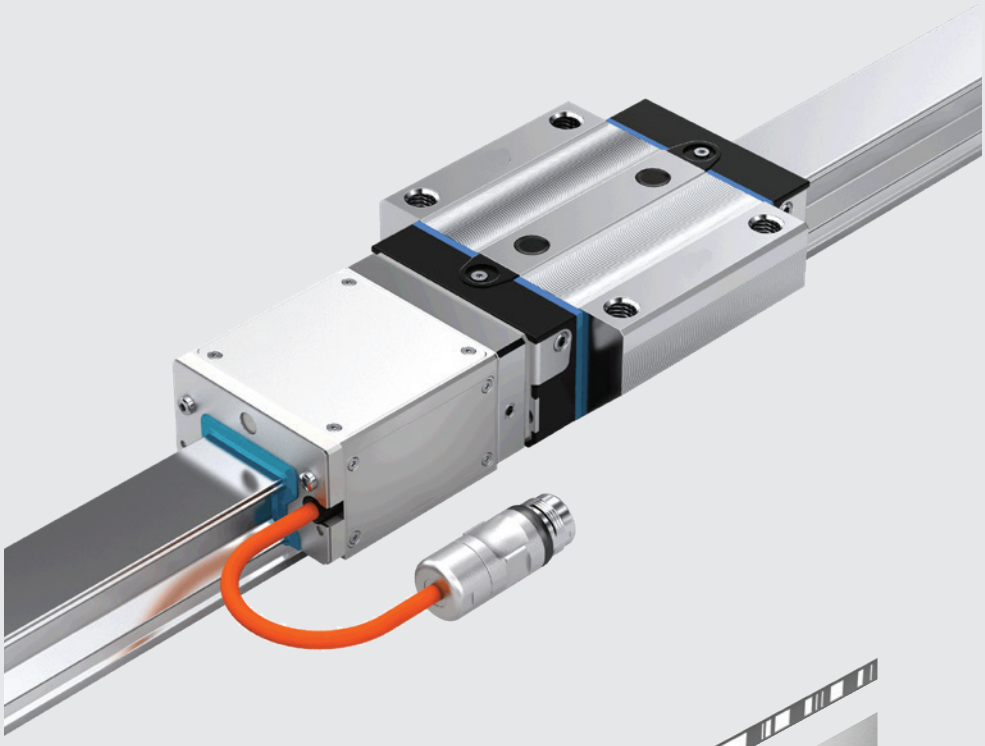
rexroth
A Bosch Company

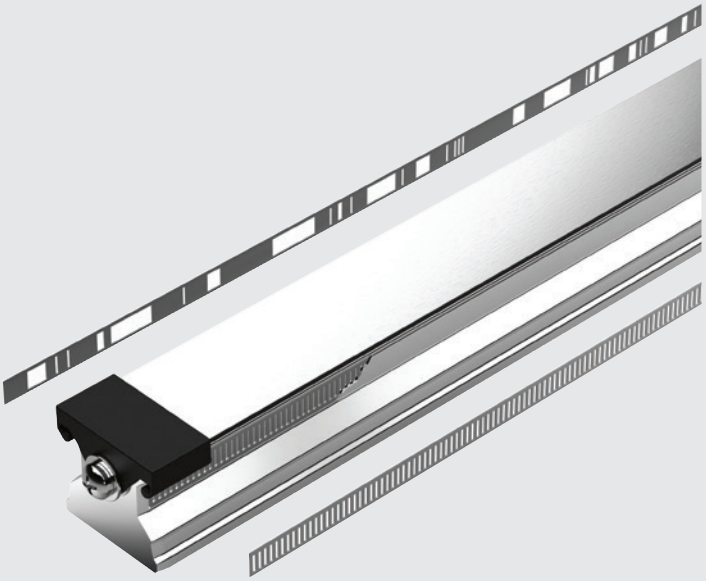
Integrated Measuring System IMS for Ball and Roller Rail systems

R320103166/2017-10
EN

Instructions for electrical interfaces

EN





This data has been provided solely for the purpose of describing the product. Any references to possible uses are provided merely as a convenience and shall be understood as application examples or suggestions.
Catalog data may not be construed as guaranteed characteristics.
The information given does not release the user from the obligation of own judgment and verification. It should be noted that our products are subject to a natural process of aging and wear.

The title page contains an illustration of a sample configuration. The product as delivered can differ from the illustration.

The original instructions are in the German language.

Any dissemination of the product must include these instructions.

Diese Anleitung ist nur als PDF in folgenden Sprachen verfügbar.
These instructions are only available as a PDF in the following languages.

DE Deutsch (Original document)

EN English

Contents

1 About these instructions

1.1 Scope and purpose of the documentation

This documentation applies to the following products:

- Integrated Measuring System IMS according to the “Integrated Measuring System IMS” catalog.

This documentation is intended for assembly/installation personnel, line operators and machinery/plant users.

This documentation contains important information for proper and safe installation, operation, maintenance and disassembly of the product and for troubleshooting simple errors oneself.

▶ Before putting the product into service read these instructions completely.

1.2 Required documentation

Documentation which is indicated by the book symbol 📖 must be obtained before handling the product and must be adhered to:

Table 1: Required documentation

	Title	Document number	Application
📖	Integrated Measuring System IMS	R999000466	Catalog
📖	Ball Rail Systems	R999000464	Catalog
📖	Roller Rail Systems	R999000353	Catalog
📖	Instructions for Profiled Rail Systems	R320103885	Instructions
📖	Instructions for Integrated Measuring System IMS	R320103262	Mechanical system instructions
📖	Product data sheet for Dynalub 510	R310 2052	Catalog

The Rexroth documentation is available for download at www.boschrexroth.com/mediadirectory.

1.3 Presentation of information

To enable users to work rapidly and safely with the product while following these instructions, this documentation uses standardized safety instructions, symbols, terms and definitions, and abbreviations. These are explained in the following sections.

1.3.1 Safety instructions in this manual

This manual contains safety instructions preceding any actions that involve a risk of personal injury or damage to property. The safety precautions described must be adhered to.

Safety instructions are structured as follows:

⚠ SIGNAL WORD

Type of hazard!

Consequences if ignored.

▶ Hazard avoidance precautions.

- Warning sign: draws attention to the hazard
- Signal word: indicates the severity of the hazard
- Type of hazard: indicates the type or source of the hazard
- Consequences: describes the consequences that may occur if the hazard avoidance precautions are ignored
- Hazard avoidance precautions: indicates how to avoid the hazard

The safety instructions cover the following hazard levels. The hazard level describes the risks involved if the safety instruction is not complied with.

Hazard levels as per ANSI Z535:

Warning sign, Signal word	Meaning
⚠ DANGER	Indicates an imminently hazardous situation which will result in death or serious injury if not avoided.
⚠ WARNING	Indicates a potentially hazardous situation which could result in death or serious injury if not avoided.
⚠ CAUTION	Indicates a potentially hazardous situation which may result in minor or moderate injury if not avoided.
NOTE	Damage to property: The product or surrounding environment could get damaged.

1.3.2 Symbols

The following symbols indicate notes that are not safety-critical but make the documentation easier to understand.

Table 2: Meaning of the symbols

Symbol	Meaning
	If this information is not observed, the product will not be optimally used or operated.
▶	Single, independent work step
1. 2. 3.	Numbered work steps The numbers indicate the sequence of the work steps.
➠ 7	See section 7
➠ Fig. 7.1	See Figure 7.1

1.3.3 Abbreviations

The following abbreviations are used in this documentation:

Table 3: Abbreviations and definitions

Abbreviation	Meaning
IMS	Integrated Measuring System
IMS-I	Integrated Measuring System Incremental
IMS-A	Integrated Measuring System Absolute

2 Start-up

⚠ WARNING

Risk of injury due to moving parts!

Crushing.

- Do not attempt to grasp any moving parts while the system is in operation.
- Do not stand in the hazard zone around moving parts.
- Make sure that no one is in the hazard zone before putting the equipment into service.

- The product must not be put into service until it has been verified that the final product (for example a machine or system) into which the Rexroth product has been installed complies with the country-specific requirements, safety regulations and standards for the application.

2.1 Checking the operating conditions

NOTE

Risk of collision due to missing or wrongly set limit switches!

Damage to the product.

- Do not allow the product to collide with a stop.

- Before putting the product into service, make sure it has adequate basic lubrication. ➠ See relevant catalog.
- Consider the operating conditions and technical data (e.g. ambient temperature, load, travel speed etc.). ➠ See relevant catalog.

2.2 Putting into service for the first time

Perform the following checks before putting the machine into service:

- Proper functioning of safety-critical assemblies (protective doors, emergency stop switches, etc.)
- Proper mounting of guide rails and cover strips.
- Ensure that all components have initial lubrication (see documents in table 1).
- Tidy routing of connection cable.
- Unit is connected up to the drive controller.
- No contamination or obstacles in the working zone / along the travel path.

