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rexroth
A Bosch Company

IndraControl

VDP 8x, VAM 8x and VAC 06
Machine Operator Panel / Display

Assembly Instructions   Edition 02
R912005998
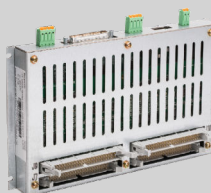
Record of Revision

Edition	Release Date	Notes
Edition 01	08.2015	First edition
Edition 02	04.2020	Content update

Table of Contents

Page

1 About this Documentation

Overview – target groups and product phases

The activities, product phases and target groups that refer to the present documentation are marked in red color in the following figure.

Example: In the product phase "Mounting (assembly/installation)", the "mechanic/electrician" can execute the activity "install" using this documentation.
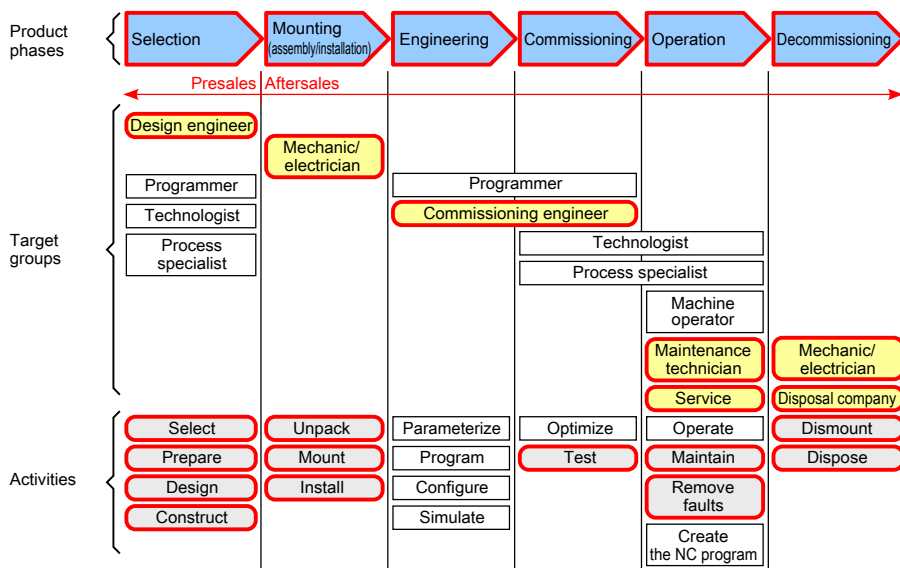
Fig. 1-1: Assigning the present documentation to the target groups, product phases and activities of the target group

Purpose

This document instructs the technical staff of the machine manufacturer on how to perform the mechanic and electrical installation in a safe way and on how to commission the device.

Required qualifications: Individual who is able to assess the tasks assigned and identify possible safety risks owing to qualification in the subject, knowledge and experience. The individual should also be familiar with the standards and regulations.

Scope

This document is valid for all variants whose type designation starts with "VDPxx.1...".

The type designation code specifications are located on the type plate of the device, see also chapter 2.1 "Product Identification" on page 3.

Further documents

Title	Codes and notes
Rexroth IndraMotion	DOK-MTXMIC-SYS*DES*V13-PR01-EN-P
MTX micro 13VRS	R911343385
System Description	Project Planning Manual
Rexroth IndraControl VDP 80.1	DOK-SUPPL*-VDP*80.1***-PR03-EN-P
Machine Operator Panel	R911329156
Operator Display	Project Planning Manual
Rexroth IndraDrive	DOK-INDRV*-HCQ-T+HMQ-T-PR03-EN-P
Drive Controllers	R911324185
HCQ, HCT	Project Planning Manual
Rexroth IndraMotion MTX micro	DOK-MTXMIC-EASY*******-CO05-EN-P
Easy Setup for Standard	R911332281
Turning and Milling Machines	Commissioning Manual

2 Product Identification and Scope of Delivery

2.1 Product Identification

The type plate is located on the rear panel.
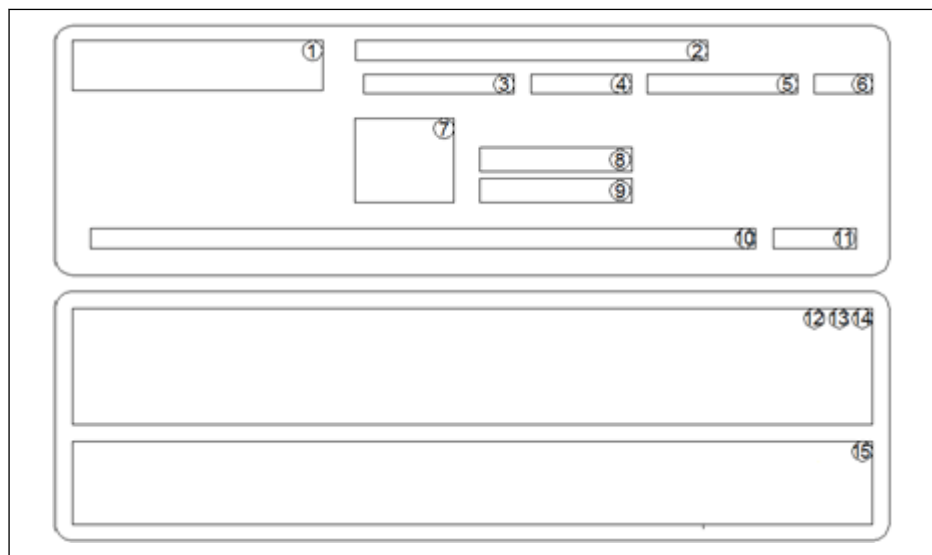
1	Logo	**9**	Serial number
2	Product type code	**10**	Company name
3	Input voltage	**11**	Factory code
4	Input current	**12**	UL logo
5	Production data	**13**	CE logo
6	Version	**14**	RoHS logo
7	Bar code	**15**	Address and Tel Address
8	Product material number		

Fig. 2-1: Type plates

2.2 Scope of Delivery

- Operating display
- Safety instructions
- Mounting kit
- 2s4 V female connector strip

3 Using the Safety Instructions

3.1 Safety Instructions – Structure

The safety instructions are structured as follows:

Safety alert symbol

Signal word

Consequences and source of danger

⚠ CAUTION   **Burns and chemical burns due to wrong battery treatment!**

Do not open the batteries and do not heat them over 80 °C.

Avoiding danger
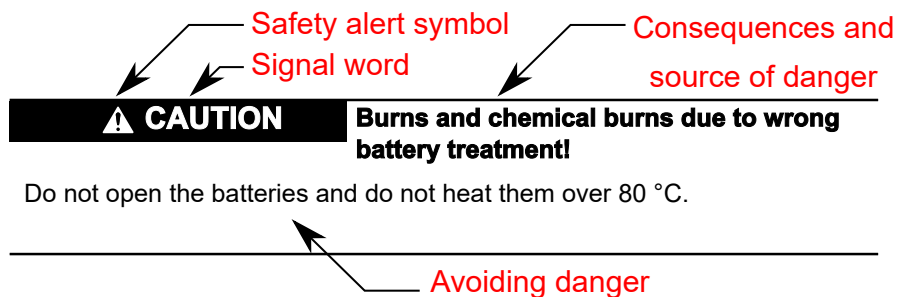
Fig. 3-1:   Safety instructions – Structure

3.2 Explaining signal words and safety alert symbol

The safety instructions in this documentation contain specific signal words (danger, warning, caution, notice) and, if necessary, a safety alert symbol (according to ANSI Z535.6-2006).

The signal word draws attention to the safety instruction and indicates the risk potential.

The safety alert symbol (triangular safety reflector with exclamation marks), preceding the signal words Danger, Warning, Caution indicates hazards for persons.

⚠ DANGER

In case of non-compliance with this safety instruction, death or serious injury **will** occur.

⚠ WARNING

In case of non-compliance with this safety instruction, death or serious injury **can** occur.

⚠ CAUTION

In case of non-compliance with this safety instruction, minor or moderate injury can occur.

NOTICE

In case of non-compliance with this safety instruction, material damage can occur.

3.3 Symbols Used

Notes are displayed as follows:

☞	This is a note.

Tips are displayed as follows:

💡	This is a tip.

4 Intended Use

The Bosch Rexroth operator terminals are passive operation and visualization terminals. They form a PC-based operator terminal when used with a Bosch Rexroth control cabinet PC.

NOTICE	**Danger of destruction of the device if not expressly stated accessories, mounting parts and other components, cables, lines, software and firmware are used.**

The operator displays may be used only as intended and with the accessories, mounting parts and other components specified in this documentation. Components that are not expressly mentioned must neither be attached nor connected. The same is valid for cables and lines.

Operation must only be carried out with the hardware component configurations and combinations that are expressly specified and with the software and firmware indicated and specified in the respective documentation and functional descriptions.

Typical areas of application of the operator displays are:

- Handling systems and assembly systems
- Packaging and food processing machines
- Printing machines and paper converting machines
- Machine tools
- Wood processing machines

The operator displays may only be operated under the mounting and installation conditions, the position, and the ambient conditions (temperature, degree of protection, humidity, EMC etc.) specified in this documentation.

5 Dimensions, Installation and Wiring

5.1 Dimensions
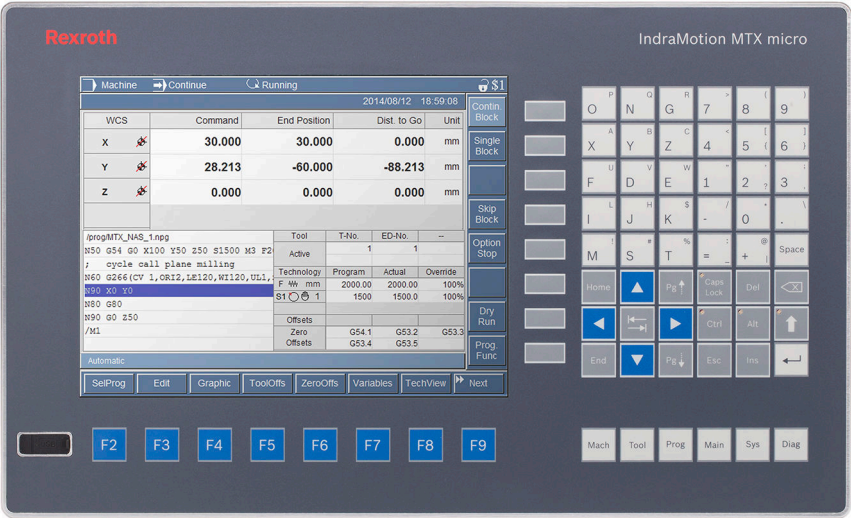
Fig. 5-1: Front panel of the VDP81.1FKN-C1-NN-EN

Fig. 5-2: Front panel of the VDP82.1FKN-C1-NN-EN
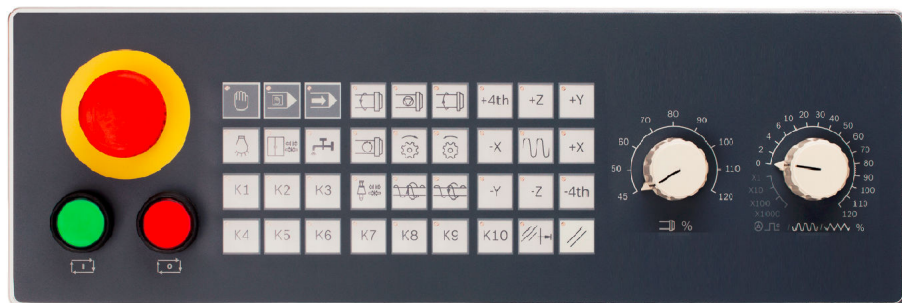
Fig. 5-3: Front panel of the VAM81.1-USB-NF-TA-TA-VE-MA-NNNN

