CL550

Controller Manual

Edition 101

BOSCH
Automation

CL550

Controller Manual

1070 072 263-101 (01.08) GB

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1 Safety Instructions

Before you start working with the CL550 controller, we recommend that you thoroughly familiarize yourself with the contents of this manual. Keep this manual in a place where it is always accessible to all users.

1.1 Intended use

This manual contains a comprehensive set of instructions and information required for the standard operation of the described products. The described products are used for installation and operation of a CL550 controller.

The described products

- were developed, manufactured, tested and documented in accordance with the relevant safety standards. Normally, the product does not present any danger for people or equipment provided that the specifications and safety instructions relating to project planning, installation, and normal operation of the product are observed.
- fully comply with the requirements of
  - EMC Directives (89/336/EEC 93/68/EEC, and 93/44/EEC)
  - Low-Voltage Directive (73/23/EEC)
  - Harmonized standards EN 50081-2 and EN 50082-2
- are designed for operation in an industrial environment (Class A emissions), i.e.
  - direct connection to the public low-voltage power supply is not permitted;
  - Connection to the medium and/or high-voltage system must be provided via transformer.

  The following applies to the usage in residential settings, in business and commercial areas and in small-industry settings:
  - Installation in an enclosure with high shield attenuation.
  - Cables that exit the screened area must be provided with filtering or screening measures.
  - The user will be required to obtain an individual operating license issued by the appropriate national authority or approval body. In Germany, this is the Regulierungsbehörde für Post und Telekommunikation (RegTP) (Regulatory Body for Post and Telecommunication), and/or its local offices.

☞ **This is a Class A device. In a residential setting, this device may cause radio interferences. In such a case, the user may be required to introduce suitable countermeasures at his own costs.**

Proper transport, handling and storage, placement and installation of the product are indispensable prerequisites for its correct and safe operation.

1.2 Qualified Personnel

The relevant requirements are based on the job specifications as outlined by the ZVEI and VDMA in Germany. Please refer to the following German-Language publication:
Weiterbildung in der Automatisierungstechnik
Editor: ZVEI and VDMA
Maschinenbau Verlag
Postfach 71 08 64
60498 Frankfurt/Germany

This manual is intended for especially qualified PLC experts.

Interventions in the hardware and software of our products that are not described in this manual may only be performed by Bosch's own specifically trained personnel.

Unqualified interventions in the hardware or software or non-compliance with the warnings listed in this instruction manual or indicated on the product may result in serious personal injury or damage of the equipment.

Only trained electricians as per IEV 826-09-01 (modified) who are familiar with the contents of this manual may undertake installation and maintenance tasks regarding the described products.

These electricians

- are, due to their professional training, skills and experience and based upon their knowledge of and familiarity with applicable technical standards, capable of evaluating the work to be carried out, and of recognizing possible dangers.
- possess, based upon several years of working in a comparable field, a level of knowledge and skills that may be deemed equal to that after formal professional education.

With regard to the foregoing, please note our comprehensive training program. For up-to-date information, web shop for teachware and online seminar booking, please refer to http://www.bosch.de/at/didactic or call our training center at (+49) (0) 60 62 78-258.

1.3 Safety Markings on Components

DANGER! High voltage!

DANGER! Corrosive battery acid!

CAUTION! Electrostatically sensitive components!

Disconnect mains power before opening!

Lug for connecting PE conductor only!

Functional earthing or low-noise earth only!

Screened conductor only!

1.4 Safety Instructions in this Manual

DANGEROUS ELECTRICAL VOLTAGE
This symbol warns of the presence of **dangerous electrical voltage**. Insufficient or non-compliance with this warning can result in **personal injury**.

DANGER
This symbol is used whenever insufficient or non-compliance with instructions can result in **personal injury.**

CAUTION
This symbol is used whenever insufficient or non-compliance with instructions can result in **damage of equipment or data files.**

☞ This symbol is used to alert the user to an item of special interest.

★ This symbol indicates an activity to be performed by the user.

1.5 Safety Instructions for the Described Product

DANGER
Life endangered by ineffective EMERGENCY-STOP devices!
EMERGENCY-STOP safety devices must remain effective and accessible during all operating modes of the system. Unlocking the EMERGENCY-STOP device must not cause an uncontrolled system restart! First, test the EMERGENCY-STOP sequence, then restore power!

DANGER
Danger for persons and equipment!
Before operating the system, test every new program!

DANGER
Retrofits or modifications may interfere with the safety of the described products!
The consequences may be severe personal injury or damage to the equipment or the environment. Therefore, any retrofitting or modification of the system utilizing components from other manufacturers does require approval by Bosch.

DANGEROUS ELECTRICAL VOLTAGE
Unless described otherwise, maintenance procedures must only be carried out when the system is turned off! During this process, the system must be safe from unauthorized or inadvertent restart.

If measuring or testing procedures must be carried out when the system is active, it must be done by trained electricians only.

CAUTION
Do not plug or unplug the module as long as the controller is switched on! The module could be destroyed. Turn off or unplug the controller's power supply module, the external power supply and the signal voltage first. Only then plug or unplug the module!

CAUTION
Please use only spare parts that are approved by Bosch!

CAUTION
Please comply with all ESD protection measures when using the module! Avoid electrostatic discharges!

Please comply with the following protection measures for electrostatically endangered modules and components (EEM)!

- The employees responsible for storage, transport and handling must be trained in ESD protection.
- Store and transport EEMs in the specified protective packaging.
- Work with EEMs only at special ESD work stations equipped for this particular purpose.
- Employees, work surfaces and all devices and tools that could come into contact with EEMs must be on the same potential (e.g. earthed).
- An approved earthing wrist strap must be worn. It must be connected to the work surface via a cable with an integrated 1 MΩ resistor.
- EEMs must, under no circumstances, come into contact with objects susceptible to accumulating an electrostatic charge. Most items made of plastic belong to this category.
- When installing EEMs in or removing them from an electronic device, the power supply of the device must be switched OFF.

1.6 Documentation, Software Release and Trademarks

Documentation

This manual contains information about the operation and installation of the CL550 programmable logic controller.
Descriptions regarding the COM-MAP module are excluded.

Available manuals:

Manuals	Language	Order no.
CL550 Configuration and Commissioning, Software Manual	English	1070 072 262

☞ **In this manual the floppy disk drive always uses drive letter A:, and the hard disk drive always uses drive letter C:.**

Special keys or key combinations are shown enclosed in pointed brackets:

- Named keys: e.g., <Enter>, <PgUp>, <Del>
- Key combinations (pressed simultaneously): e.g., <Ctrl> + <PgUp>

Version

☞ **This manual is applicable for the following versions:**

Hardware: **GG4–9 201**
NT4 101
ZS550 301
Con550 202

Software: **Project configurator 1.0**
WinSPS 3.01
WinDP 2.01

Trademarks

All trademarks referring to software that is installed on Bosch products when shipped from the factory are the property of their respective manufacturers.

At the time of shipment from the factory, the installed software is protected by copyright. Software may therefore be duplicated only with the prior permission of Bosch or according to the license agreement of the respective manufacturer.

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PROFIBUS® is a registered trademark of PROFIBUS Nutzerorganisation e.V.

INTERBUS-S® is a registered trademark of Phoenix Contact.

2 System Overview CL550

The CL550 is an open multiprocessor system with up to six democratic central units. Each central unit constitutes a closed control unit with all data areas and the entire I/O address range. Communication among the modules is processed via Ethernet.

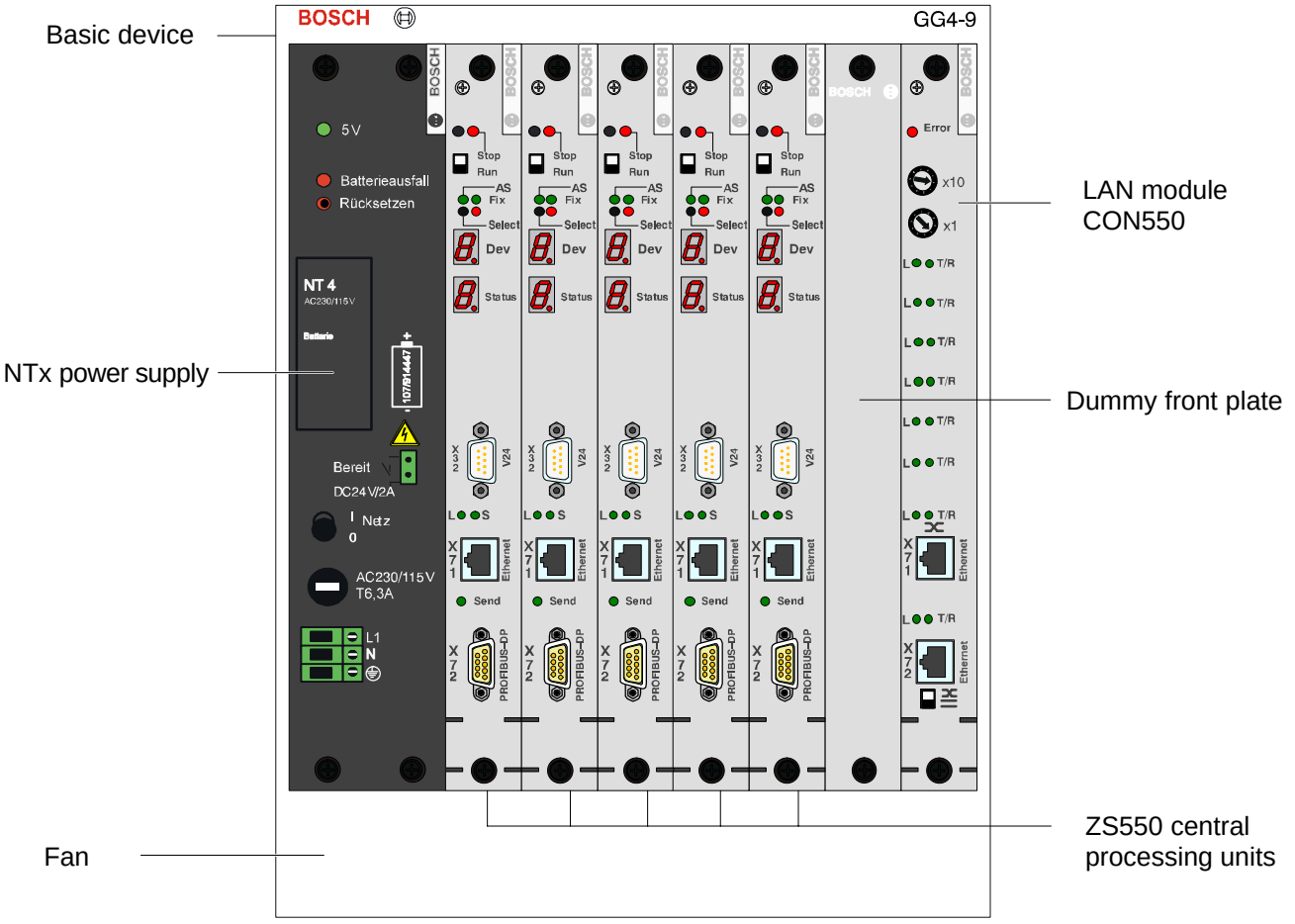
2.1 Controller Structure

A CL550 must contain:

- GG4-9 mounting rack
- an NTx power supply
- a ZS550 or ZS550-DP-IBS central processing unit
- a fan

☞ **The ZS550-DP-IBS module necessitates two slots.**

The remaining slots can be equipped with additional CL550 system modules.



Slot coding

The obligatory slot codes are as follows:

- Slot 1 + 2: NTx power supply
- Slot 9: LAN interface CON550

The other assignments can be chosen freely. The configurator's default settings provide the following:

- CPU modules (ZS...) are set from left to right, next to the power supply.
- MAP modules are set from right to left.

☞ **The slot coding cannot be altered.**

If the 9 slots of the mounting rack are not sufficient for the desired control rack system, additional modules and peripheral modules can be plugged into further mounting racks. The mounting racks can be connected together in a network.

Power supply module

The NTx power supply supplies the mounting rack with current.

☞ **The external I/O modules need their own power supply. They do not receive their current from the power supply unit.**

ZS550

A ZS550 module contains:

- PLC functionality (program flow)
- Busmaster PROFIBUS-DP (V1 functionality) for triggering the in- and outputs
- TCP/IP communication:
  - Backside: system buscommunication
  - Frontside: external bus communication
- The ZS550-DP-IBS mounting rack has been additionally provided with: InterBus-S interface

CON550

☞ **If the CL550 contains more than one ZS550, a CON550 module can be added in order to enable the modules to communicate with each other via the backside.**

The CON 550 module is an Ethernet switch which connects the Ethernet interfaces on the backside with each other. The address of the mounting rack must be set with the rotary switch on the front. In addition to the 6 internal Ethernet connections, the module is provided with 2 external connections. A configuration program helps to assign and display the characteristics of the module.

2.1.1 Communication via Ethernet

The Ethernet is defined in the IEEE 802.3 specification. All computers connected to the Ethernet network system share the same cable and the highest possible bandwidth of 10 Mbits/s or 100 Mbits/s.

Ethernet and Internet protocols are the basis for communication. On an Ethernet basis, the UDP/IP standard protocol is used to send Bosch BÜP commands.The thus created protocol is called BÜP-E. To do so, the ZS550 is provided with two Ethernet interfaces. The interfaces can be operated with up to 100 Mbits/s. One interface is located on the frontside, the other is located on the back and serves for communication on the system bus.

Communication via TCP/IP Ethernet is used with the following two applications:

- Communication PLC – HMI (Human Machine Interface): Each CL550 central processing unit communicates with the corresponding HMI via the front Ethernet interface.
- Communication PLC – PLC: The central processing units communicate with each other on an Ethernet basis via the CON550 module.

