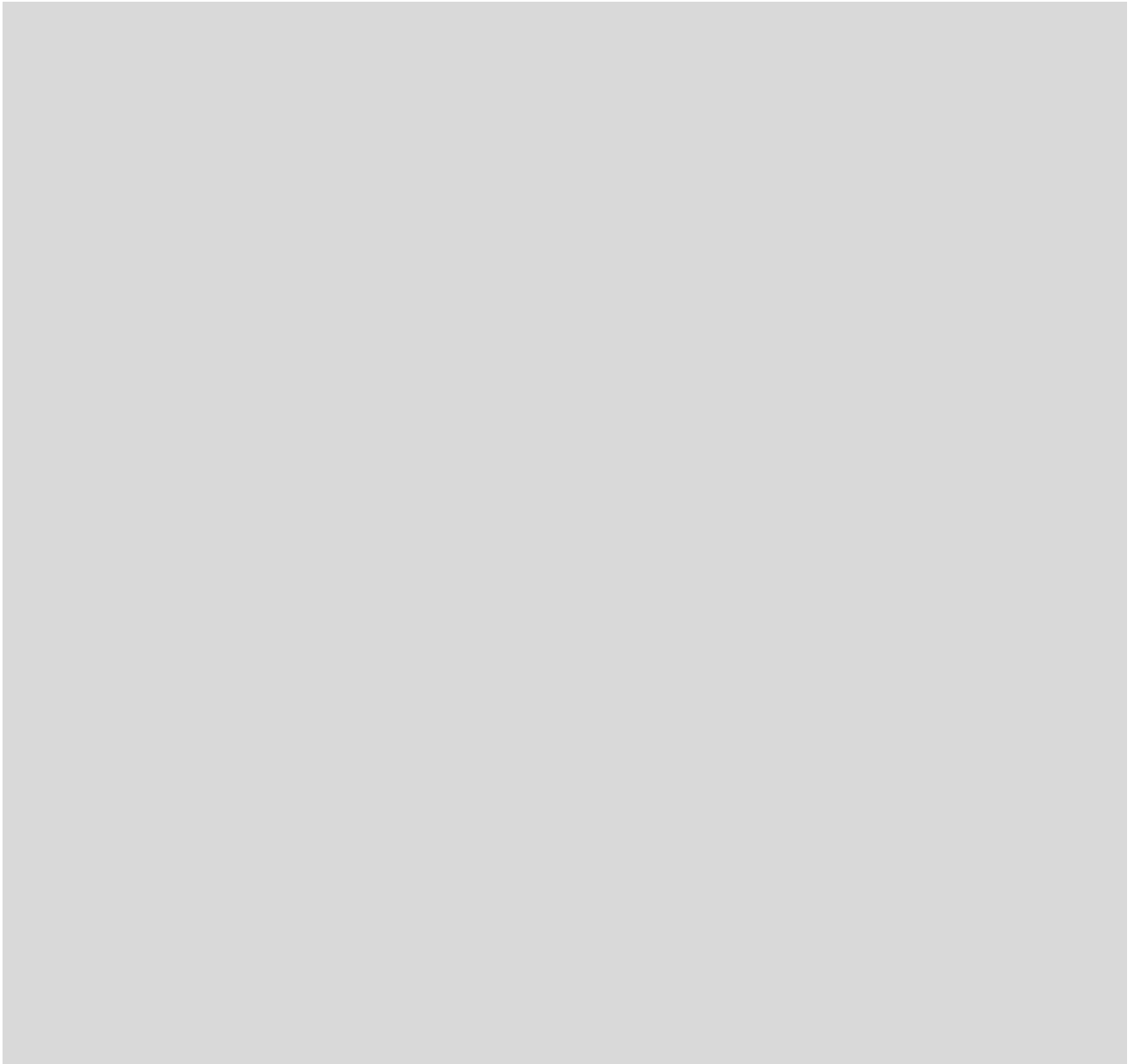


CL400 / CL500

COM-P Module Description



Edition

101

CL400 / CL500

COM-P Module Description

1070 072 170-101 (98.06) GB



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Safety Instructions

Before you start working with the COM-P communication module, 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.

Standard operation

This instruction manual presents a comprehensive set of instructions and information required for the standard operation of the described products.

The products described hereunder –

- were developed, manufactured, tested and documented in accordance with the relevant safety standards. In standard operation, and provided that the specifications and safety instructions relating to the project phase, installation and correct operation of the product are followed, there should arise no risk of danger to personnel or property.
- are certified to be in full compliance with the EEC Council Directives 89/336/EEC (electromagnetic compatibility), 93/68/EEC (amending directives), 93/44/EEC (relating to machinery), as well as 73/23/EEC (operation within certain voltage limits). In addition, we certify compliance with harmonized standards EN 50081-2 and EN 50082-2.
- are designed for operation in an industrial environment. Prior to the intended installation and/or operation within a private residence or business area, on retail premises or in a small-industry setting, the user will be required to obtain a single operating license issued by the appropriate national authority or approval body. In Germany, this is the Federal Institute for Posts and Telecommunications, and/or its local branch offices.

Qualified personnel

This instruction manual is designed for specially trained PLC personnel. The relevant requirements are based on the job specifications as outlined by the ZVEI and VDMA professional associations in Germany. Please refer to the following German-language publication:

Weiterbildung in der Automatisierungstechnik
Hrsg.: ZVEI und VDMA
Maschinenbau-Verlag
Postfach 71 08 64
60498 Frankfurt

This instruction manual is specifically designed for PLC specialists. They require special knowledge with regard to the PROFIBUS-FMS.

Interventions in the hardware and software of our products which are not described in this instruction manual may only be performed by our skilled 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 to property.

Installation and maintenance of the products described hereunder is the exclusive domain of **trained electricians** as per VDE 1000-10 who are familiar with the contents of this manual. Relevant procedures must be in compliance with applicable accident prevention regulations (in Germany, these are UVV VBG4, VDE 100, VDE 105) and installation instructions (EN 60204 part 1, EN 50178).

Trained electricians are persons of whom the following is true:

- They are capable, due to their professional training skills and expertise, and based upon their knowledge and familiarity with applicable technical standards, of assessing the work to be carried out, and of recognizing possible hazards.
- They possess, subsequent to several years' experience in a comparable field of endeavour, a level of knowledge and skills that may be deemed commensurate with the level attainable in the course of a formal professional education.

Intervention by insufficiently trained or unskilled personnel may cause severe damage to machine and drive components, loss of software or even personal injury.

Programming, start-up and operation, as well as the modification of program parameters must be performed only by appropriately trained personnel! The referred persons must be capable of recognizing possible hazards that may arise from programming and program changes, and that may be generally produced by mechanical, electrical or electronic devices.

