BERGHOF

AUTOMATION

ZUNDEL Holding Enterprise

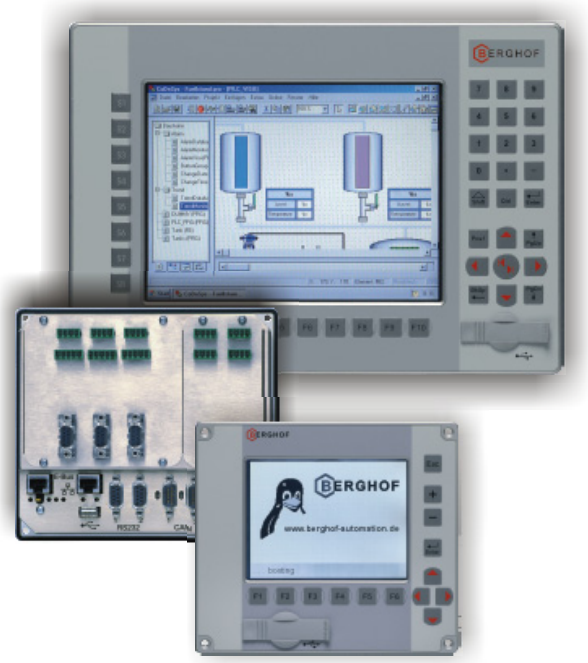
DIALOG CONTROLLER

DC1005

DC1010

DC1012

V.1.3



Equipment Manual

CANtrol® // dialog

Disclaimer

The content of this publication was checked for compliance with the hardware and software described. However, discrepancies may arise, therefore no liability is assumed regarding complete compliance. The information in this document will be checked regularly and all necessary corrections will be included in subsequent editions. Suggestions for improvements are always welcome.

Subject to technical changes.

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Legal Notice

For the proper characterization of our products it is essential that we employ registered trademarks and manufacturer names in the documentation related to the services and goods we sell. We would expressly note that all trademarks, brand names and marks as well as manufacturer names used in this document are the sole property of the individual owner and are used by us strictly for the purposes of characterizing our product.

General Information on this Manual

Content:
This manual describes the DIALOG CONTROLLER DC1005 and its modifications. The product-related information contained herein was up to date at the time of publication of this manual.

Completeness:
This manual is complete only in conjunction with the user manual entitled

'Introduction
to CANtrol Automation System'

s and the product-related hardware or software user manuals required for the particular application.

Standards:
The CANtrol automation system, its modules and its application are all oriented towards the international standard, IEC 61131, Part 1 to 4 (EN 61131, Part 1 to 3 and Bbl 1).
Supplementary Sheet 1 of EN 61131 (IEC 61131-4) entitled 'User Guidelines' is of particular importance for the user.

Order numbers:
Please see the relevant product overview in the 'Introduction to CANtrol Automation System' manual for a list of available products and their order numbers.

ID No.: 2809820

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Update

Version	Date	Subject
1.1	22.09.06	First version
1.2		Inexistent
1.3	31.05.07	Dimensions updated under “Technical Specifications” and in the graphs. Plug/unplug cycles added to the “USB Pin Assignment” section of the technical specifications. Description, “Chemical Resistance for Touch Screens” and "I/O-Modules" included. Notice to 'SD-card reader' included. Update under 'Power Supply -Internal power pack, 'Profibus master card' and 'Profibus slave card'.

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1. General Information

Documentation

This equipment manual is intended for qualified personnel and contains information regarding the mounting, installation, commissioning and maintenance of the DIALOG CONTROLLER.

The information contained in this manual is subject to change without prior notice.

1.1. About This Manual

This equipment manual is an integral part of the product. Make sure the equipment manual is always available near the product's point-of-employment. The manual contains information about the following topics:

- Areas of application;
- Safety;
- Mechanical construction;
- Electrical construction;
- Connections;
- Commissioning;
- Care and maintenance;
- Decommissioning;
- Disposal.

1.2. Hazard Categories and Terminology

DANGER	**Immediate danger** Failure to observe the information indicated by this warning will result in death, serious injury or extensive property damage.
WARNING	**Potential danger** Failure to observe the information indicated by this warning may result in death, serious injury or extensive property damage.
CAUTION	**Danger** Failure to observe the information indicated by this warning may result in injury or property damage.
NOTICE	**No hazard** Information indicated in this manner provides additional notes concerning the product.

1.3. Qualified Personnel

Only qualified personnel may install, operate and maintain the DIALOG CONTROLLER.

Within the context of this documentation and the safety information it contains, qualified personnel constitutes trained specialists who have the authority to mount, install, commission, ground and identify equipment, systems and power circuits in accordance with the standards of safety technology, and who are familiar with the safety concepts of automation technology.

1.4. Due Diligence

The operator or original equipment manufacturer (OEM) must ensure:

- That the DIALOG CONTROLLER is only employed for its intended use;
- That the DIALOG CONTROLLER is only employed in a fault-free, operational state;
- That the equipment manual is always maintained in a complete and legible condition and is available at the point-of-employment of the DIALOG CONTROLLER;
- That only properly qualified and authorized personnel mount, install, commission and maintain the DIALOG CONTROLLER;
- That these specialists receive regular and ongoing instruction in all pertinent questions related to work safety and environmental protection and that they are familiar with the contents of the equipment manual, in particular, with the safety information it contains;
- That the equipment identifiers as well as safety and warning information applied to the DIALOG CONTROLLER are not removed and that they are maintained in a legible condition;
- That all international, federal, state and local ordinances governing the control of machinery and equipment applicable at the location at which the DIALOG CONTROLLER is employed are complied with;
- That the users always have available all relevant information they require with regard to the DIALOG CONTROLLER and its employment.

1.5. Basic Safety Measures

Working on the DC

Before beginning work on the DIALOG CONTROLLER you must always;

- First ensure that the equipment is in a safe state;
- Then first switch the DC off, followed by the equipment, and;
- Only then disconnect the DC from the equipment.

Hazards due to unforeseeable functional and processing movements when the INDUSTRIAL-PC is disconnected.

These can result in death, serious injury or extensive property damage.

All equipment components must be disconnected from the DIALOG CONTROLLER whenever the DIALOG CONTROLLER is not being used for operational or control purposes, e.g., during maintenance or during functional checks after repairs.

Lock out and tag out all equipment components after they have been switched off!

Opening the DC

First, please note all the tasks steps outlined in the above section “Working on the DC”.
The supply voltage must be switched off before opening the housing or when components are being installed or removed.

To do this, switch the power supply to the DIALOG CONTROLLER off. Then remove the plug from the power supply socket on the DIALOG CONTROLLER.

Do not open the housing cover with the power switched on!

Hazard due to contact with live components.

This can result in death, serious injury or extensive property damage.

Only open the housing cover once the DIALOG CONTROLLER has been safely disconnected from the power supply.

1.6. Use as Prescribed

This is a modular automation system based on the CANbus, intended for industrial control applications within the medium to high performance range.

The automation system is designed for use within Overvoltage Category I (IEC 364-4-443) for the controlling and regulating of machinery and industrial processes in low-voltage installations in which the rated supply voltage does not exceed 1,000 VAC (50/60 Hz) or 1,500 VDC.

Qualified project planning and design, proper transport, storage, installation, use and careful maintenance are essential to the flawless and safe operation of the automation system.

The automation system may only be used within the scope of the data and applications specified in the present documentation and associated user manuals.

The automation system is to be used only as follows:

- as prescribed,
- in technically flawless condition,
- without arbitrary or unauthorized changes and
- exclusively by qualified users

The regulations of the German professional and trade associations, the German technical supervisory board (TÜV), the VDE (Association of German electricians) or other corresponding national bodies are to be observed.

Safety-oriented (fail-safe) systems

Particular measures are required in connection with the use of SPC in safety-oriented systems. If an SPC is to be used in a safety-oriented system, the user ought to seek the full advice of the SPC manufacturer in addition to observing any standards or guidelines on safety installations which may be available.

⚠ WARNING	As with any electronic control system, the failure of particular components may result in uncontrolled and/or unpredictable operation. All types of failure and the associated fuse systems are to be taken into account at system level. The advice of the SPC manufacturer should be sought if necessary.

1.7. Conformity Declaration

1.7.1. CE Notice (European Union)

- The DIALOG CONTROLLER is currently still being tested.
  Our goal is to obtain CE certification for operating the device in both industrial as well as domestic environments.

1.8. Transport and Setup

NOTICE	Please note the specified storage conditions in the Section, "*Technical Specifications*".

Transport

Protect the DIALOG CONTROLLER against extreme mechanical stress during transport. Always transport the DIALOG CONTROLLER in its original packaging. The built-in components are extremely sensitive to jarring and strong vibrations.

CAUTION  CONDENSATION	**Condensation hazard resulting from climatic fluctuations.** Risk of damage as a result of moisture forming on or in the DIALOG CONTROLLER (condensation). This can result in destruction of the device or consequential damages. After storage or transport in cold weather or under conditions of strongly fluctuating temperatures, the DIALOG CONTROLLER must be allowed to slowly adjust to the ambient temperature at its point of use before it can be taken into service. In case of condensation, the unit may not be taken into service for at least 12 hours (temperature compensation).

Unpacking

Proceed as follows:

- Inspect the packaging for any external damage.
  If the packaging is severely damaged or if damage to the contents can be detected, do not open the packaging any further.
  Immediately contact your shipper and your supplier.
- Remove the packaging. Do not discard the original packaging!
  The packaging can be used for subsequent transport.
- Inspect the contents for visible shipping damage.
- Check the contents against the order for completeness.
  Save all included documentation. This documentation contains important information concerning the DIALOG CONTROLLER and is an integral part of the product.
- If shipping damage is detected or if the received contents do not agree with the order, please contact your supplier immediately.

Setup

This DIALOG CONTROLLER is designed for installation in fully enclosed circuit cabinets of industrial machinery and equipment.
When installing the DIALOG CONTROLLER, take particular care to ensure that the included seal profiles are not damaged. Also ensure compliance with the ambient conditions specified under "*Technical Specifications*".

2. Product Description

Short description

The DIALOG CONTROLLER is a real-time control module with a display and a broad spectrum of data interfaces. The module can be programmed in 'C' or in accordance with IEC 61131-3 (CoDeSys 2.3).

Installation

The DIALOG CONTROLLERs are intended for front panel or switch cabinet installation in harsh industrial environments. Maintenance is minimal, thanks to their fan-free design and flash memory.

Processors

The DIALOG CONTROLLER is equipped with either a 266 MHz or 400 MHz POWERPC™ processor from Freescale.

Display

The great differences in the appearance of the DIALOG CONTROLLER is based on the selection of the employed display technology and a common display diagonal size. 5.7” units with a monochrome (STN), color (CSTN) or TFT display are available. Above a diagonal screen size of 10.4” only TFT displays are employed. Unit housing dimensions and protective method (IP65 on the front) do not depend on whether the version in question has a touch screen or matrix keypad.

Ethernet

A 10/100 MBit/s Ethernet interface is included. TCP/IP and UDP/IP protocols offer highly flexible connections to visualization software, higher order control units or an IT infrastructure.

USB ports

The two USB host ports provide interfaces for widely dispersed peripheral devices. For example, one USB stick can be used to quickly and easily perform application updates or data extraction. Please contact our Technical Support if no driver support is available for a specific USB device.

CAN ports

The DIALOG CONTROLLER is equipped with two standard CAN interfaces, both of which can be operated at 1 MBit/s.

Serial ports

A total of three serial ports can be used on the DIALOG CONTROLLER. The RS232 programming interface is supplemented by an additional RS232 and an RS485 port.

E-bus extension The DIALOG CONTROLLER's I/O level can be expanded via the E-bus socket to include up to seven E-bus subscribers.

Expansion slots The device is equipped with three expansion slots for expansion cards (e.g., I/O cards) with the associated SPI interface. Alternately, one of the slots can be used for an "Anybus®" embedded bus module (e.g., Profibus DP) manufactured by HMS.

Real-time clock A software interface can be used to set or reset a real-time clock equipped with a backup battery.

SD card reader Data can be written to or read from memory cards using the conventional MMC/SD card interfaces.

NOTICE	If the SD card reader is activated, then the second RS232 interface (X5) is not longer available.

Performance feature overview

- Freescale POWERPC™ CPU: 266 (400) MHz
- Application program and data memory(RAM):
  64 (128) MB onboard / 32 (96) MB for the application
- Application program memory (Flash):
  16 (32) MB onboard / 8 (24) MB for the application
- Retain memory: 16 KB
- 1 Ethernet 10/100 port
- 2 (3) USB host ports
- 2 CAN ports
- 1 RS232 serial port for programming tools and applications
- 2 serial data ports: RS232 / RS485
- I/O level locally expandable via an internal E-bus for up to seven subscribers (digital / analog)
- 3 onboard expansion slots for I/Os and a bus module
- Real-time clock
- MMC /SD card slot

Standard delivery The controller module's standard delivery includes:

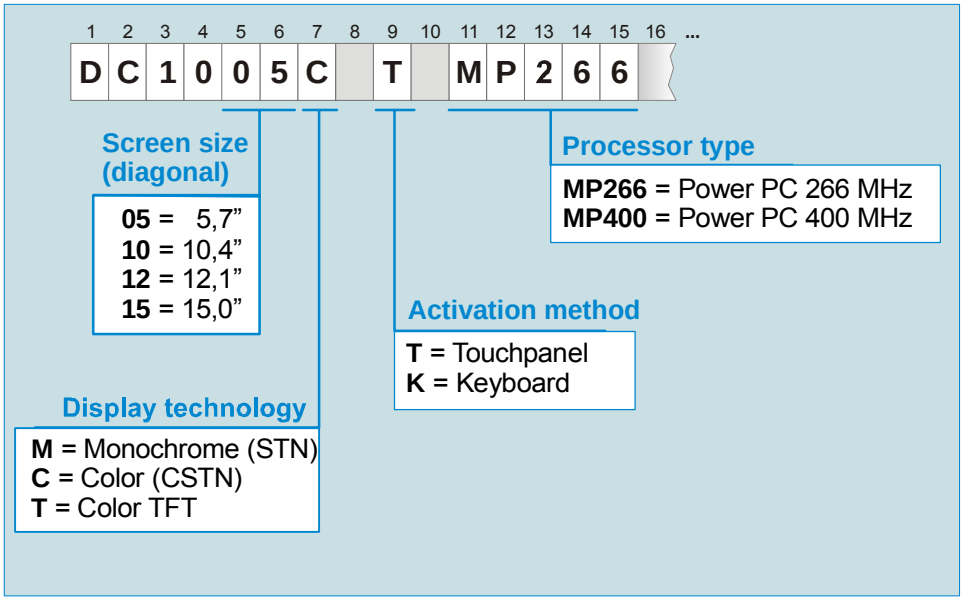
- DIALOG CONTROLLER DC1000.

2.1. Identification

Product DIALOG CONTROLLER

Type DC10xx

Identification key The identification code provides a key to the DIALOG CONTROLLER (refer to the nameplate). The code can be read as follows.



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Nameplate

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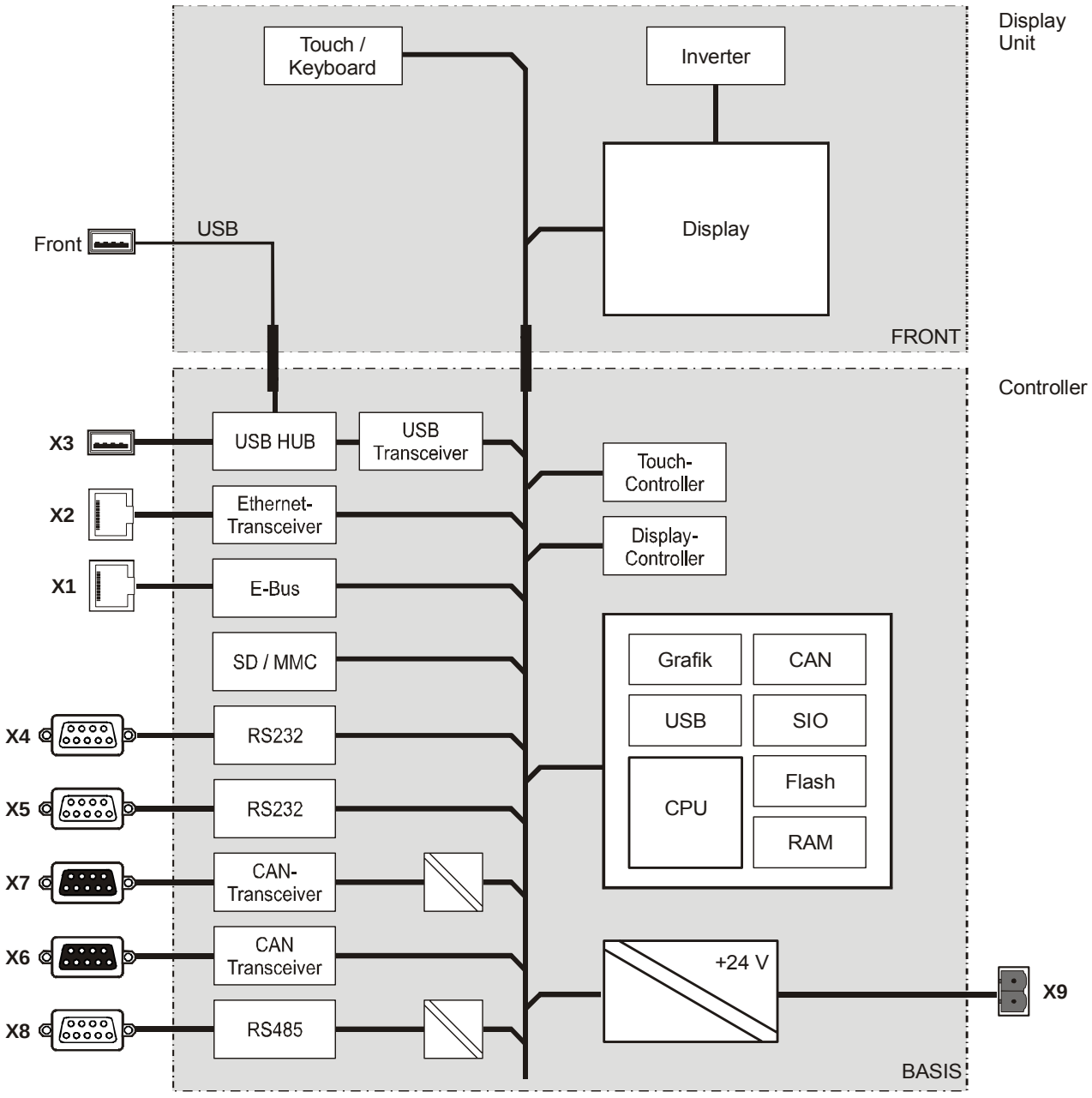
2.2. DIALOG CONTROLLER DC1005 / DC1010 / DC1012 Construction