2.1.2 Communication via LAN

The Ethernet interface on the frontside of the CPU serves for external networking in LAN.

With the 100Base-T, the network structure in the local network must be realized via starshaped patch cabling with 100 Mbits/s. Each device must be connected to the network component (hub, switch, etc.) via cables whose maximum length is 100 m each.

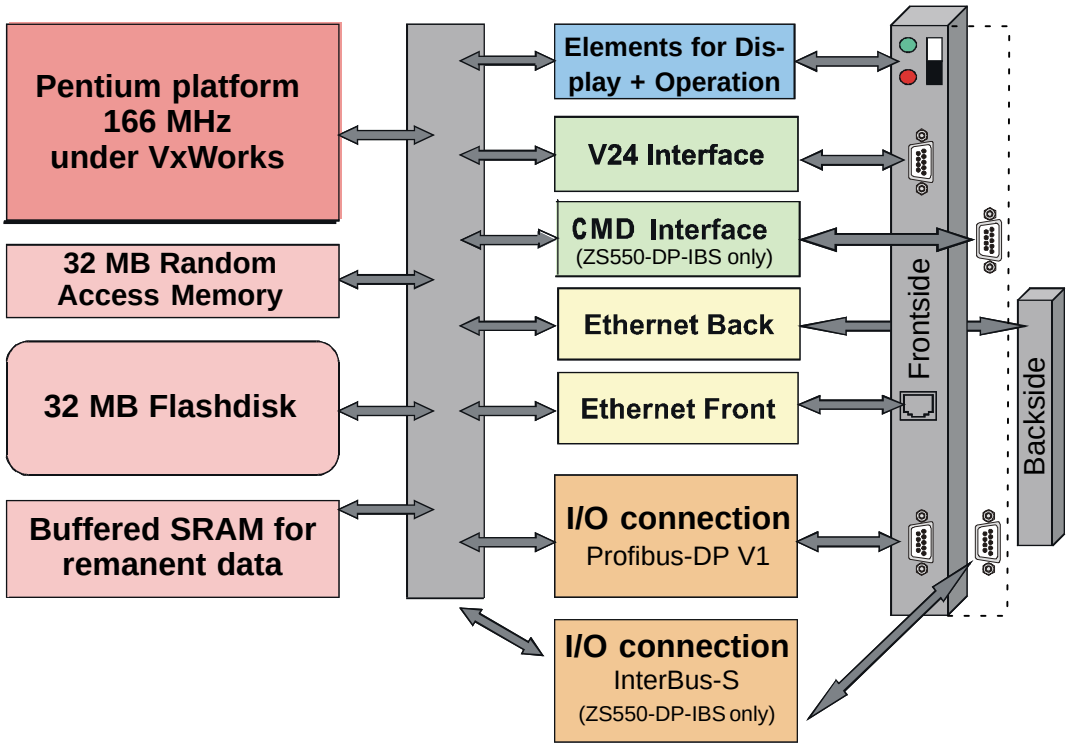
☞ **The length of the cables shall under no circumstances be exceeded.**

2.2 Decentralized In-/Outputs

The CL550 is provided with decentralized peripherals only (digital and analog in- and outputs). The peripherals must be connected either via PROFIBUS coupling on which the DP-V1 protocol is implemented or via an InterBus-S interface which is implemented on the ZS550-DP-IBS module.

☞ **Peripherals can be connected centrally via the expansion racks CL200 (RM2-DP12 module) and CL400 (RM4-DP12 module). For further information regarding the expansion racks refer to the CL200 and CL400 manuals.**

2.3 Configuration



The control part has been realized through a high-performance PC kernel under VxWorks, a real time operating system. 1500 K-words have been reserved in the RAM for the control program's memory size. With an average command length of six words per instruction, about 250 K-instructions are programmable. Upon startup, the control program and the data will be copied from the flashdisk into the RAM. Then, the remanent data will be read from the buffered SRAM and laid over the data in the RAM.

2.4 Programming

Programmable logic controllers process a program in which the controlling tasks are described. To do so, special programming languages are used that can be displayed and printed in several ways.

2.4.1 Central Programming

The PLC program can be created with a programming device or a computer; a controller is not necessary. It will be loaded into the controller via the WinSPS utility program.

2.4.2 Program Display

The following is available as a programming language:

- Sequential function chart
- Instructions list
- Function diagram
- Ladder diagram
- Structured text (since WinSPS 3.1)
- High-level language ANSI ”C” (since WinSPS 3.1)

Sequential function chart

The sequential function chart (SFC) is a graphic programming surface that describes the machine’s functions to be processed sequentially in form of a sequencer. This representation will be translated into the executable programming language ”instructions list”. Only then it can be loaded into the CL550.

Instructions list

The instructions list (IL) is a textual programming language that is used to describe the control tasks in assembly notation.

Function diagram

The ”function diagram” (FUD) programming language is used to describe the logic links with graphical symbols.

Ladder diagram

The ”ladder diagram” (LD) programming language is used to describe the control tasks with standard circuit diagram symbols.

Structured text

The structured text (ST) is a textual programming language of the IEC 61131-3. ST is an easy to learn high-level language that serves to formulate programming tasks in a compact way. ST is very well suited to perform e.g. very complex inspection and controlling tasks.

2.4.3 WinSPS

The programming tool WinSPS is used for programming under Windows NT (version 3.51 or higher) or Windows 95, based on DIN EN 61131-3.

For communication with WinSPS and other programs, the TCP/IP standard protocol with the BÜP (Bosch transmission protocol) command language is used.

2.4.4 WinDP

The programming tool WinDP is used to configure the decentralized peripherals of the PROFIBUS-DP.

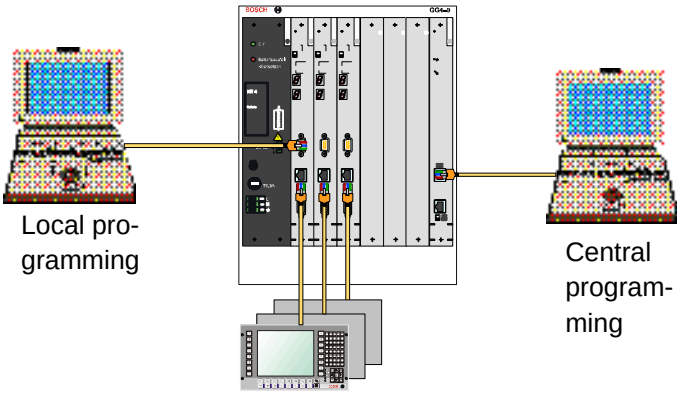
For communication with WinDP and other programs, the TCP/IP standard protocol with the BÜP (Bosch transmission protocol) command language is used.

2.4.5 CMD Software (used only with operation of the ZS550-DP-IBS)

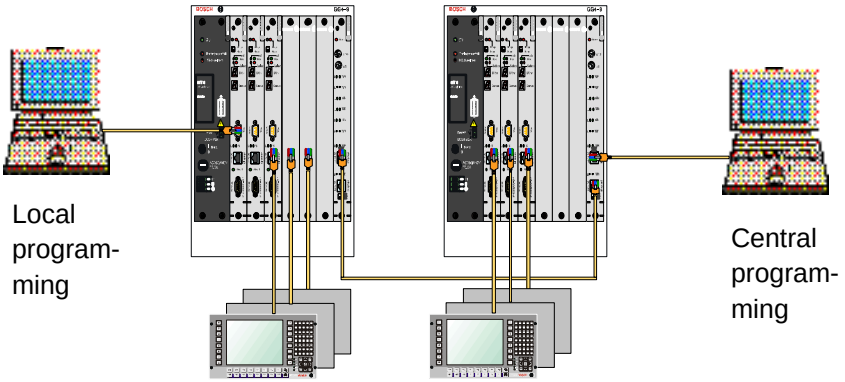
Phoenix Contact's programming tool CMD (Configuration, Monitoring and Diagnostics) is used to configure, parameterize and diagnose the decentralized peripherals of InterBus-S. Use version 4.5 or higher only!

2.5 Installation

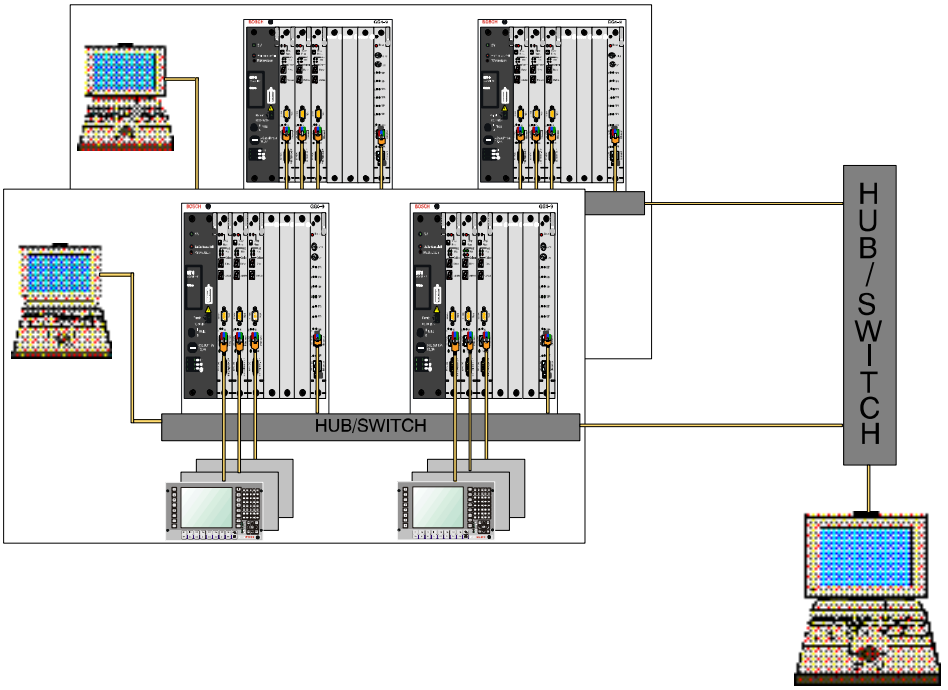
Connection of mounting racks



Connection mounting rack coupling



Connection mounting rack coupling via hub/switch



2.6 Compliance with Statutes and Standards

- EMC statute of 11-09-1992
- EN 50081-2

Electromagnetic compatibility; generic emission standard; part 2: industrial environment (March 1994)

- EN 50082-2

Electromagnetic compatibility; generic emission standard (February 1996); part 2: industrial environment

- EN 61131-2 (IEC 1131-2)

Programmable controllers – Part 2: Equipment requirements and tests (March 1994)

- EN 60204-1

Safety of machinery – Electrical equipment of machines – Part 1: General requirements (June 1993)

- EN 50178 (VDE 0160) Draft

Electronic equipment for use in power installations (May 1994)

- EN 60 529

Degrees of protection provided by enclosures (IP code) (November 1992)

- EN 55011

Industrial, scientific and medical (ISM) radio-frequency equipment – Radio disturbance characteristics – Limits and methods of measurement (IEC/CISPR 11/1997)

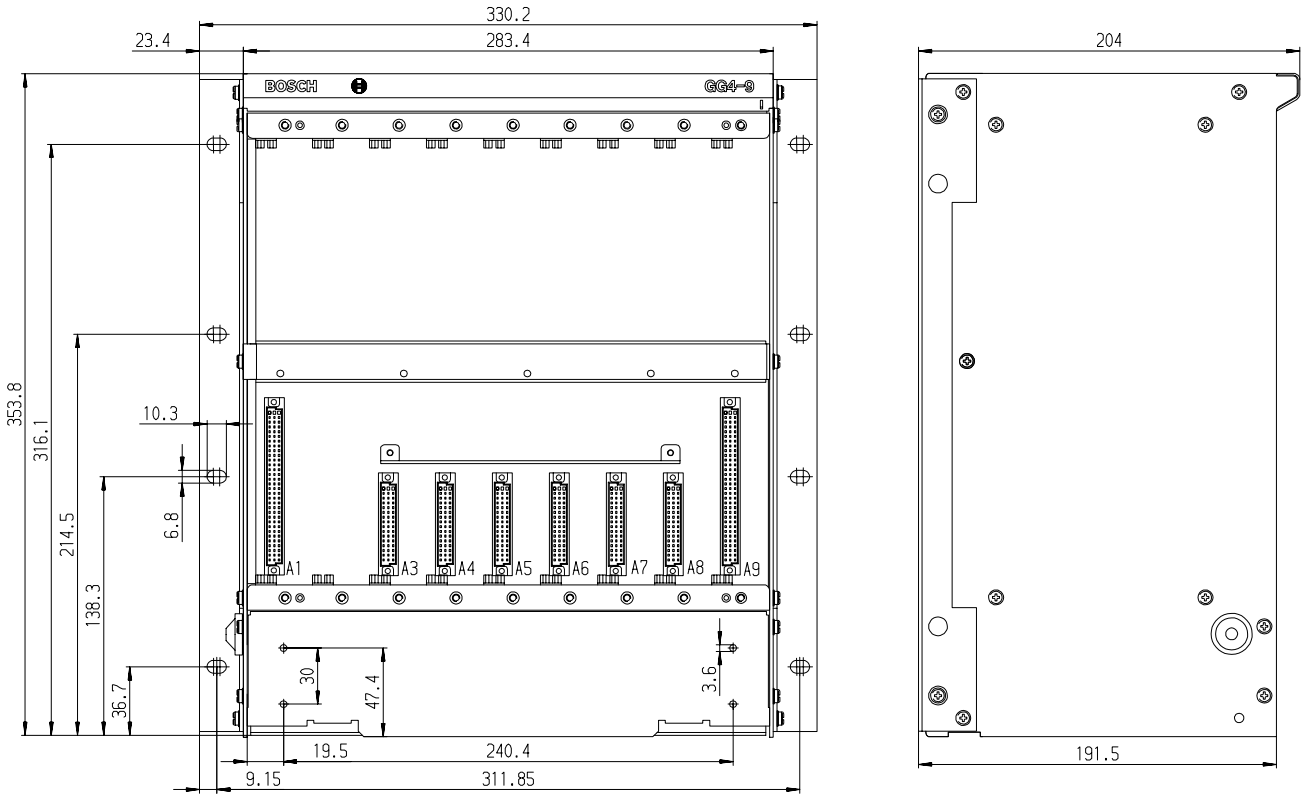
3 Mounting Rack GG4-9

The mounting rack consists of a metal housing with nine slots.

