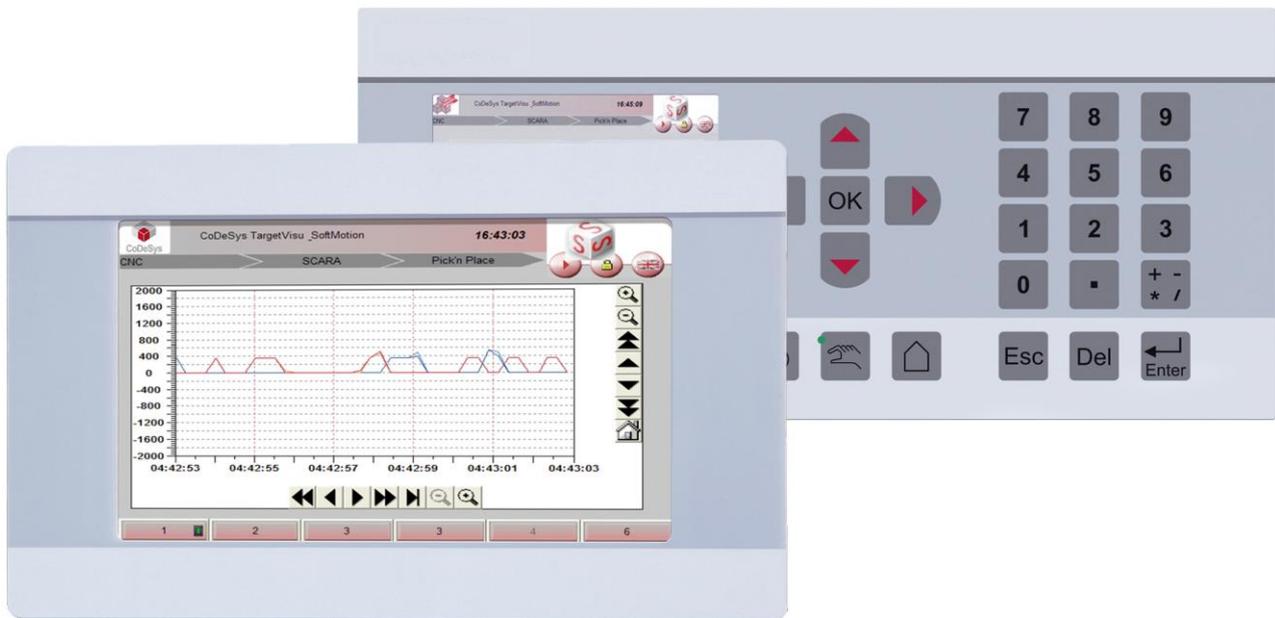


# DC1100

## Dialog-Controller Basic Plus



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### **General Information on this Manual**

This equipment manual contains product-specific information valid at the time of publication.

This equipment manual is only complete in conjunction with the product-related hardware and software user manuals required for the individual application.

→ [Content](#)

→ [Completeness](#)

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## Update

Version	Date	Subject
1.01	12.09.2012	First Version
1.1	23.11.2012	Update of the title page Update of the trademarks Update in the 'Conformity Declaration' section Integration of DC1107 WT in chapter 'Product description', sections 'Technical data', 'Front view', 'Dimensions', 'Panel cut-out' and 'Screw-on mounting'
1.2	19.07.2013	Transition into new CD

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# 1. General

## 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

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

### 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



**If damage can be seen on the faceplate of the Dialog-Controller, the device must not be operated any more! It must be disconnected from the supply voltage immediately!**

Besides the danger of injury owing to the visibly sharp edges, there is also the risk of touching parts under high voltage. Contact with high voltage can still occur even some time after the supply voltage has been shut off.

### Working on the Dialog-Controller

Before beginning work on the Dialog-Controller you must always

- first ensure that the equipment is in a safe state,
- then first switch the Dialog-Controller off, followed by the equipment, and
- only then disconnect the Dialog-Controller from the equipment.



**Hazards due to unforeseeable functional and processing movements when the Dialog-Controller 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 Dialog-Controller

First, please note all the tasks steps outlined in the above section “Working on the Dialog-Controller”. 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. Intended use

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.



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. Declaration of conformity

Both the standard version of the Dialog-Controller and with the extension modules mentioned below comply with and make allowance for the following directives and standards:

- **EMP Directive 2004/108/EC**
- **EN 61131-2:2009-1** Programmable logic controllers  
Part 2: Equipment requirements and tests  
Class B, connector cable of the I/O, max. 30 m
- **EN 61000-6-2:2011-6** Electromagnetic compatibility (EMP)  
Part 6-2: Generic standard – immunity for industrial environments
- **EN 61000-6-3:2011-9** Electromagnetic compatibility (EMP)  
Part 6-4: Generic standard – electrostatic discharge for industrial environments

## 1.8. Transport and setup



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.



#### 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'.

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## 2. Product description

The Dialog-Controller is a realtime-capable control module with a display and a broad range of data interfaces. The module can be programmed in conformity with IEC 61131-3 (CODESYS 2.3). [→ Brief description](#)

### Mounting

Dialog-Controllers are designed for installation on the front panel or for building into a switching cabinet in a rough, industrial environment. The fanless design and the flash memory make the cost and effort for maintenance minimal.

### Processors

The Dialog-Controller is equipped with either a 266-MHz or a 400-MHz clocked POWERPC™ processor from Freescale.

### Display

There are 3.5" and 7" TFT displays to choose from.

### Ethernet

Up to two 10/100 Mbit/s Ethernet interfaces are available. Thanks to the TCP/IP and UDP/IP protocols it is possible to link it very variably to visualisation software, to higher order control units or an IT infrastructure. The second Ethernet interface is implemented as an EtherCAT interface.

### USB

The USB host interface provides a widely-used peripheral interface. For example it can be used to carry out application updates or data migration simply via a USB stick. Please contact our Technical Support if no driver support is available for a specific USB device.

### CAN interfaces

The Dialog-Controller possesses 1 standard CAN interface which can be used up to 1 Mbit/s.

### Serial interfaces

In all, 2 serial interfaces can be deployed on the Dialog-Controller. The RS232 is supplemented by an RS485 interface.

### E-bus extension

The I/O level of the Dialog-Controller can be extended by a maximum of 7 E-bus users via the E-bus plug-in connector. The E-bus interface is not available in the "EtherCAT" device option.

### Realtime clock

A battery-buffered realtime clock can be set at the current time via a software interface.

### SD card reader

With the off-the-shelf MMC/SD card interface data can be written onto or read off memory cards.

**Performance features – an overview**

- Freescale POWERPCTM CPU 266 (400) MHz
- User program and data memory (RAM): 64 (128) MB on board / 32 (96) MB for application
- User program memory (Flash): 16 (32) MB on board / 8 (24) MB for application
- RetainMemory, 16 kB
- 1 Ethernet 10/100 interface; optional second Ethernet interface for EtherCAT
- 1 USB Host interface
- 1 CAN interface
- 1 RS232 serial interface for programming tools and application
- 1 RS485 serial interface
- I/O level can be extended locally via the internal E-bus for up to 7 users (digital / analog); optional
- Realtime clock
- MMC/SD card slot

→ Scope of supply

The scope of supply of the controller module consists of:

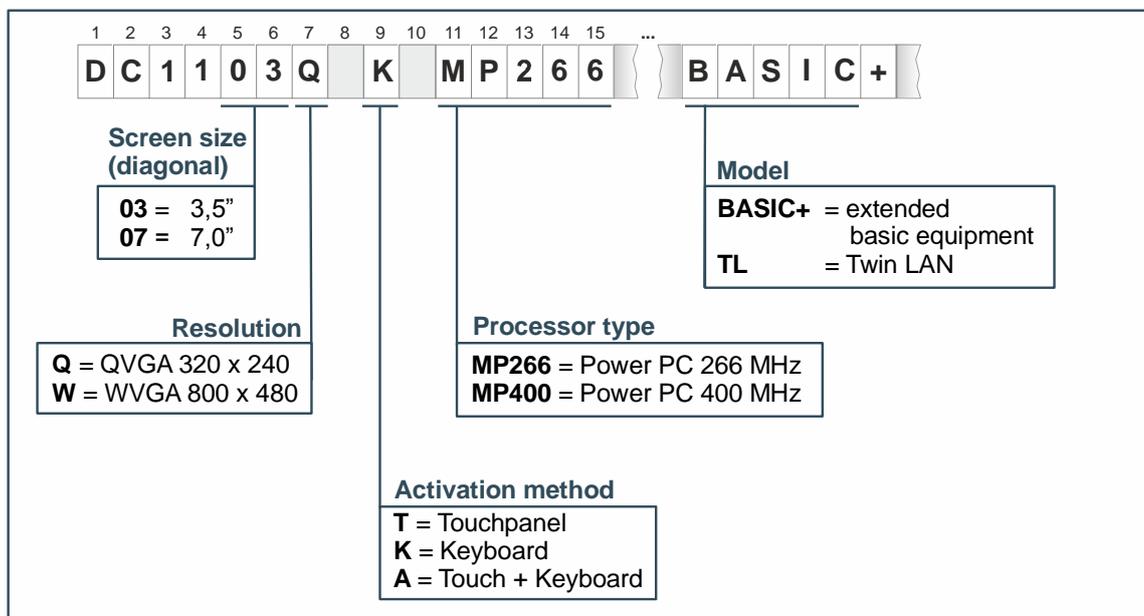
- Dialog-Controller DC11xx  
incl. 2-pin plug-in connector for power supply

