Technical Documentation

Process Indicator X2 PR 5310

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Release 4.4.0

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Foreword

Must be followed!

Any information in this document is subject to change without notice and does not represent a commitment on the part of Minebea Intec unless legally prescribed. This product may only be operated by trained operating personnel. The Installing may only be performed by qualified service personnel authorized by Minebea Intec. In correspondence concerning this product, the type, name, and release number/serial number as well as all license numbers relating to the product have to be cited.

Note

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Table of contents

1 Introduction

1.1 Read the safety instructions and the manual

- Please read the safety instructions and this manual carefully and completely before using the product.
- These are part of the product. Keep the safety instructions in a safe and easily accessible location.

1.2 This is what operating instructions look like

1. - n. are placed before steps that must be done in sequence.

▶ is placed before a step.

▷ describes the result of a step.

1.3 This is what lists look like

- indicates an item in a list.

1.4 This is what warnings look like

Signal words indicate the severity of the danger involved when measures for preventing hazards are not followed.

⚠ DANGER

Warning of personal injury

DANGER indicates death or severe, irreversible personal injury which will occur if the corresponding safety measures are not observed.

▶ Take the corresponding safety precautions.

⚠ WARNING

Warning of hazardous area and/or personal injury

WARNING indicates that death or severe, irreversible injury may occur if appropriate safety measures are not observed.

▶ Take the corresponding safety precautions.

⚠ CAUTION

Warning of personal injury.
CAUTION indicates that minor, reversible injury may occur if appropriate safety measures are not observed.

▶ Take the corresponding safety precautions.

NOTICE

Warning of damage to property and/or the environment.
NOTICE indicates that damage to property and/or the environment may occur if appropriate safety measures are not observed.

▶ Take the corresponding safety precautions.

Note: User tips, useful information, and notes.

1.5 Hotline

Phone: +49.40.67960.444
Fax: +49.40.67960.474
E-mail: help@minebea-intec.com

2 Safety instructions

2.1 General instructions

⚠ CAUTION

Warning of personal injury.

This device has been built and tested in compliance with the safety regulations for measuring and control equipment for protection class I (protective grounding conductor) according to EN 61010 or VDE 0411.
The device was in perfect condition with regard to safety features when it left the factory.

- To maintain this condition and to ensure safe operation, the user must follow the instructions and observe the warnings in this manual.

2.2 Intended use

The device is intended for use as an analysis device for weighing functions.
The device may only be operated by trained operating personnel.
Device commissioning may only be performed by qualified service personnel authorized by Minebea Intec.
Device maintenance may only be performed by qualified service personnel authorized by Minebea Intec.
The device reflects the state of the art.
No warranty is given that the device is free of faults, especially not in conjunction with third-party software and hardware components required for operation.
The manufacturer does not accept any liability for damage caused by third-party system components or due to incorrect use of the device. The use of this device signifies recognition of the stipulations listed above.
Accessories do not fall within the scope of the ATEX Directive and therefore do not have their own certification and/or labeling.

2.3 Initial inspection

Check the contents of the consignment for completeness. Check the contents visually to determine whether any damage has occurred during transport.
If there are grounds for rejection of the goods, a claim must be filed with the carrier immediately. A Minebea Intec sales or service organization must also be notified.

2.4 Before operational startup

NOTICE

Visual inspection!

Before operational startup as well as after storage or transport, inspect the product visually for signs of mechanical damage.

- ▶ The device should not be put into operation if it displays signs of visible damage and/or is defective.

2.4.1 Installation

The device has to be installed in an EMC-compliant manner, see Chapter EMC-compliant installation.

The panel device is suitable for control cabinet mounting. The table-top device is suitable for table-top, wall mount or poles mount installations.

Component	Protection class	Installation
Panel housing: Front + housing	IP64	Control panel cut-out
Panel housing: rear panel	IP30	
Table-top housing: complete	IP65	

To ensure proper cooling of the device, make sure air circulation around the device is not blocked. Avoid exposing the instrument to excessive heat, e.g. from direct sunlight and vibrations. The ambient conditions specified in Chapter Ambient conditions must be observed at all times.

With outdoor mounting, make sure that adequate weather protection is provided (for temperatures, see Chapter Ambient conditions).

2.4.2 Opening the device

⚠ WARNING

Working on a device that is switched on can have life-threatening consequences.

When removing covers or parts using tools, live parts may be exposed. Please note that capacitors in the device may still be charged even after disconnecting the device from all voltage sources.

- The device must not be opened by the operating personnel.
- The device may only be opened by qualified service personnel authorized by Minebea Intec in accordance with specifications.
- Disconnect the device from the electrical supply.