To the lower front side of the mounting rack a cable duct can be installed. It opens to the front and provides the possibility to mark the installed modules.

3.1 Dimensions and Assembly

Dimensions

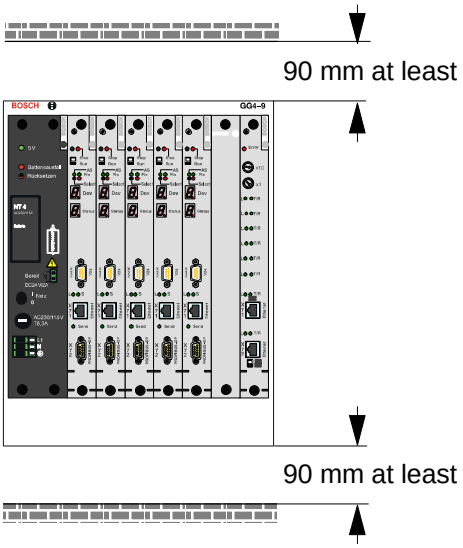


Assembly

The mounting rack must be installed and operated horizontally in a standard control cabinet.

By repositioning the lateral fixing brackets, the mounting rack is suitable for front as well as rear mounting.

Above and below the mounting rack, a clearance of at least 90 mm must be observed in order to ensure circulation of the ambient air.



Insert mounting rack

CAUTION
Endangered module!
Do not plug or unplug the module as long as the controller is switched on! The module can be destroyed. Turn off or unplug the controller's power supply module, the external power supply and the signal voltage first. Only then plug or unplug the module!
Please comply with all ESD protection measures when using the module! Prevent electrostatic discharges!

★ Put the modules on the rail and push them into the mounting rack.

★ Fasten the screws on the front panel.

★ Cover empty spaces with dummy front plates.

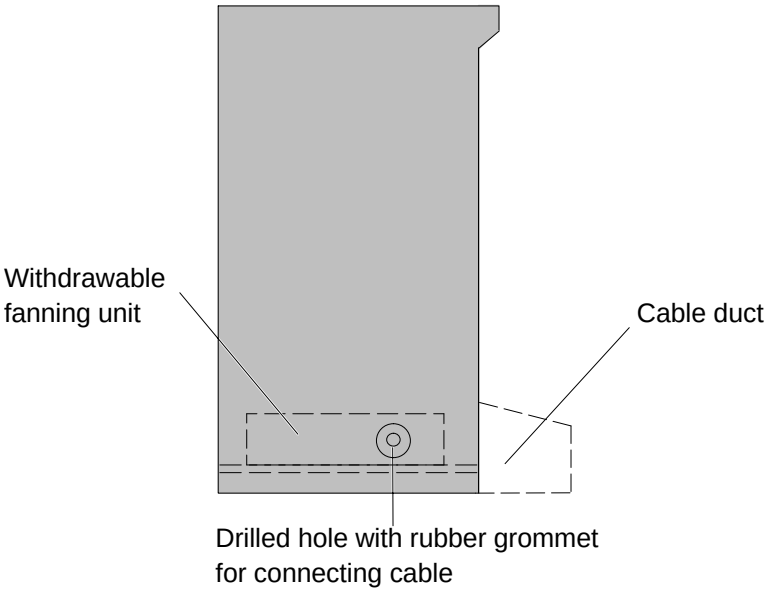
☞ **A solid screw connection of the module and the mounting rack provides high mechanical resistance and contact stability as well as an increased insensitivity against external electric interferences.**

3.2 Fan

Heat accumulation can result in failure or damage of the module. Therefore, the mounting rack must be provided with a withdrawable fanning unit with two fans.

3.2.1 Installation and Electric Connection

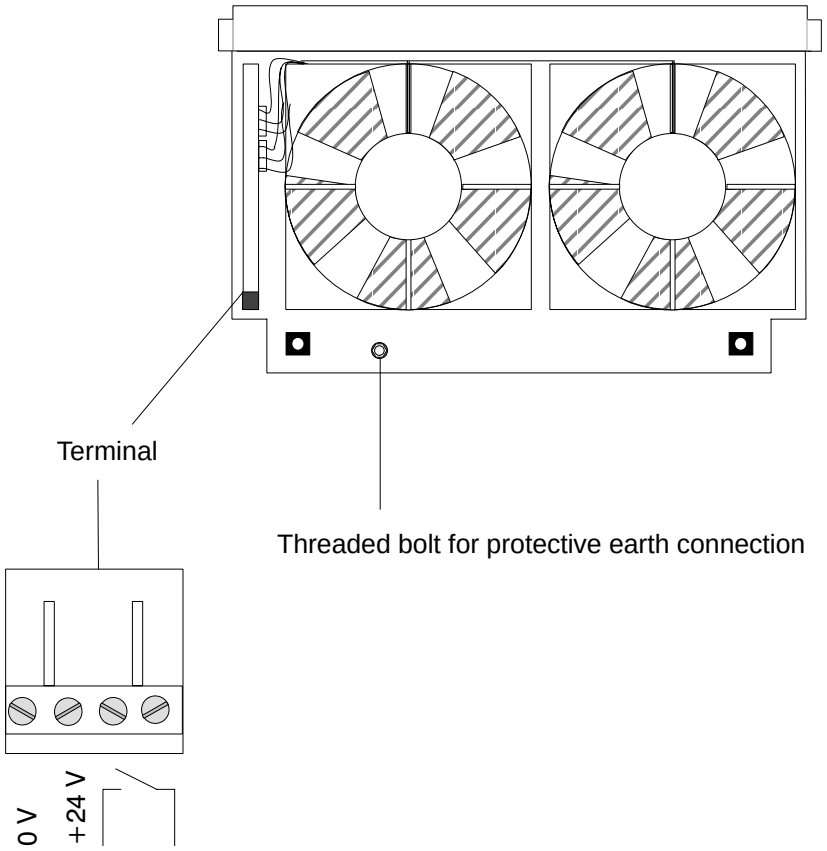
The withdrawable fanning unit will be installed in the lower part of the mounting rack.



★ Lead connecting cable through rubber grommet

★ Connect the protective earth conductor for the mounting rack to the cable lug at the mounting rack's designated bolt.

★ Connect the protective earth conductor for the withdrawable fanning unit to the cable lug at the unit's designated threaded bolt.



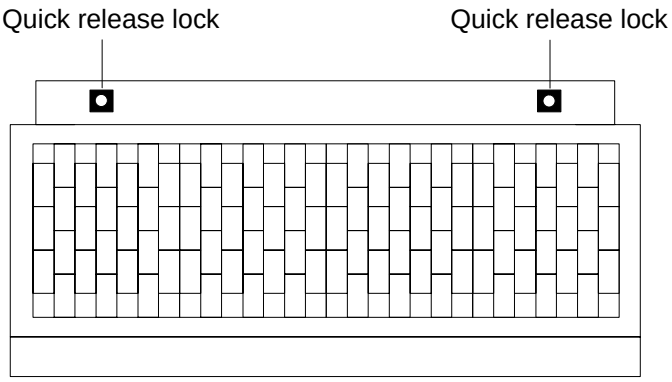
★ Connect 24 V voltage supply

★ Connect connecting cable for the failure contact.

CAUTION
Endangered failure contact!
Please be aware of maximum switching voltage and contact rating for the failure contact, see also chapter 4, page 4–4.

The withdrawable fanning unit must be installed in the mounting rack from below, with the fan looking upwards and the filter matt grid downwards.

View from below



★ Put the rear edge of the fanning unit on the supporting surface of the mounting rack.

★ Lift the front side of the withdrawable fanning unit.

★ Press the quick release locks and make sure they snap into place.

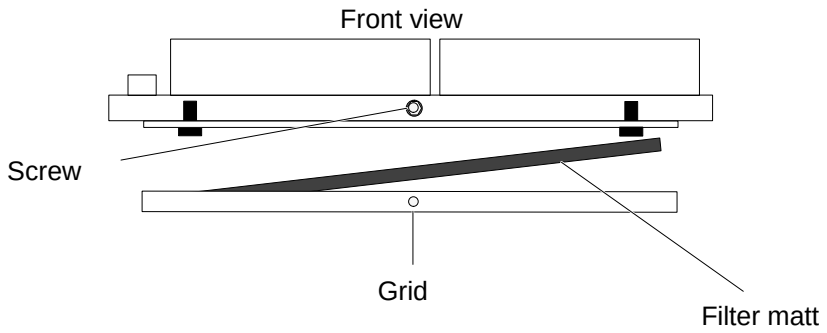
★ Fasten screws.

3.2.2 Changing the Filter Matt

☞ **The filter matt of the withdrawable fanning unit must be inspected and changed regularly. How often the filter matt must be changed depends on the degree of contamination of the ambient air. The fan monitor does not measure the degree of contamination!**

Order information

- Filter matt 129 x 274: Order No. 1070 081 976



★ Release screw with torx screw driver (M3 x 6).

★ Turn grid down.

★ Change filter matt.

★ Close grid.

★ Fasten screw.

★ Dispose of dirty filter matt according to your waste disposal laws.

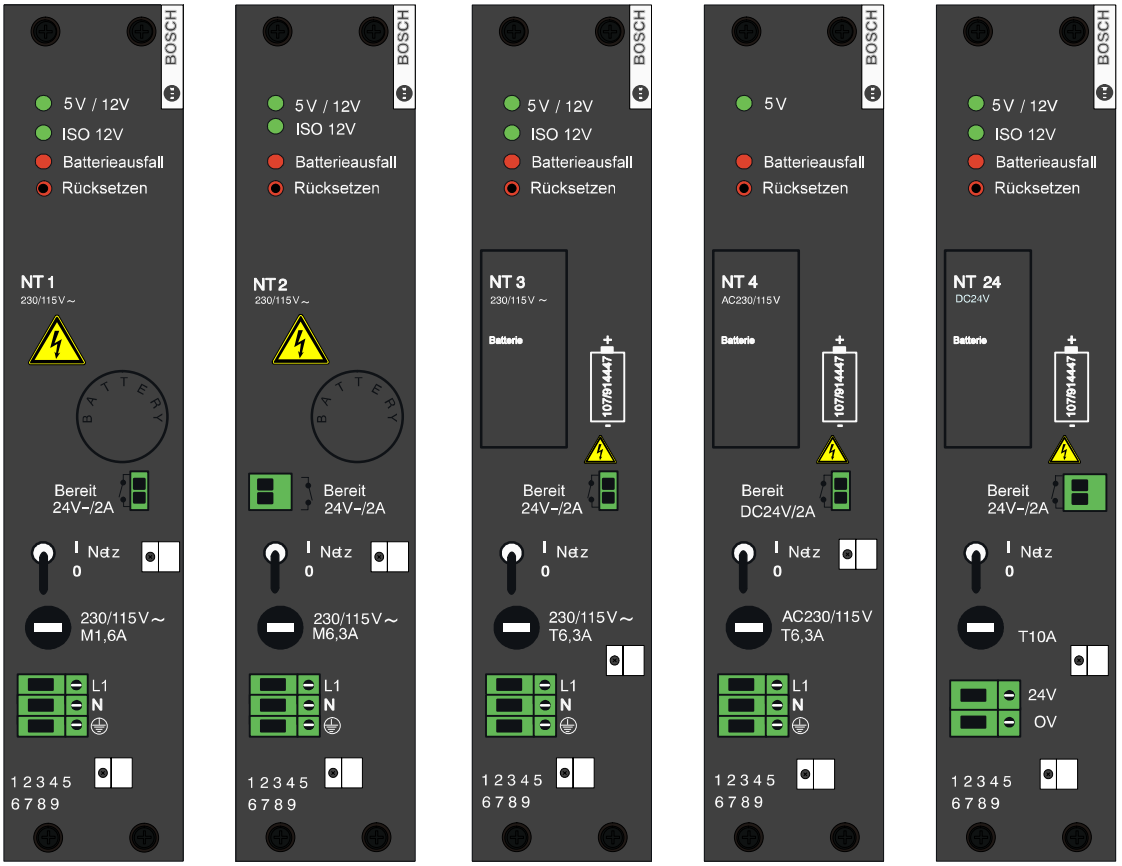
Maintenance

The maintenance of the controller is limited to the following:

- Inspection and changing of the withdrawable fanning unit's filter matt.
- Yearly exchange of the backup battery, see chapter 4, page 4–10.

4 Power Supply Module

We offer five power supply modules: NT1, NT2, NT3, NT4 and NT24.



The power supply module takes over the following tasks:

- Providing the internal supply voltage
- Monitoring the input voltage with regard to under- and overvoltage
- Monitoring the power supply module's temperature (60 °C and 10%)
- Supply of the controller's buffered memories in case of voltage failure via the backup battery.
- Monitoring the backup battery.

