

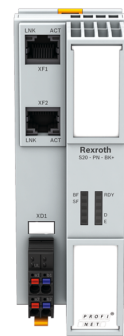
# S20 bus coupler for PROFINET

**R911342784**  
Edition 02

## Data sheet S20-PN-BK+

PROFINET controller board  
modular extensions possible using S20 modules

05 / 2024



## 1 Description

The bus coupler is intended for use within a PROFINET 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.

### Features

- 2 Ethernet ports (with integrated switch)
- Conformance with PROFINET specification V2.3 (as of index AC1)
- Supports PROFIsafe
- Supports PROFIenergy
- Supports PROFINET S2 system redundancy (as of index AC1)
- PROFINET RT and IRT
- Minimum cycle time of PROFINET for RT and IRT is 250  $\mu$ s
- Firmware can be updated
- Runtime in bus coupler is negligible (almost 0  $\mu$ s)

- The typical cycle time of the S20 system bus is around 10  $\mu$ s
- Web-based management
- IOL-CONF supported (from index AC1)



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](http://www.boschrexroth.com/electrics).

Here you will also find the current GSDML file.

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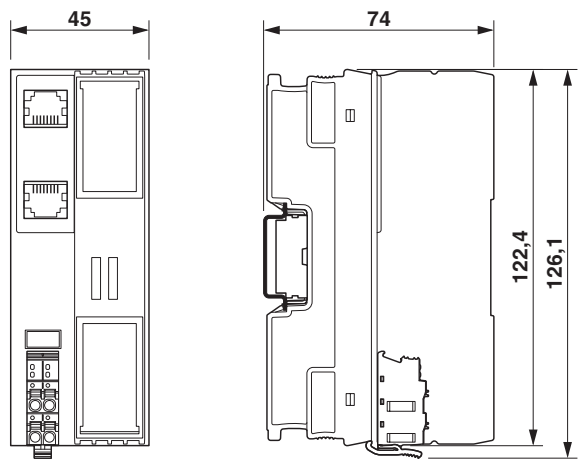
3 Ordering data

| Description                                             | Type                                 | MNR        | Pcs./Pkt. |
|---------------------------------------------------------|--------------------------------------|------------|-----------|
| S20 bus coupler<br>for PROFINET                         | S20-PN-BK+                           | R911173359 | 1         |
| Accessories                                             | Type                                 | MNR        | Pcs./Pkt. |
| S20 bus base module                                     | S20-BS-BK                            | R911173392 | 5         |
| Documentation                                           | Type                                 | MNR        | Pcs./Pkt. |
| Application description<br>S20: System and Installation | DOK-CONTRL-S20*SYS*INS-<br>AP..-EN-P | R911335988 | 1         |
| Application description<br>S20: Error Messages          | DOK-CONTRL-S20*DIAG*ER-<br>AP..-EN-P | R911344826 | 1         |
| Project planning manual<br>Security manual              | DOK-IWORKS-SECURITY***-<br>PR..-EN-P | R911342562 | 1         |

**Additional ordering data**  
For additional ordering data (accessories), please refer to the product catalog at [www.boschrexroth.com/electrics](http://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)<br>-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: PROFINET**

|                      |                                               |
|----------------------|-----------------------------------------------|
| Number of interfaces | 2                                             |
| Connection method    | RJ45 jack (Auto negotiation and autocrossing) |
| Transmission speed   | 100 Mbps (full duplex)                        |
| 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    | Micro USB type B (up to index AB1)<br>USB type C (from index AC1) |

**System limits of the bus coupler**

|                        |                                                                                                                                                                        |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Amount of process data | max. 1012 Byte (Input, from index AC1)<br>max. 1012 Byte (Output, from index AC1)<br>max. 262 Byte (Input, up to index AB1)<br>max. 262 Byte (Output, up to index AB1) |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                   |         |
|---------------------------------------------------|---------|
| Number of local bus devices that can be connected | max. 63 |
|---------------------------------------------------|---------|

|                           |                         |
|---------------------------|-------------------------|
| Number of IO-Link masters | max. 8 (from index AC1) |
|---------------------------|-------------------------|

**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.

**PROFINET**

|                   |                     |
|-------------------|---------------------|
| Device function   | PROFINET device     |
| Specification     | Version 2.3         |
| Conformance Class | Conformance-Class C |
| Vendor ID         | 011F <sub>hex</sub> |
| Device ID         | 2A05 <sub>hex</sub> |

