The Drive & Control Company

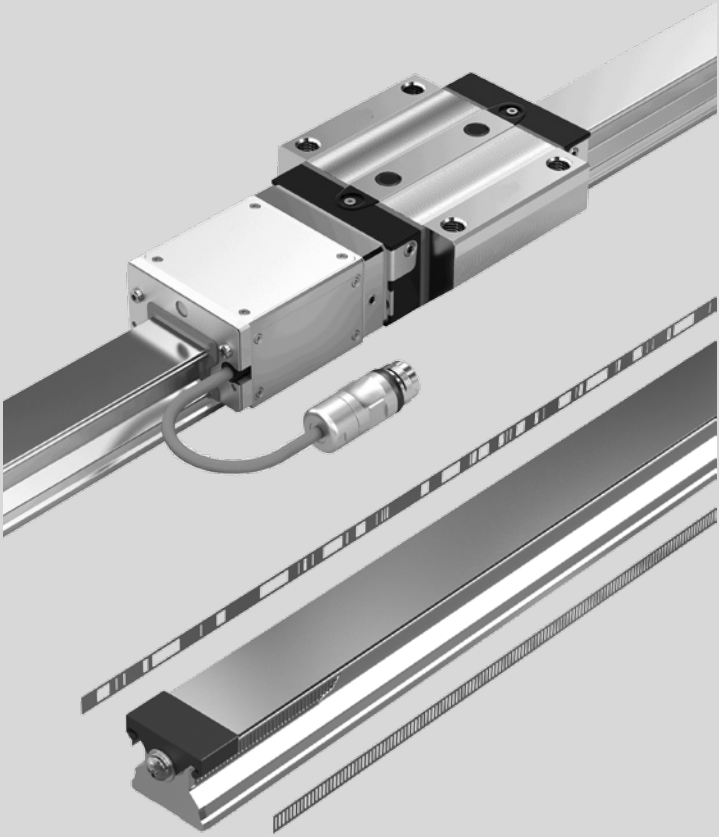
Rexroth
Bosch Group

Integrated Measuring System IMS for Ball and Roller Rail Systems

R320103262 (2015.12)
Replaces: 2014.04
DE+EN+FR+IT+ES+
PT+ZH

Instructions

EN



Die vorliegende Anleitung ist in folgenden Sprachen verfügbar.
These instructions are available in the following languages.
Les présentes instructions sont disponibles dans les langues suivantes.
Le presenti istruzioni sono disponibili nelle lingue seguenti.
Las presentes instrucciones están disponibles en los siguientes idiomas.
As presentes instruções estão disponíveis nas seguintes línguas.
本说明书有下列语言版本。

DE German (Originaldokumentation)
EN English
FR Français
IT Italiano
ES Español
PT Português
ZH 德文

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 deinstallation of the product and for troubleshooting simple errors oneself.

▶ Before putting the product into service read this instruction 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	Type
📖	Integrated Measuring System IMS	R310EN 2350	Catalog
📖	Ball rail systems	R999000464	Catalog
📖	Roller rail systems	R999000353	Catalog
📖	Instructions for profiled rail systems	R320103885	Instructions
📖	Product data sheet for Dynalub 510	R310 2052	Catalog
📖	System documentation of the machinery/ system manufacturer		
📖	Manuals for the other machine/system components		

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 sub-sections.

1.3.1 Safety instructions in these instructions

These instructions contain 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.

- Safety alert symbol: 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 ignored.

Hazard levels as per ANSI Z535:

Safety alert symbol, signal word	Meaning
⚠ DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
NOTICE	Damage to property: Risk of damaging the product or the surrounding environment.

1.3.2 Symbols

The following symbols designate notes or cross-references that are not safety-relevant but increase the clarity of the documentation.

Table 2: Meaning of the symbols

Symbol	Meaning
	If this information is not observed, the product will not be used optimally.
▶	Single, independent work step
1. 2. 3.	Numbered work steps The sequence of the work steps is indicated by the numbers.
➠ 7	See section 7
➠ Fig. 7.1	See figure 7.1
	Screw with strength class...
	Tightening torque
μ	Friction factor for screws
	Clean
	Wear gloves

1.3.3 Abbreviations

The following abbreviations are used in this document:

Table 3: Abbreviations and definitions

Abbreviation	Meaning
IMS	Integrated Measuring System
IMS-I	Integrated Measuring System Incremental
IMS-A	Integrated Measuring System Absolute
BRS	Ball Rail System
RRS	Roller Rail System

2 Safety instructions

The product has been manufactured according to generally accepted standards of good engineering practice. Nevertheless, if these safety instructions and the

safety instructions given in the related documentation (instruction manuals, product catalogs) are not adhered to, there is a risk of personal injury and damage to property when using the product.

These safety instructions form part of the product instructions.

To avoid personal injury and damage to property:

- Before commencing any work with the product, be sure to read the product documentation carefully and completely.
- Make sure these safety instructions and the product documentation are always accessible to all users.
- When passing the product on to third parties, always include these safety instructions and all the required documentation.
- The product may only be mounted, started up and maintained in accordance with these safety instructions and the information given in the product documentation.

2.1 Intended use

The Integrated Measuring System (IMS for short) is an assembly. The IMS consists of components for precise linear movements and integrated position measuring. The product may be used in accordance with the technical documentation (➠ product catalog) for the following purposes:

- as a direct linear position sensing system in industrial environments (woodworking, laser welding, laser cutting, metal cutting and metal forming machine tools, automation technology.
- as linear encoder in applications with a linear motor.
- in interpolating axes in machine tools.
- in measuring machines within the scope of the achievable accuracy.
- as a scale for connection to display units, evaluation electronics for PCs and drive controllers.

The product is exclusively intended for professional use and not for private use.

Use for the intended purpose also includes the requirement that you have read and understood the product documentation completely, in particular these “Safety instructions”.

The product is exclusively intended for incorporation into a final machine or a system or for assembly to other components for the purpose of building a final machine or a system.

The permitted operating conditions are determined by the individual components.

2.2 Misuse

Use of the product in any other way than as described under “Intended use” is considered to be misuse and is therefore not permitted.

The product may only be used in applications or environments constituting a danger to the health and life of persons if this use – for example, in potentially explosive atmospheres covered by ATEX regulations – has been expressly specified and permitted in the product documentation.

Bosch Rexroth AG will not accept any liability for injury or damage caused by misuse of the product. The risks associated with any misuse of the product shall be borne by the user alone.

Misuse of the product includes:

- The transport of persons
- Use in potentially explosive atmospheres
- Use in the food industry in direct contact with unpacked foods
- Use in liquids
- Use as a safety component, either mechanical or electrical
- Use in environments with increased radioactivity
- Use with clamping and braking units

2.3 Personnel training and qualifications

The activities described in these safety instructions and the product documentation require fundamental knowledge of mechanical and electrical engineering principles and familiarity with the associated technical terminology. For transporting and handling the product, additional skills are required in regard to the correct use of hoisting equipment and the associated fastening means.

In order to ensure safe use, these activities may therefore only be performed by appropriately trained specialists or instructed persons working under the supervision of a trained specialist.

A trained specialist is a person whose professional training, knowledge, experience and familiarity with the relevant regulations enable him/her to assess the tasks assigned to him/her, identify potential hazards and take appropriate safety precautions. A trained specialist must adhere to the relevant technical rules and standards and possess the necessary technical knowledge to do so.

Bosch Rexroth offers you support for training in specialist areas. You will find an overview of the training topics offered on the internet at: http://www.boschrexroth.com/didactic

2.4 General safety instructions

The Integrated Measuring System uses state-of-the-art technology and complies with the relevant safety regulations. However, dangers can still arise.

Improper handling of these components, failure to comply with the safety instructions given here, and improper interventions can result in damage to property, injuries and, in extreme cases, death.

Persons who mount/install, operate, de-install or maintain Rexroth products shall not be under the influence of alcohol, other drugs or medications which might affect their judgment or slow down their reactions.

- The safety rules and regulations of the country in which the product is used must be complied with.
- All applicable accident prevention and environmental regulations must be adhered to.
- The product may only be used when it is in technically perfect condition.
- Only manufacturer-approved accessories and replacement parts may be used in order to exclude danger to personnel caused by unsuitable replacement parts.
- The technical data and environmental conditions stated in the documentation for the product and accessories must be complied with.
- The product may only be used in safety-relevant applications if this use has been expressly specified and permitted in the product documentation.
- 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 product has been installed complies with the country-specific requirements, safety regulations and standards for the application.
- The product must never be altered or modified.
- The product must never be disassembled. The only exceptions are activities described in the section “Removal and replacement” of the product instructions.
- The constituents of the product have been designed to last the lifetime of the product. In exceptional cases, however, a defect can occur. In vertical or hanging installations, the product can fall down.

  Appropriate measures must be taken in such installation configurations to protect against such an event (see also the Division Information Sheet on “Gravity-Loaded Axes” (No. 005 Edition 08/2012) of the Woodworking and Metalworking Division of the German statutory accident assurance association DGUV).
- The product must not under any circumstances be subjected to impermissible mechanical loads (for data, see product catalog).
- The product must never be used as a hand-support or step.
- Do not place any objects on the product without fixing them.

- Take note of the transport instructions on the packaging.
- Safety interlocks must be provided to prevent inadvertent switching on of the machine or system part.
- Cables and wires must be routed safely and tidily so that they will not be damaged and no one can become entangled in them.
- Checks must be performed to ensure that all electrical connections are connected up or sealed off.
- The product may only be put into service when it has been completely installed.
- It must be ensured that only persons so authorized by the equipment user are granted access to the immediate operating zone of the product. This applies also when the product is at a standstill.
- It must be ensured that no cable connections, other connections or parts are disconnected while the system is energized and under pressure. Secure the machine or system against reactivation.
- After any work on the machine, reinstall the product in compliance with instructions and regulations and check its function.
- The following standard is to be observed: DIN 637, Safety regulations for dimensioning and operation of profiled rail guides with recirculating rolling elements.

2.5 Personal protective equipment

- When handling the product, personnel must wear appropriate protective equipment or clothing (e.g. safety shoes, gloves, etc.). All items of personal protective equipment must be intact.

2.6 Duties and obligations of the user

The user of the product is responsible for complying with the appropriate safety precautions for use of the product for the particular purpose envisaged by the user.

- It must be ensured that the product is operated only within the scope of the intended use as stated under ➠ “2.1 Intended use”.
- It must be ensured that the operating personnel is appropriately instructed at regular intervals.
- Any potential hazard zones must be indicated by signs.

The user is responsible for ensuring that safety devices and guards are in proper working order.

2.7 Safety devices and guards

- It must be ensured that all safety devices and guards are in perfect condition and are inspected regularly according to the manufacturer's instructions and in compliance with occupational safety regulations.
- Before putting the product into service, it must be ensured that all safety devices and guards required for the product have been properly installed and are in full working order.

3 General notes on damage to product and property

The warranty applies exclusively to the as-delivered configuration.

- The warranty is voided by faulty mounting, start-up and operation, and by misuse and/or improper handling.
- The following notes apply to the use of single-axis and multiple-axis linear systems.