☞ **If one of the first three monitoring functions is addressed, the power supply module will be turned off. All outputs will be set to 0.**

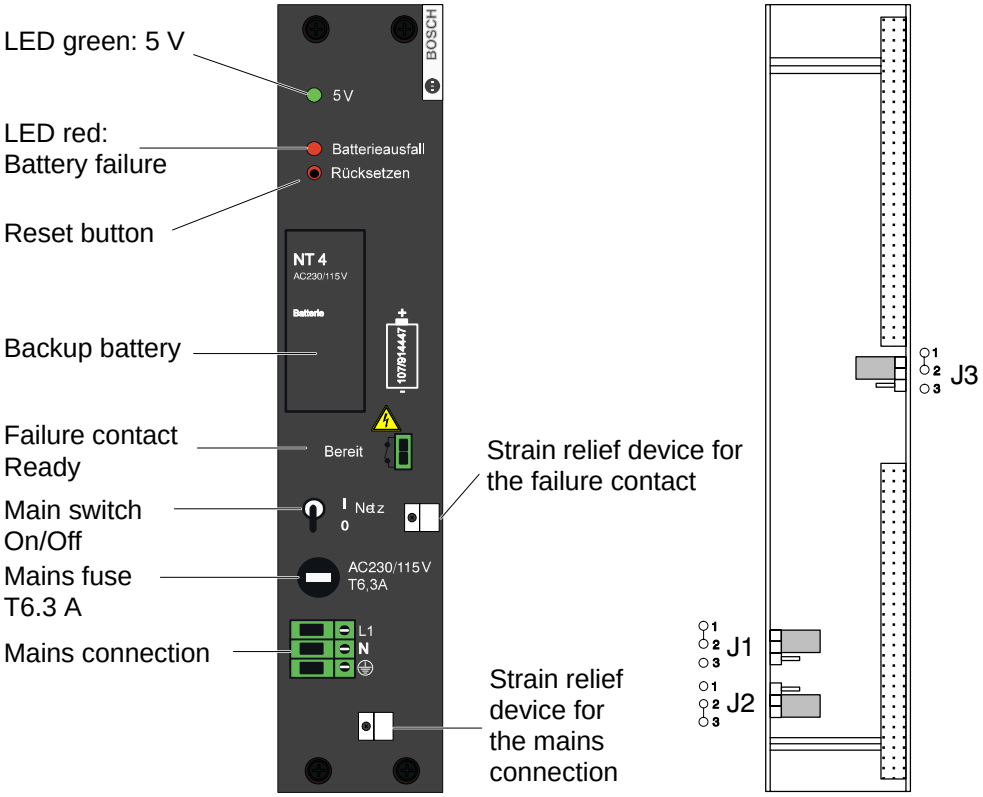
4.1 Selection

The selection of the power supply module depends on the configuration of the controller:

- NT1: maximum of 1 x ZS550 + 1 x CON550
- NT2: maximum of 2 x ZS550 + 1 x CON550
- NT3: maximum of 3 x ZS550 + 1 x CON550
- NT4: maximum of 6 x ZS550 + 1 x CON550
- NT24: maximum of 3 x ZS550 + 1 x CON550

☞ **Please note that when using the NT1, NT2, NT3, and NT24 modules, the remanence cannot be guaranteed completely (please refer also to chapter 4.5).**

4.2 Power Supply NT4



Description of the NT4 power supply

LED green: 5 V	
lit	5 V voltage supply of the modules from the power supply unit is available
off	5 V voltage supply of the modules from the power supply unit is not available
LED red: Battery failure	
lit	Backup battery on the power supply empty or defect
off	Backup battery is o.k.
Reset button	• Acknowledge exchange of the backup battery • Perform load test of the backup battery
Failure contact	
closed	Internal voltage supply is available
open	• Voltage failure • Central processing unit is in STOP mode or a voltage failure has occured ☞**Refer to jumper settings**
Main switch ON/OFF	Switch on mains supply
Sicherung 230/115V	Mains fuse ☞**Replace only with fuse of the same type**
Mains connection	
L1	230 VAC
N	Neutral conductor
PE	Potential earth (protective earth conductor)
	☞**Connect in compliance with the corresponding regulations; refer to the manuals of the external peripherals.**

Jumper settings

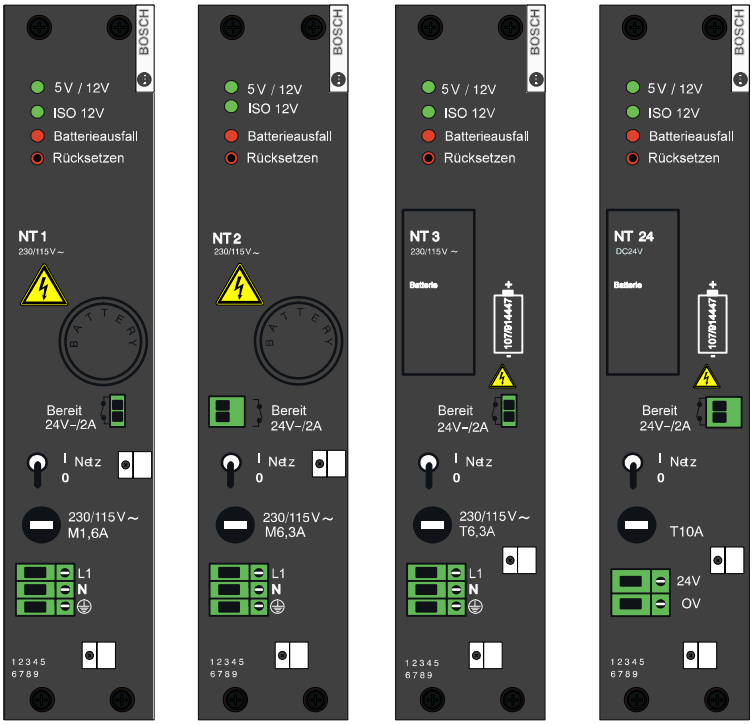
The jumpers J1 and J2 are freely accessible when the power supply unit is unplugged. The assignment is printed on the printed circuit board.

J1	
Position 1–2	Failure contact opens when central processing unit is in Stop mode and in case of voltage failure
Position 2–3	Ausfallkontakt öffnet nur bei Spannungsausfall
J2	
Position 1–2	No battery connected Monitoring the backup battery not active
Position 2–3	Battery connected Monitoring the backup battery active
J3	
Position 1–2	No function
Position 2–3	No function

Technical Data

Technical Data	NT4
Order number	1070 083 441
Input voltage	220/230 V automatic switching to 110/115 V, –15 % to +10 %, 47 to 63 Hz
Jumpering of power failures at the power supply module	One full wave, repetition rate ≥ 10 s
Continuous input current	1.9 A
Inrush current	a maximum of 50 A for a maximum of 5 ms
Fuse	T6.3 A
Supply voltage ● Backup battery ● Logics	 3.6 V battery voltage +5 V +5 V buffer voltage
Power supply ● +5 V ● +5 V buffer voltage in operation	 ≥ 20 A ≤ 4 A The current for the buffered 5 V is included in the +5V supply.
Backup battery ● Capacity ● Battery voltage ● Buffer time	 5.2 Ah 3.6 V 6 to 12 months
Current limiting ● +5 V	 ≥ 26 A
Failure contact ● Switching voltage ● Switching impulse current	 24 VDC ≤ 2 A
Mechanical stress	Installation in fixed devices, not free of vibrations (DIN 40 046)
Vibration and shock resistance	IEC 65 A Heavy mechanical components must be fastened
Insulation withstand voltage	IEC 60-(2)
Insulation voltage	DIN IEC 65 A
Interference resistance (static discharges)	IEC 801-2, ESD-B class (>15 kV)
Interference resistance against electromagnet fields	IEC 801-3 (>10 V/m)
Radio interference suppression	DIN/VDE 871, limit value class B
Interference resistance according to	IEC 801-2/-3/-4, EN 61131-2, VDE 0160
Width	2 slots

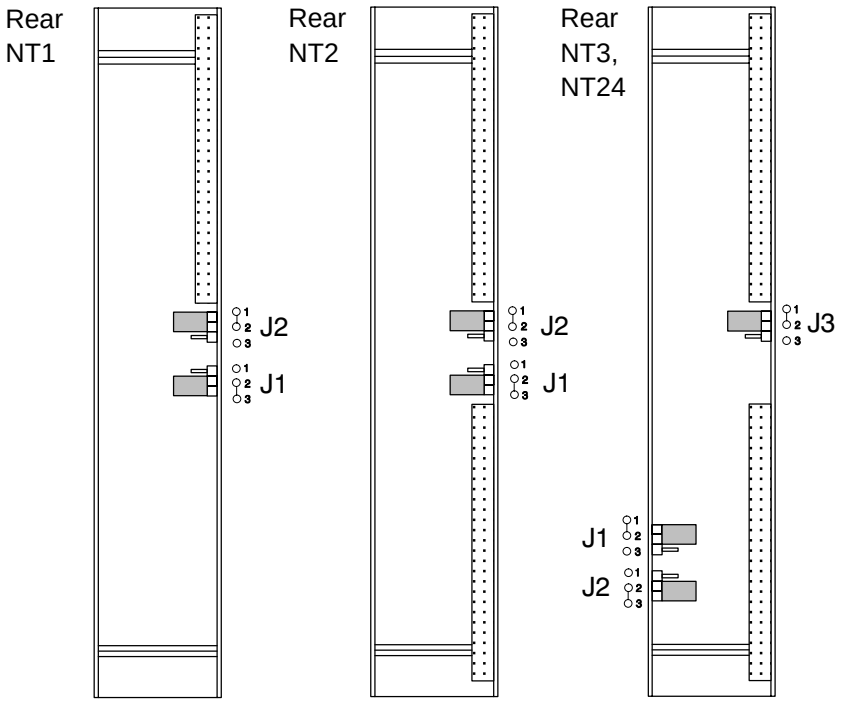
4.3 NT1 / NT2 / NT3 / NT24



LED green: 5 V lit off	 5 V voltage supply of the modules from the power supply unit is available 5 V voltage supply of the modules from the power supply unit is not available
LED green: ISO 12 V lit off	 ISO 12 V available ISO 12 V not available
LED red: Battery failure lit off	 Backup battery on the power supply empty or defect Backup battery is o.k.
Reset button	• Acknowledge exchange of the backup battery • Perform load test of the backup battery
Failure contact closed open	 Internal voltage supply is available • Voltage failure • Central processing unit is in STOP mode or a voltage failure has occured ☞**Refer to jumper settings**
Main switch ON/OFF	Switch on mains supply

Fuses	Mains fuse ☞**Replace only with fuse of the same type**
Mains connection L1 N PE	 230 VAC Neutral conductor Potential earth (protective earth conductor) ☞**Connect in compliance with the corresponding regulations; refer to the manuals of the external peripherals.**

Jumper settings



The jumpers J1 and J2 are freely accessible when the power supply unit is unplugged. The assignment is printed on the printed circuit board.

J1	
Position 1–2	Failure contact opens when central processing unit is in Stop mode and in case of voltage failure
Position 2–3	Failure contact opens only in case of voltage failure
J2	
Position 1–2	Monitoring the backup battery is not active
Position 2–3	Monitoring the backup battery is active
J3	
Position 1–2	Current limiting for +12 V : 6 A
Position 2–3	Current limiting for +12 V : dropped to 2 A ±10 %

Technical Data	NT1	NT2	NT3	NT24
Order number	1070 071 376	1070 062 687	1070 062 309	1070 068 046
Input voltage	220/230 V automatic switching to 110/115 V, –15 % to +10%, 47 to 63 Hz			24 VDC, –33 % to +71 %
Jumpering of power failure at the power supply module	One full wave, repetition rate ≥10 s			according to EN 61131-2, class PS2 ≤10 ms, repetition rate ≥1 s
Continuous input current	1 A		1.9 A	6.9 A
Peak inrush current	typ. 25 A max. 50 A	typ. 27 A max. 50 A	typ. 23 A max. 50 A	typ. 18 A max. 30 A
Duration of this increased current	5 ms			10 ms
Fuses	M 1.6 A	M 6.3 A	T 6.3 A	T 10 A
Supply voltage				
• Backup battery	3.6 V battery voltage			
• Logics	+5 V +5 V buffer voltage			
• Peripheral bus	+12 V			
• Insulated for interfaces	±12 V ISO (insulated)			
Power supply				
• +5 V	4 A	8 A	26 A	11.2 A
• +5 V buffer voltage in operation	0.25 A	1 A included in 8 A	4 A included in 26 A	3 A included in 11.2 A
• +12 V	1.8 A	3 A	6 A	4.4 A
• +12 V ISO	+0.5 A	+1 A	+4.5 A	1.5 A
• –12 V ISO	–0.1 A	–0.5 A	–1.5 A	–1 A
Backup battery				
• Capacity	5.2 Ah			
• Battery voltage	3.6 V			
• Buffer time	6 to 12 months			
Failure contact				
• Switching voltage	24 VDC			
• Switching impulse current	≤ 2 A			
Interference resistance according to	EN 61131-2, VDE 0109, VDE 0160, VDE 804, VDE 0871		IEC 801-2/-3/-4, EN 61131-2, VDE 0109, VDE 0160, VDE 0871	IEC 801-3/-4, EN 61131-2, VDE 0160
Width	2 slots			

4.4 Backup battery

In case of a supply voltage failure and the turn-off of the power supply module, the backup battery serves

- to centrally secure the remanently set areas for markers, timers, counters, data field and data buffers
- to supply the internal RAM
- to supply the internal RAM program memory modules.

Lifetime

The backup battery's lifetime depends on the following factors:

- The equipment of the controller with modules
- The ambient temperature
- The turn-off time of the controller.

☞ **The backup battery must be changed after one year at the latest.**

Monitoring

The monitoring function detects the following:

- Missing backup battery
- Undervoltage of the backup battery.

Early warning

A load test of the backup battery will be performed

- after turning on the power supply module
- after pushing the reset button on the front panel of the power supply module.

In case of an error, the special marker SM20.1 will be set.

Failure

After recognition of an error, the controller goes into STOP mode.

If the monitoring function of the backup battery is active, a backup battery failure will be detected

- in case of a missing backup battery
- if the backup battery voltage is too low
- in case of a missing or previously unplugged central processing unit.

