

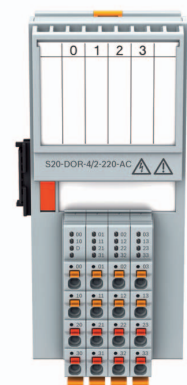
Rexroth IndraControl S20 digital output module 4 relay outputs

R911346610
Edition 01

Data sheet S20-DOR-4/2-220-AC

4 relay outputs, N/O contacts
AC 230V / DC 220V - 8A
Floating

07 / 2016



1 Description

The module is designed for use within an IndraControl S20 station.

It has four floating relay N/O contacts which are independent of one another.

You can use low-voltage and extra low-voltage modules directly next to each other within an IndraControl S20 station.

Features

- 4 monostable relays
- Floating connections for 4 actuators
- Nominal current of each output: 8 A
- Total current of the module: 32 A (4 x 8 A)
- Device type label stored
- Diagnostic and status indicators



WARNING dangerous contact voltage

When working on the modules and wiring, always switch off the supply voltage and ensure it cannot be switched on again.

Observe the safety notes in "Installation and startup".



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



Make sure you always use the latest documentation.

It can be downloaded under www.boschrexroth.com/electrics.

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3 Ordering data

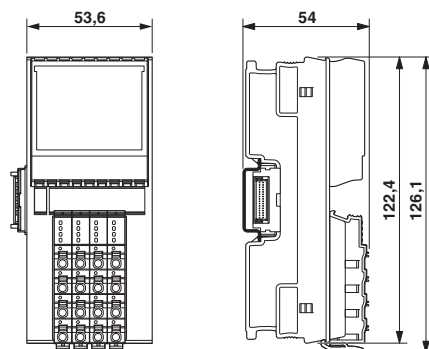
Description	Type	MNR	Pcs./Pkt.
Rexroth IndraControl S20 digital output module 4 relay outputs	S20-DOR-4/2-220-AC	R911173749	1
Accessories	Type	MNR	Pcs./Pkt.
Rexroth IndraControl S20 bus base module	S20-BS	R911172540	5
Documentation	Type	MNR	Pcs./Pkt.
Application description for the Rexroth IndraControl S20: System and Installation	DOK-CONTRL- S20*SYS*INS-AP..-EN-P	R911335988	1
Application description for Rexroth IndraControl S20: Error Messages	DOK-CONTRL- S20*DIAG*ER-AP..-EN-P	R911344826	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	53.6 mm
Height	126.1 mm
Depth	54 mm
Note on dimensions	The depth is valid when a TH 35-7.5 DIN rail is used (according to EN 60715).

General data

Color	gray
Weight	206 g (with connectors and bus base module)
Ambient temperature (operation)	-25 °C ... 60 °C (Max. 6 A/channel for wall mounting on horizontal DIN rail; max. 4 A/channel for any mounting position) -25 °C ... 50 °C (Max. 8 A/channel for wall mounting on horizontal DIN rail; max. 6 A/channel for any mounting position) -25 °C ... 40 °C (Max. 8 A/channel for any mounting position)
Ambient temperature (storage/transport)	-40 °C ... 85 °C

General data

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
Overvoltage category	III (EN 61010-2-201/UL 61010-2-201), up to 2000 m above sea level II (EN 61010-2-201/UL 61010-2-201), up to 3000 m above sea level
Degree of pollution	2
Mounting position	any (observe temperature and current derating)

Connection data

Designation	S20 connector
Connection method	Push-in connection
Conductor cross section solid / stranded	0.2 mm ² ... 1.5 mm ² / 0.2 mm ² ... 1.5 mm ²
Conductor cross section [AWG]	24 ... 16
Stripping length	8 mm



Observe the specifications for the conductor cross sections in the application description for the IndraControl S20 system, material number R911335988.
When selecting the cables, please note that in the case of a small conductor cross section and high current, the terminal point temperature may be up to 30 K above the ambient temperature.