Fig. 5-4: Front panel of the VAM82.1-USB-NF-TA-TA-VE-MA-NNNN
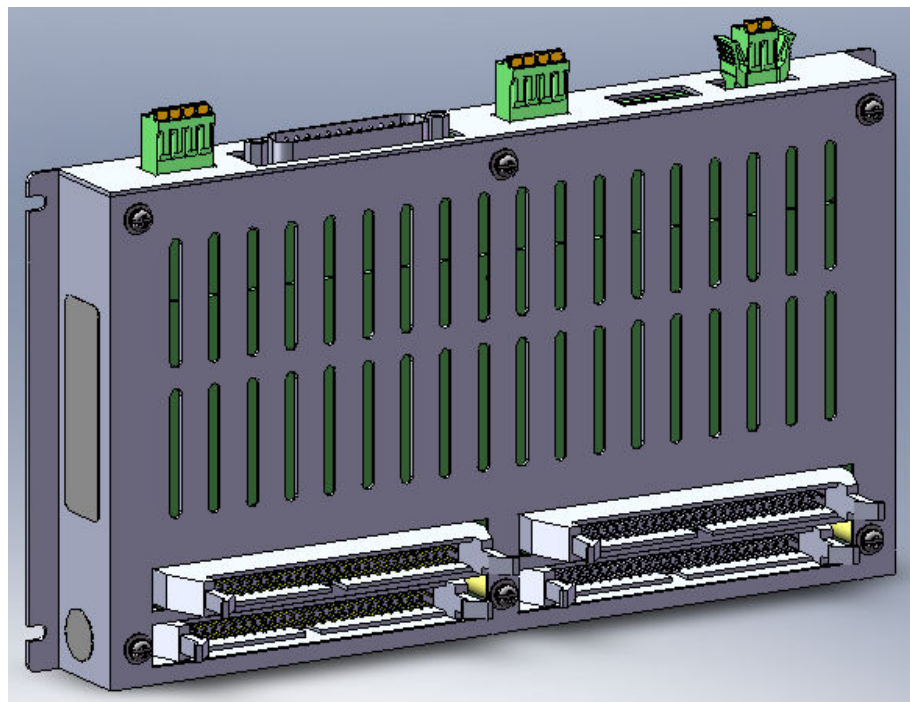
Fig. 5-5: View of VAC06.1S-MU1-NNNN
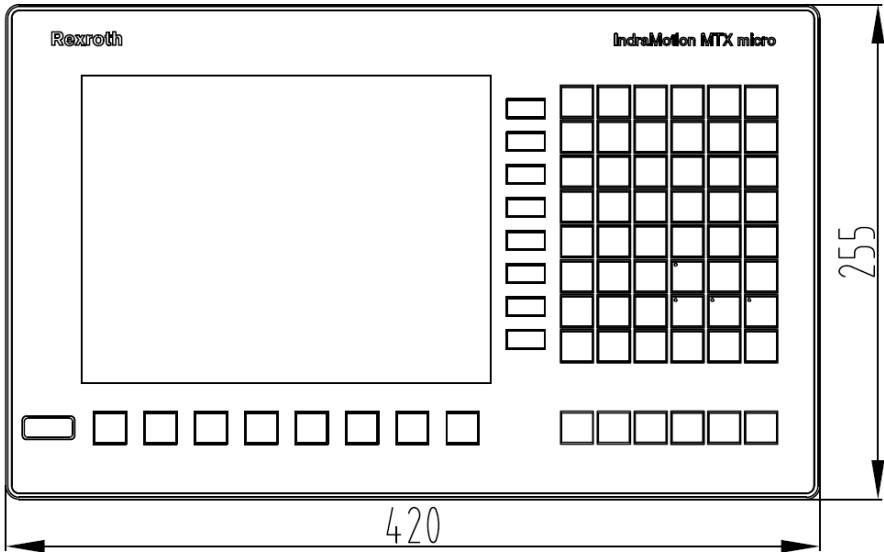
Fig. 5-6: VDP81.1FKN-C1-NN-EN dimensions
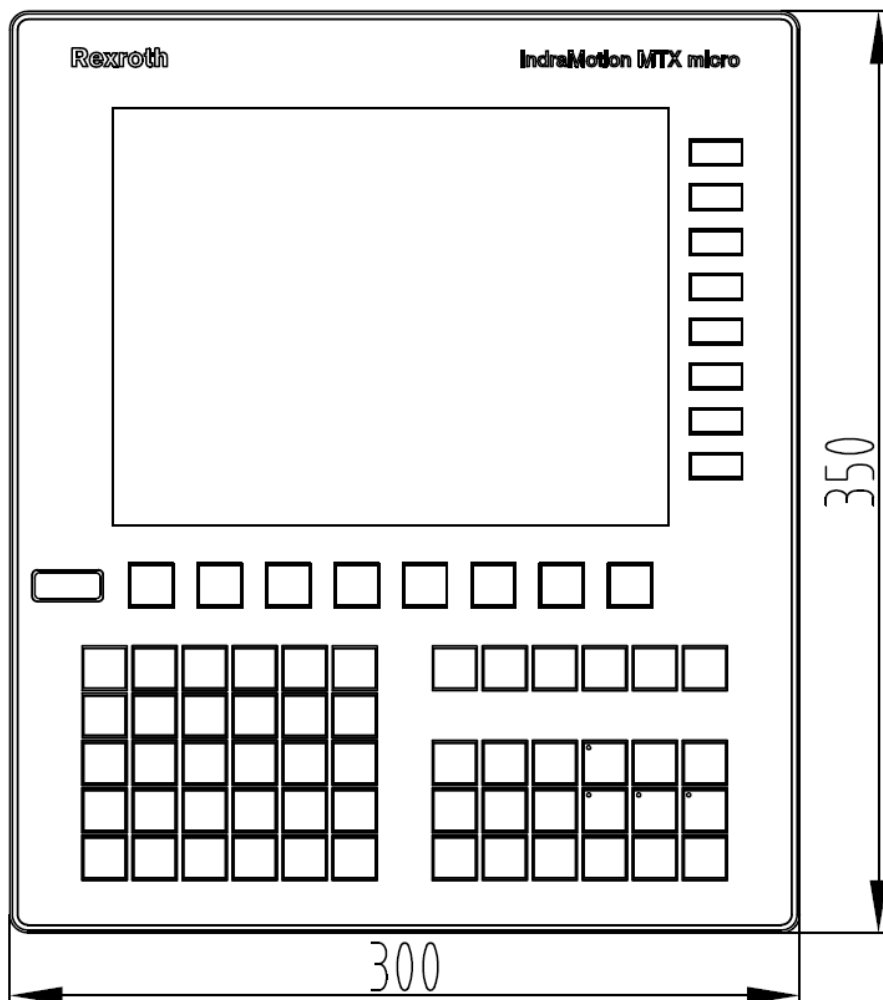
Fig. 5-7: VDP82.1FKN-C1-NN-EN dimensions
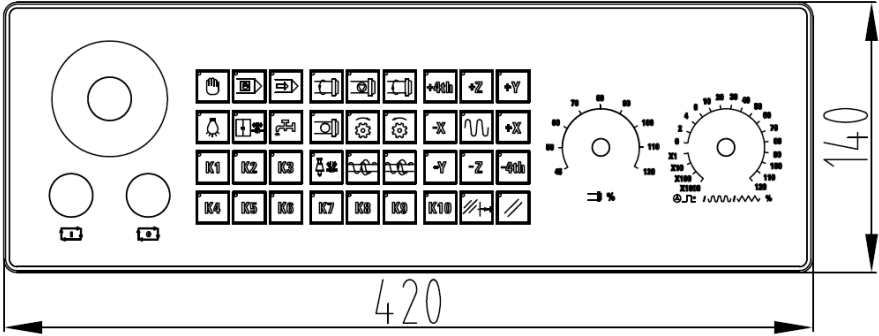
Fig. 5-8: VAM81.1-USB-NF-TA-TA-VE-MA-NNNN dimensions
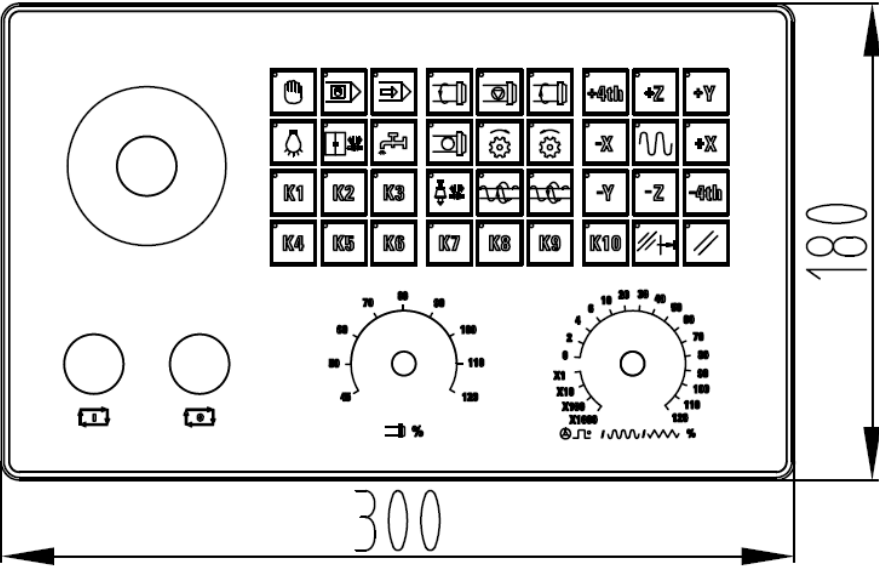
Fig. 5-9: VAM82.1-USB-NF-TA-TA-VE-MA-NNNN dimensions
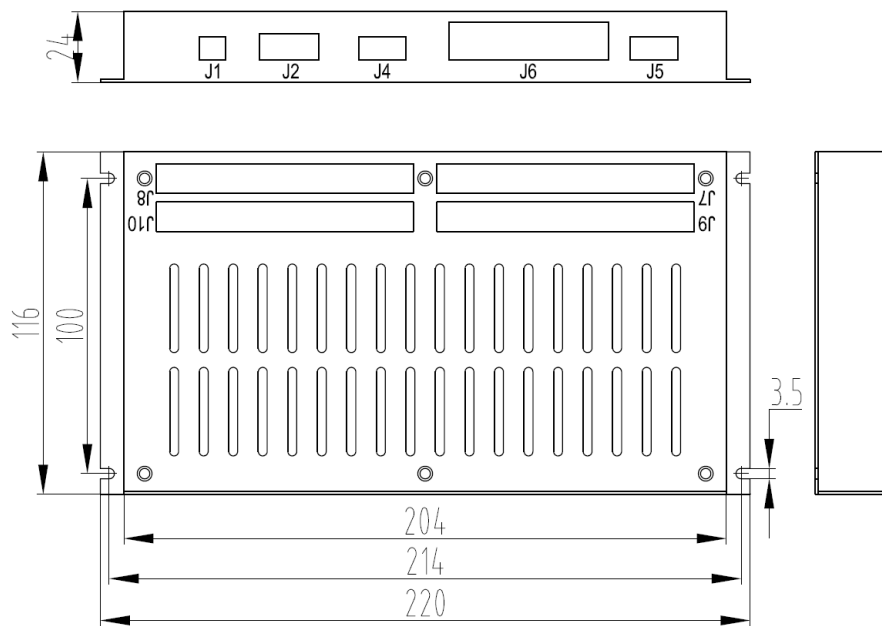
Fig. 5-10: VAC06.1S-MU1-NNNN dimensions

☞ The VAC06.1S-MU1-NNNN can be installed on the back of VDP81.1FKN-C1-NN-EN or VDP82.1FKN-C1-NN-EN.

Please fixed the VAC06.1 with M3 screw.

5.2 Panel Cut Out
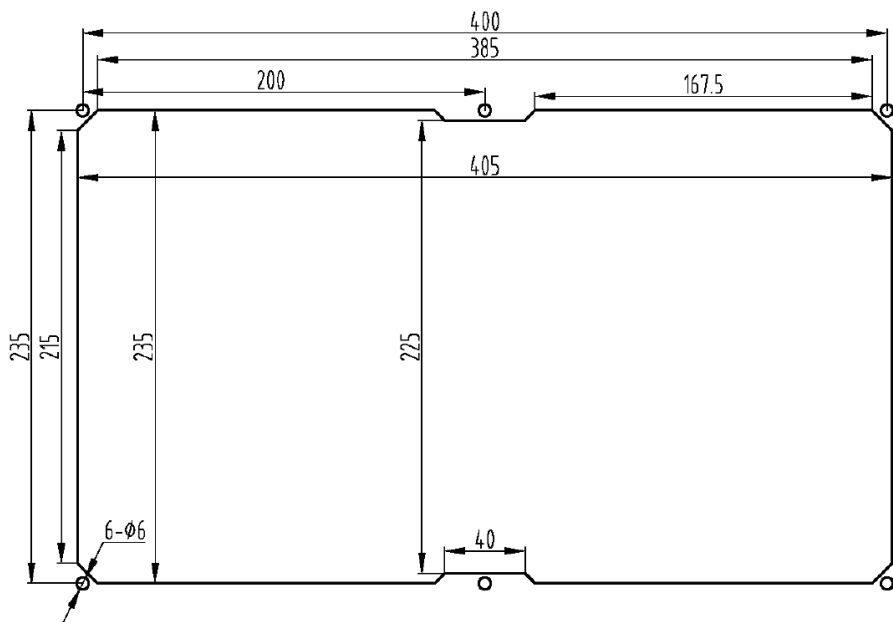
Fig. 5-11: Cut out of VDP81.1FKN-C1-NN-EN
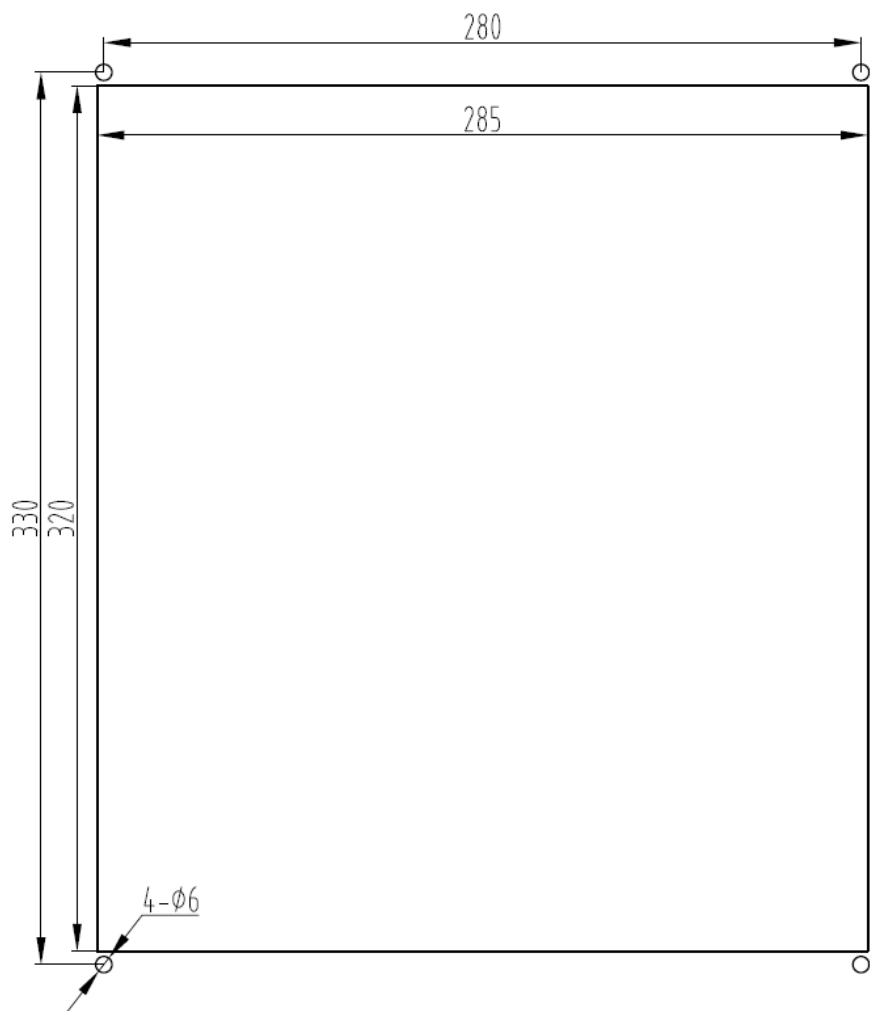
Fig. 5-12: Cut out of VDP82.1FKN-C1-NN-EN
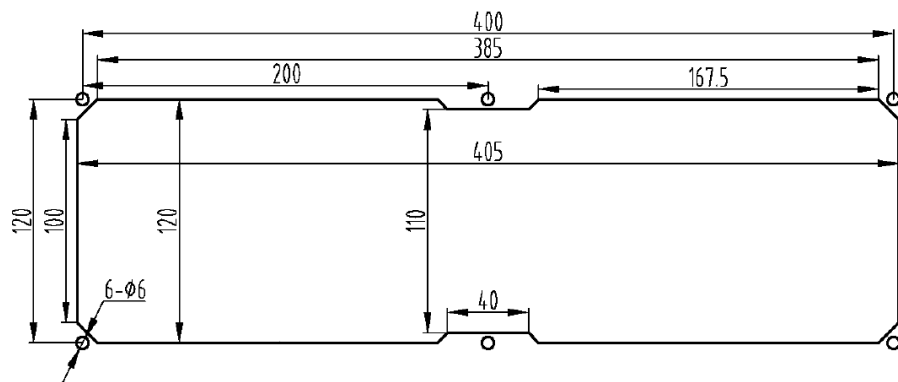
Fig. 5-13: Cut out of VAM81.1-USB-NF-TA-TA-VE-MA-NNNN
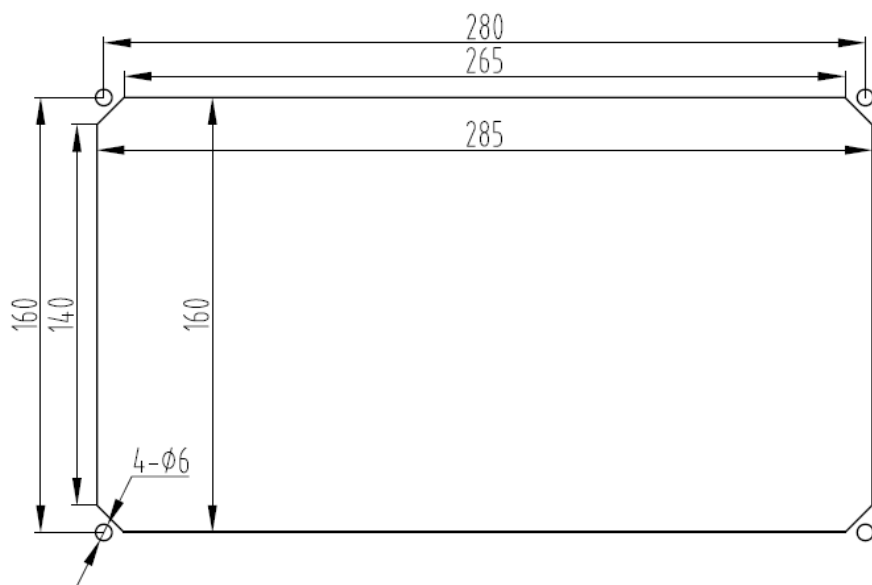
Fig. 5-14: Cut out of VAM82.1-USB-NF-TA-TA-VE-MA-NNNN

☞ Please fixed the panels (VDP81/2.1 and VAM81/2.1) with M5 nut.

