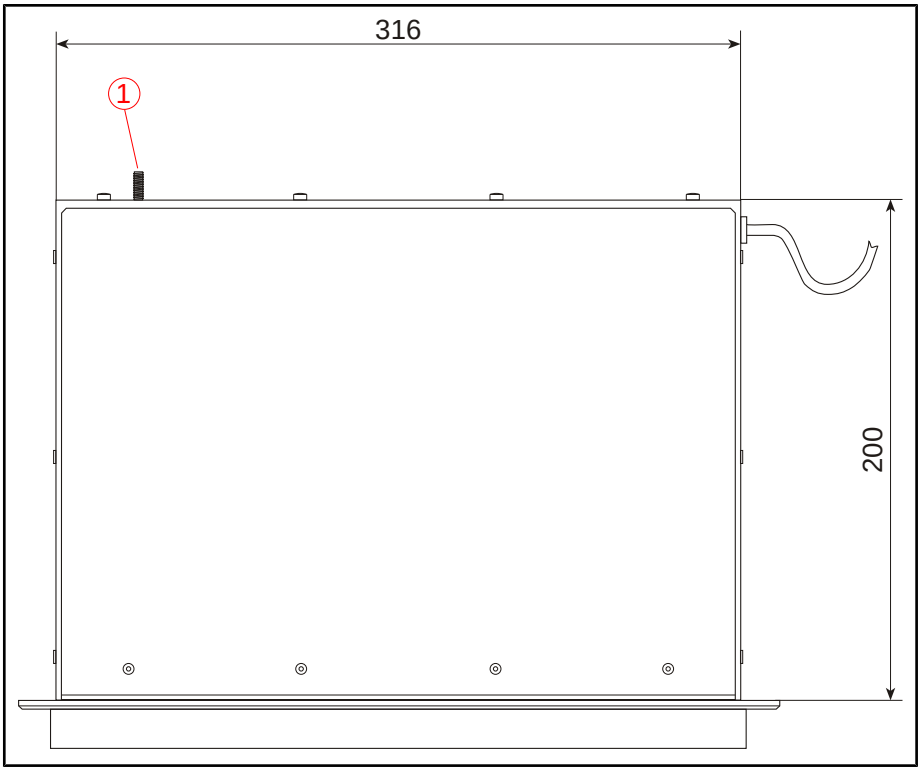


Fig.5-2: Side view VAK 10.1

Dimensions

5.1.3 VAK 10.1: Top View



① Insert bolt for ground connection

Fig.5-3: Top view VAK 10.1

5.2 Housing Dimensions VAK 40.1

5.2.1 VAK 40.1: Front View

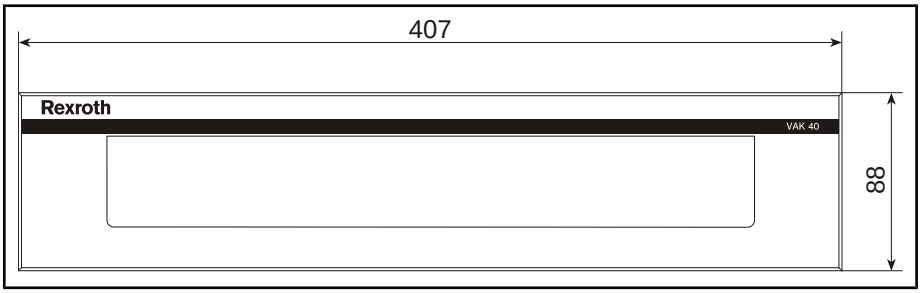


Fig.5-4: Front view VAK 40.1

5.2.2 VAK 40.1: Side View

