

IMScompact integrated measuring system

Position display (24 VDC)

R320103179/2019-12

EN

Instructions



- Position display with signal input for 1 axis
- Input for IMScompact TTL
- Adjustable reference value, tool offset and saw blade thickness
- 7-digit LCD display, including sign and measuring units
- 2 configurable digital control inputs
- Data memory in case of power failure

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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.
 本说明书具有下列语言版本。

EN Deutsch (Original document)
 EN English
 FR Français
 IT Italiano
 ES Español
 PT Português
 ZH 中文

The data specified above only serves to describe the product.
 No statements concerning a certain condition or suitability for
 a certain purpose can be derived from our information. 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.

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 to apply for patent protection. It may not be reproduced or given
 to third parties without our consent.

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

The original instructions are in German.

Any dissemination of the product must include these instructions.

2 General information, safety, transport and storage

2.1 Information on operating instructions

These operating instructions provide important information on handling the device. For your own safety and operational safety, observe all warnings and notes! Observing the safety instructions and action instructions is crucial in order to ensure a safe work environment. Furthermore, the local accident prevention regulations and general safety provisions applicable at the location of use of the device must be complied with. Read the operating instructions carefully before commencing any work! The operating instructions are part of the product and must be stored in the vicinity of the device, accessible to the personnel at all times. For a better presentation of issues, the figures used in these instructions are not necessarily true to scale and may slightly vary from the actual design.

2.2 Explanation of symbols

In these operating instructions, special instructions are marked with symbols. These instructions are initiated by signal words expressing the extent of the hazard. It is essential to observe the instructions and to proceed with caution in order to prevent accidents as well as personal injuries and damage to property.

Warnings:

	DANGER! This symbol in connection with the signal word "Danger" indicates an imminent danger to the life and health of persons. Failure to observe these instructions will result in serious damage to health or even life-threatening injuries.
	WARNING! This symbol in connection with the signal word "Warning" indicates a possible danger to the life and health of persons. Failure to observe these instructions may result in serious damage to health or even life-threatening injuries.
	CAUTION! This symbol in connection with the signal word "Caution" indicates a possible danger situation. Failure to observe these instructions may result in minor injuries or damage to property.

Special safety instructions:

	DANGER! This symbol in connection with the signal word "Danger" indicates an imminent danger to the life and health of persons due to electrical voltage. Failure to observe these instructions will result in serious damage to health or even life-threatening injuries. Work to be performed must only be carried out by qualified electricians.
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Tips and recommendations:

	NOTE! ... highlights useful tips and recommendations as well as information for efficient and trouble-free operation.
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Identification of references:

-  Refers to another section within these operating instructions
-  Refers to another section within another document

2.3 Warranty conditions

The manufacturer guarantees the correct functioning of the process technology used and the specified performance parameters.

2.4 Disassembly and disposal

If no return or disposal agreement was made, disassemble the device properly following the safety instructions in these operating instructions, and dispose of it in an environmentally-friendly manner.

Before disassembly:

Switch off the power supply and protect it against being switched on again. Then, physically disconnect the power supply lines and discharge any stored residual energy. Remove any operating and auxiliary materials as well as remaining processing materials.

On disposal:

Recycle disassembled components: Metallic components to scrap metal, electronic components to electronic scrap, plastic parts for recycling, dispose other components sorted by material quality.

	CAUTION! Environmental damage may occur if disposed incorrectly! Electronic waste, electronic components, lubricants and other auxiliary materials are subject to the treatment of hazardous waste and must only be disposed of by authorized specialized companies!
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Local authorities and waste management companies provide information on environmentally sound disposal.

Safety

	NOTE! Please read the operating instructions carefully before commissioning the device! Notes on installation must be observed! Only commission the device if you have understood the operating instructions. The operator must take and implement appropriate security-relevant measures. Commissioning must only be performed by qualified personnel authorized and instructed by the operator.
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2.5 General sources of danger

This section provides an overview of important safety issues for optimum protection of personnel as well as for secure and trouble-free operation. Failure to observe the action and safety instructions specified in these instructions may lead to considerable dangers.

