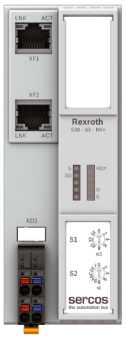
S20 bus coupler for Sercos

R911342782
Edition 03

Data sheet S20-S3-BK+



Sercos controller board
modular extensions possible using S20 modules

12 / 2023

1 Description

The bus coupler is intended for use within a third-generation Sercos® network.
The bus coupler is the link to the S20 system and the industrial I/O signals connected to it.
Up to 63 S20 devices can be connected to the bus coupler.
A corresponding SDDML file is available for integrating the S20 station into the programming system. This file can be downloaded at www.boschrexroth.com/electrics.

Features

- 2 Ethernet ports (with integrated switch)
- Rotary coding switches for setting the Sercos address
- Certified in accordance with Sercos V1.12
- Supports Sercos V1.31
- FSP-IO (Function Specific Profile-IO) for modular I/O devices
- Minimum Sercos III cycle time of 31.25 µs
- 8 connections (max. 4 consumer and max. 4 producer connections)
- Cross communication is possible up to reaching the maximum number of connections
- Synchronization between fieldbus and local bus
- The typical cycle time of the S20 system bus is around 10 µs
- Runtime in bus coupler is negligible (almost 0 µs)
- IOL-CONF supported (from index AF1)

Valid from index AE1.

This data sheet is only valid in association with the application description for the S20 system, material number R911335988.

Make sure you always use the latest documentation.
It can be downloaded under www.boschrexroth.com/electrics.

2 Table of contents

3 Ordering data

Description	Type	MNR	Pcs./Pkt.
S20 bus coupler for Sercos	S20-S3-BK+	R911173318	1

Accessories	Type	MNR	Pcs./Pkt.
S20 bus base module	S20-BS-BK	R911173392	5
Sercos III cabel, 100-Base-T, CAT5E, S/STP RJ-45 <-> RJ-45 connector, 8-wire, twisted pair			
Length: 0.25 m	RKB0013/00,25 (*******-*******-*******)	R911317797	1
Length: 0.35 m	RKB0013/00,35 (*******-*******-*******)	R911317800	1
Length: 0.55 m	RKB0013/00,55 (*******-*******-*******)	R911317801	1
Sercos III cabel, 100-Base-T, CAT5E, shielded RJ-45 <-> RJ-45 connector, 4-wire			
Length: 2 m	RKB0011/002,0 (RBS0016-REB0400-RBS0016)	R911342087	1
Length: 5 m	RKB0011/005,0 (RBS0016-REB0400-RBS0016)	R911321548	1
Length: 10 m	RKB0011/010,0 (RBS0016-REB0400-RBS0016)	R911338772	1
Length: 20 m	RKB0011/020,0 (RBS0016-REB0400-RBS0016)	R911342096	1
Additional lengths available on request			

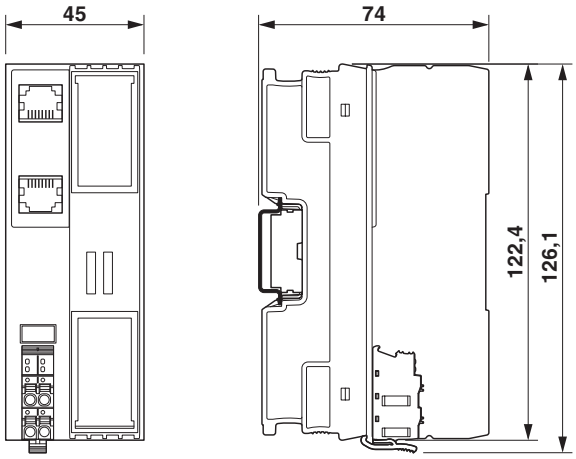
Documentation	Type	MNR	Pcs./Pkt.
Application description S20: System and Installation	DOK-CONTRL-S20*SYS*INS-AP..-EN-P	R911335988	1
Application description S20: Error Messages	DOK-CONTRL-S20*DIAG*ER-AP..-EN-P	R911344826	1
Project planning manual Security manual	DOK-IWORKS-SECURITY***-PR..-EN-P	R911342562	1

Additional ordering data

For additional ordering data (accessories), please refer to the product catalog at www.boschrexroth.com/electrics.

4 Technical data

Dimensions (nominal sizes in mm)	



Width	45 mm
Height	126.1 mm
Depth	74 mm
Note on dimensions	The depth applies when a TH 35-7.5 DIN rail is used (in accordance with EN 60715).

General data	
Color	Housing: light grey (RAL 7035)
Weight	177 g (with connector and bus base module)
Ambient temperature (operation)	-25 °C ... 60 °C (Mounting position: wall mounting on horizontal DIN rail) -25 °C ... 55 °C (Mounting position: any)
Ambient temperature (storage/transport)	-40 °C ... 85 °C
Permissible humidity (operation)	5 % ... 95 % (non-condensing)
Permissible humidity (storage/transport)	5 % ... 95 % (non-condensing)
Air pressure (operation)	70 kPa ... 106 kPa (up to 3000 m above sea level)
Air pressure (storage/transport)	70 kPa ... 106 kPa (up to 3000 m above sea level)
Degree of protection	IP20
Protection class	III (IEC 61140, EN 61140, VDE 0140-1)
Overvoltage category	II (IEC 60664-1, EN 60664-1)
Degree of pollution	2 (IEC 60664-1, EN 60664-1)
Mounting type	DIN rail mounting
Mounting position	any (observe temperature derating)

Connection data: S20 connector	
Connection method	Push-in connection
Conductor cross section, rigid	0.2 mm² ... 1.5 mm²
Conductor cross section, flexible	0.2 mm² ... 1.5 mm²
Conductor cross section [AWG]	24 ... 16
Stripping length	8 mm

Observe the specifications for the conductor cross sections in the application description for the S20 system, material number R911335988.

Interface: Sercos	
Number of interfaces	2
Connection method	RJ45 jack (Auto negotiation and autocrossing)
Transmission speed	100 Mbps (full duplex)
Cycle Time	min. 31.25 µs (adjustable)
Transmission physics	Ethernet in RJ45 twisted pair
Transmission length	max. 100 m

Interface: Local bus	
Number of interfaces	1
Connection method	Bus base module
Transmission speed	100 Mbps

Interface: Service	
Number of interfaces	1
Connection method	USB type C (From index AG1) Micro USB type B (Up to index AF1)

System limits of the bus coupler	
Number of local bus devices that can be connected	max. 63

NOTICE **Electronics may be damaged when overloaded**

Observe the logic current consumption of each device when configuring anS20 station. It is specified in every module-specific data sheet. The current consumption can differ depending on the individual module. The permissible number of devices that can be connected therefore depends on the specific station structure.