☞ When designing the housing for the HMI Panel, please take the height of the plug-in connections and the permissiable bending radius for the cables into consideration.

5.3 System Installation Environment

The HMI operator panel has to be handled with care. The housing of the panel has to be sealed and dust-proof. Only if the housing is sealed and dust-proof, the panel is protected against coolant splashes or dust accumulating during machining.

Ambient conditions:

- Ambient temperature during operation: 0 ºC to 45 ºC
- Storage and transport temperature: −20 ºC to 60 ºC
- Changing the ambient temperature: ≤ 1,1 ºC/min
- Relative humidity: ≤ 75%
- Oscillations: ≤ 0.5 G
- Active power: 24 V DC ±20% (SELV and LIM or Class 2)
- Protection class: IP 54 (front side), IP 20 (back side)

Please note the following points to comply with the afore-mentioned conditions:

- Because the back side protection class of panels is IP20, a sealed housing is recommended in the complicated environment. Sealant has to be applied to doors and cable outputs.
- The HMI operator panel housing has to be dust-proof and impermeable to water (also to coolant etc.).
- The HMI operator panel housing has to be sufficiently large to ensure heat dissipation.
- Installing a filter device for ventilation purposes is recommended. Additionally, a heat exchanger has to be installed in case of a considerably high ambient temperature.
- The EMC of the housing for the HMI operator panel has to be taken into consideration.

The components in the HMI operator panel housing have to positioned to facilitate easy access during maintenance work.

5.4 Grounding the HMI panel

The HMI panel has to be grounded to ensure correct operation. The required minimum cable cross section is 2 mm^2.

GND in the grounding diagram stands for the service ground of the system, supplying the reference voltage 0 V. FG stands for shield ground, reducing the cross interferences.

Symbol of protective conductor terminal on panels
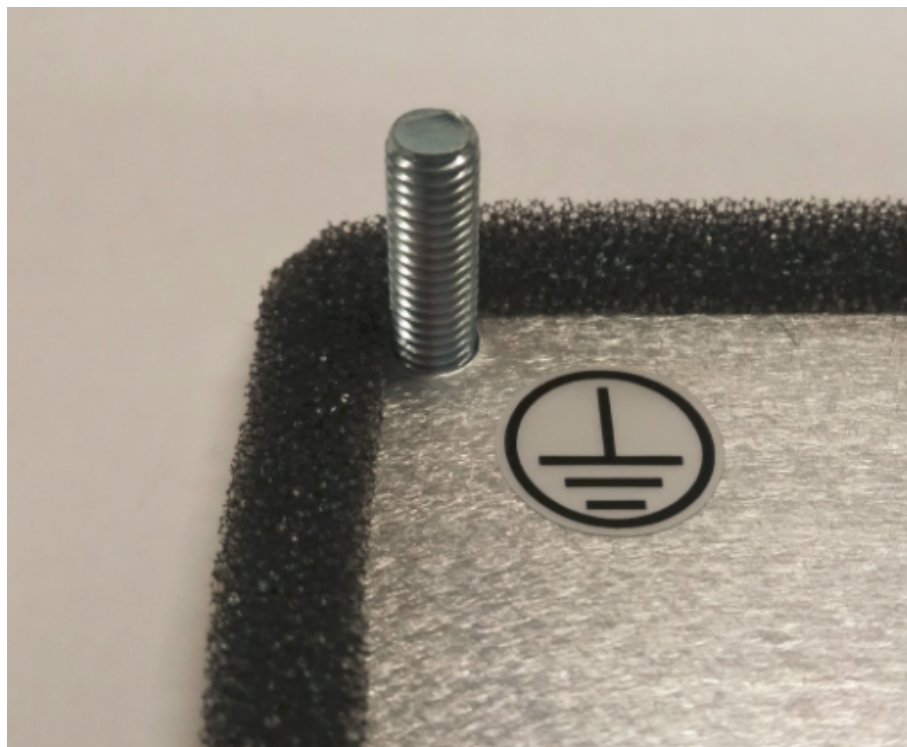
Fig. 5-15: GND terminal
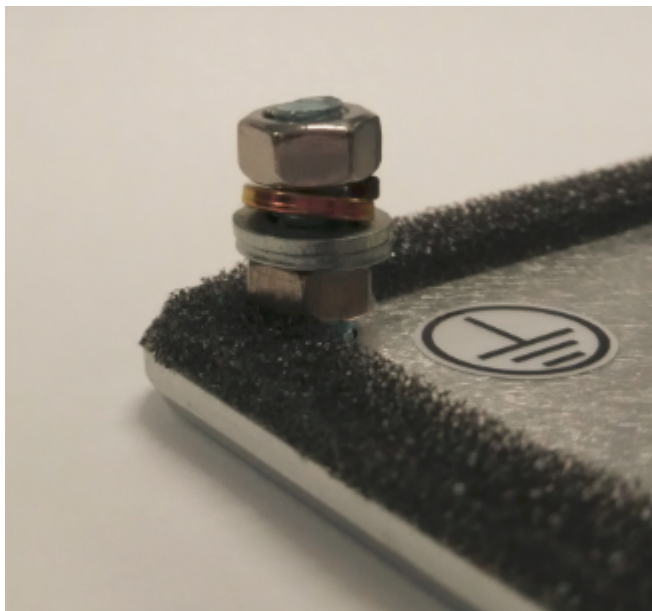
Fig. 5-16: Recommend GND terminal with nuts

☞ The shielding of the connecting cable has to be soldered properly with the jacket of the cable connector for all parts of the system.

All shieldings of the electronic unit should be connected to GND.

Two M5 nuts, two M5 Washers and one M5 spring washer are recommended for GND cable connection.

5.5 Technical Data

5.5.1 Display

	VDP81.1, VDP82.1
Display area	211.2 (H) x 158.4 mm (V)
Diagonal display size	26 cm (10.4 inch)
Screen actuation	a-Si TFT Active matrix
Display colors	262.144 colors
Resolution	640 (H) x 480 pixel (V)
Cycle life of backlight	50.000 hrs

Tab. 5-1: Technical data display
Ambient temperature: 25 °C

☞   Cycle life of backlight:

The cycle life of the backlight is limited to a certain amount of ope-rating hours. Once the time has lapsed, the brightness of the back-light only amounts to 50% of the original value.

☞   LCD display:

The readability of the LCD display continuously decreases due to a low backlight. In this case, the backlight has to be exchanged. Please contact the Bosch Rexroth service for further information.

5.5.2 Weight

Device	Weight
VDP81.1FKN-C1-NN-EN	ca. 2.2 kg
VDP82.1FKN-C1-NN-EN	ca. 2.2 kg
VAM81.1-USB-NF-TA-TA-VE-MA-NNNN	ca. 1.1 kg
VAM82.1-USB-NF-TA-TA-VE-MA-NNNN	ca. 1.1 kg
VAC06.1S-MU1-NNNN	ca. 0.7 kg

Tab. 5-2: Weight

5.5.3 Standards

Applied Standards

The HMI operator panel complies with the following standards:

Standard	Description
EN 60204-1	Electric machine equipment
EN 61000-6-4	Generic standards – Electromagnetic emission for industrial sectors
EN 61000-6-2	Generic standards – Electromagnetic emission for industrial sectors
EN 61558-2-6	Transformer safety for 24-V power supply units
EN 61131-2	24-V output requirements
EN 61131-2	24-V power supply requirements
EN 60529	Protection classes (incl. housing and built-in compartments)
EN 60068-2-6	Test procedure: Oscillate
EN 60068-2-27	Test procedure: Shock
EN 60721-3-1 and 60721-3-3	Classification of ambient conditions
ISO 13850	Machine safety – EMERGENCY STOP – Design guidelines

Tab. 5-3: Applied Standards

CE Conformity Marking

Declaration of conformity

$C\varepsilon$

The electronic products described in the project planning manual meet the requirements and targets of the following EC Directive and comply with the recognized European Standard:

EMC directive 2004/108/EG

The electronic products described in the project planning manual meet the operating requirements in the industrial sectors:

- EN 61000-6-2-2005
- EN 61000-6-4-2007

UL Approval

(UL) US LISTED

The HMI operator panels of the VDP series are approved in compliance with the following standard:

- **UL61010** (industrial control systems)

In combinations or extensions, approvals can be limited or missing. That is why the approval has to be checked at the device by means of the UL marking.

To ensure an operation according to the UL standard, the following require‐ments have to be met:

The UL mark only applies to the device in delivery status (ex works). The compli‐ance with UL requirements has to be checked after changes have been made to the device, e.g. after additional extension cards have been plugged in.

6 Design

6.1 Overview

Fig. 6-1: Rear view of VDP81.1 HMI operator panel
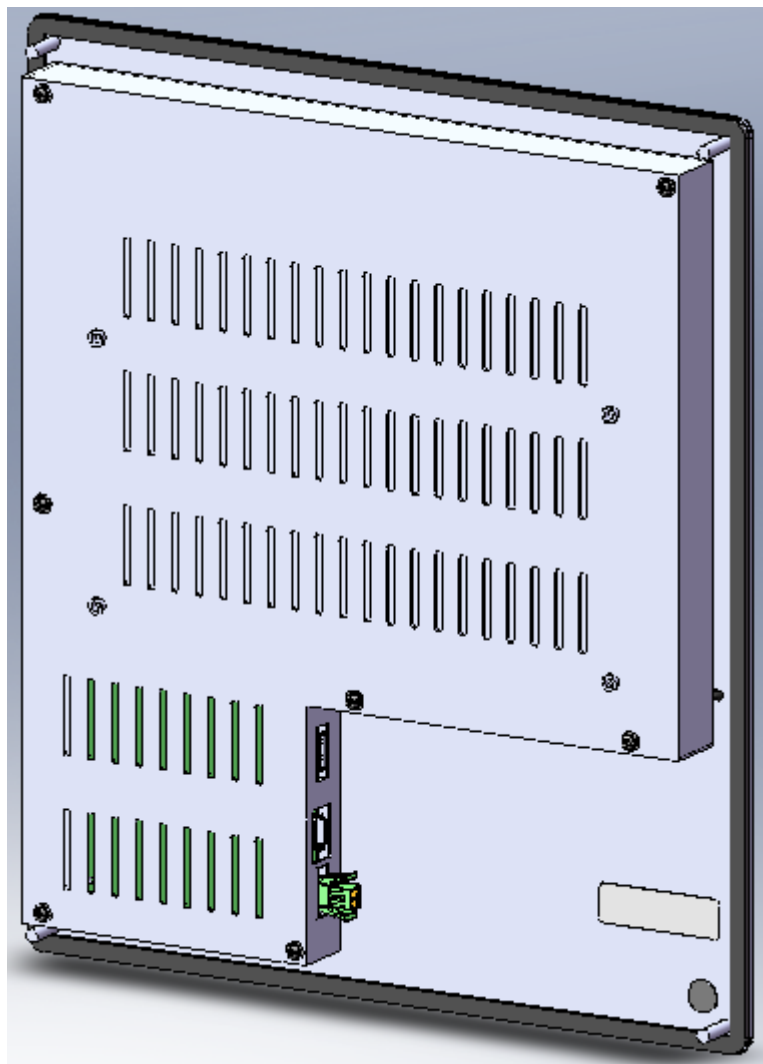
Fig. 6-2: Rear view of VDP82.1 HMI operator panel
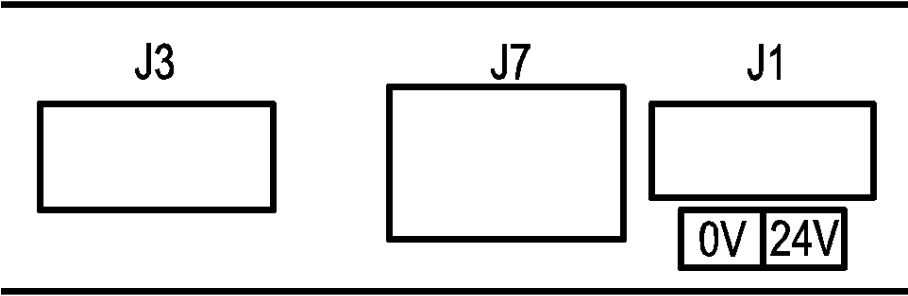
Fig. 6-3: Interface view of VDP81.1 and VDP82.1 HMI operator panel

List of VDP81.1 and VDP82.1 interfaces

Interface number	Interface type	Interface description	Remarks
J1	Connector, 2-pin Distance 3.5 mm	Power supply interface	24 V DC power supply (see chapter 7.1 "Interface Connection of VDP81.1 and VDP82.1 HMI Operator Panel Power Supply" on page 36)
J7	Connecting box 1394	Interface for data exchange	(see chapter 7.2 "Interface Connection Data exchange " on page 37)
J3	USB1A connection	USB interface	(see chapter 7.3 "USB Interface" on page 40)