2.2.1. Block Circuit Diagram



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2.3. Technical Specifications, DC1005

DIALOG CONTROLLER			
Product identification			
Display type:	**Input:**	**Designation:**	**Part no.:**
Monochrome (STN)	Keyboard	DC1005M K MP266	270000100
Monochrome (STN)	Touchpad	DC1005M T MP266	270000000
Color (CSTN)	Touchpad	DC1005C T MP266	270000200
Color TFT	Touchpad	DC1005T T MP266	270000300
Color TFT	Keyboard	DC1005T K MP266	270000900
Display			
Diagonal measurement		5.7”	
Resolution		320 x 240 pixels (1/4 VGA)	
Colors		Monochrome (STN): 4 Color (CSTN): 256 (8 bits per pixel) Color TFT 256 (8 bits per pixel)	
CPU, application memory			
CPU		Freescale PowerPC 266 MHz	
Program memory (Flash)		16 MB onboard / 8 MB for the application	
Program memory and data memory (RAM)		64 MB onboard / 32 MB for the application	
Retain memory		16 KB	
Real-time clock		Yes	
Development environment		CP1131 (CoDeSys 2.3)	
Dimensions and weight			
Dimensions (WxHxD [mm])		194 x 172 x 52 (+6 mm front panel)	
Weight		approx. 1.5 kg	
Operating conditions			
Ambient temperature range		0°C to 50°C	
Relative humidity		max. 85 %, non-condensing (monochrome: max. 75 %)	
Transport, storage			
Ambient temperature range		-20°C to +70°C	
Relative humidity		max. 85 %, non-condensing (monochrome: max. 75 %)	
Shock resistance			
Vibration		Sinusoidal (EN 60068-2-6) test: Fc 10 ... 150 Hz, 1 G (operation mode)	
Shock resistance		15 G (approx. 150 m/s²); duration: 10 ms; semi-sinusoidal (EN 60068-2-27) test: Ea	
EMC, protection type			
Interference emission		EN 61000-6-4, industrial environments	
Interference resistance		EN 61000-6-2, industrial environments	
Protection class		III	
Insulating resistance		EN 61131-2; DC 500 V test voltage	
Protection type		IP20 (front: IP65)	

Power supply (24 V power pack)	
Supply voltage	+24 VDC (-15% / +20%) SELV max. alternating component: 5%
Current consumption	Typically 1.0 A; max. 2.0 A at +24 VDC Fusing depending on the I/O load, max. 12A
Polarity reversal protection	Yes
Potential isolation	Yes, between CAN bus and I/Os
Ethernet port	
Number / interface type	1x 10/100 Base T
Connection method	RJ45
USB ports	
Number / interface types	1 x host USB, Rev. 1.1 (on rear) 1 x host USB, Rev. 1.1 (on front)
Plug/unplug cycles	max. 1000
CAN bus ports	
Number / interface types	2x standard CAN ISO 11898
Potential isolation	CAN0 (X6) potential isolated
Transmission rate	max. 1 MBit/s
Terminating resistor	Switchable
Serial port	
Number / interface types	2x RS232 1x RS485
Potential isolation	RS485 (X8) potential isolated
Terminating resistor	Switchable with the RS485
E-bus port	
Interface types	I/O expansion bus for up to 7 E-bus subscribers
Expansion slots	
Number / interface types	3 slots for 3 I/O modules or 2 I/O modules and one AnyBus® module

2.3.1. DC1005 Front View

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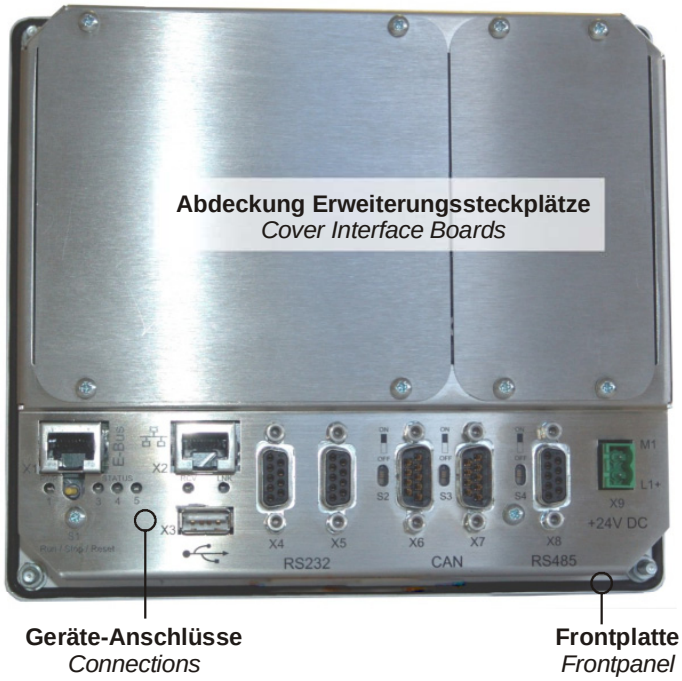
2.3.2. DC1005 Rear View



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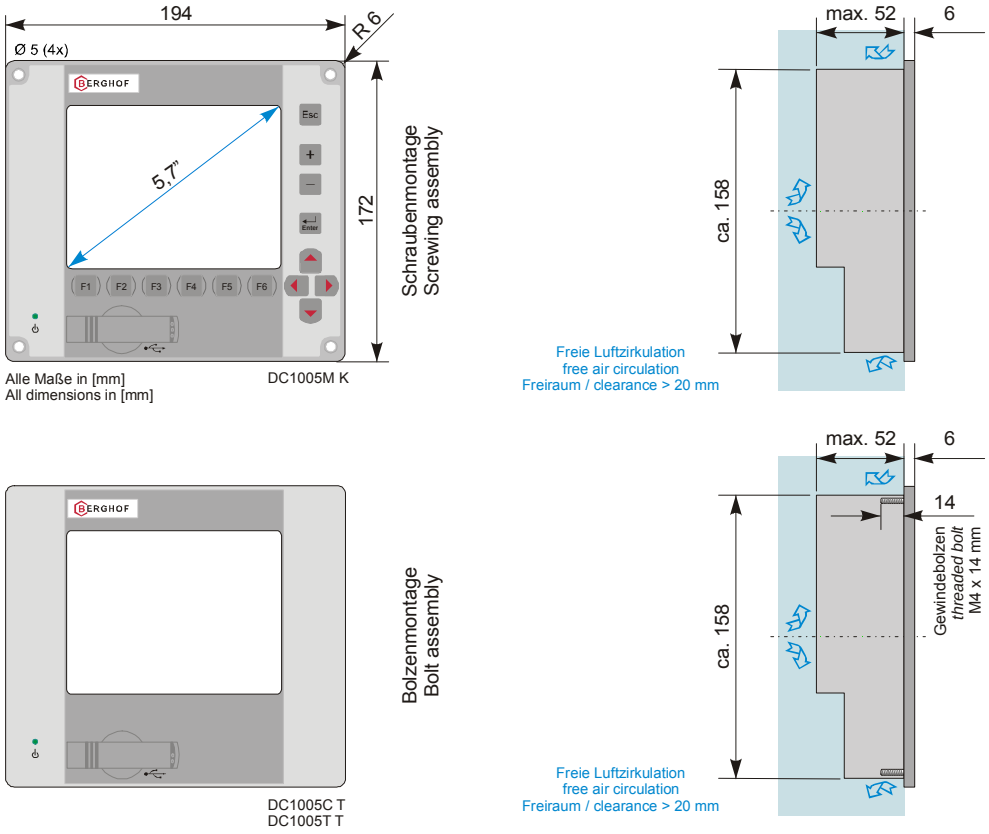
2.3.3. DC1005 Dimensions

Dimensions are identical for units equipped with either a keyboard or a touchpad.



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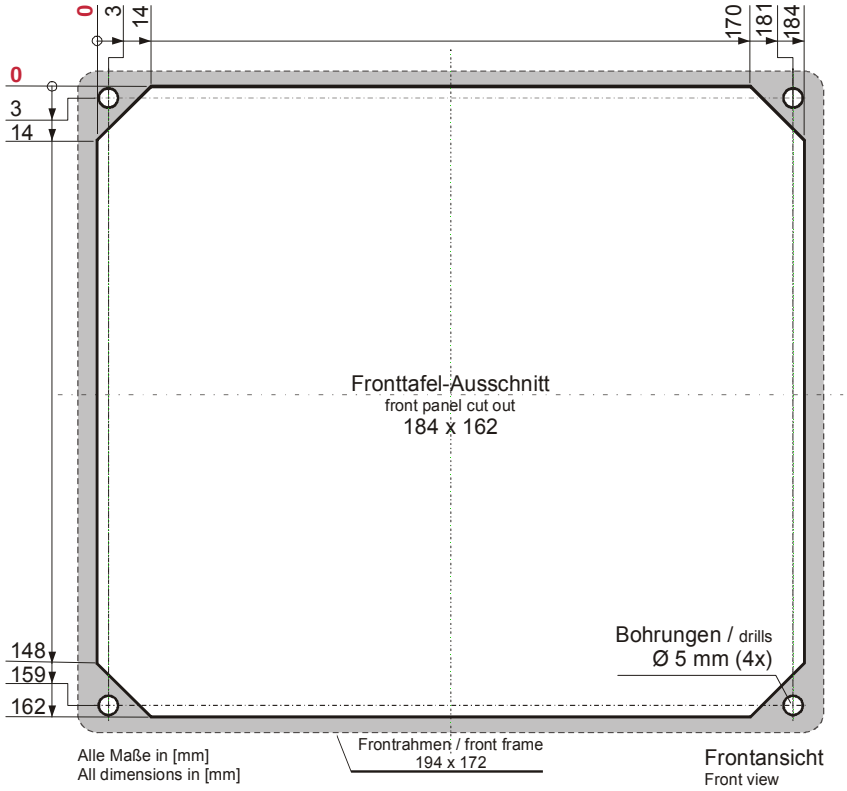
2.3.4. DC1005 Panel Cutout

⚠ CAUTION

Installation instruction:
Only install the DIALOG CONTROLLER on a level surface.

The support points on the DIALOG CONTROLLER may not deviate from one another by more than +/-0.5 mm. If the DIALOG CONTROLLER is nonetheless mounted on a base which is not level, mechanical tension can result in cracks in the front panel.

The DIALOG CONTROLLER is intended for front installation. A square panel cut-out is required. The support material thickness may not exceed 6 mm. The panel cutouts are identical for units equipped with either a keyboard or a touchpad.



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2.4. Technical Specifications, DC1010

DIALOG CONTROLLER			
Product identification			
Display type:	**Input:**	**Designation:**	**Part no.:**
Color TFT	Keyboard	DC1010T K MP400	270000800
Color TFT	Touchpad	DC1010T T MP400	270000400
Display			
Diagonal measurement		10.4”	
Resolution		640 x 480 pixels (VGA)	
Colors		65536 (16 bit per pixel)	
CPU, application memory			
CPU		Freescale PowerPC 400 MHz	
Program memory (Flash)		32 MB onboard / 24 MB for the application	
Program memory and data memory (RAM)		128 MB onboard / 96 MB for the application	
Retain memory		16 KB	
Real-time clock		Yes	
Development environment		CP1131 (CoDeSys 2.3)	
Dimensions and weights			
Dimensions (WxHxD [mm])		360 x 260 x 77 (+6 mm front panel)	
Weight		approx. 5 kg	
Operating conditions			
Ambient temperature range		0°C to 50°C	
Relative humidity		max. 90 %, non-condensing	
Transport, storage			
Ambient temperature range		-20°C to +70°C	
Relative humidity		max. 90 %, non-condensing	
Shock resistance			
Vibration		Sinusoidal (EN 60068-2-6) test: Fc 10 ... 150 Hz, 1 G (operation mode)	
Shock resistance		15 G (approx. 150 m/s²); duration: 10 ms; semi-sinusoidal (EN 60068-2-27) test: Ea	
EMC, protection type			
Interference emission		EN 61000-6-4, industrial environments	
Interference resistance		EN 61000-6-2, industrial environments	
Protection class		III	
Insulation resistance		EN 61131-2; DC 500 V test voltage	
Protection type		IP20 (front IP65)	

Power supply(24 V power pack)	
Supply voltage	+24 VDC (-15% / +20%) SELV max. alternating component: 5%
Current consumption	Typically 1.0 A; max. 2.0 A at +24 VDC Fusing depending on the I/O load, max. 12A
Polarity reversal protection	Yes
Potential isolation	Yes, between CAN bus and I/Os
Ethernet port	
Number / interface type	1x 10/100 Base T
Connection method	RJ45
USB ports	
Number / interface types	1 x host USB, Rev. 1.1 (on rear) 1 x host USB, Rev. 1.1 (on front)
Plug/unplug cycles	max. 1000
CAN bus ports	
Number / interface types	2x Standard CAN ISO 11898
Potential isolation	CAN0 (X6) potential isolated
Transmission rate	max. 1 MBit/s
Terminating resistor	Switchable
Serial ports	
Number / interface types	2x RS232 1x RS485
Potential isolation	RS485 (X8) potential isolated
Terminating resistor	Switchable with the RS485
E-bus port	
Interface types	I/O expansion bus for up to 7 E-bus subscribers
Expansion ports	
Number / interface types	3 Slots for three I/O modules or 2 I/O modules and one AnyBus® module

2.4.1. DC1010 Front View

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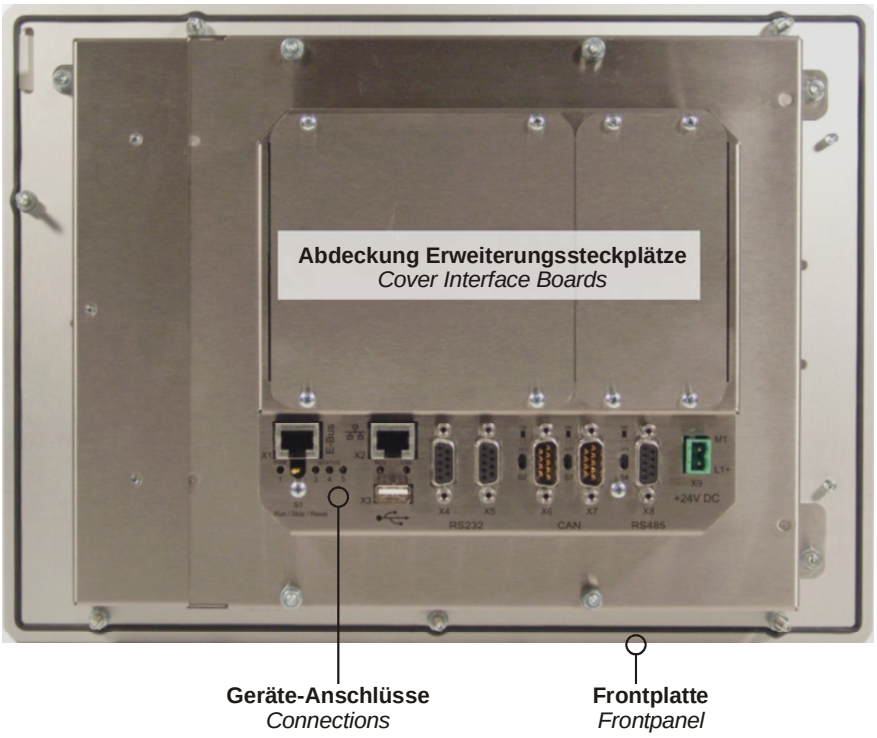
2.4.2. DC1010 Rear View



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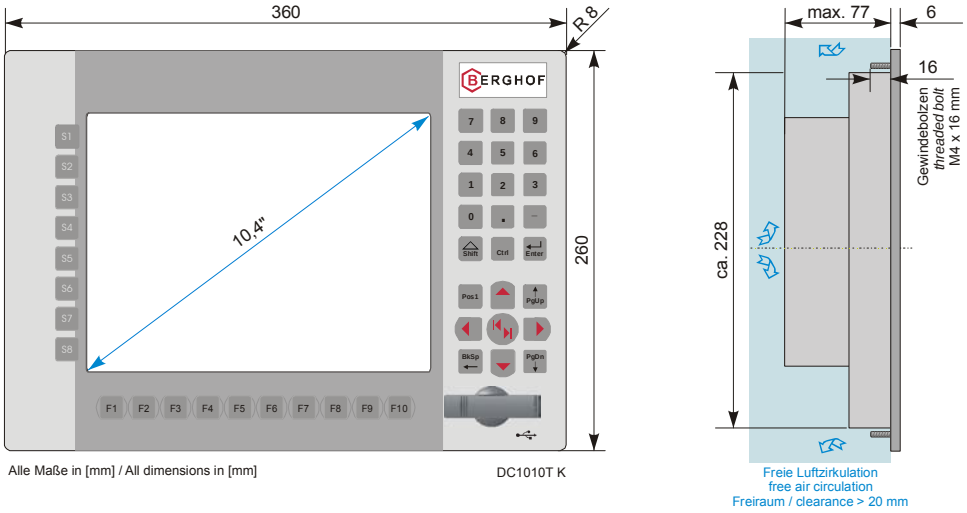
2.4.3. DC1010 Dimensions

Dimensions are identical for units equipped with either a keyboard or a touchpad.