With regard to the foregoing, please read the information about our comprehensive training program. You'll find a listing of our seminars on the front inside cover of this manual.

The professional staff at our training centre will be pleased to provide more information. You may contact the centre by telephone at (+49) 6062 78-258.

Safety instructions affixed to control components



DANGER: High voltage!



DANGER: Battery acid!



Electrostatically sensitive components!



Disconnect at mains before opening!



PE conductor



Functional earthing / low-noise earth



GND / Earth conductor

Safety instructions in this manual



DANGEROUS ELECTRICAL CURRENT

This symbol is used to warn of the presence of **dangerous electrical current**. Insufficient or lacking compliance with these instructions can result in **personal injury**.



DANGER

This symbol is used wherever an insufficient or lacking compliance with instructions can result in **personal injury**.



CAUTION

This symbol is used wherever an insufficient or lacking compliance with instructions can result in **damage to equipment or data files**.

 This symbol is used to inform the user of special features.

Safety Instructions

**DANGER**

Danger to persons and equipment!
Test every new program before operating the system!

**DANGER**

Fatal injury hazard through ineffective Emergency-OFF devices!
Emergency-OFF safety devices must remain effective and accessible during all operating modes of the system. The release of functional locks imposed by Emergency-OFF devices must never cause an uncontrolled system restart! Before restoring power to the system, test the Emergency-OFF sequence!

**DANGER**

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

**DANGEROUS ELECTRICAL VOLTAGE**

Unless otherwise indicated, maintenance procedures must always be carried out with the system switched OFF! The system must be protected and secured against inadvertent restart.

In the event that measuring and testing procedures on the live system are required, compliance with applicable safety and accident prevention regulations is mandatory. In any case, only approved electrical tools must be used!

**CAUTION**

Danger to the module!

Do not insert or remove the module while the controller is switched ON! This may destroy the module. Prior to inserting or removing the module, switch OFF or remove the power supply module of the controller, external power supply and signal voltage!

**CAUTION**

Service repairs and maintenance procedures are the exclusive domain of Bosch Service engineers or Bosch-licensed repair and service companies! Only spare parts or replacement components authorized by Bosch must be used!

**CAUTION**

Danger to the module!

All ESD protection measures must be observed when using the module! Prevent electrostatic discharges!

Observe the following protective measures for electrostatically endangered modules (EEM)!

- The employees responsible for storage, transport and handling must be trained in ESD protection.
- EEMs must be stored and transported in the dedicated protective packaging specified for this purpose.
- Out of principle, EEMs may only be handled 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 integrated 1 M Ω resistor.
- EEMs may under no circumstances come into contact with objects susceptible to accumulating an electrostatic charge. Most items made of plastics 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.

Documentation and Software

The present manual provides the user with comprehensive information about the COM-P communication module. Additional information appears in the following manuals:

Documentation	Order no.	
	German	English
R200P, Module description	1070 072 401	1070 072 162
R500P, Module description	1070 072 065	1070 072 138

Throughout this instruction manual, the floppy disk drive is always assumed to be drive A:\, and the hard disk is always designated drive C:\.

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At the time of shipment from the factory, all installed software is protected by copyright. Software may therefore be duplicated only with the prior permission of the respective manufacturer or copyright owner.

1 Compatibility

The COM-P communication module replaces the R500P computer interface module.

The system configuration table (SC table) provides a new identification for the module, i.e., COM-P. This will require the use of the PROFI utility program, version 4.6 and higher, or WinSPS, version 2.0 and higher.

Local upload of PROFIBUS configuration data is possible with WinSPS version 2.0 and higher.

Remote configuration procedures are possible with the Konfigurator program, version 1.53 and higher.

For detailed descriptions, please refer to the instruction manuals supplied with the R500P and R200P computer interface modules.

The R500P instruction manual makes specific reference to the handling of function modules. The individual PROFIBUS utilities and error messages are discussed in the R200P instruction manual.

The COM-P module provides for up to 200 entries in the object dictionary. The number of connections was increased to 63. In addition, the COM-P module supports up to 8 virtual field devices (VFDs).

Notes:

2 Hardware

The COM-P communication module facilitates the interconnection of the CL400 / CL500 PLC controllers with other types of Bosch controllers or other types of intelligent devices.

To connect the CL400 / CL500 PLC controllers to other types of communication devices (bus stations) that support the PROFIBUS protocol, as per the EN 50170 standard, the COM-P communication module features a 9-pin PROFIBUS connector.

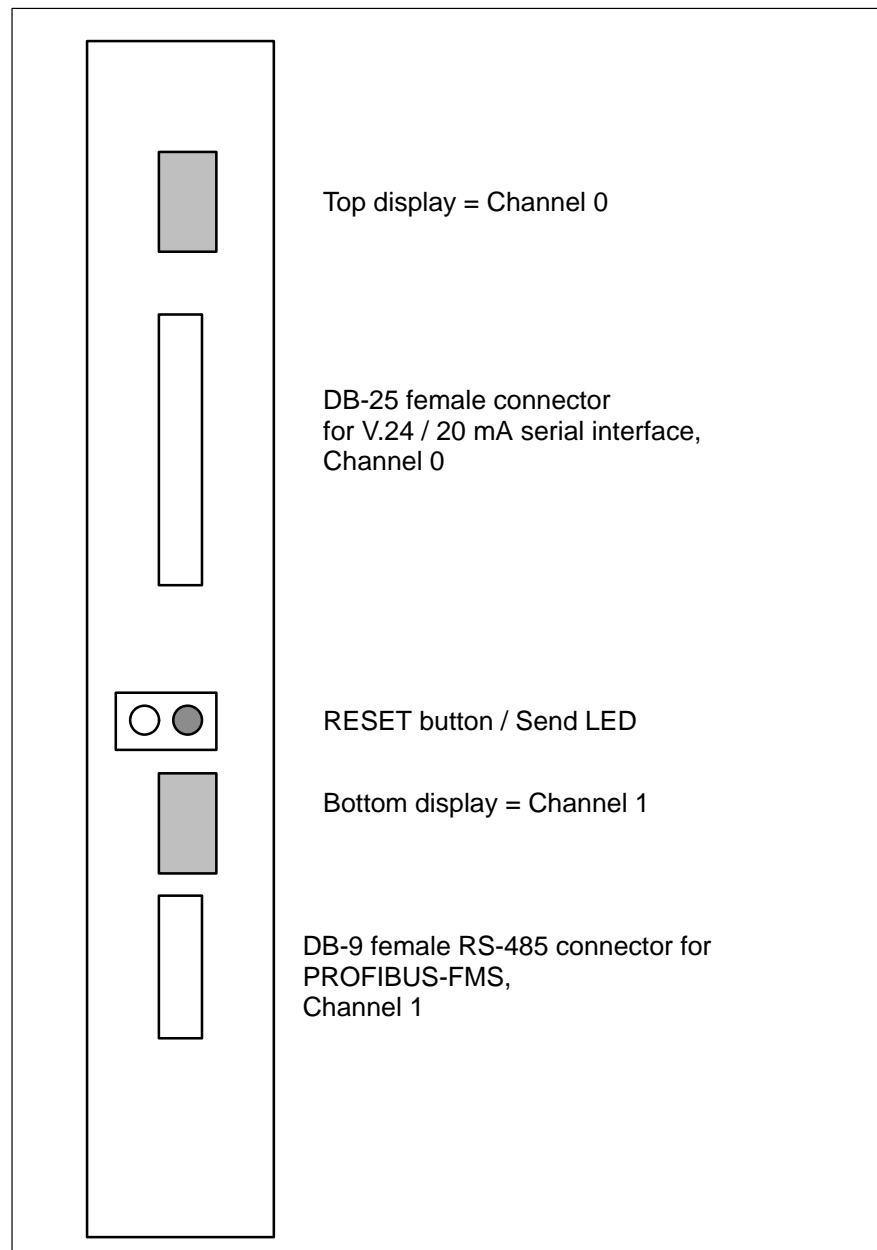
The COM-P module also provides a combination V.24 / 20 mA serial interface for point-to-point connections.