Sercos	
Equipment type	Sercos slave
Device profile	FSP_IO
Sercos protocols	Sercos
Specification	Sercos specification 1.31

Supported protocols	
Supported protocols	Sercos, TFTP

Feed-in of the communications power U_L (the local bus supply (U_{Bus}) is generated from U_L)	
Supply voltage	24 V DC
Supply voltage range	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Current consumption	typ. 105 mA (Without I/O modules, U_L = 24 V, up to index AF1) typ. 85 mA (Without I/O modules, U_L = 24 V, from index AG1) max. 570 mA (2.0 A at U_{Bus}, U_L = 24 V, up to index AF1) max. 670 mA (2.5 A at U_{Bus}, U_L = 24 V, from index AG1)
Power consumption	typ. 2.5 W (Without I/O modules, U_L = 24 V, up to index AF1) typ. 2 W (Without I/O modules, U_L = 24 V, from index AG1) max. 13.7 W (2.0 A at U_{Bus}, U_L = 24 V, up to index AF1) max. 16 W (2.5 A at U_{Bus}, U_L = 24 V, from index AG1)
Surge protection	electronic
Reverse polarity protection	electronic

NOTICE **Electronics may be damaged when overloaded**

Provide external fuses for the 24 V U_L area. If you are using an external fuse, the power supply unit must be able to supply four times the nominal current of the fuse. This ensures that it trips in the event of an error.

Supply of the local bus (U_{Bus})	
Supply voltage	5 V DC (via bus base module)
Power supply unit	max. 2 A (Up to index AF1) max. 2.5 A (From index AG1)

Electrical isolation/isolation of the voltage areas	
Test section	**Test voltage**
Ethernet interface 1 / Ethernet interface 2	1500 V AC, 50 Hz, 1 min.
Ethernet interface 1 / 24 V communications voltage (U_L) feed-in	1500 V AC, 50 Hz, 1 min.
Ethernet interface 2 / 24 V communications voltage (U_L) feed-in	1500 V AC, 50 Hz, 1 min.
Ethernet interface 1 / functional ground	1500 V AC, 50 Hz, 1 min.
Ethernet interface 2 / functional ground	1500 V AC, 50 Hz, 1 min.
24 V communications voltage (U_L) feed-in / functional ground	500 V AC, 50 Hz, 1 min.

Mechanical tests	
Vibration resistance in accordance with EN 60068-2-6/IEC 60068-2-6	5g
Shock in accordance with EN 60068-2-27/IEC 60068-2-27	30g
Continuous shock in accordance with EN 60068-2-27/IEC 60068-2-27	10g

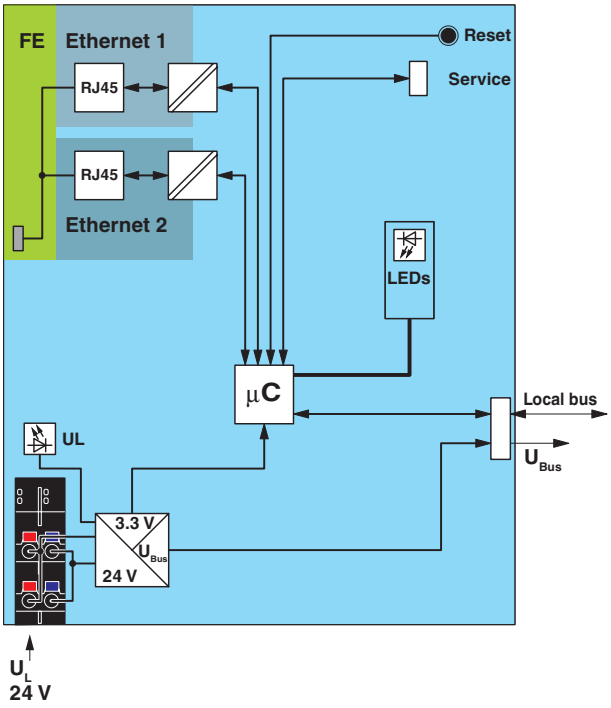
Conformance with EMC Directive 2014/30/EU	
Immunity test in accordance with EN IEC 61000-6-2	
Electrostatic discharge (ESD) IEC 61000-4-2	Criterion B, 6 kV contact discharge, 8 kV air discharge
Electromagnetic fields IEC 61000-4-3	Criterion A, Field intensity: 10 V/m
Fast transients (burst) IEC 61000-4-4	Criterion B, 2 kV
Transient overvoltage (surge) IEC 61000-4-5	Criterion B; DC supply lines: ±0.5 kV/±1.0 kV (symmetrical/ asymmetrical), fieldbus cable shielding: ±1.0 kV
Conducted interference IEC 61000-4-6	Criterion A, Test voltage 10 V
Noise emission test in accordance with EN IEC 61000-6-3	Class B

Approvals

For the current approvals, please visit www.boschrexroth.com/electrics.

5 Internal circuit diagram

Fig. 1 Internal wiring of the terminal points



Key:

FE	Functional ground
Ethernet 1/2	Sercos 1/2
Reset	Reset button
Service	Service interface
Local bus	Local bus
RJ45	RJ45 interface
	Power supply unit with electrical isolation
	Power supply unit
µC	Microcontroller
	LED
	Electrically isolated areas

6 IT security

NOTICE **Unauthorized network access possible**

Connecting devices to a network via Ethernet entails the danger of unauthorized access to the network.

To prevent unauthorized network access, please read the following notes.

If possible, deactivate unused communication channels.

Assign passwords such that third-parties cannot access the bus coupler and make changes without authorization.

Due to its communication interfaces, the bus coupler should not be used in safety-critical applications without additional security appliances.
Therefore, please take additional protective measures in accordance with the IT security requirements and the standards applicable to your application (e.g. virtual networks (VPN) for remote maintenance access, firewalls, etc.) for protection against unauthorized network access.

The operation of installations, systems and machines requires the implementation of an integral concept for state-of-the-art IT security. Bosch Rexroth products are part of this integral concept. Bosch Rexroth product characteristics have to be taken into consideration in an integral IT security concept. The relevant characteristics are documented in the IT security guideline DOK-IWORKS-SECURITY***-PR..-EN-P (R911342562).

7 For your safety

7.1 Intended use

Only use S20 modules in accordance with the information in this data sheet and in the application description for the S20 system, material number R911335988.

If the equipment is used in a manner not specified, the protection provided by the equipment may be impaired.

7.2 Qualification of users

The use of products described in this data sheet is oriented exclusively to electrically skilled persons or persons instructed by them. The users must be familiar with the relevant safety concepts of automation technology as well as applicable standards and other regulations.

7.3 Electrical safety

WARNING **Loss of electrical safety**

If used incorrectly, device safety may be impaired.

During installation, startup, and operation, observe the notes in this data sheet and the specifications in the application description for the S20 system, material number R911335988.

7.4 Installation

Only install the S20 modules in a control cabinet or junction box.

NOTICE **Fire hazard**

- The device must be installed in the final protective housing, which provides sufficient resistance to mechanical strain and protection against the spreading of fire in accordance with the standards UL/IEC/EN 61010-1 and UL/IEC/EN 61010-2-201.
- The supply and external circuits intended to be connected to this device shall be galvanically separated from the mains supply or hazardous live voltage by reinforced or double insulation and meet the requirements of SELV/PELV (Class III) circuits of UL/CSA/IEC/EN 61010-1, UL/CSA/IEC/EN 61010-2-201.