2.6 Personal protective equipment

In order to minimize health risks, wearing personal protective equipment is required when assembling the device. **Therefore:** Before performing any work, put on the designated protective equipment properly and wear during work. It is necessary to follow the signs for personal protective equipment attached in the work area.

Always wear the following when performing any work:

	PROTECTIVE CLOTHING ... is close-fitting protective clothing with low tensile strength, tight-fitting sleeves and without protruding parts. It serves primarily as protection from entanglement in moving machine parts. Do not wear rings, necklaces or other jewelry.
	PROTECTIVE GLOVES ... to protect the hands from abrasions, rubbing or similar superficial injuries of the skin.
	PROTECTIVE HELMET ... to protect the head from injuries.

2.7 Intended use

The position display is designed for the intended application described here only:

The position display serves for visualization of positions, lengths, pulses or angular degrees only.

	WARNING! Danger through improper use! Any use other than for the intended purpose and/or other type of use of the device can lead to dangerous situations. Therefore: • Only use the device as intended • Strictly follow the instructions of these operating instructions • In particular, avoid the following: • Modification, refitting or changing of the design or individual components with the intention to alter the area of application or the usability of the device.
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Claims for damages arising from improper use are excluded.

The operator of the device alone shall be responsible for any damages resulting from improper use.

2.8 Safety instructions for transport, unpacking and loading

	CAUTION! Transport the packaging (box, pallet, etc.) professionally. Do not throw, hit or fold it.
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2.9 Handling of packaging material

Notes for proper disposal: ↗ 2.4.

2.10 Inspection of transport

Check the delivery immediately upon receipt for completeness and transport damage.

In case of externally recognizable transport damage:

- Do not accept the delivery or only under reserve.
- Note the extent of damage on the transport documents or the delivery note.
- File complaint immediately.

	NOTE! Claim any damage as soon as it has been detected. Claims for damage can only be asserted within the valid complaint period.
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2.11 Storage

Only store the device under the following conditions:

- Do not store outside
- Keep dry and dust-free
- Do not expose to aggressive media
- Protect from direct sunlight
- Avoid mechanical shocks
- Observe the storage temperature (↗ 4)
- Do not exceed the relative humidity (↗ 4)
- Regularly inspect the general condition of all parts and the package if stored for more than three months

3 Product features

3.1 General information

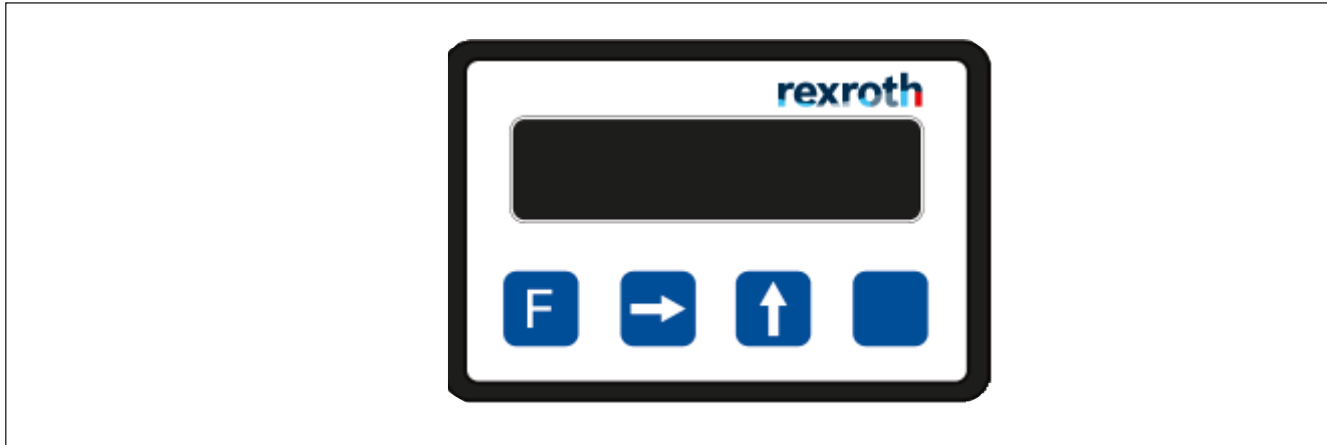


Fig. 1: Position display

The compact position display has a 10 mm high LCD display which allows a comfortable and accurate reading of the actual position. It can be set to 0 or to an arbitrary reference value via the dust-proof front keypad or external signals.