- All installation work must be performed with a high regard for cleanliness to avoid contamination that could lead to premature wear and malfunctioning of the product.
- Before starting up the product, all seals and plug-in connections must be checked for correct installation and intactness in order to prevent liquids and foreign matter from working their way into the product.
- At critical ambient temperatures, ➠ 15 "Operating conditions" in the product instruction manual, the product must be allowed to acclimatize for several hours before being put into service.
- Do not disconnect plug connectors or cover them with protective caps to ensure that no cleaning agent or detergent can work its way into the system.
- Perform the specified maintenance work at the intervals stated in the product instruction manual.

4 Scope of supply

Table 4: Scope of supply

Runner block	Guide rail
Runner block with mounted scanner	Guide rail with scale
Lube nipple	Accuracy report for the scale
Instructions for IMS (R320103262)	Mounting hole plugs or cover strip
	Instructions for the IMS guide rail (R320103696)
	Guide rail leaflet (R320103695)

4.1 Accessories

See “IMS” catalog for accessories

5 Product description

5.1 Features

Please refer to the notes, technical data and descriptions in the catalog.

5.2 Equipment description

The product consists of the following parts:

1 Guide rail
2 End seal
3 Support plate
4 Scanner
5 Adapter plate (fixed to the runner block)
6 Runner block
7 Reference marks (IMS-I) or scale with absolute code band (IMS-A)
8 Scale incremental
9 Scale protection: laser-welded stainless steel strip
10 Reference or absolute code sensor
11 Measuring sensor
12 Evaluation electronics
13 Cable and connector
14 Nameplate

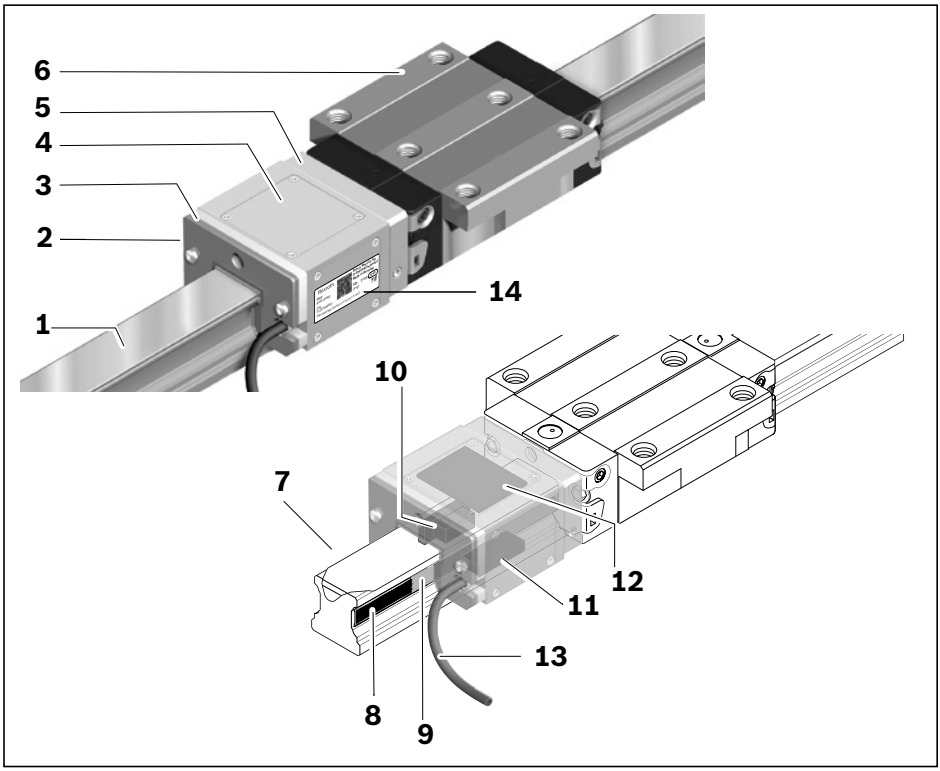


Fig. 1: **Structural design of the product**

5.3 Identification of the product

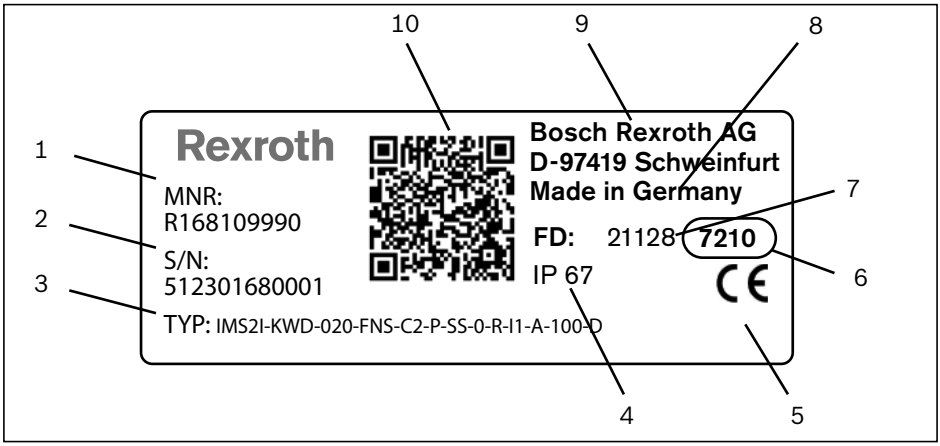


Fig. 2: **Nameplate IMS-I (example)**

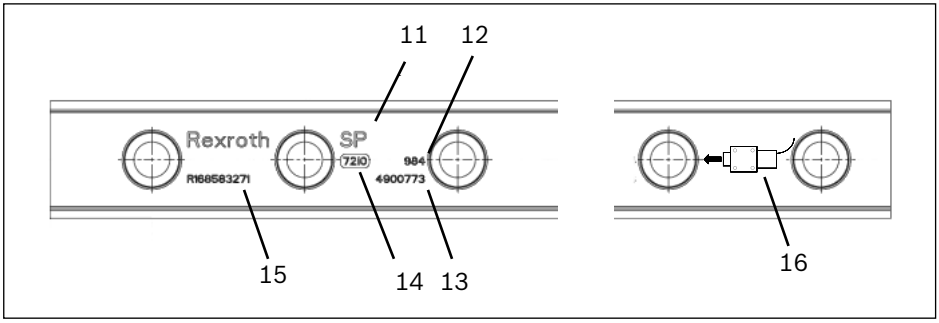


Fig. 3: **Identification guide rail (example)**

1 Part number
2 Serial number
3 Type designation (40 characters)
4 Protection class
5 CE mark
6 Department/factory number
7 Date of manufacture
8 Designation of origin
9 Company address
10 QR code
11 Accuracy class of the guide rail*
12 Date of manufacture
13 Serial number
14 Department/factory number
15 Part number
16 Rail end identification

* The accuracy class of the scale is shown on the accuracy protocol provided (scope of supply)

5.3.1 Type designation

Example type designation

I M S 2 I - K W D -
I M S 2 I - R W D -
I M S 2 A - K W D -
I M S 2 A - R W D -

IMS2	Integrated Measuring System Gen. 2
I	Incremental
A	Absolute
KWD	Ball runner block with scanner
RWD	Roller runner block with scanner

0 2 0	-	F N S	-	C 2	-	P	-	S S	-	R	-	R	-	I 1	-	A	-	1 0 0	-	D
1		2		3		4		5		6		7		8		9		10		11

1	Size
2	Construction form
3	Preload class
4	Accuracy class
5	Seal
6	Ball chain
7	Scanner mounting side
8	Interface
9	Connector type
10	Cable length
11	Documentation

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6 Transport and storage

Consider the operating conditions ➠ 15 and catalog.

6.1 Transporting the product

Take note of the Instructions for profiled rail systems

6.2 Storage

NOTICE

Risk of damage due to incorrect storage!

Potential corrosion of product parts.

- Store the product only in dry, roofed areas.
- Protect the protect against humidity and corrosive agents.

7 Mounting

7.1 Installation conditions

Consider the operating conditions ➠ 15 and catalog.

Dimensions and part numbers of the individual components ➠ Catalog

7.2 Mounting orientation

⚠ WARNING

Risk of product crashing down in vertical or slanting installations due to lack of arrestor devices!

Severe personal injury or even death.

- In vertical or slanting installations, secure the product so that it cannot drop down.
- Do not stand within the hazard zone.
- Observe the instructions for profiled rail system

NOTICE

Risk of damage due to non-permissible loads!

Damage to the product.

- Observe the instructions for profiled rail system

7.3 Mounting the IMS guide rails

7.3.1 Preparatory steps

The rail end at which the runner block (with scanner) is to be pushed on is identified with a label (1) and a lasting mark (2) on the guide rail.

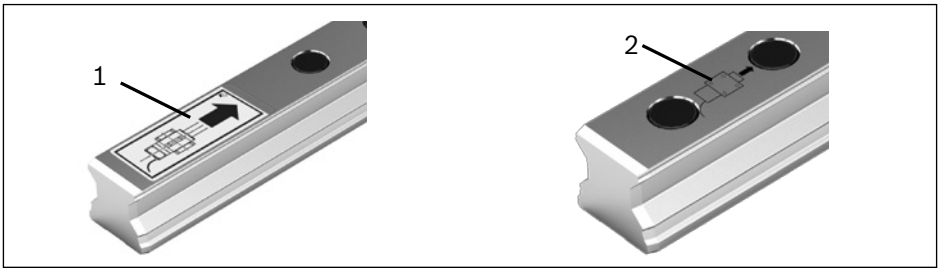

Fig. 4: **Preparatory steps**

- The runner block must be pushed on after the installation of the guide rail as shown on the label (1).
- Warning: when a cover strip is used, the markings (1) (2) are covered and the push-on direction is no longer visible.
- If it is mounted in the wrong direction, the measuring system will not work.

Remove the label and fix it on the rail bed/substructure or mark the push-on direction of the block in another suitable way.

7.3.2 Mounting the IMS guide rails

NOTICE

Damage due to improper mounting!

Damage to the product.

- Always handle the measuring system with great care.
- Observe the instructions for profiled rail system

Effects on the system accuracy of the measuring system.

- Mount the IMS guide rails as shown in Fig. 5.
- Take care not to exceed the maximum permitted tightening torques.

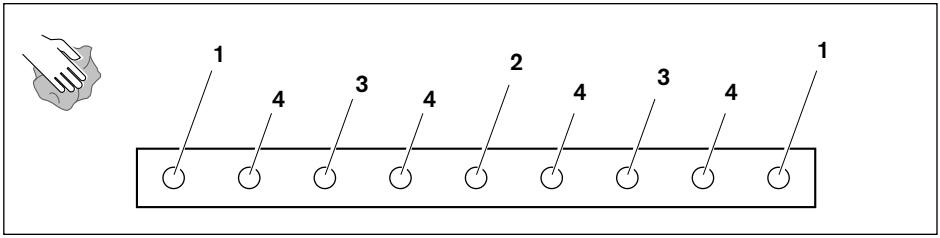

Fig. 5: **Mounting the IMS guide rails**

- For parallelism, vertical offset, screw fastening, strength ➠ see the relevant catalog.
- Before mounting the guide rail, the proper mounting orientation of the rail within the overall system must be verified. This can be done by checking against the design drawings. This will ensure the “right” orientation of the reference edge on the runner block, ensuring that the scanner on the runner block is in the right orientation in its final installed state.
- Screw down the guide rails starting with the ends (1).
- Then screw down each successive screw at mid-point (2, 3, 4) between two already installed screws.
- Mount the guide rail cover strip or mounting hole plugs ➠ see relevant instructions. If necessary, “mark” the direction in which the runner block has to be pushed on. (reuse the label)

7.4 Mounting the runner blocks

⚠ WARNING

Risk of injury due to sharp edges!