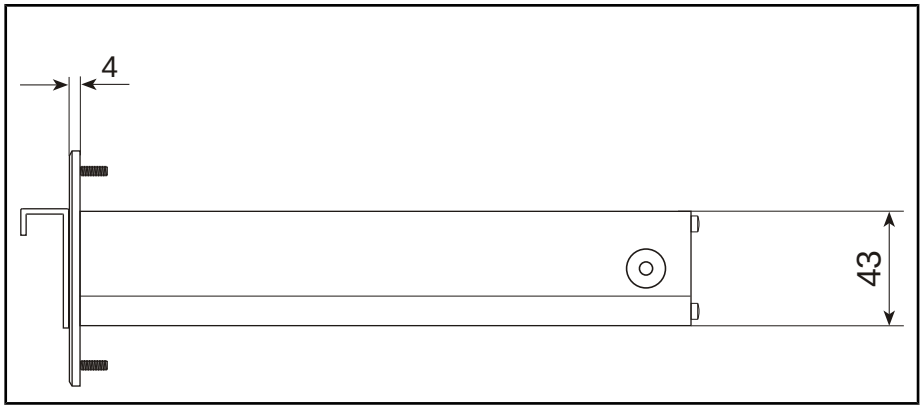
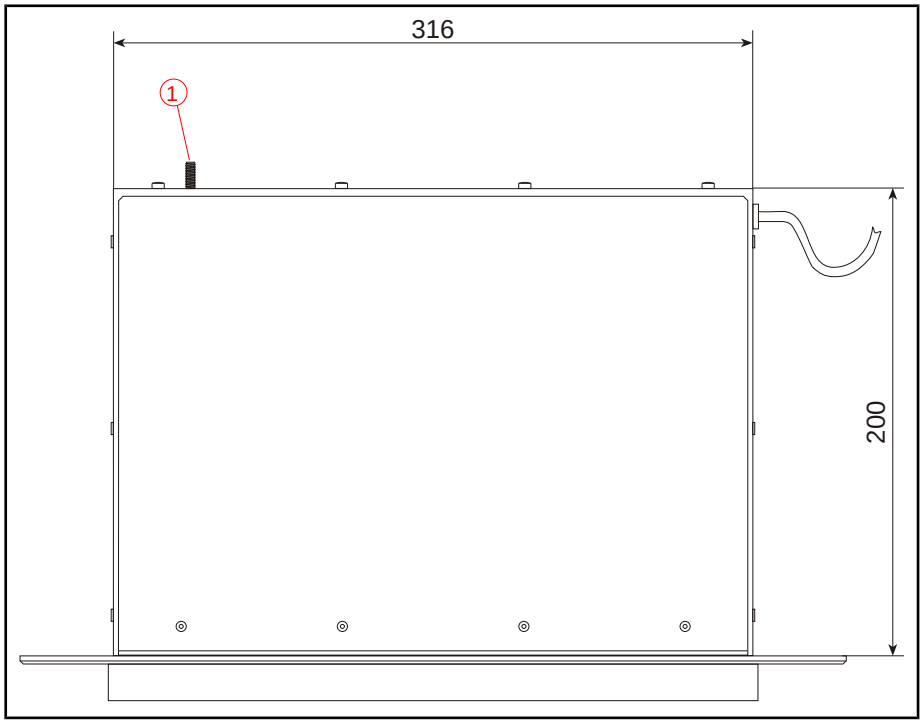


Fig.5-5: Side view VAK 40.1

5.2.3 VAK 40.1: Top View



① Insert bolt for ground connection

Fig.5-6: Top view VAK 40.1

5.3 Mounting Dimensions VAK 10.1

5.3.1 VAK 10.1: Unit Installation

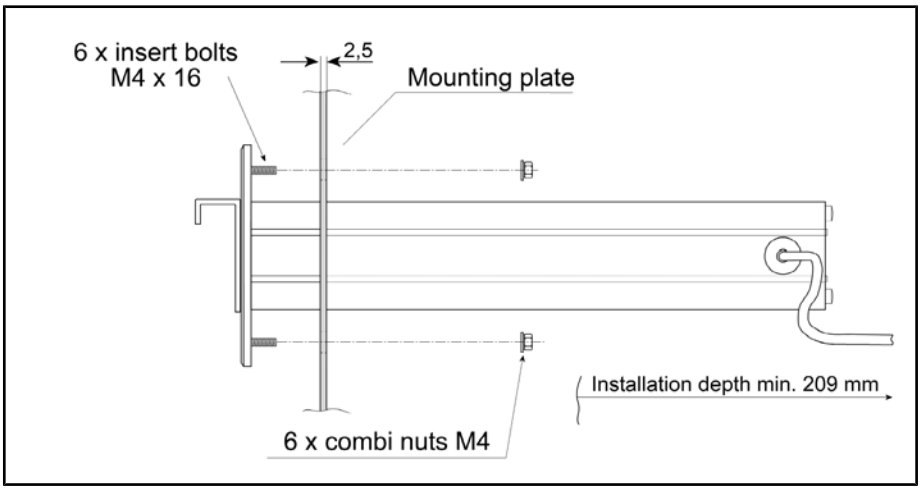


Fig.5-7: Unit installation VAK 10.1 (from the front)