This device contains electrostatically sensitive components. Therefore, potential equalization must be provided when working on the device (antistatic protection).

Before connecting or disconnecting additional devices from the data outputs, the device must be disconnected from the mains.

2.4.3 Supply voltage connection

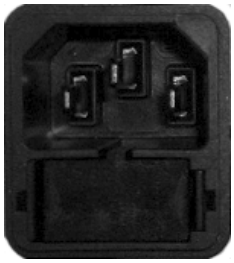
2.4.3.1 Version 230 V AC

Only an approved and appropriate power plug should be used to connect the device.
The power cable must have a cross section of at least 0.75 mm^2 and must comply with the EN 60227 or EN 60245 standard.

> **Note:** Easy access to the disconnecting device (power plug) must be provided.

2.4.3.1.1 Panel device

The panel device is not provided with a power switch. It is ready for operation immediately after connecting the supply voltage.



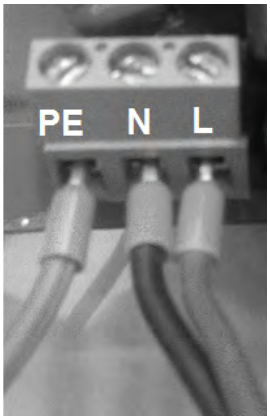
Safe interruption of both supply voltage conductors must be provided for by disconnecting the power plug.
The device is protected on the primary side by two fuses (see Chapter Supply voltage connection version 230 V AC).
The device is equipped with a wide range power supply and covers AC systems with a frequency of 50/60 Hz and a voltage range of U_{AC} = 100 to 240 V -15/+10 % automatically (without manual selection).
The power supply is protected against short circuits and overloads, and disconnects automatically in case of a fault.

If the electrical protection has triggered:

- Disconnect the device from all power sources and wait at least 1 minute.
- Determine and eliminate the cause of the error.
- Reconnect the device to the supply voltage.

2.4.3.1.2 Table-top device

The table-top device is not provided with a power switch. It is ready for operation immediately after connecting the supply voltage.



Safe interruption of both supply voltage conductors must be provided for by disconnecting the power plug.
The device is protected on the primary side by one internal fuse each in the N and L line (siehe Kapitel- Supply voltage connection version 230 V AC).
The device is equipped with a wide range power supply and covers AC systems with a frequency of 50/60 Hz and a voltage range of U_{AC} = 100 to 240 V -15/+10 % automatically (without manual selection).
The power supply is protected against short circuits and overloads, and disconnects automatically in case of a fault.

If the electrical protection has triggered:

- Disconnect the device from all power sources and wait at least 1 minute.
- Determine and eliminate the cause of the error.
- Reconnect the device to the supply voltage.

2.4.3.2 Version 24 V DC

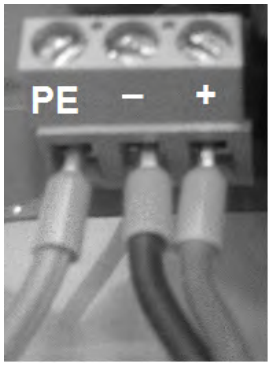
2.4.3.2.1 Panel device

The panel device is not provided with a power switch. It is ready for operation immediately after connecting the supply voltage.

This version is designed for 24 V direct current.
The power connection is established via a 2-pin plug connection (-/24 V/+) and may only be operated with SELV/PELV.
The device is protected by a fuse in the – conductor (see Chapter Supply voltage connection version 24 V DC) on the rear panel (primary side).
The device is protected against incorrect polarity.

2.4.3.2.2 Table-top device

The table-top device is not provided with a power switch. It is ready for operation immediately after connecting the supply voltage.

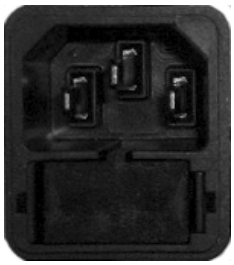


This version is designed for 24 V direct current.
The power connection is established via a 3-pin plug connection (PE/-/+) and may only be operated with SELV/PELV.
The device is primary protected by internal fuse in the + and - conductor (see Chapter Supply voltage connection version 24 V DC).
The device is protected against incorrect polarity.