2.3 Connecting the electrical power supply to the IMS

- The connectors may only be connected up by specialist personnel.
- For transport and assembly purposes, the pins of the connector are protected by an ESD protective cap. Leave this on the plug connector until you are ready to connect the IMS to the drive controller.
- Always make sure the power is off (no voltage) before connecting the connectors.
- Connection errors (e.g. wrong pin assignment) can lead to the destruction of the scanner electronics.
- For EMC-compliant use, only the extension cables described in section 3.1 may be used. Furthermore, when installing the connection cable, make sure that its metallic plug is electrically isolated from other current-carrying plug connections.
- Ensure the power supply in accordance with the operating conditions ➠4.
  The voltage drop across the entire cable length must be taken into account to ensure that U_{min} is complied with.

2.4 Connectors / pin assignments

2.4.1 Connector types

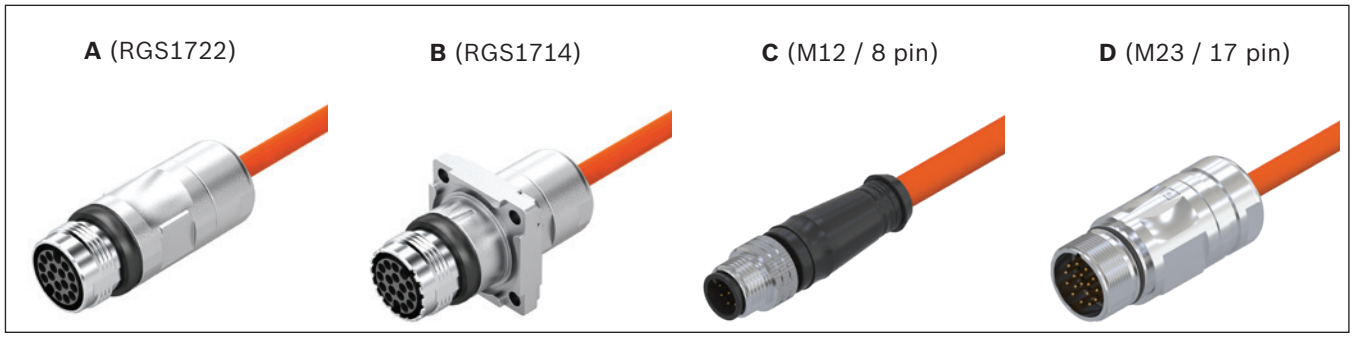


Fig. 1: **Connector types**

Connector type A/B

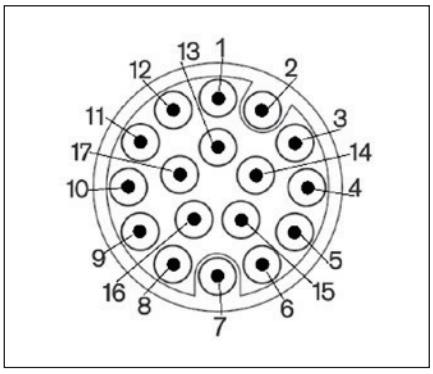


Fig. 2: **View of contact side (pins) connector type A/B**

Connector type C

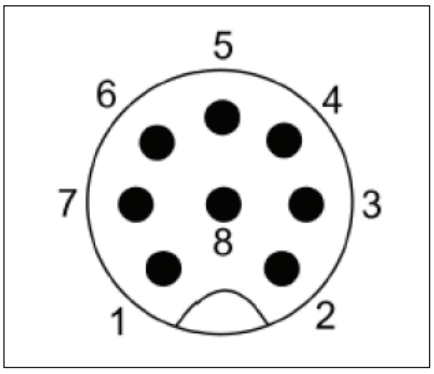


Fig. 3: **View of contact side (pins) connector type C**

Connector type D

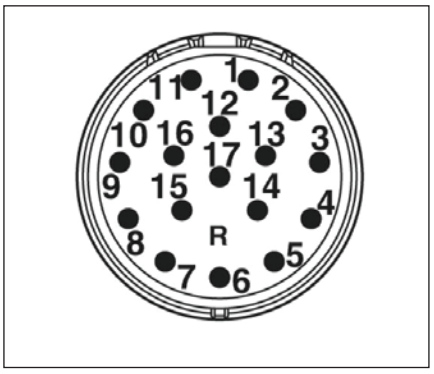


Fig. 4: **View of contact side (pins) connector type D**

Table 4: Pin assignment connector type A/B

Pin no.	Signal assignment	Function
1	Inner shield	Inner cable shield
2	A +	Analog/digital path information
3	A -	
4	GND	Power supply GND
5	B +	Analog/digital path information
6	B -	
7	Data +	IMS-I: only for service purposes
8	Data -	IMS-A: HIPERFACE®/ SSI data line
9	EncCLK+ / RI+	IMS-I: Reference mark signal
10	EncCLK- / RI-	IMS-A: SSI-CLOCK
11	VDD	Power supply VDD
12	n.c.	
13	n.c.	
14	n.c.	
15	0 V_Sense	Sense line[1] GND
16	5 V_Sense	Sense line[1] VDD
17	n.c.	
Housing	Outer shield	Outer shield contacted via connector housing

1) If there is no voltage adjustment via sense lines available, the sense lines should be switched parallel to the power supply lines.

Table 5: Pin assignment connector type C

Pin no.	Signal assignment	Function
1	24 V	Power supply 24 V
2	Data +	only for service purposes
3	RXP	Received data positive
4	RXN	Received data negative
5	0 V	Power supply 0 V
6	TXN	Sent data negative
7	TXP	Sent data positive
8	Data -	only for service purposes
Housing	Outer shield	Outer shield contacted via connector housing

Table 6: Pin assignment connector type D

Pin no.	Signal assignment	Function
1	5 V	Power supply 5 V
7		
8	RD	αi data line positive
9	*RD	αi data line negative
10	GND	Power supply GND
14	Data+ / SD	only for service purposes
17	Data- / *SD	
Housing	Outer shield	Outer shield contacted via connector housing

2.4.2 Making plug connections

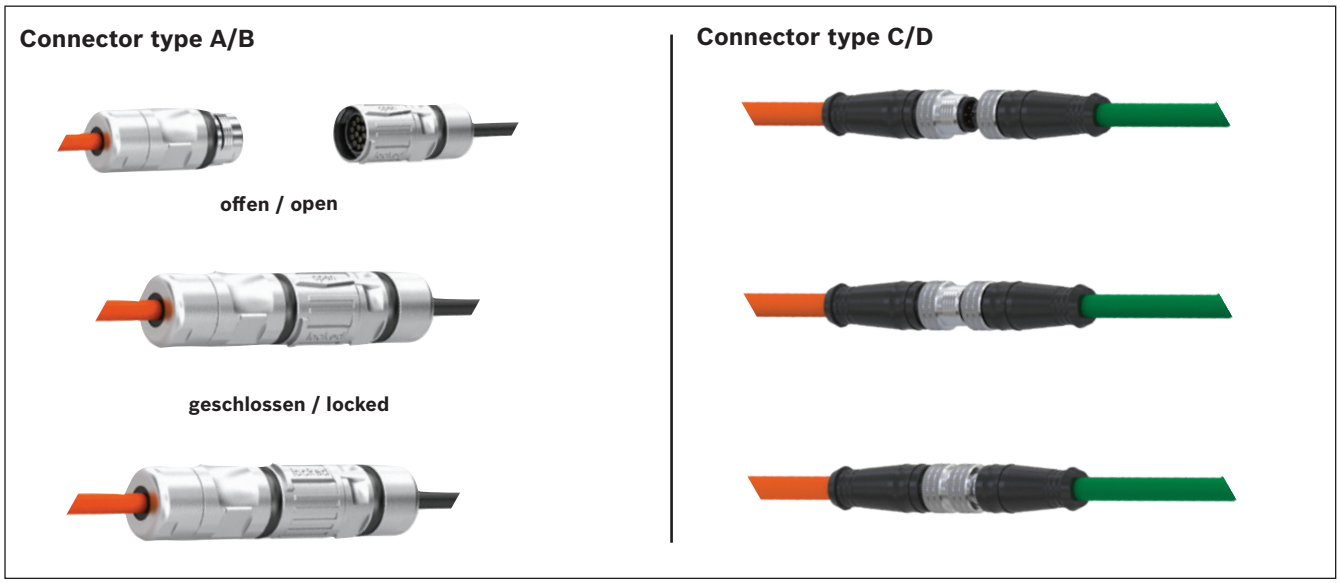


Fig. 5: **Making plug connections**

- Connector type A/B: After connecting the mating plug halves, the sleeve nut must be twisted by more than 90° to ensure a secure connection.
- Connector type C/D: Locking via bolting