NOTICE **Damage to contacts or malfunction**

Physical overloads can result in damage to the terminal points.

- Relieve strain in the connected cables.

8 Connection of Sercos and supply

8.1 Connecting Sercos

Connect Sercos to the bus coupler via an RJ45 connector.

The Sercos connections are set to autocrossing (auto crossover).

Install Sercos in accordance with the specifications in the current “Planning and Installation Guide” (see www.sercos.com).

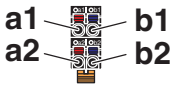
Shielding
The shield of the connected twisted pair cables is electrically connected to the RJ45 socket. When connecting network segments, avoid ground loops, potential transfers, and equipotential bonding currents via the braided shield.

Observe bending radii
The housing dimensions specified under "Dimensions" refer to the bus coupler with I/O connectors without Ethernet connection. When installing the bus coupler in a control box, observe the bending radii of the cables and the connectors used.

If required, use angled RJ45 connectors to maintain these bending radii.

8.2 Connecting the supply voltage - terminal point assignment

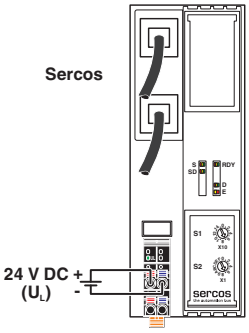
Fig. 2 Terminal point assignment



Terminal point	Color	Assignment	
Supply voltage input			
a1, a2	Red	24 V DC (U_L)	Communications power feed-in (bridged internally)
b1, b2	Blue	GND	Reference potential of the supply voltage (bridged internally)

9 Connection example

Fig. 3 Connection of the cables

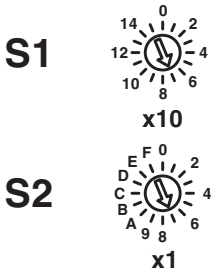


10 Configuration via rotary encoding switch

You can assign the address and configure other functions using the rotary encoding switches.

Every time you change the switch position, restart the bus coupler. A change of the switch position during operation has no effect.

Fig. 4 Rotary encoding switch



The code results from the sum of S1 x 10 plus S2 x 1. The image shows code 77 (7 x 10 + 7).

S1	S2	Code	Function
0	0	00	Remote address assignment
0 ... 15	0 ... 9	01 ... 159	Manual address assignment
12	C	12C	Resetting to the default settings
Other			Reserved

10.1 Remote address assignment

Switch position 00

The standard Sercos remote access is activated with this switch position, so that the bus coupler accepts an address assignment e.g., via the engineering system.

10.2 Manual address assignment

Switch position 01 ... 159

The devices are automatically assigned addresses as standard.

Set the Sercos address manually with this switch position. Remote address assignment, e.g., via an engineering tool, is deactivated.

10.3 Resetting to the default settings

Switch position 12C

All settings are reset to the delivery state.

The device is ready for operation after powering up, as soon as the RDY LED lights up green.
A connection to the device however cannot be established in this switch position.
As soon as the RDY LED lights up green, a new switch position can be selected on the rotary encoding switch and the device can be restarted.

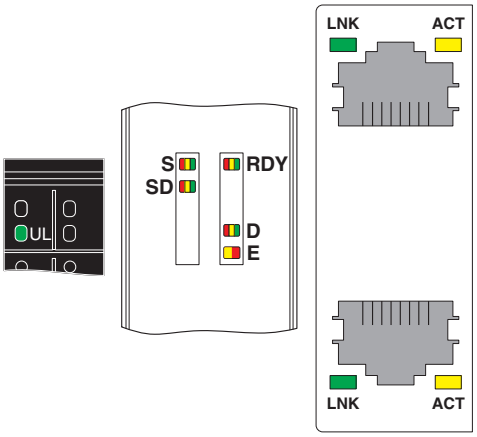
Alternatively, the default setting can also be restored via the reset button (see “Reset button”).

10.4 Reserved/invalid switch position

The device starts with the previous settings, e.g., with the settings that were valid before the device was restarted.

11 Local diagnostic and status indicators

Fig. 5 Local diagnostic and status indicators



Designation	Color	Meaning	State	Description
UL	Green	U_{Logic}	On	Communications power supply present.
			Off	Communications power supply not present.
S	Red/orange/green	Sercos	Off	NRT mode; no Sercos communication
			Orange on	CP0
			Flashing orange/green	CP1: 250 ms green, 2750 ms orange
			Flashing orange/green	CP2: 250 ms green, 250 ms orange, 250 ms green, 2250 ms orange
			Flashing orange/green	CP3: 250 ms green, 250 ms orange, 250 ms green, 250 ms orange, 250 ms green, 1750 ms orange
			Green on	CP4
			Flashing green	Loop back activated
			Flashing red/orange	User error; see chapter on "Diagnostics: bus and user errors"
			Flashing red/green	MST loss
			Red on	Communication error
			Flashing orange (2 Hz)	Identification (bit 15 in device control); is used for address assignment and configuration errors.
			Flashing red (2 Hz)	Watchdog error
SD	Red/orange/green	Sub Device	Green on	Sub device is on the operation level (OL)
			Orange on	Sub device is on the parameterization level (PL)
			Red on	Error in the sub device (C1D)
			Off	Sub device is not active.

Designation	Color	Meaning	State	Description
RDY	Green/ yellow/ red	Ready	Green on	Device is ready for operation.
			Flashing green/ yellow	Communications power undervoltage or surge voltage
				Overtemperature
			Yellow on	Firmware/bus coupler is booting.
			Flashing yellow	Firmware update is being performed.
			Flashing yellow/red	Firmware update has failed. Check the firmware file and the settings.
			Flashing red	Faulty firmware. Carry out a firmware recovery update.
			Red on	Rotary encoding switches are set to an invalid/reserved position.
			Off	Device is not ready to operate. Check the supply voltage.
D	Red/yellow/ green	Diagnostics of local bus communication		
		Run	Green on	The station is ready to operate; communication within the station is OK. All data is valid. An error has not occurred.
		Active	Flashing green	The station is ready to operate. Communication within the station is ok. The data are **not** valid. The controller or higher-level network is not providing valid data. The module is not malfunctioning.
			Flashing green/ red	A rest system will be operated; at least one device of the configuration is not available.
		Ready	Yellow on	The station is ready to operate. No data are being exchanged.
		Connected	Flashing yellow	Access via DTM in I/O check mode
			Flashing yellow/red	Local bus error during active I/O check
		Not connected	Flashing red	Local bus error on startup
				Possible causes:
				The configuration cannot be generated. Information from one device is missing.
				Chip version of a device is <V1.1
				The desired and actual configuration are different
				No local bus device connected
				The maximum number of local bus devices is exceeded.
		Reset	Red on	The station is ready for operation but has lost connection to at least one device.
				Possible causes:
				Communication error
				Local bus device has been removed or configured device is missing.
				Reset at a local bus device
				Serious device error at a local bus device (local bus device can no longer be reached)
		Power down	Off	Device is in (power) reset or in energy-saving mode.
E	Yellow/ red	Error	Yellow on	I/O warning at a local bus device
			Red on	I/O error at a local bus device
			Off	No I/O messages present.
LNK 1/2	Green	Link port 1/2	On	Connection via Ethernet to a module via port 1/2 established
			Off	No connection established via port 1/2
ACT 1/2	Yellow	Activity port 1/ 2	Flashing	Transmission or reception of Ethernet telegrams at port 1/2
			Off	No transmission or reception of Ethernet telegrams at port 1/2

12 Sercos

12.1 Realtime connections

The module supports a maximum of eight realtime data connections (S-0-1050.0.x to S-1050.7.x), with a maximum of four consumer and four producer connections.