## 2.1. Identification

**Product:** Dialog-Controller, Type DC11xx

**Identification code**

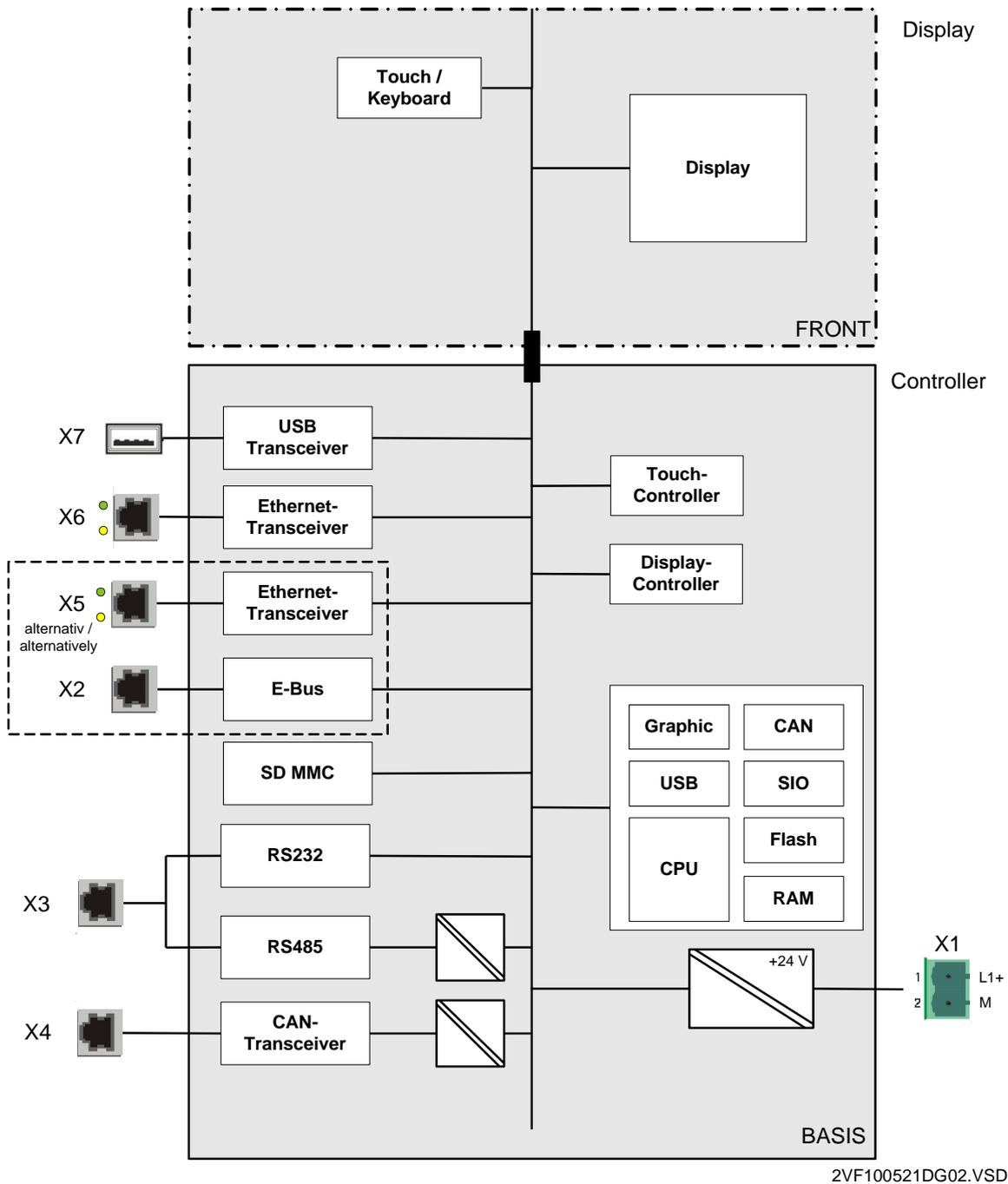
The features of the Dialog-Controller (see “Annex, Nameplate”) can be itemised according to the identification code.



2VF100519DG01.cdr

## 2.2. Layout of the DC1100 Dialog-Controller

### 2.2.1. Block diagram



## 2.2.2. Technical data DC1100

Module data	DC1103	DC1105
<b>Display</b>	<b>QVGA</b>	<b>VGA</b>
Diagonal	3.5"	7" Wide
Art. no.	270005300	-
Resolution	320 x 240 pixels	800 x 480 pixels
Colours	TFT: 256 (8 bits / pixels)	TFT: 65536 (16 bits / pixels)
<b>CPU, user memory</b>		
CPU	266 MHz CPU	400 MHz CPU
Program memory (Flash)	16 MB / 8 MB for application	32 MB Onboard / 24 MB for application
Program / data memory (RAM)	64 MB, 32 MB for application	128 MB Onboard / 96 MB for application
Retain memory	16 kB	
Development environment	CODESYS PLC programming tool	
Input	Touch operation and / or membrane keyboard	
<b>Sizes and weights</b>		
Dimensions (WxHxD [mm])	232x105x40	215x156x45
Weight	700 g	
<b>Operating conditions</b>		
Ambient temperature	0 °C to 55 °C (if installation instructions are observed)	
Relative air humidity	Max. 85 %, non-condensating	
<b>Transportation, storage</b>		
Ambient temperature	-20 °C to +70 °C	
Relative air humidity	Max. 85 %, non-condensating	
<b>EMC, protection class</b>		
Emitted interference	EN 61000-6-3, residential area	
Immunity to interference	EN 61000-6-2, industrial sector	
Protection type	IP20 (front IP54)	
<b>Energy supply (24 V power supply unit)</b>		
Supply voltage	+24 VDC (-15 % / +20 %) SELV, max. proportion of a.c. voltage 5 %	
Power consumption	typ. 1.0 A, max. 2.0 A at +24 VDC	
Reverse voltage protection	Yes	
Bridging in case of power failure	10 ms at < 20.4 VDC; Power Fail < 19.2 VDC	

**Module data****Ethernet interfaces**

Number / type of interfaces	1 x 10/100 Base-T on RJ45 plug-in connector / Optional: 2 <sup>nd</sup> Ethernet interface as the EtherCAT Master
-----------------------------	--

**USB interface**

Number / type of interface	1 x Host USB Rev. 1.1 (rear side)
----------------------------	-----------------------------------

**CAN bus interface**

Number / type of interface	1 x Standard CAN ISO 11898 isolated
----------------------------	-------------------------------------

**Serial interfaces**

Number / type of interfaces	1 x RS232, 1x RS485
-----------------------------	---------------------

**E-bus interface**

Type of interfaces	I/O extension bus, max. 7 users (alternative to 2 <sup>nd</sup> Ethernet interface)
--------------------	---