	NOTE! In a de-energized state, movements or displacements of the measuring system or the encoder cannot be detected! With incremental measuring systems, a referencing procedure must be performed after activation of the supply voltage. Corresponding information can be found in the operating instructions of the respective measuring system.
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3.2 Product features

The display unit has numerous useful functions and programmable features:

- Position display with signal input for 1 axis
- Input for conventional encoders and measuring systems
- Adjustable reference value, tool offset and saw blade thickness
- 7-digit LCD display, including sign and measuring units
- Encoder supply +24 V DC
- Easy assembly
- Switching between relative and absolute dimension on the front panel
- Data storage in case of power failure
- 1, 2 and 4-fold edge triggering

Further information on these functions can be found within these operating instructions.

4 Technical data

4.1 Identification

The name plate serves for accurate identification of the unit. It is located on the housing of the device and gives information about the exact order designation (see type designationl  11). Furthermore, the name plate contains a unique and traceable device number. When corresponding with Rexroth, please always indicate and use this information.

4.2 Dimensions

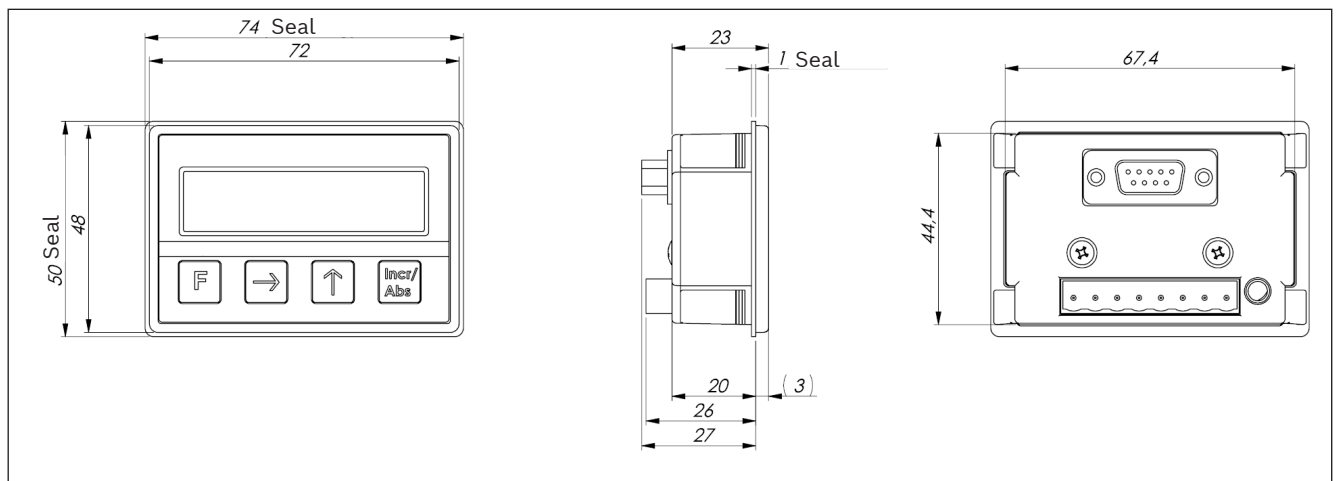


Fig. 2: Dimensions

4.3 Technical data

Table 1: Technical data

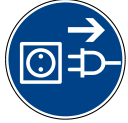
Power supply voltage	24 V DC +/- 20 %
Current consumption	25 mA (without measuring system)
Reverse polarity protection	yes
Encoder supply	24 V DC
Load-carrying capacity by measuring system	max. 300 mA
LCD display	7 decade counters, character height 10 mm, including sign and measuring units
Perspective	12 o'clock
Keyboard	Foil with short-stroke keys
Measuring units	mm, m, inch, rpm or degrees
System accuracy	+/- 1 digit
Operating temperature	0 ... +50 °C
Storage temperature	-20 ... +80 °C
Humidity	max. 80 %, non-condensing
Inputs	max. input current 10 mA, PNP (active high), switching voltage 24 V DC
Input frequency	max. 80 kHz
Power-down memory	FRAM
Housing	Standard panel housing, ABS plastic, black
Housing dimensions	W x H = 72 x 48 mm
Installation depth	27 mm (without connection plug)
Panel cutout	W x H = 68 x 45 mm
Protection type front side	IP54 (when installed with seal) IP43 (when installed without seal)
Protection type rear side	IP40