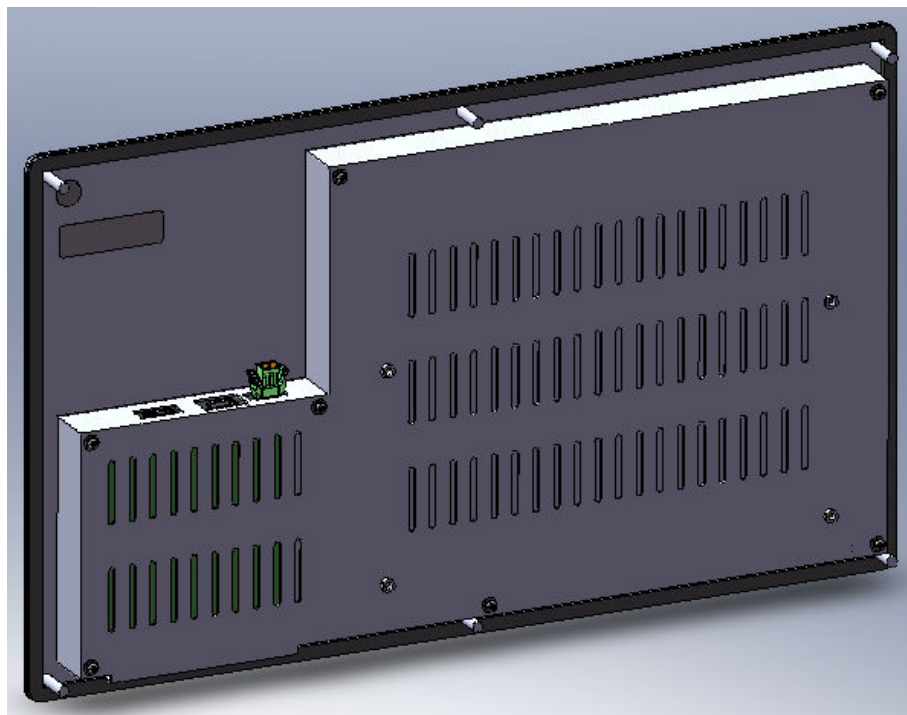**Tab. 6-1:** VDP 81.1 and VDP82.1, control interfaces
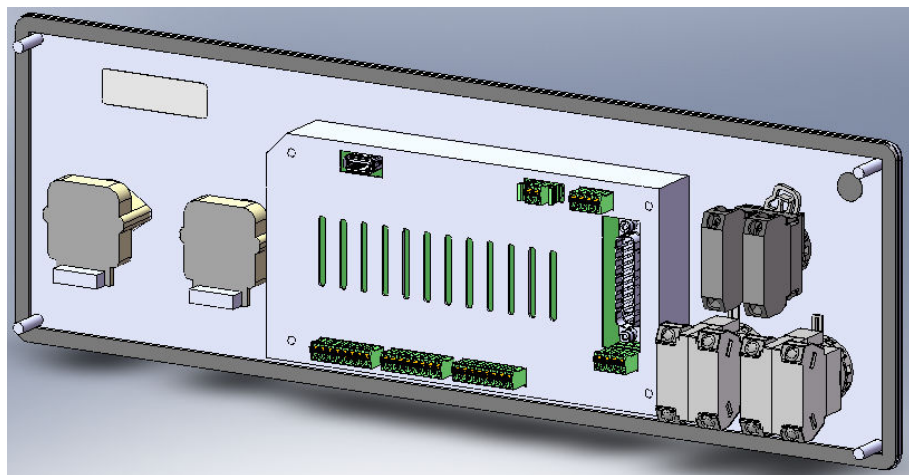
Fig. 6-4: Rear view of VAM81.1 HMI operator panel
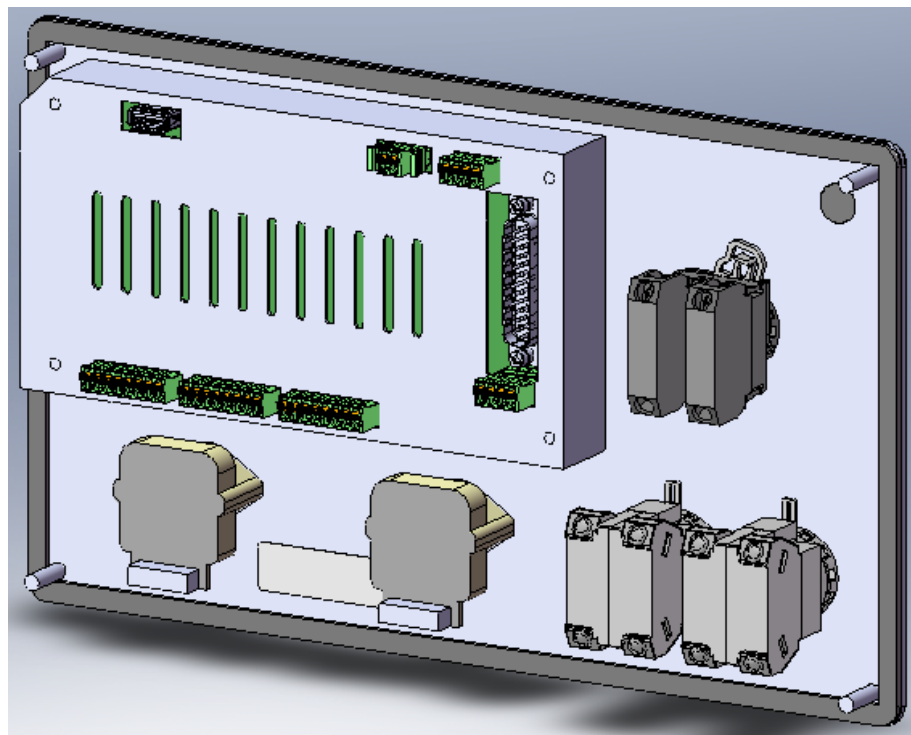
Fig. 6-5: Rear view of VAM82.1 HMI operator panel
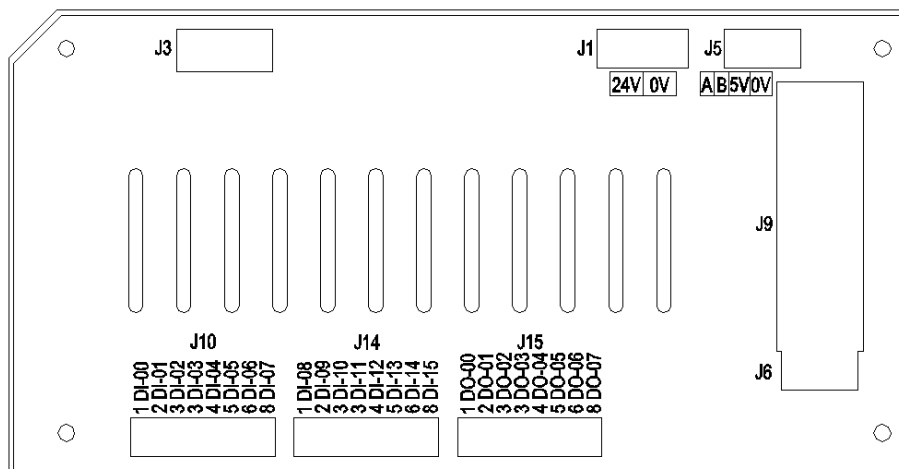
Fig. 6-6: Interface view of VDP81.1 and VDP82.1 HMI operator panel

List of VAM81.1 and VAM82.1 interfaces

Interface number	Interface type	Interface description	Remarks
J1	Connector, 2-pin Distance 3.5 mm	Power supply interface	24 V DC power supply (see chapter 8.1 "Interface Connection of VAM81.1 and VAM82.1 HMI Operator Panel Power Supply" on page 41)
J3	USB1A connection	USB interface	(see chapter 8.2 "USB Interface" on page 42)
J5	Connector, 4-pin Distance 3.5 mm	Interface for additional handwheel	(see chapter 8.3 "Handwheel extended interface " on page 43)
J9	D-SUB connection, 25-pin 25P-M (pin)	Interface for handwheel unit	Open collector outputs (see fig. 8-6 "Handwheel unit - Output of type open collector" on page 47) Differential inputs (see fig. 8-7 "Handwheel unit - Input of type differential" on page 49)
J6	Connector, 4-pin Distance 3.5 mm	Stop Switch in handwheel interface	(see chapter 8.5 "Stop Switch in Interface for Handwheel Unit" on page 51)
J10	Connector, 8-pin Distance 3.5 mm	Extended Inputs interface	(see chapter 8.6 "Connecting the Extended IO Interface" on page 53)

Interface number	Interface type	Interface description	Remarks
J14	Connector, 8-pin Distance 3.5 mm	Extended Inputs interface	(see chapter 8.6 "Connecting the Extended IO Interface" on page 53)
J15	Connector, 8-pin Distance 3.5 mm	Extended Outputs interface	(see chapter 8.6 "Connecting the Extended IO Interface" on page 53)

Tab. 6-2: VAM81.1 and VAM82.1, control interfaces
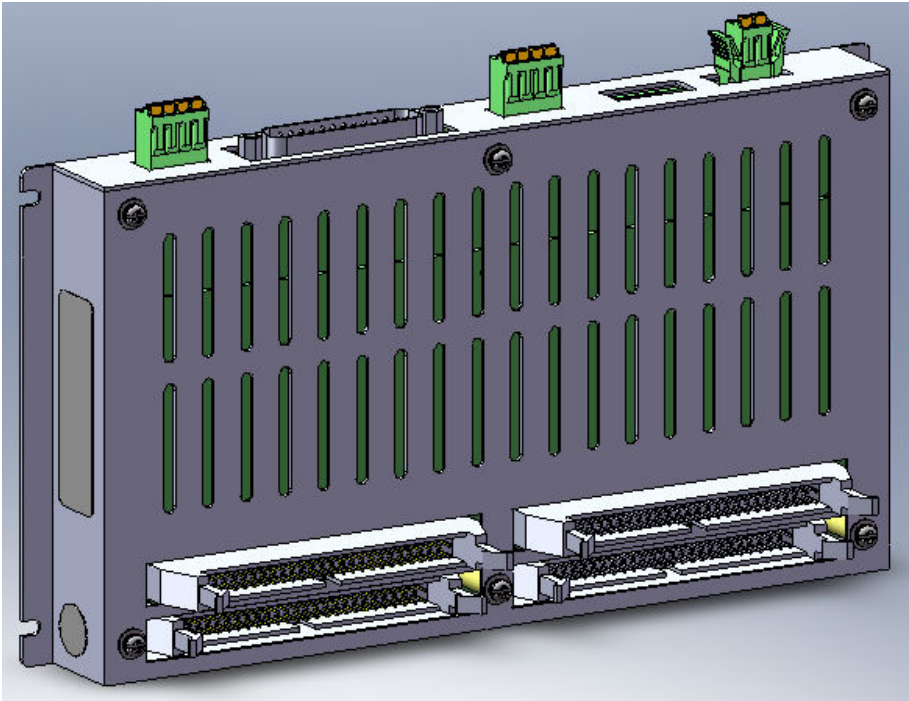
Fig. 6-7: View of VAC06.1
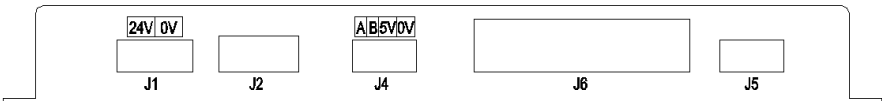
Fig. 6-8: Front interface view of VAC06.1
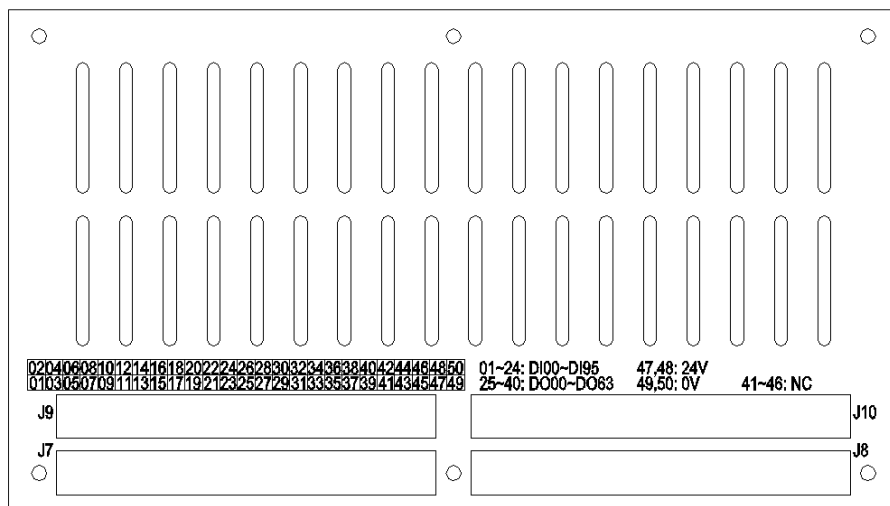
Fig. 6-9: Top interface view of VAC06.1

List of VAC06.1 interfaces

Interface number	Interface type	Interface description	Remarks
J1	Connector, 2-pin Distance 3.5 mm	Power supply interface	24 V DC power supply (see chapter 9.1 "Interface Connection of VAC06.1 Power Supply" on page 58)
J2	USB1A connection	USB interface	(see chapter 9.2 "USB Interface" on page 59)
J4	Connector, 4-pin Distance 3.5 mm	Interface for additional handwheel	(see chapter 9.3 "Handwheel extended interface " on page 60)
J6	D-SUB connection, 25-pin 25P-M (pin)	Interface for handwheel unit	Open collector outputs (see fig. 9-6 "Handwheel unit - Output of type open collector" on page 64) Differential inputs (see fig. 9-7 "Handwheel unit - Input of type differential" on page 66)

Interface number	Interface type	Interface description	Remarks
J5	Connector, 4-pin Distance 3.5 mm	Stop Switch in handwheel interface	(see chapter 9.5 "Stop Switch in Interface for Handwheel Unit" on page 68)
J7,J8,J9,J10	IDC50 connection	Extended IO interface	(see chapter 9.6 "Connecting the Extended IO Interface" on page 70)

Tab. 6-3: VAC06.1, control interfaces

6.2 Operating Elements

Fig. 6-10:   Example : VDP81 for milling

7 Connections and Interfaces of VDP81.1 and VDP82.1

7.1 Interface Connection of VDP81.1 and VDP82.1 HMI Operator Panel Power Supply

Pin assignment

J1

Pin no.	Assignment
01	+24V
02	0V

Tab. 7-1: Pin assignment J1

Detailed description
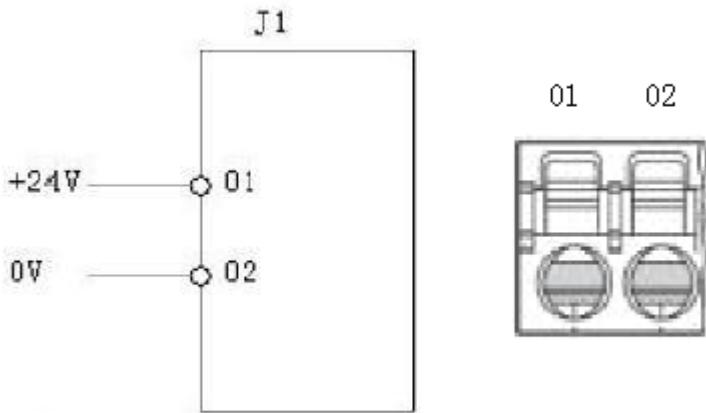
Fig. 7-1: Power supply interface

Technical data:

- Nominal input: 24 V DC ±20%
- Nominal current: 0.3 A
- Conductor cross section AWG min. 24
- Conductor cross section AWG max. 16

7.2 Interface Connection Data exchange

Pin assignment

J7

Pin no.	Assignment	Pin no.	Assignment
06	USB+	05	USB-
04	LVDS+	03	LVDS-
02	GND	01	GND

Tab. 7-2: Pin assignment J7

☞ The HMI operator panel can be connected to the MTX micro via a da-
ta connection cable.