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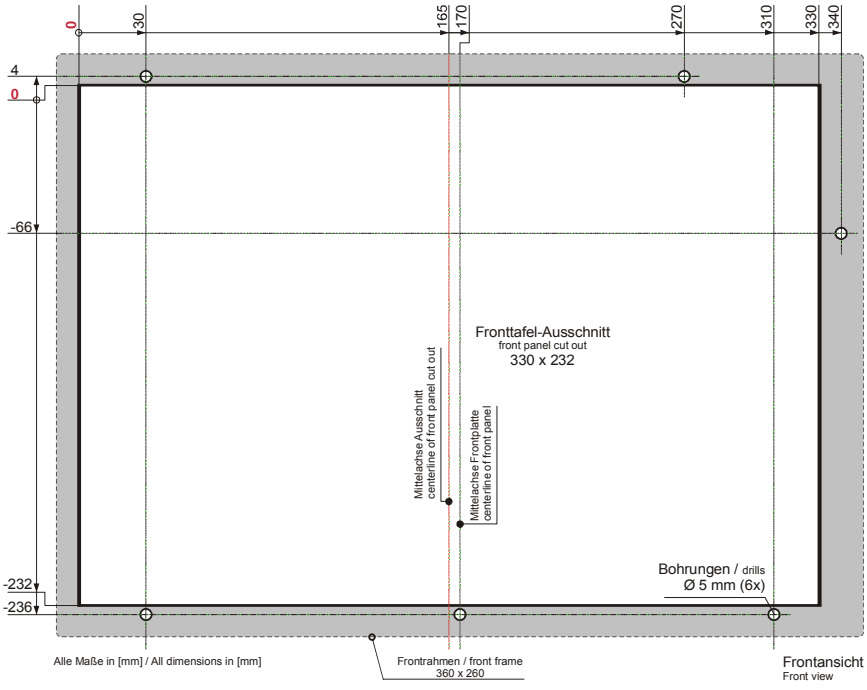
2.4.4. DC1010 Panel Cutout

⚠ CAUTION

Installation instruction:
Only install the DIALOG CONTROLLER on a level surface.
The support points on the DIALOG CONTROLLER may not deviate from one another by more than +/-0.5 mm. If the DIALOG CONTROLLER is nonetheless mounted on a base which is not level, mechanical tension can result in cracks in the front panel.

The DIALOG CONTROLLER is intended for front installation. A square panel cut-out is required. The support material thickness may not exceed 6 mm. The panel cutouts are identical for units equipped with either a keyboard or a touch panel.



2VF100244DG00.cdr

2.5. Technical Specifications, DC1012

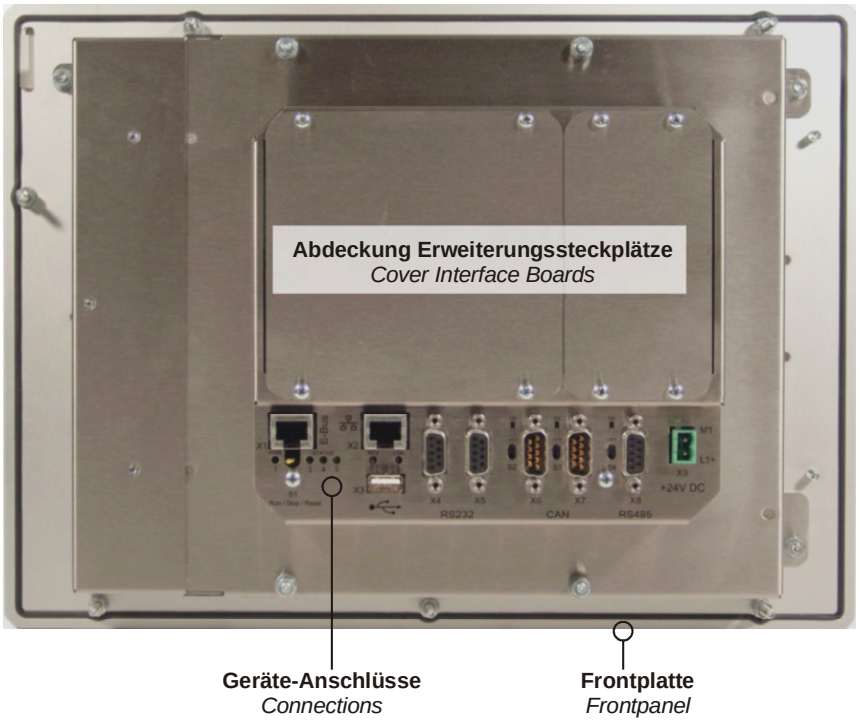
DIALOG CONTROLLER			
Product identification			
Display type:	**Input:**	**Designation:**	**Part no.:**
Color TFT	Keyboard	DC1012T K MP400	270000700
Color TFT	Touchpad	DC1012T T MP400	270000600
Display			
Diagonal measurement		12.1”	
Resolution		800 x 600 pixels (VGA)	
Colors		65536 (16 bit per pixel)	
CPU, application memory			
CPU		Freescale PowerPC 400 MHz	
Program memory (Flash)		32 MB onboard / 24 MB for the application	
Program memory and data memory (RAM)		128 MB onboard / 96 MB for the application	
Retain memory		16 KB	
Real-time clock		Yes	
Development environment		CP1131 (CoDeSys 2.3)	
Dimensions and weights			
Dimensions (WxHxD [mm])		360 x 260 x 77 (+6 mm front panel)	
Weight		approx. 6 kg	
Operating conditions			
Ambient temperature range		0°C to 50°C	
Relative humidity		max. 90 %, non-condensing	
Transport, storage			
Ambient temperature range		-20°C to +70°C	
Relative humidity		max. 90 %, non-condensing	
Shock resistance			
Vibration		Sinusoidal (EN 60068-2-6) test: Fc 10 ... 150 Hz, 1 G (operation mode)	
Shock resistance		15 G (approx. 150 m/s²); duration: 10 ms; semi-sinusoidal (EN 60068-2-27) test: Ea	
EMC, protection type			
Interference emission		EN 61000-6-4, industrial environments	
Interference resistance		EN 61000-6-2, industrial environments	
Protection class		III	
Insulation resistance		EN 61131-2; DC 500 V test voltage	
protection type		IP20 (front IP65)	

Power supply (24 V power pack)	
Supply voltage	+24 VDC (-15% / +20%) SELV max. alternating component: 5%
Current consumption	Typically 1.0 A; max. 2.0 A at +24 VDC Fusing depending on the I/O load, max. 12A
Polarity reversal protection	Yes
Potential isolation	Yes, between CAN bus and I/Os
Ethernet port	
Number / interface type	1x 10/100 Base T
Connection method	RJ45
USB ports	
Number / interface types	1 x host USB, Rev. 1.1 (on rear) 2 x host USB, Rev. 1.1 (on front)
Plug/unplug cycles	max. 1000
CAN bus ports	
Number / interface types	2x Standard CAN ISO 11898
Potential isolation	CAN0 (X6) potential isolated
Transmission rate	max. 1 MBit/s
Terminating resistor	Switchable
Serial ports	
Number / interface types	2x RS232 1x RS485
Potential isolation	RS485 (X8) potential isolated
Terminating resistor	Switchable with the RS485
E-bus port	
Interface types	I/O expansion bus for up to 7 E-bus subscribers
Expansion ports	
Number / interface types	3 Slots for three I/O modules or 2 I/O modules and one AnyBus® module

2.5.1. DC1012 Front View

2VF100272DG00. cdr

2.5.2. DC1012 Rear View



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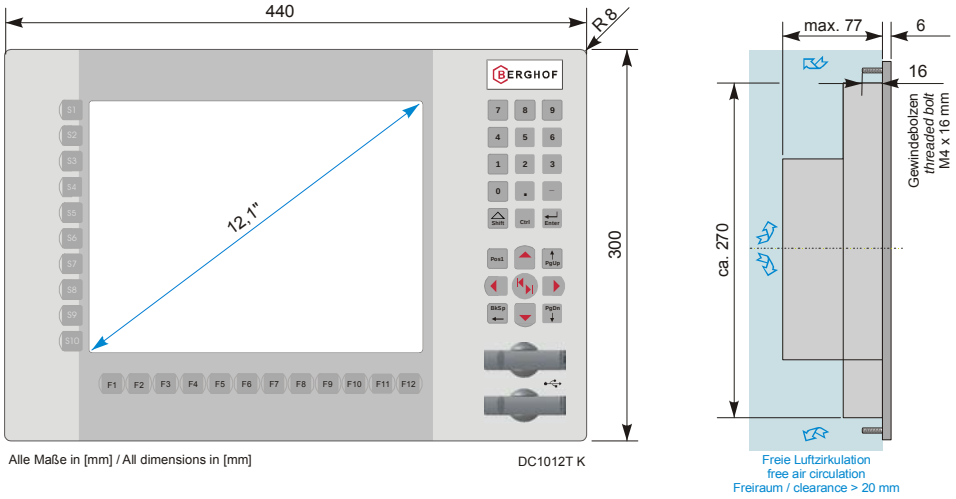
2.5.3. DC1012 Dimensions

Dimensions are identical for units equipped with either a keyboard or a touchpad.



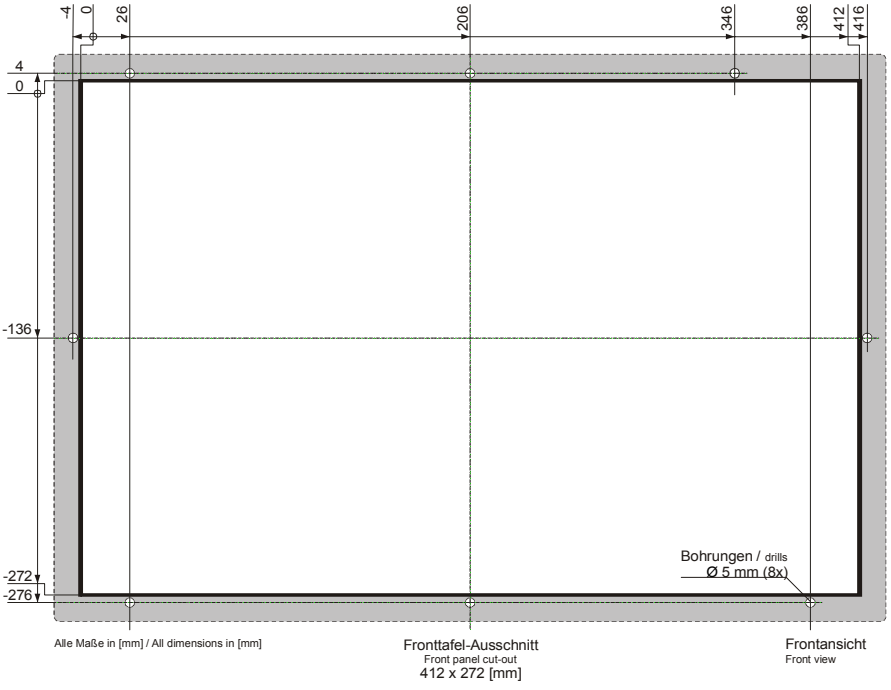
2VF100270DG01.cdr

2.5.4. DC1012 Panel Cutout

⚠ CAUTION

Installation instruction:
Only install the DIALOG CONTROLLER on a level surface.
The support points on the DIALOG CONTROLLER may not deviate from one another by more than +/-0.5 mm. If the DIALOG CONTROLLER is nonetheless mounted on a base which is not level, mechanical tension can result in cracks in the front panel.

The DIALOG CONTROLLER is intended for front installation. A square panel cut-out is required. The support material thickness may not exceed 6 mm. The panel cutouts are identical for units equipped with either a keyboard or a touch panel.



2VF100271DG00.cdr

2.6. Mounting and Connection

2.6.1. Mounting

Required tools Box wrench, Allan key (7 mm) or open-end wrench SW

Securing

The DIALOG CONTROLLER is equipped with approx. 15 mm-long, M 4, welded-on stud bolts.

The unit is secured using U washers, spring washers/lock washers and nuts (M 4).

- Remove the shipping nuts and washers.
- Push the DIALOG CONTROLLER through the panel cutout.
- Secure the DIALOG CONTROLLER in the panel cutout.
- Adjust the DIALOG CONTROLLER in the panel cutout and tighten all nuts.

NOTICE

Disassembly:
Follow the reverse sequence to disassemble the DIALOG CONTROLLER.

2.6.2. Connections

Power supply

Power for the DIALOG CONTROLLER comes from an external 24 VDC power supply.
Before continuing with the connection, check that the external power supply meets the required specifications.

External power supply (24 VDC)	
Output voltage	+24 VDC SELV (-15% / +20%)
Alternating component	max. 5% The direct voltage level may not fall below 20.4 V.
Power output	Max. 2.0 A at +24 VDC at 25 °C

Installation

All connections and wiring must be laid out to prevent any interference due to inductive or capacitive pick-up from arising in the DIALOG CONTROLLER. The infeed lines must provide adequate current and voltage carrying capacity.

Ground

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Connect the DIALOG CONTROLLER's housing to the ground lead (PE) with a copper cross-section of at least 1.5 mm².

The DIALOG CONTROLLER is equipped with a 6.3 x 0.8 mm plug-in tab for this purpose.

2.7. Pin Assignment

2.7.1. Pin Overview

2VF100231DG00.cdr

2.7.2. Power Supply

Internal power pack

A power pack to provide 24 VDC (-15% / +20%) input voltage is built into the DIALOG CONTROLLER. The power pack is equipped with internal polarity reversal protection and a current at make limiter.

The infeed line and the power pack must be protected by means of an external short circuit and overload protector with a maximum of 12 A (depending on the number of I/Os).

X9 pin

Assignment:

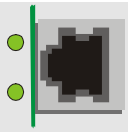
X9		
 Phoenix MSTB 2.5/2-G-5.08	**1**	External power supply 24 VDC (-15% / +20%)
	2	External power supply GND

2.7.3. 10/100 Base T Network Connection (Ethernet)

The onboard 10/100 Base T Ethernet adapter with an RJ-45 connector is used to connect the unit to a network. The “LNK” and “RCV” status LEDs provide information regarding a successful network link.

X2 connector

Pin assignment:

X2		
 RJ45	**1**	TX+
	2	TX-
	3	RX+
	4	75 Ohms
	5	75 Ohms
	6	RX-
	7	75 Ohms
	8	75 Ohms
LED “LNK”	**Green**	ON – operational
LED “RCV”	**Green**	FLASHING – data receive

2.7.4. USB

Devices equipped with USB interfaces can be connected to the two USB master ports (Rev. 1.1). The USB on the back (X3) and the front USB (under the IP65 cover) are connected via an internal USB hub.

The only USB devices classes which can be employed for CoDeSys users are USB sticks. A mouse can only be employed at the Linux level. The following points must be taken into consideration when USB sticks are employed:

⚠ CAUTION

A USB stick may only be pulled during operation if all file operations have been completed, otherwise the USB stick may become unusable!

If programs still have files open, the directory will no longer be able to be removed once the USB stick has been pulled. In this situation file or directory operations will result in blockages because information is to be read from a device that is no longer available in the system. Therefore, always make sure that no program still has open files in the USB stick before pulling the stick.

- USB memory sticks can be inserted and pulled during operation. The inserted device is automatically detected and mounted in the /media/usbX directory. When the USB stick is pulled, the associated /media/usbX directory automatically “disappears” provided no program is currently accessing it (see above).
- Either the first partition or, if there are no partitions, the entire memory will be mounted on the memory stick, in other words, the associated directory appears automatically.
- The first stick is mounted under /media/usb0, the second under /media/usb1, and so on. A maximum of 8 sticks may be inserted simultaneously (/media/usb[0-7]). If a new (or previously inserted, then pulled) stick is inserted it will be placed on the directory with the lowest number. Connecting a USB hub allows multiple sticks to be operated at a given USB interface. Care must be taken that no USB devices are still inserted in the hub when the hub is itself inserted or pulled.

NOTICE

The mechanical structure of the USB port is designed for a maximum of 1.000 insertion cycles.

X3 connector

Pin assignment (identical for the front USB):

X3		
 USB	**B1**	VCC
	B2	D-
	B3	D+
	B4	GND

⚠ CAUTION

A maximum current of 0.5 A is available at the USB ports (combined)!

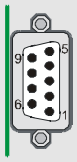
A device requiring more current will therefore not function and may be damaged.

2.7.5. CAN Bus

The two CAN ports (CAN0/CAN1) comply with the ISO 11898 standard and can be operated up to a maximum baud rate of 1 MBit/s. The smallest CAN baud rate that can be set is 50 kBit/sec. In addition, the X6 interface (CAN0) is equipped with a potential isolation.

X6/7 connector

Pin assignment:

X6/7		
 Sub-D9 M	**1**	NC (Do not connect)
	2	**CAN_L**
	3	**CAN_GND**
	4	NC (Do not connect)
	5	NC (Do not connect)
	6	NC (Do not connect)
	7	**CAN_H**
	8	NC (Do not connect)
	9	NC (Do not connect)

NOTICE

A terminating resistor can be switched using the S2 (CAN0) and S3 (CAN1) switches.

This is required if the associated CAN interface is located at the beginning or at the end of its CAN bus topology.

2.7.6. Serial Ports

In all, the module is equipped with three serial communications interfaces, each of which is connected using a 9-pin Sub-B socket. X8 is a potential isolated RS485 interface, while two RS232 ports are available at X4/X5.

NOTICE

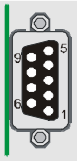
The RS232 port at X4 has an exception setting!

Depending on the configuration it can be used as either a Linux console, or as a PPP interface for remote maintenance or a CoDeSys programming interface.

If the DIALOG CONTROLLER is started in the configuration mode, the device can be configured in this mode using a serial PPP link. Here too, connection is via X4.

X4/5 connector

RS232:pin assignment

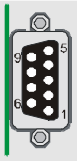
X4/5		
 Sub-D9 F	1	NC (Do not connect)
	2	**RXD**
	3	**TXD**
	4	NC (Do not connect)
	5	**GND**
	6	NC (Do not connect)
	7	NC (Do not connect)
	8	NC (Do not connect)
	9	NC (Do not connect)

NOTICE

If the SD card reader is activated, then the second RS232 interface (X5) is not longer available.