A backup battery failure will be displayed on the lower 7-segment display of the ZS550 central processing unit; refer also to chapter 5, page 5–3.

Failure contact

The failure contact of the power supply module opens

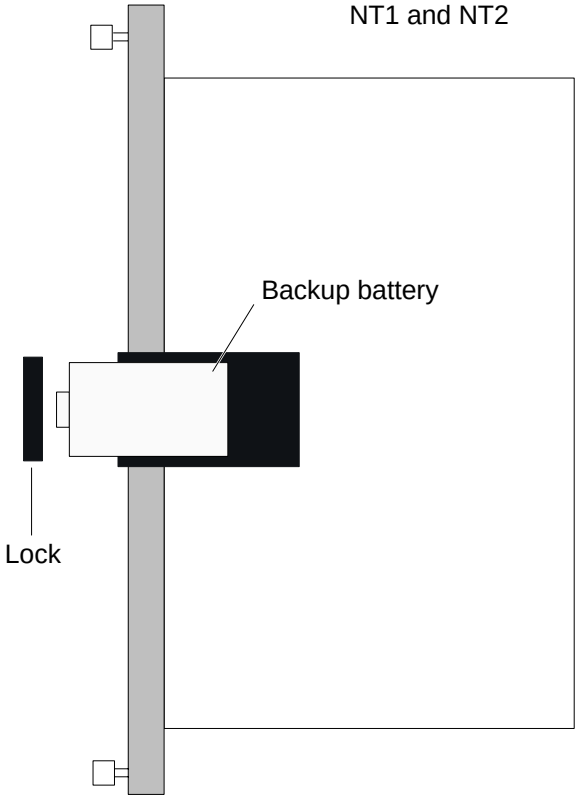
- in case of a failure of the internal 5 V supply voltage
- in case of a controller stop

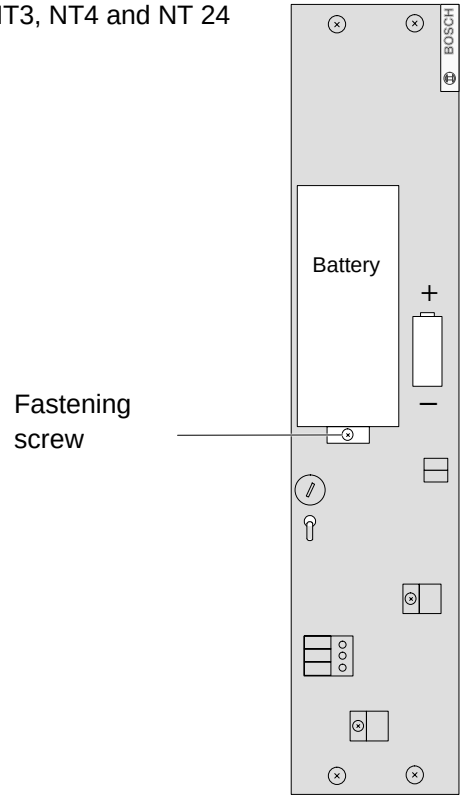
☞ **Jumper 1 must be in position 1-2, Jumper 2 in position 2-3. Also refer to Jumper settings, chapter 4.2 and 4.3.**

CAUTION
Endangered failure contact!
Please be aware of maximum switching voltage and contact rating for the failure contact; see also ”Power supply modules, Technical data”.

Insertion and exchange

Data loss
The removal of the backup battery with the power supply module being turned off results in the loss of all remanent data and the PLC program in the RAM!
Exchange the backup battery only with the power supply module being turned on!





★ With NT1 and NT2, unscrew the backup battery's lock.

★ With NT3, NT4, and NT24, unscrew the fastening screw of the cover.

★ Take out the backup battery.

★ Knock the new backup battery softly on a firm surface in order to destroy the inner oxide layer.

★ Insert the new backup battery. Ensure correct polarity.

★ With NT1 and NT2, fasten the backup battery's lock.

★ With NT3, NT4, and NT24, put cover back in place and fasten screw.

The ZS550's 7-segment display shows a backup battery failure by displaying "F6".

★ Acknowledge a backup battery failure with the reset button.

A load test of the backup battery will be performed. If the ZS550's 7-segment display shows "F6" again, the backup battery does not function correctly.

☞ **The old lithium backup battery must be disposed according to the local toxic waste disposal regulations. Comply with the regulations of the landfill area.**

4.5 Data Backup prior to Power Supply Module Exchange

For remanence, i.e. for data backup after turn-on/off or a voltage failure, each central processing unit is provided with a static RAM. The static RAM is buffered via the power supply.

The following components of the current project will be managed as remanent data:

- all data modules
- fixations
- FIFOs
- areas of the data field
- areas of the data buffer
- areas of the marker
- areas of the timers
- areas of the counters

Power supply NT4

For data backup, only the remanent area must be defined. Other precautions are not necessary.

☞ **For information regarding the definition of the remanent areas refer to the Software Manual.**

The NT4 keeps the internal voltages, necessary for saving the remanent data, for at least another 120 ms after the occurrence of a voltage failure or the turn-on/off of the CL550 alive. This time is sufficient to store all data for an new start in the static RAM of the ZS550.

When restarting the controller, the data will be loaded from the flash memory into the dynamic RAM. Afterwards, the remanent areas from the static RAM will be updated.

☞ **Only the NT4 ensures the complete backup of the remanent data without additional programming. There is no restriction regarding the installed components.**

NT1, NT2, NT3 and NT24

The remanence cannot be guaranteed completely because after turning off the power supply units, the voltage necessary for the backup of the remanent data cannot be kept alive.

With the help of backup commands, a limited remanence, managed by the user, can be used:

- Cyclical backups secure the remanent areas in each I/O state; for further information, please refer to ”PLC and CL550 Programming and Operation, Software Manual”.
- Backup on demand secures the remanent areas upon request by PLC instructions; for further information, please refer to ”PLC and CL550 Programming and Operation, Software Manual”.

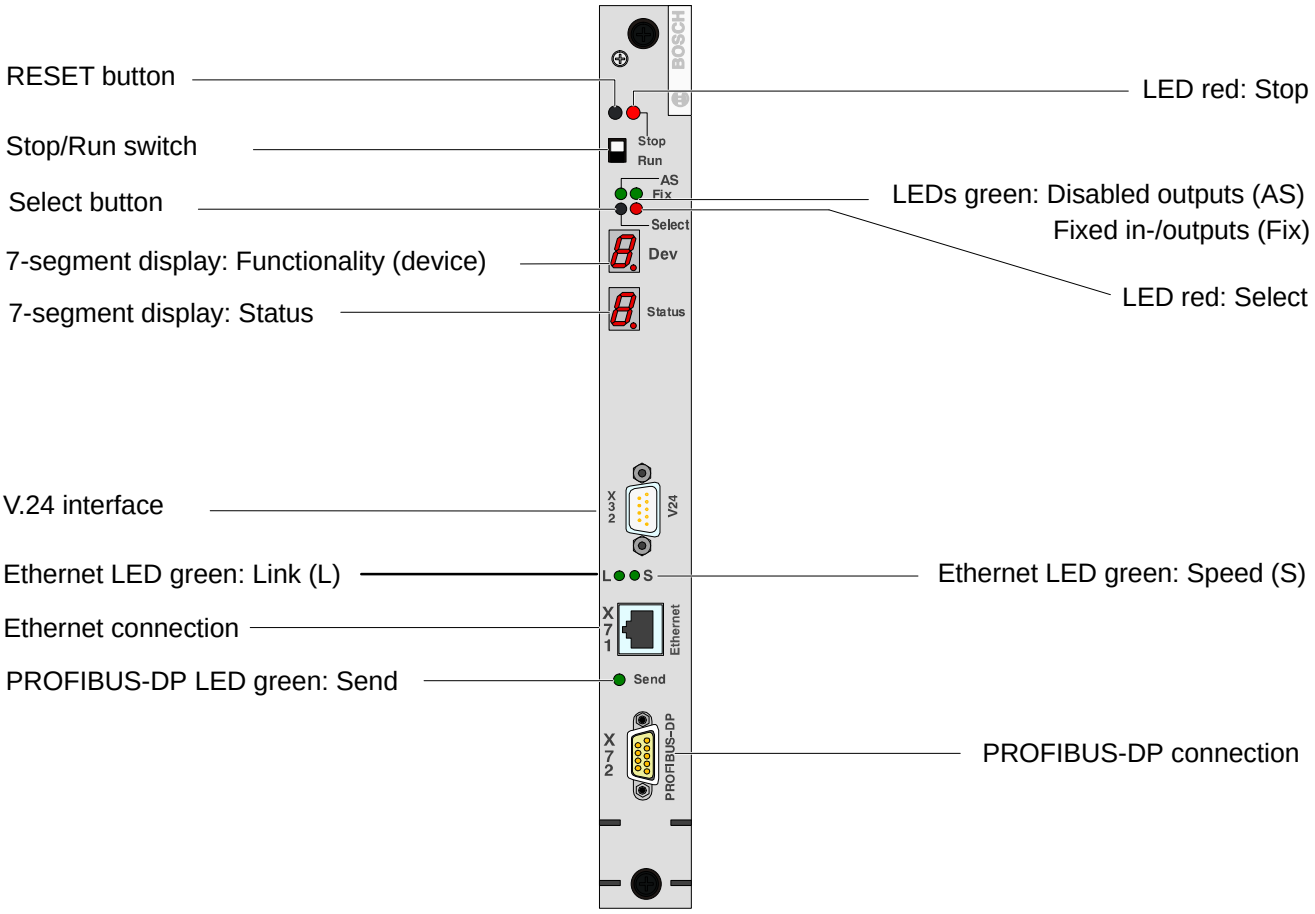
☞ **When using the backup commands for remanent areas, the data in the static RAM always corresponds to the latest storage procedure. I.e. that in case of a, for example, cyclic backup, the data does not come from the current but the last completed PLC cycle.**

5 ZS550

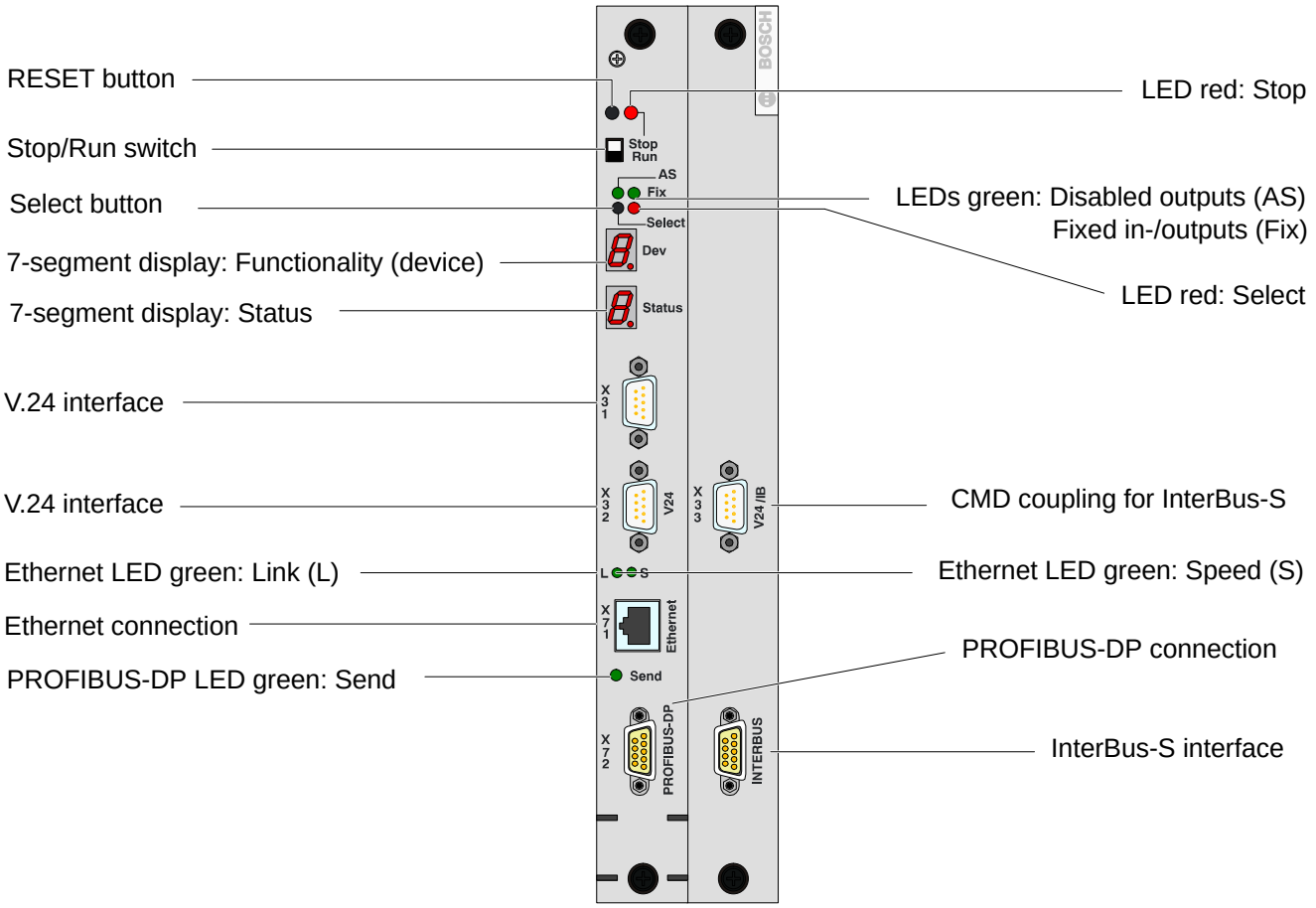
Each ZS550 central processing unit constitutes a closed control unit with all data areas and the entire I/O address range. The ZS550s are a democratic system and the units are connected via the system bus by means of an Ethernet coupling. They communicate with each other via a CON550 supplementary module, a switch at the Ethernet. The I/O operation on each ZS550 is completely isolated. The exact identification of the ZS550 in the system and/or the network lies in the slot ID and the mounting rack ID.