5 Installation and initial commissioning

	NOTE Please read the operating instructions carefully before commissioning the device! Notes on installation must be observed! In case of damage caused by non-observance of these operating instructions, the warranty expires. Rexroth shall assume no liability for consequential damages! We also do not assume any liability for personal injury, damage to property or financial losses! The operator must take and implement appropriate security-relevant measures. Commissioning must only be performed by qualified personnel authorized and instructed by the operator.
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5.1 Operating area

	WARNING! Do not use the device in an explosive or corrosive environment! The device must not be installed close to interference sources which have strong inductive or capacitive interference or strong electrostatic fields!
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   	CAUTION! Electrical connections must be made by appropriately qualified personnel in accordance with local regulations. The device may be designed for switchboard mounting. During work on the switchboard, all components must be de-energized if there is a danger of touching energized parts! (Protection against accidental contact) Wiring work must only be performed in de-energized state! Thin cable strands have to be equipped with cable-end sleeves! Before switching on the device, all connections and plug connectors have to be checked! The device must be mounted so that it is protected against harmful environmental influences such as splashing water, solvents, vibrations, shocks and severe pollution and that the operating temperature is maintained.
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6 Design and function

The position display has 4 front-panel keys. The figure shows the respective basic functions:

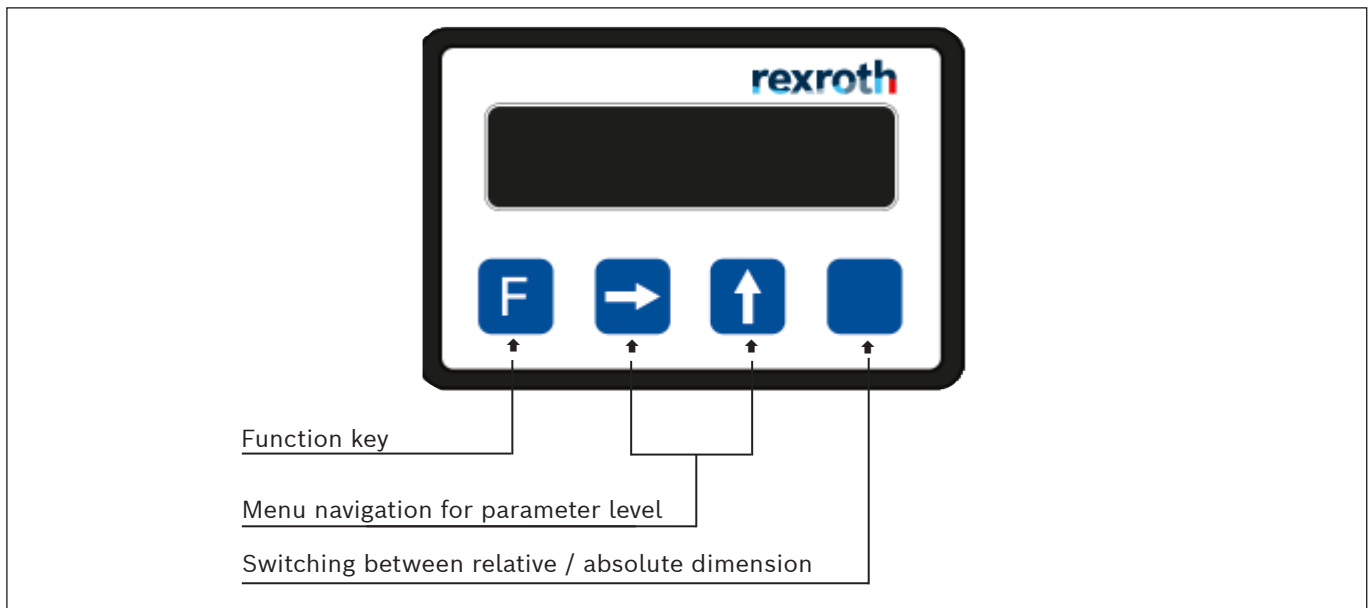


Fig. 3: Design and function

The functions and key combinations are described in detail in section 6.3.