5.3.2 VAK 10.1: Mounting Cut-out

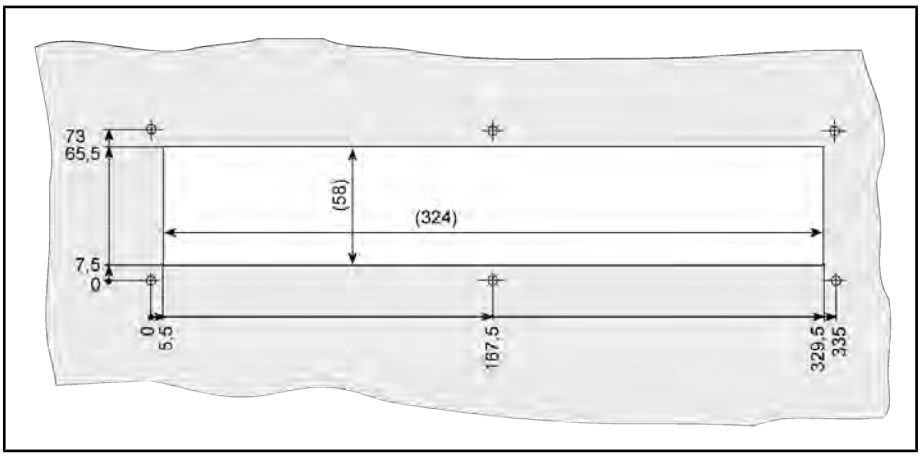


Fig.5-8: Mounting cut-out VAK 10.1

5.4 Mounting Dimensions VAK 40.1

5.4.1 VAK 40.1: Unit Installation

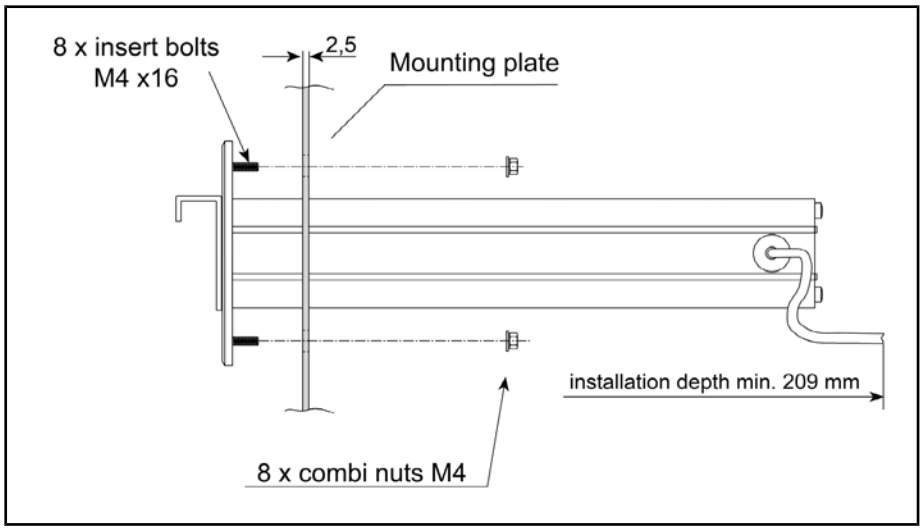


Fig.5-9: Unit installation VAK 40.1 (from the front)