5.1 Structure and Function

ZS550

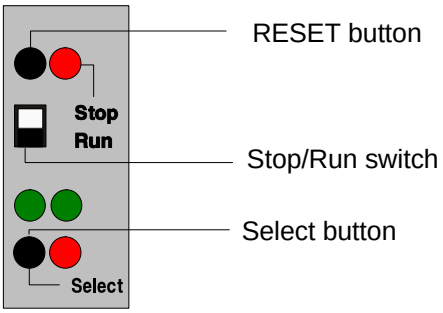


ZS550-DP-IBS


RESET button
Stop/Run switch
Select button
7-segment display: Functionality (device)
7-segment display: Status
V.24 interface
V.24 interface
Ethernet LED green: Link (L)
Ethernet connection
PROFIBUS-DP LED green: Send
LED red: Stop
LEDs green: Disabled outputs (AS)
Fixed in-/outputs (Fix)
LED red: Select
CMD coupling for InterBus-S
Ethernet LED green: Speed (S)
PROFIBUS-DP connection
InterBus-S interface
BOSCH
Stop
Run
AS
Fix
Select
Dev
Status
X31
X32
V24
X33
V24 /IB
L
S
X71
Ethernet
Send
X72
PROFIBUS-DP
INTERBUS

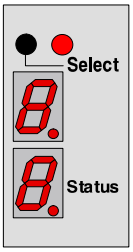
5.2 Elements for Display and Operation

Operation elements



Operation element	Description
RESET button	Restart (admissible in exceptional situations only)
Stop/Run switch Run Stop	Change between Run/Stop ● Program runs ● Outputs are triggered ● Timer and counter values are processed ● The CPU (ZS...) is in Stop mode ● All outputs are set to ”0”. ● Remanent markers, timer and counter values remain valid
Select button	● Selector function ● Display of messages

7-segment displays

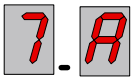


Upper display: ZS550 functionality (device)

Lower display: Status code

The status code displayed on the lower display always refers to the ZS550 functionality shown on the upper display.

For the display of the ZS550 functionalities (device) applies the following:

	PLC functionality
	Busmaster-DP functionality (cyclic I/O processing)
	TCP/IP-COM functionality via backside; systembus communication (channel 0)
	TCP/IP-COM functionality via frontside; external communication (channel 1)
	DP/V1-COM functionality (channel 2)
	V.24-COM functionality, serial interface – if configurated (channel 3)
	InterBus-S functionality (ZS550-DP-IBS only)
	Freely configurable for COM-MAP modules or future options (channels 4–7)
	Power supply (backup battery monitoring)
	Functional or configuration mode (refer to chapter 5.2.7, Functional specifications)

Pending messages during the control mode Run merely lead to a lighting up of the LED Select.

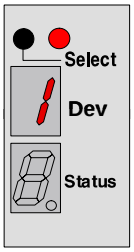
★ Press the Select button in order to switch the pending message up front.

☞ **Messages that lead to a stop of the modules will be switched up front immediately.**

★ For scrolling further messages use the Select button.

5.2.1 PLC Functionality

Status display

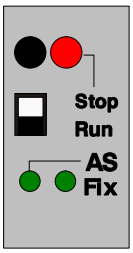


Select : PLC functionality

Status display refers to PLC functionality

Display status	Description
Off	Application program runs
	Remanence error, data loss at user operands
	Storage error, missing application program
	Cyclic time error (HW and SW)
	Application program error (application stack error, module task error, no DM active)
	Application program error (parameter error, address error, module missing)
	HLT command in application program
	STOP via programming device
	STOP via slide switch on the front

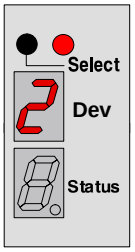
LED displays



LED display	Description
LED red: Stop	
lit	Module stop by ZS (CPU) (detailed info on 7-segment status display)
off	ZS (CPU) in Run mode
LED green: AS	
lit	Outputs disabled: • all outputs are set to ”0”. • PLC program is processed • I/O image is processed
off	Outputs not disabled
LED green: Fix	
lit	In-/outputs/markers are fixed by PLC utility program
off	In-/outputs/markers are not fixed

5.2.2 Busmaster Functionality

Status display



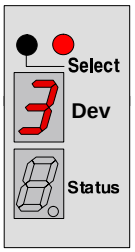
Select: Busmaster functionality
cyclic I/O processing

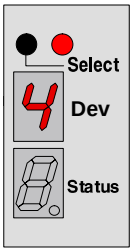
Status display refers to busmaster functionality

Display status	Description
Off	OERATE mode (error-free operation); The busmaster is in cyclic I/O data transfer
	CLEAR mode, cause: ● controller in Stop ● controller in CLAB (disable outputs) The busmaster is in cyclic I/O data transfer For the outputs 00H will be transferred (outputs canceled)
	New master parameter set (MPS) is loaded
	OFFLINE mode The busmaster is offline No or only invalid MPS available
	Bootstrap initialization (after off/on) is active The busmaster tries to start with the existing MPS The initialization phase will be stopped if: ● an error (hardware, address assignment, MPS, etc.) is pending ● all slaves can be reached without an error ● the PLC_Stop_Time is expired
	At least 1 slave indicates a configuration error
	At least 1 slave is not reachable or not ready for cyclic data transfer
	----
	Bus error Busmaster cannot access the bus (no idle state level) Possible causes: ● Short circuit on the field bus ● Terminating resistance not switched on ● Terminating resistance has no voltage
	System error in busmaster

5.2.3 TCP/IP-COM Functionality

Status display



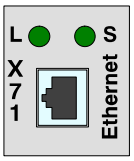


Select: TCP/IP-COM functionality

Status display refers to TCP/IP-COM functionality

Display status	Description
Off	The channel is not active or processes external jobs only (server operation)
0 – F	The central job displayed here is faulty (0–F corresponds to Job ID 0–15)
r	At least one central job with an ID > 15 is faulty
-	The serial channel is used for job reporting (tracer on)
_	The serial channel is used for error reporting (error print on)
U	The Ethernet channel has not been assigned an IP address
n	Errors have been detected during consistency checkup of the configuration file (mounting rack consistency)

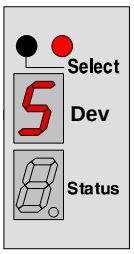
LED displays of the front Ethernet interface



LED display	Description
LED green: L (Link)	
off	No connection
lit	Connection is o.k., no activity
flashes	Connection is o.k., activity
LED green: S (Speed)	
off	10 Mbits/s
on	100 Mbits/s

5.2.4 DP/V1-COM Functionality

Status display

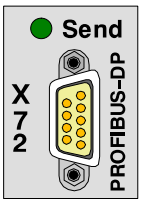


Select: DP/V1-COM functionality

Status display refers to DP/V1-COM functionality

Display status	Description
0 – F	The central job displayed here is faulty (0–F corresponds to Job ID 0–15)
r	At least one central job with an ID > 15 is faulty

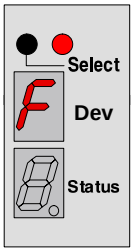
LED 'Send' of the PROFIBUS interface:



LED display	Description
LED green: Send	
lit	Bus interface active
off	Bus interface not active.

5.2.5 Power Supply Functionality

Status display



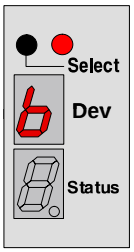
Select: Power supply (backup battery monitoring)

Status display refers to the power supply (backup battery monitoring)

Display status	Description
Off	Backup battery on power supply is o.k.
	Battery error, backup battery on power supply has failed
	Early battery warning → change backup battery

5.2.6 InterBus-S Functionality (ZS550-DP-IBS only)

Status display



Select: InterBus-S functionality

Status display refers to InterBus-S functionality

Display status	Description
0	ACTIVE: InterBus-S in active status
1	USER: User error/parameterization
3	READY: InterBus-S in ready status
7	PF: Peripheral fault
8	DETECT: Diagnosis routine is active
b	Bus error Busmaster cannot access the bus (no idle state level) Possible causes: • Short circuit on the field bus • Terminating resistance not switched on • Terminating resistance has no voltage
E	Error on the interface module/hardware

5.2.7 Functional and Configuration Mode

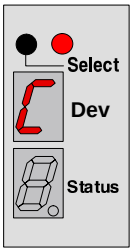
In functional and configuration mode, the following settings are available:

Display Dev	Display status	Description
1.	8.	Cancel fixation
2.	8.	Overlay non-remanent start-up, reset remanence error
3.	0. 1.	Release output Outputs disabled
4.	0. 1.	Serial interface has been assigned with BÜP19E Connecting a programming device is possible Serial interface assigned by tracer (Job reporting)
5.	0. 1.	Cancel MPS of DP busmaster part selectively Cancel all stored data (PLC program, I/O configuration, IP configuration)
6.	8.	Software version of ZS550 (available from V1.1 or higher)

☞ **The active fixation and the disabled outputs are immediately displayed by the assigned LEDs.**

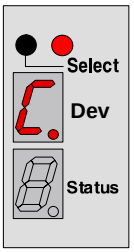
Select mode

★ Press the SELECT button until the upper display shows ”C”.



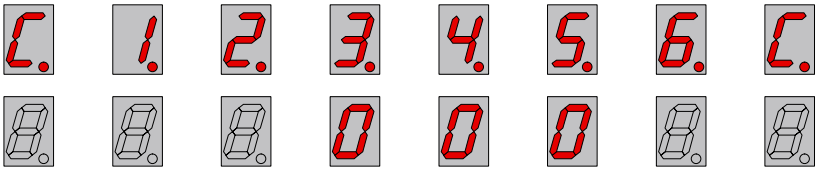
★ Use the Stop/Run switch within approximately 10 seconds in order to change to configuration mode. The upper display additionally shows a dot.

☞ **If you do not use the Stop/Run switch within approximately 10 seconds, the display ”C” disappears.**

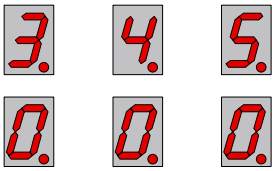


Select menu items

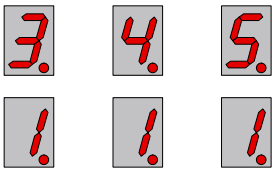
★ Press the Select button in order to select the requested menu item. The menu items 3, 4, and 5 are provided with further options, refer to table on page 5–12.



★ Use the Stop/Run switch to continue with options. The lower display appears with a dot.



★ Press the Select button in order to select the requested option.



★ Use the Stop/Run switch to activate the option.

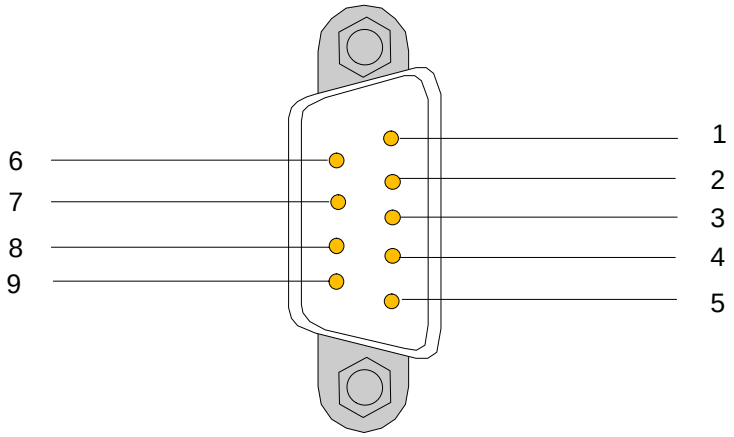
After making and activating the selection with the Stop/Run switch, the system immediately switches back to the display mode.

If no selection is made, it is possible to switch back to component code ”C” via the Stop/Run switch. If you operate the Stop/Run switch a second time, the configuration mode will be terminated. The display with the highest priority will be visualized.

5.3 Serial Interface X31 (ZS550-DP-IBS only)

Upon delivery, the function of the X31 serial interface on the front of the ZS550-DP-IBS is to connect the programming device to the central processing unit. The interface is provided with a 9-pin sub-D socket. The assignment of the interface can be changed by the user. This way, the interface can also be used as a computer interface channel.

The interface's parameters are set to 115.2 Kbaud and filed in the configuration file. The data transfer can be done with the BÜP03, BÜP64, or BÜP19E protocol.



Pin	Assignment
1	Receive-signal level DCD
2	Received data RxD
3	Transmitted data TxD
4	Data terminal ready DTR
5	Station ground GND
6	Data set ready DSR
7	Activate transmitter RTS
8	Clear to send
9	Incoming call RI

Interconnecting cable

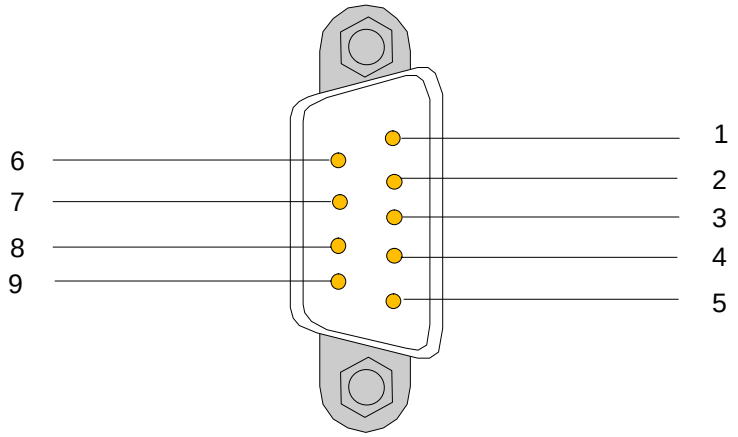
Zum Anschließen von Programmiergeräten kann ein vorkonfektioniertes Interconnecting cable verwendet werden:

Designation	Order No.
Interconnecting cable ZS/PG	1070 077 753

5.4 Serial Interface X32

The X32 serial interface on the front of the ZS550 serves to connect the programming device to the central processing unit or as a computer interface. The interface is provided with a 9-pin sub-D socket.