6.1 External inputs

The device has 2 digital control inputs that can be connected via the 8-pin RIA connector S1.

The external input 1 is adjustable. It can be programmed by using parameter P19 "level-sensitive" or "edge-sensitive". The switching characteristics of the input is 24 V DC / PNP which means that the input is active at a high level or a positive edge.

The external input 2 is always "level-sensitive". The switching characteristics of the input is 24 V DC / PNP which means that the input is active at a high level.

- The function of input 1 can be programmed by using parameter P17 (connector S1/5 9)
- The function of input 2 can be programmed by using parameter P18 (connector S1/6 9) (see parameter description 7).

6.2 Encoder supply

For the measuring system or encoder supply, a 24 V DC supply is available at the terminals or pins 1(-) and 2(+) of both connectors (8-pin RIA connector S1 and 9-pin D-SUB female connector S2 9).

The maximum load-carrying capacity by the measuring system is 300 mA.

Please note: A 5 V DC encoder supply is not available!

6.3 Key functions

The operation of the device is divided into 2 levels:

- Parameter level: For configuration of all operating parameters (➤ 7).
- User level: Allows access to the basic functions of the unit (depending on software version).

All entries are made exclusively via the 4 front-panel keys or various key combinations.

Table 2: Key functions

Regular mode:	
	Press shortly = switching from absolute to incremental dimension
	Press shortly = activate tool offset (in absolute mode) An activated tool offset is indicated by the digit "1" in the upper display frame.
 + 	Press shortly = set to reference value (in absolute mode) Press for 3 seconds = change reference value Return to regular mode with the Incr/Abs key
 + 	Press shortly = set to "0" (in absolute mode) Press for 3 seconds = change tool offset Return to regular mode with the Incr/Abs key
 + 	Press for 3 seconds = call up the parameter level
Parameter level:	
	Press shortly = select decade
	Press shortly = increase decade
	Press shortly = save changes and switch over to next parameter
	Entry of negative parameters (negative sign only possible if value is unequal to 0)
 + 	Press for 3 seconds = exit the parameter level
	NOTE! P01 is visible if the parameter level is called up. The display switches to the value of P01 if the key combination F + Incr/Abs is released. When switching the parameters with the Incr/Abs key, the selected parameter (e.g. "P05") is displayed for the duration of holding the key. The display switches to the respective value if the Incr/Abs key is released.

7 Parameter level

This section describes the available parameters and their configuration options. A parameter list for a quick overview of all parameters can be found in the next chapter (8). Customer-specific settings can be added there.

Table 3: Parameters

Parameters	Configuration options
P01: Counting direction	Change of the counting direction. (0: forwards, 1: backwards)
P02: Display measurement unit	Display of the measurement unit. 0 = mm; 1 = inch; 2 = m; 3 = degrees; 4 = rpm; 5 = no measurement unit
P03: Decimal point	Definition of the decimal point (0 = 1 / 1 = 0.1 / 2 = 0.01 / 3 = 0.001).
P05: Keyboard lock	0 = off; 1 = on
P06: Edge evaluation*	Adjustment of the edge evaluation. Range: Evaluation of 1 / 2 / 4 edges (0: x 1, 1: x 2, 2: x 4)
P07: Measuring system*	0 = incremental for IMS-C TTL
P08: Multiplication factor	Definition of the multiplication factor. Range: 00.00001 ... 99.99999
P10: Tool offset	Definition of the tool offset. Range: 000000.1 ... 999999.9
P11: Saw blade	Adjustment of the saw blade thickness. Range: 0000.1 ... 9999.9
P16: Default initialization*	Reset to factory parameters. (0: not init., 1: default init.) Enter "1" in this parameter and confirm with the "Incr/Abs" key. Then, switch off the device. After switching the device on again, the factory parameters have been uploaded and the device has been reset.
P17: Function of external input 1	The corresponding external input can be programmed as follows: 0 = external input 1 has no function 1 = set actual value to reference value (P09) 2 = set actual value to 0
P18: Function of external input 2	The corresponding external input can be programmed as follows: 0 = external input 2 has no function 1 = add the tool offset (P10) (only if P19=0)
P19: Trigger for external input 1	0 = level-sensitive (high); 1 = edge-sensitive (positive)
P20: Display mode	0 = standard; 1 = rotation speed; 3 = angle
P99: Software version	This parameter displays the software version