2.5 IMS block diagram

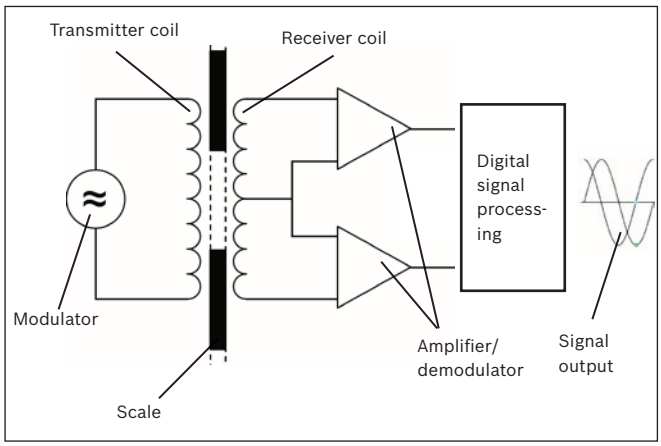


Fig. 6: **Block diagram of the measuring sensor circuitry**

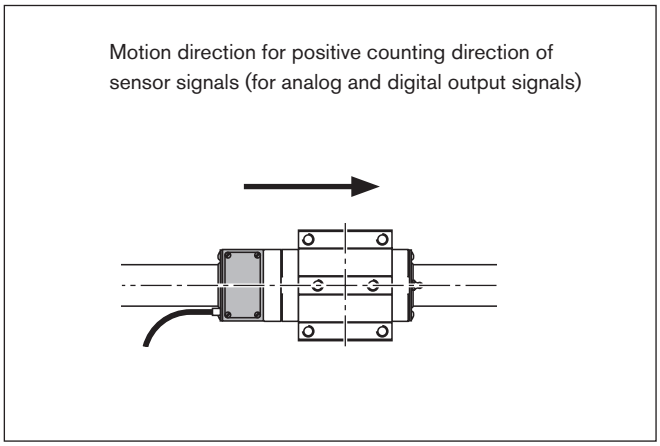
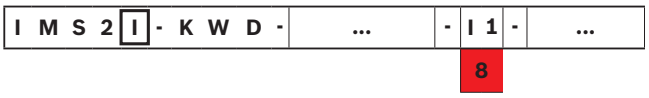


Fig. 7: **Definition of the motion direction**

2.6 Identification / selection of the measuring system



I= Incremental ➠ 2.7 / A= Absolute ➠ 2.8

2.7 Signal types IMS-I

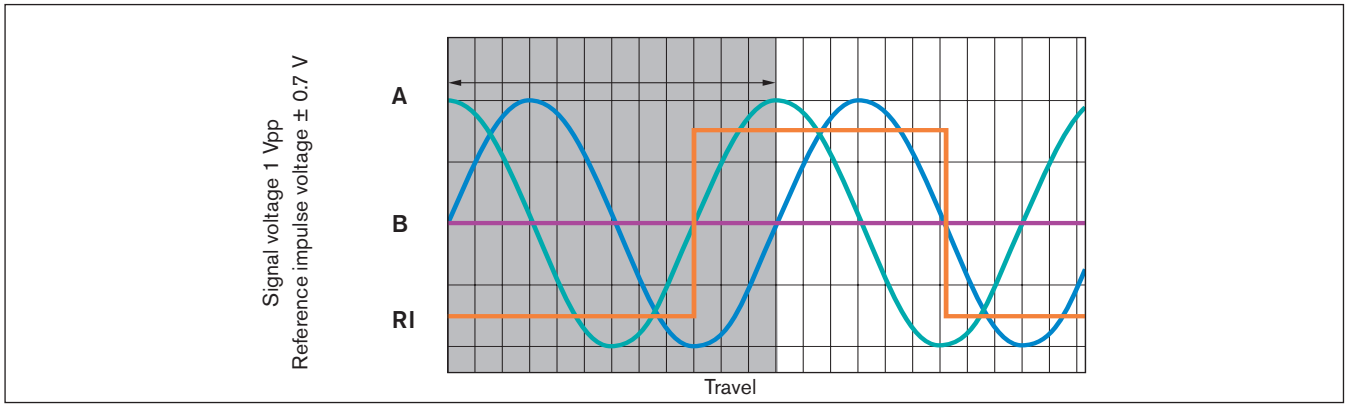


Fig. 8: **Analog sinusoidal (I1)*)**

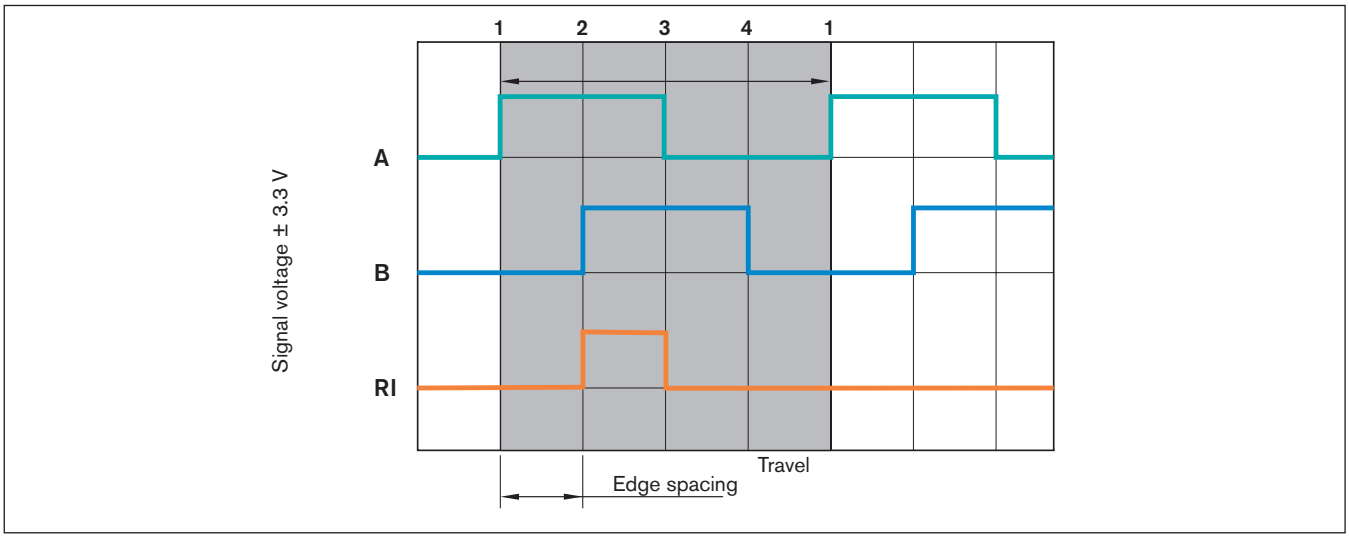


Fig. 9: **Digital square-wave signals (I2, I3, I4)*)**

Feature	**Description**	**Resolution (edge spacing)** (µm)	**Signal period** (µm)
I2	TTL 1 µm	1	4
I3	TTL 5 µm	5	20
I4	TTL 10 µm	10	40

*) **Fig. 8 / 9: A, B and full differential RI for sensor motion in the positive counting direction.**

2.7.1 Notes and electrical data of the signal types

- Close the signal outputs with a load resistance of 120 Ω.
- An oscilloscope with differential scanner is suitable for measuring the signals.
- The edge spacing corresponds to the TTL resolution e.g. TTL 1µm has an edge spacing of 1 µm

NOTE

Damage due to incorrect signal measurement!

Short-circuit.

- Ensure that a differential scanner is used for measuring!
  Otherwise, one of the signals to be measured could be short circuited by the ground connection of the oscilloscope.

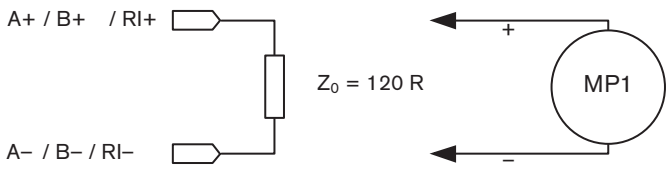


Fig. 10: **Differential measurement**

Table 7: Electrical data of the signal types

Symbol	Parameter	Unit	Nom.	Min.	Max.	Remark
Incremental analog interface (I1) / 1 V_{pp}						
$U_{A/B}$	Differential signal voltage	V_{PP}	1	0.6	1.2	
U_{RI_LOW}	Differential Low of reference voltage	V	-	±0.7	-0.4	
U_{RI_HIGH}	Differential High of reference voltage	V	-	0.4	±0.7	
$T_{A/B}$	Signal period	µm	40	-	-	
B_{RI}	Reference signal pulse width	µm	40	20	60	
$f_{A/B\ A}$	Analog signal frequency at V_{max}	kHz	-	0	125	
$t_{RI\ A}$	RI pulse duration at v_{MAX} (analog)	µs	8	4	12	
Incremental digital interface (I2, I3, I4) / TTL						
$U_{A/B/RI\_LOW}$	Differential Low of signal voltage	V	-	-3.3	-2	
$U_{A/B/RI\_HIGH}$	Differential High of signal voltage	V	-	2	3.3	
$T_{A/B\ TTL}$	Signal period	µm	4	-	-	1 µm TTL
			20			5 µm TTL
			40			10 µm TTL
$B_{RI\ TTL}$	Reference pulse width	µm	1	-	-	1 µm TTL
			5			5 µm TTL
			10			10 µm TTL
f_{A/B_TTL}	Square frequency displacement signals	kHz	-	0	250	1 µm TTL
					250	5 µm TTL
					125	10 µm TTL
t_{RI_TTL}	RI pulse duration at v_{MAX} (digital)	µs	1	-	-	1 µm TTL
			1			5 µm TTL
			2			10 µm TTL
The switching response times are ≤ 100 ns at a capacitative load of ≤ 1000 pF.						