5.4.2 VAK 40.1: Mounting Cut-out

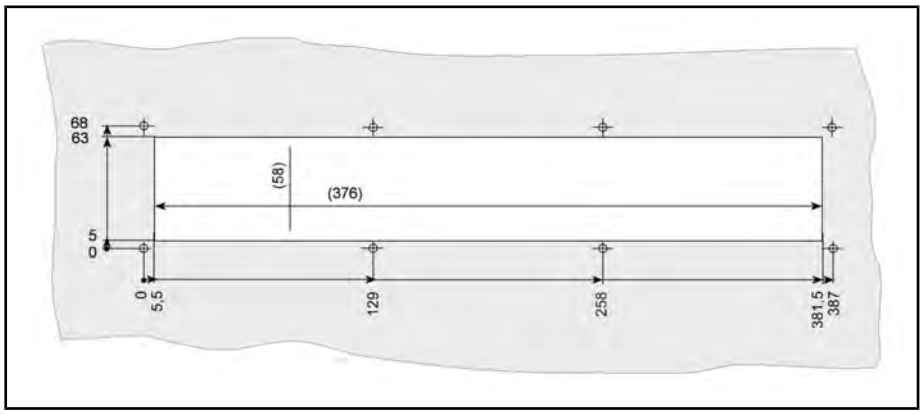


Fig.5-10: Mounting cut-out VAK 40.1

6 Keyboard and Mouse

6.1 Assignment and Function of the Key Front

Fig.6-1: Keyboard VAK 40.1

Keyboard

The keypad of the VAK 10.1 and the VAK 40.1 features all functions of a conventional PC keyboard.

Mouse

The integrated mouse function is used as follows:

The mouse pointer is situated on the right-hand side of the keyboard and serves to move the mouse pointer. The mouse keys are arranged above and beneath the mouse pointer. You will find the same functions on the left top side of the key front; the mouse buttons are wired parallelly. The functions are illustrated in fig. 6-3 " Mouse pointer, keyboard and LEDs" on page 25.

LEDs

LED display	Status
Num function	Lights: Enabled Doesn't light: Disabled
Caps-Lock	Lights: Enabled Doesn't light: Disabled

Fig.6-2: Display LEDs

The function assigned to the respective LED is also illustrated in the figure.

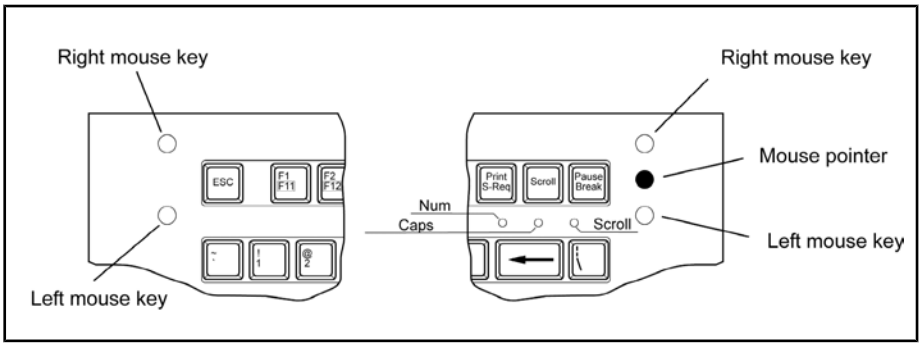


Fig.6-3: Mouse pointer, keyboard and LEDs

6.2 Installation of the mouse driver (for PS/2 connection)

☞ If you use the operating system Windows XP or a keyboard with USB connection, the device (PC keyboard) is automatically detected.

The following section describes the commissioning of the VAK 40 with PS/2 at a BTV 20.3 with WINNT4.0. Generally, it is assumed that the mouse is activated in BIOS.

☞ During the Windows boot process the mouse is not automatically recognized!

1. Login as administrator and select under **Start ▸ Settings ▸ Control Panel ▸ Mouse** the register button "General", then select "Change" (also if the Microsoft PS/2 mouse is already selected) (see fig. 6-4 "Register button to set general mouse properties" on page 26).