12.2 Sercos profile, classes and function groups

The following Sercos profile, classes and function groups are implemented in the module:

Sercos device model (GDP: Generic Device Profile)

- Basis device model (GDP_Basic)
  - Diagnostics (FG_Diagnosis)
  - Administration (FG_Administration)
  - Device identification (FG_Identification)
- Identification (GDP_Id)
- Function/Hardware/Firmware/Firmware loader version (GDP_Rev)
- Password (GDP_PWD)
- State machine (GDP_StM)
  - State machine (FG_StateMachine)
- Diagnosis trace (GDP_DiagT)
- Diagnosis trace advanced (GDP_DiagTAdv)
- Energy status (GDP_EnS)
  - Energy (FG_Energy)
- Energy control basic (GDP_EnCBasic)
  - Energy (FG_Energy)

Sercos communication model (SCP: Sercos Communication Profiles)

- Variable configuration (SCP_VarCfg, SCP_VarCfg_0x02, SCP_VarCfg_0x03)
  - Identification of SCP classes (FG SCP Identification)
  - Control of communication phases (FG Control)
  - Telegram structure (FG Telegram Setup)
  - Parameters for producer-consumer connection (FG Connection)
  - Bus diagnostics (FG Bus-Diagnostics)
  - Parameters for the non-realtime channel (FG NRT)
  - Timing behavior of the communication (FG Timing)
- Synchronous and isochronous producer and consumer data (SCP_Sync, SCP_Sync_0x02)
- Diagnostics (SCP_Diag)
  - Control of communication phases (FG Control)
  - Bus diagnostics (FG Bus-Diagnostics)
- Non-realtime channel (SCP_NRTPC)
  - Parameters for the non-realtime channel (FG NRT)
- Consumer connection monitoring; Watchdog (SCP_WDCon)
  - Parameters for the producer-consumer connection (FG Connection)
- Support for SCP_TFTP
- Cyclic communication (SCP_Cyc)

Sercos function model (FSP: Function Specific Profile I/O)

- I/O function profile (FSP_IO)

12.3 Electronic rating plate

The electronic rating plate comprises the IDNs S-0-1300.x.y. See the table in the “Sercos parameter” section.

12.4 Mapping of I/O modules in Sercos

The local bus devices are assigned to the I/O function groups and structure instances according to the Sercos I/O profile.

A structure instance (slot) can consist of an I/O function group or several I/O function groups (for example devices with inputs and outputs).

The first local bus device occupies slot 1 (structure instance 1), the second occupies slot 2 (structure instance 2), etc.

When assigning the inputs and outputs to the container input data (S-0-1500.0.09) or to the container output data (S-0-1500.0.05), the input and output process data is always mapped in byte limits in the container according to the Sercos I/O profile.

The number of bytes of the containers is always even.

The following function groups are defined:

Function group (FG_IO)	Name
S-0-1501	I/O function group unknown
S-0-1502	I/O function group digital output
S-0-1503	I/O function group digital input
S-0-1504	I/O function group analog output
S-0-1505	I/O function group analog input
S-0-1506	I/O function group counter
S-0-1507	I/O function group complex protocol
S-0-1508	I/O function group sub bus master
S-0-1509	I/O function group sub bus slave
S-0-1512	I/O function group PLC module
S-0-1513	I/O function group motor starter
S-0-1514	I/O function group PWM (pulse width modulation)
S-0-1515	I/O function group positioning
S-0-1516	I/O function group passive

The bus coupler supports the following IDNs as configurable data:

In a producer connection	In a consumer connection
S-0-1500.0.02	S-0-1500.0.01
S-0-1500.0.09	S-0-1500.0.05
FG_IO.x.9	FG_IO.x.5
FG_IO.x.13	FG_IO.x.11
S-0-0390	
S-0-1500.0.32	
S-0-1500.0.33	
This information is stored in the IDNs:	
S-0-0187	S-0-0188

12.5 Synchronization mechanisms of the bus coupler

The bus coupler offers three synchronization mechanisms. These are standardized according to the Sercos specification and are configured by the Sercos master.

The modules, which support a synchronization method, are stored in IDN S-0-1050.x.13.

Module-specific restriction:
For module S20-DI-16/4-DO-8/3-HS / R911173845, bus-synchronous operation is only possible for cycle times < 5 ms.

Asynchronous mode

The local bus, which is at a lower level to the bus coupler, runs asynchronously to the higher-level Sercos bus.

Clock-synchronous mode

The local bus, which is at a lower level to the bus coupler, runs synchronously to the higher-level Sercos bus.

The input and output data is read in or output at a time determined by the master.

In doing so, the runtimes of the S20 modules are taken into consideration.

Cyclic mode

The local bus, which is at a lower level to the bus coupler, runs synchronously to the higher-level Sercos bus.

The output data is output as quickly as possible and the input data is read in as late as possible.

In doing so, the runtimes of the S20 modules are taken into consideration.

12.6 Diagnostics: bus and user errors

Sercos diagnostic code (IDN S-0-0390.0.0) [hex]	Message	Meaning	Corrective
Local bus error			
C10F.B001	Local bus device is missing	Device not present	Install the device or check the contacts and replace a defective device, if necessary.
C10F.B002	Incorrect local bus device present	Wrong device	An incorrect device was detected at the specified location. Check the contacts, replace a defective device, if necessary or adapt the configuration.
C10F.B004	Local bus modules amount error	Additional device	An additional device was detected at the specified location. Check the local bus structure or adjust the configuration.
C10E.B012	Local bus device peripheral or application error	Error in a local bus device	See corresponding data sheet.
C10F.B030	IO process data amount error	Maximum number of permissible I/O points exceeded	Reduce the local bus structure.
C10F.B041	Local bus hardware error	Hardware fault	Replace the device.
C10F.B043	Sync mode not possible, fallback asynchronous	Synchronous mode is not possible, fallback: asynchronous mode	Replace the device with a device that supports synchronous mode or work in asynchronous mode.
Device error			**Read out via IDN 1500.0.32 to ascertain which device and possibly which channel is affected and check the contact, parameterization and function.**
C10F.B012	Application not ready	Application on device not ready	Check the specified channel of the device, the devices connected to the module, the parameters of the specified device as well as the connected sensors and actuators. Delay the start after power on or replace the device. See corresponding data sheet.
C10F.B013	Local bus device power on reset	Local bus devices causes a restart	The specified device executed a reset due to a fault or insufficient voltage supply. Check the power supply. Find the cause by checking the power supply to the devices and check whether they conform to the nominal value of the permissible AC component. Check the power supply unit of the bus coupler for overload (see corresponding data sheet).