X8 connector

RS485 pin assignment (potential isolated):

X8		
 Sub-D9 F	1	**RTXD-**
	2	NC (Do not connect)
	3	NC (Do not connect)
	4	**RTXD+**
	5	**GND**
	6	NC (Do not connect)
	7	NC (Do not connect)
	8	NC (Do not connect)
	9	NC (Do not connect)

2.7.7. E-Bus

The E-bus (X1) allows up to seven E-bus subscribers to be connected to the DIALOG CONTROLLER. Please note that, due to their function, some E-bus modules represent two E-bus subscribers, e.g., QDIO-E 16/16/Z2.

Cable	
Type	Ethernet patch cable; 1:1 assignment (not crossed)
Lead cross-section	At least 0.22 mm^2
Category	CAT.5
Length	Max. 7 m

⚠ CAUTION

The DIALOG CONTROLLER makes a max. current of 0.5 A available for E-bus modules!

As a rule, this is sufficient current to supply seven E-bus modules. However, should this current consumption level be exceeded, the E-bus and the connected modules may become nonfunctioning!

Therefore, please note the current consumption of all E-bus modules and all connected consumers as a whole. In some instances, connection of consuming devices, e.g., an encoder can result in the current limit being exceeded.

Wherever possible you should only employ consumer devices with as low a current requirement as possible!

2.7.8. Connections for Expansion Ports

NOTICE

Device connection

Prior to connecting any external devices, please carefully read the documentation included with these devices.

Always hold a lead by the plug when connecting or disconnecting a device. Never pull on the lead itself!

The connection level for all external devices is located on the rear of the DIALOG CONTROLLER. All connections are plug-in.

2.8. SD-Card

WARNING

The SD card must not be plugged in or unplugged while the DIALOG CONTROLLER is operating as this would result in functional errors with the DIALOG CONTROLLER!

The SD card may only be installed or removed when the DIALOG CONTROLLER has been switched off!

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The SD card drive is equipped with a push-in/push-out insert and eject mechanism.

Gold plated contacts ensure low contact resistance and a service life of up to 10,000 plug-in/unplug cycles.

The write protection switch on the SD card is currently not recognized.

The SD card drive must be activated via the web configuration. In this case the application can no longer access the second serial port (SIO2/X5).

The files on the SD drive can be written to, read from as well as copied.

Access to the drive is along the following path: /media/sd.

NOTICE

If the SD card reader is activated, then the second RS232 interface (X5) is not longer available.

3. DIALOG CONTROLLER Operation

⚠ CAUTION

MALFUNCTION

Never plug in, apply, disconnect or touch connections while the device is operating!

This could result in malfunction or destruction of the device. Before working on the modules, always switch all infeeds to them off; including infeeds from connected peripheral devices such as remote-feed encoders, programming devices, etc.

3.1. Commissioning

Before applying the supply voltage, recheck all connections to ensure they are properly wired and have the correct polarity.

Switching on

The DIALOG CONTROLLER is not equipped with its own main power switch. The DIALOG CONTROLLER starts when the associated equipment is switched on or when the power supply is connected.

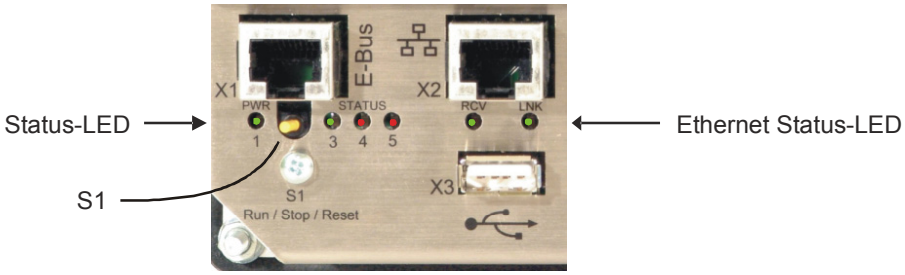
Switching off

The DIALOG CONTROLLER switches off when the associated equipment is switched off or the power supply is disconnected.

3.2. Function Selection, Indicators, Diagnostics

3.2.1. Status Indicators

The function of the status indicators frequently depends on the software development environment employed on the DIALOG CONTROLLER.
CP1131: PLC programming using CoDeSys.
CPC++: C programming on the LINUX operating system.



2VF100232DG00.cdr

Operating mode selection switch (S1)

Used to change the operating mode and for module restart.

Switch position	CP1131	CPC++
RUN	CP1131 program in the RUN mode. Can be changed with the programming device.	Freely programmable
STOP	CP1131 program in the STOP mode.	Freely programmable
RESET	CP1131 program restart with deleted and RETAIN variables.	Freely programmable

Status LED

Four operating status LEDs provide information about the current status of the power supply, the module mode as well as fault and error messages.

LED		Logical state
1	**PWR** (green)	ON = Correct supply voltage to the module electronics

Status LEDs for CP1131 programs

Status 3 (green)	Status 4 (red)	Status 5 (red)	Description
On	Off	Any	Application program status: RUN
Off	On	Any	Application program status: STOP
Off	Flashing	Any	Application program status: ERROR STOP
Flashing	On	Any	Application program status: Breakpoint STOP
Any	Any	On	CP1131 mode: FORCE

Basic recovery procedure in case of an ERROR STOP:

- Determine the cause of the error; (indicated in the service menu on the display or can be read using a web browser);
- Correct the cause of the error;
- Perform a controller reset, or alternatively:
  Mode selection switch / Service menu / CoDeSys/ web browser;
- Return the controller to operation.

NOTICE

CP1131 FORCE mode:

FORCE indicates that the application program is running and CoDeSys forces a value to be written to at least one variable at the start of every cycle. This makes it evident to the user that the application program might react differently if no such forced access to the PLC program's process were to occur.

Status LEDs for CPC++ programs

LEDs 3 to 5 can each be separately controlled by application software.

Ethernet status LED

Refer to the Section, "10/100 Base T Network Connection (Ethernet)".

3.3. Service Menu

Functional scope

The DIALOG CONTROLLER's service menu allows the user to define and examine device and communications parameters as well as device states. It also represents a valuable service and commissioning aid. The service menu thus permits setting definition at the Ethernet interface and diagnostics functions in case of errors to be simplified and accelerated.

Basic structure

The service menu has a two-part structure.

Parameter window

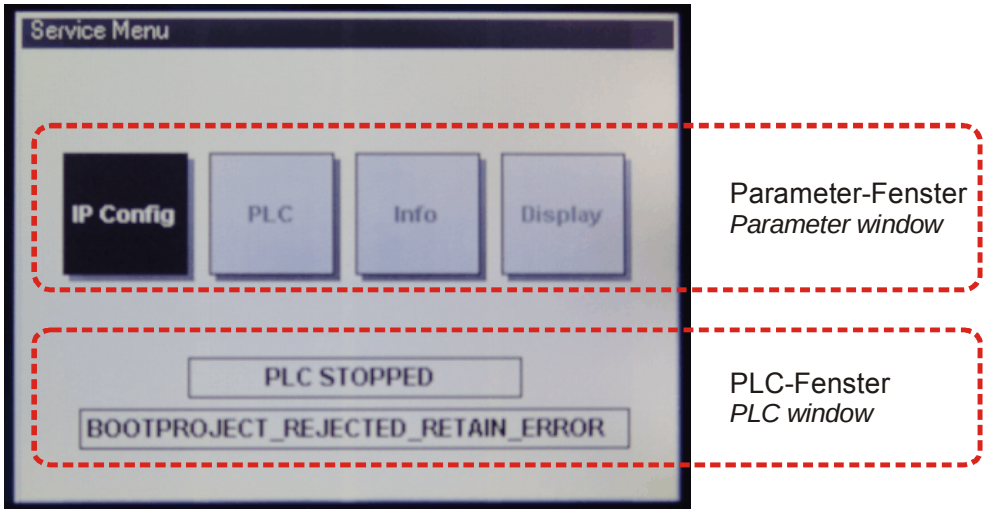
The following four menu items are displayed here:

- IP Config
- PLC
- Info
- Display

Each menu item can contain additional subject-related submenu items.

PLC window

Up to two lines reflecting the current PLC status can be displayed. Line 1 will always be visible, while line 2 will only appear when an error occurs.



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3.3.1. Using the Service Menu

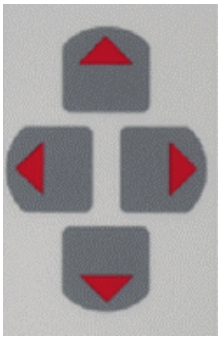
Touch screen

In DIALOG CONTROLLERs with a built-in touch screen, the service menu can be operated directly via screen input.

Keyboard

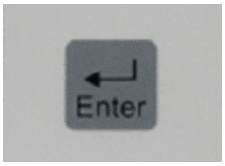
If the DIALOG CONTROLLER is equipped with a keyboard, the following keys are used to operate the service menu:

Cursor block



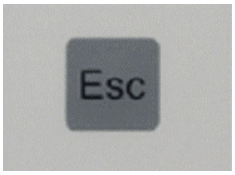
The cursor block is used to navigate between the individual menu items on a given menu level.

[Enter] key



The [Enter] key is used to confirm an input.
If a submenu permits values to be modified, this modification is performed with the [Enter] key.
The [+] / [-] keys do not function in the service menu. However, using the cursor block, you can navigate to a “+/-” symbol displayed on the screen, then use the [Enter] key to either increment or decrement the associated value.

[Esc] key



The [Esc] key is used to exit a menu without saving any changes which may have been made.

3.3.2. Parameter Window

Parameter window structure

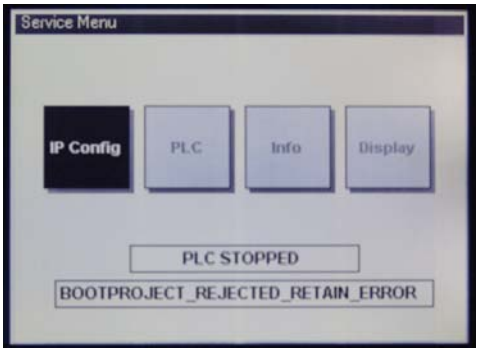
Checking and setting options are accessed through this window section.

The following four menu items are available for selection:

- **IP Config** to check and adjust Ethernet parameters;
- **PLC** to check and operate the PLC;
- **Info** to display the hardware and software version levels as well as diagnostic data;
- **Display** to adjust contrast values.

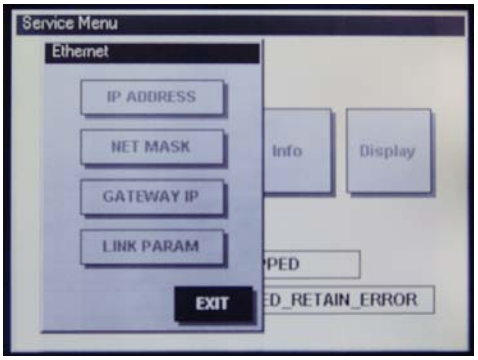
"IP Config" service menu

IP Config

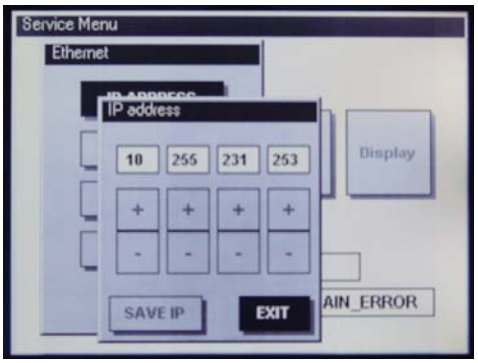


Check and adjust Ethernet parameters.

Ethernet
"IP ADDRESS"



Check and adjust the IP address



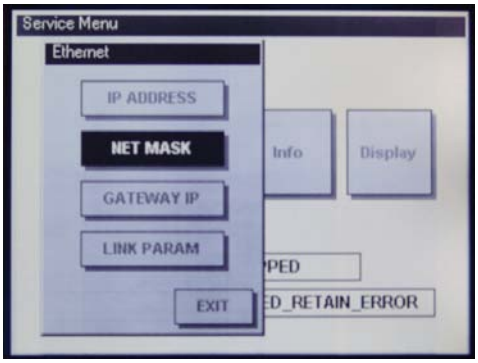
IP address:

The "**+/-**" keys can be used to adjust and set each individual IP address byte.

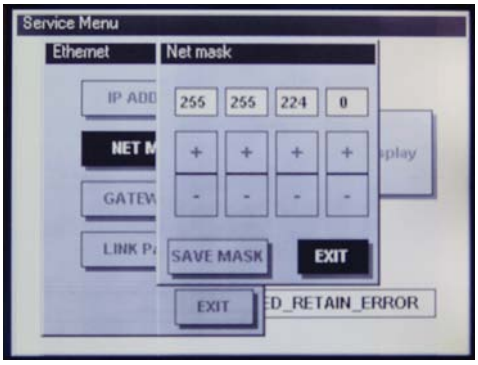
The **"Save IP"** button is then used to save the settings. New settings will only take effect after a restart!

The **"EXIT"** button allows you to leave the menu without saving any changes which may have been made.

Ethernet
“NET MASK”



Check and adjust the network mask.



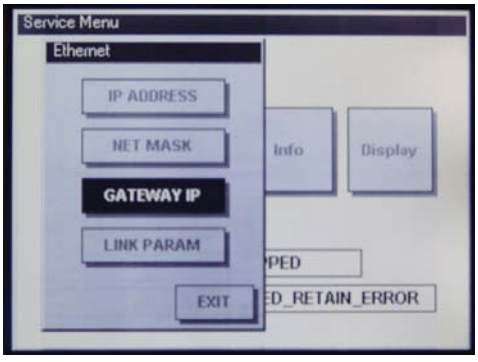
Net mask:

The “**+/-**” keys can be used to adjust and set each individual network mask byte.

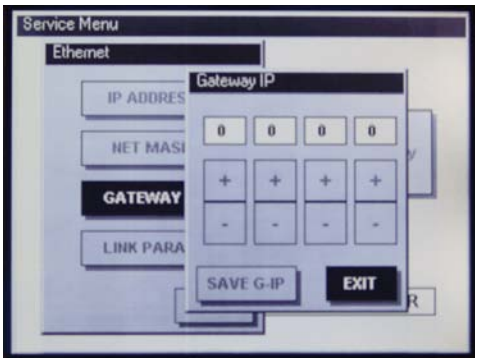
The **“Save Mask”** button is then used to save the settings. New settings will only take effect after a restart!

The **“EXIT”** button allows you to leave the menu without saving any changes which may have been made.

Ethernet
“GATEWAY IP”



Check and adjust the gateway IP address.



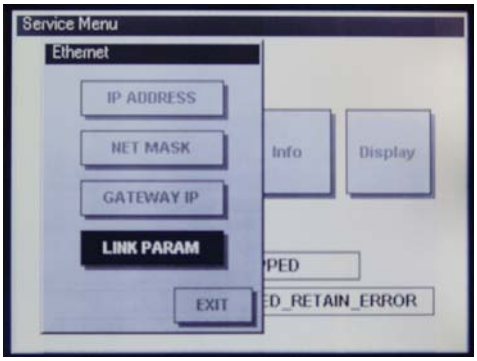
Gateway IP:

The “**+/-**” keys can be used to adjust and set each individual gateway IP address byte.

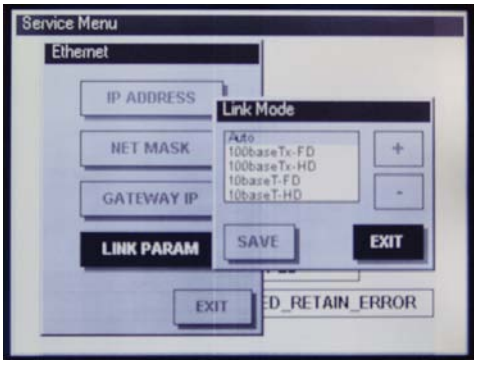
The **“Save G-IP”** button is then used to save the settings. New settings will only take effect after a restart!

The **“EXIT”** button allows you to leave the menu without saving any changes which may have been made.

Ethernet
“LINK PARAM”



Check and adjust the communications parameters.



Link Mode:

Auto: Automatic parameter setting negotiated among the communications parameters (default setting).

The default settings should only be changed under special circumstances (e.g., communications problems).

100base-Tx-FD: 100 MBit/s, full duplex
100base-Tx-HD: 100 MBit/s, half duplex

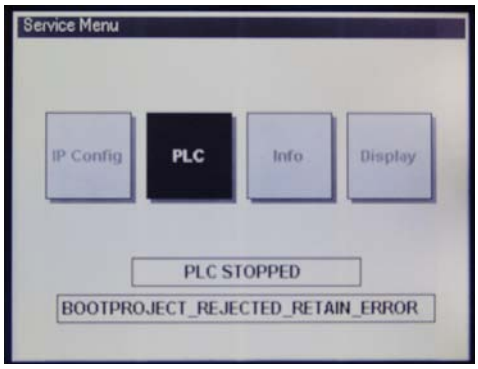
10base-T-FD: 10 MBit/s, full duplex
10base-T-HD: 10 MBit/s, half duplex

The **“Save”** button is used to save the new setting. New settings will only take effect after a restart!

The **“EXIT”** button allows you to leave the menu without saving any changes which may have been made.