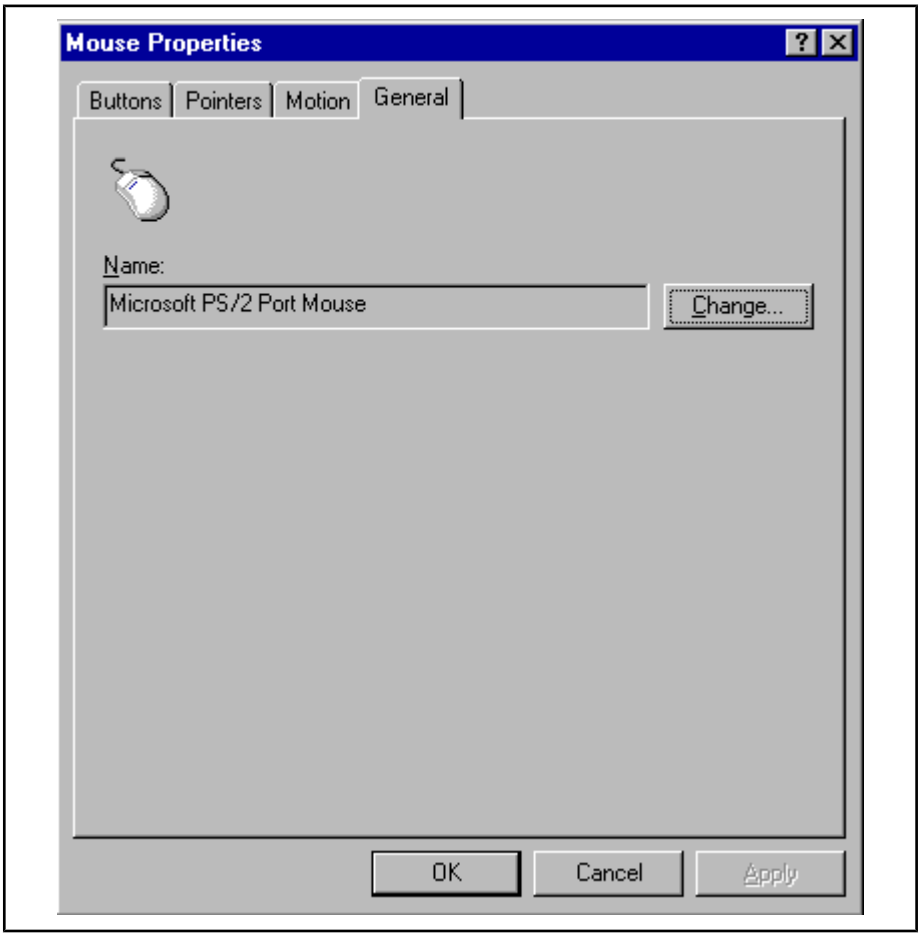


Fig.6-4: Register button to set general mouse properties

2. Highlight the Microsoft PS/2 mouse and confirm your selection with "OK".

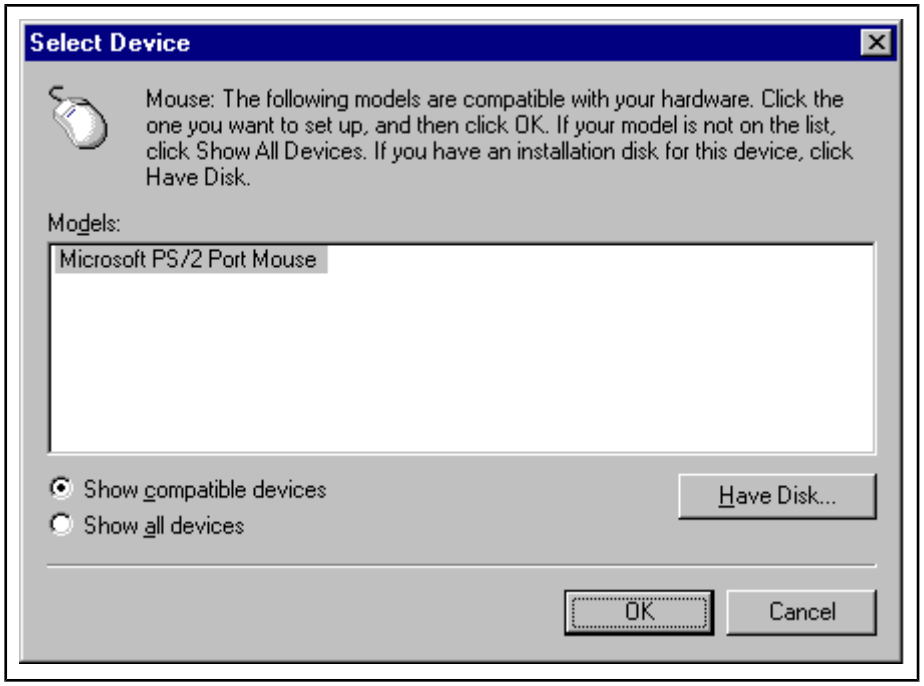


Fig.6-5: Selection window of the Microsoft PS/2 mouse

3. Now confirm the appearing message "Confirm Device Install" with "Yes".

Fig.6-6: Dialog: Confirm device install

4. Confirm the next appearing message "Would you like to skip file copying" with "Yes" because the data are already available on the system.