Sercos diagnostic code (IDN S-0-0390.0.0) [hex]	Message	Meaning	Corrective
Transmission error			**Check the system and replace devices, if necessary.**
C109.B022	Communication error	Multiple transmission error	Bus errors occurred. The system has transmission errors. Check the segment, shielding of the bus cables, grounding/equipotential bonding, connectors, communications power (for power drops), FO assembly, as well as the remote bus devices and whether the devices are aligned correctly.
C10F.B023	Data communication error	I/O communication error	Check the system, shielding of the bus cables, connectors, grounding/equipotential bonding, voltage supply of the periphery and the voltage supply of the inputs/outputs. Replace devices if necessary.
C10F.B024	Management communication error	Strong interference in local bus communication	Check the system, shielding of the bus cables, connectors, grounding/equipotential bonding, voltage supply of the periphery and the voltage supply of the inputs/outputs. Replace devices if necessary.
Configuration errors			
C10F.B030	Configuration error	Configuration errors	The configuration is invalid. Replace device or modify configuration.
General errors			
C10F.B041	Hardware error	Hardware fault	Replace the device.
C10F.B042	Firmware error	Firmware error	Replace the device.
C10F.B043	Local bus is running asynchronously (in relation to the Sercos bus cycle)	Local bus is running asynchronously (in relation to the Sercos bus cycle)	Check the time parameters and adapt them, if necessary.
Manufacturer-specific errors			
400F.0A73	Not supported local bus slave at slot: x	S20 module at slot x is not supported; x = slot of the first non-supported module	At least one old, non-supported module is located in the S20 station. Replace the module for a module with a current hardware/firmware version.

12.7 Diagnose: periphery and channel error

Periphery and channel error can only occur once for each I/O module or channel.

In accordance with the Sercos specification, errors and messages are mapped in the following IDNs:

- Entry depending on error code in IDN S-0-0390 as well as S-0-1500.x.32 and S-0-1500.x.33
- Bit 7 is set in IDN S-0-1045.
- Bit 13 is set in IDN S-0-1500.x.02.
- Text message in IDN S-0-0095.
- Entry in IDN S-0-1303.0.10, S-0-1303.0.11, and S-0-1303.0.12

You can also read out module-specific diagnostics via IDN P-1-0024.x.0.

Access PDI object 0018_{hex} (DiagState) with IDN P-1-0024.x.0 via the mapping method. See “Mapping method” section and module-specific data sheet.

12.8 Sercos address

You can configure the Sercos address assignment manually or remotely, see section “Configuration via rotary coding switch”.

The Sercos address is saved retentively.

For an automatic address assignment description, please refer to the documentation of your Sercos master.

12.9 Password (IDN/S-0-0267)

In the default setting some module parameters are write-protected with a password.

The default password is PW170875.

The following IDNs are password protected:

IDN	Description
P-0-2000.0.1	Update procedure command

13 Sercos parameter

The following table lists all Sercos parameters (S parameters) with important features that have been implemented into the bus coupler.

IDN	Name	Default values	Unit
S-0-0000	Dummy IDN	-	-
S-0-0014	Interface status	-	-
S-0-0017	IDN-list of all operation data	-	-
S-0-0021	IDN-list of invalid operation data for CP2	-	-
S-0-0022	IDN-list of invalid operation data for CP3	-	-
S-0-0025	IDN-list of all procedure commands	-	-
S-0-0095	Diagnostic message	-	-
S-0-0099	Reset class 1 diagnostic (process command)	-	-
S-0-0127	CP3 transition check (process command)	-	-
S-0-0128	CP4 transition check (process command)	-	-
S-0-0187	IDN-list of configurable data as producer	-	-
S-0-0188	IDN-list of configurable data as consumer	-	-
S-0-0267	Password	PW170875	-
S-0-0279	IDN-list of password protected data	-	-
S-0-0390	Diagnostic number	-	-
S-0-0394	List IDN	-	-
S-0-0395	List index	-	-
S-0-0396	Number of list elements	-	-
S-0-0397	List segment	-	-
S-0-0420	Activate parameterization level procedure command (PL)	-	-
S-0-0422	Exit parametrization level procedure command	-	-
S-0-0423	IDN-list of invalid data for parametrization level	-	-
S-0-0425	Sub-device state machine control	-	-
S-0-1000	SCP type & version	0201_{hex}, 0202_{hex}, 0203_{hex}, 0301_{hex}, 0302_{hex}, 0501_{hex}, 0701_{hex}, $0C01_{hex}$, $1301_{hex,}$ 1801_{hex}, $0E01_{hex}$, $1A01_{hex}$, 1901_{hex}, $1E01_{hex}$,	-
S-0-1000.0.01	List of active SCP classes & versions	-	-
S-0-1002	Communication cycle time (t_{Scyc})	-	µs
S-0-1003	Allowed MST losses in CP3/CP4	10	-
S-0-1005	Minimum feedback processing time (t5)	250 000	µs
S-0-1006	AT0 transmission starting time (t1)	-	µs
S-0-1007	Feedback acquisition capture point (t4)	-	µs
S-0-1008	Command value valid time (t3)	-	µs
S-0-1009	Device control (C-Dev) offset in MDT	-	-
S-0-1010	Length of MDTs	-	-
S-0-1011	Device status (S-Dev) offset in AT	-	-

IDN	Name	Default values	Unit
S-0-1012	Length of ATs	-	-
S-0-1013	SVC offset in MDT	-	-
S-0-1014	SVC offset in AT	-	-
S-0-1015	Ring delay	-	µs
S-0-1016	SYNCCNT (P&S)	-	µs
S-0-1017	NRT transmission time	650 000 950 000	µs
S-0-1019	MAC address	00.60.34.xx.xx.xx	-
S-0-1020	IP address	192.168.0.10	-
S-0-1020.0.01	Current IP address	192.168.0.10	-
S-0-1021	Subnet mask	255.255.255.0	-
S-0-1021.0.01	Current subnet mask	255.255.255.0	-
S-0-1022	Gateway address	192.168.0.1	-
S-0-1022.0.01	Current gateway address	192.168.0.1	-
S-0-1023	SYNC jitter	1000	µs
S-0-1024	SYNC delay measuring procedure command (process command)	-	-
S-0-1026	Version of communication hardware	-	-
S-0-1027.0.01	Requested MTU	-	-
S-0-1027.0.02	Effective MTU	-	-
S-0-1028	Error counter MST	-	-
S-0-1031	Test pin assignment port 1 and port 2	-	-
S-0-1032.0.00	Communication control	-	-
S-0-1033.0.01	Device function setup procedure command	-	-
S-0-1033.0.02	Finish connection configuration procedure command	-	-
S-0-1035	Error counter port1 and port2	-	-
S-0-1035.0.01	Error counter P&S	-	-
S-0-1036	Inter frame gap	-	-
S-0-1037	Slave jitter	-	-
S-0-1039	Host name	-	-
S-0-1039.0.01	Current hostname	-	-
S-0-1040	Sercos address	1	-
S-0-1041	AT command value valid time (t9)	-	µs
S-0-1044	Device control (C-DEV)	-	-
S-0-1045	Device status (S-Dev)	-	-
S-0-1047	Maximum consumer activation time (t11)	-	µs
S-0-1048	Activate network settings	-	-
S-0-1049.0.00	List of IPS classes & version	-	-
S-0-1050.x.01	Connection setup	-	-
S-0-1050.x.02	Connection number	-	-
S-0-1050.x.03	Telegram assignment	-	-
S-0-1050.x.04	Max. length of connection	-	-
S-0-1050.x.05	Current length of connection	-	-
S-0-1050.x.06	Configuration list	-	-
S-0-1050.x.08	Connection control (C-CON)	-	-
S-0-1050.x.9	Connection state	-	-
S-0-1050.x.10	Producer cycle time	-	µs
S-0-1050.x.11	Allowed data losses	-	-