2.1 Hardware Configuration

The COM-P communication module comprises a computer interface module featuring both a combination V.24 / 20 mA interface and a PROFIBUS connection.

The V.24 / 20 mA serial interface is assigned channel 0, with the PROFIBUS interface serving channel 1. Both channels can be operated simultaneously.

2.2 Front Panel



2.2.1 Red Send LED

The Send LED illuminates when a task is being transmitted via channel 1 of the PROFIBUS module. As a prerequisite, valid configuration data must have been loaded.

The Send LED illuminates when the COM-P has received the transmit-ready token within the logical token ring. If no transmit requests are present, the module will pass on the token without delay. In the event that transmit requests are present, the token is passed on no later than after the token hold time has elapsed.

The Send LED extinguishes the instant the token has been passed on.

If no transmit requests are being executed, this will be indicated a dim glow of the LED. The execution of transmit requests causes the Send LED to flash briefly because the token remains with the module for an extended period of time.

2.2.2 RESET Button

Pressing the RESET button causes the module to be returned to its initial state. At the same time, all requests being processed are cancelled while returning error code 3160H, with the PLC responding by returning 10H. In addition, the request queue is deleted, and the PROFIBUS protocol is restarted automatically.

The default start-up is initiated via RESET button in cases where, at the time of module power-up, the RESET button is pressed and held down until the version ID in the status display extinguishes.



CAUTION

This action causes all configured connections, objects and bus parameters to be deleted.

- **Active tasks will be subject to abrupt cancellation without safety procedure.**
 - **The task queue will be deleted.**
 - **STOP and CLAB requests from the module will be deleted.**
-

2.2.3 Status Display

A status display is provided for each of the two channels on the COM-P communication module.

The status of channel 1 (PROFIBUS connection) is indicated in the bottom 7-segment display.

The status of channel 0 (V.24 / 20 mA interface connection) is indicated in the top 7-segment display.

The COM-P provides the following status displays:

Bottom display	Top display	Explanation
U	*	No PROFIBUS configuration loaded.
.	*	Indicates an active central request on the PROFIBUS.
0 – F	*	Indicates errored PROFIBUS requests.
*	P	No protocol activated on this channel.
*	.P	Request logging is enabled.
*	.	Indicates an active central request on the PROFIBUS.
*	0 – F	Indicates errored PROFIBUS requests.
–	0, 1, 2	Three-digit error code, system error
H	0	Flash error
H	1	RAM error
H	2	LCA error
H	3	DPR error
H	4	System bus error
C	*	System fault
* indicates that this 7-segment display may indicate other random displays.		

During the module start sequence, the software version is indicated in the status displays. The top display show the main version number, and the bottom display the release number.

2.2.4 Interfaces

The COM-P communication module features two interfaces. The interface labelled X71 comprises the connection to a PROFIBUS network (refer to Section 2.4).

The interface labelled X31 comprises the serial V.24 / 20 mA connection (refer to Section 2.5) used for point-to-point connection to another device, and/or for connecting the control monitor.

2.2.5 Version ID

The version identification signifies the various release statuses of the module. Each version change is indicated by a white dot.

2.2.6 Labelling Field

The labelling field enables the user to affix to the module an external mark of special significance within the system.

2.3 Module Slot

A maximum of 5 system modules can be operated in a given PLC.

At this time, these system modules include:

- COM-P
- R500
- R500P
- ZAT
- DB500

2.4 PROFIBUS Interface

The PROFIBUS interface accepts connections of all devices (including devices from other manufacturers) featuring a PROFIBUS connection conforming to the EN 50170 standard. PROFIBUS comprises an open, manufacturer-independent and standardized transmission protocol.

The PROFIBUS interface features potential isolation, and is permanently assigned to channel 1 of the COM-P communication module.

The hardware connector of the PROFIBUS interface complies with the EN 50170 standard. The female DB-9 connector is mounted on the front panel of the COM-P communication module.

2.4.1 Pin Assignment and Connecting Cable

Pin Assignment

The bus cable plug connector and cable connections use the following pin assignment:

Pin no.	RS-485	Signal	Explanation
1		open	
2		open	
3	B/B'	RxD/TxD-P	Receive / Send data (pos.)
4		RTS-P	Repeater control signal (pos.)
5	C/C'	DGND	Data reference potential
6		VP	Supply voltage (pos.)
7		open	
8	A/A'	RxD/TxD-N	Receive / Send data (neg.)
9		RTS-N	Repeater control signal (neg.)
Enclosure		Shield	Screen and/or PE conductor

Connecting Cable, Plug Connectors

The connecting cable consists of dual-screened, twisted 2-wire cable (order no. 917201 or 917202), as per EN 50170.

The wiring utilizes male bus connectors, IP 20 (order no. 918538 or 918539). These plug connectors must be used at the line ends. At the line ends, the bus termination is enabled in the plug connectors.

2.4.2 Transmission Speeds and Line Lengths

A range of 9 different transmission speeds can be used for the data transfer via the PROFIBUS.

However, increasing transmission speed causes a reduction of the maximum possible line length.