**Other functions**

Realtime clock	Yes, battery-buffered
----------------	-----------------------

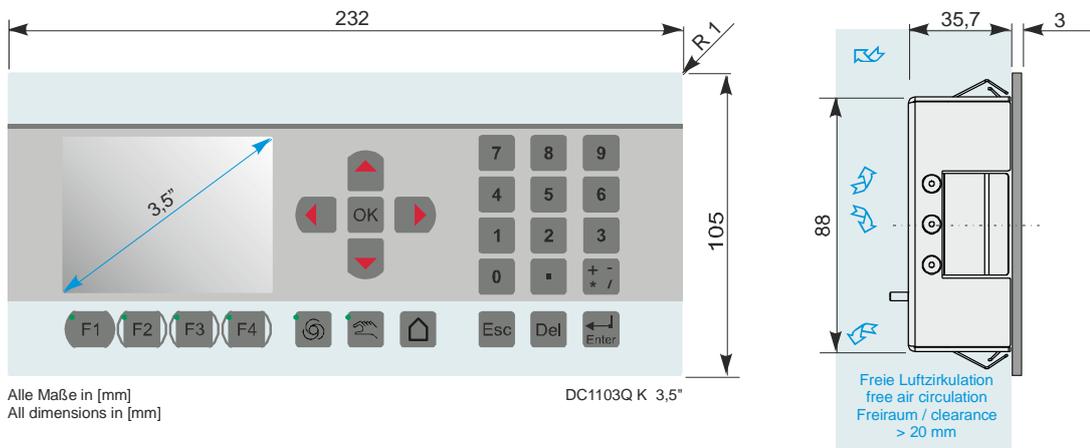
SD card	Optional
---------	----------

### 2.2.3. Front view of the DC1103 QK



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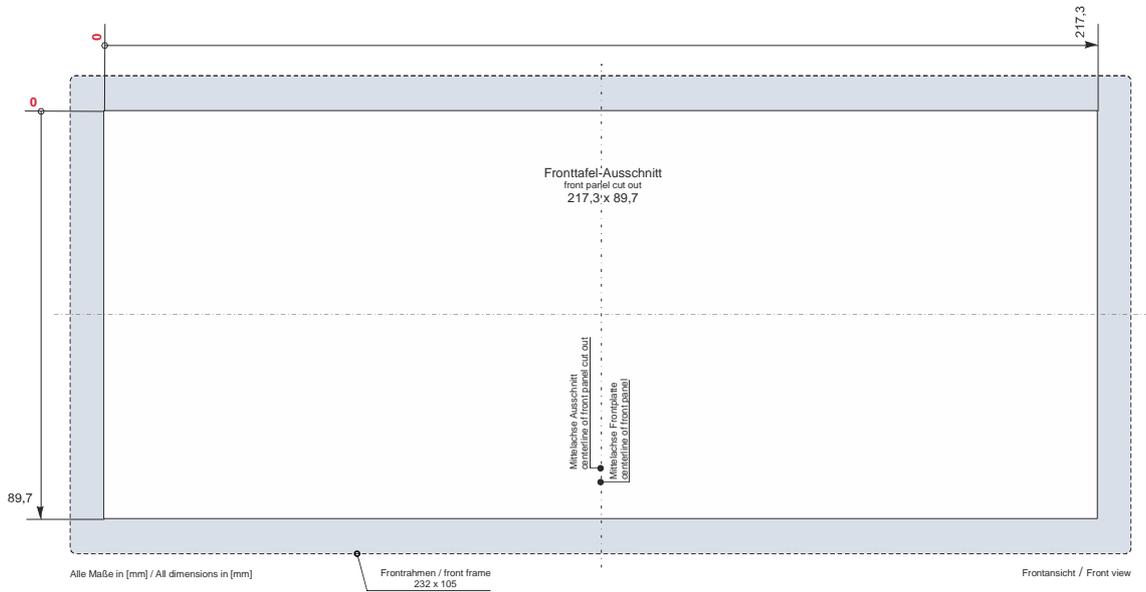
### 2.2.4. Dimensions of the DC1103 QK



2VF100520DG00.cdr

### 2.2.5. Panel cut-out for the DC1103 QK

The Dialog-Controller is intended for front installation. A rectangular cut-out is required. The thickness of the carrier material must not exceed 1.5 to 3.5 mm.



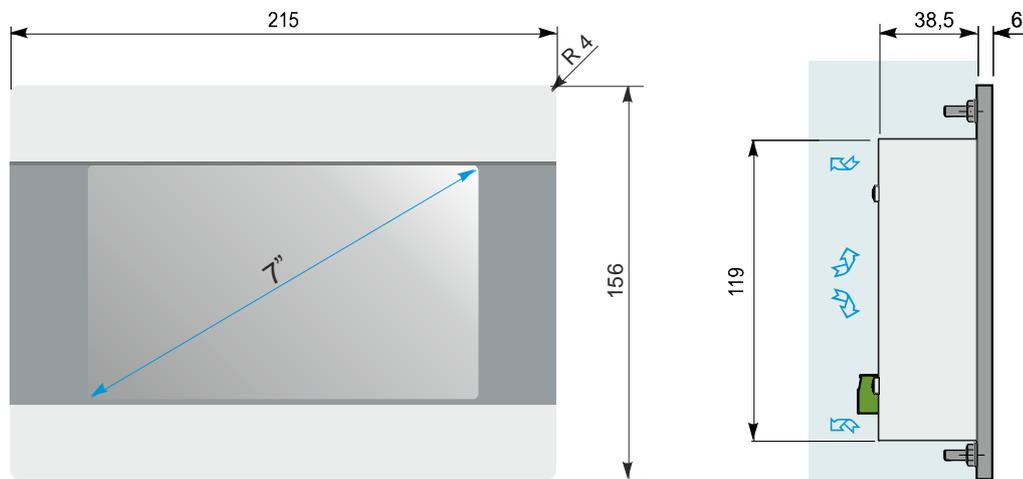
2VF100518DG00.cdr

### 2.2.6. Front view of the DC1107 WT



2VF100535DG00.cdr

### 2.2.7. Dimensions of the DC1107 WT



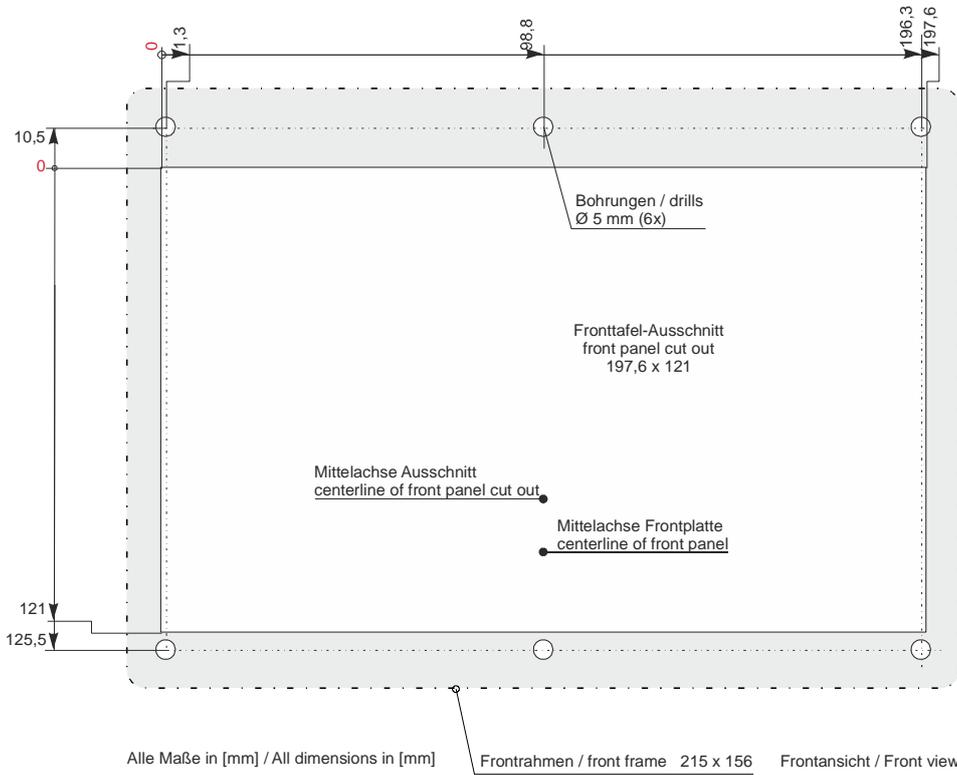
Alle Maße in [mm] / All dimensions in [mm] Dialog-Controller DC1107 WT

Freie Luftzirkulation  
free air circulation  
Freiraum / clearance  
> 20 mm

2VF100541DG00.cdr

### 2.2.8. Panel cut-out for the DC1107 WT

The Dialog-Controller is intended for front installation. A rectangular cut-out is required. The thickness of the carrier material must not exceed 1,5 to 3,5 mm.



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## 2.3. Mounting and connecting

### 2.3.1. Mounting and installing

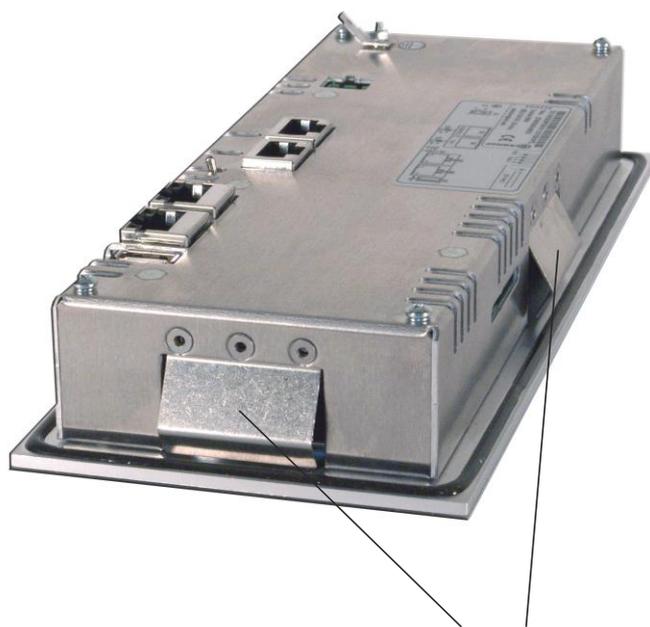
The Dialog-Controller is designed for automatic convection cooling.