IDN	Name	Default values	Unit
S-0-1050.x.12	Error counter data losses	-	-
S-0-1050.x.13	Configuration list for sync	-	-
S-0-1051	Image of connection setups	-	-
S-0-1300.0.01	Component name	sercos bus coupler	-
S-0-1300.0.02	Vendor name	Bosch Rexroth AG	-
S-0-1300.0.03	Vendor code	100	-
S-0-1300.0.04	Device name	S20-S3-BK+	-
S-0-1300.0.05	Device ID	R911173318	-
S-0-1300.0.06	Connected to sub-device	-	-
S-0-1300.0.07	Function revision	-	-
S-0-1300.0.08	Hardware revision	-	-
S-0-1300.0.09	Software revision	-	-
S-0-1300.0.10	Firmware loader revision	-	-
S-0-1300.0.11	Order number	R911173318	-
S-0-1300.0.12	Serial number	xxxx...	-
S-0-1300.0.13	Manufacturing Date	-	-
S-0-1300.0.134	FIBO version info	-	-
S-0-1300.x.01	Component name	xxxx...	-
S-0-1300.x.02	Vendor name	xxxx...	-
S-0-1300.x.03	Vendor code	xxx	-
S-0-1300.x.04	Device name	xxxx...	-
S-0-1300.x.05	Device ID	xxxx...	-
S-0-1300.x.07	Function revision	-	-
S-0-1300.x.8	Hardware revision	-	-
S-0-1300.x.9	Software revision	-	-
S-0-1300.x.11	Order number	xxxx...	-
S-0-1300.x.12	Serial number	xxxx...	-
S-0-1301	List of GDP classes & version	0101_{hex}, 0201_{hex}, 0401_{hex}, 0601_{hex}, $0B01_{hex}$, $0D01_{hex}$, 1001_{hex}	-
S-0-1302.0.01	FSP type & version	00010001_{hex}	-
S-0-1302.0.02	Function groups	S-0-1500.0.00	-
S-0-1302.0.03	Application type	Modular IO station	-
S-0-1303.0.01	Diagnosis trace configuration	-	-
S-0-1303.0.02	Diagnosis trace control	-	-
S-0-1303.0.03	Diagnosis trace state	-	-
S-0-1303.0.10	Diagnosis trace buffer no1	-	-
S-0-1303.0.11	Diagnosis trace buffer no2	-	-
S-0-1303.0.12	Diagnosis trace buffer no3	-	-
S-0-1303.0.128	Read index for 'row'-accessing diagnosis trace	-	-
S-0-1303.0.129	Access diagnosis trace message (row of DT-table)	-	-
S-0-1305.0.01	Sercos current time	-	-
S-0-1305.0.02	Sercos current fine time	-	µs

IDN	Name	Default values	Unit
S-0-1305.0.03	Sercos current coarse time	-	s
S-0-1320	List of available energy modes	-	-
S-0-1321.0.06	Power consumption	-	-
S-0-1322	Procedure command change energy mode	-	-
S-0-1322.0.01	List of supported command types	-	-
S-0-1322.0.02	Type selection for change energy mode	-	-
S-0-1322.0.03	Target EM for procedure command change energy mode	-	-
S-0-1323.0.1	Current energy mode	-	-
S-0-1350	Reboot device	-	-
S-0-1500	I/O bus coupler	-	-
S-0-1500.0.01	IO control	-	-
S-0-1500.0.02	IO status	-	-
S-0-1500.0.03	List of module type codes	-	-
S-0-1500.0.05	Container output data	-	-
S-0-1500.0.09	Container input data	-	-
S-0-1500.0.19	Parameter channel receive	-	-
S-0-1500.0.20	Parameter channel transmit	-	-
S-0-1500.0.23	Local bus cycle time	-	µs
S-0-1500.0.32	IO diagnostic message	-	-
S-0-1500.0.33	Current IO diagnostic message	-	-
S-0-1500.0.128	Local bus error continue mode	-	-
S-0-1500.0.134	Local bus diagnostic register	-	-
S-0-1500.0.135	Restart local bus	-	-
S-0-1501	I/O function group unknown	-	-
S-0-1502	I/O function group digital output	-	-
S-0-1503	I/O function group digital input	-	-
S-0-1504	I/O function group analog output	-	-
S-0-1505	I/O function group analog input	-	-
S-0-1506	I/O function group counter	-	-
S-0-1507	I/O function group complex protocol	-	-
S-0-1508	I/O function group sub bus master	-	-
S-0-1509	I/O function group sub bus slave	-	-
S-0-1512	I/O function group PLC module	-	-
S-0-1513	I/O function group motor starter	-	-
S-0-1514	I/O function group PWM (pulse width modulation)	-	-
S-0-1515	I/O function group positioning	-	-
S-0-1516	I/O function group passive	-	-
P-1-x.y.z	Sercos SVC/PDI 1:1 mapping (x = PDI-Index, y = module slot, z = Subindex)	-	-

S-0-1050.x.01 (Connection setup)

The bus coupler supports the following connection types (bit 0 and 1 of IDN S-0-1050.x.1):

- Producer cycle, synchronous operation (clock synchronous, 00_{bin})
- Asynchronous operation with watchdog (non-cyclic type 1, 01_{bin})
- Asynchronous operation without watchdog (non-cyclic type 2, 10_{bin})
- Cyclic mode (cyclic, 11_{bin})

S-0-1050.x.13 (Configuration list for sync)

The IDN contains a list of IDNs that are taken into consideration for the synchronization and therefore for the calculation of t5 (minimum feedback processing time) and t11 (maximum consumer activation time).

All cyclical data of the modules that are capable of synchronization are included by default. If the user takes IDNs from the list, these are not processed synchronously. They will not be used in the calculation of t5 or t11 either.

Despite this, the data is transferred via the connection and further processed asynchronously.

S-0-1500.0.32 (IO diagnostic message)
S-0-1500.0.33 (Current IO diagnostic message)

From index AG1.

As of index AG1, the IDNs can additionally be mapped to a real-time connection. Previously, this only applied to IDN S-0-0390.

S-0-1500.0.128 (Local bus error continue mode)

This IDN defines the behavior after a bus error.