Baud rate	Maximum Line Lengths			
	No repeater	1 Repeater	2 Repeaters	3 Repeaters
9.6 / 19.2 / 93.75 kbaud	1.2 km	2.4 km	3.6 km	4.8 km
187.5 kbaud	600 m	1.2 km	1.8 km	2.4 km
500 kbaud	200 m	400 m	600 m	800 m
1.5 Mbaud	100 m	200 m	300 m	400 m
3 Mbaud	100 m	200 m	300 m	400 m
6 Mbaud	100 m	200 m	300 m	400 m
12	100 m	200 m	300 m	400 m

The potential differential between the data reference potential (DGND) of all connections must not exceed ± 7 V. No compensating currents must flow across the screen of the bus cable. If required, a means of potential equalization must be introduced.

2.5 V.24 / 20 mA Serial Interface

The V.24 / 20 mA interface is available on channel 0. It can be used to connect devices that also feature a V.24 or 20 mA interface.

The following protocols are available:

- BUEP19E (Bosch transmission protocol)
- BUEP03E (Bosch transmission protocol, free ASCII protocol)
- BUEP64 (Siemens 3964R transmission protocol)

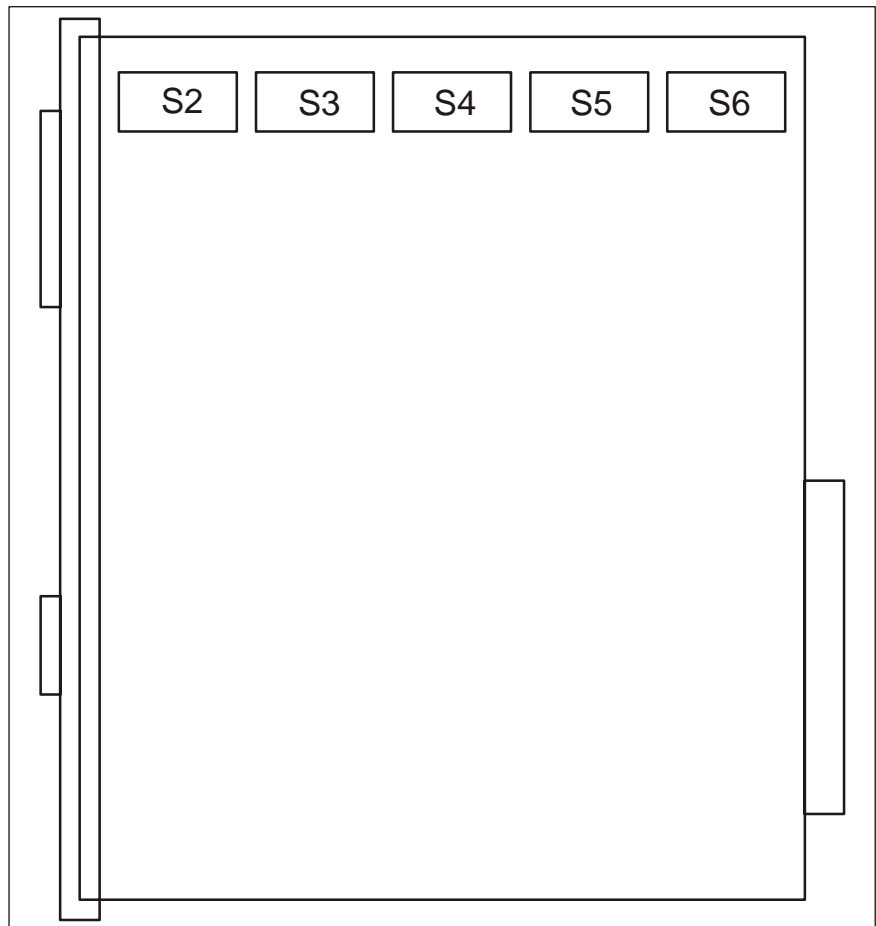
For detailed descriptions, please refer to the instruction manual supplied with the R500.

2.6 Possible Settings on the COM-P Module

The required settings must be effected prior to the startup of the COM-P module.

DIP Switches	Explanation
S2	Block address settings
S3	Baud rate, parity settings, etc., on channel 0
S4	Selecting PROFIBUS bus station address
S5	spare
S6	Setting supplementary information for channel 0 and channel 1

DIP Switch Locations



2.6.1 S2 Block Address

SS1	SS2	SS3	SS4	SS5	SS6	SS7	SS8	System bus address
off	off	off	off	off	off	off	off	0000H
on	off	off	off	off	off	off	off	0001H
off	on	off	off	off	off	off	off	0002H
..
on	off	on	on	on	on	on	on	00FDH
off	on	on	on	on	on	on	on	00FEH
on	on	on	on	on	on	on	on	00FFH

2.6.2 Channel 0 – V.24 / 20 mA, S3

SS1	SS2	SS3	SS4	SS5	SS6	SS7	SS8	Explanation
*	*	*	*	*	*	*	off	Control signal query disabled
*	*	*	*	*	*	*	on	Control signal query enabled
*	*	*	*	off	off	off	*	38400 baud
*	*	*	*	on	off	off	*	57600 baud
*	*	*	*	off	on	off	*	600 baud
*	*	*	*	on	on	off	*	1200 baud
*	*	*	*	off	off	on	*	2400 baud
*	*	*	*	on	off	on	*	4800 baud
*	*	*	*	off	on	on	*	9600 baud
*	*	*	*	on	on	on	*	19200 baud
*	*	*	off	*	*	*	*	no parity
*	*	*	on	*	*	*	*	Active parity
*	*	off	*	*	*	*	*	Odd parity
*	*	on	*	*	*	*	*	Even Parity
off	off	*	*	*	*	*	*	No protocol
off	on	*	*	*	*	*	*	BUEP03E
on	off	*	*	*	*	*	*	BUEP19E
on	on	*	*	*	*	*	*	BUEP64

2.6.3 PROFIBUS Station Address, S4

The PROFIBUS station address is set by means of switch segments SS1 through SS7 on DIP switch S4. A total of 126 bus stations are available. The bus station number 0 is reserved for the PROFIBUS Konfigurator, and must not be used by other bus stations.

The switch segment SS8 on DIP switch S2 determines whether the COM-P is to be operated as a master or slave within a PROFIBUS network.