Max. cable length: 10 m.

Order information can be found under chapter chapter 12.7 "Con-
necting Cables" on page 88.

Signal connection diagram
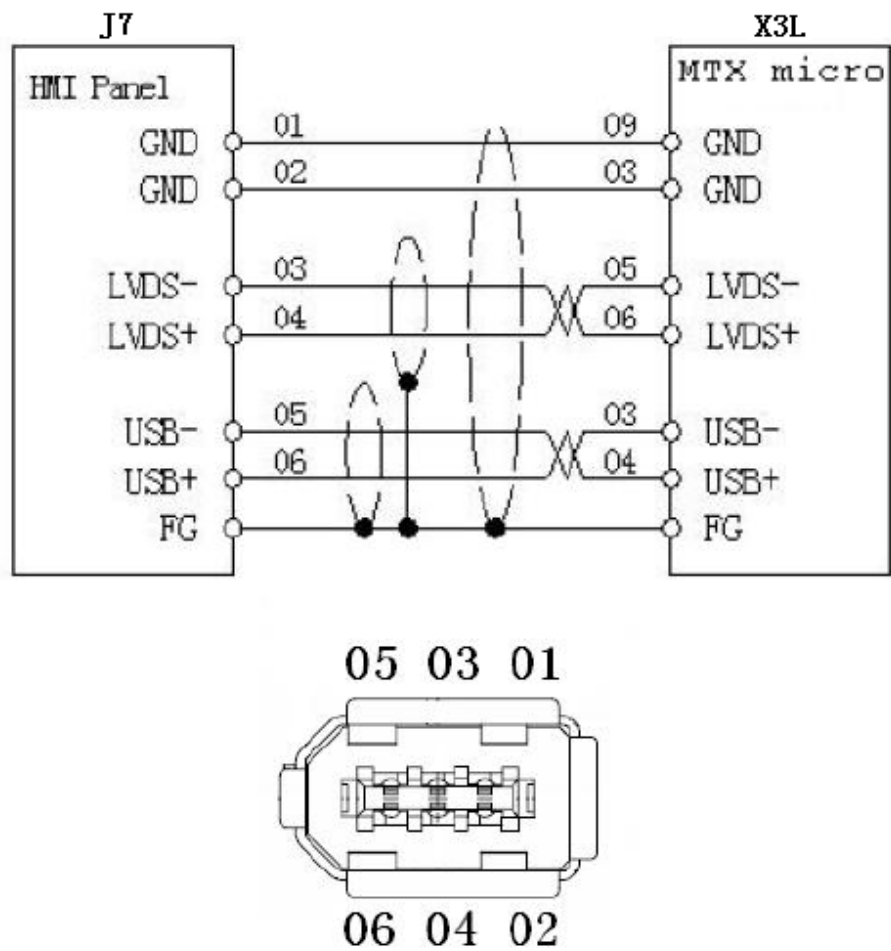
Fig. 7-2: Interface for data exchange

Signal description

Signal	Description
GND	Signal ground connection
LVDS-	Signal display
LVDS+	Signal display

Signal	Description
USB-	USB signal
USB+	USB signal
FG	Shielding

7.3 USB Interface

Pin assignment

J3

Pin no.	Assignment
01	-
02	D-
03	D+
04	GND

Tab. 7-3: Pin assignment J3

Signal connection diagram
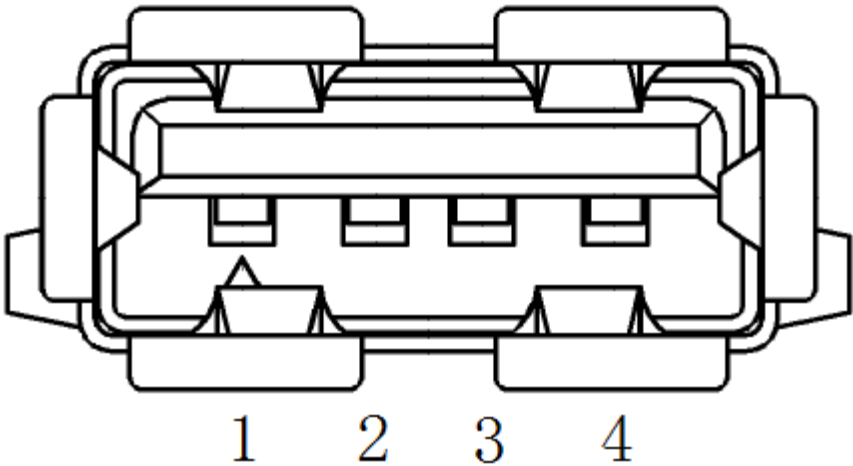
Fig. 7-3: Signal connection USB interface

This interface is an USB-A connection that is only connection for VAM81.1, VAM82.1 or VAC06.1.

Permissible length of the USB connection cable: max. 1.0 m.

8 Connections and Interfaces of VAM81.1 and VAM82.1

8.1 Interface Connection of VAM81.1 and VAM82.1 HMI Operator Panel Power Supply

Pin assignment

J1

Pin no.	Assignment
01	+24V
02	0V

Tab. 8-1: Pin assignment J1

Detailed description
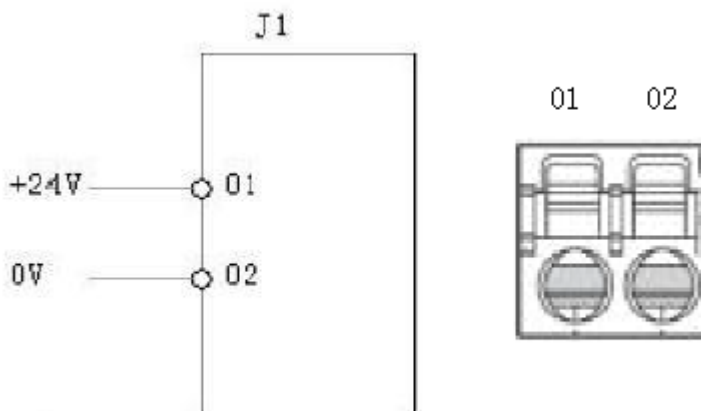
Fig. 8-1: Power supply interface

Technical data:

- Nominal input: 24 V DC ±20%
- Nominal current: 0.3 A
- Conductor cross section AWG min. 24
- Conductor cross section AWG max. 16

8.2 USB Interface

Pin assignment

J3

Pin no.	Assignment
01	-
02	D-
03	D+
04	GND

Tab. 8-2: Pin assignment J3

Signal connection diagram
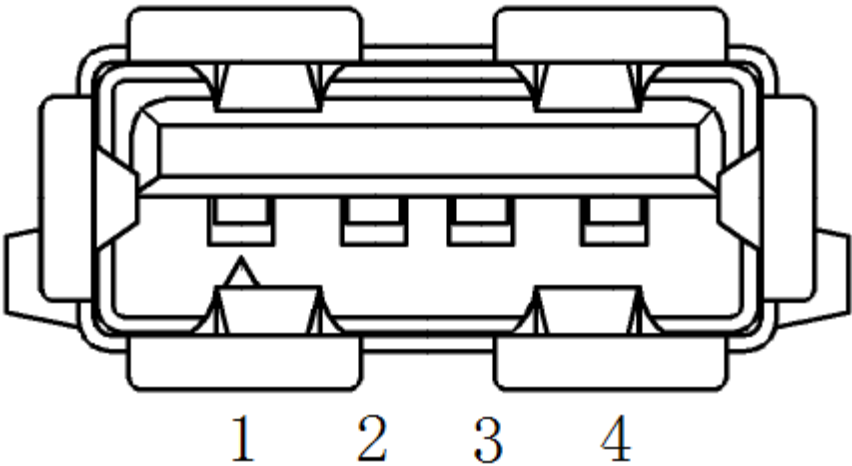
Fig. 8-2: Signal connection USB interface

☞ This interface is an USB-A connection that is only connection for VDP81.1 or VDP82.1.

Permissible length of the USB connection cable: max. 1.0 m.

8.3 Handwheel extended interface

Pin assignment

J5

Pin no.	Assignment
04	GND
03	+5V
02	B (TTL)
01	A (TTL)

Tab. 8-3: Pin assignment J5

Signal connection diagram
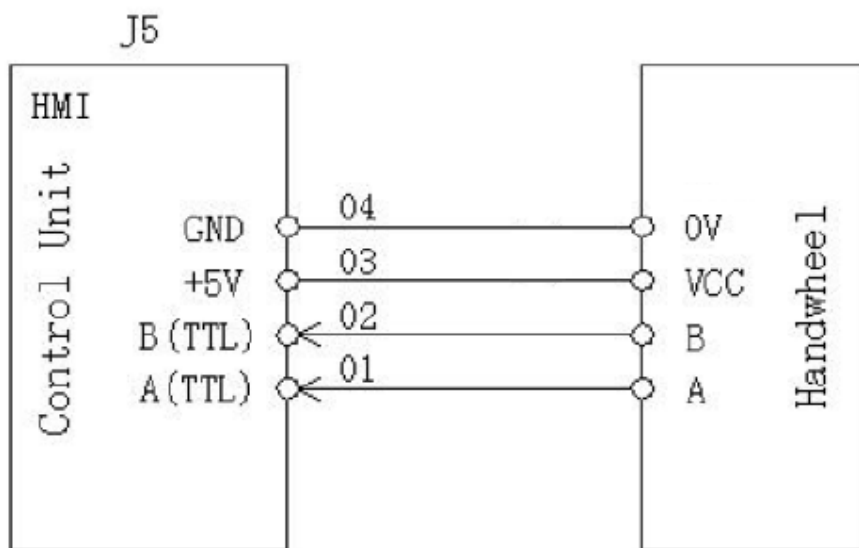
Fig. 8-3: Handwheel signal interface

Fig. 8-4: Signal connection J5

Technical data:

- Conductor cross section AWG min. 24
- Conductor cross section AWG max. 16

Signal description

Signal description	Description
GND	Handwheel GND
+5V	Handwheel +5V
A (TTL)	TA signal handwheel
B (TTL)	TB signal handwheel

Tab. 8-4: Signal description J5

Recommend cable length is less than 3 m.

8.4 Interface Connection of Handwheel Unit

Pin assignment

J9

Pin no.	Assignment	Pin no.	Assignment
01	A	14	*A
02	B	15	*B
03	/A (TTL)	16	/B (TTL)
04	+5V	17	GND
05	MAG1	18	MAG2
06	MAG3	19	MAG4
07	AXIS1	20	AXIS2
08	AXIS3	21	AXIS4
09	COM	22	EMG2
10	EMG1	23	EMG4
11	EMG3	24	COM
12	DO	25	24V
13	24V		

Tab. 8-5: Pin assignment J9

Signal connection diagram
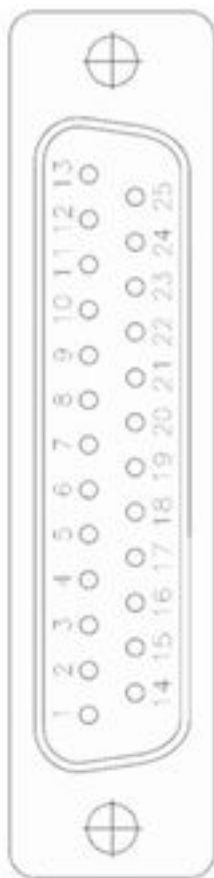
Fig. 8-5:   Handwheel unit - Output interface
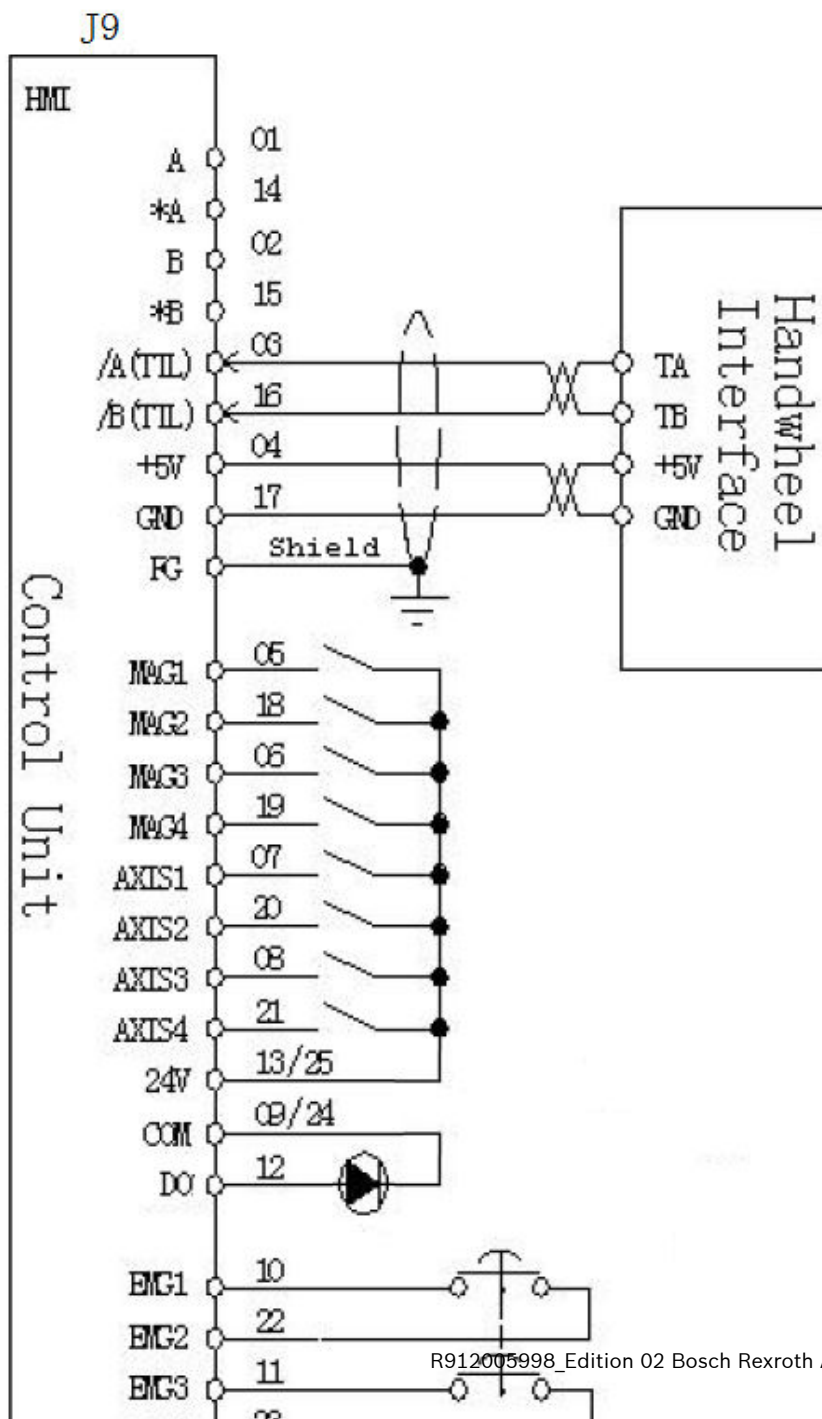
1. Output of type open collector

☞   **Check grounding terminals!**

All power supply terminals (GND) have to be interconnected.