 <p><b>CAUTION</b></p>	<p><b>Installation instructions:</b></p> <p><b>The Dialog-Controller must always be mounted on a flat surface!</b></p> <p>The support points of the Dialog-Controller may only differ from one another by max. +/- 0.5 mm. If the Dialog-Controller is nevertheless mounted on an uneven surface, mechanical tensions may cause cracks in the faceplate.</p>
---	--

### 2.3.2. Snap In mounting for 3.5“ devices

The Dialog-Controller can be placed inside the prepared front panel cut-out without any tools.

→ The tension springs on the sides and top fix the device in the front panel (“Snap In” mounting).



Spannfedern / Tension springs

2VF100526DG01.cdr

→ [Dismounting](#)

Dismounting/removal of the Dialog-Controller takes place in reverse order.

### 2.3.3. Screw-on mounting for 7“ devices

#### 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.



#### Disassembly:

Follow the reverse sequence to disassemble the Dialog-Controller.

### 2.3.4. Connecting

#### Power supply

The Dialog-Controller is energised via a 24 VDC external power supply. Before connecting up, check that the specifications required for the external power supply are observed.

#### External power supply (24 VDC)

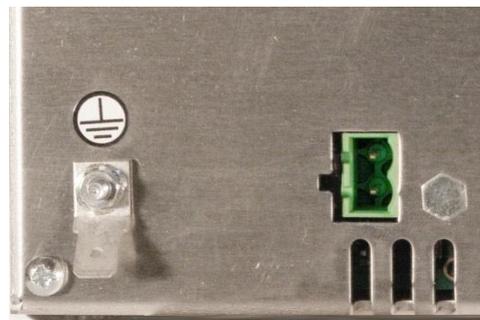
Output voltage	+24 VDC SELV (-15 % / +20 %)
Ripple quantity	Max. 5 %. The DC voltage level must not drop below 20.4 V.
Output power	Max. 2.0 A at +24 VDC at 25 °C.

#### Installation

All connections and lines must be executed so that no faults are caused by inductive and capacitive interference in the Dialog-Controller. The supply lines must be sufficiently resilient to current and voltage.

Connect the housing of the Dialog-Controller to the protective conductor (PE), wire diameter min. Cu 1.5 mm<sup>2</sup>.

There is a 6.3 x 0.8-mm flat pin on the Dialog-Controller for this purpose.

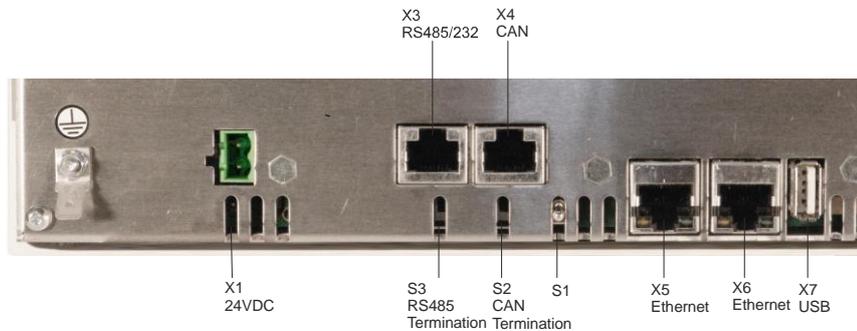


→ Protective connector

2VF100523DG00.jpg

## 2.4. Pin assignment

### 2.4.1. Plug-in connector overview



2VF100524DG00.cdr

### 2.4.2. Power supply

#### Internal power supply unit

A power supply unit is installed in the Dialog-Controller to provide 24 VDC input voltage (-15 % / +20 %). The power supply possesses integrated polarity-reversal protection and inrush-current limitation. The supply line and the power supply unit must both be protected by an external short-circuit and overload protection with a maximal tripping current of 5 A in each case (depending on the number of I/O).

#### Energy buffering

The power supply unit can bridge voltage dips lasting max. 10 ms at < 20.4 VDC.

#### X1 pin assignment

X1	
1	external power supply 24 VDC (-15 % / +20 %)
2	external power supply GND

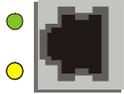
Phoenix MSTB  
2.5/2-G-5.08

### 2.4.3. 10/100 Base-T network connection (Ethernet)

The 10/100 Base-T on board Ethernet adapter with RJ-45 connection enables connection to the network. The “LNK” and “RCV” status LED give information about successful connection to the network.

<b>NOTICE</b>	The 2 <sup>nd</sup> Ethernet interface (X5) can currently be used exclusively for an EtherCAT Master function.
---------------	--

## X5/6 pin ssignment

X 5/6		
 RJ45	1	TX+
	2	TX-
	3	RX+
	4	75 Ohm
	5	75 Ohm
	6	RX-
	7	75 Ohm
	8	75 Ohm
LED „LNK“	<b>green</b>	ON - ready to operate
LED „RCV“	<b>yellow</b>	FLASHING - Data Receive

### 2.4.4. USB

Devices with USB interfaces can be connected to the two USB master ports (Rev. 1.1). The USB on the rear side (X7) and the front USB (at the front under the IP65 cover) are connected via an internal USB hub. The only classes of USB devices which can be used by CODESYS users are USB sticks. A mouse can only be used at the level of Linux. The following issues must be taken into account when using USB sticks:



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

If programs still have files open, the directory cannot be deleted when the USB stick is removed. In this situation file or directory operations cause blockages because a reading must be taken from a device which is no longer available in the system. Therefore, when removing the USB stick, always make sure that no program has any files still open on the USB stick.

- USB memory sticks can be plugged in and removed during operation. The plugged-in device is automatically identified and mounted in the /media/usbX directory. When the USB stick is unplugged the relevant /media/usbX directory automatically “vanishes” again, if it is no longer being accessed by a program (see above).
- Either the first partition or – if there is no partition – the entire memory is mounted on the memory stick, i.e. the relevant directory appears automatically.
- The first stick is mounted under /media/usb0, the second under /media/usb1, etc. Maximally 8 sticks can be plugged in and used at once (/media/usb [0-7]). If a new stick is plugged in (or one which has previously been plugged in and then removed), it will be placed in the directory bearing the lowest free number. By connecting a USB hub it is possible to operate multiple sticks on one USB interface. In this case attention must be paid that there are no USB devices still attached to the hub itself when it is plugged in and unplugged.

<b>NOTICE</b>	The mechanical structure of the USB port is designed for max. 1,000 mating cycles.
---------------	--

### X7 pin assignment

X7		
 USB	<b>B1</b>	VCC
	<b>B2</b>	D-
	<b>B3</b>	D+
	<b>B4</b>	GND

<b>CAUTION</b>	<p><b>The maximum current available on the USB ports is 0.5 A.</b></p> <p>A device requiring more current is not serviceable and may be damaged by this.</p>
----------------	--

## 2.4.5. CAN bus

The CAN interface (CAN0/CAN1) conforms to the ISO 11898 standard and can be operated up to the maximum baud rate of 1 Mbit/s. The lowest baud rate which can be set is 50 kbit/s.

### X4 pin assignment

X4		
 CAN transceiver	1	NC (Do not connect)
	2	<b>CAN_L</b>
	3	<b>CAN_GND</b>
	4	NC (Do not connect)
	5	NC (Do not connect)
	6	NC (Do not connect)
	7	<b>CAN_H</b>
	8	NC (Do not connect)
	9	NC (Do not connect)



**A terminating resistor can be connected by means of the S2 (CAN0) switch.**  
 This is necessary if the appropriate CAN interface is located at the beginning or end of the relevant CAN bus topology.

### 2.4.6. Serial interfaces

The module has a total of 2 serial communication interfaces which can be connected via a joint RJ45 plug-in connector. X3 encompasses an RS232 and an RS485 interface.



**The RS232 interface X3 has an exceptional position!**  
 Depending on the configuration, it can be used either as a Linux console, or as a PPP interface for remote maintenance, or as a CODESYS programming interface.  
 If the Dialog-Controller is started in the configuration mode, the module can be configured via a serial PPP connection in this mode. Here, too, the connection is made via X3.