The serial interface is operated as COM1. The interface's parameters are set to 57 Kbaud and filed in the configuration file. The data transfer can be done with the BÜP03, BÜP64, or BÜP19E protocol.



Pin	Assignment
1	Receive-signal level DCD
2	Received data RxD
3	Transmitted data TxD
4	Data terminal ready DTR
5	Station ground GND
6	Data set ready DSR
7	Activate transmitter RTS
8	Clear to send
9	Incoming call RI

Interconnecting cable

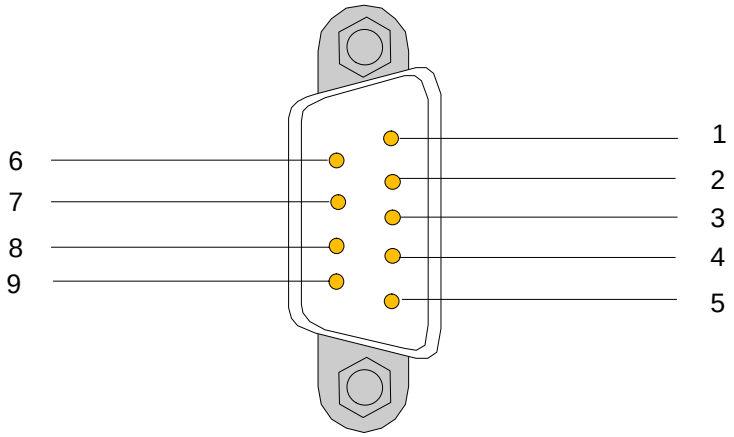
For connecting programming devices, a prefabricated interconnecting cable can be used:

Designation	Order No.
Interconnecting cable ZS/PG	1070 077 753

5.5 Serial Interface X33 (ZS550-DP-IBS only)

The X33 serial interface on the front of the ZS550-DP-IBS serves to couple the CMD software for the InterBus-S. The interface cannot be addressed via the applications program. The interface is provided with a 9-pin sub-D socket.

The software CMD (IBS CMD SWT G4, version 4.5 or higher) by Phoenix Contact is used to configure, parameterize and diagnose the InterBus-S. The parameterization and configuration can be stored remanently on the interface module.



Pin	Assignment
1	Not assigned
2	Transmitted data TxD
3	Received data RxD
4	Not assigned
5	Station ground GND
6	Not assigned
7	Activate transmitter RTS (not used)
8	Clear to send (not used)
9	Not assigned

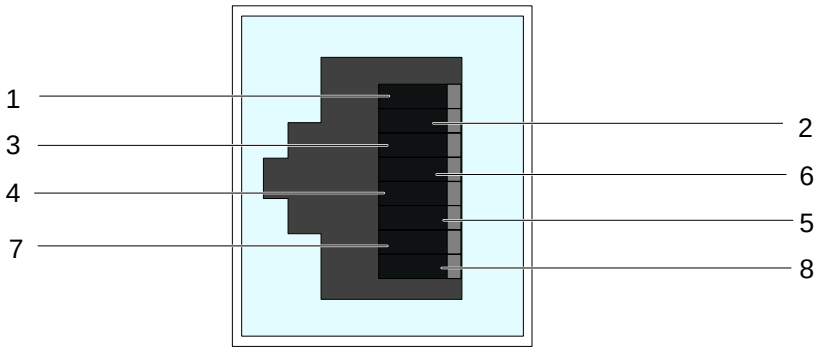
Interconnecting cable

In order to connect a diagnostic interface to a PC, an untransposed RS232 cable (not included in the delivery) can be used.

5.6 Ethernet Interface X71

The Ethernet interface on the frontside serves for external connection of the ZS550. Ethernet and Internet protocols are the basis for communication. On an Ethernet basis, the UDP/IP standard protocol is used in order to send Bosch BÜP commands. The interface can be addressed directly from the PLC program. It can be operated with a transfer rate of up to 100 Mbits/s.

A patch cable connects the ZS550 to a network connection. The network is connected via an RJ45 socket.



Pin	Assignment
1	TX_D1+
2	TX_D1–
3	RX–D2+
4	BI_D3+
5	BI_D3–
6	RX_D2–
7	BI_D4+
8	BI_D4–

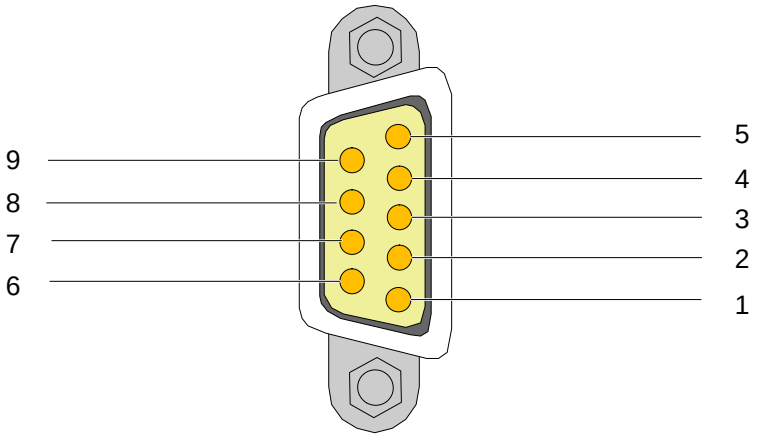
5.7 PROFIBUS-DP Interface X72

The decentralized peripherals will be connected via a DP/V1 master interface. The data exchange with the decentralized bus stations (slaves) is cyclic. I.e. that the master reads the input information from the slaves and writes the output information to the slaves. The V1 extension to the PROFIBUS-DP additionally allows for an acyclic data exchange. It is necessary in order to exchange data blocks with complex data types.

All components have been designed for a baud rate of 12 MBaud. The voltage is supplied by an insulated 5 V/5 V DC/DC converter.

X72 is a 9-pin D-sub socket. In addition to the bus signals, an insulated 5 V voltage will be provided for the supply of an external device. The maximum load there is 100 mA.

☞ **The screen must be connected to the housing on both sides with low impendance.**



Pin	Assignment
1	not assigned
2	not assigned
3	B-line
4	RTS
5	GND
6	5 V
7	not assigned
8	A-line
9	not assigned

Baud rates

The transfer rate is set via the programming unit software and stored in the master parameter set.

Interconnecting cable

When operating a PROFIBUS system, both stations that represent the bus connection must be activated (active bus connection).

For PROFIBUS wiring, the following components are available:

Designation	Order No.
Trailing cable, type of line: A	1070 917 201
Bus cable, type of line: A	1070 917 202
Bus connector with inductivities	1070 918 538
Bus connector with inductivities and PG connector	1070 918 539
Repeater 12 Mbaud	1070 918 723

The maximum cable length depends on the used cable, the transfer rate and the used repeaters:

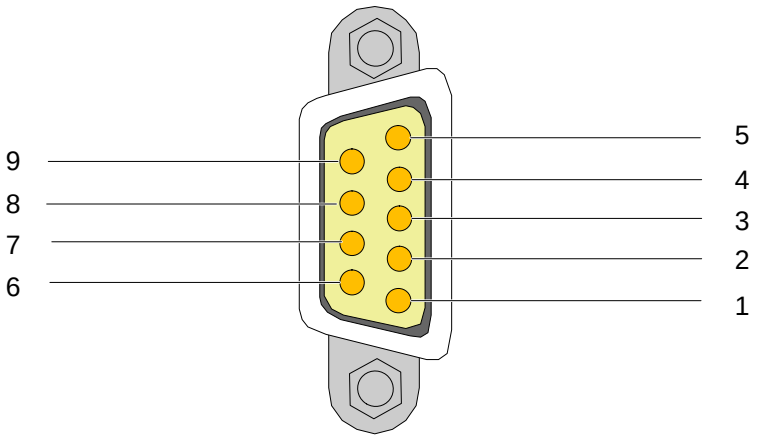
Baud rate in [Baud]	Length in m
Up to 93.75	12000
187.5	1000
500	400
1500	200
3000	100
6000	100
12000	100

- For the above mentioned dimensions, the usage of an A-line (according to EN50170-2) with the corresponding bus terminal resistances is imperative.
- Up to 1.5 Mbaud, a stub length of 6.6 m is permissible (sum of all stubs in a segment).
- For 3 to 12 Mbaud, a stub length of 1.6 m is permissible (sum of all stubs in a segment). For this wiring, longitudinal inductivities according to EN50170-2 are imperative.

5.8 InterBus-S Interface X73 (ZS550-DP-IBS only)

With the ZS550-DP-IBS, the decentralized peripherals can be connected via the DP/V1 master interface and also via an InterBus-S master interface. The data exchange with the decentralized bus stations (slaves) is cyclic. I.e. that the master reads the input information from the slaves and writes the output information to the slaves. The master itself sets the transfer rate. The master starts a test run of the bus, one with 2 Mbits/s and another with 500 Kbits/s. The bus shall continue on the transfer rate on which the bus runs without error.

The InterBus-S interface is not galvanically isolated. By using the IBS optical fibre adapter IBS OPTOSUB-MA/M/L-LK by Phoenix Contact (not included in the delivery), a connection to an optical fibre InterBus-S system is possible as well.



Pin	Assignment
1	Data Out (DO)
2	Data In (DI)
3	COM
4	GND
5	+5 V
6	$\overline{DO}$
7	$\overline{DI}$
8	Vcc
9	not assigned

5.9 Technical Data

Technical Data	ZS550
Program memory module	• RAM program memory module, 250K instructions • buffered RAM program memory module, 1 year battery backup with backup battery failure recognition and backup battery early warning • Flash program memory module
Clock frequency	166 MHz
Execution times • Bit command • Word processing	 80 ns 100 ns
Registers	4 registers; 1 bit, 8 bit,16 bit, and 32 bit processing
Organization modules	256
Data modules	1024
Program modules	1024
Nesting depth	32 modules
Nesting levels	7, monitoring via PG possible
Formats of operands	Bit, byte, word, double word
Inputs	8 Kbytes, address: I0.0 to I8191.7
Outputs	8 Kbytes, address: O0.0 to O8191.7
Markers	8 Kbytes, address: M0.0 to M8191.7
Special markers	32 bytes, address: SM0.0 to SM31.7
Timers	256, address: T0 to T255
Counters	256, address: C0 to C255
System area	512 bytes, address: S0 to S511
FIFO memory	4 x 1024
Remanence	optional for M, DF, T, C
Serial programming unit interface	V.24 interface with 9.6 to 115.2 Kbaud
Dimensions	Measures of the front plate correspond to a slot of the CL550

Notes:

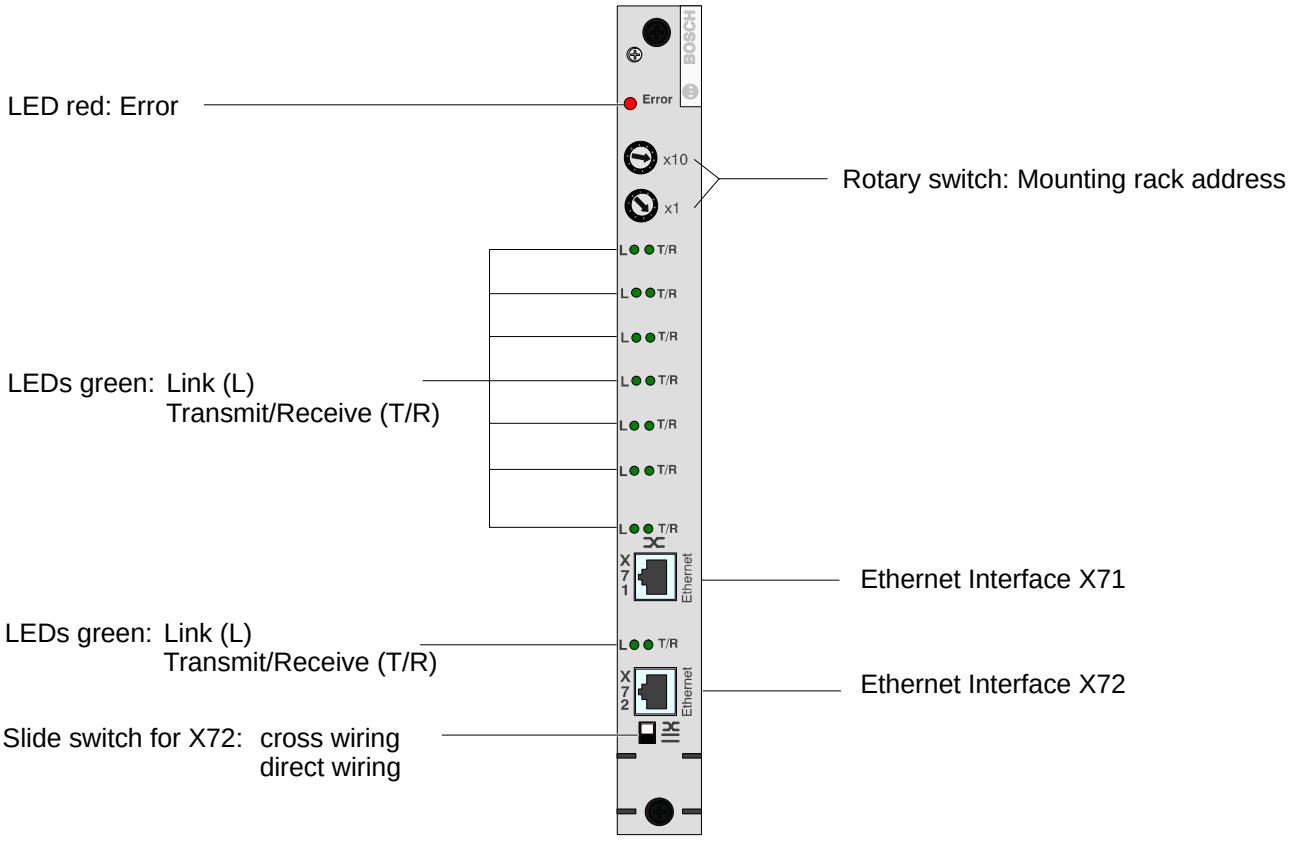
6 CON550

The module CON550 is an Ethernet switch for the CL550 system. It provides eight 10/100Base-T interfaces:

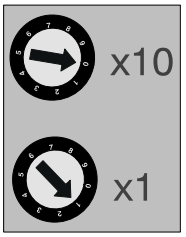
- 6 interfaces on the frontside for communication with other stations in the network.
- 2 interfaces on the backside for communication with other modules of the basic device.