Crushed fingers and hands, slicing of finger tips when moving over the mounting holes of the guide rail.

- Plug the mounting holes in the guide rail before pushing on the runner block.
- Observe the instructions for profiled rail system

NOTICE

Damage due to improper mounting!

Damage to the product.

- Always handle the measuring system with great care.
- Observe the instructions for profiled rail system
- The transport lock must remain in the runner block until the block is pushed onto the guide rail! Otherwise, the rolling elements may fall out!
- Do not push a runner block with measuring system onto the guide rail with the scanner first!
- Never push runner blocks with measuring system onto standard guide rails, only onto IMS guide rails.

7.4.1 Preconditions for proper mounting

- Do not push on the runner blocks until the mounting holes in the guide rails have been plugged. If the holes are not plugged, the seals on the runner block will be damaged.
- In composite guide rails with “sharp-edged” joints (where the joint area is not part of the measuring range), the scanner may only be traversed over the IMS guide rail when the system is in operation.
- Push on the IMS as marked on the rail ➠ 7.3.1.
- Do not apply any tension and pressure forces on the scanner via the cable.
- Smallest cable bending radius (20 mm stationary); cable is not suitable for use as a drag chain

7.4.2 Mounting the runner block

- Position the runner block with transport lock (1) against the guide rail.
- Push the runner block onto the rail ➠ Fig. 6
- Keep the transport lock (1) for later use during disassembly.

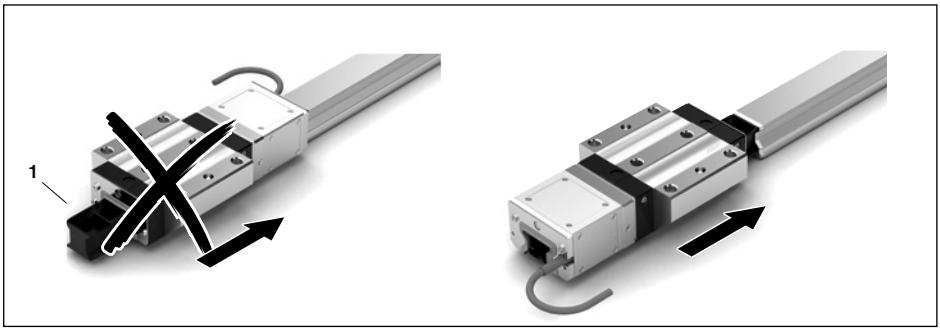

Fig. 6: **Pushing the runner block onto the rail**

7.5 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 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 14 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 voltage supply in accordance with the operating conditions ➠15.
- The voltage drop across the entire cable length must be taken into account to ensure that U_{min} is complied with.

7.6 Connectors / pin assignments

7.6.1 Connector types

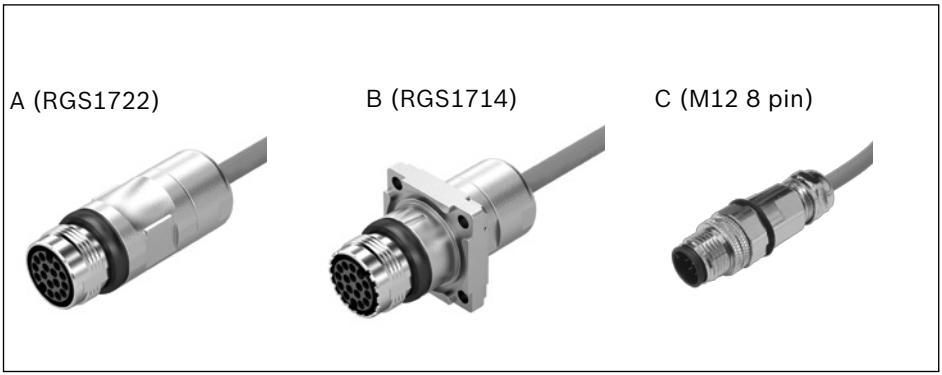

Fig. 7: **Connector types**

Connector type A/B

Scanner cable design with male contacts

Fig. 8: **View contact side connector type A/B**

Table 5: Pin assignment

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

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

Connector type C

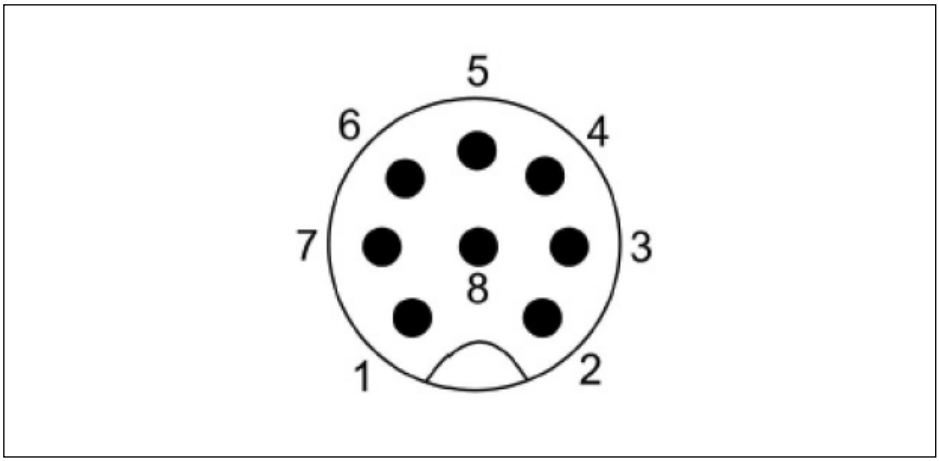

Fig. 9: **View contact side connector type C**

Table 6: Pin assignment

Pin no.	Signal assignment	Function
1	24 V	Power supply 24 V
2	Data +	for customer not usable
3	RXP	Received data positive
4	RXN	Received data negative
5	0V	Power supply 0 V
6	TXN	Sent data negative
7	TXP	Sent data positive
8	Data –	for customer not usable
Housing	Outer shield	Outer shield contacted via connector housing

Making plug connections

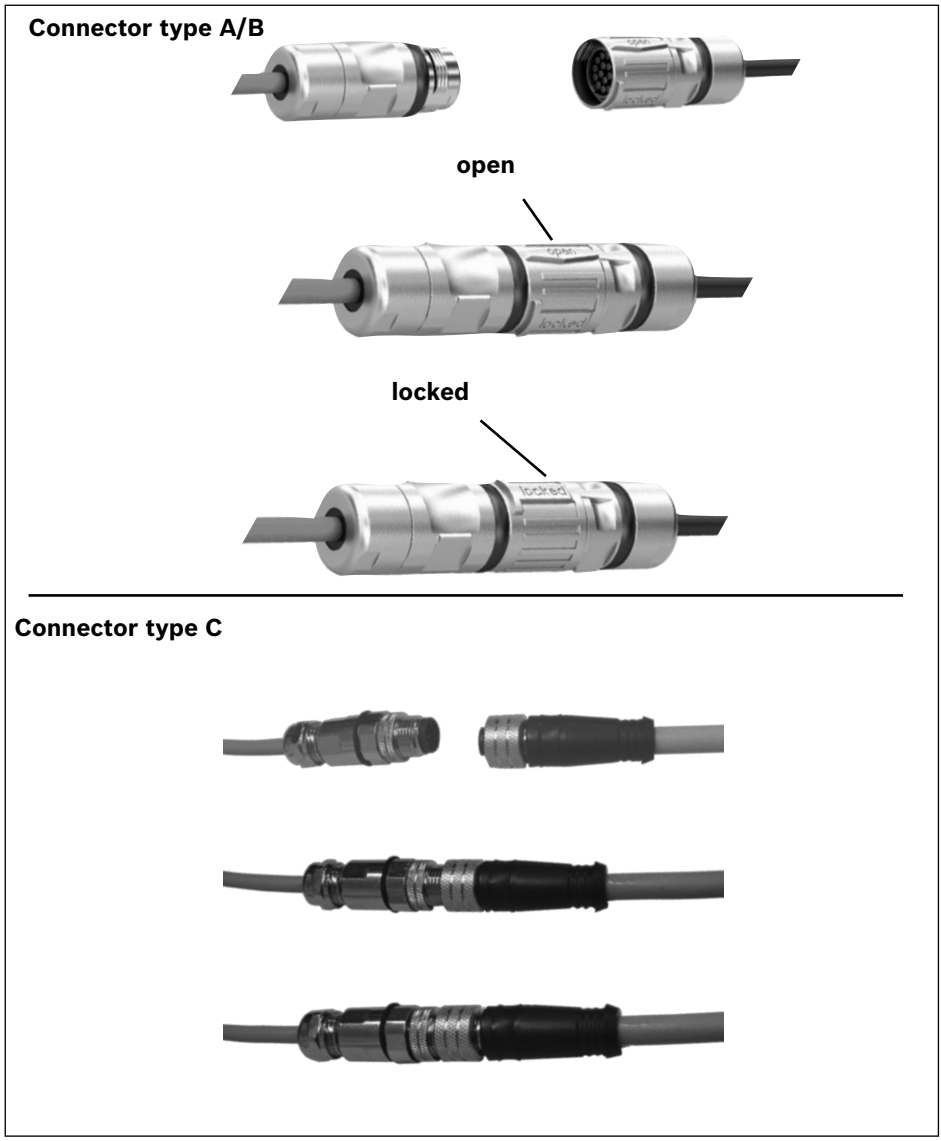

Fig. 10: **Making plug connections**

- Connector type A and 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: Locking via screw connection

8 Putting into service

⚠ 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.

8.1 Checking the operating conditions

NOTICE

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

Damage to the product.

- Do not allow the product 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

8.2 Putting into service for the first time

Perform the following checks before putting the machine into service:

- Proper functioning of safety-related assemblies (protective doors, emergency stop switches, etc.)
- Proper mounting of guide rails and cover strips.
- Ensure that all components have initial lubrication.
- 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.

8.3 IMS block diagram

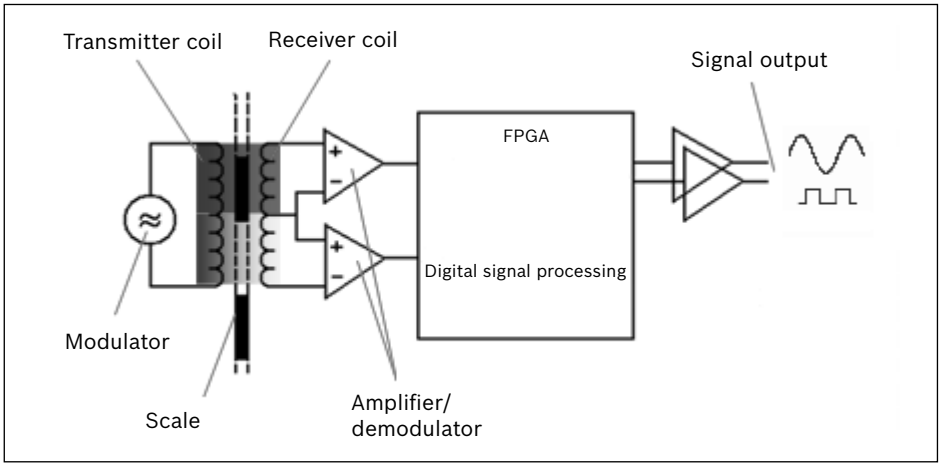

Fig. 11: **Block diagram of the measuring sensor circuitry**

Because the sensor information is processed in one single FPGA, the IMS is not suitable for use as a safe encoder!