Check the connections!

2. Input of type differential

Fig. 8-7: Handwheel unit - Input of type differential

☞   **Check grounding terminals!**

All power supply terminals (GND) have to be interconnected.

Check the connections!

Signal description

Signal description	Description
A	Differential signal A-phase handwheel
*A	Differential signal *A-phase handwheel
B	Differential signal B-phase handwheel
*B	Differential signal *B-phase handwheel
/A (TTL)	TA-signal handwheel
/B (TTL)	TB-signal handwheel
+5V	Handwheel +5V
GND	Handwheel GND
MAG1	Handwheel override Select 1
MAG2	Handwheel override Select 2
MAG3	Handwheel override Select 3
MAG4	Handwheel override Select 4
AXIS1	Handwheel axis selection 1
AXIS2	Handwheel axis selection 2
AXIS3	Handwheel axis selection 3
AXIS4	Handwheel axis selection 4
24V	Control, power source +24V
COM	Control, GND
DO18	Logic instruction handwheel
EMG1	Stop Switch Pin
EMG2	Stop Switch Pin
EMG3	Stop Switch Pin
EMG4	Stop Switch Pin

☞   Recommend cable length is less than 3 m.

8.5 Stop Switch in Interface for Handwheel Unit

Pin assignment

J6

Pin no.	Assignment
01	EMG1
02	EMG2
03	EMG3
04	EMG4

Tab. 8-6: Pin assignment J6

Signal connection diagram
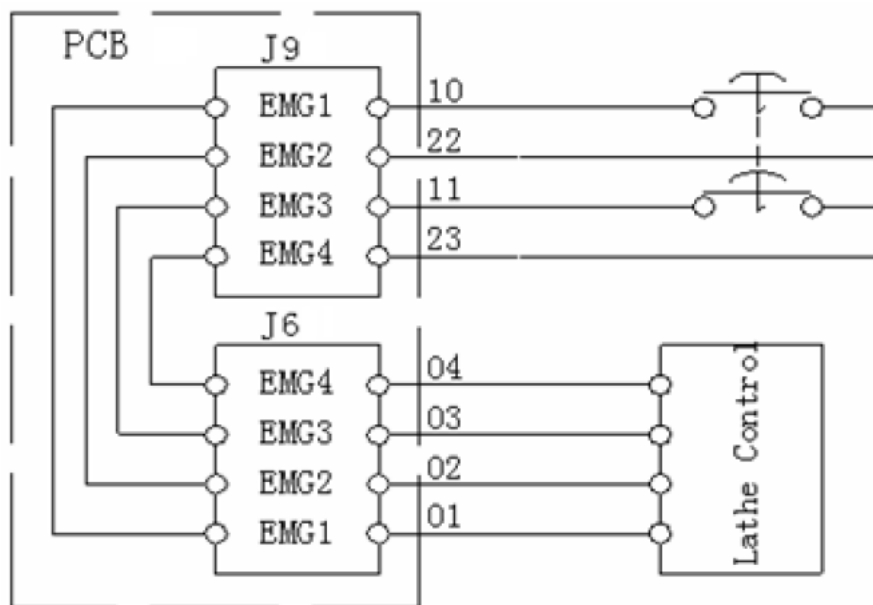
Fig. 8-8: Stop Switch in handwheel unit signal connection
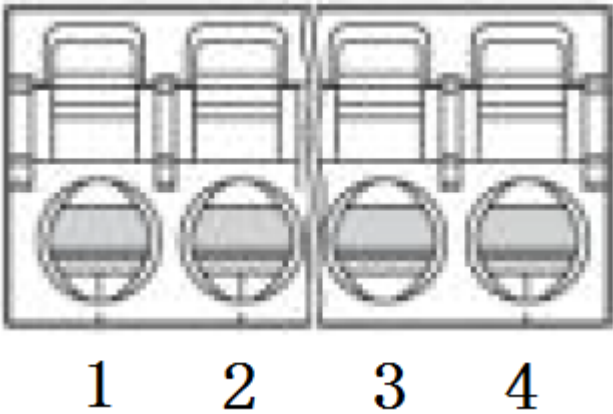
Fig. 8-9: Connecting the Stop Switch interface in the handwheel unit
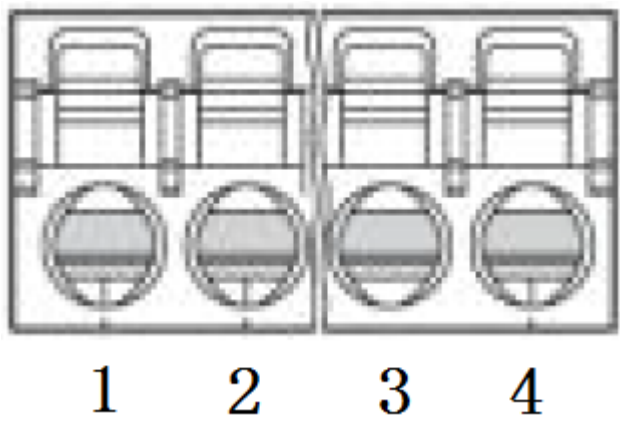
Technical data:

- Conductor cross section AWG min. 24
- Conductor cross section AWG max. 16

Signal description

Signal description	Description
EMG1	Stop Switch Pin
EMG2	Stop Switch Pin
EMG3	Stop Switch Pin
EMG4	Stop Switch Pin

8.6 Connecting the Extended IO Interface

Pin assignment

J10

Pin no.	Assignment
01	DI-00
02	DI-01
03	DI-02
04	DI-03
05	DI-04
06	DI-05
07	DI-06
08	DI-07

Tab. 8-7: Pin assignment J10

Pin assignment

J14

Pin no.	Assignment
01	DI-08
02	DI-09
03	DI-10
04	DI-11
05	DI-12
06	DI-13
07	DI-14
08	DI-15

Tab. 8-8: Pin assignment J14

Pin assignment

J15

Pin no.	Assignment
01	DO-00
02	DO-01
03	DO-02
04	DO-03
05	DO-04
06	DO-05

Pin no.	Assignment
07	DO-06
08	DO-07

Tab. 8-9: Pin assignment J15

Signal connection diagram
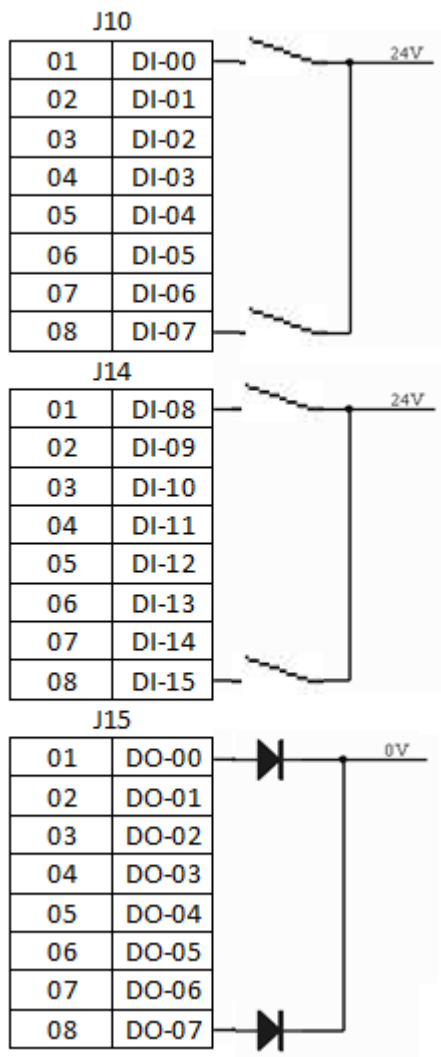
Fig. 8-10: Extended IO interface (circuit)
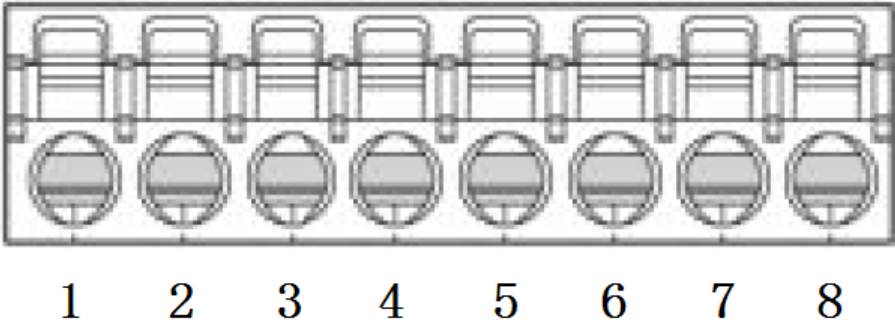
Fig. 8-11: Extended IO interface (plug connector)

Technical data:

- Conductor cross section AWG min. 24
- Conductor cross section AWG max. 16

☞ **Check the total current!**

The current for an individual output cannot exceed a maximum of 100 mA.

☞ **Check the polarity!**

Verify the correct signal interface polarity as an incorrect connection can result in fusing of the IO interface.

Check the correct position of the connection!

Signal description

Signal description	Description
DI-00 to DI-15	Digital input 16 bits (SELV)
DO-00 to DO-07	Digital output 8 bits (SELV)

☞ Recommend cable length is less than 3 m.

8.7 Emergency Stop Switch

Emergency Stop Switch

Fig. 8-12: Emergency Stop Switch

Type code: YW1B-V4E02R (IDEC)

Technical Data:

- UL number: E68961
- Pilot Duty Code A600
- Ui 600V
- I th10A
- Use copper wire, 14 - 16 AWG, 1.3 N.m

The emergency stop switch not connection when the product delivery.

Please connect wire base on the technical data as above.

9 Connections and Interfaces of VAC06.1

9.1 Interface Connection of VAC06.1 Power Supply

Pin assignment

J1

Pin no.	Assignment
01	+24V
02	0V

Tab. 9-1: Pin assignment J1

Detailed description
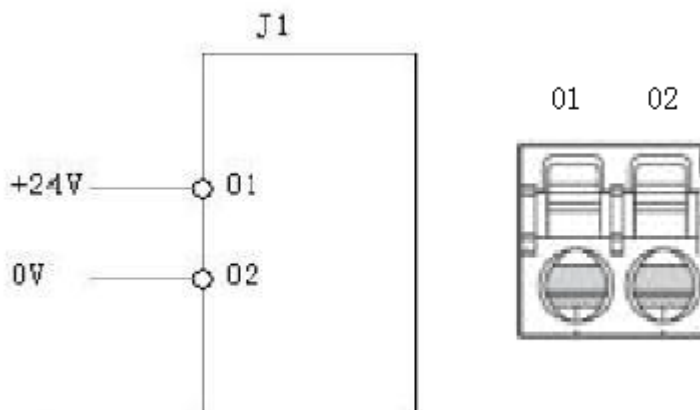
Fig. 9-1: Power supply interface

Technical data:

- Nominal input: 24 V DC ±20%
- Nominal current: 0.3 A
- Conductor cross section AWG min. 24
- Conductor cross section AWG max. 16

9.2 USB Interface

Pin assignment

J2

Pin no.	Assignment
01	-
02	D-
03	D+
04	GND

Tab. 9-2: Pin assignment J2

Signal connection diagram
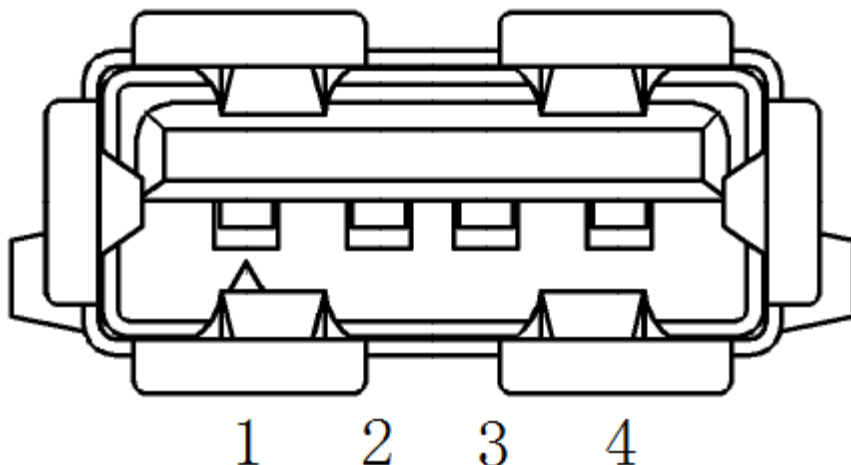
Fig. 9-2: Signal connection USB interface

☞ This interface is an USB-A connection that is only connection for VDP81.1 or VDP82.1.

Permissible length of the USB connection cable: max. 1.0 m.

9.3 Handwheel extended interface

Pin assignment

J4

Pin no.	Assignment
04	GND
03	+5V
02	B (TTL)
01	A (TTL)

Tab. 9-3: Pin assignment J4

Signal connection diagram
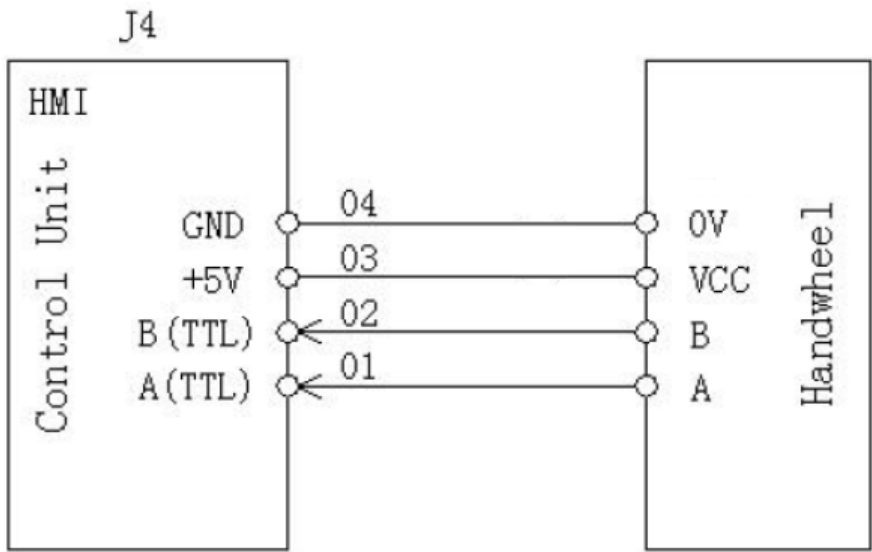
Fig. 9-3: Handwheel signal interface

Fig. 9-4: Signal connection J4

Technical data:

● Conductor cross section AWG min. 24

● Conductor cross section AWG max. 16

Signal description

Signal description	Description
GND	Handwheel GND
+5V	Handwheel +5V
A (TTL)	TA signal handwheel
B (TTL)	TB signal handwheel

Tab. 9-4: Signal description J4

☞ Recommend cable length is less than 3 m.