The module has been provided with automatic recognition and automatic switching between 10Base-T and 100Base-T.

6.1 Structure and Function



6.2 Address Settings

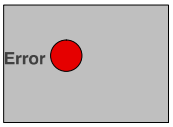


The ID of the CL550's mounting rack is set with both the 10-steps rotary switches. Each mounting rack ID can only be given once in a controlling system. It identifies each unit in the system unambiguously. The mounting rack ID has already been reserved and shall not be assigned otherwise.

☞ **For further information, please refer to the Software Manual, CL550 Configuration and Commissioning.**

6.3 Display Elements

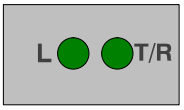
LED Error



LED display	Meaning
LED red: Error	
off	Normal operation
lit	• after operating the RESET button on the ZS550 • during the Ethernet Switch IC's self test (power on); after a successful self test, the LED goes off, otherwise the module must be changed.

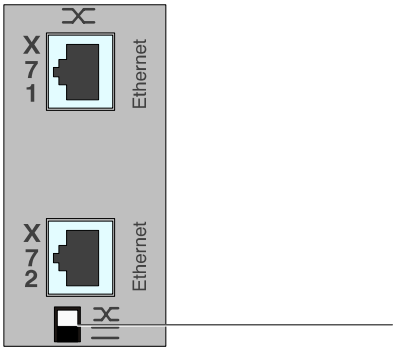
LEDs Link, Transmit/Receive

Each of the 8 Ethernet channels is provided with two LED displays.



LED display	Meaning
LED green: L	Connection between CON550 and data terminal (ZS550, external switch, etc.) is available ☞**The LED must always be lit**
LED green: T/R off lit	 No data traffic Data traffic

6.4 Ethernet Interfaces X71 and X72



The module is provided with 2 external connections: X71 and X72. They are accessible via RJ45 sockets.

The slide switch determines whether the X72 connection is provided with a data terminal assignment (even; MDI) or a slide switch assignment (crossed; MDI-X).

The even assignment is used for a connection of the CON550 with the network. The crossed assignment allows for communication between the CON550 and the programming device.

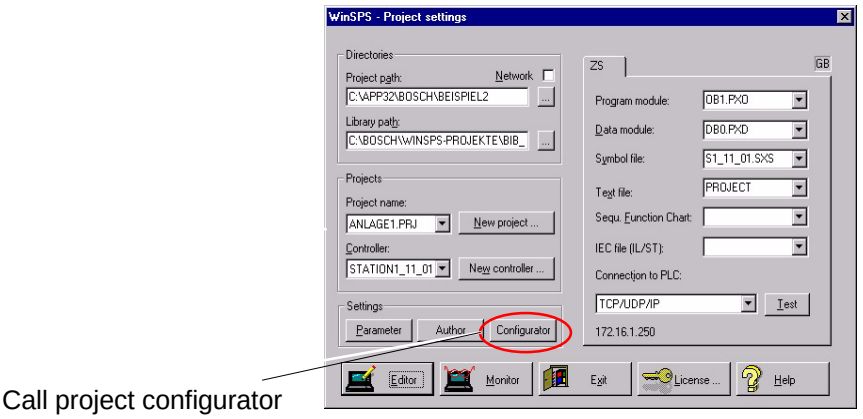
6.5 Technical Data

Technical Data	CON550
Order number	1070 081 968
Power input	a maximum of 10 W
Ethernet switch	10/100Base-T
Interface	8 Ethernet interfaces (2 x RJ45, 6 x backside)
Data memory	512 Kbyte SRAM
Interference immunity factor according to	EN 50081-2, EN 50082-2
Dimensions	Dimensions of the front plate correspond to a slot of the CL550

7 Commissioning and Configuration

7.1 Project Configurator

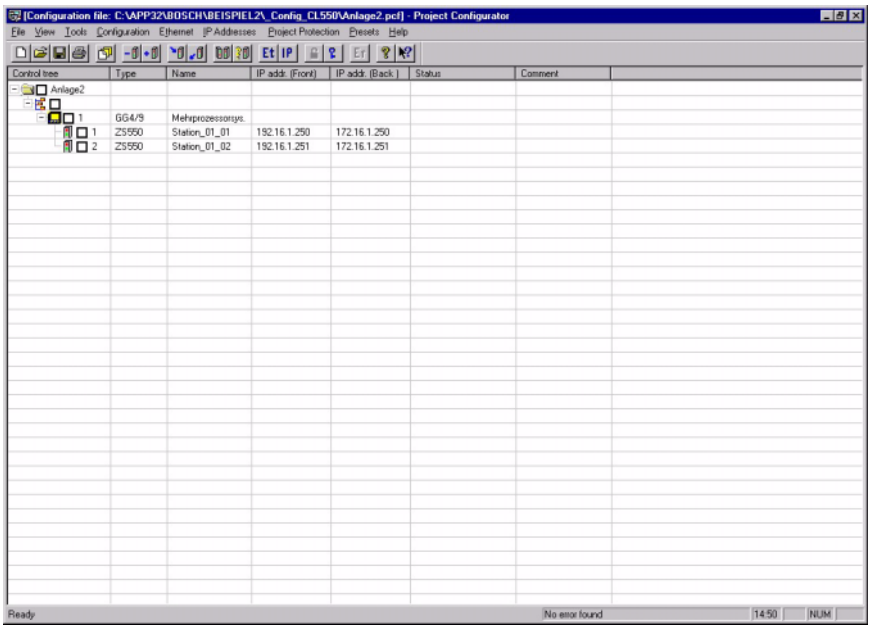
The project configurator is a software tool for the CL550 controller. It is called from within the utility program WinSPS.



Call project configurator

The project configurator makes it possible for the user to define his/her own system which can be interconnected with several other manufacturing systems.

For communication with the components of the system, the project configurator uses the TCP/IP protocol. In order to ensure the correct operation of all modules in the TCP/IP network, it creates a configuration file. The configuration file contains the IP addresses and Ethernet parameters of the modules. It will be loaded onto each of the system's module.



The project configurator makes it possible to

- create
- check
- load
- unload
- compare
- update
- document the configuration file and
- effect safety measures for the entire system

☞ **For further information, please refer to the Software Manual, CL550 chapter 3,4, Configuration and Commissioning.**

Licensing

The project configurator is protected by a software dongle. After installation, the functions must be released by inserting a computer key. This key consists of a number determined by Bosch.

The user interface of WinSPS provides a ”license” button for applying for such a license. The displayed computer key unambiguously describes the computer on which the software has been installed. Please send the key with the attached fax form to Robert Bosch GmbH. The transmitted number is used to generate a key code that is to be entered into the input field. This key code releases the protected functions. Alternatively, it is possible to set up, free of charge, a single 14-days trial license via the corresponding button.

An already existing license can be transferred from one computer to another via the functions ”Create transfer disk”, ”Read transfer disk” and ”Export...”.

Instead of the software license, a hardlock which is to be inserted in the parallel interface or which can be used as an internal ISA-Bus card (IntroCard) can be used. The hardlock is available at Bosch Software-Service. A hardlock can simultaneously accept the licences for WinSPS, WinCAN, WinDP, and WinPanel.

★ In order to set up a license, operate the button ”Apply for a hardlock license”.

The function ”Transfer softlicense –> hardlock” can be used to transfer an existing softlicense to the hardlock. Afterwards, the license is only available in the hardlock. Before the license can be transferred, the hardlock must be connected to the user’s PC.

7.2 Address Assignment

The project configurator takes over the tasks of correct assignment and verification of the IP addresses of the ZS550 controllers.

At the first connection setup, the ZS550 controllers that are assigned via the system's project coordinator do not have an IP address. Since the project configurator cannot address the ZS550 controllers via the IP addresses, it builds up the connection via the mounting rack ID and the mounting rack position ID. It sends a broadcast command to the identification number of the system modules. The system modules send an acknowledging signal. A connection has been established.

Now, the user can assign the IP addresses permissible in the network, which the project configurator will then assign to the ZS550 controllers. A connection via the IP addresses will be established.

☞ **For further information, please refer to the Software Manual, CL550 chapter 3,4, Configuration and Commissioning.**

Notes:

8 Accessories and Ordering Information

Designation	Order No.
Mounting rack GG4-9, basic device, 9 slots, without withdrawable fanning unit	1070 081 960
NT1	1070 071 376
NT2	1070 062 687
NT3	1070 062 309
NT4	1070 083 441
NT24	1070 068 046
Central processing unit ZS550	1070 081 964
CON550, LAN module 10/100 MHz	1070 081 968
Withdrawable fanning unit	1070 081 972
Filter matt 129 x 274	1070 081 976
Backup battery	1070 914 447
Programming software: WinSPS	1070 077 925
Programming software: WinDP	1070 080 724
Dongle, empty	1070 919 875

Notes:

A Appendix

A.1 Abbreviations

Abbreviation	Description
ANSI	American National Standards Institute
BÜP	Bosch Transmission Protocol (Bosch-Übertragungs-Protokoll)
COMx	Serial Interface x
CPU	Central Processing Unit
DC	Direct Current, Gleichstrom
DIP	Dual Inline Package
DM	Data Module
DP	Decentralized Peripherals, is used for PROFIBUS DP bus system
EEM	Electrostatically Sensitive (Endangered) Components
EMC	Electromagnetic Compatibility
ESD	Electrostatic Discharge; abbreviation for all terms that concern electrostatic discharges, e.g. ESD protection, ESD danger
FC	Program Module
GND	Ground
HW	Hardware
I	Input
ID	Identification Number
IP	Internet Protocol
ISA	IIndustrial Standard Architecture, PC bus system
LAN	Local Area Network
LED	Light Emitting Diode, state display
MAC	Media Access Control. MAC determines, when a device is allowed to send data
MPS	Master Parameter Set
O	Output
OM	Organization Module
PCI	Peripheral Component Interconnect, PC bus system
PE	Protective Earth
RAM	Random Access Memory. Each location can be addressed individually and its contents can be varied.
SRAM	Static Random Access Memory
SW	Software
TCP/IP Protocol	Transmission Control Protocol/Internet Protocol
ZS	see CPU

A.2 Glossary

Term	Description
10Base-T	Ethernet with a transmission speed of 10 MBit/s via starshaped UTP or STP cabling. The bus is concentrated in the hub. The stations are each connected to the hub via cables whose maximum length is 100 m each.
100Base-T	Ethernet with 100 Mbits/s via starshaped UTP or STP cabling with four wires (two pairs UTP category 5, STP type 1 or S/STP category 5). The maximum length of the cable between hub and station is 100 m. 100Base-T is the most popular fast Ethernet type.
DIP switch	Dual Inline Package Switch. Very small switch on the adapter card, which serves to configure the card.
Hub	Network device which functions as the wiring center in starshaped wiring arrangement.
IEEE 802.x	A series of specifications for the definition of network standards which have been developed by the IEEE (Institute of Electrical and Electronics Engineers). The x stands for individual specifications like e.g. 802.3 for Ethernet.
LAN	Local Area Network. A relatively small network which in general is not available for public access. The networks used in companies or private households are usually called LAN.
MAC	The Media Access Control manages the access to the physical network. MAC determines, when a device is allowed to send data. In the network, a connected device can be identified by the MAC address. It is unequivocally stored on the card for each network card worldwide. Network addresses (e.g. IP addresses) are always displayed via certain mechanisms on this MAC address.
OSI model	Standard which divides the communication between computers into seven protocol layers. Each layer is responsible for a different function regarding the preparation of data for transmission within the network.
PROFIBUS-DP	Bus system that is tailored specifically for the requirements of decentralized peripherals. Communication of the PROFIBUS-DP proceeds via a two-wire line. There are so-called masters on the one hand and slaves on the other. While the masters coordinate the data exchange on the bus, the slaves are simple peripheral devices.
RJ45	Subminiature Cannon connector with 8 pins, which is especially used for UTP cables for 10Base-T and 100Base-T.
Switch	Switching device in the network, which leads data packages directly from the sender to the port of the receiver.
STP	Shield Twisted Pair, cable with four or eight wires, two of which are always twisted together; each one of these pairs has a separate port. In addition, an S/STP cable, equipped with an additional shield, is available.
TCP/IP Protocol	Transmission Control Protocol/Internet Protocol; a protocol stack which has been developed to enable communication between networks which are connected with each other. TCP/IP is supported by almost any network.
UTP	Unshielded Twisted Pair, cable with four or eight wires, two of which are always twisted together into pairs. The individual cable pairs are not shielded.
UDP/IP Protocol	Protocol that is active in the transport layer. It uses the IP protocol for delivery. UDP is a connectionless transport protocol, i.e. it does not establish a connection between sender and receiver before transmitting data.

A.3 Subject Index

Notes:

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