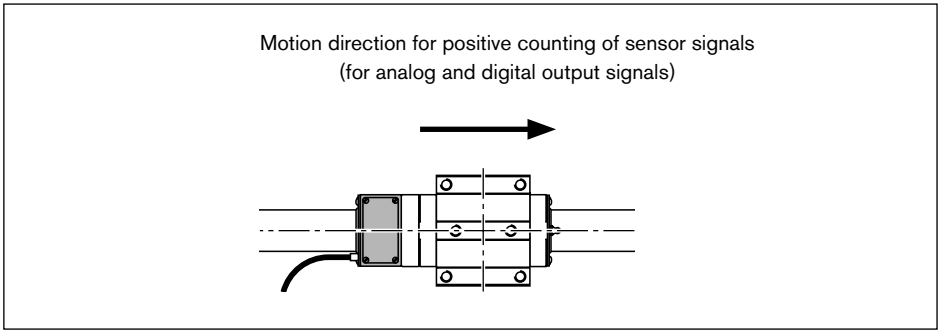

Fig. 12: **Definition of the motion direction**

8.4 Identification / selection of the measuring system

I	M	S	2	I	-	K	W	D	-	...	-	I	1	-	...
													8		

I= Incremental ➠ 8.5 / A= Absolute ➠ 8.7

8.5 Signal forms IMS-I

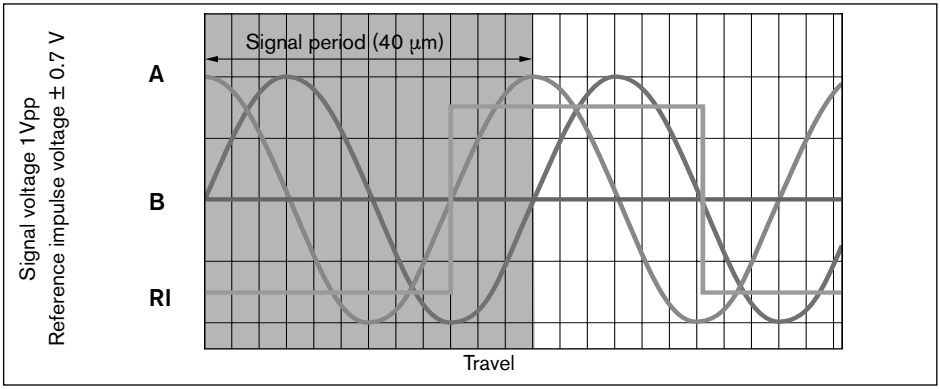

Fig. 13: **Analog sinusoidal (I1)*)**

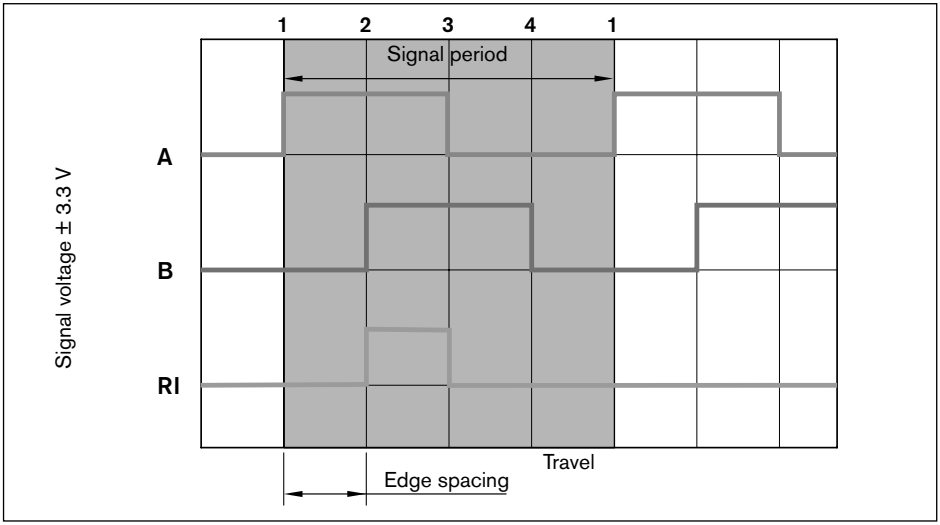

Fig. 14: **Digital square-wave signals (I2, I3, I4)*)**

Feature	**Designation**	**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. 13 / 14: A, B and full differential RI for sensor motion in the positive counting direction.

8.5.1 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

NOTICE

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.

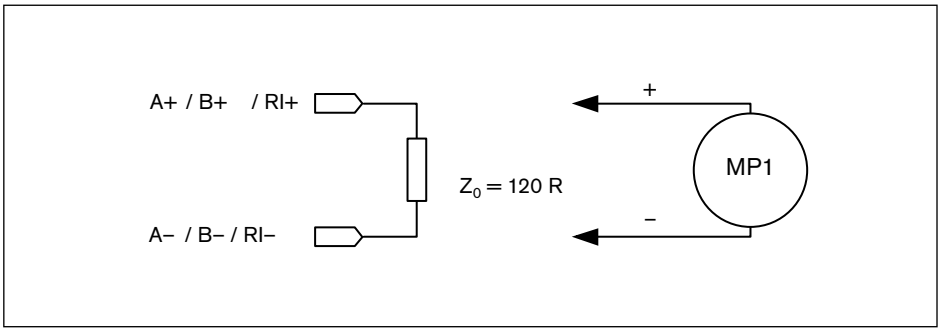

Fig. 15: **Differential measurement**

Table 7: Electrical data of the signal types

Symbol	Parameter	Unit	Nom.	Min.	Max.	Remark
Incremental analog interface (I1)						
$U_{A/B}$	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)						
$U_{A/B/RI\_LOW}$	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 ≤ 1,000 pF.

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8.5.2 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 (1,000 µ/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	I2	I3	I4
≤ 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

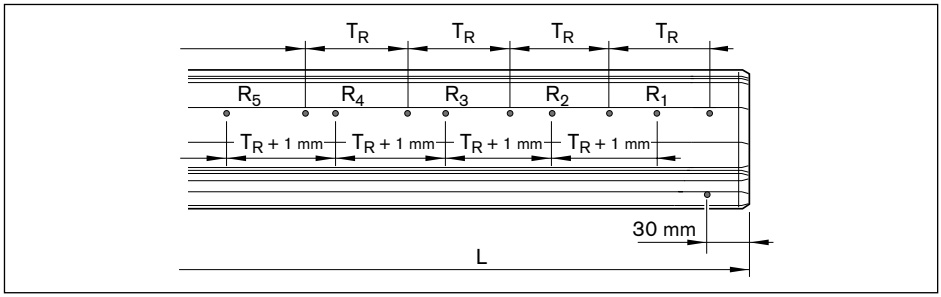
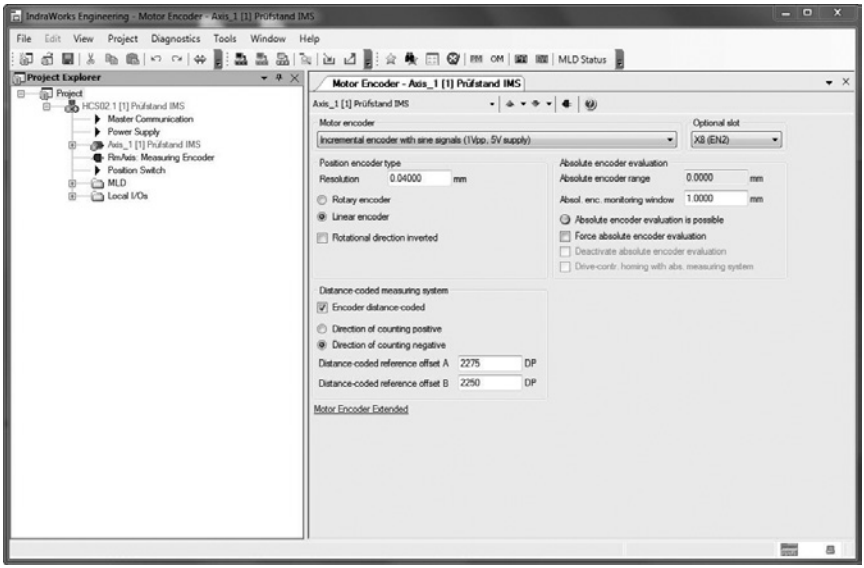


Fig. 16: **Reference marks**

▶ Enter the controller values in IndraWorks



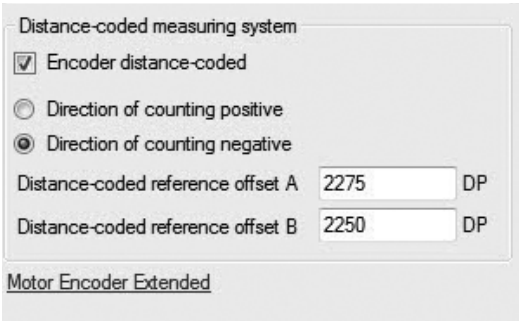


Fig. 17: **Example: Parameter input (controller value) in IndraWorks for encoder interface EN2.**

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8.6 IMS-A

8.6.1 HIPERFACE® (optional: HF)

Table 9: Type-specific settings

Type ID (command 52h)	FFh
Free E2PROM [bytes]	2048
Address	40h
Mode_485	E4h (Default: 9600 Bd, Even Parity)
Codes 0 to 3	55h (Default)
Counter	0

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

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

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

Table 11: Overview of supported commands

Command Byte / Function	Code 0 [1]	Comment
42h Read position		HIPERFACE ® - description, part no. 8010701.
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		
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” = 55h.