9.4 Interface Connection of Handwheel Unit

Pin assignment

J6

Pin no.	Assignment	Pin no.	Assignment
01	A	14	*A
02	B	15	*B
03	/A (TTL)	16	/B (TTL)
04	+5V	17	GND
05	MAG1	18	MAG2
06	MAG3	19	MAG4
07	AXIS1	20	AXIS2
08	AXIS3	21	AXIS4
09	COM	22	EMG2
10	EMG1	23	EMG4
11	EMG3	24	COM
12	DO	25	24V
13	24V		

Tab. 9-5: Pin assignment J6

Signal connection diagram
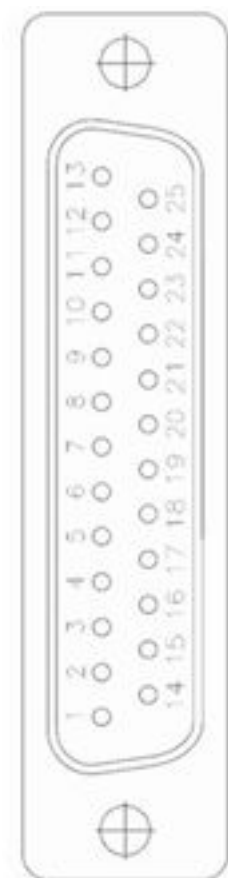
Fig. 9-5: Handwheel unit - Output interface
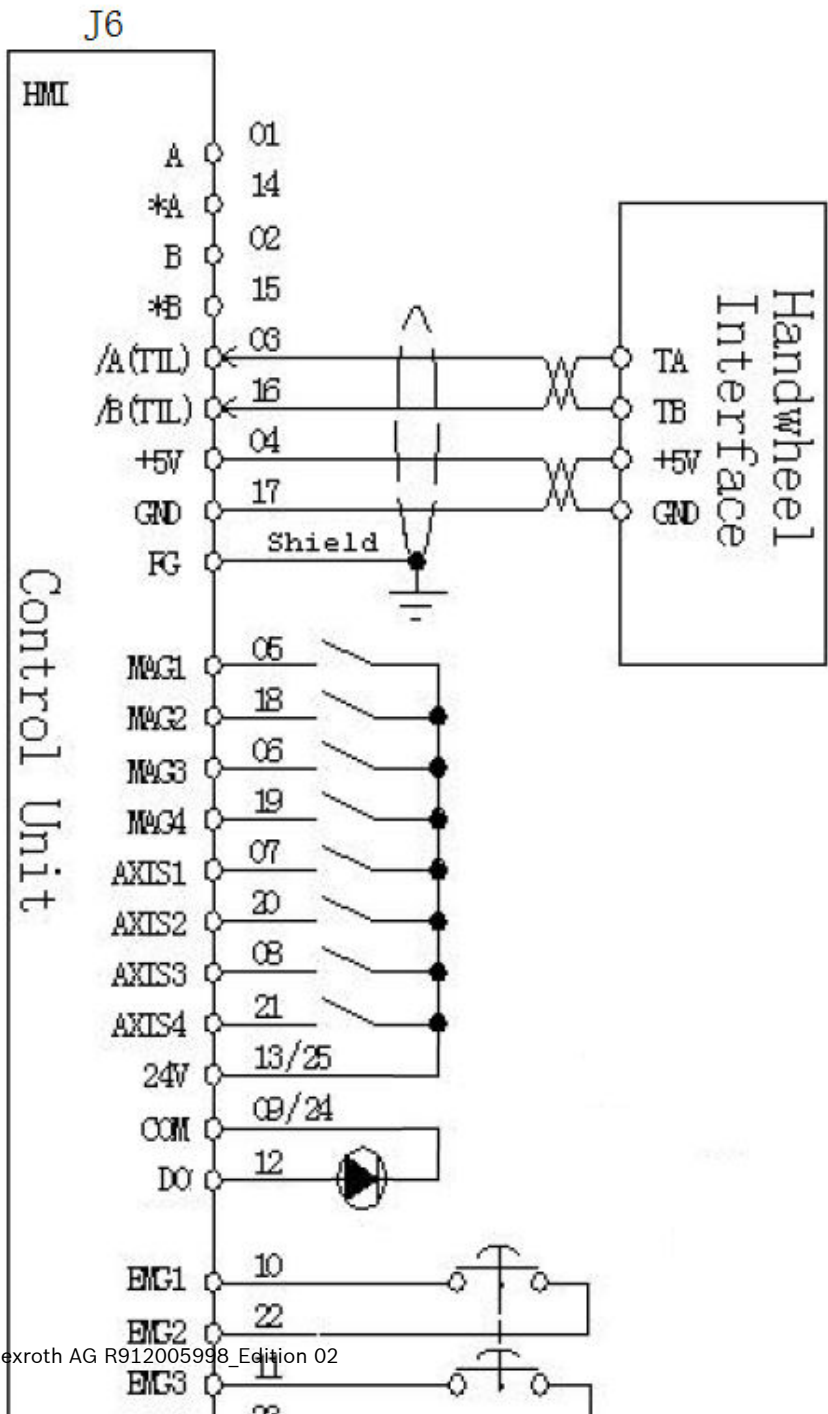
1. Output of type open collector

☞   **Check grounding terminals!**

All power supply terminals (GND) have to be interconnected.

Check the connections!

2. Input of type differential

Fig. 9-7: Handwheel unit - Input of type differential

☞ **Check grounding terminals!**

All power supply terminals (GND) have to be interconnected.

Check the connections!

Signal description

Signal description	Description
A	Differential signal A-phase handwheel
*A	Differential signal *A-phase handwheel
B	Differential signal B-phase handwheel
*B	Differential signal *B-phase handwheel
/A (TTL)	TA-signal handwheel
/B (TTL)	TB-signal handwheel
+5V	Handwheel +5V
GND	Handwheel GND
MAG1	Handwheel override Select 1
MAG2	Handwheel override Select 2
MAG3	Handwheel override Select 3
MAG4	Handwheel override Select 4
AXIS1	Handwheel axis selection 1
AXIS2	Handwheel axis selection 2
AXIS3	Handwheel axis selection 3
AXIS4	Handwheel axis selection 4
24V	Control, power source +24V
COM	Control, GND
DO18	Logic instruction handwheel
EMG1	Stop Switch Pin
EMG2	Stop Switch Pin
EMG3	Stop Switch Pin
EMG4	Stop Switch Pin

☞ Recommend cable length is less than 3 m.

9.5 Stop Switch in Interface for Handwheel Unit

Pin assignment

J5

Pin no.	Assignment
01	EMG1
02	EMG2
03	EMG3
04	EMG4

Tab. 9-6: Pin assignment J5

Signal connection diagram
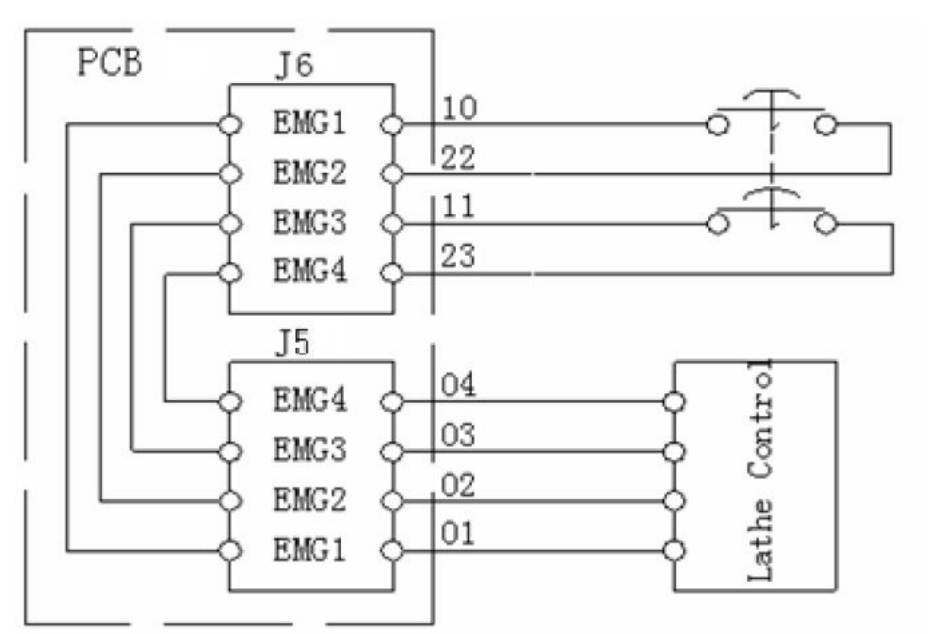
Fig. 9-8: Stop Switch in handwheel unit signal connection
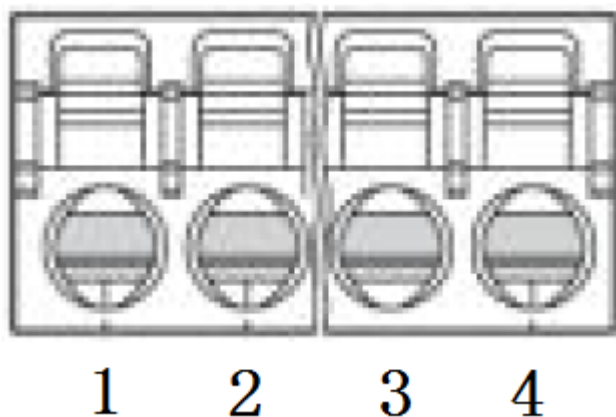
Fig. 9-9: Connecting the Stop Switch interface in the handwheel unit
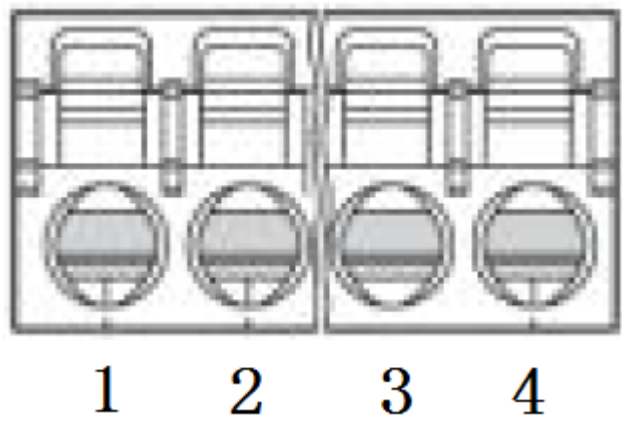
Technical data:

- Conductor cross section AWG min. 24
- Conductor cross section AWG max. 16

Signal description

Signal description	Description
EMG1	Stop Switch Pin
EMG2	Stop Switch Pin
EMG3	Stop Switch Pin
EMG4	Stop Switch Pin

9.6 Connecting the Extended IO Interface

Pin assignment

J7

Pin no.	Assignment	Pin no.	Assignment
01	DI-00	26	DO-01
02	DI-01	27	DO-02
03	DI-02	28	DO-03
04	DI-03	29	DO-04
05	DI-04	30	DO-05
06	DI-05	31	DO-06
07	DI-06	32	DO-07
08	DI-07	33	DO-08
09	DI-08	34	DO-09
10	DI-09	35	DO-10
11	DI-10	36	DO-11
12	DI-11	37	DO-12
13	DI-12	38	DO-13
14	DI-13	39	DO-14
15	DI-14	40	DO-15
16	DI-15	41	-
17	DI-16	42	-
18	DI-17	43	-
19	DI-18	44	-
20	DI-19	45	-
21	DI-20	46	-
22	DI-21	47	COM+
23	DI-22	48	COM+
24	DI-23	49	COM-
25	DO-00	50	COM-

Tab. 9-7: Pin assignment J7

Pin assignment

J8

Pin no.	Assignment	Pin no.	Assignment
01	DI-24	26	DO-17
02	DI-25	27	DO-18

Pin no.	Assignment	Pin no.	Assignment
03	DI-26	28	DO-19
04	DI-27	29	DO-20
05	DI-28	30	DO-21
06	DI-29	31	DO-22
07	DI-30	32	DO-23
08	DI-31	33	DO-24
09	DI-32	34	DO-25
10	DI-33	35	DO-26
11	DI-34	36	DO-27
12	DI-35	37	DO-28
13	DI-36	38	DO-29
14	DI-37	39	DO-30
15	DI-38	40	DO-31
16	DI-39	41	-
17	DI-40	42	-
18	DI-41	43	-
19	DI-42	44	-
20	DI-43	45	-
21	DI-44	46	-
22	DI-45	47	COM+
23	DI-46	48	COM+
24	DI-47	49	COM-
25	DO-16	50	COM-

Tab. 9-8: Pin assignment J8

Pin assignment

J9

Pin no.	Assignment	Pin no.	Assignment
01	DI-48	26	DO-33
02	DI-49	27	DO-34
03	DI-50	28	DO-35
04	DI-51	29	DO-36
05	DI-52	30	DO-37
06	DI-53	31	DO-38
07	DI-54	32	DO-39
08	DI-55	33	DO-40

Pin no.	Assignment	Pin no.	Assignment
09	DI-56	34	DO-41
10	DI-57	35	DO-42
11	DI-58	36	DO-43
12	DI-59	37	DO-44
13	DI-60	38	DO-45
14	DI-61	39	DO-46
15	DI-62	40	DO-47
16	DI-63	41	-
17	DI-64	42	-
18	DI-65	43	-
19	DI-66	44	-
20	DI-67	45	-
21	DI-68	46	-
22	DI-69	47	COM+
23	DI-70	48	COM+
24	DI-71	49	COM-
25	DO-32	50	COM-

Tab. 9-9: Pin assignment J9

Pin assignment

J10

Pin no.	Assignment	Pin no.	Assignment
01	DI-72	26	DO-49
02	DI-73	27	DO-50
03	DI-74	28	DO-51
04	DI-75	29	DO-52
05	DI-76	30	DO-53
06	DI-77	31	DO-54
07	DI-78	32	DO-55
08	DI-79	33	DO-56
09	DI-80	34	DO-57
10	DI-81	35	DO-58
11	DI-82	36	DO-59
12	DI-83	37	DO-60
13	DI-84	38	DO-61
14	DI-85	39	DO-62