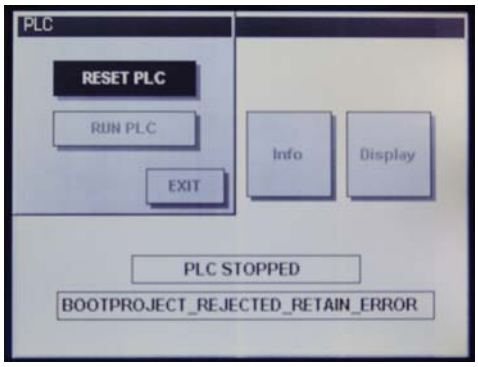
"PLC" service menu

PLC



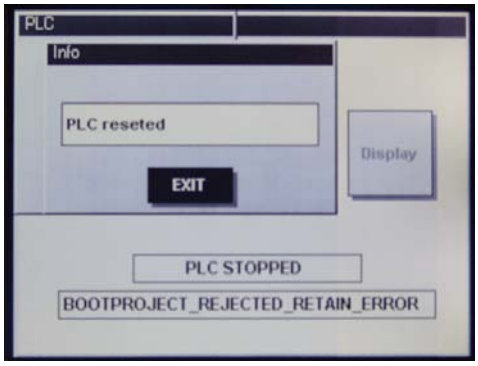
Change the PLC state.

PLC "RESET PLC"



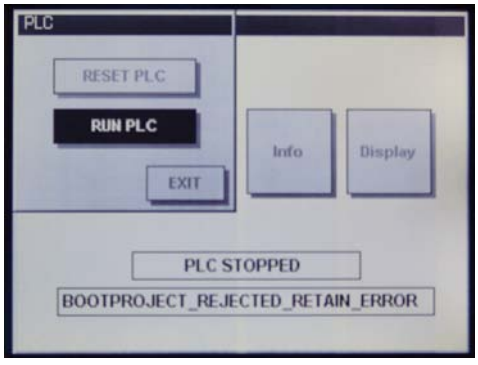
<u>"RESET PLC"</u>
Command for the PLC program.

This command can be used to acknowledge an error which has occurred. The prerequisite for such an acknowledgement is that the "RUN PLC" command has been successfully carried out.



<u>Info:</u>
Status of the "RESET PLC" command.

PLC "RUN PLC"



<u>"RUN PLC"</u>
Command for the PLC program.

If there is a PLC program on the DIALOG CONTROLLER and if the program was successfully started, the service menu is closed and the PLC program is carried out.

If the PLC program is not/cannot be carried out, this may be due to one of the following causes:

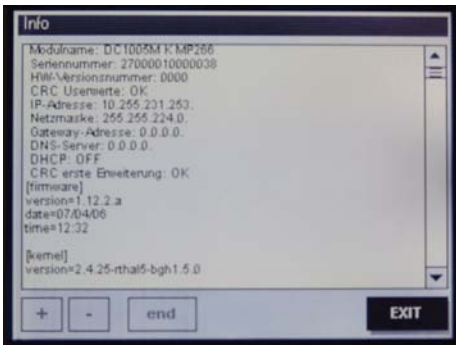
- There is no PLC program on the DIALOG CONTROLLER.
- The operating mode selection switch is set to "STOP".
- A PLC program error was not acknowledged by a "RESET" command (see above).

"INFO" service menu

"Info"

Device status indicator

"Info"



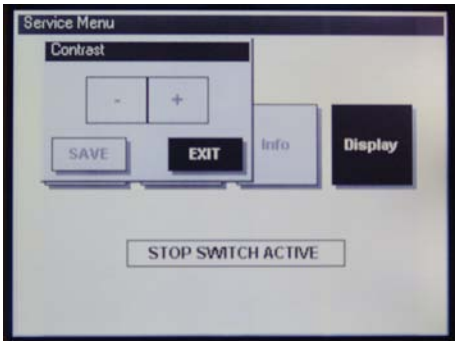
- Parameter display
- Hardware and software versions
- Event logger
  Displays all user activities as well as messages and software module problems.
  To aid in diagnostics, the entire content of the displayed page can be uploaded to a PC using the integrated "Web Configuration" where it can then be saved and sent to BERGHOF.
  The individual event logger messages as well as the web configuration are explained in the *"CANtrol PPC System Introduction"* manual.

"Display" service menu

Display

Status display or contrast and backlighting adjustment.

Display "Contrast"



<u>DIALOG CONTROLLERs with STN/CSTN displays</u>

The "**+/-**" keys can be used to adjust the contrast.
Changes are applied immediately and will remain in effect until the next restart, even if you leave the menu with the "EXIT" button.

The **"Save"** button is used to save the new contrast setting.

The **"EXIT"** button allows you to leave the menu without saving any changes which may have been made (although such changes will remain in effect until the next restart).

<u>DIALOG CONTROLLERs with TFT displays</u>

The backlight brightness can be adjusted in 10 increments.
The procedure is the same as for contrast adjustment.

3.3.3. PLC Window

The following PLC states can be displayed on Line 1 in the PLC window:

Display	Description
STOP SWITCH ACTIVE	Operating mode selection switch S1 is set to the STOP position. The PLC program can only be started with a programming tool if S1 is set in the RUN position.
PLC STOPPED	Operating mode selection switch S1 is set to the RUN position. However, the PLC programming tool forced the PLC program into the STOP state.
PLC NO PROGRAM	Operating mode selection switch S1 is set to the RUN position, but no PLC program is loaded.
PLC ERROR STOP	Operating mode selection switch S1 is set to the RUN position. However, the PLC program could not be started due to an error.

If an error occurs when the PLC program is started, the following states may be displayed on Line 2 in the PLC window:

Display	Description
BOOTPROJECT_REJECTED_RETAIN_ERROR	The DIALOG CONTROLLER has detected a difference between the PLC program saved as the boot project and the most recently loaded PLC program. The latter was only loaded to RAM and was not saved as a boot project. If the DIALOG CONTROLLER is switched off in this situation; the system notes the ID number of the program previously loaded to RAM. The displayed message now prevents the automatic startup of a possibly outdated PLC program. Error correction: Either load, save and then start the new PLC program or use a reset command to start the saved and possibly outdated program.
RETAIN_IDENTITY_MISMATCH	The DIALOG CONTROLLER was unable to correctly reestablish the retain variables. Error correction: By performing a reset, the saved PLC program can be started using the reset retain variables.
RTSEXCPT_IOUPDATE_ERROR	One or all of the E-bus modules were not detected after the PLC program started. The E-bus modules also include the I/O expansion cards installed in the DIALOG CONTROLLER. All E-bus modules entered in the controller configuration must be present and must be supplied with power at the time the program starts. Error correction: Check the number and type of E-bus modules entered in the controller configuration. Check the contacts and wiring connections on these E-bus modules. Once the number of actually available E-bus modules agrees with the controller configuration setting, the controller can be restarted using a reset command.

3.4. Decommissioning

3.4.1. Disposal

Disassembly

The DIALOG CONTROLLER must be disassembled into its component parts for disposal. All metal components can be disposed of as recyclable metal.

Electronic waste

All electronic components such as PCBs, drives, etc. must be set aside and disposed of separately.
Disposal is generally regulated by national and local ordinances which must be complied with.

Battery

Batteries contain materials which represent health and environmental hazards.

Batteries may only be disposed of at an authorized waste disposal facility.

Make sure the battery is fully discharged before disposing of it. If necessary, place an insulating strip across the contacts to prevent short circuits.

3.5. Maintenance

Cleaning

In order to prevent accidental activation and possible problems, the DIALOG CONTROLLER must be switched off when the front panel is cleaned.

Use a clean, moistened, lint-free cloth to clean the front of the DIALOG CONTROLLER.
Please note the following to avoid damaging the front panel when cleaning it:

- Never use high-pressure or steam washers;
- Never use caustic cleaning agents (even diluted), abrasives or hard objects to clean the panel;
- Do not apply excessive pressure to the front panel when cleaning it.

3.6. Help in Case of Problems

Please read the Section, *"Basic Safety Measures"*.
If the measures described there do not solve the problem, please contact your supplier's Service Department.

Fault	Possible cause	Recommended action
No function after the DIALOG CONTROLLER is started.	No power supply to the DIALOG CONTROLLER.	Make sure the power cord is plugged in. Check the pin assignment for reversed polarity. Check (measure) the connecting voltage.
The DIALOG CONTROLLER fails to completely boot.	Memory fault	Return the device for service.
	Corrupted software	Put the device in the configuration mode and reload the firmware.

4. Chemical Resistance

4.1. Resistance of the Touch Screen

The active area of the touch screen is resistant to the following chemicals if exposed to them for a period of one hour at a temperature of 21 °C:

Industrial chemicals	Household chemicals
Acetone	Ammonia-based glass cleaners
Dichloromethane	Laundry detergent
Methyl ethyl ketone	Cleansers (Fantastic, Formula 409, Joy, etc.)
Isopropyl alcohol	Vinegar
Hexane	Coffee
Turpentine	Tea
Naphtha	Grease
Lead-free gasoline	Cooking oil
Diesel oil	Salt
Motor oil	
Transmission fluid	
Antifreeze	

4.2. Resistance of the Front Foil Sheeting to Chemicals

4.2.1. General Resistance of the Foil Sheeting Material

AUTOTEX is based on a polyester foil sheet with a biaxial arrangement and therefore exhibits better resistance to solvents. It is stronger and more durable than other sheeting materials such as polycarbonate or PVC, commonly employed for touch pads and front face panels.

AUTOTEX is resistant to the following chemicals in accord. with DIN 42 115, Part 2, and will exhibit no alterations for exposure periods of more than 24 hours:

Ethanol Cyclohexanol Diacetone alcohol Glycol Isopropanol Glycerin Methanol Triacetin Dowandol DRM/PM	Formaldehyde 37% - 42% Acetaldehyde Aliphatic hydrocarbons Toluene Xylene Thinners (white spirits)	l.l.l. trichloro ethane Ethyl acetate Diethyl ether N-butyl acetate Amyl acetate Butyl cellosolve Ether
Acetone Methyl ethyl ketone Dioxan Cyclohexanon MIBK Isophoron	Formic acid <50% Acetic acid <50% Phosphoric acid <30% Hydrochloric acid <36% Nitric acid <10% Trichloro acetic acid <50% Sulfuric acid <10%	Sodium chloride <20% Hydrogen peroxide <25% Potash soap Laundry soap Tensides Softeners Ferric chloride ($FeCl_2$) Ferrous chloride ($FeCl_3$) Dibutyl phthalate Dioctyl phthalate Sodium carbonate
Ammonia <40% Caustic soda <40% Potassium hydroxide <30% Alkali carbonate Bichromate Potassium ferrocyanide Acetonitril Sodium bisulfate	Drilling emulsions Diesel oil Varnish Paraffin Castor oil Silicon oil Turpentine oil replacements Brake fluid Decon Aircraft fuel Gasoline Water Salt water	

AUTOTEX is resistant to glacial acetic acid in accordance with DIN 42 115, Part 2, for exposure times of <1 hour and will exhibit no visible damage.

⚠ CAUTION

SURFACE RESISTANCE

The product is <u>not</u> resistant to the following chemicals and influences:

- Concentrated mineral acids;
- Concentrated alkaline solutions;
- Benzyl alcohol;
- Methyl alcohol;
- High pressure steam above 100°C.

4.2.2. Resistance to Household Chemicals

AUTOTEX is resistant to the following products and will exhibit no visible damage for exposure periods of 24 hours at 50 °C:			
Top Job	Grape juice	Ariel	Ajax
Jet Dry	Milk	Persil	Vim
Gumption	Coffee	Wisk	Domestos
Fantastic		Lenor	Vortex
Formula 409		Downey	Windex

Very close examinations would reveal mild discoloration after exposure to the following materials:

- Mustard;
- Tomato juice;
- Ketchup;
- Lemon juice.

4.2.3. Environmental Values

Lowest exposure temperature

After 0.5 million activations at –40°C, AUTOTEX exhibited no functional impairment.

Highest exposure temperature

High humidity	(>80% rel.H.)	40°C
Moderate humidity	(10-80% rel.H.)	60°C
Low humidity	(<10% rel.H.)	85°C

Outdoor use

As is the case for all polyester-based sheeting, AUTOTEX is not intended for extended exposure to direct sunlight.

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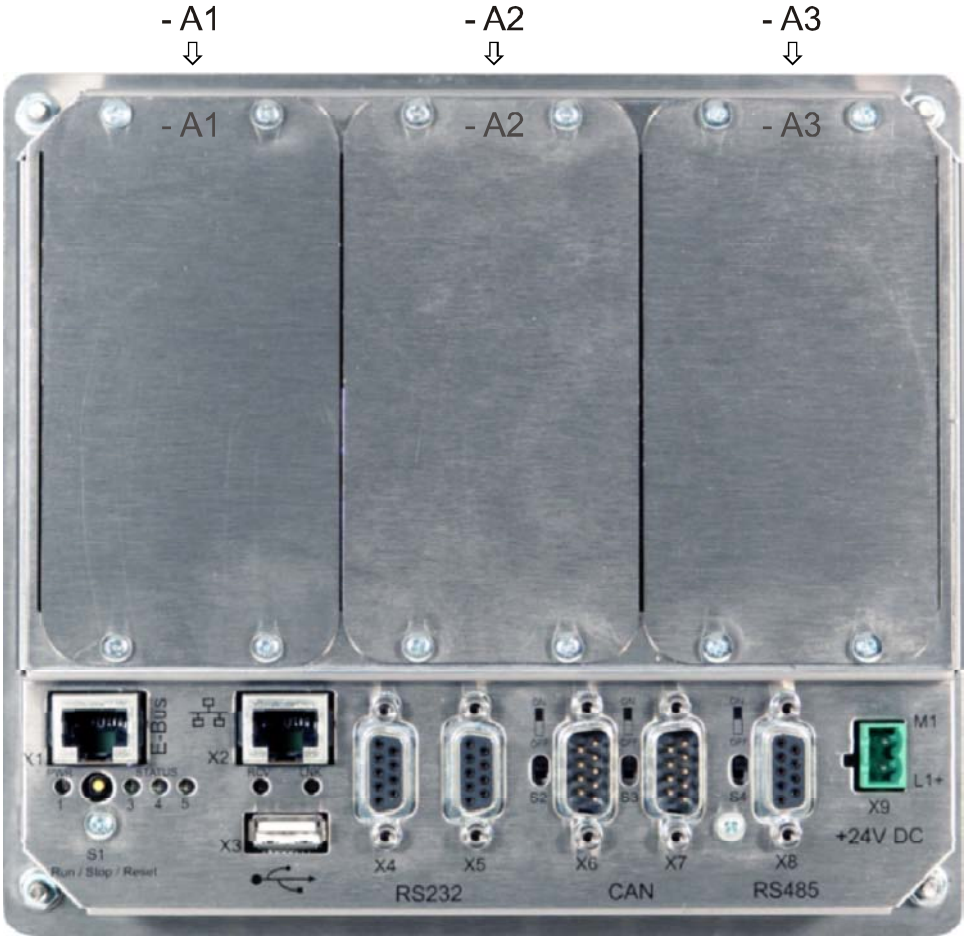
5. Extension Modules

Steckplatzbezeichnung für Erweiterungsmodule / *Slot marking for extension modules*



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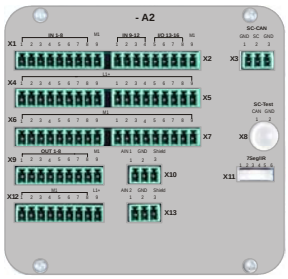
Extension modules		Slot		
Type	Designation	A1	A2	A3
I/O card with SC-CAN	U DC XS 12/8/4-CSC		**X**	
PROFIBUS master	ABM DPV HMS	**X**		
PROFIBUS slave	ABS PDP HMS	**X**		

5.1. I/O Card With SC-CAN Interface

Short description



The I/O card is an I/O module which is permanently installed in a DIALOG CONTROLLER.

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Performance characteristics overview

- 12 digital inputs
- 8 digital outputs
- 4 digital inputs/outputs
- 2 digital inputs can also be used as counters
- 2 analog inputs, 0..10V or 0..20mA
- 1 CAN interface for contact line systems with monitoring capability
- Connection for a 5-place 7-segment display with remote control receiver

Standard delivery

The standard control module delivery comprises:

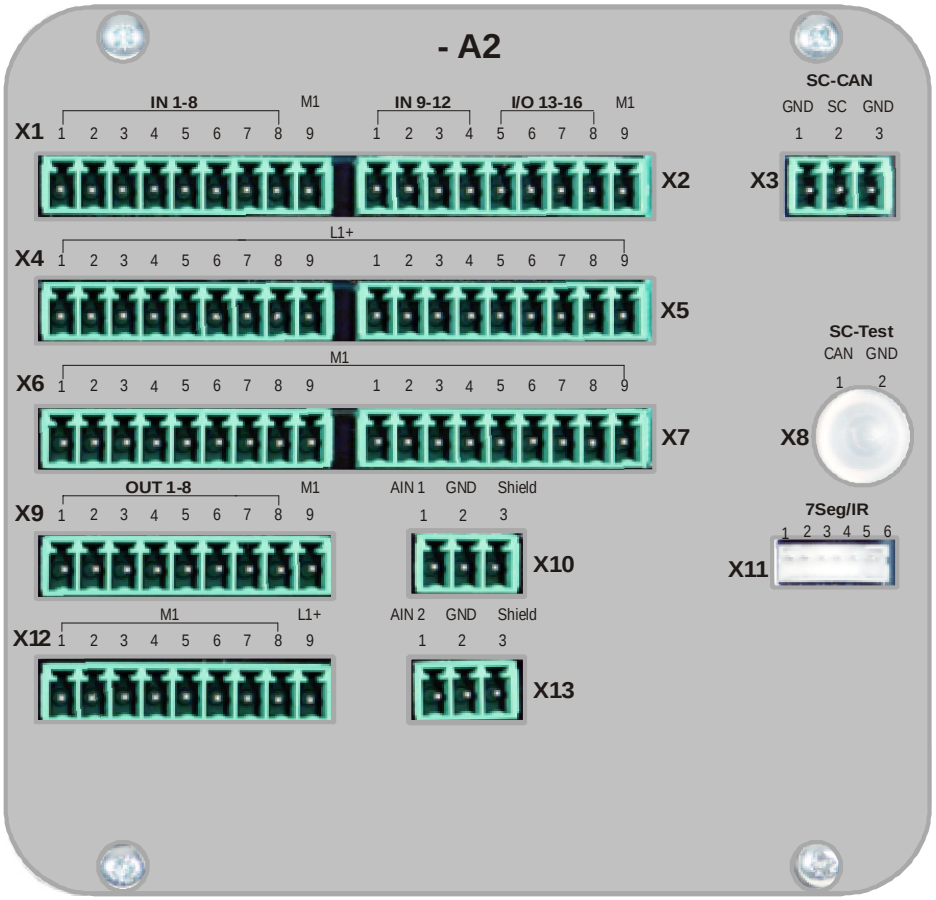
- I/O card installed in the DIALOG CONTROLLER.