- ON – Slave
- OFF – Master

SS1	SS2	SS3	SS4	SS5	SS6	SS7	SS8	PROFIBUS bus station address
off	off	off	off	off	off	off	*	0 (reserved for Konfigurator)
on	off	off	off	off	off	off	*	1
off	on	off	off	off	off	off	*	2
..	*	..
on	off	on	on	on	on	on	*	125
off	on	on	on	on	on	on	on	126
*	*	*	*	*	*	*	off	Master mode
*	*	*	*	*	*	*	on	Slave mode

2.6.4 Multiswitch, S6

SS1	SS2	SS3	SS4	SS5	SS6	SS7	SS8	Explanation
Channel 0		Channel 1				spare		
off	*	*	*	*	*	off	off	BUEP19E: Priority, central requests BUEP64: Priority, central requests BUEP03E: Data length 8 bits
on	*	*	*	*	*	off	off	BUEP19E: Priority, periph. requests BUEP64: Priority, periph. requests BUEP03E: Data length 7 bits
*	off	*	*	*	*	off	off	BUEP64: Protocol end, DLE ETX
*	on	*	*	*	*	off	off	BUEP64: Protocol end, EBL ETB
*	*	off	off	off	off	off	off	9.6 kbaud
*	*	on	off	off	off	off	off	19.2 kbaud
*	*	off	on	off	off	off	off	93.75 kbaud
*	*	on	on	off	off	off	off	187.5 kbaud
*	*	off	off	on	off	off	off	500 kbaud
*	*	on	off	on	off	off	off	spare
*	*	off	on	on	off	off	off	1.5 Mbaud
*	*	on	on	on	off	off	off	3.0 Mbaud
*	*	off	off	off	on	off	off	6.0 Mbaud
*	*	on	off	off	on	off	off	12.0 Mbaud
*	*	off	on	off	on	off	off	spare
*	*	on	on	off	on	off	off	spare
*	*	off	off	on	on	off	off	spare
*	*	on	off	on	on	off	off	spare
*	*	off	on	on	on	off	off	spare
*	*	on	on	on	on	off	off	spare

2.6.5 V.24 Interface

The signal voltage levels and the connector pin assignment comply with VDI Guidelines 2880, sheet 2, for programmable logic controllers, process and data interfaces.

Signal level (data line):

- logical 1 --> -15 V through -3 V
- logical 0 --> +3 V through +15 V

Signal level (signal and control line):

- active --> +3 V through +15 V
- passive --> -15 V through -3 V

Explanation	Designation	Pin no.	Signal direction
Screen	Shield	*	
PLC Send data	TxD	2	-->
PLC Receive data	RxD	3	<--
Reference conductor	Signal GND	7	
Data Set Ready	DSR	6	<--
Data Terminal Ready	DTR	20	-->
* The screen is attached to the metal shells of the SUB-D connectors.			

20 mA Interface

The signal voltage levels and the connector pin assignment comply with VDI Guidelines 2880, sheet 2, for programmable logic controllers, process and data interfaces (exception: max. blocking voltage, 27 V). Dependent upon the pin assignment, the 20 mA interfaces can be connected for active (with power supply) or passive operation.

Line statuses:

- logical 1 --> 20 mA
- logical 0 --> no current

20 mA passive

Explanation	Designation	Pin no.	Signal direction
Screen	Shield	*	
PLC Receive data (pos.)	RxD +	22	<--
PLC Receive data (neg.)	RxD –	12	
PLC Send data (pos.)	TxD +	23	-->
PLC Send data (neg.)	TxD –	13	
Data Set Ready (pos.)	DSR +	11	<--
Data Set Ready (neg.)	DSR –	14	
Reader Control (pos.)	RDRCTL +	19	-->
Reader Control (pos.)	RDRCTL –	16	

* The screen is attached to the metal shells of the SUB-D connectors.

2.6.6 Line Length

The maximum permissible line length is baud rate-dependent. The following line length specifications are valid for the Bosch cable 14 x 0.14 twisted and screened, Bosch order no. 910152:

Transmission speed (baud)	V.24 interface m	20 mA interface m
600...4800	15	350
9600	15	300
19200	15	150
38400	15	100
57600	15	50

As a prerequisite, only minor potential differentials ($-2\text{ V} < V_{\text{diff}} < +2\text{ V}$) exist between sending and receiving units.

The transmission cable must not be routed in parallel with neighbouring high-power lines.

Notes:

3 PROFIBUS Transmission Protocol

The PROFIBUS transmission protocol is available for the RS-485 interface. It is oriented in line with the open communications ISO/OSI layer model.

The PROFIBUS utilizes the physical layer 1, the data security layer 2, and the application layer 7. These layers are defined in the EN 50170 standard.

3.1 Services

The table below provides an overview of the functions provided by the COM-P communication module.

Service	Client	Server
Initiate	X	X
Abort	X	X
Reject	–	X
Status	X	X
Identify	X	X
Read	X	X
Write	X	X
physical – Read	X	X
physical – Write	X	X
Information-Report	X	X
Get-OV	X ¹⁾	X
Initiate-Put-OV	–	X
Put-OV	–	X
Terminate-Put-OV	–	X
FMA7 Event	X ¹⁾	X
FMA7 Initiate	–	X
FMA7-Abort	–	X
Initiate-Load-KBL-Rem	–	X
Load-KBL-Rem	–	X
Terminate-Load-KBL-Rem	–	X
Read-KBL-Rem	–	X
Set-Value-Rem	–	X
Read-Value-Rem	–	X
Ident-Rem	–	X
LSAP-Status-Rem	–	X
¹⁾ Not accessible to the user		

Table key:

- X = function is supported
- – = function is not supported

3.2 Object Types

Object Types	supported
Single variables	X
Array	X
Record	X
Variable List	–

3.3 Data Types

Designation	ID
Boolean ⁽¹⁾	1
Integer8	2
Integer16	3
Integer32	4
Unsigned8	5
Unsigned16	6
Unsigned32	7
Floating Point ⁽¹⁾	8
Visible String ⁽¹⁾	9
Octet String	10
Date ⁽¹⁾	11
Time-of-Day ⁽¹⁾	12
Time Difference ⁽¹⁾	13
Bit String ⁽¹⁾	14

⁽¹⁾ The support of these data types comprises the fact that these data types can be transferred via the PROFIBUS. The contents are not interpreted or monitored, however.

3.4 Connections

The COM-P communication module supports the following connection types:

Connection types		Client mode	Server mode
MMAZ	Master-Master, acyclic	X	X
MSAZ	Master-Slave, acyclic	X	X
MSAZ-SI	Master-Slave, acyclic, with Slave initiative	X	X
MSZY	Master-Slave, cyclic	X	X
MSZY-SI	Master-Slave, cyclic, with Slave initiative	X	X
MULTI	Multicast	X	X
BROAD	Broadcast	X	X

3.5 Communication Model for CL400 / CL500

In order to utilize standardized terminology with all CL400 / CL500 computer interface modules and the COM-P PROFIBUS communication module, and in a departure from the standard PROFIBUS nomenclature, the terms *centralized task* and *peripheral task* will be used in this text.