The interfaces in the software are addressed by the following names:

Plug-in connector	Software interface
X3 / RS232	COM1
X3 / RS485	COM2

### X3 pin assignment

X3	RS232	RS485		
	1		RTXD-	
	2	RXD	NC (Do not connect)	
	RS232 / RS485	3	TXD	NC (Do not connect)
		4		RTXD+
	5	GND	GND	
	6	NC (Do not connect)	NC (Do not connect)	
	7	NC (Do not connect)	NC (Do not connect)	
	8	NC (Do not connect)	NC (Do not connect)	
	9	NC (Do not connect)	NC (Do not connect)	

→ RS232 / RS485 (isolated)

The interface is “softly” closed at 500 Ω in the Dialog-Controller. A 120 Ω differential terminating resistor can be activated for each S4 switch.

**i NOTICE**

**In order to use the symmetrical terminating resistor (S4) on the inoperative bus:**

**On an inoperative bus the terminating resistor causes a qualitatively unstable signal state, which can give rise to faulty received data.**

Background information:

Thanks to the differential signal transmission, the RS485 interface achieves a high signal-to-noise ratio and facilitates high data rates and large ranges. An operative bus with defined states: logical '1' ( $A-B < -0.2\text{ V}$ ) or logical '0' ( $A-B > +0.2\text{ V}$ ), is prerequisite for a high symmetrical signal-to-noise ratio. In the inoperative bus the signals are high-ohmic and hence susceptible to interference. Thanks to the terminating resistor, which can be activated, a signal state is produced with a low voltage difference between lines A and B.

There are two measures which can prevent this state:

- An appropriate protocol ensures that one of the bus users operates the bus actively at all times.
- If the state of the inoperative bus is to be kept under control, a sufficient signal-to-noise ratio must be established by means of an asymmetric bus termination (at the same time reducing the symmetrical signal-to-noise ratio). With a suitable resistance network as the line termination, a voltage difference between the signals can be produced in the inoperative state. Generally speaking, it is impossible to specify favorable dimensioning because it is influenced by the length of the bus and the transmission rates. By way of example, reference is made to the line termination in the case of the Profibus.

**i NOTICE**

**How to connect "GND":**

**Despite differential signal transmission, depending on the topology and length of the connected lines, it may be imperative to connect the ground reference (GND)!**

The longer the line the greater the potential differences between bus subscribers may be. In such cases, despite potential isolation, common-mode interference may exceed voltage limits causing differential signal interference, and hence a functional disorder. It is urgently advised to carry along the "GND" signal for isolated interfaces, with a connection to the reference ground in one spot. An attenuating connection, for example via  $200\ \Omega$  at multiple points on the bus.

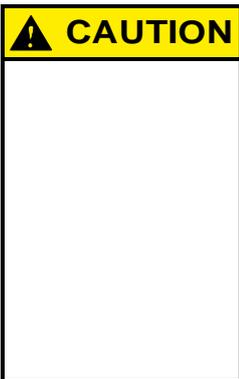
### 2.4.7. E-bus



**If an E-bus interface is available there is no second Ethernet interface.**

The E-bus (X2) enables up to 7 E-bus users to connect up to the Dialog-Controller. Please note that some E-bus modules represent 2 E-bus users owing to their functions, such as for example QDIO-E 16/16/Z2.

Cable	
Type	Ethernet patch cable 1:1 assignment (not crossed)
Wire cross-section	Min. 0,22 mm <sup>2</sup>
Category	CAT.5
Length	Max. 7 m



**The Dialog-Controller provides the E-bus modules with 0.5 A maximum current!**

As a rule this current is sufficient to supply 7 E-bus modules. However, if this power consumption is exceeded it may impair the serviceability of the E-bus and the connected modules!

Therefore, take note of the total power consumption of all E-bus modules and all connected users together. In special cases the connection of consumer devices, such as an encoder, causes the power limit to be exceeded.

Therefore, use only consumer devices with the lowest possible power requirements!

## 2.5. SD Card



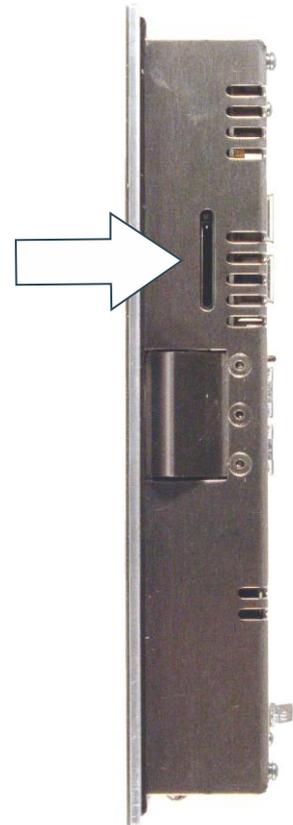
**While the module is in operation the SD card may not be inserted or removed, otherwise the functions of the Dialog-Controller may be impaired!**  
The SD card may only be inserted when the Dialog-Controller is de-energised!

The compact SD card drive is equipped with a push-in/push-out insertion and ejection mechanism. Gold-plated contacts guarantee low contact resistances and a service life of 10,000 push-in cycles.

At present the write protection switch on the SD card is not identified.

The SD card drive has to be activated via the web configuration. The files on the SD drive can be written, read and copied. The drive can be accessed via the following path: `/media/sd`.

At present data memory cards with a memory capacity of up to 1 GB can be used.



2VF100527DG01.cdr

### 3. Dialog-Controller operation



**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

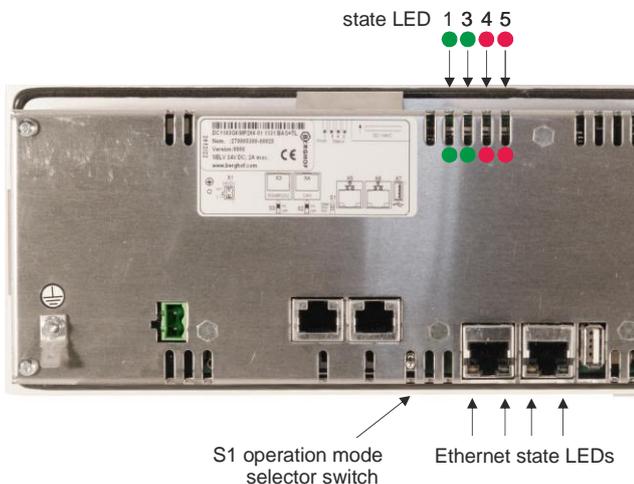
The Dialog-Controller switches off when the associated equipment is switched off or the power supply is disconnected.

#### 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-P:** PLC programming using CODESYS and Berghof Target Support Package
- **CPC++:** C programming directly on the LINUX operating system



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### Operating mode selection switch (S1)

Used to change the operating mode and for module restart.

Switch position	CP1131-P	CPC++
<b>RUN</b>	CP1131-P program in the RUN mode. Can be changed with the programming device.	Freely programmable
<b>STOP</b>	CP1131-P program in the STOP mode.	Freely programmable
<b>RESET</b>	CP1131-P program is restarted with deleted variables (RETAIN variables are not deleted).	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 <b>PWR</b> (green)	ON = Correct supply voltage to the module electronics

Status LEDs for CP1131-P 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

**CP1131-P 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.

The service menu has a two-part structure:

→ [Basic structure](#)

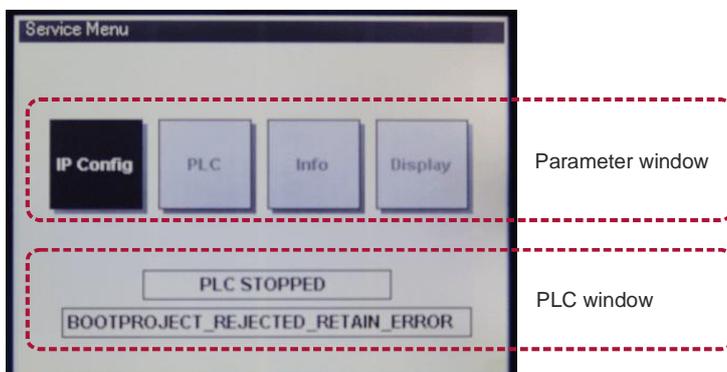
**Parameter window**

The following four menu items are displayed here. Each menu item can contain additional subject-related submenu items.