= 0:	The data transfer is only started once the error has been removed and the S-0-0099 command has been executed.
= 1:	The data transfer is started automatically once the error has been removed.

S-0-1500.0.134 (Local bus diagnostic register)

From index AG1.

This IDN offers the option to access the diagnostic registers of the local bus master.

For the meaning of the diagnostic registers, please refer to the DOK-CONTRL-S20*DIAG*ER-AP..-EN-P application description.

S-0-1500.0.135 (Restart local bus)

From index AG1.

Using this IDN, you can re-read the local bus in phase CP2.

14 Access to PDI objects

You can access PDI objects from the modules of a station via Sercos. You have two options here:

- Mapping method
  - Simple method
  - For PDI objects with the index 0001_{hex} ... 1000_{hex}
- Tunnel method
  - More complex method
  - For all PDI objects

For an overview of the PDI objects of a module, please refer to the module-specific data sheet.

15 Mapping method

You can use the mapping method for PDI objects with the index 0001_{hex} ... 1000_{hex} (1_{dec} ... 4096_{dec}).

In the bus coupler, these PDI objects are mapped to the manufacturer-specific parameters P-1-x.y.z.

This means that you have read and/or write access to the PDI objects via the manufacturer-specific parameters P-1-x.y.z .

P-1-x.y.z	Sercos SVC/PDI 1:1 mapping
x	PDI index (decimal) P-1-0001.y.z ... P-1-4096.y.z
y	Module slot Bus coupler: y = 0 1st module after the bus coupler: y = 1 : 63rd module after the bus coupler: y = 63
z	Subindex
Example:	P-1-0010.15.0

15.1 Description of parameter P-1-x.y.z

Function

You can use this parameter to access PDI objects with index 0001_{hex} ... 1000_{hex}.

Attributes

Length	Maximum number of elements is device-specific Current length variable
Format	Object-specific
Function	Parameter
Changeability	Yes
Executability	Communication phases CP2, CP3, CP4

After the IDN has been sent, the result is shown in the IDN.

15.2 Example: read PDI object

Read the order number of the first module after the bus coupler.

x	PDI index	$000A_{hex} = 0010_{dec}$
y	Module slot; 1st module	1
z	PDI subindex	0

The parameter to be sent is P-1-0010.1.0.

The contents of the object are reported as the result in the IDN.

Byte	Contents (hex)	Meaning
0	52	Item No. R911172534
1	39	
2	31	
3	31	
4	31	
5	37	
6	32	
7	35	
8	33	
9	34	
10	00	Zero-terminated

16 Tunnel method

16.1 Tunnel method

You can use the tunnel method for all PDI objects.

You tunnel the PDI object through the function groups of the FSP_I/O, i.e. through IDNs S–0–1501 to S–0–1516.

S-0-15xx.y.20	**Parameter channel transmit** Transferring data to the parameter channel via the service channel. The response is in S-0-15xx.y.19.
S-0-15xx.y.19	**Parameter channel receive** Read the response via the service channel after transmitting IDN S-0-15xx.y.20.
y	Module slot 1st module after the bus coupler: y = 1 : 63rd module after the bus coupler: y = 63

If a module is assigned to several function groups, the PDI objects can be read via each assigned function group.

16.2 Structure of IDN S-0-15xx.y.20

Byte	Meaning
0	Service command code (high byte)
1	Service command code (low byte)
2	Parameter count (high byte)
3	Parameter count (low byte)
4	Reserved
5	Reserved (slot)
6	Subslot
7	Reserved
8	PDI object index (high byte)
9	PDI object index (low byte)
10	PDI object subindex
11	Amount of data to be written in bytes
14 ... xxxx	Data to be written

Command code

0041_{hex}	Read PDI object
0042_{hex}	Write PDI object

Parameter count

Number of following parameters in words

Reserved (slot)

It is not necessary to specify the slot number because it is taken from the IDN (y). If you enter a value that does not equal 00_{hex} in byte 5, this value is overwritten internally by the slot number specified by y.

Subslot

Specify a subslot if you wish to access a submodule (e.g., IO-Link). Not used at present (= 0).

PDI object index

See module-specific data sheet.

PDI object subindex

See module-specific data sheet.

Amount of data to be written in bytes

For command 0041_{hex}:	00_{hex}
For command 0042_{hex}:	Amount of data to be written in bytes

Data to be written

For command 0041_{hex}:	Not available
For command 0042_{hex}:	Data to be written

16.3 Structure of IDN S-0-15xx.y.19

Byte	Meaning
0	Service command code (high byte)
1	Service command code (low byte)
2	Parameter count (high byte)
3	Parameter count (low byte)
4	Reserved (copy)
5	Slot
6	Subslot (copy)
7	Reserved
8	PDI object index (high byte) (copy)
9	PDI object index (low byte) (copy)
10	PDI object subindex (copy)
11	Amount of data read in bytes
12	Error class
13	Error code
14 ... xxxx	Read data or additional code

Command code

8041_{hex}	Response to “Read PDI object”
8042_{hex}	Response to “Write PDI object”

Parameter count

Number of following parameters in words

... (copy)

Copy of request from IDN S-0-15xx.y.20

Amount of data read in bytes

For command 0041_{hex}:	Amount of data read in bytes
For command 0042_{hex}:	00_{hex}
For an error:	00_{hex}

Error class, error code

= 0000_{hex}:	No error; positive response
≠ 0000_{hex}:	An error has occurred; negative response

Read data or additional code

Positive response	
For command 0041_{hex}:	Read data
For command 0042_{hex}:	Not available
Negative response	
Byte 14, 15	Additional error code

Should an error occur, the error message details the error class, error code, and additional code. Potential errors are listed in the following table.

Error messages

Error class (hex)	Error code (hex)	Additional code (hex)	Meaning
00	00	0000	No error
05	02	0031	Permissible length exceeded. Object cannot be read completely.
06	02	00A2	Hardware fault
	03	0000	Write and fetch not supported
06	05	0000	Inconsistent object attributes
		0011	Subindex is not supported
		0012	Code is not a request
		0013	A reserved bit has been used
		0014	Subslot not supported
		0015	Read/write service type is not supported
		0016	Index of request fetch service does not equal 0000_{hex}
		0017	Length for read or fetch service does not equal zero
		0018	Length does not correspond to the object length which has been read from the EEPROM
		0019	Read only object cannot be overwritten
	07	0000	Object does not exist
08	01	0000	Error writing the object
		00A2	Error reading the object
0F	00	0000	Error cannot be assigned
	04	0000	Inconsistent parameters
	05	0000	Invalid parameters
	06	0000	Access not supported
	11	0000	Invalid device
	12	0000	Time-out
	21	0000	Invalid slot number
	22	0000	Slot is not active
	23	0000	Invalid data length
	24	0000	Invalid parameter counter

16.4 Example: read PDI object

Read the order number of the first module after the bus coupler.

Read request

In this example, the first module is a digital output module. Therefore, IDN S-0-1502.1.20 is used.