COM-P PROFIBUS-Module	PROFIBUS-Standard	Explanation
Centralized task	Client behaviour	Task issued by PLC program
Peripheral task	Server behaviour	Task received from communication partner

The user can access communications via a PLC interface that is implemented with the aid of function modules.

The data exchange between the COM-P and a central processing unit is handled via the central peripheral bus.

3.6 PLC Interface

The PLC interface comprises the access to communications, and is implemented with the aid of the following function modules:

- R5INIT
- R5REQ
- R5CON
- R5IND

The PLC interface provides the option to issue requests to the COM-P (client behaviour of the CL400 / CL500), or to monitor the execution of requests that were issued by the communication partner (server behaviour of the CL400 / CL500). In addition, events that have occurred are indicated.

The function modules do not provide a request monitoring function (timeout). This function is handled by the firmware of the COM-P communication module..

As an additional feature, the PROFIBUS provides a connection monitoring option. Within definable time intervals, this function provides for a verification by communications whether or not the connection with the communication partner still exists.

Any break in the connection is indicated to the user by the R5IND function module.

 **In the event that the COM-P communication module is operated purely as a server or slave, the use of function modules will not be required.**

Notes:

A Appendix

A.1 Abbreviations

Abbreviation	Explanation
C:	Drive identification letter, here: drive C:\ (hard disk drive)
EGB	Electrostatically endangered module
ESD	Electrostatic discharge Abbreviation used with all terms referring to electrostatic discharges, such as ESD protection, ESD hazard, etc.
EZ	Extended input
PE	Protective earth conductor

A.2 PLC Terminology, German / English

Operanden/Operands

Deutsch		Englisch	
AST	Anwender-Stack	AST	Application stack
AWP	Anwenderprogrammzähler	UPP	User program pointer counter
A	Ausgang	O	Output
AZ	Ausgangszusatzfeld	EO	Extended output
D	Datum	D	Data
DB	Datenbaustein	DM	Data module
DF	Datenfeld	DF	Data field
DP	Datenpuffer	DB	Data buffer
E	Eingang	I	Input
EZ	Eingangszusatzfeld	EI	Extended input
F	Fehler	E	Error
FI	FIFO-Operand (Warteschlange)	FI	FIFO operand
IA	Interface-Ausgang	IO	Interface output
IE	Interface-Eingang	II	Interface input
K	Konstante	K	Constant
KD	Doppelwort-Konstante	KD	Constant double word
KF	Gleitkomma-Konstante	KF	Constant floating point
KME	Koordinierungsmerker einfach	CFS	Coordination flag single
KMP	Koordinierungsmerker permanent	CFP	Coordination flag permanent
Kx.y	Zeitkonstante	Kx.y	Constant of time
M	Merker	M	Marker
'nr'	Parameternummer	'nr'	Number as parameter
P	Parameter	P	Parameter
PI	Peripherieinterrupt	PI	Peripheral interrupt
S	Systembereich	S	System range
SI	Systeminterrupt	SI	System interrupt
SM	Sondermerker	SM	Special marker
T	Zeit	T	Time
TI	Zeitinterrupt	TI	Time interrupt
Z	Zähler	C	Counter
\$	direkte Adreßeingabe der Befehle L und T	\$	Operand absolute
-xx	Symbolischer Operand	-xx	Symbol

Befehle/Instructions

Deutsch		Englisch	
ADC	Addition mit Carry	ADC	Addition with carry
ADD	Addition	ADD	Addition
AF	Alarm freigeben	AE	Alarm enable
AS	Alarm sperren	AD	Alarm disable
BA	Baustein aufruf unbedingt	CM	Call module
BAAG	Baustein aufruf arithmetisch größer, AG=1	CMAG	Call module arithmetical greater, AG=1
BAB	Baustein aufruf bedingt, VKE=1	CMC	Call module conditional, RES=1
BAC	Baustein aufruf Carry, C=1	CMCY	Call module carry, C=1
BACN	Baustein aufruf Carry nicht, C=0	CMCN	Call module carry not, C=0
BACZ	Baustein aufruf Carry oder Null, C=1 oder Z=1	CMCZ	Call module carry or zero, C=1 or Z=1
BAI	Baustein aufruf invers, VKE=0	CMCI	Call module conditional invers, RES=0
BALG	Baustein aufruf logisch größer, LG=1	CMLG	Call module logical greater, LG=1
BAM	Baustein aufruf Minus, N=1	CMM	Call module minus, N=1
BAMZ	Baustein aufruf Minus oder Null, N=1 oder Z=1	CMMZ	Call module minus or zero, N=1 or Z=1
BAN	Baustein aufruf nicht Null, Z=0	CMN	Call module not zero, Z=0
BAO	Baustein aufruf Overflow, O=1	CMO	Call module overflow, O=1
BAON	Baustein aufruf Overflow nicht, O=0	CMON	Call module overflow not, O=0
BAP	Baustein aufruf Plus, N=0	CMP	Call module plus, N=0
BAX	Baustein aufruf im zweiten Segment	CMX	Call module into second segment
BAZ	Baustein aufruf Null, Z=1	CMZ	Call module zero, Z=1
BE	Baustein ende unbedingt	EM	End of module
BEAG	Baustein ende arithmetisch größer, AG=1	EMAG	End of module arithmetical greater, AG=1
BEB	Baustein ende bedingt, VKE=1	EMC	End of module conditional, RES=1
BEC	Baustein ende Carry, C=1	EMCY	End of module carry, C=1
BECN	Baustein ende Carry nicht, C=0	EMCN	End of module carry not, C=0
BECZ	Baustein ende Carry oder Null, C=1 oder Z=1	EMCZ	End of module carry zero, C=1 or Z=1
BEI	Baustein ende invers, VKE=0	EMI	End of module invers, RES=0
BELG	Baustein ende logisch größer, LG=1	EMLG	End of module logical greater, LG=1
BEM	Baustein ende Minus, N=1	EMM	End of module minus, N=1
BEMZ	Baustein ende Minus oder Null, N=1 oder Z=1	EMMZ	End of module minus Zero, N=1 or Z=1
BEN	Baustein ende nicht Null, Z=0	EMN	End of module not zero, Z=0
BEO	Baustein ende Overflow, O=1	EMO	End of module overflow, O=1
BEON	Baustein ende Overflow nicht, O=0	EMON	End of module overflow Not, O=0
BEP	Baustein ende Plus, N=0	EMP	End of module plus, N=0
BEZ	Baustein ende Null, Z=1	EMZ	End of module zero, Z=1
BID	Wandlung Binär in Dezimal	BID	Binary to decimal conversion
BLA	Block anfang	SBL	Start of block
BLAA	Block anfang absolut	SBLA	Start of block absolute