*) Switch the device off and on again

8 Parameter list

Table 4: Parameter list

Par. no.	Function	Default setting	Description	Customer settings for IMSc TTL10 µm
P01	Counting direction	0	forwards	
P02	Display measurement unit	0	mm	0
P03	Decimal point	1	1 decimal place	2
P04	Reserve	-		-
P05	Keyboard lock	0	deactivated	
P06	Edge evaluation	0	1 edge	2
P07	Measuring system selection	0	incremental	0
P08	Multiplication factor	01.00000		01.00000
P09	Reference value	000000.0		
P10	Tool offset	000000.0		
P11	Saw blade	0000.0		
P12	Reserve	-		-
P13	Reserve	-		-
P14	Reserve	-		-
P15	Reserve	-		-
P16	Default init	0	not active	
P17	Function ext. input 1	0	not active	
P18	Function ext. input 2	0	not active	
P19	Trigger external input 1	0	level-sensitive	
P20	Display mode	0	standard	0
P21	Reserve	-		-
P22	Reserve	-		-
P23	Reserve	-		-
P24	Reserve	-		-
P25	Reserve	-		-
P99	Software version	-		-

9 Terminal assignment

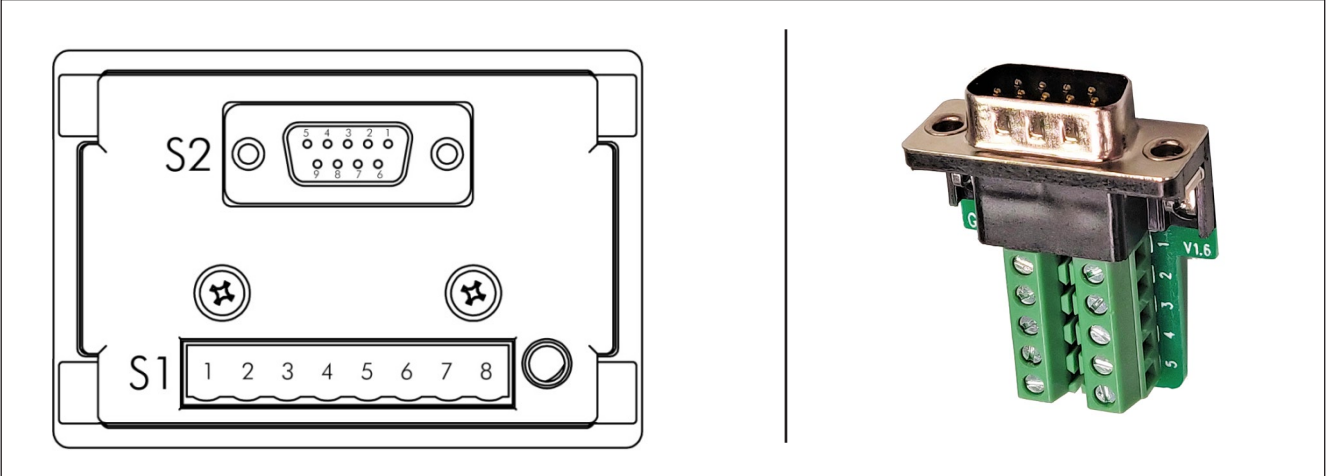


Fig. 4: Terminal assignment: left: position display; right: D-SUB-Breakout Box

Table 5: Terminal assignment
Connector S1: 8-pin RIA connector

Terminal	Function
1	0 V / GND (encoder supply output)
2	+24 V DC (encoder supply output)
3	HTL channel A
4	HTL channel B
5	External input 1 (24 V-PNP)
6	External input 2 (24 V-PNP)
7	0 V / GND (power supply input)
8	+24 V DC (power supply input)