2.7.2 IMS-I distance-coded reference marks:

When entering parameters in the drive controller, the values for the distance-coded reference dimension A/B have to be multiplied by a factor (1000µ/signal period) because of the signal period of 40 µm (I1).
The same applies when using distance-coded reference marks with a basic distance T_R = 40, 70, 90 and 100 mm.

S-0-0165 distance-coded reference dimension A (larger distance)
S-0-0166 distance-coded reference dimension B (smaller distance)
S-0-0277 Bit 1 1 = distance-coded reference marks
Bit 5 1 = negative counting direction
e.g. For a rail with T_R = 90 mm, the controller values to be entered are 2250 and 2275.

Table 8: Controller values

Rail length (mm)	**Reference dimension T_R (mm)**	**Controller value:** S-0-0165 / S-0-0166			
		I1 / $1V_{PP}$	I2 / TTL 1 µm	I3 / TTL 5 µm	I4 / TTL 10 µm
≤ 800	40	1 025	10250	2050	1 025
		1 000	10000	2000	1 000
≤ 2 400	70	1 775	17750	3550	1 775
		1 750	17500	3500	1 750
≤ 4 000	90	2 275	22750	4550	2 275
		2 250	22500	4500	2 250
≤ 4 500	100	2 525	25250	5050	2 525
		2 500	25000	5000	2 500

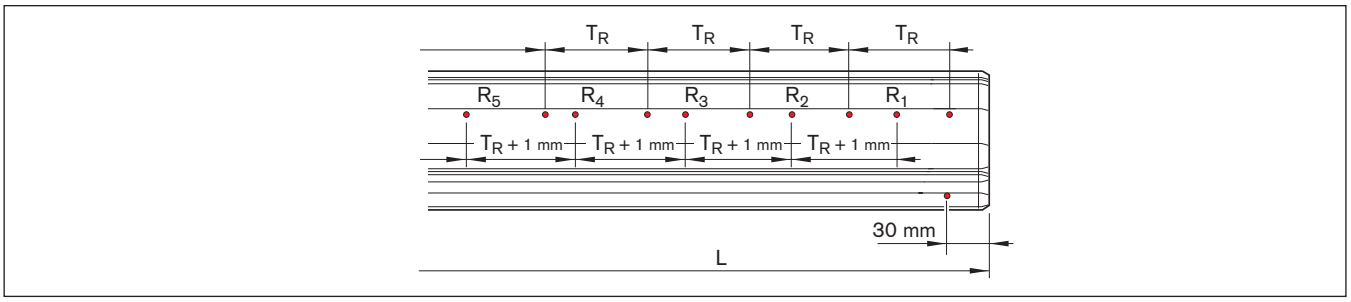


Fig. 11: **Reference marks**

▶ Enter the controller values in IndraWorks

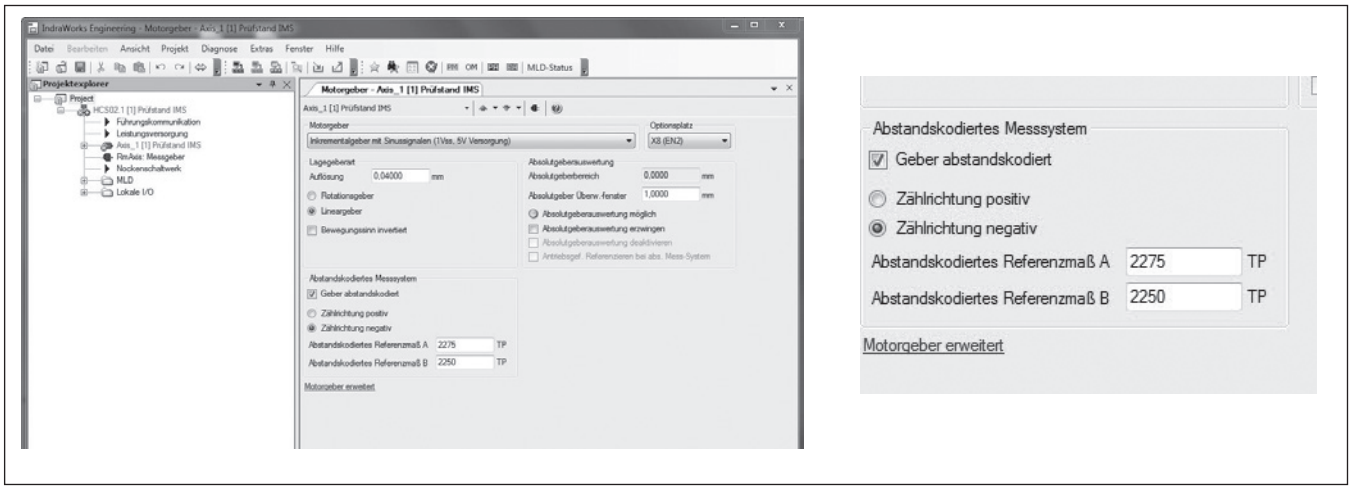


Fig. 12: **Example: Parameter input (controller value) in IndraWorks for encoder interface EN2.**

2.8 IMS-A

2.8.1 Adjust the absolute offset value

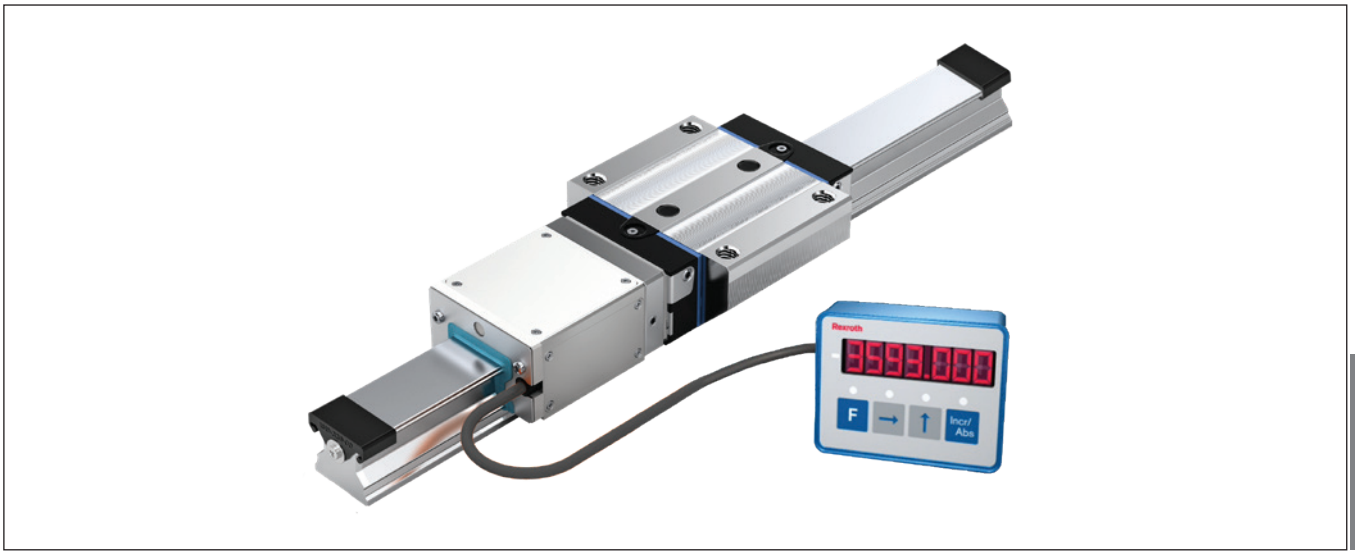


Fig. 13: **Adjust the absolute offset value**

- An arbitrary absolute code band section (between 0 meters and 24.5 meters) is installed in each absolute rail. This leads to an absolute offset, which the customer first needs to correct to the machine-specific value in order to set the absolute zero point dimension to the required position.
- Even when re-ordering an absolute rail with the same material number, the absolute offset needs to be corrected again by the customer.