5.1.1. Technical Specifications

Module data	
Versions / part no.	Only available as a built-in module
Dimensions, WxH [mm]	113.5 x 108
Weight	approx. 100 g
Operating temperature range	5° C to 50° C (condensation free) Convection cooling ensured
EMI, protection class, insulation test, protection type (installed)	
Interference emission	EN 61000-6-4, Industrial application
Interference resistance	EN 61000-6-2, Industrial application
Protection class	III
Insulation resistance	EN 61131-2; DC 500 V test voltage
Protection type	IP 20
Supply voltage, current consumption	
Module electronics power supply (connection voltage)	SELV DC +24 V < 0.4 A (EN 61131-2)
Digital I/O power supply	DC +24 V (EN 61131-2) together with module supply
Current consumption	At U_e= DC +24 V in neutral, max. 500 mA, Fusing based on I/O load, max. 8 A
Protection against supply voltage pole reversal	Yes
Potential isolation	No
Digital inputs/outputs (DIO)	
Number of inputs	12 (X1/X2), of which 4 can be used as +24V encoder inputs; counter frequency at 4x evaluation: < 20 kHz
Number of outputs	8 (X9)
Number of inputs/outputs	4 (X2)
Output current	0.5 A
Short circuit protection	Yes
Potential isolation	Yes
Connection technique	Standing front wiring for 3.81 terminal strips (not part of the standard delivery)
Analog inputs	
Number	2 analog inputs, 0..20mA / 0..10V switchable (X10/X13)
Input characteristics	Up to 20 mA U < 5V in case of short circuit, max. 40 mA
Resolution	10 Bit (accuracy: 8 Bit)
Connection technique	Standing front wiring for 3.81 terminal strips (not part of the standard delivery).
CAN interfaces	
Number and type of interfaces	1 CAN interface for (X20) contact line communications / SC_CAN (X3); 1 SC_CAN monitoring interface with standard signals
Connection technique	Standing front wiring for 3.81 terminal strips (not part of the standard delivery).
Operating and display elements	
Display elements	Interface (X11) for 5-place, 7-segment display with IR receiver diode for remote control.

5.1.2. Pin assignment

Pin overview



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Power supply

I/O supply

The digital and analog I/Os must be supplied from an external source. An input voltage of 24 VDC (-15% / +20%) is permissible. The I/Os are equipped with a built-in pole reversal protection.

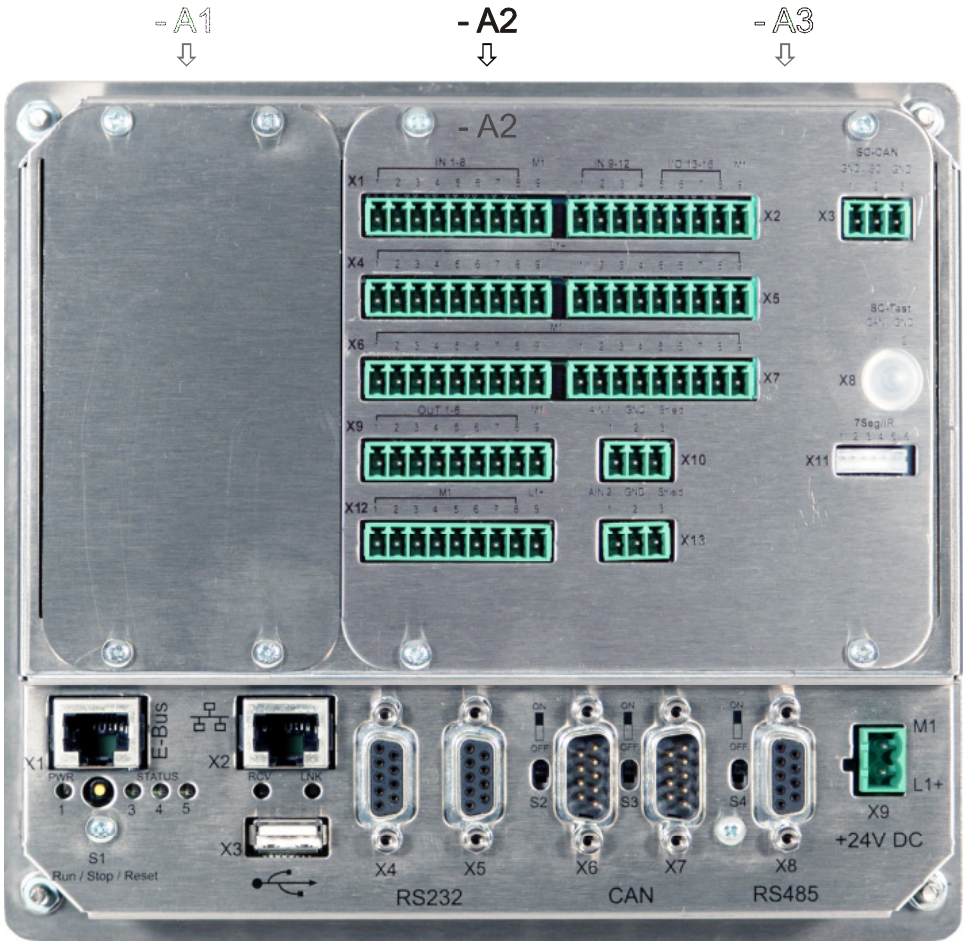
The power cord and the external power supply must be equipped with an external short circuit and overload protection with an activation current of 8 A max. (depending on the number of I/Os).

External power supply

The CAN communications interface is supplied from the DIALOG CONTROLLER power supply.

Installation

The I/O card is factory installed and may only be installed in the DIALOG CONTROLLER in the position shown in the figure below.



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CAN Bus for contact line communications

⚠ WARNING

The transmission circuit voltage level of the SC_CAN signals is 85 V or 110 V at 25 Ohm.

Based on the employed voltage level, all signal carrying lines must exhibit the same level of contact protection as the power supply (230 / 400 V).

⚠ CAUTION

Directly connecting ISO11898 devices to the SC_CAN bus will result in there being destroyed and is therefore prohibited.

Such devices include, for example, remote I/Os, drive controllers and CAN bus analyzers.

SC_CAN – X3

Pin assignment

Pin	Signal	Description
1	PE	Protective earth
2	SC	SC_CAN signal
3	PE	Protective earth

⚠ CAUTION

The two protective earth (PE) connectors must be laid to the contact line connection using two separate conductors.

Any other type of circuit construction (e.g., a bridge between the two PE connections) may result in functional errors or functional inefficiency of the SC_CAN.

Termination

The SC_CAN must be terminated at both line ends.
The values for these terminating resistors deviate from the ISO 11898 (CAN Bus) standard and they can be ordered separately from BERGHOF (CTR-SC-T2, part no.: 201601200).

⚠ CAUTION

If the SC_CAN bus is incorrectly terminated, its operation can result in the destruction of the I/O subassembly!

You must ensure that the correct termination is employed!

Baud rate

The preset baud rate for the SC_CAN is 50 KB/sec. The SJA1000 CAN controller is also in the “self test mode”, that is, when a CAN telegram is correctly transmitted it is not necessary for a subscriber to send a CAN ACK signal. Should it become necessary, these factory settings can be altered in the application by using the appropriate CAN library.

SC Test - X8

Pin assignment 2-pin post connector

Pin	Signal	Description
1	CAN	CAN signal
2	GND	Signal ground

A test or so-called “monitoring interface” for the SC_CAN is located on this connector. This “monitoring interface” serves to analyze the SC_CAN telegrams and possess the following characteristics:

- It is a point-to-point interface;
- It is only for devices with an ISO11898 CAN interface;
- CAN telegrams cannot be sent;
- No terminating resistors may be employed.

Pin assignment for an adapter cable

2-pin post (2.54)		9-pin Sub D	
Pin	**Signal**	**Signal**	**Pin**
1	CAN	CAN HIGH	2
2	GND	CAN LOW	7

External 7-segment display

For special applications an external 7-segment display (with integrated infrared receiver) can be connected to the I/O subassembly.
Connection is to connector X11 by means of a cable available from BERGHOF.
The external display can be addressed from the software in the same way as the digital I/Os.

5.1.3. Analog Inputs

The module is equipped with two unipolar analog inputs protected by diodes. Power supply to the sensors is from an external source. The analog current and voltage values are accessible via the CoDeSys controller configuration.

Input channel data

Current measurement	
Nominal input current value	0..20 mA
Maximum input current value	40 mA (Ue = +24 V)
Voltage measurement	
Nominal input voltage value	0..10 V
Maximum input voltage value	12 V
General data	
Input filter, 1st order	τ = 1ms for current τ = 10ms for voltage measurement
Conversion method	Successive approximation, no error codes
Resolution	10 bit; 1 LSB = 78.1 µA / 39.06 mV
Accuracy within the 0...50 °C temperature range	2 LSB; +/- 1 %
Pole reversal protection	Yes
Sampling rate	approx. 1 ms

NOTICE

Due to internal protective circuitry, the load is nonlinear for current operation.

Analog IN – X10/13 Pin assignment

Pin	Signal	Description
1	AIN	Analog input
2	GND	Signal ground
3	Shield	Shield

The maximum value will be indicated if no sensor is connected to an analog input.

5.1.4. Digital Inputs/Outputs 12/4/8-0.5

Supply is to terminals L1+ and M1. All inputs and outputs have a common feed and therefore also have a common feed potential.

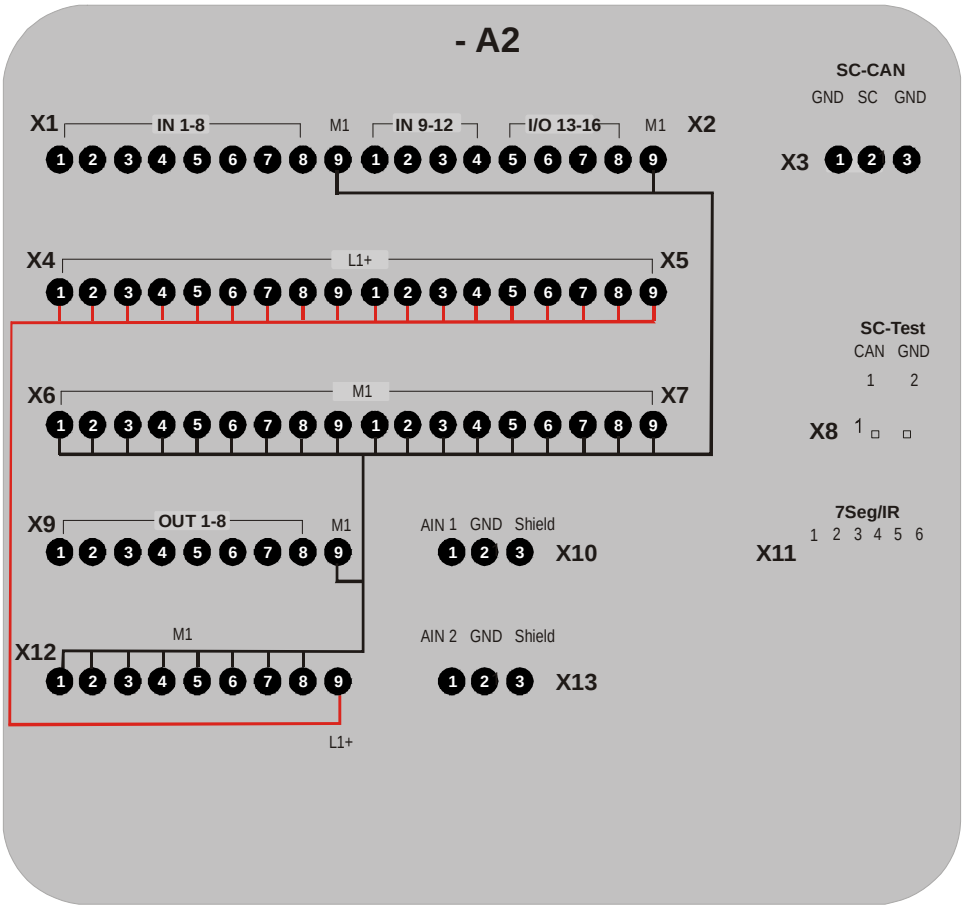
Feed

The feed must come directly (unswitched) from the feed device.
Feed for inputs (sensors) must come directly from the feed device. Do not lay the sensor supply across switched circuits.

WARNING

Feedback can result in the destruction of the module and/or the sensors!

With the group power supply switched off, the connected sensors may produce feedback via the output transistors. Make sure that the sensors are all supplied from the same power source as the module's associated I/O group.



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Digital inputs, positive switched

The digital inputs are positive-switching, type 1 inputs for 3-wire sensors. They are designed for nominal 24 V input voltages. The inputs are transmitted to the CPU in cycles. An open input is interpreted as being static 0 (LOW).

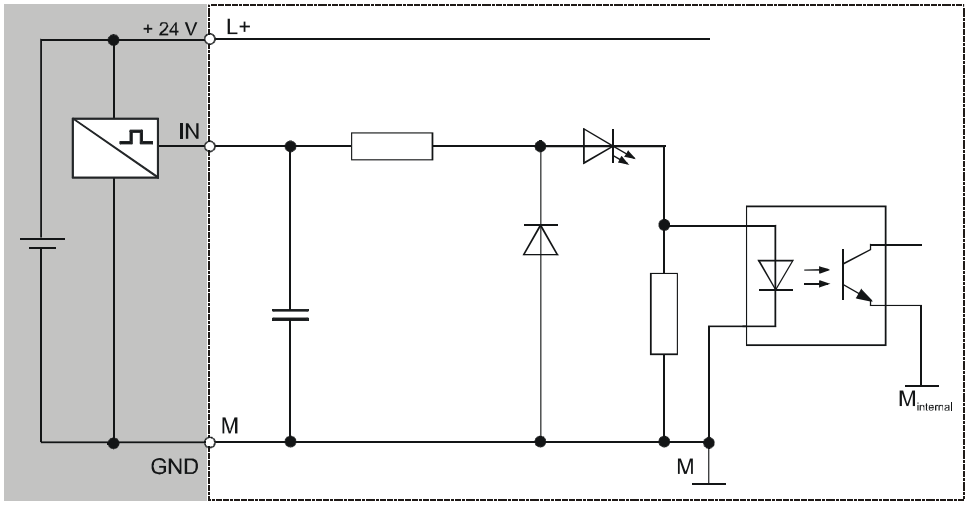
Impulse detection and interference suppression

Inputs are read in cycles. Impulses of < 100 µs are suppressed by the hardware. The shortest possible sampling rate is 250 µs.

In order for impulses to be properly detected they must be longer than the sampling rate defined by the software.
Multiple sampling can be programmed to suppress interference impulses. The sampling rate and multiple sampling (filtering) can be activated in individual groups of 32 inputs.

NOTICE	This function is only available for C applications. The sampling rate is predefined under IEC 61131-3.

Basic input circuit diagram



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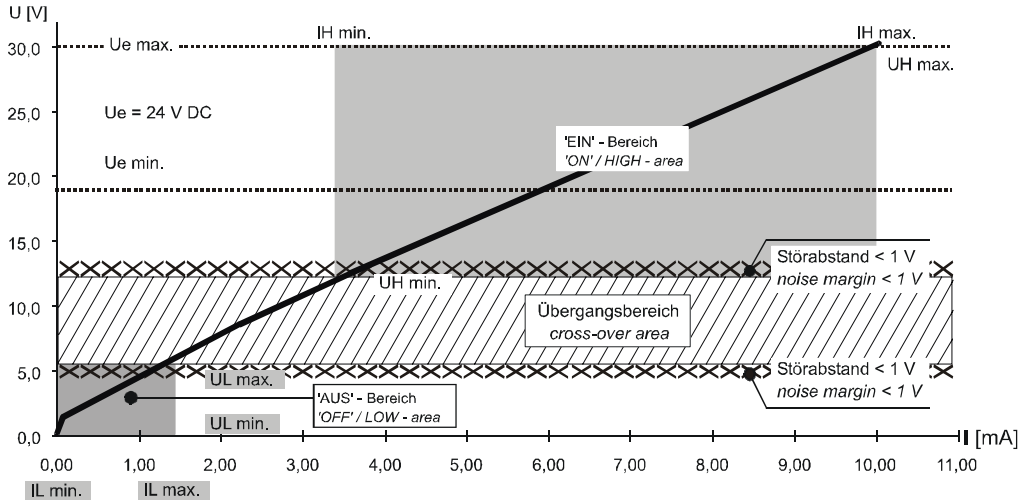
Digital input data

Module data	
Number of inputs	12 (max. 16 if the I/O is used as an input)
Line length: in the circuit cabinet	Take the voltage drop into account when selecting a conductor. Other than this, there are no relevant restrictions.
field wiring	Comply with all locally applicable requirements as well as those in accordance with EN 61131-3. Where the risk of lightning exists, please consult the manufacturer.
Nominal load voltage, L+ Pole reversal protection	DC 24 V (SELV) Yes
Potential isolation	Yes (optocoupler) in groups
Status indicator	None
Alarms	Definable depending on the software
Input delay	Definable via the software
Input capacitance	< 10 nF

Digital input operating ranges



Eingangsspannung (DC) der externen Stromversorgung
Input voltage (DC) of extern power supply

Ue	24 V	Bemessungsspannung / *rated voltage*
Ue max.	30 V	oberer Grenzwert / upper *limit*
Ue min.	19,2 V	unterer Grenzwert / *lower limit*

Grenzwerte für '1' Signal für die 'EIN'-Bedingung
Limit for '1' signal for the 'ON'-condition

$UH_{max.}$	30,0 V	obere Spannungsgrenze / upper *voltage limit*
$IH_{max.}$	10,0 mA	obere Stromgrenze / upper *current limit*
$UH_{min.}$	13,5 V	untere Spannungsgrenze / *lower voltage limit*
$IH_{min.}$	3,5 mA	untere Stromgrenze / *lower current limit*

Grenzwerte für '0' Signal für die 'AUS'-Bedingung
Limit for '0' signal of the 'OUT'-condition

$UL_{max.}$	5,5 V	obere Spannungsgrenze / upper *voltage limit*
$IL_{max.}$	1,5 mA	obere Stromgrenze / upper *current limit*
$UL_{min.}$	0 V	untere Spannungsgrenze / *lower voltage limit*
$IL_{min.}$	0 mA	untere Stromgrenze / *lower current limit*

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5.1.5. Digital Outputs, Positive Switched

WARNING	Voltages of >32 V and / or feed back can destroy the module. **This represents a fire hazard!**

Each digital output can also be used as an input. When used as an input, the information provided under “Digital Inputs” applies.