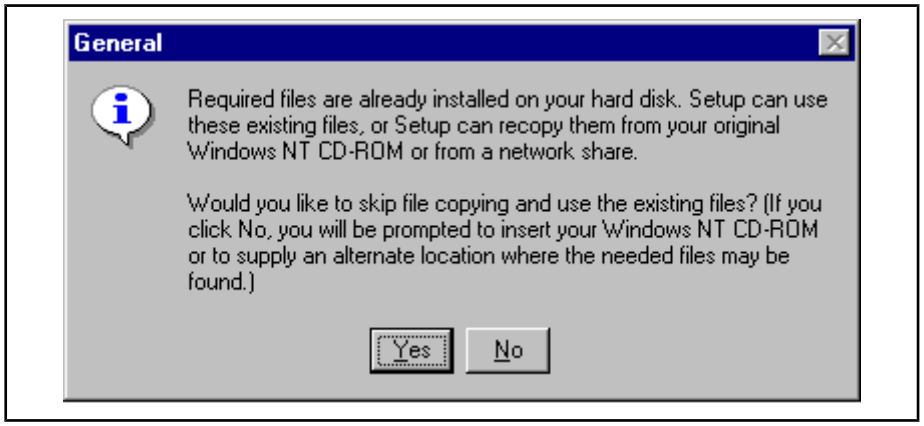


Fig.6-7: Dialog: Copy files

5. At last, close the dialog and restart Windows.

7 Description of the Used Connections

7.1 Pin Assignment: PS/2

The keyboard connector is a Mini-DIN PS/2 connector with combined assignment of the keyboard and mouse signals.

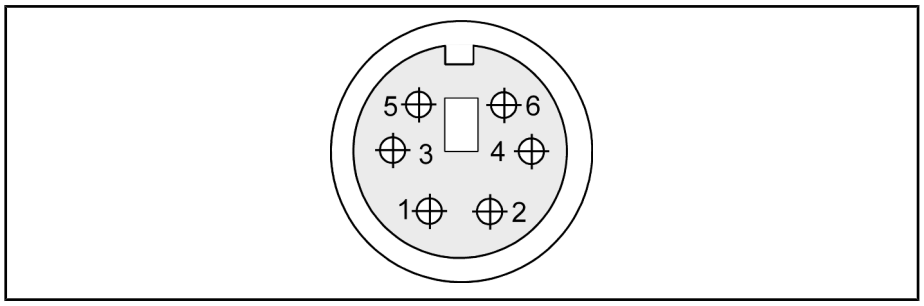


Fig.7-1: Mini DIN PS/2 keyboard connector: Pins

The pins of the keyboard connector are assigned as follows:

Pin No.	Description
1	Keyboard data
2	Mouse data
3	GND
4	VCC + 5 V
5	Keyboard clock
6	Mouse clock

Fig.7-2: Pin assignment of the VAK 10/40 keyboard connector

7.2 Pin Assignment: USB

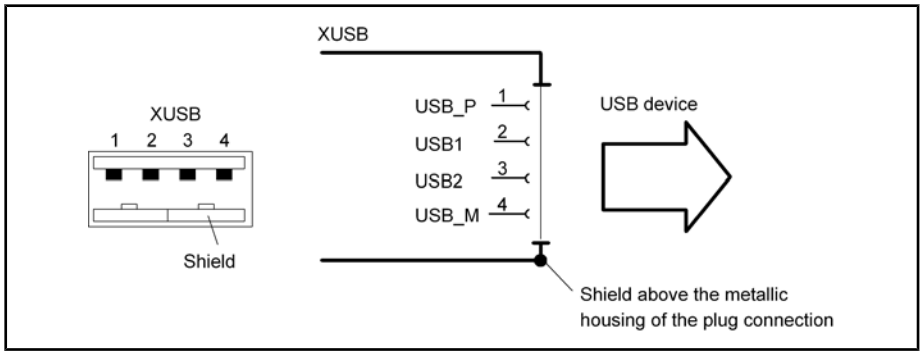


Fig.7-3: USB keyboard connector

7.3 Connection to an Operator Terminal

USB To connect the drawer keyboards to a VSP16/40 and VPP16/40 as well as to a VPB40, VDP16/40 and VSB40 the USB connector of the keyboard has to be connected to the USB female connector of the control cabinet PC.

PS/2 To connect the drawer keyboards to a BTV 20 or BTV 16/40 unit, the 6-pin keyboard connector has to be connected to the PS/2 female connector on the rear side of the BTV unit. For a BTV 20 use the female connector with the

designation "PS/2 KEYBOARD", for a BTV 16 or BTV 40 the female connector with the designation "Keyboard".