**Supported protocols**

|                     |                                                                                                 |
|---------------------|-------------------------------------------------------------------------------------------------|
| Supported protocols | PROFINET, TFTP, PTCP, LLDP, SNMP, MRP, DCP, DDI, BootP (BootP only to perform firmware updates) |
|---------------------|-------------------------------------------------------------------------------------------------|

**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 AB1)<br>typ. 72 mA (without I/O modules, $U_L = 24$ V, from index AC1)<br>max. 570 mA (2.0 A at $U_{BUS}$ , $U_L = 24$ V, up to index AB1)<br>max. 700 mA (2.5 A at $U_{BUS}$ , $U_L = 24$ V, from index AC1) |
| Power consumption           | typ. 2.5 W (without I/O modules, $U_L = 24$ V, up to index AB1)<br>typ. 1.8 W (without I/O modules, $U_L = 24$ V, from index AC1)<br>max. 14 W (2.0 A at $U_{BUS}$ , $U_L = 24$ V, up to index AB1)<br>max. 16.8 W (2.5 A at $U_{BUS}$ , $U_L = 24$ V, from index AC1)    |
| Surge protection            | electronic                                                                                                                                                                                                                                                                |
| Reverse polarity protection | no                                                                                                                                                                                                                                                                        |

**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 AB1)<br>max. 2.5 A (from index AC1) |

**Electrical isolation/isolation of the voltage areas**

| Test section                                                                 | Test voltage             |
|------------------------------------------------------------------------------|--------------------------|
| PROFINET interface 1 / PROFINET interface 2                                  | 1500 V AC, 50 Hz, 1 min. |
| PROFINET interface 1 / 24 V communications voltage (U <sub>L</sub> ) feed-in | 1500 V AC, 50 Hz, 1 min. |
| PROFINET interface 2 / 24 V communications voltage (U <sub>L</sub> ) feed-in | 1500 V AC, 50 Hz, 1 min. |
| PROFINET interface 1 / functional ground                                     | 1500 V AC, 50 Hz, 1 min. |
| PROFINET interface 2 / functional ground                                     | 1500 V AC, 50 Hz, 1 min. |
| 24 V communications voltage (U <sub>L</sub> ) 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)<br>IEC 61000-4-2 | Criterion B, ±6 kV contact discharge, ±8 kV air discharge                                                   |
| Electromagnetic fields<br>IEC 61000-4-3        | Criterion A, Field intensity: 10 V/m                                                                        |
| Fast transients (burst)<br>IEC 61000-4-4       | Criterion B, ±2 kV                                                                                          |
| Transient overvoltage (surge)<br>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<br>IEC 61000-4-6        | Criterion A, Test voltage 10 V                                                                              |

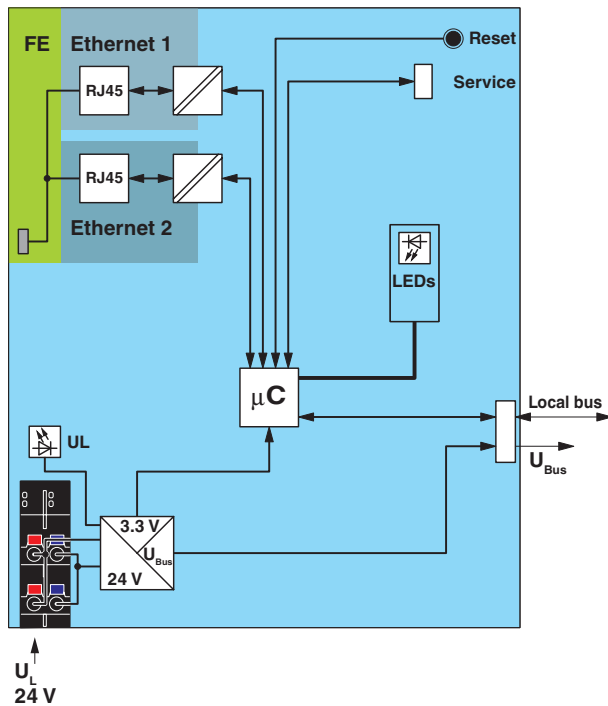
**Noise emission test in accordance with EN IEC 61000-6-3**

Class B

**Approvals**For the current approvals, please visit [www.boschrexroth.com/electrics](http://www.boschrexroth.com/electrics).