Connector S2: 9-pin D-SUB female connector / 5 V-TTL inputs		Terminal assignment for single wires to D-SUB-Breakout Box	
Pin	Function	Wire color	Klemme
1	0 V / GND (encoder supply output)	Blue	1
2	+24 V DC (encoder supply output)	Red	2
3	TTL channel A+ (5 V level only)	Green	3
4	TTL channel B+ (5 V level only)	Brown	4
5	-	-	5
6	TTL channel A- (5 V level only)	Yellow	6
7	TTL channel B- (5 V level only)	White	7
8	TTL channel RI+ (5 V level only)	Pink	8
9	TTL channel RI- (5 V level only)	Grey	9
		External shield	GND

NOTES!

Only measuring systems or encoders with a 10 ... 30 V DC or 24 V DC power supply can be supplied using the encoder supply output. A 5 V encoder supply is not available.

For notes on earthing and fault clearance, see 10.1

10 Operational disruptions, maintenance, cleaning

This chapter describes possible causes for faults and measures for elimination. In case of increasingly occurring faults, please observe the measures for fault clearance described in section 10.1. If faults cannot be eliminated with the following notes or measures, please contact the manufacturer (see second page).

10.1 Measures for fault clearance



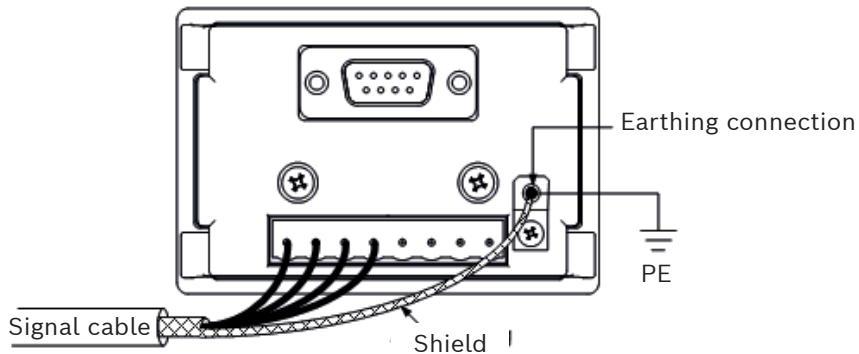
CAUTION!

The device, connection lines and signal cables must not be installed close to interference sources which have strong inductive or capacitive interference or strong electrostatic fields.

External interferences can be avoided with a suitable cable routing.



The shield of the signal output cable should only be connected to the downstream electronics on one side. The figure shows how the shield is connected to the position display in order to avoid interferences.



The shields should not be grounded on both sides. Signal cables should always be laid separately from load power lines. A safety distance of at least 0.5 mm from inductive and capacitive interference sources such as contactors, relays, motors, switching power supplies or clocked controllers has to be maintained!

If interferences occur in spite of all the points described above being observed, please proceed as follows:

1. Install RC circuits via contactor coils of AC contactors (e.g. 0.1 μ F / 100 Ω)
2. Install recovery diodes via DC inductors
3. Install RC circuits via the individual motor phases (in the terminal box of the motor)
4. Do not connect protective earth and ground potential
5. Connect a mains filter upstream of the external power pack

10.2 Possible errors and their correction

The following table shows possible errors and their correction.

Table 6: Error messages and their correction

Error number	Error description	Error correction
"Err 110"	Data storage error	Switch the device off and on again. If the error occurs again, return the device for repair.
"Err 210/220"	Sensor error (occurs only with absolute measuring systems).	Switch the device off and on again. If the error occurs again, check the measuring system and its wiring. If unsuccessful, return the device for repair.
"Err 240"	Power supply breaks down during operation.	Switch the device off and on again. If the error occurs again, check the supply source or the power pack. If unsuccessful, return the device for repair.
"Err 250"	Power supply breaks down during switch-on.	Switch the device off and on again. If the error occurs again, check the supply source or the power pack. If unsuccessful, return the device for repair.