Interface Local bus

Connection method	Bus base module
Transmission speed	100 MBit/s

Communications power

Communications power U_{Bus}	5 V DC (via bus base module)
Current consumption from U_{Bus}	max. 280 mA (all relays pick up)
Power consumption at U_{Bus}	max. 1.4 W (all relays pick up)

Relay output

Number of outputs	4
Connection method	Push-in connection
Connection method	2-wire
Connection method	2-wire
Nominal output voltage	220 V DC 230 V AC
Output voltage range	24 V DC ... 220 V DC -20 % / +15 % 24 V AC ... 230 V AC -20 % / +15 % (50/60 Hz)
Output current	max. 8 A (per channel, provide an external fuse) max. 32 A (per module)

NOTICE Damage to the electronics

Limit the channel current to a maximum of 8 A. Use a fuse with the following properties for this:
 $\leq 8 \text{ A} / \geq 250 \text{ V}$ for low-voltage applications
 $\leq 8 \text{ A} / \geq 60 \text{ V}$ for SELV/PELV applications

Inrush current	max. 15 A (for 4 s) max. 65 A (for 0.02 s)
Contact type	4 floating N/O contacts
Contact material	AgSnO ₂

Relay output

Switching current	max. 8 A AC ($\cos \phi = 1$) For DC see load limit curve, e.g., the following values: max. 8 A DC (≤ 30 V, ohmic load) max. 500 mA DC (≤ 110 V, ohmic load) max. 250 mA DC (220 V DC, ohmic load) max. 220 mA DC (125 V DC, $L/R \leq 50$ ms, applications with UL approval) max. 110 A DC (250 V DC, $L/R \leq 50$ ms, applications with UL approval)
Switching capacity	max. 2000 VA For DC see load limit curve, e.g., the following values: max. 240 W (30 V DC) max. 55 W (≥ 60 V DC) max. 25 W (125 V DC, 250 V DC, applications with UL approval)
Switching capacity according to IEC 60947-5-1	6 A (120 V (AC-15)) 3 A (240 V (AC-15)) 0.22 A (125 V (DC-13)) 0.1 A (250 V (DC-13))
Switching frequency	0.1 Hz (with load); 20 Hz (without load)
Nominal power consumption	212 mW (per relay)
Typical response time	10 ms
Bouncing time	3 ms
Typical release time	5 ms
Service life, electrical	100000 cycles
Mechanical service life	10×10^6 cycles
Common potentials	all contacts floating

Configuration and parameter data in a PROFIBUS system

Required parameter data	1 Byte
Need for configuration data	6 Byte

Error messages to the higher level control or computer system

None

Electrical isolation/isolation of the voltage areas

Test section	Test voltage
Relay contact / logic	4 kV Rated surge voltage (safe isolation according to EN 61010-2-201/IEC 61010-2-201)
Relay contact / logic	5 kV Pulse test voltage according to EN 61850/IEC 61850
Contact / functional earth ground	4 kV Rated surge voltage (safe isolation according to EN 61010-2-201/IEC 61010-2-201)
Contact / functional earth ground	5 kV Pulse test voltage according to EN 61850/IEC 61850
Contact / contact (open contact)	1 kV, 50 Hz, 1 min.
Contact / contact (adjacent connectors)	2.5 kV Pulse test voltage according to EN 61850/IEC 61850

Mechanical tests

Vibration resistance in acc. with EN 60068-2-6/IEC 60068-2-6	5g
Shock in acc. with EN 60068-2-27/IEC 60068-2-27	20g (contact interruption) / 5g (contact closure)
Continuous shock according to EN 60068-2-27/IEC 60068-2-27	10g

Conformance with EMC Directive 2014/30/EU**Noise immunity test in accordance with EN 61000-6-2**

Electrostatic discharge (ESD) EN 61000-4-2/IEC 61000-4-2	Criterion A, 6 kV contact discharge, 8 kV air discharge
Electromagnetic fields EN 61000-4-3/IEC 61000-4-3	Criterion A, 20 V/m up to 1 GHz, 10 V/m up to 3 GHz
Fast transients (burst) EN 61000-4-4/IEC 61000-4-4	Criterion A, 4 kV
Transient overvoltage (surge) EN 61000-4-5/IEC 61000-4-5	Criterion A, ± 4 kV (asymmetrical)
Conducted interference EN 61000-4-6/IEC 61000-4-6	Criterion A; Test voltage 10 V

Noise emission test according to EN 61000-6-3

Radio interference properties EN 55022	Class B
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Developed according to standard IEC 61850-3

Electrostatic discharge (ESD) EN 61000-4-2/IEC 61000-4-2	Criterion A, 6 kV contact discharge, 8 kV air discharge
Electromagnetic fields EN 61000-4-3/IEC 61000-4-3	Criterion A, 20 V/m up to 1 GHz, 10 V/m up to 3 GHz
Fast transients (burst) EN 61000-4-4/IEC 61000-4-4	Criterion A, 4 kV
Transient overvoltage (surge) EN 61000-4-5/IEC 61000-4-5	Criterion A, ± 4 kV (asymmetrical)
Conducted interference EN 61000-4-6/IEC 61000-4-6	Criterion A; Test voltage 10 V
Immunity to magnetic fields, EN 61000-4-8/IEC 61000-4-8	300 A/m continuous, 1000 A/m for 1 s
Immunity to attenuated oscillating magnetic fields, EN 61000-4-10/IEC 61000-4-10	100 A/m
Immunity to conducted common-mode interference, EN 61000-4-16/IEC 61000-4-16	30 V continuous, 300 V for 1 s
Attenuated oscillating waves, EN 61000-4-18/IEC 61000-4-18	2.5 kV asymmetrical
Radio interference properties EN 55022	Class B