## 5 Internal circuit diagram

Fig. 1 Internal wiring of the terminal points



Key:

FE Functional ground

Ethernet 1/2 PROFINET 1/2

Reset Reset button

Service Service interface

Local bus Local bus

RJ45 interface



Electrical isolation for data or power supply



Power supply unit



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.

### 7.5 Applications with UL approval



Information:

To install the device in accordance with UL/CSA/IEC standard, the following notes must be observed.

- Use copper conductors only.
- Minimum temperature rating of the cables to be connected to the field wiring terminals:  
70 °C, AWG 24 ... 16

## 8 Connecting PROFINET and supply

### 8.1 Connecting PROFINET

Connect PROFINET to the bus coupler via an 8-pos. RJ45 connector.

Only one twisted pair cable with an impedance of 100 Ω may be connected to each Ethernet interface in RJ45 format. The data transmission speed is 100 Mbps. The 100Base-TX port of the bus coupler is able to detect a pair of incorrectly connected receive cables (RD+/RD-) and to correct them using the auto polarity correction function.

- 

Auto crossover

Both Ethernet interfaces are provided with the auto crossover function.
- 

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

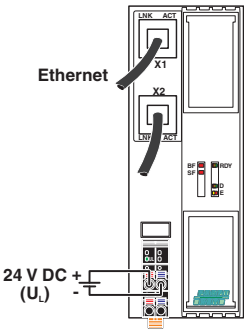
Fig. 2 Terminal point assignment



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

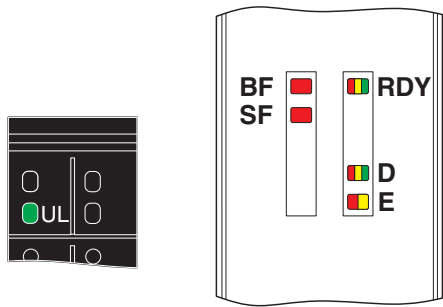
## 9 Connection example

Fig. 3 Connection of the cables



10 Local diagnostic and status indicators

Fig. 4 Local diagnostic and status indicators



| Designation | Color            | Meaning                         | State                           | Description                                                                                        |
|-------------|------------------|---------------------------------|---------------------------------|----------------------------------------------------------------------------------------------------|
| UL          | Green            | U <sub>Logic</sub>              | On                              | Communications power supply present.                                                               |
|             |                  |                                 | Off                             | Communications power supply not present.                                                           |
| BF          | Red              | Communication error (Bus Fault) | On                              | No link status available on any port                                                               |
|             |                  |                                 | Flashing                        | SF LED not flashing: Link status available, no communication connection to the PROFINET controller |
|             |                  |                                 | Flashing                        | SF flashing: Hardware watchdog triggered                                                           |
|             |                  |                                 | Off                             | A PROFINET controller has established an active communication connection to the PROFINET device.   |
| SF          | Red              | System failure (PROFINET)       | On                              | PROFINET diagnostics available                                                                     |
|             |                  |                                 | Off                             | PROFINET diagnostics not available                                                                 |
|             |                  |                                 | Flashing                        | Only flashes together with the BF LED. Watchdog has been triggered.                                |
| RDY         | Green/yellow/red | Ready                           | Green on                        | Device is ready for operation.                                                                     |
|             |                  |                                 | Flashing green/yellow           | Communications power undervoltage or surge voltage                                                 |
|             |                  |                                 | Flashing green, LED D yellow on | Overtemperature                                                                                    |
|             |                  |                                 | Flashing green, LED D yellow on | Device is in standby mode.                                                                         |
|             |                  |                                 | 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.                              |
|             |                  |                                 | Red flashing                    | Faulty firmware                                                                                    |
|             |                  |                                 | Off                             | Device is not ready for operation.                                                                 |

| Designation | Color                    | Meaning                                | State                               | Description                                                                                                                                                                                                         |
|-------------|--------------------------|----------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| D           | Red/<br>yellow/<br>green | Diagnostics of local bus communication |                                     |                                                                                                                                                                                                                     |
|             |                          | Run                                    | Green on                            | The station is ready to operate; communication within the station is OK.<br>All data is valid. An error has not occurred.                                                                                           |
|             |                          | Active                                 | Flashing green                      | The station is ready to operate. Communication within the station is ok.<br>The data are <b>not</b> valid. The controller or higher-level network is not providing valid data.<br>The module is not malfunctioning. |
|             |                          |                                        | Flashing green/red (from index AC1) | 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.                                                                                                                                                       |
|             |                          |                                        | Flashing yellow                     | Access via DTM in I/O check mode                                                                                                                                                                                    |
|             |                          |                                        | Flashing yellow/red                 | Local bus error during active I/O check                                                                                                                                                                             |
|             |                          |                                        | Red flashing                        | 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                                                                                                                                                                                       |
|             |                          |                                        | Red on                              | The maximum number of local bus devices is exceeded.                                                                                                                                                                |
|             |                          |                                        |                                     | 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/<br>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.                                                                                                                                                                                            |