☞ During changing the keyboard ensure that the keyboard may only be connected or disconnected, when the power has been switched off.

8 Environmental Protection and Disposal

8.1 Environmental Protection

Production Processes

The products are made with energy- and resource-optimized production processes which allow re-using and recycling the resulting waste. We regularly try to replace pollutant-loaded raw materials and supplies by more environment-friendly alternatives.

Prohibited Substances

We guarantee that out products include no substances according to the chemicals-ban-decree. We furthermore declare that our products are free of mercury, asbestos, PCB and chlorinated hydrocarbons.

No Release of Hazardous Substances

Our products do not contain any hazardous substances which may be released in the case of appropriate use. Normally, our products will not have any negativ influences on the environment.

Significant Components

Basically, out products contain the following components:

Electronic devices
- steel
- aluminium
- copper
- synthetic materials
- electronic components and modules

Motors
- steel
- aluminium
- copper
- brass
- magnetic materials
- electronic components and modules

8.2 Disposal

Return of Products

Our products can be returned to our premises free of charge for disposal. It is a precondition, however, that the products are free of oil, grease or other dirt.

Furthermore, the products returned for disposal must not contain any undue foreign material or foreign components.

Send the products ”free domicile” to the following address:

Bosch Rexroth AG
Electric Drives and Controls
Buergermeister-Dr.-Nebel-Strasse 2
97816 Lohr am Main, Germany

Packaging

The packaging materials consist of cardboard, wood and polystyrene. These materials can be recycled anywhere without any problem.

For ecological reasons, please refrain from returning the empty packages to us.

Recycling

Most of the products can be recycled due to their high content of metal. In order to recycle the metal in the best possible way, the products must be disassembled into individual modules.

Metals contained in electric and electronic modules can also be recycled by means of special separation processes. The synthetic materials remaining after these processes can be thermally recycled.

If the products contain batteries or accumulators, these have to be removed before recycling and disposed of.