2.4.4 Protective ground connection

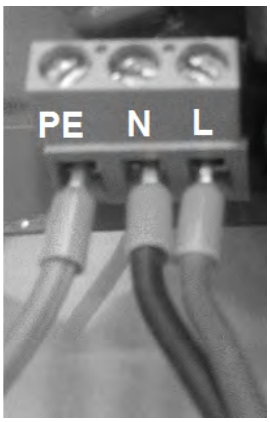
2.4.4.1 Version 230 V AC

2.4.4.1.1 Panel device



The device must be connected to a protective ground via a protective grounding conductor (PE) in the power connector.
The power cable contains a protective grounding conductor which must not be interrupted inside or outside the device.
The protective grounding conductor is connected to the rear panel of the housing.

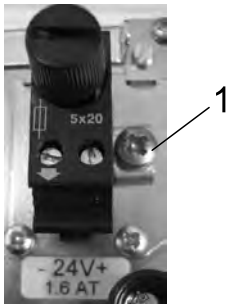
2.4.4.1.2 Table-top device



The device must be connected to protective earth via a protective earth conductor (PE) in the plug connector.
The power cable contains a protective grounding conductor which must not be interrupted inside or outside the device.
The protective grounding conductor is connected to the rear panel of the housing.

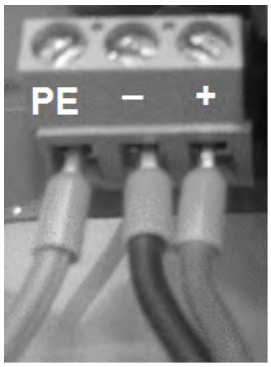
2.4.4.2 Version 24 V DC

2.4.4.2.1 Panel device



The rear panel of the housing must be connected to the protective earth conductor; fixed with screw (1).

2.4.4.2.2 Table-top device



The device must be connected to protective earth via a protective earth conductor (PE) in the plug connector.
The power cable contains a protective earth conductor which must not be interrupted inside or outside the device.
The conductor (PE) is connected to the device.

2.4.5 RF interference suppression

The device is intended for use in an industrial environment. Operation of this device in a residential environment is likely to cause radio frequency interference, see Chapter RF interference suppression. In this case, the operator may be required to take appropriate measures.

2.4.6 Failure and excessive stress

If there is any reason to assume that safe operation of the device is no longer ensured, shut it down and make sure it cannot be used.

Safe operation is no longer ensured if any of the following is true:

- The device is physically damaged.
- The device does not function.
- The device has been subjected to stresses beyond the tolerance limits (e.g., during storage or transport).

2.4.7 Important note

Make sure that the construction of the device is not altered to the detriment of safety. In particular, leakage paths, air gaps (of live parts) and insulating layers must not be reduced.
Minebea Intec cannot be held responsible for personal injury or property damage caused by a device repaired incorrectly by an operator or installer.

2.4.8 Repairs and maintenance

2.4.8.1 General information

Repairs are subject to inspection and must be carried out at Minebea Intec. In case of defect or malfunction, please contact your local Minebea Intec dealer or service center for repair.
When returning the device for repair, please include a precise and complete description of the problem.
Maintenance work may only be carried out by qualified service personnel authorized by Minebea Intec who have expert knowledge of the hazards involved and the required precautions.

2.4.8.2 Electrostatically sensitive components

This device contains electrostatically sensitive components. Therefore, potential equalization must be provided when working on the device (antistatic protection).

2.4.8.3 Replacing fuses

⚠ WARNING

Damage from overheating.

The use of repaired fuses and bypassing the fuse holder is prohibited.

- Only the fuses listed in Chapter General technical data are permissible.
- Fuses may only be replaced by qualified service personnel authorized by Minebea Intec.

Disconnect the device from the supply voltage before removing/replacing the fuses.

3 Device description

3.1 General information

The indicator is equipped with a six-digit 7-segment display and additional status indication. Local operation is performed using 6 double-function keys.

3.2 Overview of the device

- Accuracy 6,000 d (acc. to OIML R76 Class III) for the weighing electronics The inputs and outputs for control signals may only be operated with SELV/PELV.
- High-speed conversion with response times from upto 5 ms
- Weight indication with status by transflective 6-digit 7-segment display
- 6 function keys for front-panel operation
- Protection class panel version: Front + housing rated to IP64, rear panel rated to IP30
- Protection class stainless steel version: IP65
- RS-232 interface, built-in for connecting e.g. a printer or a remote display
- RS-485 interface, built-in for communication e.g. ModBus
- 3 internal passive opto-decoupled inputs
- 3 relay outputs
- Expansion of the instrument is not possible. When ordering, the possible equipment is determined, see Order information
  - Analog output
  - ProfiBus-DP
  - DeviceNet
  - EtherNet/IP
  - ProfiNet I/O
- Galvanically isolated interfaces (except RS-232, RS-485)
- Wide range power supply for U_{AC} = 100...240 V, protection class I (protective earth)
- Version for U_{DC} = 24 V
- Panel device: plug-in connections are on the rear panel for load cells, inputs/outputs, serial interfaces
- Table-top device: plug-in connections are on the rear panel for load cells, inputs/outputs, serial interfaces via cable glands
- Calibration using front keys
- Calibration using weights, by entering mV/V values or directly, using load cell data (Smart Calibration)
- Software configuration of the interface cards, e.g. for remote display or printer