Table 12: Overview of status messages

	Status code	Description
Error type	00h	The encoder has not detected any faults
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	15h	Error while determining the absolute position
Other	13h	Temperature limit value exceeded
	14h	Vector length limit value exceeded
	08h	Counter overflow

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

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

Table 13: 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: 40µm = 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 14: Area B: Parameter selector (address 1Ch..1Dh for parameter selector 1)

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

Table 15: Area C: Parameter selector (address 1Eh..3Fh for parameter selector 2)

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

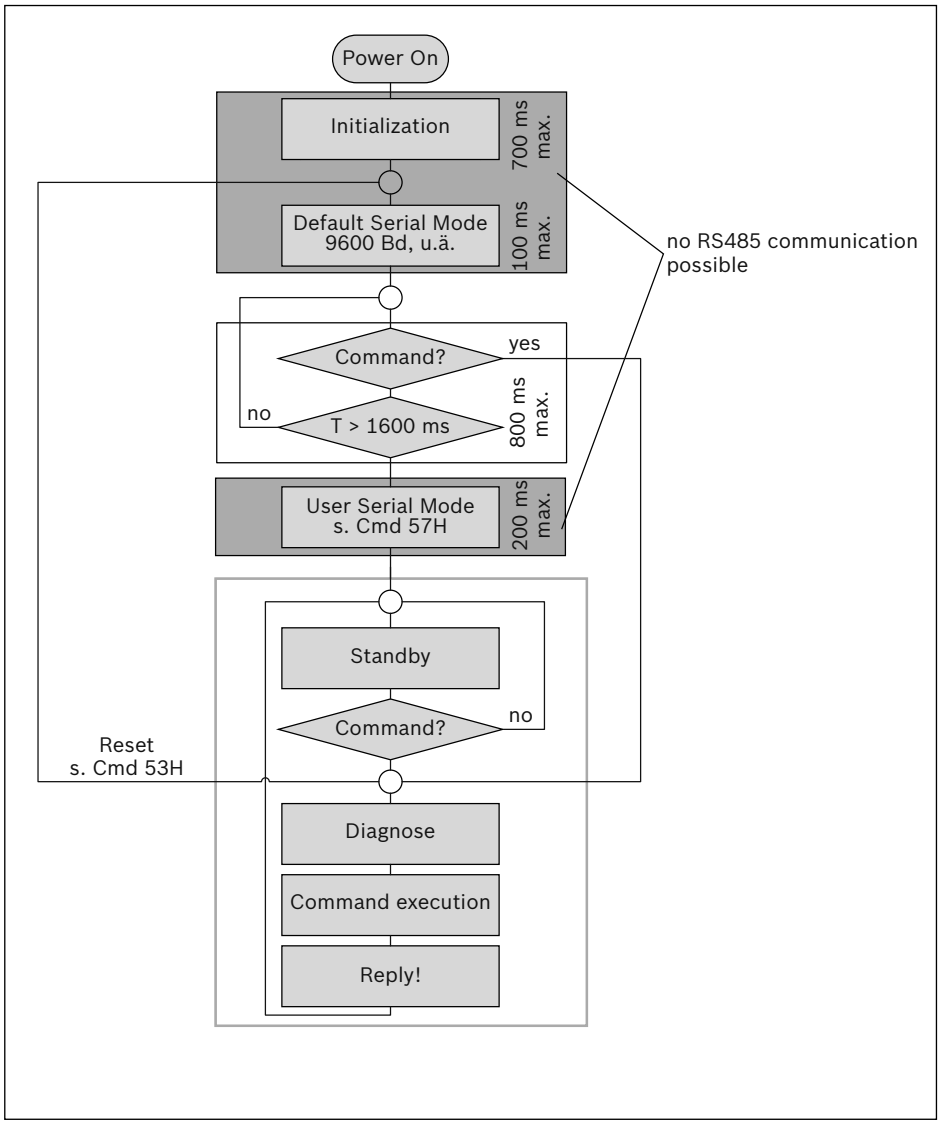

Fig. 18: **HIPERFACE flow chart**

▶ Enter the controller values in IndraWorks

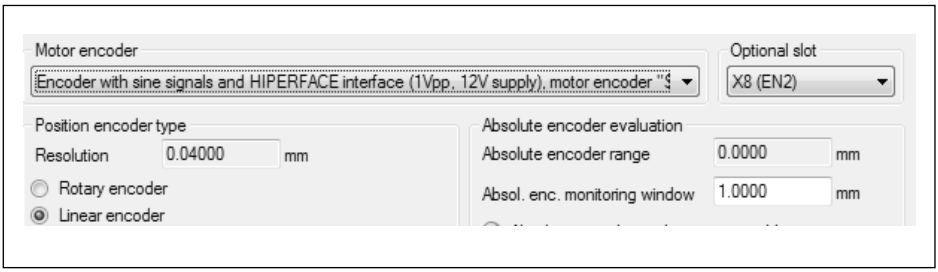

Fig. 19: **Parameter input (controller value) in IndraWorks**

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8.6.2 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	

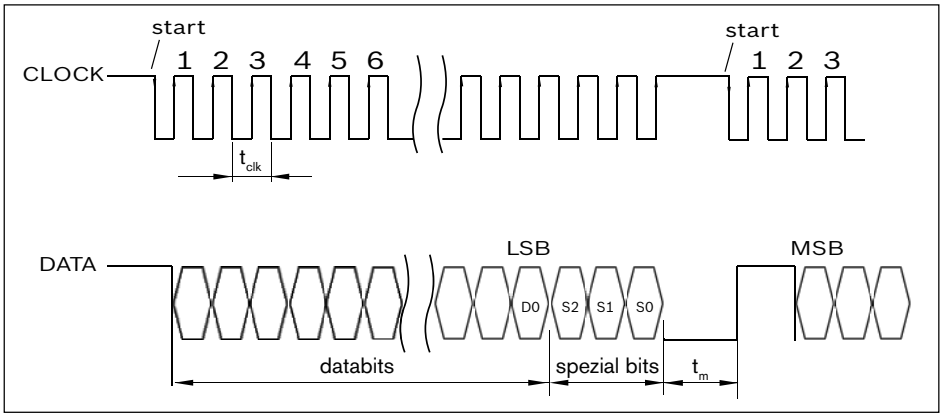

Fig. 20: **Timing diagram**

- 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.
- S1: Warning bit - is set if the temperature in the scanner exceeds 65 °C or falls below 0 °C.
- S0: Parity

8.6.3 DRIVE-CLiQ

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.

9 Operation

⚠ WARNING

Risk of injury due to moving parts

Limbs or extremities may be crushed.

- Do not attempt to grasp any moving parts while the system is in operation.
- Do not stand within the hazard zone.

⚠ CAUTION

Hot surfaces

Risk of burns

- The scanner and runner block may possibly heat up.
- Wear appropriate protective clothing or
- Allow the system to cool down before beginning any maintenance work.

Noise generation while in operation

Risk of damage to hearing, deafness

- Always wear ear protectors within a radius of 3 m from the unit.

NOTICE

Insufficient lubrication!

Damage to the product.

- While the equipment is in service, comply with the lubrication and maintenance intervals for ball and roller rail systems.
- Be sure to comply also with the operating conditions for the products.

- The accuracy of the IMS is only assured when the operating conditions are complied with and the unit has been properly installed.

10 Maintenance and repair

10.1 Cleaning and care

NOTICE

Damage to the surface from solvents and aggressive detergents!

Degradation of seals and malfunction of the product.

- Use only a lint-free cloth to clean the product.

- Dirt can settle and encrust on guide rails, especially when these are not enclosed.
- To ensure that seals and cover strips retain their functionality, dirt must be removed at regular intervals.
- It is advisable to perform at least one full cleaning cycle over the entire travel path at least twice a day or every 8 hours at the latest.
- Before shutting down the machine, always perform a cleaning cycle.
- Check that the seals and locks of plug connections fit tightly to ensure that no moisture can penetrate the system during cleaning.

10.2 Lubrication/maintenance

The only maintenance required is regular lubrication of the running block, and possibly the exchange of sealing elements.

The scanner of the IMS is non-contacting and thus maintenance.

⚠ WARNING

Risk of injury due to moving parts.

Limbs or extremities may be crushed.

- Do not attempt to grasp any moving parts while the system is in operation.
- Do not stand within the hazard zone.

- Always switch off the machine and apply all safety interlocks before commencing any maintenance work!
- Lubricate ball and roller runner blocks via the free lube ports. ➠ see relevant catalog
- All accessories used for scraping or wiping the guide rails must be checked at regular intervals and replaced if necessary.
- In environments with heavy contamination, it is advisable to replace all the parts directly exposed to such contamination.
- We recommend an annual maintenance.
- Before using lubricants, read and take note of the corresponding material safety data sheets.

NOTICE

Risk of property damage due to insufficient lubrication!

Loss of performance and corrosion.

- Lubricate the product as specified in the relevant catalog.

Risk of insufficient lubrication due to use of wrong lubricants!

Damage to the product.

- Use only recommended lubricants ➠ see relevant catalog.

Performance altered by special operating conditions!

Damage to the product.

- Before putting the product into service under special operating conditions, please consult Bosch Rexroth AG. This applies especially to environments with glass fiber or wood dust, solvents, extreme temperatures, and for short-stroke applications.

10.2.1 Runner block lubrication, lubrication intervals and lubricant quantities

- See relevant catalog

11 Removal and replacement

⚠ WARNING

Danger of uncontrolled movements due to lack of arrestor devices in vertical or slanting installations

Severe personal injury or even death

- In vertical or slanting installations, secure the product so that it cannot drop down.
- Do not stand within the hazard zone.

⚠ CAUTION

Risk of lubricant escape

Contamination of soil and water

- Always use a collecting container

Risk of skin irritation

- Wear protective gloves

Hot surfaces

Risk of burns

- The scanner and runner block may possibly heat up.
- Wear appropriate protective clothing or
- allow the system to cool down before beginning any maintenance work.

Sharp edges

Risk of injury

- Wear protective gloves

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- Make sure the machine is secured and in a safe state before beginning to remove individual components.
- The rail with scale and the runner block-scanner assembly can be replaced separately (interchangeability).
- When a runner block is replaced, check the wear on the guide rail running tracks and replace the rail, if necessary.

11.1 Changing the end seal on the scanner (sensor unit)

The end seal should be replaced directly on the guide rail. To do this, proceed as follows:

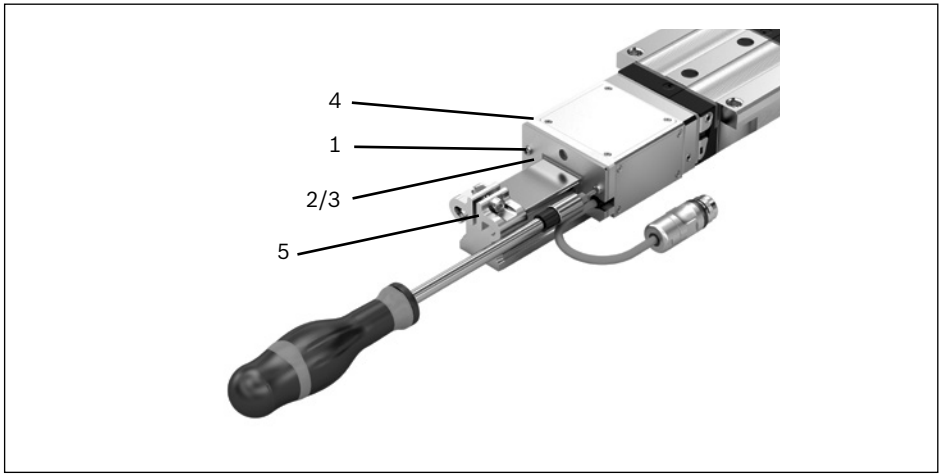

Fig. 21: **Removing the end seal**

1. Remove any cover strip protection (5)
2. Remove the two fixing screws (1) on the scanner.
3. Remove the reinforcing plate (2) and the defective seal (3).
4. Replace the reinforcing plate (4) and center it on the guide rail.
5. When mounting the new seal (3) over the rail head, do not bend it open. Instead, use both hands to twist it and carefully slip it over the guide rail or thread it on over the rail end (as shown in Fig. 22).