- Config
- PLC
- Info
- Display

**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.



2VF100273DG01.cdr

### 3.3.1. Using the service menu

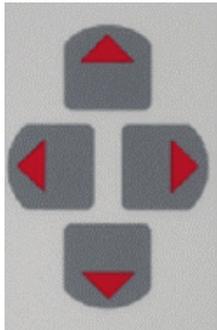
#### Touch screen

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

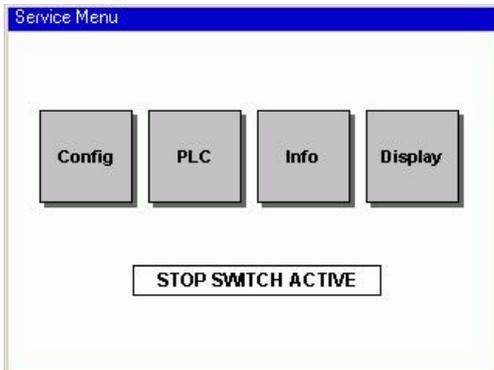
→ [Parameter window structure](#)

Checking and setting options are accessed through this window section.

The following four menu items are available for selection:

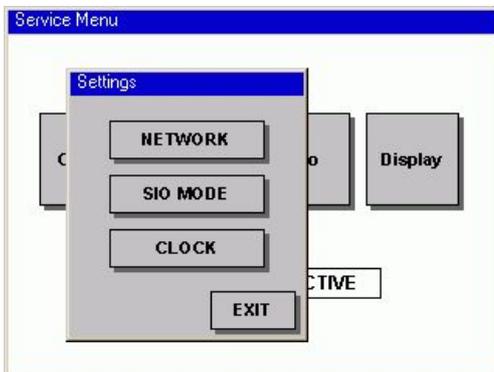
- **Config** to check and adjust Ethernet parameters, system time and the COM1 serial interface (X4).
- **PLC** to check and operate the PLC.
- **Info** to display the hardware and software version levels as well as diagnostic data; and it also offers the save function (USB, SD, Flash).
- **Display** to adjust contrast values.

“Config” service menu



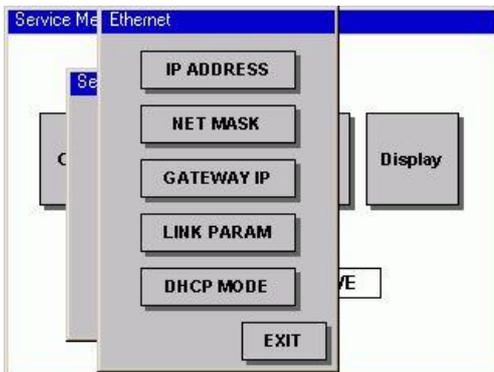
Check and adjust the parameters.

→ [Config](#)



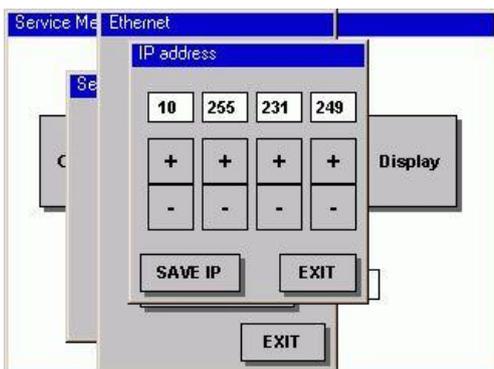
Check and adjust Ethernet parameters.

→ [NETWORK](#)



Check and adjust the IP address.

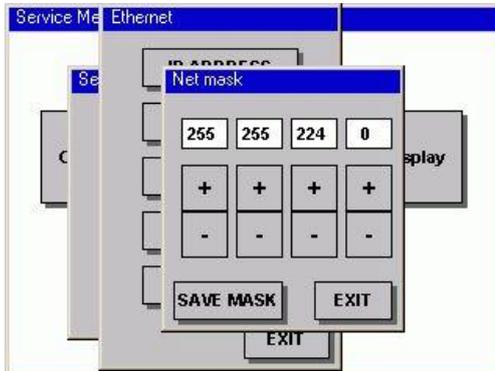
→ [Ethernet](#)  
“IP ADDRESS”



**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”

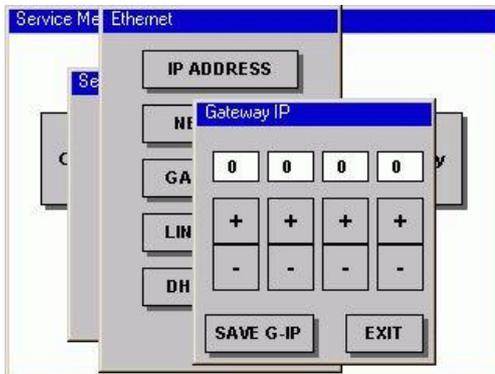


Check and adjust the network mask.

**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”

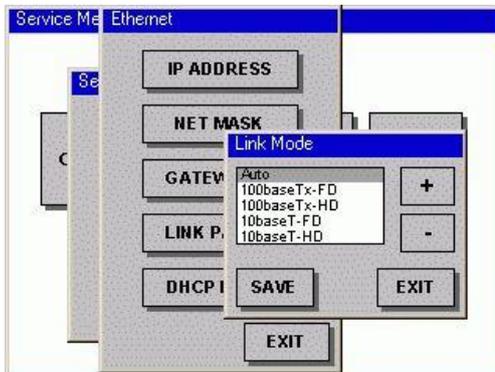


Check and adjust the gateway IP address.

**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).

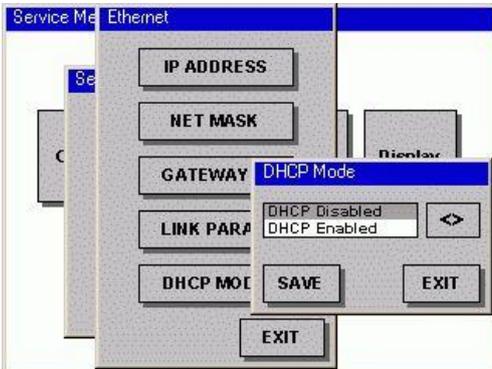
100base-Tx-FD: 100 MBit/s, full duplex

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.



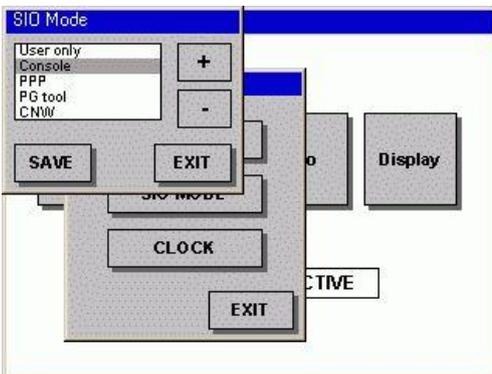
**DHCP Mode:**

**Disabled:** The IP ADDRESS set on the Dialog-Controller is valid.

**Enabled:** The IP ADDRESS is automatically retrieved from a DHCP server.

**Caution:** If DHCP is enabled, and there is no DHCP server available, the Controller will not boot! The Controller waits for a DHCP to allocate a valid IP address to it. If no DHCP server is present, the Dialog-Controller can only boot if the DHCP disabled setting has been configured. For this purpose the device must be put into configuration mode and can be converted via COM1 (X4) by means of web configuration (see manual: CP1131-P introduction).

→ Ethernet  
"DHCP Mode"



Setting the COM1(X4) serial interface.

**User only:** COM1 is available for CODESYS application

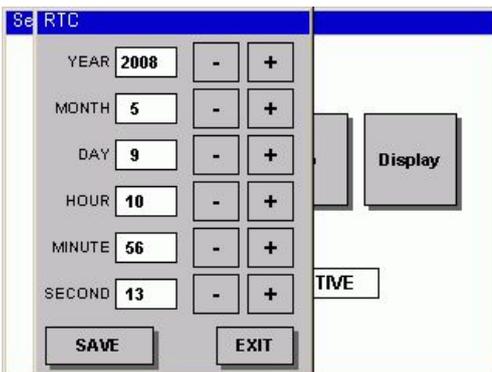
**Console:** Debug outputs of the operating system

**PPP:** TCP/IP over PPP protocol

**PG Tool:** CODESYS can upload and debug serial programs

**CNW:** reserved

→ SIO MODE  
"SIO MODE"

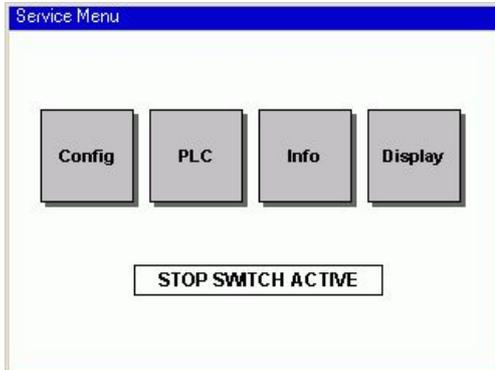


**RTC:** Setting the battery-buffered realtime clock.

→ CLOCK "RTC"

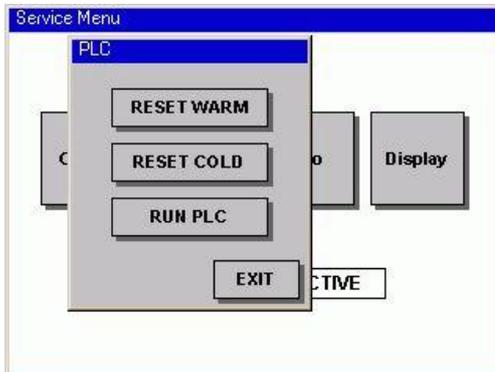
“PLC” service menu

→ PLC



Change the PLC state.