2.8.2 HIPERFACE® (Option: HF)

For additional information about the RS485 settings see HIPERFACE ® - description, part no. 8010701.

Table 9: Type-specific settings

Type ID (command 52 h)	FFh (Size 64 Bytes)
Free E2PROM [bytes]	2048
Address	40 h
Mode_485	E4 h (Default: 9600 Bd, Even Parity)
Codes 0 to 3	55 h (Default)
Counter	0
Max. number of data arrays	16
Max. size of data arrays (bytes)	128

Note: size of data arrays, can be determined by reading “Status data field”.

Table 10: Programmable baud rates (see RS485 Settings, Command 57 h, 67 h)

RS485 Settings (Command 57 h and 67 h)	Baud rate
[D2..D0] = 100	9600 Bd (default)
[D2..D0] = 101	19200 Bd
[D2..D0] = 110	38400 Bd
[D2..D0] = other	9600 Bd (default)

Table 11: Overview of supported commands

Command Byte / Funktion	Code 0 [1]	Comment
42h Read position		
43h Set position	●	
44h Read analog value		
46h Read counter		
47h Increase counter		
49h Delete counter	●	
4Ah Read data		
4Bh Store data		
4Ch Determine status of a data field		
4Dh Create data field		
4Eh Determine available memory area		
4Fh Change access code		
50h Read encoder status		Status messages see table 12
52h Read out type label		
53h Encoder reset		
55h Allocate encoder address	●	
56h Read serial number and program version		
57h Configure serial interface	●	
63h Set position with internal synchronization	●	
67h Temporarily configure serial interface		

1) The commands thus marked include the parameter “Code 0”. Code 0 is a byte inserted into the protocol to provide additional protection of vital system parameters against accidental overwriting. When the device is delivered, “Code 0” = 55 h.

Table 12: Overview of status messages

	Status code	Description
Error type	00h	The encoder has not detected any faults
Initialization [2]	01h	Calibration data incorrect / not valid
	06h	Internal checksum error
Protocol	09h	Parity error
	0Ah	Checksum of transmitted data is incorrect
	0Bh	Unknown command code
	0Ch	Number of transmitted data is incorrect
	0Dh	Transmitted command argument is not allowed
Data	0Eh	The selected data field must not be written to
	0Fh	Incorrect access code
	11h	Specified word address lies outside the data field
	12h	Access to non-existent data field
Position [2]	15h	Error in determining the absolute position
	16h	Error in determining the absolute position
	1Ch	Exceeded vector length limit (for example, scanner position is out of scale)
Other	13h	Encoder temperature limit is reached (Errorbit is set) [2]
	08h	Counter overflow

2) If a position error or initialization error occurs or the encoder temperature limit is reached, the system has to be reset with command 53 h or switched on/off to clear the failure.

After Command “Encoder reset” 53 h the absolute position is redetermined.

Error messages:

No Answer:

- Incorrect transmission parameters (e.g. wrong parity)
- incorrect address (e.g. Default 40 h or broadcast address FFh)

➠ The frame is discarded

Status message 0Ah (checksum of the transmitted data is wrong)

- Frame lenght corrupt or checksum failure
- Wrong command received
- Incomplete command received (wrong bit count) the frame will be discarded
- Too much bytes received, all redundant bytes will be discarded and the next correct received command will be executed

Command 56h: “read serial number and program version”

Serial number: Consists of 9 bytes (MSB first, LSB least) which contains the hex encoded scanner serial number.

Firmware Version: consists of 20 ASCII Characters

Structure: ‘F‘ ‘W‘ aa ‘.‘ bb ‘.‘ cc ‘L‘ ‘W‘ dd ‘.‘ ee ‘.‘ ff

aa to ff are placeholders (each 2 ASCII characters)

aa, dd: system, bb, ee: version, cc, ff: Release

Firmware Date: consists of 8 ASCII Characters. Structure TT.MM.YY

Nameplate information in the data field 0xFF (Encoder with Type Label 0xFF)

Table 14: Area A: Encoder description (address 00..1Bh)

Address	Byte no.	Contents	Description
00	1	D7h	Checksum
01	2	03	Bit1 = 1: Counting method bipolar; Bit0 = 1: Linear
02...05	3-6	0x00009c40	Period length in nm: 40 µm = 40.000 nm = 0x00009c40
06...09	7-10	0x00096000	Coded measurement range in number periods (1..n): (2**14) * 1.5 mm ==> 24576000 µm / 40 µm = 614400 ==> 0x96000
	0		
0Ah...1Bh	11-28	BOSCH- REXROTH IMS	Designation, 18 digits, left-justified, ASCII “BOSCH-REXROTH IMS” ASCII: 42 4F 53 43 48 2D 52 45 58 52 4F 54 48 20 49 4D 53 20

Other nameplate data is saved in the data field 0xFA (128 bytes)

Table 15: Area B: Parameter selector (address 1Ch..1Dh for parameter selector 1)

Address	Byte no.	Contents	Description
1Ch...1Dh	29-30	0x0000	Not used

Table 13: Area C: Parameter selector (address 1Eh..3Fh for parameter

Address	Byte no.	Contents	Description
1Eh...3Bh	31-59	0x00...0x00	Not used
3Bh...3Fh	60-64	0x00...0x00	Not used