Outputs

The outputs are positively switching 24 V outputs (2-wire). Output current: max. 500 mA per output. The outputs have a common reference potential (GND). Power supply is separate from the module electronics supply (refer to “Pin Assignment”). If there is no data connection to the CPU or if the internal module supply is inadequate the outputs independently switch to “0” (LOW).

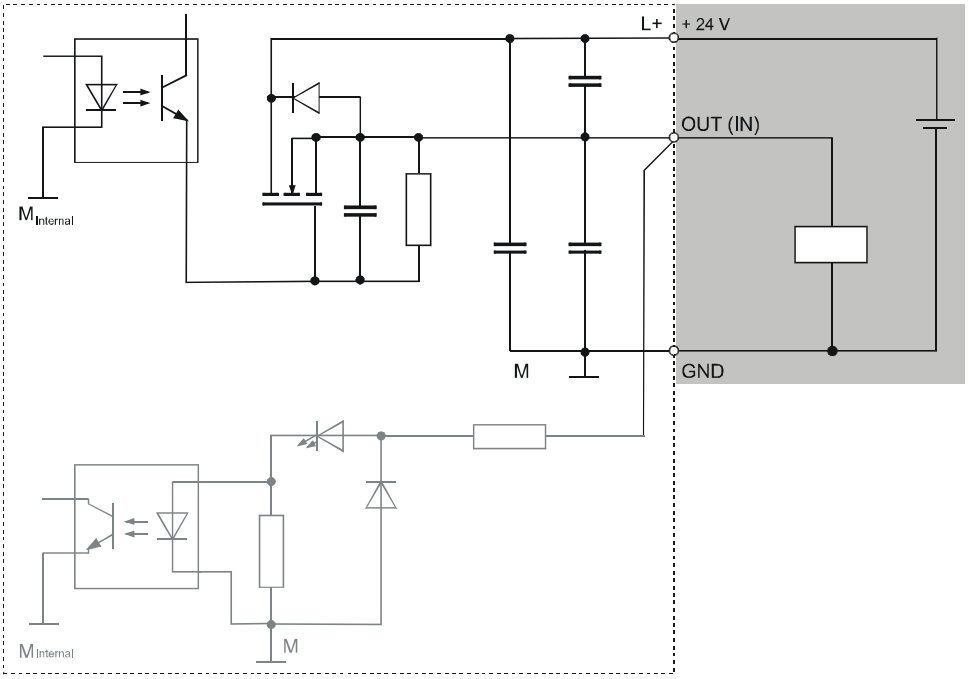
Protected output

All outputs are protected by an internal current limiter and thermal overload protection. In case of an overload, the current limiter switches the overloaded output off. Once the overload has been corrected and the unit has cooled down the output can be reactivated via the program. A quick deactivation using a terminal voltage of 50 V referenced to L+ protects all outputs against induced voltage peaks from inductive loads.
If feedback or the quick deactivation produce thermal loads, the overload protection may also be prematurely tripped by uninvolved outputs.

Operating status

The status of each output is indicated by a yellow status LED on the front of the module. The LEDs are spatially assigned to the connection terminals. The LED is on when the associated output is activated, that is, when it is logical “1” (HIGH).

Basic output circuit diagram



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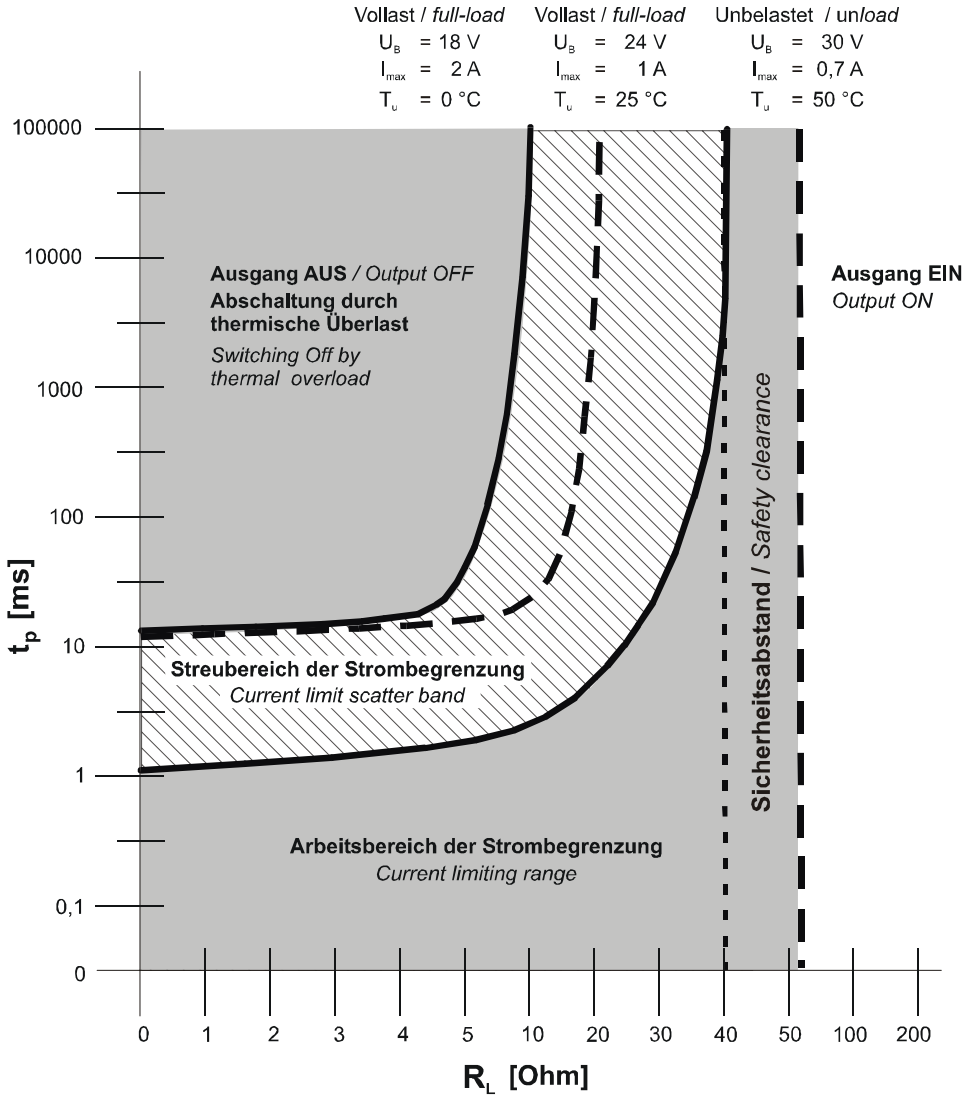
Digital output data

Module data	
Number of outputs	8 (max. 12 if the I/O is used as an output)
Type of output	Semiconductor, non-saving
Protected circuit for inductive loads	Quick deactivation 50 V terminal voltage (typical) against + 24 V
Power dissipation resulting from deactivation	max. 0.5 W / output max. 4 W / module
Status indicator	None
Diagnostic function	None
Load connection	
Total load (100%)	6 A (12 x 0.5 A)
Overload protection	Yes, for thermal overloads Activation of the thermal overload protection may influence adjacent outputs.
Short circuit protection [1)] Activation threshold	Yes, electronic current limiter min. 0.5 A, typically 0.9 A
1) Current is electronically limited. Activation of the short circuit protection results in a thermal overload which activates the thermal overload protection.	
Output delay From “0” to “1” From “1” to “0”	 max. 0.5 ms max. 0.5 ms
Output capacitance	< 20 nF
Reference voltage	DC +24 V
Voltage drop (at reference current)	< 0.5 V
Reference current for “1” signal	0.5 A
Leakage current for “0” signal	max. 0.1 mA
Total current, all outputs (horizontal installation on vertical panel)	max. 6 A (12 x 0.5)
Lamp load (DC +24 V)	max. 6 W
Parallel switching of two outputs for logical linkage to increase performance	 Permissible Prohibited
Insulation resistance	
Reference voltage	0 V <Ue <50 V
Test voltage up to an altitude of 2000 m	DC 500 V

Digital output overload behavior

Überlast-Verhalten der digitalen Ausgänge
Overload-reaction of digital output



Innerhalb des Streubereichs der Strombegrenzung ist das Verhalten der Strombegrenzung undefiniert.
Within the current-limit scatter band the reaction of current limiting is undefined.

2VF100021DG00.cdr

NOTICE

No assurance as to whether a shutdown or a return to the working range will occur can be made within the current limiter scatter band. Therefore, this state should be avoided!

The output will again be operational once the overload has been corrected and the unit has cooled down.

5.1.6. Digital Input/Output Pin Assignments

Connection		Signal name	Configured as		Note
			Digital I/O	TPU- I/O	
X12	9	L1+	Feed		
X12 X9 X7 X6 X1 X2	1..8 9 1..9 1..9 9 9	M1	GND for module and I/O feed		
X4 X5	1..9 1..9	+24V=	I/O feed		Across L1+
X1	1	IN1	Digital IN +24V	Counter input, +24V	Form encoder 1
	2	IN2	Digital IN +24V	Counter input, +24V	
	3	IN3	Digital IN +24V	Counter input, +24V	Form encoder 2
	4	IN4	Digital IN +24V	Counter input, +24V	
	5	IN5	Digital IN +24V		
	6	IN6	Digital IN +24V		
	7	IN7	Digital IN +24V		
	8	IN8	Digital IN +24V		
X2	1	IN9	Digital IN +24V		
	2	IN10	Digital IN +24V		
	3	IN11	Digital IN +24V		
	4	IN12	Digital IN +24V		
	5	I/O13	Digital I/O +24V		
	6	I/O14	Digital I/O +24V		
	7	I/O15	Digital I/O +24V		
	8	I/O16	Digital I/O +24V		
X9	1	OUT1	Digital OUT +24V		
	2	OUT2	Digital OUT +24V		
	3	OUT3	Digital OUT +24V		
	4	OUT4	Digital OUT +24V		
	5	OUT5	Digital OUT +24V		
	6	OUT6	Digital OUT +24V		
	7	OUT7	Digital OUT +24V		
	8	OUT8	Digital OUT +24V		

Encoder interface

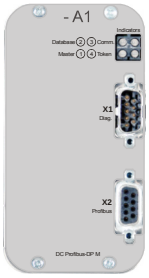
Groups of 2 inputs can be combined to form a quadrature encoder for evaluation.

Function	Input 1	Input 2
Encoder 1	IN 1 (X1)	IN 2 (X1)
Encoder 2	IN 3 (X1)	IN 4 (X1)

The encoder values are only reset (0) when the unit is switched on or rebooted after a reset.

5.2. PROFIBUS MASTER Card

Short description



The PROFIBUS MASTER card is a PROFIBUS MASTER module, permanently installed in a DIALOG CONTROLLER.

2VF100308DG00.cdr

Performance characteristics overview

- PROFIBUS DP master bus module
- Max. of 125 slave nodes can be connected
- Max. 3 KB process data
  (1536 byte input and 1536 byte output data
- Baud rates: 9600 bit/sec. - 12 MB/sec.
- Potential isolated PROFIBUS MASTER RS485 interface with integrated DC/DC converter and optocouplers
- Cyclic DP master services.

Standard delivery

The standard delivery comprises:

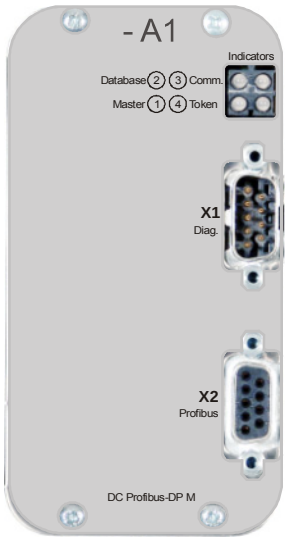
- PROFIBUS MASTER card installed in the DIALOG CONTROLLER.

5.2.1. Technical Specifications

Module data	
Versions / part no.	Only available as a built-in module
Dimensions, WxHxD [mm]	56.5 x 108 x 8
Weight	approx. 100 g
Operating temperature range	5° C to 50° C (condensation free) Convection cooling ensured
EMI, protection class, insulation test, protection type (installed)	
Certification	CE, UL, cUL
Interference emission	EN 61000-6-4, Industrial application
Interference resistance	EN 61000-6-2, Industrial application
Protection class	III
Insulation resistance	EN 61131-2; DC 500 V test voltage
Protection type	IP 20
Supply voltage, current consumption	
Module electronics power supply (connection voltage)	5 V / max. 370 mA from the DIALOG CONTROLLER's mains power supply
PROFIBUS MASTER interfaces	
Number and type of interfaces	1 PROFIBUS MASTER DP interface, for connecting a max. of 125 slave nodes.
Potential isolation	Yes
Connection technique	9-pin, Sub-D
Operating and display elements	
Display elements	4 diagnostic LEDs

5.2.2. Front View and Pin Assignment

Pin overview



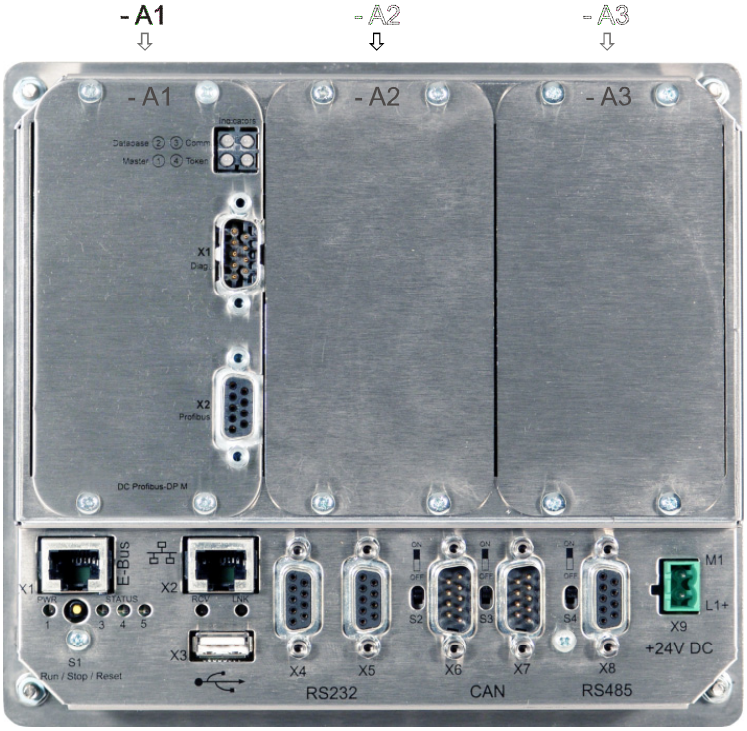
2VF100308DG00.cdr

Power supply

External power supply The PROFIBUS MASTER communications interface is supplied from the DIALOG CONTROLLER's power supply.

Installation

The PROFIBUS MASTER card is factory installed and may only be installed in the DIALOG CONTROLLER in the position shown in the figure below.



2VF100309DG00.cdr

PROFIBUS MASTER interface

The embedded PROFIBUS MASTER bus module is a PROFIBUS DP master. The module has been tested for conformity with the PROFIBUS standard and for inter-operability with many leading PROFIBUS slave devices. The onboard micro-processor automatically performs all PROFIBUS bus traffic thus completely reliving the automation device's main processor of any PROFIBUS protocol processing.

The PROFIBUS MASTER module supports a max. of 125 slaves with up to 3 KB of I/O data. All baud rates from 9.6 KB/sec. to 12 MB/sec. can be set. All cyclic PROFIBUS DP services are available.

PROFIBUS-X2 (jack) Pin assignment of the galvanically isolated field bus interface

Pin	Signal	Description
1	N.C.	Do not connect
2	N.C.	Do not connect
3	B	RS485 signal
4	RTS	Ready to send
5	GND	Bus ground
6	+5V	Bus (output)
7	N.C.	Do not connect
8	A	RS485 signal
9	N.C.	Do not connect

Diag. – X1 (pins) Pin assignment, serial diagnostics interface

Pin	Signal	Description
1	N.C.	Do not connect
2	RxD	RS232 signal
3	TxD	RS232 signal
4	N.C.	Do not connect
5	GND	Bus ground
6	N.C.	Do not connect
7	N.C.	Do not connect
8	N.C.	Do not connect
9	N.C.	Do not connect

NOTICE

All application and diagnostic data are set up via the CoDeSys controller configuration or are provided by the application. Therefore, the diagnostic interface cannot be used in an application-specific manner.

Termination

The PROFIBUS MASTER has a linear topology. It must be terminated at both ends. The PROFIBUS MASTER module is not equipped with any internal terminating resistors and we therefore recommend the use of a plug with switchable termination.

Baud rate

The baud rate is set in the CoDeSys controller configuration.

GSD file

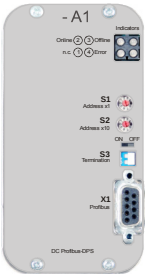
The PROFIBUS MASTER module is integrated in the CoDeSys controller configuration with a GSD file. As of Version 1.0, this GSD file will be part of the BERGHOF target installation package.