Approvals

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

5 Supplementary data

DC load limit curve

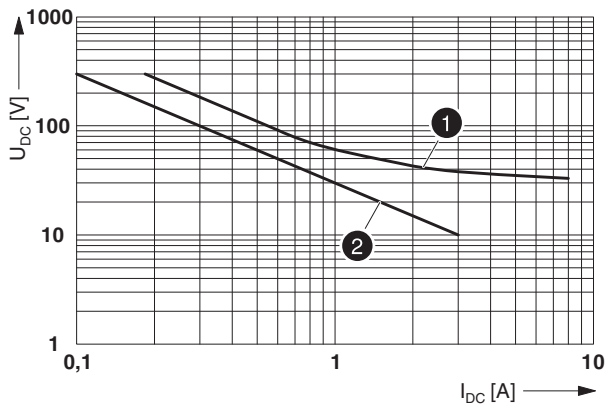


Fig. 1 DC load limit curve for REL-MLR-1X1/G 5

- 1 Ohmic load
- 2 Inductive load, $L/R = 50 \text{ ms}$

6 Internal circuit diagram

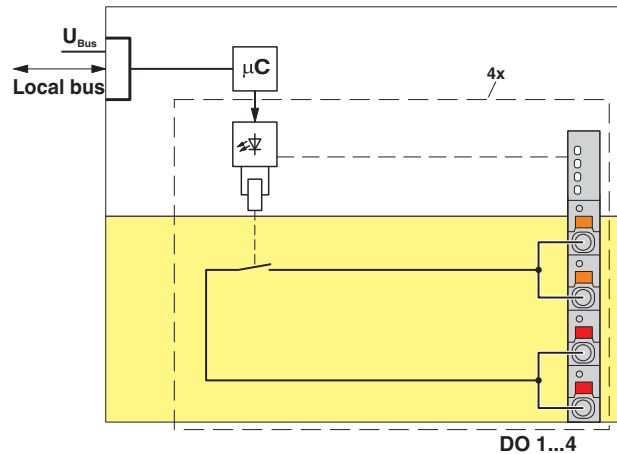


Fig. 2 Internal wiring of the terminal points

Key:

Local bus	Local bus
	Microcontroller
	LED
	Electrically isolated areas
	Monostable relay

7 Installation and startup



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 IndraControl S20 system, material number R911335988.

7.1 Installing the system

Install the system according to the requirements of EN 50178!

Only qualified personnel may work on IndraControl S20 modules in the low-voltage area.

Qualified personnel are people who, because of their education, experience and instruction and their knowledge of relevant standards, regulations, accident prevention and service conditions, have been authorized by those responsible for the safety of the plant, to carry out any required operations and who are able to recognize and avoid any possible dangers.

(definitions for skilled workers according to EN 50110-1:1996).



WARNING dangerous contact voltage

Please be aware of dangerous voltages when working on circuits that do not meet SELV requirements.

Failure to observe these instructions can lead to damage to health or even life-threatening injuries.

- Always make sure that the power supply is disconnected if you want to mount or remove the IndraControl S20 modules for the low-voltage area!
- When working on the modules and wiring, always switch off the supply voltage and ensure it cannot be switched on again.
- The IndraControl S20 modules for the low-voltage area must only be installed in a control cabinet or junction box.
These must satisfy the requirements for electrical and flameproof housings according to the following standards:
 - EN 50178 or EN 61010-1
 - UL 61010-1 (for applications with UL approval)



WARNING dangerous contact voltage in the event of ground faults

The IndraControl S20 modules for the low-voltage area must only be operated in grounded networks.



WARNING dangerous contact voltage

Do not operate one channel with low voltage and another channel with protective extra-low voltage (PELV) or safety extra-low voltage (SELV).

Only the following operating states are permitted:

- All outputs used switch low voltage or
- All outputs used switch protective extra-low voltage (PELV) or safety extra-low voltage (SELV)

7.2 Switch or circuit-breaker

Please observe the following during planning and installation:

- A switch or circuit-breaker must be included in the installation.
- It must be suitably located and easily reached.
- It must be marked as the disconnecting device for the equipment.