10.3 Recommissioning after fault clearance

After eliminating the fault(s):

- 1 If necessary, reset the emergency stop device
- 2 If necessary, reset the error message at the superior system
- 3 Make sure that there are no persons in the danger zone
- 4 Follow the instructions in section 5

	WARNING! Risk of injury due to improper fault clearance! Improper fault clearance can lead to severe personal injuries or damage of property. Therefore: • Any work to eliminate faults may only be performed by sufficiently qualified and instructed personnel. • Before starting work, ensure that there is sufficient installation space. • Make sure that the installation site is tidy and clean. Loose components and parts lying around or on top of each other are sources of accidents. If components need to be replaced: • Pay attention to correct installation of the spare parts. • Reinstall all fixing elements properly. • Before recommissioning, make sure that all covers and safety equipment are installed correctly and function properly.
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10.4 Maintenance

The device is maintenance-free.

10.5 Cleaning

	WARNING! The device must only be cleaned with a damp cloth. Do not use aggressive detergents!
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11 Type designation

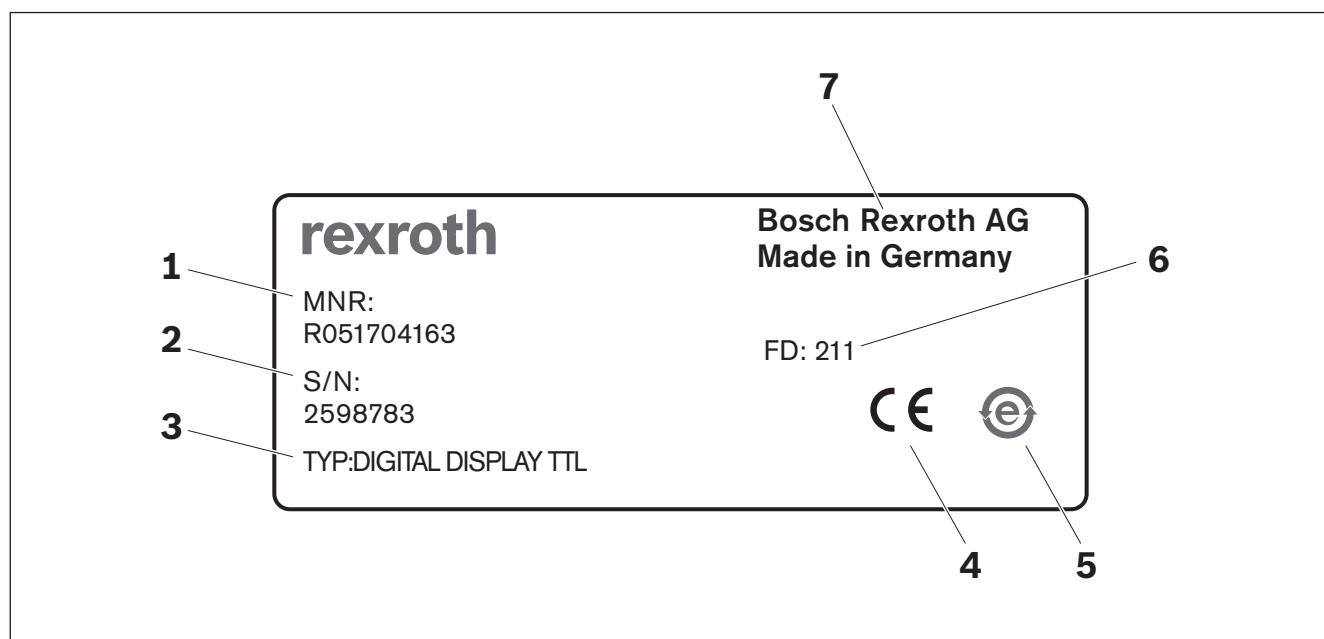


Fig. 5: Type designation

- 1 Material number
- 2 Serial number
- 3 Type designation
- 4 CE mark
- 5 RoHS
- 6 Department/factory number
- 7 Company address

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Phone +49 9721 937-0
www.boschrexroth.com

Find your local contact person here:
www.boschrexroth.com/contact



Subject to technical
modifications

These instructions are
only available as a PDF
R320103179/2019-12