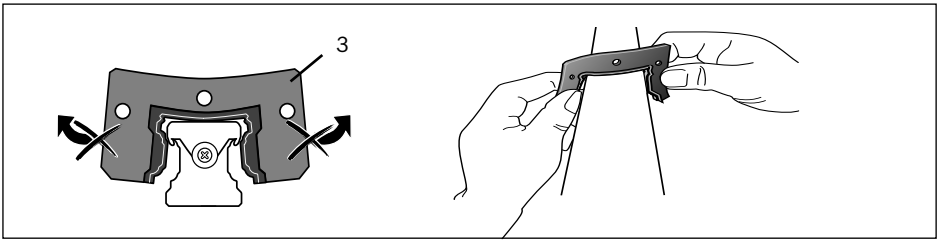

Fig. 22: **Mounting the new end seal**

6. Push the reinforcing plate (2) of the seal (3) onto the guide rail.
7. Align the end seal so that the sealing lips (6) fit snugly all around the guide rail

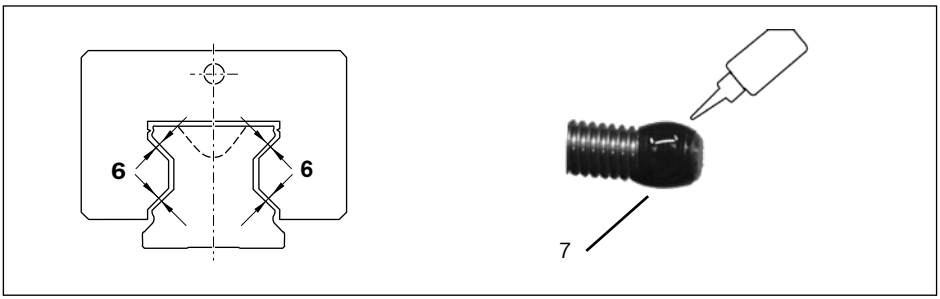

Fig. 23: **Completing the mounting procedure**

8. Apply a medium strength threadlocker adhesive (Loctite 243) to the threads of the fixing screws, taking care to wet them thoroughly all round (7). Tighten the screws with the specified tightening torque (Table 17). The threadlocker adhesive acts as a sealant. If it is not properly applied, the sealing function may be lost.

Table 17: Tightening torques end seal

Runner block	Size	Bolt	Max. tightening torque M_A (Nm)
Ball runner block	20 / 25 / 30 / 35	Allen M3 x 12 Torx TX10	1
	45	Allen M4 x 14 Torx TX20	2
Roller runner block	35	Allen M3 x 10	1
	45	Allen M4 x 12	2
	55	Allen M5 x 12	3
	65	Allen M4 x 12	2

11.2 Replacing the scanner

NOTICE

Damage due to improper mounting/removal!

Damage to the product.

- Where possible, a scanner should not be pushed onto the guide rail or removed from it without being attached to a runner block.

Disassembling the IMS in limited installation space

In limited installation space, it is possible to loosen the scanner and runner block on the rail and to remove both carefully - be extremely careful in this case to prevent damage to the rail and sensors

- Disassembling/assembling the scanner ➠ 11.2.1

The IMS allows the user to replace the scanner if necessary during servicing. The procedure for replacing the scanner will depend on its mounting location.

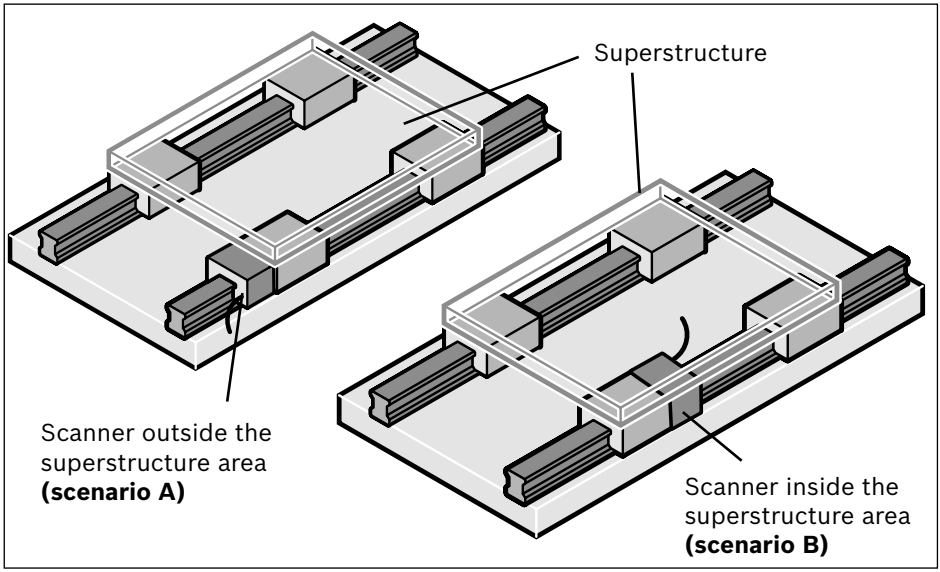

Fig. 24: **Mounting location of scanner**

Scenario A:

- Move the IMS (with the superstructure) to the end of the guide rail until the scanner is completely clear of the rail. The runner block itself must remain completely on the rail.

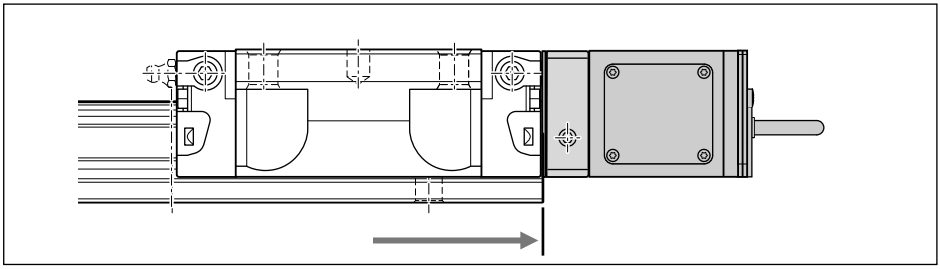

Fig. 25: **Replacing the scanner, scenario A**

- Disassembling/assembling the scanner ➠ 11.2.1

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Scenario B:

Remove the runner block and scanner.

- Disconnect the runner block from the scanner before removing it from the guide rail. ➠ 11.2.1.
- Carefully slide the runner block (without the scanner) from the guide rail onto the transport lock.
- When removing the scanner, make sure that no forces are exerted on the it.

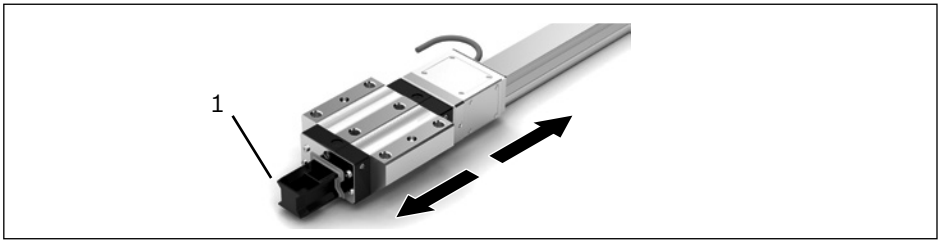

Fig. 26: **Disconnecting the runner block and scanner on the guide rail**

Pushing on the scanner and runner block

- The same level of caution must be used when pushing the scanner on the guide rail as was used when removing it
- Slide the runner block onto the guide rail front the transport lock (1).
- Connect the scanner with the measuring block ➠ 11.2.1.

11.2.1 Disassembling/assembling the scanner

- The following disassembly or assembly steps can also be carried out if runner blocks and a scanner are on the guide rail.
- Completely remove the set screws (1) on the right and left hand side of the adapter plate.
- Discard used set screws; do not reuse them.

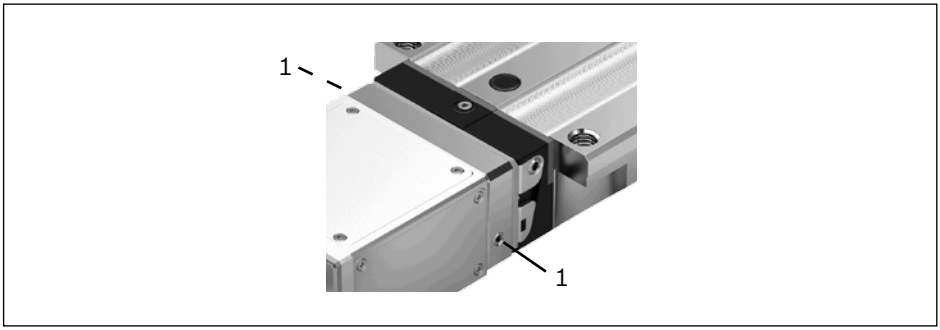

Fig. 27: **Remove the set screws**

- Pull the scanner off carefully in a straight line, taking care not tilt it. Do not use any levering tools or hammers, otherwise the precision fits or the locating screws could be damaged.
- Clean the adapter plate.
- Push on the new scanner carefully until it is lying completely flush with the adapter plate.

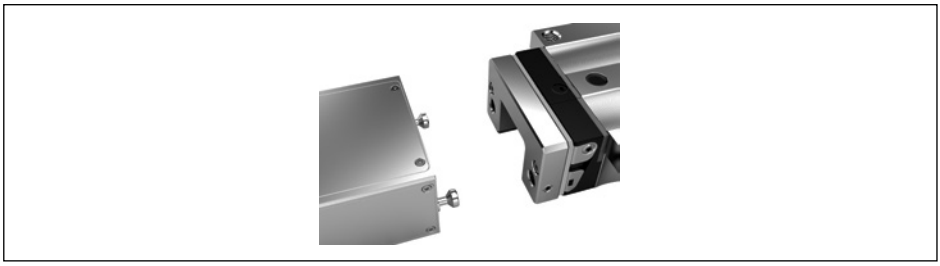

Fig. 28: **Removing the scanner**

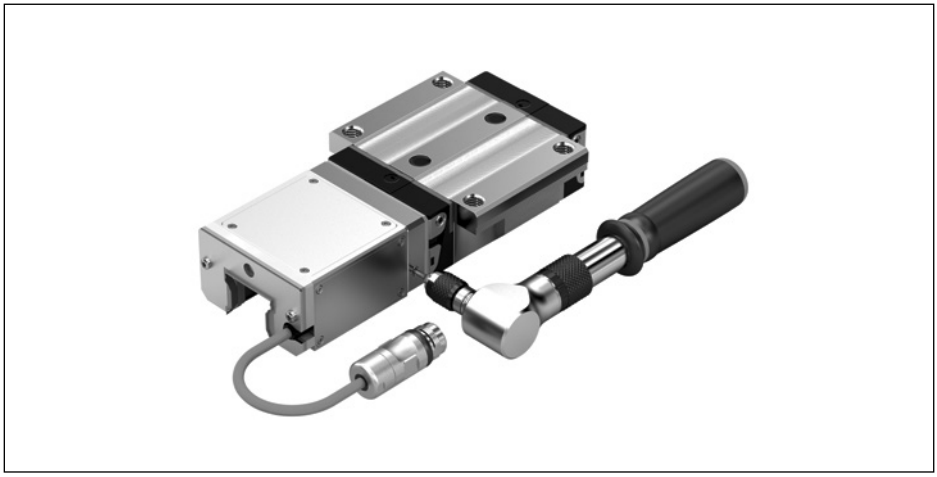

Fig. 29: **Screw-fasten the new scanner to the runner block**

- Use new set screws to fasten the scanner (do not exceed the specified tightening torques).