8 Terminal point assignment

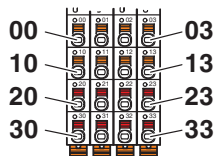


Fig. 3 Terminal point assignment

Terminal point	Color	Assignment		
00 ... 03	Orange	OUT1 ... OUT 4	Relay N/O contact	1 ... 4
10 ... 13	Orange	OUT1 ... OUT 4	Relay N/O contact	1 ... 4
20 ... 23	Red	Relay main contact		1 ... 4
30 ... 33	Red	Relay main contact		1 ... 4

9 Connection example

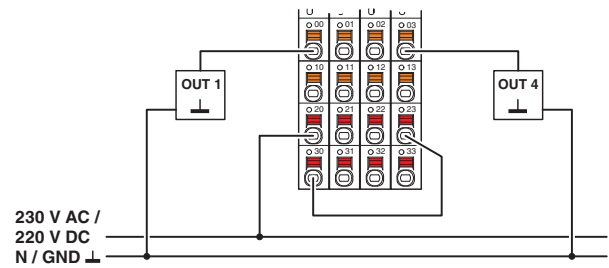


Fig. 4 Connection of actuators

10 Local status and diagnostic indicators

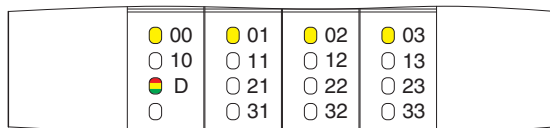


Fig. 5 Local diagnostic and status indicators

Designation	Color	Meaning	State	Description
D	Red/yellow/green	Diagnostics of local bus communication		
		Run	Green ON	The device is ready for operation, communication within the station is OK. All data is valid. An error has not occurred.
		Active	Green flashing	The device is ready for operation, communication within the station is OK. The data is not valid. Valid data from the controller/higher-level network not available. There is no fault in the module.
		Device application not active	Flashing green/yellow	The device is ready for operation, communication within the station is OK. Output data cannot be outputted and/or input data cannot be read. There is a fault on the periphery side of the module..
		Ready	Yellow ON	The device is ready for operation but did not detect a valid cycle after power-up.
		Connected	Yellow flashing	The device is not (yet) part of the active configuration.
		Reset	Red ON	The device is ready for operation but has lost the connection to the bus head.
		Not connected	Flashing red	The device is ready for operation but there is no connection to the previously existing device.
		Power down	OFF	Device is in (power) reset.
00 ... 03	Yellow	Status of the outputs	ON	Relay is activated.
			OFF	Relay is not activated.

11 Process data

The I/O data is mapped as follows.

Output process data									
Byte	0								
Bit	7	6	5	4	3	2	1	0	
Channel	Not used				4	3	2	1	
Terminal point	-				03	02	01	00	

12 Parameter, diagnostics and information (PDI)

Parameter and diagnostic data as well as other information is transmitted via the PDI channel of the IndraControl S20 station.

The standard and application objects stored in the module are described in the following section.

The following applies to all tables below:

For an explanation of the object and data types, please refer to the application description for the IndraControl S20 system, material number R911335988.

Abbreviation	Meaning
A	Number of elements
L	Length of the elements
R	Read
W	Write



Every visible string is terminated with a zero terminator (00_{hex}). The length of a visible string element is therefore one byte larger than the amount of user data.



For more detailed information on the PDI and the objects, please refer to the application description for the IndraControl S20 system, material number R911335988.