Deutsch		Englisch	
BLE	Blockende	EBL	End of block
BX	2. Datenbaustein aufruf	CX	2nd call data module
BXB	2. Datenbaustein aufruf bedingt, VKE=1	CXC	2nd call data module conditional, RES=1
BXI	2. Datenbaustein aufruf bedingt invers VKE=0	CXCI	2nd call data module conditional invers, RES=0
CH	Tausche unbedingt	CH	Change
CHAG	Tausche arithmetisch größer, AG=1	CHAG	Change arithmetical greater, AG=1
CHB	Tausche bedingt, VKE=1	CHC	Change conditional, RES=1
CHC	Tausche Carry, C=1	CHCY	Change carry, C=1
CHCN	Tausche Carry nicht, C=0	CHCN	Change carry not, C=0
CHCZ	Tausche Carry oder Null, C=1 oder Z=1	CHCZ	Change carry or zero, C=1 or Z=1
CHI	Tausche bedingt invers, VKE=0	CHCI	Change conditional invers, RES=0
CHLG	Tausche logisch größer, LG=1	CHLG	Change logical greater LG=1
CHM	Tausche Minus, N=1	CHM	Change minus, N=1
CHMZ	Tausche Minus oder Null, N=1 oder Z=1	CHMZ	Change minus or zero, N=1 or Z=1
CHN	Tausche nicht Null, Z=0	CHN	Change not zero, Z=0
CHO	Tausche Overflow, O=1	CHO	Change overflow, O=1
CHON	Tausche Overflow nicht, O=0	CHON	Change overflow not, O=0
CHP	Tausche Plus, N=0	CHP	Change plus, N=0
CHZ	Tausche Null, Z=1	CHZ	Change zero, Z=1
CLSB	Lösche Systembefehle	CLSI	Clear system instruction
CMP	Zweier-Komplement	TC	Tow's complement
DBA	Baustein aufruf registerindirekt	DCM	Dynamical call module
DEB	Wandlung Dezimal in Binär	DEB	Decimal to binary conversion
DEC	Dekrement	DEC	Decrement
DEF	Definition	DEF	Define
DEFW	Definition Wort	DEFW	Define word
DI	Sperrern Interruptgruppe	DAI	Disable all interrupts
DIV	Division	DIV	Division
DX		DX	
EI	Freigeben Interruptgruppe	EAI	Enable all interrupts
ERE	Anwenderereignis erreicht	EVA	Event achieved
ERH	Anwenderereignis anfordern im Hintergrund	EVB	Event instruction background
ERS	Anwenderereignis anfordern im Hintergrund mit Systeminterrupt	EVS	Event with system interrupt
ERU	Anwenderereignis anfordern unmittelbar	EVD	Event instruction directly
EXC	Tausche Registerinhalt	EXC	Exchange
FF	Feld freigeben	FR	Field release
FS	Feld schützen	FS	Field save
G	Größer	GT	Greater than

Deutsch		Englisch	
GG	Größer oder gleich	GTE	Greater than or equal
GL	Gleich	EQ	Equal
HLT	Halt	HLT	Halt
IF	Interrupt freigeben	EI	Enable interrupt
INC	Inkrement	INC	Increment
IR	Interrupt rücksetzen (löschen)	RI	Reset interrupt
IS	Interrupt sperren	DI	Disable interrupt
K	Kleiner	LT	Less than
KG	Kleiner oder gleich	LTE	Less than or equal
KL	Kleiner	LT	Less than
L	Laden	L	Load
LABB	Laden Inhalt des Abbildbereiches	LIMR	Load image range
LAH	Laden absolut adressiert im Hintergrund	LAB	Load absolut range in background
LAS	Laden absolut adressiert im Hintergrund mit Systeminterrupt	LAS	LAB with system interrupt
LAU	Laden absolut adressiert unmittelbar	LAD	Load absolut range directly
LFH	Laden feldadressiert im Hintergrund	LFB	Load field in background
LFI	Laden aus FIFO-Speicher	LFI	Load from FIFO
LFS	Laden feldadressiert im Hintergrund mit Systeminterrupt	LFS	LFB with system interrupt
LFU	Laden feldadressiert unmittelbar	LFD	Load field directly
LI	Laden Interruptregister der Interruptgruppe	LAI	Load all interrupts
LM	Laden der Interruptmaske	LIM	Load interrupt mask
LMB	Laden des Inhalts des Memorybereiches	LMB	Load memory band
LMBX	LMB im zweiten Segment	LMBX	LMB into second segment
LO	Leer Oder, entspricht: O(	LO	Empty logical or, O=(
LPB	Laden Peripherie Bus	LPB	Load periphery bus
LPC	Laden Programmzähler	LPC	Load program counter
LSP	Laden Stack Pointer	LSP	Load stack pointer
LUZ	Laden Uhrzeit zyklisch	LCC	Load clock cyclical
LUZS	Laden Uhrzeit zyklisch mit Systeminterrupt	LCCS	LCC with system interrupt
LZS	Laden Zeit-Sollwert	LNT	Load normalize time
MUL	Multiplikation	MUL	Multiplication
N	Einer-Komplement	N	Negation, one's complement
NOP0	Leeranweisung 0, 0000H	NOP0	No operation, 0000H
NOP1	Leeranweisung 1, FFFFH	NOP1	No operation, FFFFH
O	Oder	O	Or
ON	Oder nicht	ON	Or not
O(	Oder Klammer auf	O(	Empty logical or, O(
P	Prüfe Bit	TST	Test