Table 18: Tightening torques set screws

Runner block	Size	Bolt	Max. tightening torque (Nm)
Ball runner block	20 / 25	M3x4 / Torx TX6	0.85
	30 / 35	M5x5	3.00
	45	M5x6	3.00
Roller runner block	35 / 45	M5x5	3.00
	55	M5x6	3.00
	65	M5x6	3.00

- Check that the scanner is correctly seated
- Push the IMS back into the work zone.
- Perform a homing cycle with the IMS and redefine the zero point if necessary (adjust the drive parameters). When a scanner has been replaced there may be an offset of ≤ 1 mm.

11.3 Putting into service again after disassembly

▶ When putting the unit into service again, proceed as described in the section “Putting into service for the first time” ➠ 8.2

12 Disposal

The IMS contains a number of different materials: aluminum, steel, plastics, grease and electronic components.

The scanner and the runner block have to be disposed of separately.

The scanner must be disposed of as electronic waste, while the runner block is disposed of as scrap metal.

NOTICE

Environmentally hazardous materials can pollute the environment if not disposed of properly!

Environmental pollution.

▶ Collect any escaping lubricant and dispose of it correctly.

▶ The product and its components must be disposed of correctly and in compliance with all applicable national and international guidelines and regulations.

13 Technical data

Technical data ➠ “IMS” catalog.

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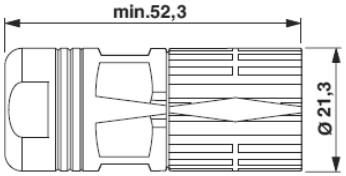
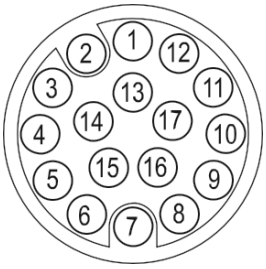
14 Accessories

14.1 Single connector (RGS1711)

For connector type A/B. For pin assignment, see table 5 on page 22.





View contact side (socket)

Fig. 30: **Single connector (RGS1711)**

14.2 Extension cable

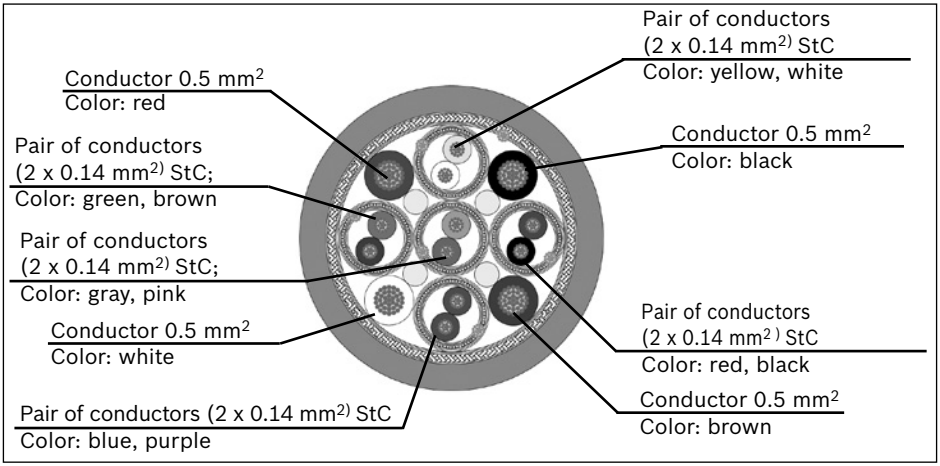


Fig. 31: **Cable structure REG0011**

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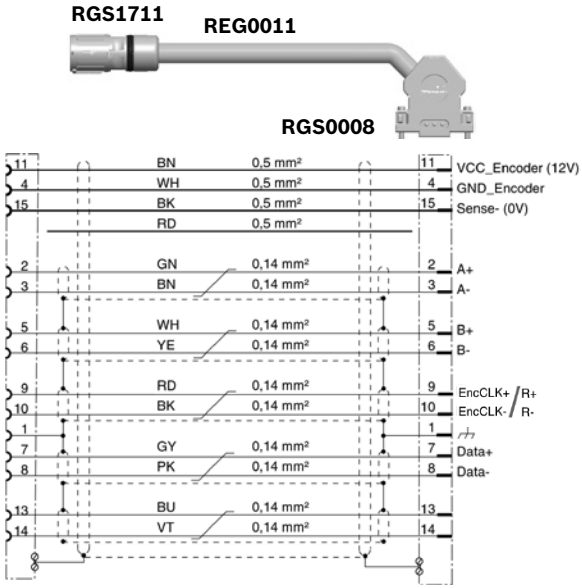
Table 19: Technical data, extension cables

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 cycle	> 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 conductor/ conductor	2 kV
Conductor/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

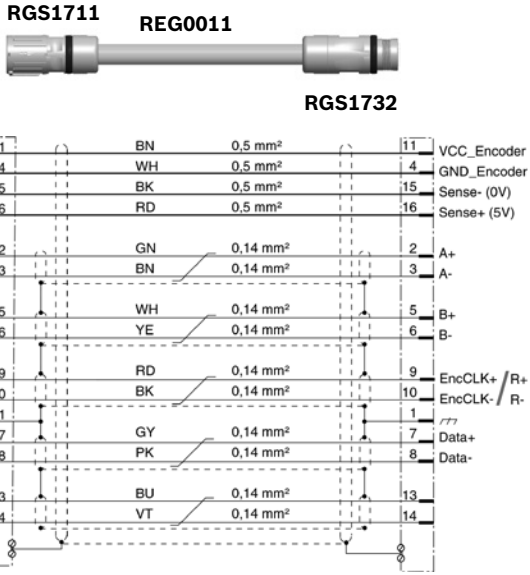
The cable is halogen-free and flame-retardant, UL and CSA approved, UL-Style 20233 (80 °C/300 V)

IMS A and I

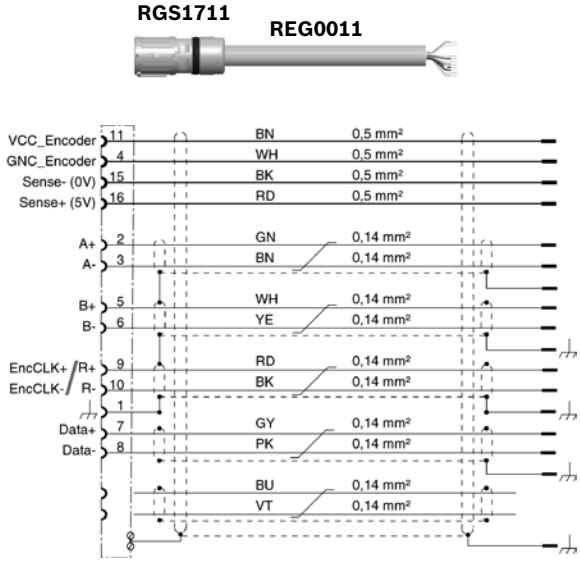
RKG 0055 extension cable (M17 ➠ EC/ENS interface (12 V DC))



RKG 0057 extension cable (M17 ➠ M17)



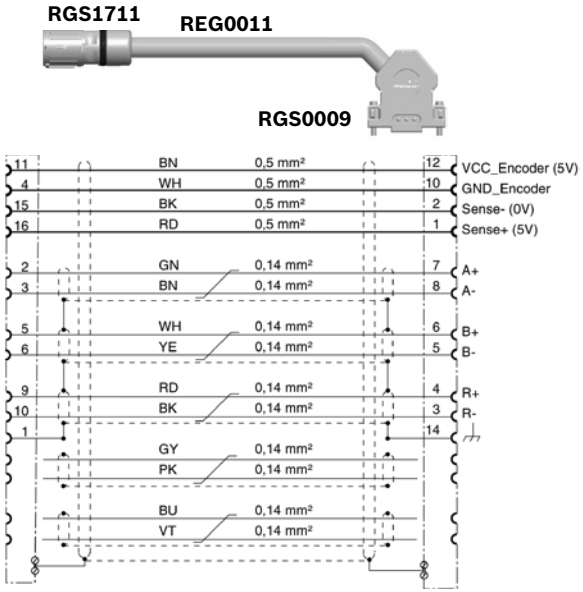
RKG 0058 extension cable (open cable ends)



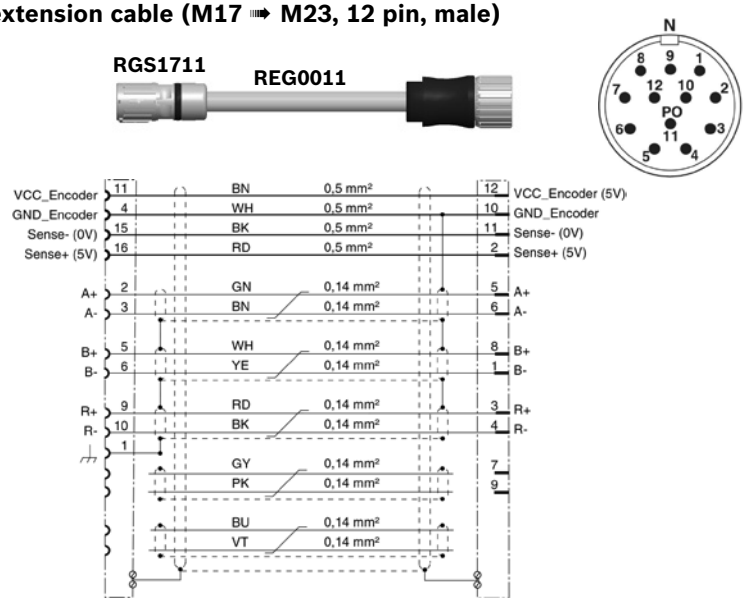
EN

IMS I

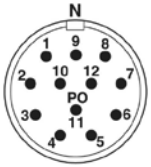
RKG 0056 extension cable (M17 ➠ EN2 interface (5 V DC))

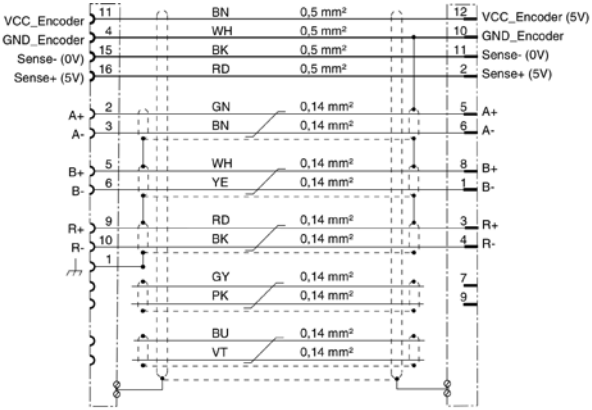


RKG 0060 extension cable (M17 ➠ M23, 12 pin, male)