→ PLC



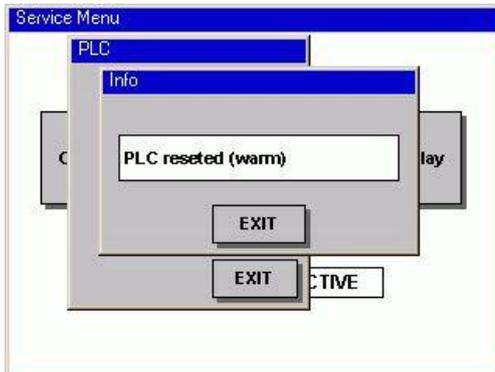
**RESET WARM:** After an error occurs the PLC program can be reset. With the exception of the RETAIN variables, all variables can be reset.

**RESET COLD:** After an error occurs the PLC program can be reset. With the exception of the RETAIN variables, all of the variables are reset, including the RETAIN variables.

**RUN PLC:** Starting the PLC program.

**NOTE:** RETAIN data are remanent data. They are saved when the Controller is switched off and are available to it when it is rebooted. If these data are deleted, important system data of the application may be deleted!

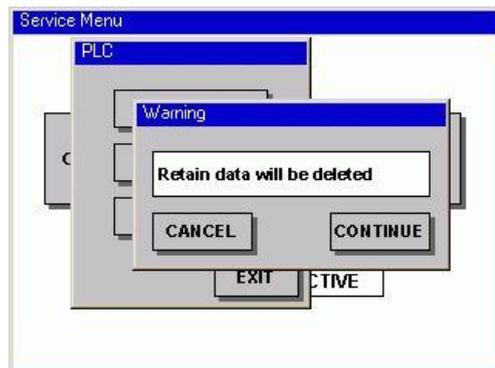
→ PLC  
“RESET WARM”



**Info:**

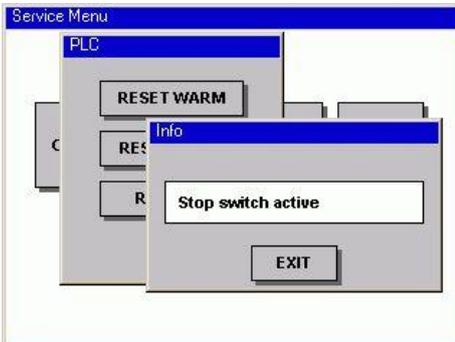
Acknowledgement of the RESET WARM command. PLC program and all variables, with the exception of the RETAIN variables, have been reset.

→ PLC  
“RESET COLD”



**Warning:**

Acknowledgement of the RESET COLD command. As soon as the “CONTINUE” button is pressed the PLC program and all variables, including the RETAIN variables, are reset.



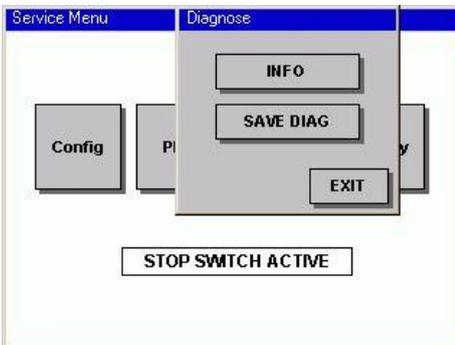
**Info:**

→ PLC "RUN PLC"

If there is a PLC program on the Dialog-Controller and it was possible to start it successfully, the Service Menu is terminated and PLC program executed. If the PLC program is not executed, the following may be the causes:

- There is no PLC program on the Dialog-Controller.
- Mode selector switch is set at "STOP".
- An error in the PLC program was not acknowledged by a "RESET" command (see above).

**"INFO" service menu**



**Diagnostics:**

→ "Info"

**INFO:** Diagnostic data displayed

**SAVE DIAG:** Diagnostic data is saved on USB stick or SD card.



**Info:**

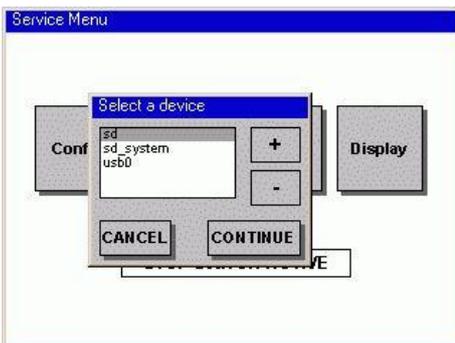
→ Info

Diagnostic data displayed:

- 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.



**Select a device:**

→ Info "SAVE DIAG"

The currently available storage media are displayed here. If neither a USB stick nor an SD card is available, the selection is empty.

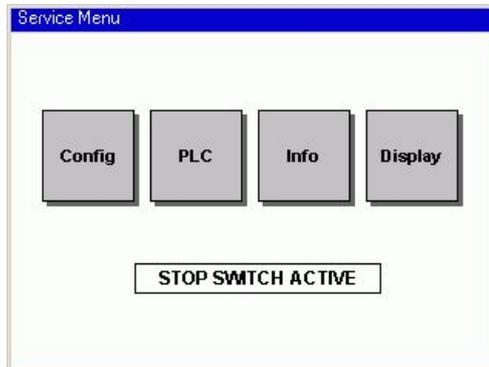
**sd:** Data partition of the SD card

**sd\_system:** System partition of an SD card is used, for example, for the PLC program

**usb0:** the first USB to be plugged in (a maximum of 8 sticks can be plugged in via a USB hub).

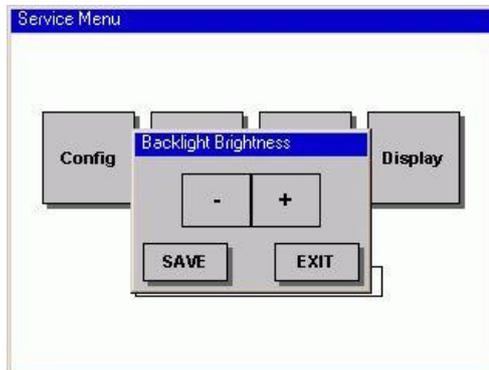
### “Display” service menu

→ Display



Status display or contrast and backlighting adjustment.

→ Display  
“Brightness”



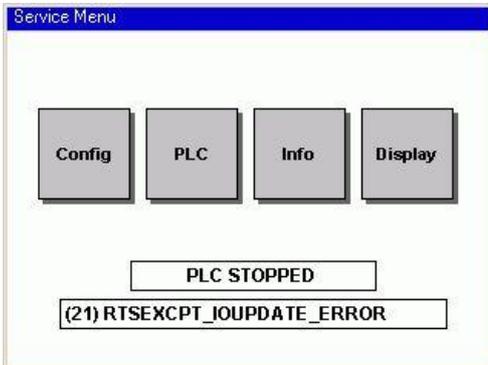
#### Dialog-Controllers with TFT displays:

The brilliance of the backlighting can be set by means of the “+/-” keys. Changes are applied immediately and will remain in effect until the next restart, even if you leave the menu with the “EXIT” button. The new value is saved by means of the “Save” button. 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).

#### Dialog-Controllers with monochrome displays:

The contrast can be adjusted here.

### 3.3.3. PLC window



The following states of the PLC Controller can be represented in line 1 of the PLC window:

→ [STOP](#)  
in the Service menu

- STOP SWITCH ACTIVE
- PLC STOPPED
- PLC NO PROGRAM
- PLC ERROR STOP

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 program has been put into the STOP state or there is another upcoming error, which has not yet been acknowledged with RESET.
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	<p>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.</p> <p><b>Error correction:</b> Either load, save and then start the new PLC program or use a reset command to start the saved and possibly outdated program.</p>
RETAIN_IDENTITY_MISMATCH	<p>The Dialog-Controller was unable to correctly reestablish the retain variables.</p> <p><b>Error correction:</b> By performing a reset, the saved PLC program can be started using the reset retain variables.</p>
RTSEXCPT_IOUPDATE_ERROR	<p>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.</p> <p><b>Error correction:</b> 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.</p>



This display appears if an error has occurred when the PLC program is executed, i.e. during program run.