Byte	Contents (hex)	Meaning	
0	00	Code	Read PDI object
1	41		
2	00	Parameter count	4 words follow
3	04		
4	00	Reserved	
5	00		
6	00	Subslot	No subslot
7	00	Reserved	
8	00	PDI object index	000A: order number
9	0A		
10	00	Subindex	No subindex
11	00	Amount of data to be written in bytes	Read, therefore = 00

Ensure that a write request always contains an even number of bytes. Top up with an additional byte if necessary. If you transmit an uneven number of bytes, you will receive a negative response with a corresponding error message.

Response

The result is stored in IDN S-0-1502.1.19.

The response always contains an even byte count. A byte with 00_{hex} is added if necessary in order to top up to an even byte number.

- Positive response

Byte	Contents (hex)	Meaning	
0	80	Code	Response to "Read PDI object"
1	41		
2	00	Parameter count	11 words follow
3	0B		
4	00	Reserved	Copy
5	01	Slot	Slot (y from IDN)
6	00	Subslot	Copy
7	00	Reserved	Copy
8	00	PDI object index	Copy
9	0A		
10	00	PDI object subindex	Copy
11	0B	Amount of data read in bytes	11 bytes of read data
12	00	Result	No error
13	00		
14 ... 24	52 39 31 31 31 37 32 35 33 34 00	Read data	Order number (11 bytes, including zero termination) E.g., R911172534
25	00	Top up to an even number of bytes	

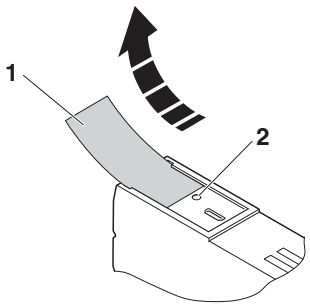
– Negative response

Byte	Contents (hex)	Meaning	
0	80	Code	Response to "Read PDI object"
1	41		
2	00	Parameter count	6 words follow
3	06		
4	00	Reserved	Copy
5	01	Slot	Slot (y from IDN)
6	00	Subslot	Copy
7	00	Reserved	Copy
8	00	PDI object index	Copy
9	0A		
10	00	PDI object subindex	Copy
11	00	Amount of data read in bytes	No data read
12	xx	Error class	Error message
13	xx	Error code	
14	xx	Additional error code	
15	xx		

17 Reset button

The reset button is located beneath the top marking label on the bus coupler.

Fig. 6 Reset button



1 Marking field

2 Reset button

The reset button has two functions:

- Restarting the bus coupler
- Resetting of the default settings

17.1 Restarting the bus coupler

Restart the bus coupler by pressing the reset button during ongoing operation.

The outputs of the station are set to the parameterized substitute values.

The process image of the inputs is not re-read.

17.2 Restoring the default settings

The bus coupler is supplied with the following default settings:

Default values (default settings)		
S-0-1019	00-60-34-xx-xx-xx	MAC address
S-0-1020	192.168.0.10	IP address
S-0-1021	255.255.255.0	Subnet mask
S-0-1022	192.168.0.1	Gateway address
S-0-1040	1	Sercos address
S-0-0267	PW170875	Password
S-0-1302.0.03	Modular IO station	Application type

If you wish to restore the default settings, proceed as follows:

- Disconnect the power to the module.
- Press and hold the reset button.
- Switch on the power.

The LEDs indicate the initialization phase:

LED	**State**	**Meaning**
RDY	Off	Starting firmware
RDY	Yellow on	Initializing firmware
RDY	Green	Initialization complete

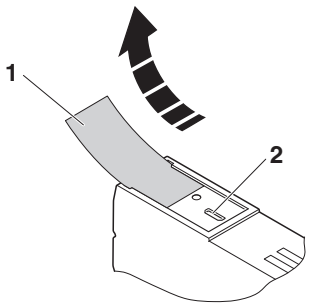
- When the RDY LED lights up green, release the button.

The default settings are restored.

18 Service interface

The service interface is located beneath the top marking field on the bus coupler.

Fig. 7 Service interface



1 Marking field

2 Service interface

The service interface can be used to connect the bus coupler to a PC via USB.

NOTICE **Damage to the USB interface**

In PCs, the USB ports are usually not electrically isolated from the rest of the hardware. This does not cause any problems for USB devices that do not have their own reference ground. However, if you connect grounded devices (e.g., the bus coupler), ground loops with undesired compensating currents may occur. These compensating currents can impair data transmission and, in extreme cases, destroy the interfaces.

Recommendation:

Connect the USB interface of the bus coupler to your PC in such a way that it is electrically isolated.
To do this, use a USB isolator.

19 Startup

19.1 Starting the firmware

The firmware is started after you have supplied power to the bus coupler.

The bus coupler is ready for operation when the RDY LED is permanently green.

19.2 Basic configuration

The bus coupler executes the basic communication after switching on the bus coupler or after resetting with the reset button and the first entry into the CP2 communication phase.

These means:

- The corresponding I/O function groups and the structure elements are generated for all devices detected on the local bus.
- Channel number and width correspond to the detected data widths of the devices.
- The input and output process data of all I/O function groups are configured via IO_FG.x.02 for mapping in S-0-1500.0.05 (container output data) and S-0-1500.0.09 (container input data).
- The content and lengths of the input and output process data on the local bus are mapped to Sercos according to the Sercos profile.
- Local bus devices are not parameterized. The devices can be parameterized in CP2 or CP3.
- **From index AG1:**
  If communication via Sercos has not been established by then, the local bus is automatically read again in the event of changes to the local bus structure or a bus error. Additionally, there is the option to re-read the local bus with the IDN S-0-1500.0.135 (Restart local bus) in CP2.

By switching over the communication phases to CP3 and subsequently CP4, the Sercos master now has the possibility to accept this configuration for realtime operation unchanged or to make changes and to activate them before switching to CP3 via process command S-0-1500.0.12 (Rearrangement of IO resource).

19.3 Sending BootP requests

On startup, the bus coupler sends three BootP requests.

If it receives a BootP response, the new IP parameters (IP address, subnetwork mask) are saved.

If the bus coupler does not receive a response, it starts with the previous configuration.

A BootP server must be available to respond to a BootP request.

19.4 Modifying IP parameters

The following IDNs for IP parameters are implemented on the bus coupler:

IP parameters		Current IP parameters		Default setting
S-0-1020	IP address	S-0-1020.0.01	Current IP address	192.168.0.10
S-0-1021	Subnet mask	S-0-1021.0.01	Current subnet mask	255.255.255.0
S-0-1022	Gateway address	S-0-1022.0.01	Current gateway address	192.168.0.1

The default settings of the relevant IDNs are identical.

The bus coupler functions with the IP parameters stored in IDNs S-0-1020.0.01, S-0-1021.0.01, and S-0-1022.0.01

If you wish to modify one or more IP parameters, proceed as follows:

- Adjust the IP parameters in IDNs S-0-1020, S-0-1021, and S-0-1022.
- Execute procedure command S-0-1048 (Activate network settings).

In doing so, at the same time, all modified IP parameters are applied as current IP parameters and the bus coupler now functions with the modified settings.

DOK-CONTRL-
S20*S3*BK+*-DA03-EN-P

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