Indicator LEDs

Indicator	Signal	Description	
1	Master	Green:	Operating mode
		Green, flashing:	Delete mode
		Red:	Stop mode
		Off:	Offline
2	Database	Green:	Databank OK
		Green, flashing:	Database load procedure running
		Red:	Database invalid
		Off:	No database available
3	Comm.	Green:	Data exchange with all configured slaves
		Green, flashing:	Data exchange with at least 1 configured slave
		Red:	Bus error, e.g., due to a short circuit or configuration error
		Off:	No data exchange
4	Token	Green:	Module has the token
		Off:	Token not at the module
All		Red:	Fatal error

5.3. PROFIBUS SLAVE Card

Short description



The PROFIBUS SLAVE card is a PROFIBUS SLAVE module, permanently installed in a DIALOG CONTROLLER.

2VF100310DG00.cdr

Performance characteristics overview

- PROFIBUS DP SLAVE bus module
- Max. 244 byte input and 244 byte output data (all together 416 byte)
- Automatic baud rate recognition, 9600 bit/sec. - 12 MB/sec.
- Potential isolated PROFIBUS SLAVE RS-485 interface with integrated DC/DC converter and optocouplers
- All required DP services as well as user parameter data and device-specific diagnostics.

Standard delivery

The standard delivery comprises:

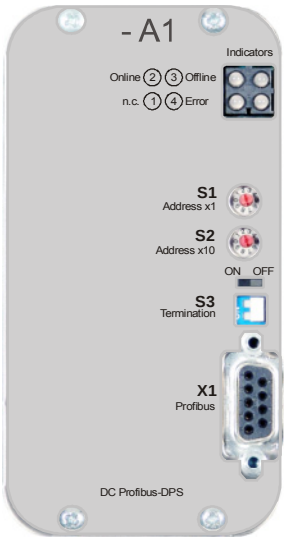
- PROFIBUS SLAVE card installed in the DIALOG CONTROLLER.

5.3.1. Technical Specifications

Module data	
Versions / part no.	Only available as a built-in module
Dimensions, WxHxD [mm]	56.5 x 108 x 8
Weight	approx. 100 g
Operating temperature range	5° C to 50° C (condensation free) Convection cooling ensured
EMI, protection class, insulation test, protection type (installed)	
Certification	CE, UL, cUL
Interference emission	EN 61000-6-4, Industrial application
Interference resistance	EN 61000-6-2, Industrial application
Protection class	III
Insulation resistance	EN 61131-2; DC 500 V test voltage
Protection type	IP 20
Supply voltage, current consumption	
Module electronics power supply (connection voltage)	5 V / max. 350 mA from the DIALOG CONTROLLER's mains power supply
PROFIBUS SLAVE interfaces	
Number and type of interfaces	1 PROFIBUS SLAVE interface DP
Potential isolation	Yes
Connection technique	9-pin, Sub-D
Operating and display elements	
Display elements	4 diagnostic LEDs
Address switch	Switches not used for applications
Termination	Switchable terminating resistor

5.3.2. Front View and Pin Assignment

Pin overview



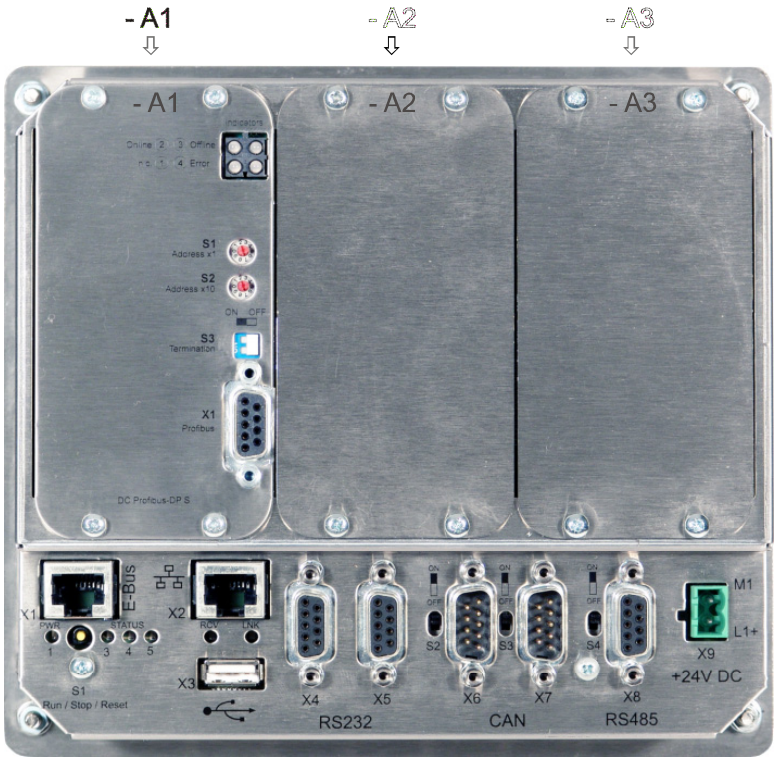
2VF100310DG00.cdr

Power supply

External power supply The PROFIBUS SLAVE communications interface is supplied from the DIALOG CONTROLLER's power supply.

Installation

The PROFIBUS SLAVE card is factory installed and may only be installed in the DIALOG CONTROLLER in the position shown in the figure below.



2VF100311DG00.cdr

PROFIBUS SLAVE interface

The embedded PROFIBUS SLAVE module is a complete PROFIBUS DP SLAVE. . It contains all analog and digital components for a high performance PROFIBUS extension circuit. The module is certified and has been tested for inter-operability with many leading PROFIBUS master subassemblies. The onboard microprocessor automatically performs all PROFIBUS bus traffic thus completely reliving the automation device's main processor of any PROFIBUS protocol processing.

The PROFIBUS module supports a maximum PROFIBUS data width of 244 input bytes and 244 output bytes as well as all rates from 9.6 KB/sec. to 12 MB/sec.

NOTICE

The PROFIBUS station address is set with the CoDeSys controller configuration. Rotary switches S1 and S2 have no effect and can therefore not be used in an application-specific manner.

PROFIBUS-X1 (jack)

Pin assignment of the galvanically isolated field bus interface

Pin	Signal	Description
1	N.C.	Do not connect
2	N.C.	Do not connect
3	B	RS485 signal
4	RTS	Ready to send
5	GND	Bus ground
6	+ 5 V	Bus (output)
7	N.C.	Do not connect
8	A	RS485 signal
9	N.C.	Do not connect

Termination, S3

The PROFIBUS has a linear topology. It must be terminated at both ends. The PROFIBUS SLAVE module has an integrated bus termination which can be activated by a DIP switch (ON position).

Baud rate

The baud rate is automatically detected.

GSD file

The PROFIBUS SLAVE master module is integrated in the CoDeSys controller configuration with a GSD file. As of Version 1.0, this GSD file will be part of the BERGHOF target installation package.

Indicator LEDs

For diagnostic LEDs indicate the current operating state and any error messages.

Indicator	Signal	Description	
1	N.C.	Not used	
2	Online	Green:	Online / data exchange permitted
		Off:	Not online
3	Offline	Red:	Offline, no data exchange possible
		Off:	Not offline
4	Error	Red, flashing at 1Hz:	Configuration error; initialized data length does not match configuration
		Red, flashing at 2Hz:	Missing user parameter; initialized data length does not match configuration
		Red, flashing at 4Hz:	Initialization error in the ASIC
		Off:	No diagnostic data available

6. Maintenance

Maintenance tasks

Maintenance tasks on the DIALOG CONTROLLER, particularly those tasks which require opening the housing, may only be performed by qualified personnel!

Before beginning any maintenance tasks, please read the Chapter, *"General Information"*, in particular, the Section, "*Basic Safety Measures*".

Never open housing covers with the power switched on!

Potential hazard due to contact with live components.

This can result in death, serious injury or extensive property damage.

Only open the housing cover once the DIALOG CONTROLLER has been safely disconnected from the power supply.

Maintenance work to the DIALOG CONTROLLER can result in damage:

- If metal objects such as screws, nuts, tools or other conducting objects fall on the PCB;
- If connecting cables are loosened, removed or incorrectly reconnected.

After maintenance

Before returning the DIALOG CONTROLLER to service, check to be sure that:

- There are no foreign objects in the CONTROLLER;
- There is a battery in the battery slot;
- All connections are correct and secure;
- The ground wire (PE) is properly connected.

Be sure all covers on the DIALOG CONTROLLER are closed before returning the unit to service!

6.1. Real-Time Clock with Backup Battery

The DIALOG CONTROLLER is equipped with a real-time clock.

Setting the clock Use either the web configuration or the CoDeSys “BGHSysLibRtc.lib” library.

Power supply A battery is required to supply power to this clock.

Charge level The DIALOG CONTROLLER monitors the backup battery’s charge level.
The current battery charge state can be displayed using the CoDeSys “BGHSys-LibRtc.lib” library.

⚠ CAUTION

Backup battery voltage values which **exceed 3.2 V** or **are below 2.0 V** will affect the real-time clock’s function.

Overvoltage: Check the battery type and device hardware.

Undervoltage: Replace the battery.

The following battery charge levels are important:

3.2 Volt	Typical value for a new battery. **This value may not be exceeded**!
3.0 Volt	Nominal battery voltage
2.5 Volt	The battery should be replaced.
2.0 Volt	The battery must be replaced immediately in order to ensure the proper function of the real-time clock.

⚠ DANGER

EXPLOSION HAZARD

EXPLOSION HAZARD!

Never throw batteries (new or dead) into a fire, never attempt to solder at any point on the battery case and never attempt to recharge batteries. Do not attempt to dismantle or disassemble batteries.

Replace batteries only with batteries which have the same rating.

Make sure the battery is facing the right way when installed.

6.1.1. Battery Replacement

Regardless of the indicated charge level, the backup battery must be replaced at least every five years.

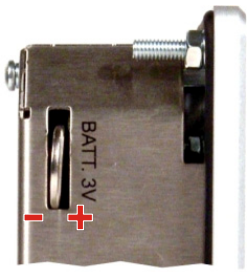
WARNING	**Only use a CR1620 (3V lithium battery) manufactured by SONY** (or an equivalent manufacturer; deviating charge current is 2.5 mA or more). The use of any other battery may result in fire or explosion.

The real-time clock's backup battery can be replaced without the risk of data loss provided the DIALOG CONTROLLER supply voltage is switched on.

Battery replacement

NOTICE	The battery is held in place by a spring clip. Never lift the spring clip retainer as this can destroy the clip.

- Push the old battery out to the side.
- Insert the new battery from the side.
  Check for correct polarity and battery type.



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7. Annex

7.1. Environmental Protection

7.1.1. Emission

When used correctly, our modules do not produce any harmful emissions.

7.1.2. Disposal

At the end of their service life, modules may be returned to the manufacturer against payment of an all-inclusive charge to cover costs. The manufacturer will then arrange for the modules to be recycled.

7.2. Maintenance/Upkeep

⚠ WARNING	**Do not insert, apply, detach or touch connections while in operation – risk of destruction or malfunction.** Disconnect all incoming power supplies before working on our modules; this also applies to connected peripheral equipment such as externally powered sensors, programming devices, etc. All ventilation openings must always be kept free of any obstruction.

The modules are maintenance-free when used correctly.
Clean only with a dry, non-fluffing cloth.
Do not use detergents.

7.3. Repairs/Service

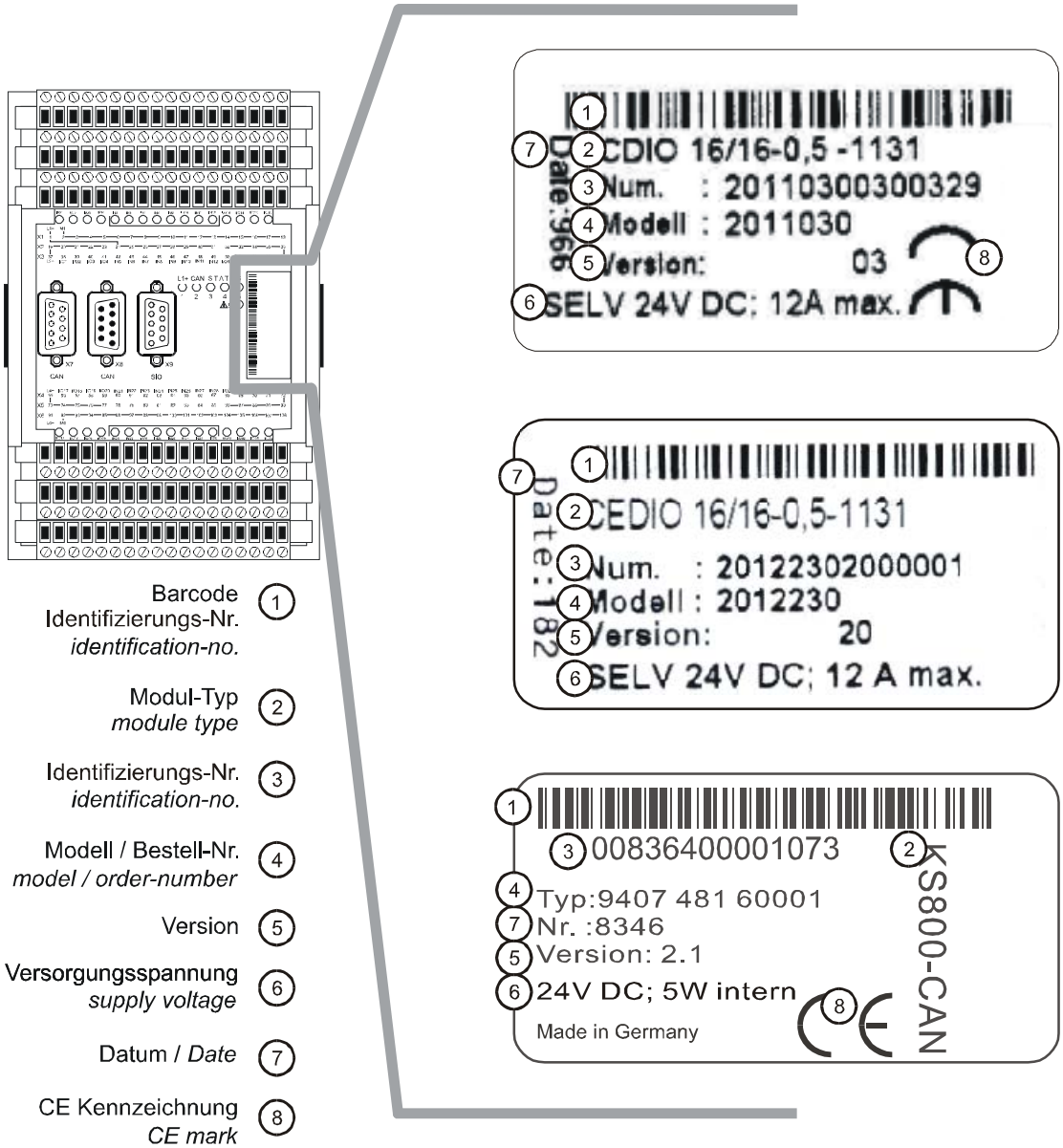
⚠ WARNING	Repair work may only be carried out by the manufacturer or its authorised service engineers.

7.3.1. Warranty

Sold under statutory warranty conditions. Warranty lapses in the event of unauthorised attempts to repair the equipment and/or product, or in the event of any other form of intervention.

7.4. Nameplate

Erklärungen zu den Typenschildern (Beispiel)
nameplate descriptions (example)



1 Barcode Identifizierungs-Nr. *identification-no.*
2 Modul-Typ *module type*
3 Identifizierungs-Nr. *identification-no.*
4 Modell / Bestell-Nr. *model / order-number*
5 Version
6 Versorgungsspannung *supply voltage*
7 Datum / *Date*
8 CE Kennzeichnung *CE mark*

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1. **Barcode**
   same as identification number.
2. **Module type**
   plain-text name of module.
3. **Identification no.**
   module's identification number.
4. **Model/order no.**
   You only need to give this number when ordering a module. The module will be supplied in its current hardware and software version.
5. **Version**
   defines the design-level of the module as supplied ex-works.
6. **Supply voltage**
7. **Date**
   internal code.
8. **CE mark**

NOTICE

The 'Version' (supply version) panel specifies the design-level of the module as supplied ex-works.

When replacing a module, users, with the CNW (CANtrol Node Wizard) tool, can read off the current software version of the newly supplied module, and then reload their 'own' software version for a particular project if necessary. With the latter in mind, before the download you should always keep a record of the existing software levels in your project documentation (software version, node IDs, baud rate, etc.).

7.5. Addresses and Bibliography

7.5.1. Addresses

CiA

'CAN in Automation', international manufacturers and users organisation for CAN users in the field of automation:

CiA - CAN in Automation e.V.
Am Weichselgarten 26
D-91058 Erlangen /Germany
e-mail: headquarters@can-cia.de
http://www.can-cia.de

DIN-EN Standards

Beuth Verlag GmbH or VDE-Verlag GmbH
10772 Berlin 10625 Berlin

IEC Standards

VDE Verlag GmbH or Internet search
10625 Berlin http://www.iec.ch/

7.5.2. Standards/Bibliography

IEC61131-1/EN61131-1	Programmable controllers Part 1: General information
IEC61131-2/EN61131-2	Programmable controllers Part 2: Equipment requirements and tests
IEC61131-3/EN61131-3	Programmable controllers Part 3: Programming languages
IEC61131-4/EN61131Bl1	Programmable logic controllers Supplementary Sheet 1: User guidelines
IEC61000-6-4 / EN61000-6-4	German EMC Act: Emitted interference
IEC61000-6-2 / EN61000-6-2	German EMC Act: Noise immunity
ISO/DIS 11898	Draft International Standard: Road vehicles - Interchange of digital information - **C**ontroller **A**rea **N**etwork (CAN) for high-speed communication
EN 954-1	Safety of machinery: Safety-related parts of control systems (Part 1)
Bibliography	A variety of specialist publications on the CANbus is available from specialist bookshops, or can be obtained through the CiA users' organisation.

NOTICE

Our Technical Support team will be glad to provide other literature references on request.