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





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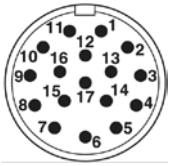
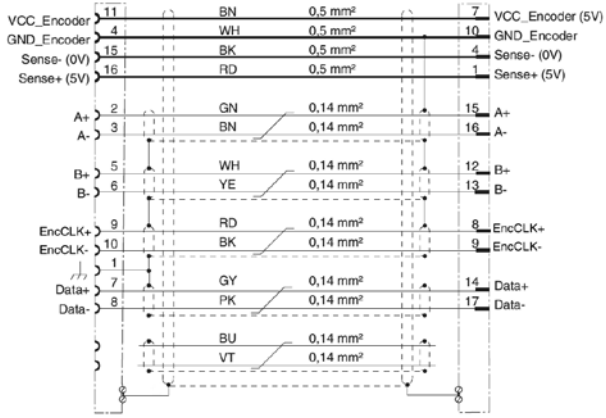
IMS A

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





15 Operating conditions

Table 20: Operating conditions

Symbol	Parameter	Unit	Min.	Nom.	Max.	Remark
General						
IP	Ingress protection level		IP67	–	–	Test acc. to standard: a.) with water b.) with Curtis S90 (10%)
P_{abs}	Ambient air pressure	hPa	800	1013	1200	
da/dt	Shock	m/s² / ms	–	–	500 / 11	½ sinus, 500 shocks, all axes
a_{VIB}	Vibration load	m/s²	–	–	100	55-2000 Hz, all axes, 10 cycles
	Operating hours	1,000 h	80	–	–	
MTTF	Mean time to first failure	a	100	–	–	MTTF
Storage						
TT	Transport and storage temperature range	°C	–10	–	+70	
ρ_T	relative humidity when in storage	%	–	–	95	at 20 °C
Operation						
V_{max}	Travel speed	m/s	–	–	5 4	BRS RRS
T_0	Operating temperature range	°C	0	–	50	
P_0	Relative humidity when in operation	%	–	–	80	at 20 °C

- Interference immunity tested to EN 61326-1:2006
- Emitted interference, class B acc. to CISPR 11 (DIN EN 55011:2010-05 and FGN EN 61000-6-3)

Table 21: Operating conditions IMS-A-Hiperface

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 22: Operating conditions IMS-A-SSI

Symbol	Parameter	Unit	Min.	Nom.	Max.	Remark
VDD	Power supply	V	4.75	–	28 V	
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 23: Operating conditions IMS-A-DRIVE-CLiQ

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

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} 1,000 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

EN

16 Ordering replacement parts

16.1 Replacement scanner

Replacement scanners can be ordered separately. Select the replacement part you need according to the type designation.

☐ To be stated when ordering

I	M	S	2	I	-	K	W	D	-	0	2	0	-	...	-	I	1	-	...
										1							8		

I	**Incremental**
A	**Absolute**
K	**Ball runner block with scanner**
R	**Roller runner block with scanner**
1	**Size**
8	**Interface**

IMS scanners are delivered as standard with a cable length of 1 m and connector type A or connector type C (DRIVE-CLiQ).

16.1.1 Scanner IMS-I

Table 25: Scanner (IMS-I) for ball runner blocks (material numbers)

Interface	1Vpp (I1)	TTL 1 µm (I2)	TTL 5 µm (I3)	TTL 10 µm (I4)
Size				
20	R051702171	R051702235	R051702240	R051702245
25	R051702172	R051702236	R051702241	R051702246
30	R051702173	R051702237	R051702242	R051702247
35	R051702174	R051702238	R051702243	R051702248
45	R051702175	R051702239	R051702244	R051702249

Table 26: Scanner (IMS-I) for roller runner blocks (material numbers)

Interface	1Vpp (I1)	TTL 1 µm (I2)	TTL 5 µm (I3)	TTL 10 µm (I4)
Size				
35	R052700628	R052700641	R052700644	R052700647
45	R052700629	R052700642	R052700645	R052700648
55	R052700630	R052700643	R052700646	R052700649

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16.1.2 Scanner IMS-A

Table 27: Scanner (IMS-A) for ball runner blocks (material numbers)

Interface	SSI (variant S1)	Hiperface	DRIVE-CLiQ
Size			
20	R051702925	R051702929	R051702934
25	R051702926	R051702930	R051702935
30	R051702927	R051702931	R051702936
35	R051702908	R051702932	R051702937
45	R051702928	R051702933	R051702938

Table 28: Scanner (IMS-A) for roller runner blocks (material numbers)

Interface	SSI (variant S1)	Hiperface	DRIVE-CLiQ
Size			
35	R052700859	R052700867	R052700871
45	R052700858	R052700868	R052700872
55	R052700865	R052700869	R052700873
65	R052700866	R052700870	R052700874

16.2 Replacement runner block

Replacement runner blocks (with adapter plates) can be ordered separately. Select the replacement part you need according to the type designation.

☐ To be stated when ordering

I	M	S	2	I	-	K	W	D	-	0	2	0	-	F	N	S	-	...	-	R	-	...
										1				2						7		

KWD	**Ball runner block**
RWD	**Roller runner block**
1	**Size**
2	**Construction form**
7	**Scanner mounting side**

16.2.1 Replacement ball runner block

Replacement runner blocks are supplied in the version

IMS2x – KWD – .. – C2 – * – SS – 0 - ..

* P for slimline runner blocks (SXX), SP for flanged runner blocks (FXX)

Table 29: KWD with adapter plate, scanner mounting side right (R) (material numbers)

Construction form	FNS	FLS	SNS	SLS	SNH	SLH
Size						
20	R051702251	R051702256	R051702261	R051702266	–	–
25	R051702252	R051702257	R051702262	R051702267	R051702272	R051702277
30	R051702253	R051702258	R051702263	R051702268	R051702273	R051702278
35	R051702254	R051702259	R051702264	R051702269	R051702274	R051702279
45	R051702255	R051702260	R051702265	R051702270	R051702275	R051702280

Table 30: KWD with adapter plate, scanner mounting side left (L) (material numbers)

Construction form	FNS	FLS	SNS	SLS	SNH	SLH
Size						
20	R051702281	R051702286	R051702291	R051702296	–	–
25	R051702282	R051702287	R051702292	R051702297	R051702302	R051702307
30	R051702283	R051702288	R051702293	R051702298	R051702303	R051702308
35	R051702284	R051702289	R051702294	R051702299	R051702304	R051702309
45	R051702285	R051702290	R051702295	R051702300	R051702305	R051702310

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16.2.2 Replacement roller runner blocks

Replacement runner blocks are supplied in the version

IMS2x – RWD – .. – C2 – S – SS – 0 - ..

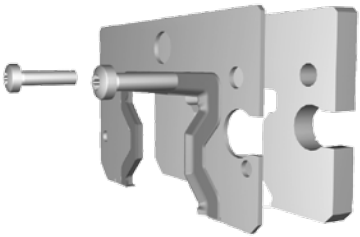
Table 31: RWD with adapter plate, scanner mounting side right (R) (material numbers)

Construction form	FNS	FLS	SNS	SLS	SNH	SLH
Size						
35	R052700663	R052700666	R052700669	R052700672	R052700675	R052700678
45	R052700664	R052700667	R052700670	R052700673	R052700676	R052700679
55	R052700665	R052700668	R052700671	R052700674	R052700677	R052700680
65	R052700875	R052700876	R052700877	R052700878	R052700879	R052700880

Table 32: RWD with adapter plate, scanner mounting side left (L) (material numbers)

Construction form	FNS	FLS	SNS	SLS	SNH	SLH
Size						
35	R052700681	R052700684	R052700687	R052700690	R052700693	R052700696
45	R052700682	R052700685	R052700688	R052700691	R052700694	R052700697
55	R052700683	R052700686	R052700689	R052700692	R052700695	R052700698
65	R052700881	R052700882	R052700883	R052700884	R052700885	R052700886

18.1.1 Scanner end seal



☐ To be stated when ordering

I	M	S	2	I	-	K	W	D	-	0	2	0	-	...
										1				

KWD	**Ball runner block**
RWD	**Roller runner block**
1	**Size**

Table 33: Scanner end seal for ball runner blocks (material numbers)

Size	
20	R1684 800 20
25	R1684 200 20
30	R1684 700 20
35	R1684 300 20
45	R1684 400 20

Table 34: Scanner end seal for roller runner blocks (material numbers)

Size	
35	R1884 300 20
45	R1884 400 20
55	R1884 500 20
65	R1884 600 20

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17 Troubleshooting and fault clearance

17.1 General procedure for identifying faults

Fault	Possible cause	Remedy
The IMS is not transmitting signals	Scanner was slid onto the guide rail the wrong way around.	Check runner block orientation relative to rail ➠ 7.3
		Remove runner block
		Turn runner block around and slide it back onto the rail ➠ 7.4
	Connectors not properly tightened/seated.	Check connectors.
	Supply voltage at scanner is too low.	Check power supply and adjust if necessary.
	Extension cable is too long	Adapt the power supply
		Increase the cable cross-section
		Shorten the cable length ➠ 15
Reference signals are not recognized by the controller/control unit	Connectors not properly tightened/seated.	Check connectors.
	Incorrect parameter set for evaluating the reference marks.	Check control parameters
Absolute dimension is incorrectly calculated	Incorrect parameters set, e.g. incorrect absolute offset value or incorrect pitch periods.	Check control parameters Correct absolute offset value Enter correct pitch period ➠ 8
Control is unstable	Positive feedback in the control loop activated Motor phases switched	Check control parameters Check wiring
Absolute accuracy of the system not reached	Incorrect fastening of the guide unit, mounting not according to instructions.	Mount the rail according to the instructions. Note the specified order for driving in the screws ➠ 7.3
	Specifications for parallelism, flatness, screw-fastening, strength of the linear guide not complied with.	Install components according to mounting instructions. Follow the notes ➠ 7.3

Fault	Possible cause	Remedy
Sensor is touching the rail	Excessive load on the runner block or the scanner.	Take note of the catalog information regarding max. load and reduced load capacity.
		Eliminate a load due a force on the scanner because of cable bend.
		Check a load due a force on the scanner because of other mechanical components.
	Option scanner mounting side incorrectly selected. Because of that the reference edge is on the wrong side	Order a runner block with correct scanner mounting side and rebuild the scanner ➠ 16
Resistance to environmental influences not assured	Specifications for parallelism, flatness, screw-fastening, strength of the linear guide not complied with.	Install components according to mounting instructions. Follow the notes.
	Contamination exceeds the level allowed for the operating location.	
	Mechanical load on the scanner is not ruled out.	Take note of the catalog information regarding max. load and reduced load capacity.
Function not assured at maximum cable length	Failure to comply with defined maximum length and type of extension cable.	Use only original extension cable ➠ 14
	Supply voltage is outside tolerance band	Check power supply and adjust if necessary

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18 Service and support

18.1 Service hotline

Our service hotline will be happy to assist you in any way they can.
You can reach us by phone at:
+49 (0) 9352 40 50 60

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