Pin no.	Assignment	Pin no.	Assignment
15	DI-86	40	DO-63
16	DI-87	41	-
17	DI-88	42	-
18	DI-89	43	-
19	DI-90	44	-
20	DI-91	45	-
21	DI-92	46	-
22	DI-93	47	COM+
23	DI-94	48	COM+
24	DI-95	49	COM-
25	DO-48	50	COM-

Tab. 9-10: Pin assignment J10

Signal connection diagram
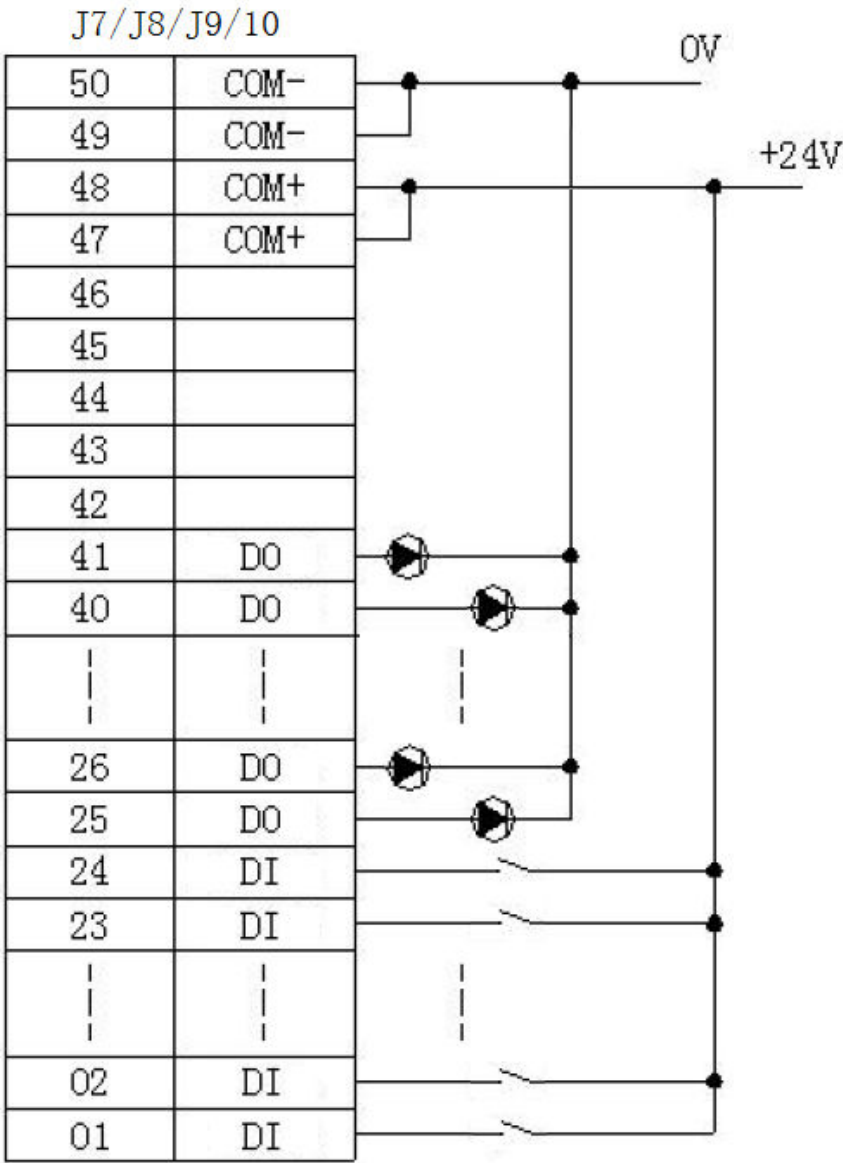
Fig. 9-10: Extended IO interface (circuit)
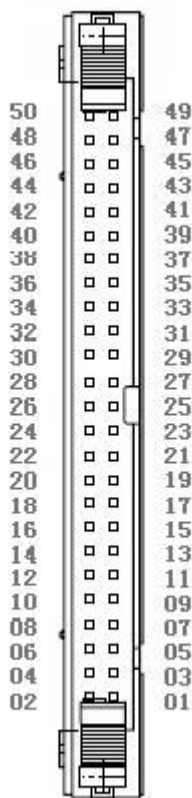
Fig. 9-11: Extended IO interface (plug connector)

☞ **Check the total current!**

The current for an individual output cannot exceed a maximum of 100 mA.

☞ **Check the polarity!**

Verify the correct signal interface polarity as an incorrect connection can result in fusing of the IO interface.

Check the correct position of the connection!

Signal description

Signal description	Description
DI-00 to DI-95	Digital input 96 bits (SELV)
DO-00 to DO-63	Digital output 64 bits (SELV)
COM+	24V
COM-	0V

☞   Recommend cable length is less than 3 m.

10 Universal Panel of VAM81.1 and VAM82.1

10.1 Labeling Strips

There are 4 labeling strips that can be changed by the user. The labeling strips are inserted at the back of the panel VAM81.1 and VAM82.1.
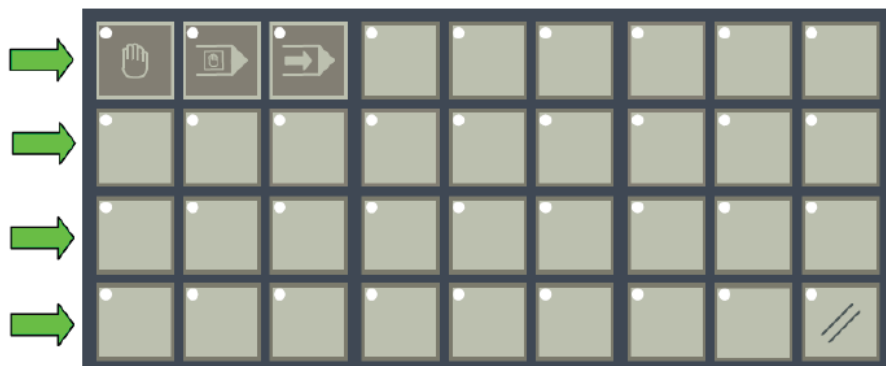
Fig. 10-1: Inserting direction of strip of VAM81.1 and VAM82.1

10.2 Labeling the Labeling Strips

The Universal panel is equipped with labeled labeling strips by default. These labeling strips are printed with standard symbols of the milling operator panel.

● When changing the labeling strip, please note that the 32 operator panel keys can be changed by the user. 4 operator panel keys are already assigned on the operator panel (Manual, MDI, Auto and Reset)

● Bosch Rexroth provides a printer template to allow the user to print his own labeling strips. All currently available symbols are provided as bitmaps. This template can be downloaded on the Bosch Rexroth webpage.

● The sheet type used to print the labeling strips is specified in the template or the documentation

The template or the documentation contains information about the manufacturer and the order number of the sheets.

With each equipped Universal operator panel, 2 blank sheets are provided to print the labeling strips. The sheet format is DIN A4.

A standard laser printer is required to print the sheets.

11 Accessory

11.1 Hand-Held Terminal VCH02 Handwheel

Order information

Material number	R912006061
Type	VCH02.2NNN-000RS

Tab. 11-1: Order information

Technical parameters

Operating voltage		DC 5 V ± 0.25 V
Power consumption		< 90 mA
Output signals	H	> 2.5 V
	L	< 0.5 V
Max. input current		20 mA
Rise/fall time		2 us
Max. output frequency		5 KHz
Dwell torque		$2*10^{-2} - 6*10^{-2}$ Nm
Permissible load		Radial : 20 N
		Axial : 10 N
Speed		max. 200 min^{-1}
Vibration		50 m/s^2, 10～200 Hz, 2 h in each position XYZ
Shock		980 m/s^2,6 ms 2 * in XYZ direction
Weight		0.6 Kg

Tab. 11-2: Technical parameters

Stop switch

Fig. 11-1: Stop switch

Type code: XA1E-BV3U02R (IDEC)

Technical Data:

- UL number: E68961
- Max. load DC: DC 30V 1A
- Min. load DC: DC 5V 1mA

Interface assignment

Pin no.	Color of wire	Signal	Element
1	Red	+5V	Pulse Generic Machine
2	Black	0V	
3	Yellow	A	
4	White	B	
*3	Pink	Ā	Line Driver Output
*4	Purple	B̄	
5	Light Blue	+	LED display
6	Red/black	-	

7	Green	X	Axis selection
8	Orange	Y	
9	Brown	Z	
10	Brown/black	4	
11	Grey	X1	Factor for motion
12	Grey/black	X10	
13	White/black	X100	
14	Blue/black	COM	
15	Yellow/black	C1	Stop Switch
16	Orange/black	CN1	
19	Green/black	C2	
17	Purple/black	CN2	
18	Pink/black		Reserved
Shield			N.C.

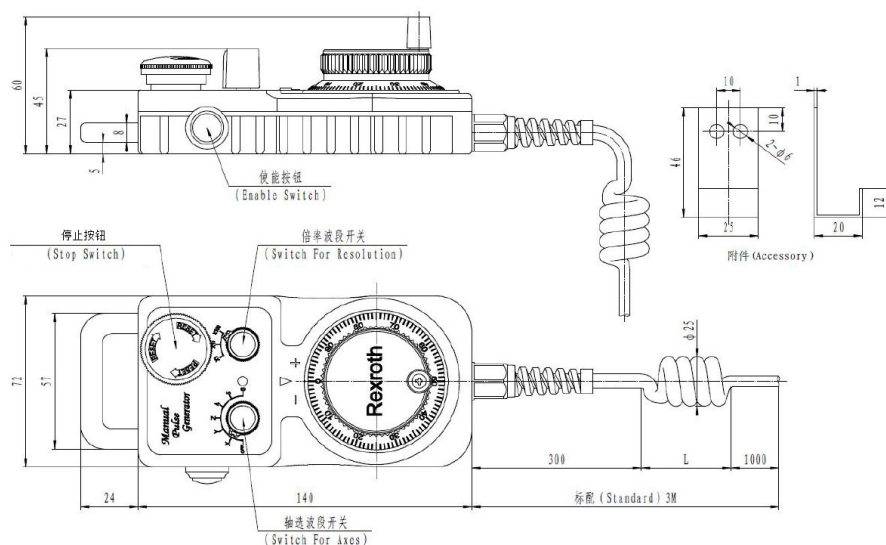**Tab. 11-3:** Interface assignment

Dimensions

Fig. 11-2: Dimensions

12 Ordering Information

12.1 Accessories and Spare Parts

For ordering information about accessories and spare parts, please refer to chapter 11.1 "Hand-Held Terminal VCH02 Handwheel" on page 79.

12.2 Type Designation Code of VDP81.1

Short text column										1									2									3									4
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
Example:	V	D	P	8	1	.	1	F	K	N	-	C	1	-	N	N	-	E	N																						

Product

VDP.........................= VDP

Line

81.. = 81

Design

1... = 1

Fornt panel and display

Rexroth Design

10,4" with ASCII tastatur,
graphit gray...= FK

Additional option

Without... = N

Control panel interface

Communication Compact Interface ....= C1

Interface

Without..= NN

Other design

Language symbols in english .... = EN

Fig. 12-1: Type designation code of VDP81.1

12.3 Type Designation Code of VDP82.1

Short text column										1										2										3										4
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
Example:	V	D	P	8	2	.	1	F	K	N	-	C	1	-	N	N	-	E	N																						

Product
VDP..........................= VDP

Line
82 .... = 82

Design
1 .... = 1

Fornt panel and display
Rexroth Design
10,4" with ASCII tastatur,
graphit gray ....= FK

Additional option
Without.. = N

Control panel interface
Communication Compact Interface ....= C1

Interface
Without..= NN

Other design
Language symbols in english ....= EN

Fig. 12-2: Type designation code of VDP82.1

12.4 Type Designation Code of VAM81.1

Short text column										1									2									3									4
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
Example:	V	A	M	8	1	.	1	-	U	S	B	-	N	F	-	T	A	-	T	A	-	V	E	-	M	A	-	N	N	N	N							

Product
VAM .... = VAM

Line
81 .... = 81

Design
1 .... = 1

Communication bus
USB...= USB

Configuration [1]
E.g. NF-TA-TA-VE-MA

Other design
None .... = NNNN

Fig. 12-3: Type designation code of VAM81.1

12.5 Type Designation Code of VAM82.1

Short text column										1 0	1	2	3	4	5	6	7	8	9	2 0	1	2	3	4	5	6	7	8	9	3 0	1	2	3	4	5	6	7	8	9	4 0
	1	2	3	4	5	6	7	8	9																																
Example:	V	A	M	8	2	.	1	-	U	S	B	-	N	F	-	T	A	-	T	A	-	V	E	-	M	A	-	N	N	N	N										

Product
VAM .... = VAM

Line
82 .... = 82

Design
1 .... = 1

Communication bus
USB...= USB

Configuration [1]
E.g. NF-TA-TA-VE-MA

Other design
None .... = NNNN

Fig. 12-4: Type designation code of VAM82.1

12.6 Type Designation Code of VAC06.1

Fig. 12-5: Type designation code of VAC06.1

12.7 Connecting Cables

Data exchange cable to connect the HMI operator panel to MTX micro.

Product key	Material number	Description
QKB0030/000,0	R911327086	Data exchange cable between HCT/HCQ and VDP8x.1, different lengths (max. 10 m)
QKB0028/000,0	R911344410	Data exchange cable between HCT/HCQ and VAC06.1, different lengths (max. 10 m)
QKB0029	R912005313	Data exchange cable between VDP81.1(J3)/VDP82.1(J3) and VAM81.1(J3)/VAM82.1(J3)/ VAC06.1(J2), length: 0.5m (max. 1 m)

Tab. 12-1: Connecting cable

13 Disposal

13.1 Take-Back

Our products can be returned to our premises free of charge for disposal. However, the products must be free of impurities like oil, grease or other impurities.

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
Bürgermeister-Dr.-Nebel-Straße 2
D-97816 Lohr am Main, Germany

13.2 Packaging

The packaging materials consist of cardboard, plastic material, wood or expanded polystyrene (EPS). The packaging materials can be recycled without any problem.

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

14 Service and support

Our worldwide service network provides an optimized and efficient support. Our experts offer you advice and assistance should you have any queries. You can contact us **24/7**.

Service Germany

Our technology-oriented Competence Center in Lohr, Germany, is responsible for all your service-related queries for electric drive and controls.

Contact the **Service Helpdesk & Hotline** under:

Phone:	**+49 9352 40 5060**
Fax:	**+49 9352 18 4941**
E-mail:	service.svc@boschrexroth.de
Internet:	http://www.boschrexroth.com

Additional information on service, repair (e.g. delivery addresses) and training can be found on our internet sites.

Service worldwide

Outside Germany, please contact your local service office first. For hotline numbers, refer to the sales office addresses on the internet.

Preparing information

To be able to help you more quickly and efficiently, please have the following information ready:

- Detailed description of malfunction and circumstances resulting in the malfunction
- Type plate name of the affected products, in particular type codes and serial numbers
- Your contact data (phone and fax number as well as your email address)

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Notes

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