The following error statuses can be displayed:

- ACCESS\_VIOLATION
- RTSEXCPT\_WATCHDOG
- RTSEXCPT\_DIVIDEBYZERO

→ **EXCEPTION**  
Major exceptional errors

#### Standard procedure in case of an error:

Saving all relevant data is an important factor for error analysis. The diagnostic information generated by the device should be saved for this reason.

“**Save Diag**” is used to store the relevant diagnostic data for example on a plugged-in USB stick. After such an error the Controller must be rebooted. This takes place after data backup, using the “**Reboot**” button.

#### Note:

The diagnostic data must definitely be saved **prior to re-booting** because only at this time can all the important data be saved!

Display	Description
ACCESS_VIOLATION	<p>Illegal memory access by the PLC program, e.g. by an invalid pointer.</p> <p><b>Notes on how to eliminate the error:</b></p> <p>The program error can be identified from the diagnostic data and/or the Breakpoint List file (BPL) generated by CODESYS, and eliminated. Further information on debugging with the aid of BPL files and debugging in general is to be found in the "CODESYS Online Help" in the "Berghof Target" section.</p>
RTSEXCEPT_WATCHDOG	<p>It was not possible for a task within the PLC program, which is monitored by a watchdog to become active during the monitoring time. This important watchdog-monitoring makes it possible to find errors in the execution behaviour and in the tasking of the PLC program. For such errors to be found at all it is important that each task is monitored by a watchdog.</p> <p><b>Notes on how to eliminate the error:</b></p> <p>The program error can be identified from the diagnostic data and/or the Breakpoint List file (BPL) generated by CODESYS, and eliminated. Further information on debugging with the aid of BPL files and debugging in general is to be found in the "CODESYS Online Help" in the "Berghof Target" section.</p>
RTSEXCEPT_DIVIDEBYZERO	<p>Division by zero in the PLC program prompts an error stop.</p> <p><b>Notes on how to eliminate the error:</b></p> <p>The program error can be identified from the diagnostic data and/or the Breakpoint List file (BPL) generated by CODESYS, and eliminated. Further information on debugging with the aid of BPL files and debugging in general is to be found in the "CODESYS Online Help" in the "Berghof Target" section.</p>

## 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.

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## 4. Maintenance

### Maintenance work

Maintenance work to the Dialog-Controller, especially such work that entails opening the housing, may only be carried out by qualified personnel! Before starting any maintenance work, please first read the 'General information' section and in particular the section on 'Basic safety measures'.



**Do not open housing while it is energised!**

**Danger if you touch parts which are under high voltage.**

The result can be death, serious injuries or major material damage.

Do not open the housing covers until the Dialog-Controller has definitely been disconnected from the power supply.

Damage can be caused by maintenance work to the Dialog-Controller,

- if metal objects such as screws, nuts, tools or other conductive objects fall onto printed circuit boards.
- if connecting cables have been loosened, removed or plugged-in incorrectly.

### After maintenance

Before you put the Dialog-Controller back into service, ensure that

- there are no foreign bodies in it.
- there is a battery in the battery compartment.
- that all connections have been made and are secure.
- the protective earth (PE) is connected correctly.



**Before you put the Dialog-Controller back into service, lock all its coverings!**

## 4.1. Real-time clock with backup battery

The DC11xx is equipped with a real-time clock.

### Setting the clock

Use either the web configuration or the CODESYS “BGHSysLibRtc.lib” library.

### Power supply

A rechargeable battery is incorporated to energise this clock.

### Changing the rechargeable battery

There is no need for the user to change the battery.

 <b>NOTICE</b>	<b>The battery must be changed expertly by the manufacturer of the module.</b>
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### Type of rechargeable battery

Panasonic VL2020 or equivalent

### Battery service life

typ. 10 years depending on temperature in use

### Battery storage

> 1 year voltage-free; thereafter the data of the RTC may possibly be lost

## 5. Chemical resistance

### 5.1. Resistance of the touch screen

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

Household and industrial chemicals	Semi-luxury food and beverages
Washing agents	Tea
Multipurpose cleaners	Coffee
Washing-up liquid	Ketchup
Glass cleaner	Mustard
Hydrogen peroxide (3%)	Vinegar
Lysol	Soy sauce
Ethanol	Beer
Isopropyl alcohol	Red wine
Acetone	White wine
Methyl ethyl ketone	Cola
Toluene	Edible oil
Concentrated hydrochloric acid	
Petroleum	
Gasoline	
Petrol	
Engine oil	
Diesel	
Gear oil	
Brake fluid	
Anti-freeze	
Hydraulic oil	

## 5.2. Resistance of the front REFLEX foil towards chemicals

### 5.2.1. General resistance of the foil

REFLEX is based on a polyester foil and possesses good resistance to solvents.

**In compliance with DIN 42 115 part 2, REFLEX is resistant to the following chemicals after exposure for over 24 hours without visible changes:**

Chemicals Group	Chemicals used
Acids diluted inorganic organic	10 % hydrochloric acid 95 % acetic acid
Alcohols	Methanol Ethanol Isopropanol
Aliphatic hydrocarbons	n-Heptane
Alkaline lye, diluted	2 % sodium hydroxide solution
Aromatic hydrocarbons	Toluene
Chlorinated hydrocarbons	1-1-1 trichloroethane Methylenchlorid
Ester	Ethyl acetic acid
Ketone	Acetone



**The product is not resistant to the following chemicals and impact, which may damage the front foil:**

- Concentrated mineral acids
- Concentrated alkaline substances
- Benzyl alcohol
- Methyl alcohol
- Iodine or iodine solution
- High-pressure vapour above 100 °C

### 5.2.2. Environmental values

#### Temperature in use

REFLEX foils have a specified application range between -40 °C and +80 °C.

#### Outdoor use

Like all polyester-based foils, REFLEX is not suitable for long-term exposure to direct sunlight.

## 6. Copyright and software licenses

The firmware of terminals, controllers with displays and Industrial PCs with displays contains free software. Parts of this software are subject to the following licenses:

- **GPL, refer to GPL license**
- **LGPL, refer to LGPL license**
- **MPL, refer to MPL license**
- **FTL, refer to free-type license (FTL)**

When required, the source code for the free software can be requested from Berghof within three years after delivery at cost price. The exact address for this:

**Berghof Automationstechnik GmbH**  
**Harretstrasse 1**  
**72800 Eningen (Germany)**



The licenses used by Berghof are listed in the 'Copyright and software licenses' manual.

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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



**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



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

### Nameplate descriptions (example)



2VF100080DG02.cdr

- ① **Barcode**  
same as identification number.
- ② **Module type**  
plain-text name of module.
- ③ **Identification no.**  
is the unique labeling of the module, consists of two elements.  
**Part no.** (the first nine digits)  
The designation of this number suffices for ordering a module.  
The delivery takes place in each current hard- and software version.  
**Serial no.** (five digits behind the hyphen)
- ④ **Version**  
defines the design-level of the module as supplied ex-works.
- ⑤ **Supply voltage**
- ⑥ **Production date**  
year / calendar week of the production.
- ⑦ **CE mark**



**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

CAN in Automation; international manufacturers and users organisation for CAN users in the field of automation: → [CiA](#)

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

EtherCAT Technology Group → [ETG](#)  
ETG Headquarters  
Ostendstraße 196  
D-90482 Nuremberg / Germany  
info@ethercat.org  
www.ethercat.org

Beuth Verlag GmbH, 10772 Berlin → [DIN-EN Standards](#)  
or  
VDE-Verlag GmbH, 10625 Berlin

VDE Verlag GmbH, 10625 Berlin → [IEC Standards](#)  
or  
Internet search: [www.iec.ch](http://www.iec.ch)

## 7.5.2. Standards/Bibliography

Standard	Label
<b>IEC61131-1 / EN61131-1</b>	Programmable controllers Part 1: General information
<b>IEC61131-2 / EN61131-2</b>	Programmable controllers Part 2: Equipment requirements and tests
<b>IEC61131-3 / EN61131-3</b>	Programmable controllers Part 3: Programming languages
<b>IEC61131-4 / EN61131BI1</b>	Programmable logic controllers Supplementary Sheet 1: User guidelines
<b>IEC61000-6-4 / EN61000-6-4</b>	German EMC Standard: Emitted interference
<b>IEC61000-6-2 / EN61000-6-2</b>	German EMC Standard: Noise immunity
<b>ISO/DIS 11898</b>	Draft International Standard: Road vehicles - Interchange of digital information - Controller Area Network (CAN) for high-speed communication
<b>DIN EN ISO 13849-1</b>	Safety of machinery: Safety-related parts of control systems (Part 1)
<b>Bibliography</b>	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.