Wiring of the RS485 interface, HIPERFACE parameter channel

The measuring system system is not intended for bus operation

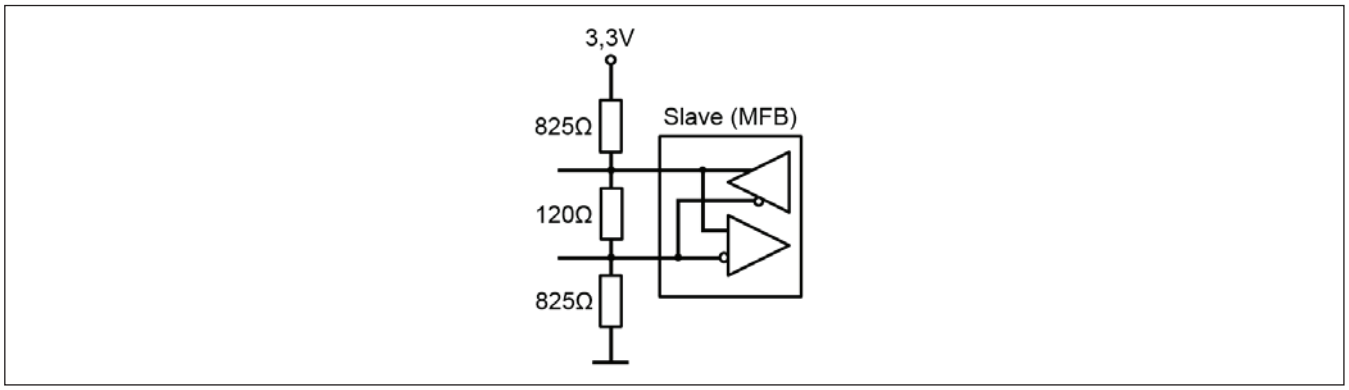


Fig. 14: **Wiring of the RS485 interface**

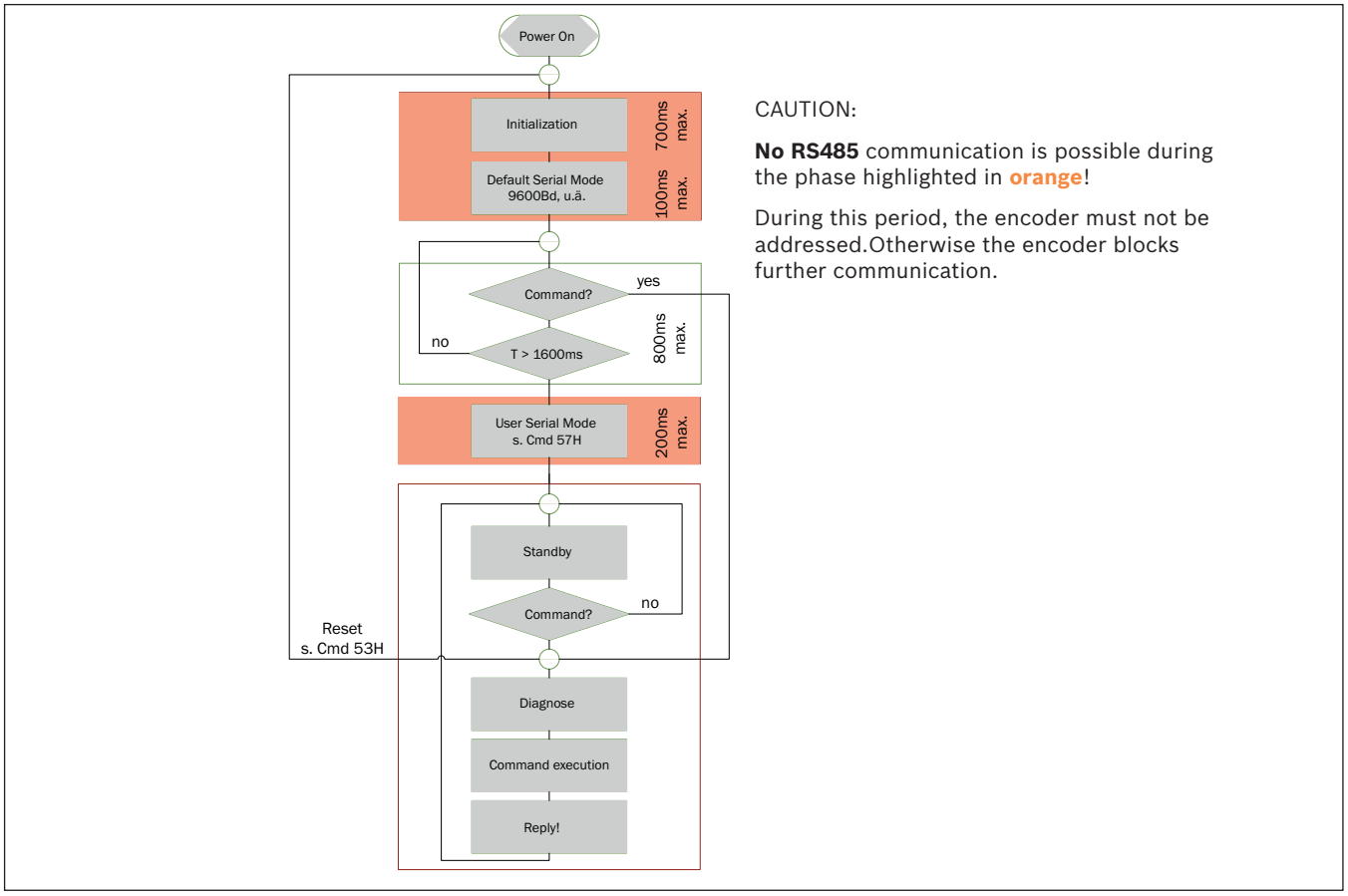


Fig. 15: **HIPERFACE flowchart**

▶ Entering controller values in Indraworks

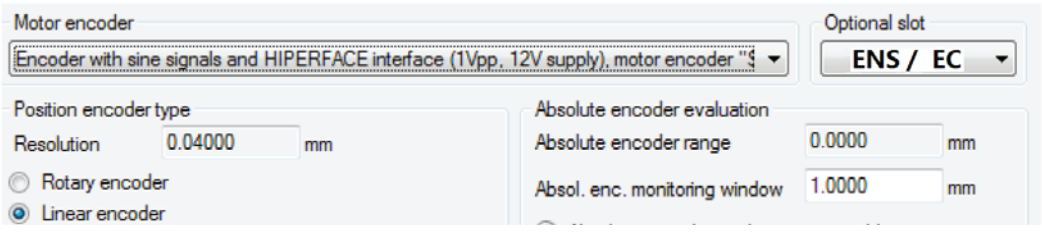


Fig. 16: **Entering controller values in Indraworks**

2.8.3 Putting into service IMS-A - SSI

SSI – Synchronous Serial Interface (options: S1, S2, S3, S4)
With the synchronous serial interface (SSI), the absolute position information is transferred to higher-level evaluation electronics via serial data transmission. Parallel to the serial data transmission, the incremental sinusoidal and cosine signals are also available for an enhanced control performance.

Table 16: SSI variants:

	S1	S2	S3	S4	S9
Coding	Binary	Binary	Binary	Gray	Exact interface parameters can be found in the order
Number of bits (position)	22	25	27	28	
Parity	straight	straight			
Error bit	yes	yes	yes	no	
Warning bit	yes	yes	no	no	
Interface resolution /µm	10	1	0.25	0.125	
Max. clock frequency	2 MHz	2 MHz	2 MHz	2 MHz	

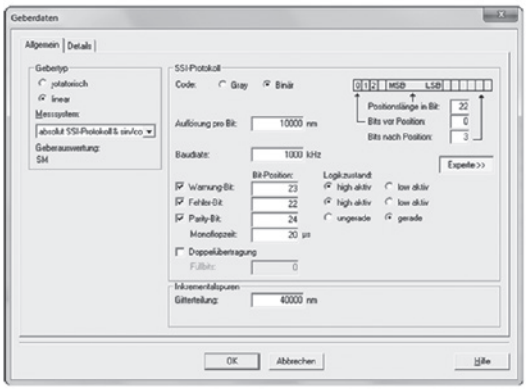


Fig. 17: **Configuration example S1**

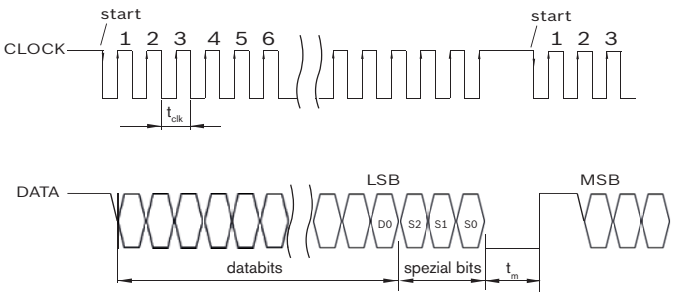


Fig. 18: **Timing diagram**

- Minimum cycle period duration t_{clk}: 500 ns
- Monoflop Time t_m: 20 µs
- S2: Error bit - is set if the determination of the absolute position fails or the scanner is no longer positioned over the grille band.
  The error bit can only be reset by switching the system off (power down).
- S1: Warning bit - is set if the permissible operating temperature is exceeded or not reached.
- S0: Parity

2.8.4 DRIVE-CLiQ (Option DQ)

DRIVE-CLiQ is a protected trademark of Siemens

IMS-A with DRIVE-CLiQ interface enables easier start up, as the interface has an electronic nameplate.

This contains IMS-A-specific data, which enables error-free configuration of the drive system during start-up.

Table 17: Supported messages

Message	Error description	Acknowledgment
31137: Encoder 1: internal error during orientation (Error cause: 10_0000_0001 bin)	Failed to detect the absolute position, scanner outside the rail, or assembly error.	Switch off (power down)
31405: Encoder 1: Temperature in encoder evaluation impermissible (1250)	Operating temperature limits exceeded or not reached.	Comply with the operating temperature limits again and acknowledge the error bit.

2.8.5 FANUC (Option FN)

IMS-A with serial FANUC interface αi offers robust, reliable, and purely serial communication for high performance tooling machines with FANUC control units.

Set the parameters of the encoder resolution to 0.025 µm.

Timing position data sampling:

T_{SAMP} = 1.428 µs ± 91 ns

T2 = 1.647 µs ± 91 ns

RO: Request Signal

SO: Serial data output

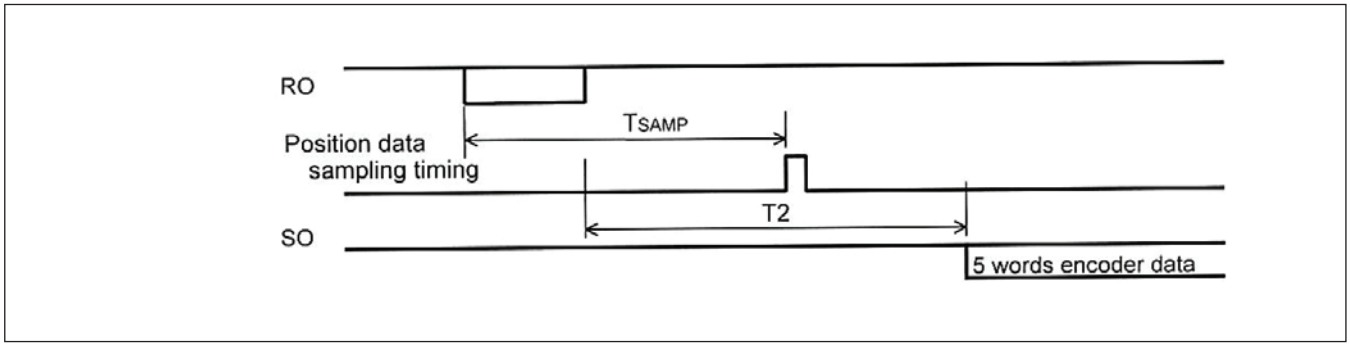


Fig. 19: **Timing diagram position data sampling**

Table 18: Supported messages

Message	Error description	Acknowledgment
OHAL “Overheat Alarm”	Exceeded encoder temperature limit reached	Depends on parameterization of the FANUC controller
CMAL “Count Miss Alarm”	Error in determining the absolute position	Alarm-Reset/All-Reset/Power down
PMAL “Pulse Miss Alarm”	Exceeded vector length limit (for example, scanner position is out of scale)	