Deutsch		Englisch	
PE	Programmende	EP	End of program
Pi	Parameterfestlegung bei parametrisierten Bausteinaufruf, i='nr'	Pi	Parameter line, i='nr'
PN	Prüfe negiert Bit	TSTZ	Test on zero
POP	Transferiere vom Stack	POP	Transfer out from stack
PSi	Parameterfestlegung bei Systembefehlen, i='nr'	PSi	Parameter line of system instructions, i='nr'
PUSH	Lade auf Stack	PUSH	Load into stack
R	Rücksetzen	R	Reset
RC	Rücksetze Carry Flag	RCY	Reset carry
RCL	Rotieren links durch Carry	RCL	Rotate through carry left
RCR	Rotieren rechts durch Carry	RCR	Rotate through carry right
RFI	Rücksetzen FIFO (Lösche FIFO)	RFI	Reset FIFO
RI	Rücksetzen der Interruptregister der Interruptgruppe	RAI	Reset all interrupts
ROL	Rotieren links	ROL	Rotate left
ROM	Rücksetzen ohne Monitoranzeige	RWM	Reset without monitoring
ROR	Rotiere rechts	ROR	Rotate right
RT	Rücksetzen Zeit	RT	Reset time
RZ	Rücksetzen Zähler	RC	Reset counter
S	Setzen	S	Set
SA	Starte Zeit als Ausschaltverzögerung	SF	Start time as falling delay
SAR	Schiebe arithmetisch rechts	SAR	Shift arithmetical to right
SBB	Subtraktion mit borgen	SBB	Subtraction with borrow
SC	Setze Carry Flag	SCY	Set carry
SE	Starte Zeit als Einschaltverzögerung	SR	Start time as raising delay
SI	Starte Zeit als Impuls	SP	Start time as puls
SINT	Sende Interrupt	SINT	Send interrupt
SLL	Schiebe logisch links	SLL	Shift logical to left
SLR	Schiebe logisch rechts	SLR	Shift logical to right
SOM	Setzen ohne Monitoranzeige	SWM	Set without monitoring
SP	Sprung unbedingt	JP	Jump
SPAG	Sprung arithmetisch größer, AG=1	JPAG	Jump arithmetical greater, AG=1
SPB	Sprung bedingt, VKE=1	JPC	Jump conditional, RES=1
SPC	Sprung Carry, C=1	JPCY	Jump carry, C=1
SPCN	Sprung Carry nicht, C=0	JPCN	Jump carry not
SPCZ	Sprung Carry oder Null, C=1 oder Z=1	JPCZ	Jump carry or zero, C=1 or Z=1
SPI	Sprung bedingt invers, VKE=0	JPCI	Jump conditional invers, RES=0
SPLG	Sprung logisch größer, LG=1	JPLG	Jump logical greater, LG=1

Deutsch		Englisch	
SPM	Sprung Minus, N=1	JPM	Jump minus, N=1
SPMZ	Sprung Minus oder Null, N=1 oder Z=1	JPMZ	Jump minus or zero, N=1 or Z=1
SPN	Sprung nicht Null, Z=0	JPN	Jump not zero, Z=0
SPO	Sprung Overflow, O=1	JPO	Jump overflow, O=1
SPON	Sprung Overflow nicht, O=0	JPON	Jump overflow not, O=0
SPP	Sprung Plus, N=0	JPP	Jump plus, N=0
SPZ	Sprung Null, Z=1	JPZ	Jump zero, Z=1
SS	Starte Zeit als speichernde Einschaltverzögerung	SRE	Start time as raising delay extended
SUB	Subtraktion	SUB	Subtraction
SV	Starte Zeit als verlängerter Impuls	SPE	Start puls extended
SWAP	Vertausche Hi-/Lo-Byte im Register	SWAP	Interchange operand bytes
SYN	Synchronisationspunkt erreicht	SYN	Synchronisation point achieved
SZ	Setze Zähler	SC	Set counter
T	Transfer	T	Transfer
TABB	Transferiere in den Abbildbereich	TIMR	Transfer image range
TAH	Transfer absolut adressiert im Hintergrund	TAB	Transfer absolut range in background
TAS	Transfer absolut adressiert im Hintergrund mit Systeminterrupt	TAS	TAB with system interrupt
TAU	Transfer absolut adressiert unmittelbar	TAD	Transfer absolut range directly
TDEC	Zeit dekrementieren	TDEC	Time decrement
TFH	Transfer feldadressiert im Hintergrund	TFB	Transfer field in background
TFI	Transfer in FIFO-Speicher	TFI	Transfer FIFO
TFS	Transfer feldadressiert im Hintergrund mit Systeminterrupt	TFS	TFB with system interrupt
TFU	Transfer feldadressiert unmittelbar	TFD	Transfer field directly
TH	Zeit halt	TH	Timer halt
TM	Transfer der Interruptmaske	TIM	Transfer interrupt mask
TMB	Transfer in Memory-Bereich	TMB	Transfer memory band
TMBX	TMB im zweiten Segment	TMBX	TMB into second segment
TPB	Transfer Peripherie Bus	TPB	Transfer periphery bus
TSP	Transferier Stack Pointer	TSP	Transfer stack pointer
U	Und	A	And
UG	Ungleich	NEQ	Not equal
UN	Und nicht	AN	And not
VGL	Vergleichen logisch	CPL	Compare logical
VGLA	Vergleichen logisch und arithmetisch	CPLA	Compare logical and arithmetical
WE	Wecken	AB	Alarm bell request
WES	Wecken mit Systeminterrupt	ABS	AB with system interrupt
WEZ	Wecken zyklisch	ABC	Alarm bell request cyclical

Deutsch		Englisch	
WEZS	Wecken zyklisch mit Systeminterrupt	ABCS	ABC with system interrupt
XO	Exklusiv Oder	XO	Exclusive or
XON	Exklusiv Oder nicht	XON	Exclusive or not
ZR	Zähle rückwärts	CD	Count down
ZV	Zähle vorwärts	CU	Count up
=	Zuweisung	=	Equal-to sign
=OM	Zuweisung ohne Monitoranzeige	=WM	Equal without monitoring
*	Hilfsmarke setzen	*	Set help label
(	Klammer auf	(	Left bracket
)	Klammer zu	)	Right bracket
)N	Klammer zu negiert	)N	Right bracket with negation

Bausteine/Moduls

Deutsch		Englisch	
ASS	Assemblerbaustein	ASS	Assembler module
DB	Datenbaustein	DM	Data module
FB	Funktionsbaustein	FM	Function module
OB	Organisationsbaustein	OM	Organisation module
PB	Programmbaustein	PM	Program module
ZB	Zusatzbaustein	EM	Extended module

Sonstige Software-Begriffe/Other software notions

Deutsch		Englisch	
AWL	Anweisungsliste	IL	Instruction list
FUP	Funktionsplan	FUD	Function diagram
KPL	Kontaktplan	LD	Ladder diagram
OKN	Operandenkennzeichen	OID	Operand identifier
OPD	Operand	OPD	Operand
OPE	Operandenergänzung	OPA	Operand attribute
OPR	Operator	OPR	Operator
OPT	Operationsteil	OPP	Operation part
PA	Programmanweisung	PI	Program instruction
PAE	Parameterergänzung	PAA	Parameter attribute
PAR	Parameter	PAR	Parameter
PZ	Programmzweig	RG	Programm rung
Q	Quelloperand	SRC	Source operand
WSB	Weiterschaltbedingung		Step-on condition
Z	Zieloperand	DEST	Destination operand

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