13 Standard objects

13.1 Objects for identification (device rating plate)

Index (hex)	Object name	Object type	Data type	A	L	Rights	Meaning	Contents
Manufacturer								
0001	VendorName	Var	Visible String	1	17	R	Vendor name	Bosch Rexroth AG
0002	VendorID	Var	Visible String	1	7	R	Vendor ID	006034
0012	VendorURL	Var	Visible String	1	28	R	Vendor URL	http:// www.boschrex- roth.com
Module - general								
0004	DeviceFamily	Var	Visible String	1	16	R	Device family	I/O digital OUT
0006	ProductFamily	Var	Visible String	1	17	R	Product family	IndraControl S20
000E	CommProfile	Var	Visible String	1	4	R	Communication profile	633
000F	DeviceProfile	Var	Visible String	1	5	R	Device profile	0010
0011	ProfileVersion	Record	Visible String	2	11; 20	R	Profile version	2011-12-07; Basis - Profil V2.0
003A	VersionCount	Array	Unsigned 16	4	4 * 2	R	Version counter	e.g., 0007 0001 0000 0000 _{hex}
Module - special								
0005	Capabilities	Array	Visible String	1	8	R	Features	Nothing
0007	ProductName	Var	Visible String	1	19	R	Product name	S20-DOR-4/2-220- AC
0008	SerialNo	Var	Visible String	1	16	R	Serial number	xxxxxxxxxxxxxx
0009	ProductText	Var	Visible String	1	32	R	Product text	4 digital relay output channels
000A	OrderNumber	Var	Visible String	1	11	R	Order No.	R911173749
000B	HardwareVersion	Record	Visible String	2	11; 4	R	Hardware version	e.g., 2013-04-26; AA1
000C	FirmwareVersion	Record	Visible String	2	11; 3	R	Firmware version	0000-00-00; --
000D	PChVersion	Record	Visible String	2	11; 6	R	Parameter channel version	2010-01-08; V1.00
0037	DeviceType	Var	Octet string	1	8	R	Module identification	20 40 00 01 00 00 0D 00 _{hex}
Use of the device								
0014	Location	Var	Visible String	1	59	R/W	Location	Can be filled out by the user.
0015	EquipmentIdent	Var	Visible String	1	59	R/W	Equipment identifier	Can be filled out by the user.
0016	ApplDeviceAddr	Var	Unsigned 16	1	2	R/W	Application device address	Can be filled out by the user.

13.2 Object for multilingual capacity

Index (hex)	Object name	Object type	Data type	A	L	Rights	Meaning	Contents
0017	Language	Record	Visible String	2	6; 8	R	Language	en-us; English

13.3 Diagnostics objects

Index (hex)	Object name	Object type	Data type	A	L	Rights	Assignment/content
0018	DiagState	Record		6	2; 1; 1; 2; 1; 1	R	Diagnostic state

Diagnostics state (0018_{hex}: DiagState)

This object is used for a structured message of an error.

0018 _{hex} : DiagState (read)					
Subindex	Data type	Length in bytes	Meaning	Contents	
0	Record	8	Diagnostic state	Complete diagnostics information	
1	Unsigned 16	2	Error number	0 ... 65535 _{dez}	
2	Unsigned 8	1	Priority	00 _{hex}	No error
				01 _{hex}	Error
				02 _{hex}	Warning
				81 _{hex}	Error removed
				82 _{hex}	Warning eliminated
3	Unsigned 8	1	Channel/group/module	00 _{hex}	No error
				FF _{hex}	entire device
4	Unsigned 16	2	Error code	See table below	
5	Unsigned 8	1	More follows	00 _{hex}	
6	Visible String	1	Text	00 _{hex}	



The message with priority 81_{hex} or 82_{hex} is a one-off, internal message to the bus coupler. The bus coupler transfers this error message to the error mechanisms of the higher-level system.



After all errors have been eliminated, it is automatically reset.

Error and status of the local diagnostics and status indicators

Subindex	2	3	4	
Error	Priority	Channel/group/module	Error code	LED
	hex	hex	hex	D
No error	00	00	0000	Green ON

13.4 Objects for process data management

Index (hex)	Object name	Object type	Data type	A	L	Rights	Assignment
0026	PDOOUT	Var	Octet string	1	1	R	Output process data
003B	PDIN_Descr	Array of Records		3	8; 2; 2	R	Description of the IN process data
003C	PDOOUT_Descr	Array of Records		3	8; 2; 2	R	Description of the output process data

The objects 003B_{hex} and 003C_{hex} are only applicable to tools.

OUT process data (0026_{hex}: PDOOUT)

You can read the OUT process data of the module with this object.

The structure corresponds to the representation in the "Process data" section.

0026 _{hex} : PDOOUT (read)			
Subindex	Data type	Length in bytes	Meaning
0	Octet string	1	Output process data

14 Application objects

Index (hex)	Object name	Object type	Data type	A	L	Rights	Assignment
FF8D	PD Output Substitute Configuration	Var	Unsigned 8	1	1	R/W	Substitute value behavior

14.1 Substitute value behavior (FF8D_{hex}: PD Output Substitute Configuration)

With this object, you parameterize the behavior of the module so that an application reset can be detected if necessary.

FF8D _{hex} : PD Output Substitute Configuration (Read, write)				
Subindex	Data type	Length in bytes	Contents	
0	Var	1	00 _{hex} (Default)	"0" output to all output bits
			01 _{hex}	Hold last value

15 Device descriptions

The device is described in the device description files.
These files are available for download at
www.boschrexroth.com/electrics in the download
area of the bus coupler used.

DOK-CONTRL-
S20*DOR4*AC-DA01-EN-
P

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