## 11 Diagnostic indicators for PROFINET

### States during operation

| LED           | Meaning                                                                 |
|---------------|-------------------------------------------------------------------------|
| SF OFF/BF OFF | PROFINET controller was able to establish communication without errors. |

### States in the event of an error

| LED                      | Meaning                                                                                                     | Measure/remedy in the event of an error                                                                                                                                           |
|--------------------------|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SF OFF/BF flashing       | PROFINET device is waiting for communication with the PROFINET controller.                                  | No error                                                                                                                                                                          |
|                          | The logic communication connection has been interrupted. The PROFINET controller can no longer be accessed. | Check the connection between the PROFINET controller and the PROFINET device. Make sure that the PROFINET device name of the PROFINET device is identical with the configuration. |
|                          | The PROFINET device is not assigned a PROFINET device name.                                                 | Assign the PROFINET device name using the relevant tool.                                                                                                                          |
| SF OFF/BF ON             | The physical communication path has been interrupted. The PROFINET controller can no longer be accessed.    | Restore the physical connection between the PROFINET controller and the PROFINET device.                                                                                          |
| SF ON/BF OFF             | Diagnostic data is available.                                                                               | Read the diagnostic message using the relevant tool.                                                                                                                              |
| SF flashing/ BF flashing | Hardware watchdog has been triggered.                                                                       | Execute a reset. Replace the device when the error occurs again.                                                                                                                  |

### States during firmware update

| LED          | Meaning                                                                |
|--------------|------------------------------------------------------------------------|
| RDY flashing | BootP requests are sent and the firmware container is loaded via tftp. |
| RDY ON       | Firmware is saved.                                                     |



The firmware update can take several minutes.

The bus coupler is restarted automatically after a successful update.

## 12 Diagnostic status register

Information on the operating and error states of the S20 local bus is stored in the diagnostic status register of the bus coupler. A state of the S20 local bus is assigned to each bit in the diagnostic status register.

The states in the error bits (F\_PW\_BIT, F\_PF\_BIT, F\_BUS\_BIT, F\_CTRL\_BIT) are described in greater detail using the two diagnostic parameter registers. For information on this, please refer to the DOK-CONTRL-S20\*DIAG\*ER-AP..-EN-P application description.

### Structure of the diagnostic status register

| Bit       | Designation  | Meaning          |                                                                                                                                                  |
|-----------|--------------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| 00        | F_PW_BIT     | I/O warning      | At least one device indicates an I/O warning.                                                                                                    |
| 01        | F_PF_BIT     | I/O error        | At least one device indicates a peripheral fault.                                                                                                |
| 02        | F_BUS_BIT    | Bus error        | A bus error has occurred.                                                                                                                        |
| 03        | -            | Reserved         |                                                                                                                                                  |
| 04        | -            | Reserved         |                                                                                                                                                  |
| 05        | F_RUN_BIT    | Run              | Data cycles are being exchanged, the output data is enabled.                                                                                     |
| 06        | F_ACTIVE_BIT | Active           | Configuration is active, PDI to the devices is possible, data exchange with invalid/non-enabled process data.                                    |
| 07        | F_READY_BIT  | Ready            | The local bus master is ready for operation, no data exchange over the bus.                                                                      |
| 08        | F_BD_BIT     | Bus different    | A device which does not belong to the current configuration has been detected at the last interface.                                             |
| 09        | F_BASP_BIT   | SYS_FAIL         | The controller is in the STOP state or no application program has been loaded. The output data is blocked (substitute value behavior is active). |
| 10        | F_FORCE_BIT  | Force Mode       | Force mode (startup tool/I/O check is active).                                                                                                   |
| 11        | F_SYNC_BIT   | Synchronization  | Synchronization between higher-level system and local bus master has failed.                                                                     |
| 12        | F_PARA_REQ   | Module parameter | At least one device is requesting parameters.                                                                                                    |
| 13 ... 15 | -            | Reserved         |                                                                                                                                                  |

You can read the diagnostic status register using asynchronous services (index 2210<sub>hex</sub> = 8720<sub>dec</sub>).