3 Accessories

3.1 Extension cable

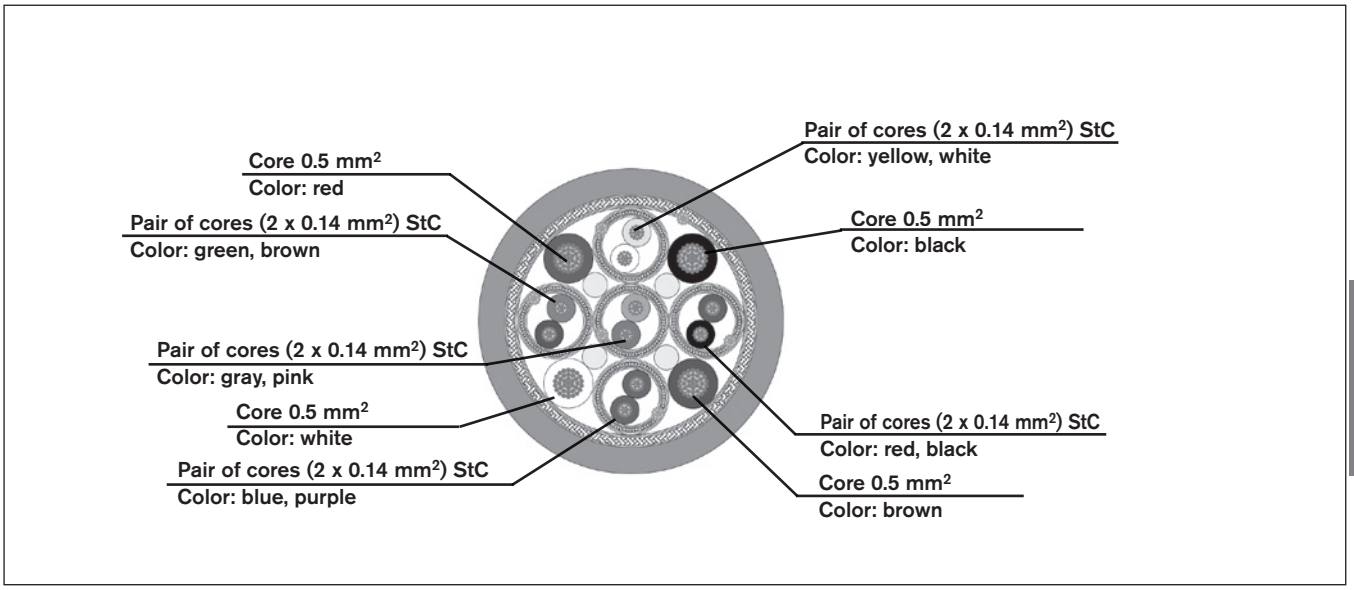


Fig. 20: **Cable structure REG0011**

Table 19: Technical data, extension cables

Cable sheath	(Polyether-based) polyurethane surface, matte, low-adhesion
Color	RAL 2003 (orange)
Cable outside diameter	10.0 ± 0.3 mm
Shield coverage	> 85 %
Bending cycles	> 5 million (with the following parameters: acceleration 20 m/s²; speed 5 m/s; travel path 20 m)
Smallest bending radius (flexing operation)	8x cable diameter
Smallest bending radius (stationary)	4x cable diameter
Test voltage core/core	2 kV
Core/shield	2 kV
Insulation resistance at 20 °C	> 20 MΩ x km
Max. current load	As per DIN VDE 0298-4, 2003-08
Conductor resistance at 20 °C	As per DIN VDE 0295 class 6 or IEC 60 228 class 6
Cable resistance	39 Ω/km at 0.5 mm² ; 140 Ω/km at 0.14 mm²
Continuous operating temperature	-40... +80 °C

The cable is halogen-free and flame-retardant, UL and CSA approved, UL-Style 20233 (80 °C/300 V)

IMS A and I extension cable

RKG 0055 extension cable (M17 ➠ EC/ENS interface (12 V DC))

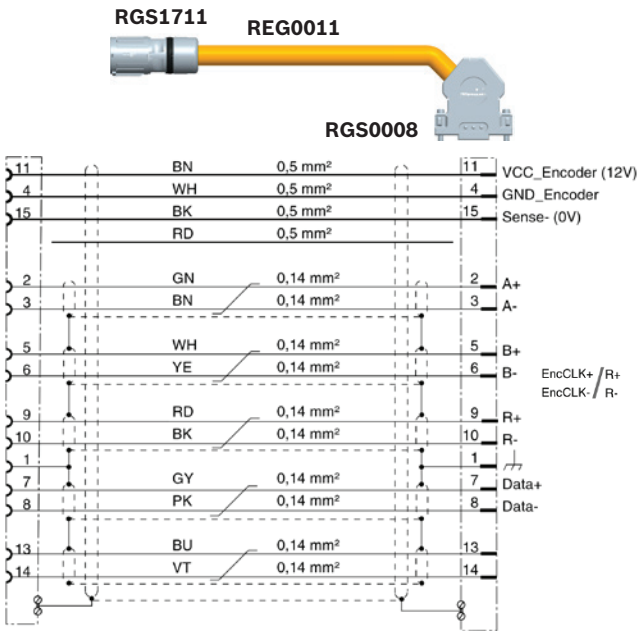


Fig. 21: **Cable structure RKG 0055**

RKG 0057 extension cable (M17 ➠ M17)

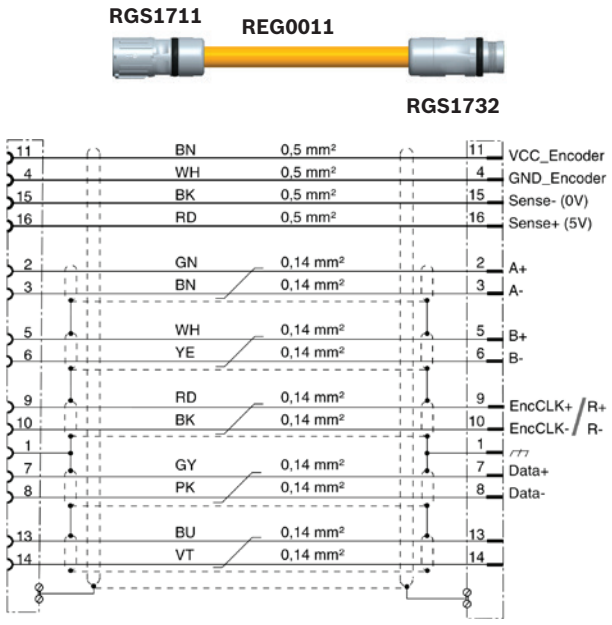


Fig. 22: **Cable structure RKG 0057**

RKG 0058 extension cable (open cable ends)

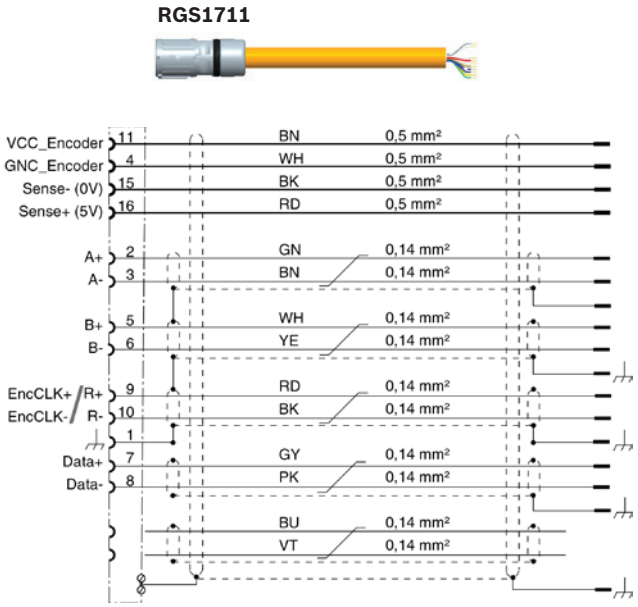


Fig. 23: **Cable structure RKG 0058**

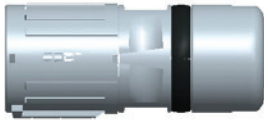
Single connector (RGS1711)

The RGS1711 single connector is available to customers for the self-assembly of an extension cable for IMS-I or IMS-A (with Hiperface).

The RGS1711 single connector can also be ordered as an accessory (R911342383).

Bosch Rexroth recommends using a double shielded cable in accordance with the structure of the REG0011 raw cable.

The pin assignment of the RGS1711 corresponds to that of extension cable RKG0058 (➠ Fig. 24).