9 Ordering Information

9.1 Type Designation Code

9.1.1 VAK 10.1

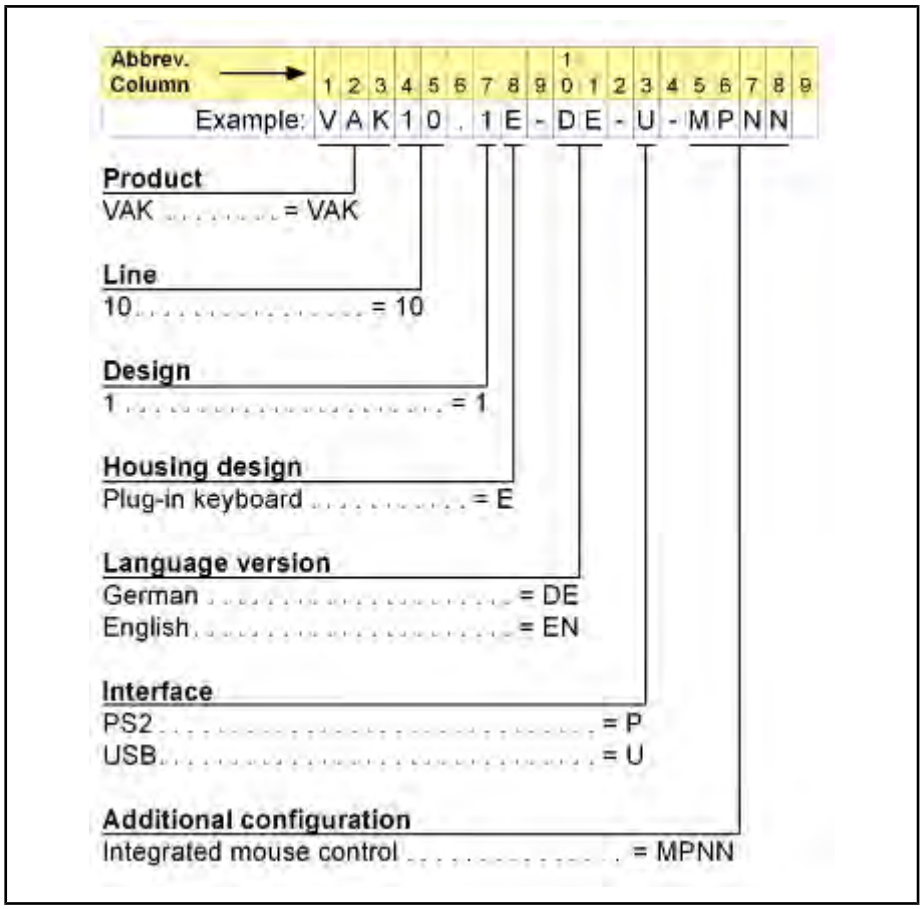


Fig.9-1: Type designation code VAK 10.1

Ordering Information

9.1.2 VAK 40.1

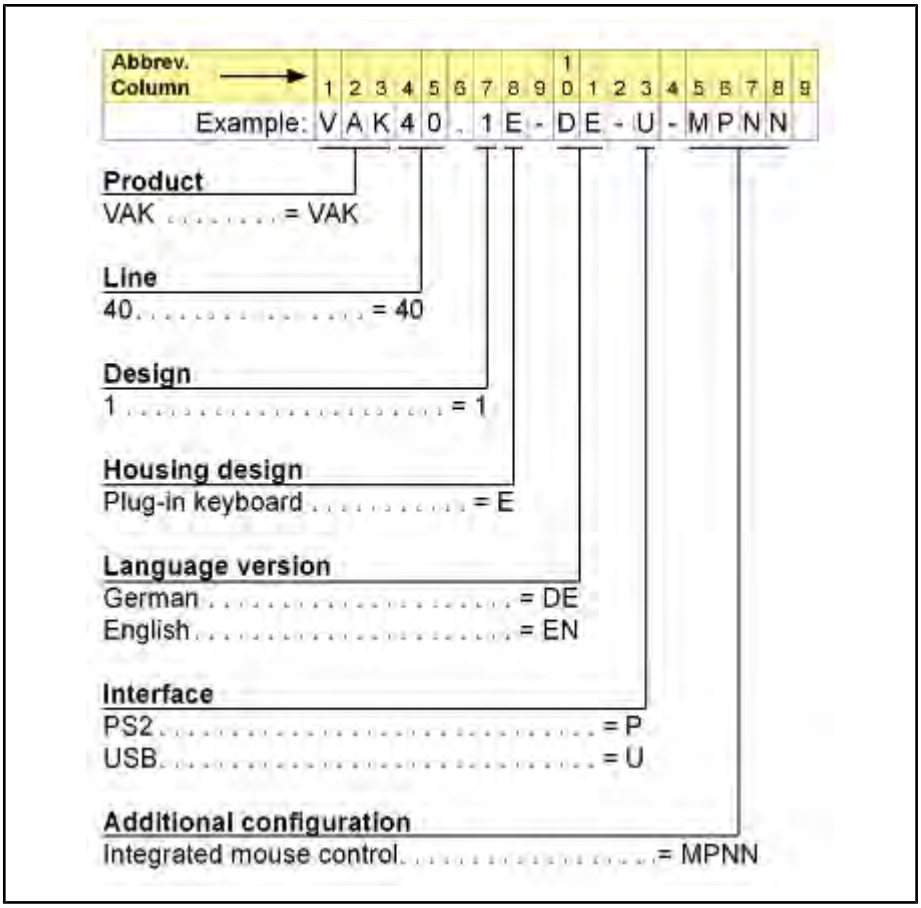


Fig.9-2: Type designation code VAK 40.1

10 Service and Support

Our service helpdesk at out headquarters in Lohr, Germany, will assist you with all kinds of enquiries. Out of helpdesk hours please contact our German service department directly.

	Helpdesk	Service Hotline Germany	Service Hotline Worldwide
Time [1]	Mo-Fr 7:00 am - 6:00 pm CET	Mo-Fr 6:00 pm - 7:00 am CET Sa-Su 0:00 am - 12:00 pm CET	Outwith Germany please contact our sales/service office in your area first. For hotline numbers refer to the sales office addresses on the Internet.
Phone	+49 (0) 9352 40 50 60	+49 (0) 171 333 88 26 or +49 (0) 172 660 04 06	
Fax	+49 (0) 9352 40 49 41	–	
e-mail	service.svc@boschrexroth.de	–	
Internet	http://www.boschrexroth.com You will also find additional notes regarding service, maintenance (e.g. delivery addresses) and training.		

1) Central European Time (CET)

Preparing 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, fax numbers and e-mail address so we can contact you in case of questions.

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Notes

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