## 13 Diagnostic alarms

PROFINET enables the PROFINET device to store diagnostic information together with the error location and error type.

The alarms are enabled in the delivery state. However, you can disable the alarms on startup via parameters.

An incoming alarm informs the PROFINET controller that diagnostic information has been stored.

When the diagnostic information has been removed, an outgoing alarm is transmitted to the controller.

If at least one piece of diagnostic information is stored, the SF LED is on. If no diagnostic information is present, the SF LED is off.

## 14 Startup

### Default upon delivery/default settings

The bus coupler is supplied with the following default settings:

|                     |                     |
|---------------------|---------------------|
| PROFINET name:      | No name assigned    |
| IP parameters:      | 0.0.0.0             |
| Module designation: | S20-PN-BK+          |
| Vendor ID:          | 011F <sub>hex</sub> |
| Device ID:          | 2A05 <sub>hex</sub> |

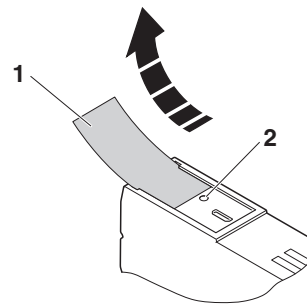
### Firmware started

Once you have supplied the bus coupler with power or pressed the reset button, the firmware is started. After completion of the firmware boot process the BF LED is either on or flashing.

## 15 Reset button

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

Fig. 5 Reset button



1 Marking field

2 Reset button

The reset button has the following functions:

- Restarting the bus coupler
- Reset to default settings (up to index AB1)

### 15.1 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.

### 15.2 Restore default settings (up to index AB1)

You can find the default settings in the section “Delivery state/default settings”.

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 |

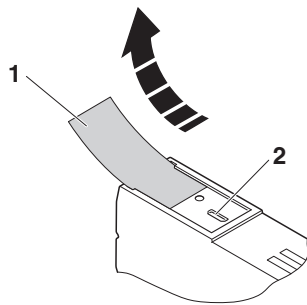
- When the RDY LED lights up green, release the button.

The default settings are restored.

## 16 Service interface

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

Fig. 6 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.

## 17 Parameterization

Parameterization of the PROFINET devices in IndraWorks requires at least IndraWorks Version 12. Install the GSDML file in IndraWorks, menu item: Extras...Device database.

From IndraWorks Version 14V10, the GSDML file is already installed in the system.



Make sure you always use the latest version of the GSDML file and the latest documentation for the bus coupler. The latest files can be downloaded at [www.boschrexroth.com/electrics](http://www.boschrexroth.com/electrics).

## 18 Device replacement

You can replace devices in the PROFINET network, without having to reconfigure them. The station name and the station address are assigned by the controller to the newly added PROFINET bus coupler with the help of the neighborhood detection function.

## 19 Dynamic configuration on the local bus

You can use the "Dynamic configuration" function with this bus coupler.

Dynamic configuration is the specification and configuration of a maximum configuration. Any subgroup of this maximum configuration can be operated.

## 20 Substitute value behavior

If PROFIBUS communication breaks down or an error occurs in the local bus, all outputs of the S20 station are set to the configured substitute values. The local bus continues to run with these values.



For the possible substitute values of a module, please refer to the relevant module-specific data sheet.

## 21 SNMP: Simple Network Management Protocol

The bus coupler supports SNMP v1 and v2c.

### Management Information Base (MIB)



The corresponding latest MIBs are available on the Internet at [www.boschrexroth.com/electrics](http://www.boschrexroth.com/electrics).

For the object descriptions, please refer to the ASN1 descriptions for this product.

The password for read access is “public”. This password cannot be changed.

By default, the password for write and read access is “private” in the delivery state. This password can be changed at any time.

## 22 WBM: Web-based management

The device has a web server, which generates the required pages for web-based management and, depending on the requirements of the user, sends them to a standard web browser.

You can use web-based management to access static or dynamic information. Examples of static information include technical data or the MAC address. Examples of dynamic information include IP addresses, status information, local bus structure and diagnostics.

### Accessing web-based management

You can address the device's web server using the IP address if it is configured accordingly. The device's homepage (web page) is accessed by entering the URL `http://<IP address>`.

Example: `http://172.16.113.38`

The default password is “private”.



If you cannot access the WBM pages, check the connection settings in your browser. Deactivate the proxy if set.