View of contact side

Fig. 24: **Single connector (RGS1711)**

Extension cable IMS-I

RKG 0056 extension cable (M17 ➠ EN2 interface (5 V DC))

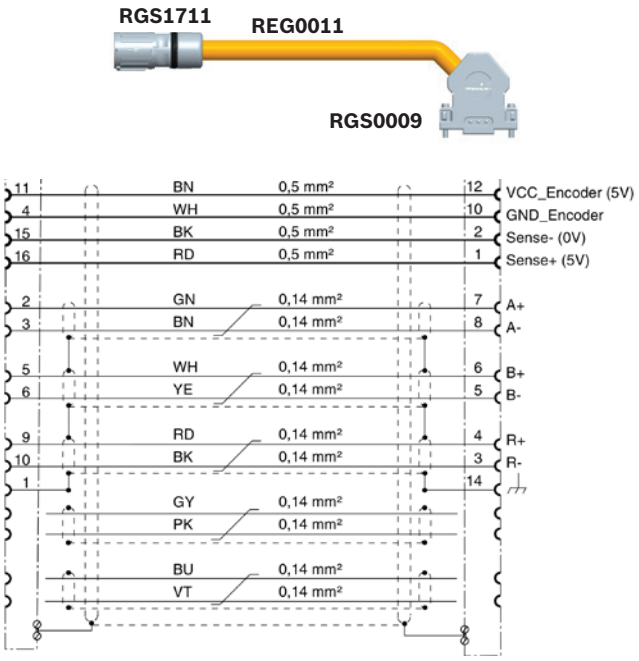


Fig. 25: **Cable structure RKG 0056**

RKG 0060 extension cable (M17 ➠ M23, 12 pin, male)

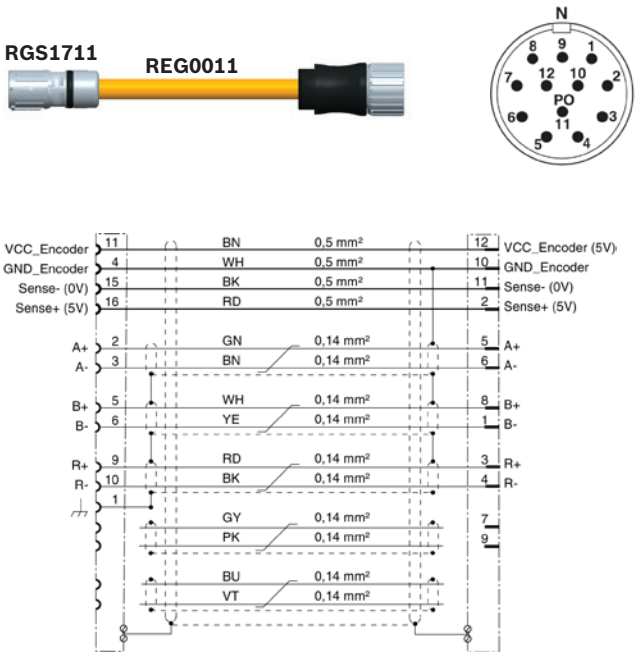


Fig. 26: **Cable structure RKG 0060**

RKG 0061 extension cable (M17 ➠ M23, 12 pin, male)

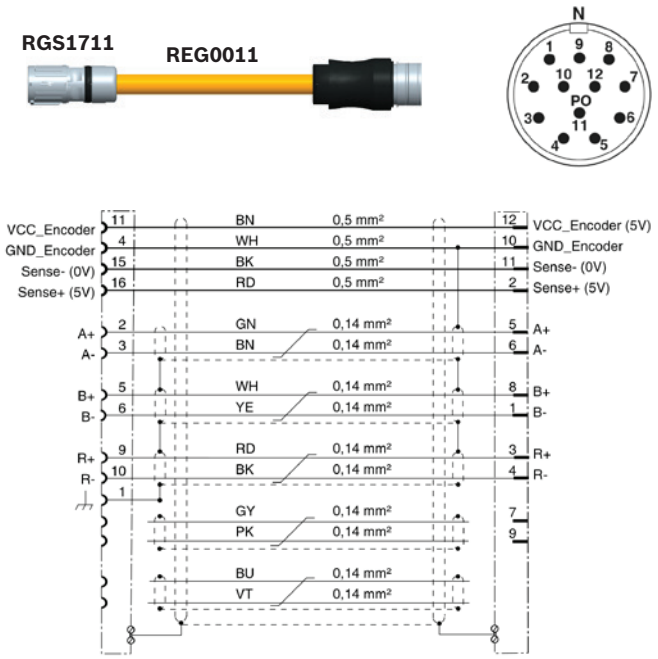


Fig. 27: **Cable structure RKG 0061**

Extension cable IMS-A

RKG 0071 extension cable (M17 ➠ M23, 17 pin, male)

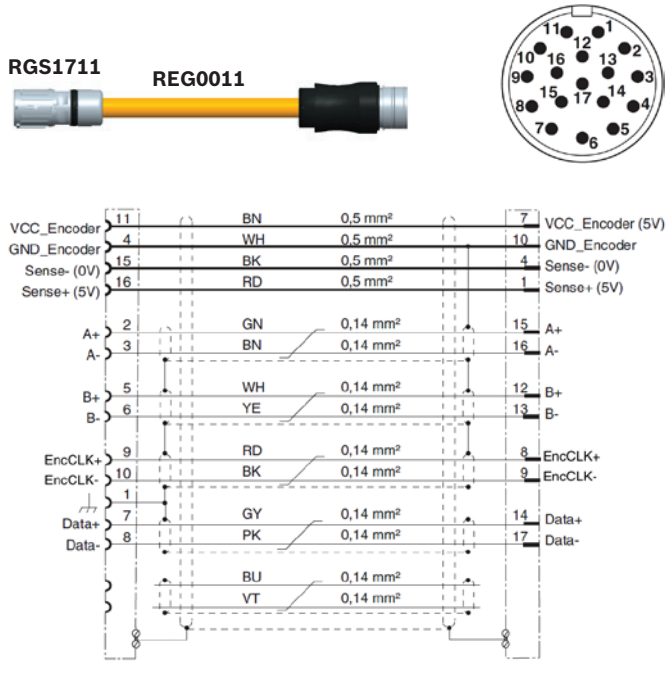


Fig. 28: **Cable structure RKG 0071**

4 Operating conditions

NOTE

Damage due to non-compliance with the operating conditions

Damage to the product.

- Observe the additional operating conditions in the “Mechanical system” instructions R320103262.

Table 20: Operating conditions IMS-A with Hiperface interface

Symbol	Parameter	Unit	Min.	Nom.	Max.	Remark
VDD	Power supply	V	7	8	28	
I_{max}	max. Current consumption	mA	-	-	250	at 7 V
V	Measuring speed	m/s	-	-	5	
	Extension cable	m	-	-	75	

Table 21: Operating conditions IMS-A with SSI interface

Symbol	Parameter	Unit	Min.	Nom.	Max.	Remark
VDD	Power supply	V	4.75	-	28V	
I_{max}	max. Current consumption	mA	-	-	300	at 5 V
V	Measuring speed	m/s	-	-	5	
	Extension cable	m	-	-	10	at 2 MHz
					48	at 1 MHz
					74	at 750 KHz

Table 22: Operating conditions IMS-A with DRIVE-CLiQ interface

Symbol	Parameter	Unit	Min.	Nom.	Max.	Remark
VDD	Power supply	V	13.2	24	30.8	
I_{max}	max. Current consumption	mA	-	-	110	
V	Measuring speed	m/s	-	-	5	
	Extension cable	m	-	-	-	in accordance with Siemens specification

Table 23: Operating conditions IMS-A with Fanuc interface

Symbol	Parameter	Unit	Min.	Nom.	Max.	Remark
VDD	Power supply	V	4.6	5.0	12.6	
I_{max}	max. Current consumption	mA	-	-	350	
V	Measuring speed	m/s	-	-	5	
	Extension cable	m	-	-	48	FANUC cable LX660-4077-T321

Table 24: Operating conditions IMS-I

Symbol	Parameter	Unit	Min.	Nom.	Max.	Remark
VDD	Power supply	V	4.75	5	12.6	
I_{max}	max. Current consumption	mA	-	-	350 TTL 300 1Vpp	Control to 5 V USense
					190 TTL 170 1Vpp	at 12 V
V	Measuring speed	m/s	-	-	5 5 2 5 5	1 V_{PP} 40 µm 1 V_{PP} 1000 µm 1 µm TTL 5 µm TTL 10 µm TTL
V_{ref}	Homing cycle speed	m/s	-	≤ 1	v_{max}	
	Extension cable	m	-	-	30 75	at 5 V VDD at 12 V VDD

5 Troubleshooting and fault clearance

See the “Mechanical system” instructions R320103262.

6 Service and support

6.1 Service hotline

Our service hotline will be happy to assist you in any way they can.
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