- Analog test for the weighing electronics
- Overwrite protection:
  - via CAL switch

3.2.1 Communication protocols

For RS-232-/RS-485 interfaces:
- Remote display protocol
- Printer
- SMA protocol
- ModBus RTU protocol

Field bus slave (options):
- ProfiBus-DP
- DeviceNet
- ProfiNet I/O
- EtherNet/IP

3.3 Housing

3.3.1 Control panel housing

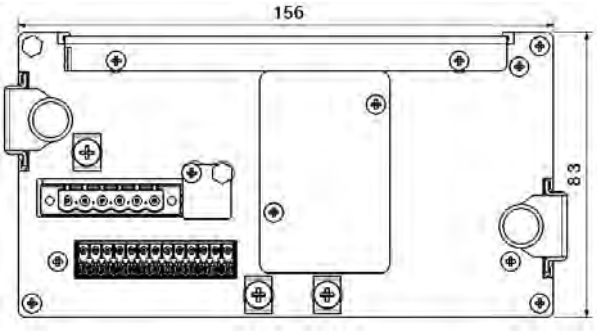
The keypad and the display form one unit with the front. Cable connections are made at the rear panel of the housing. A rectangular cut-out is required for the installation.

Materials

Component	Material
Housing	Aluminum
Front panel	Stainless steel
Gasket	EPDM
Foil keypad	PET

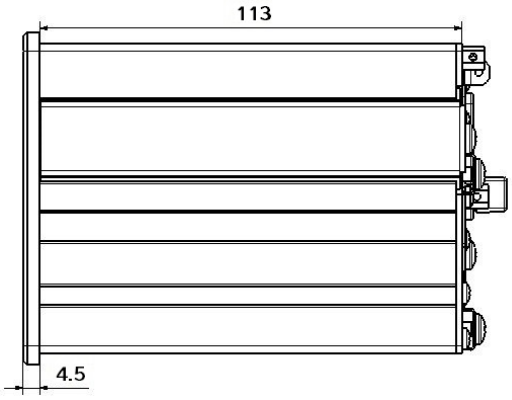
Dimensions

Rear view



all dimensions in mm

Side view



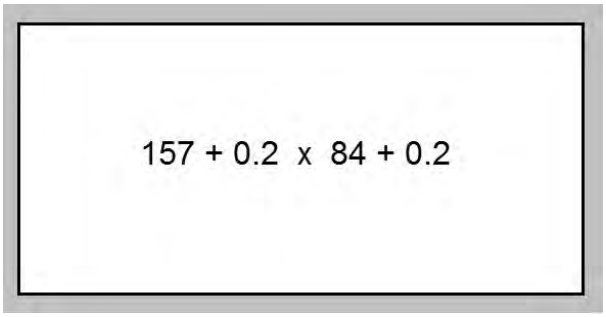
all dimensions in mm

Front view

all dimensions in mm

Control panel cut-out

The control panel cut-out must be made before installing the device.



all dimensions in mm

3.3.2 Table-top housing

The keypad and the display form a unit with the front of the upper part of the housing.

All cable connections are located inside the device. The cables are to be connected via the cable glands located on the rear of the device.

The table-top housing is suitable for table and wall mounting.

Materials

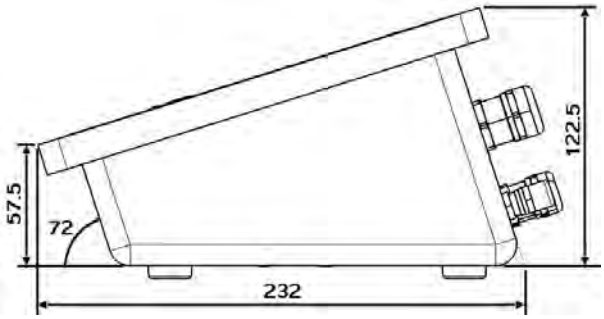
Component	Material
Housing	Stainless steel
Gasket	EPDM
Foil keypad	PET
Rubber feet	EPDM

Front view

all dimensions in mm

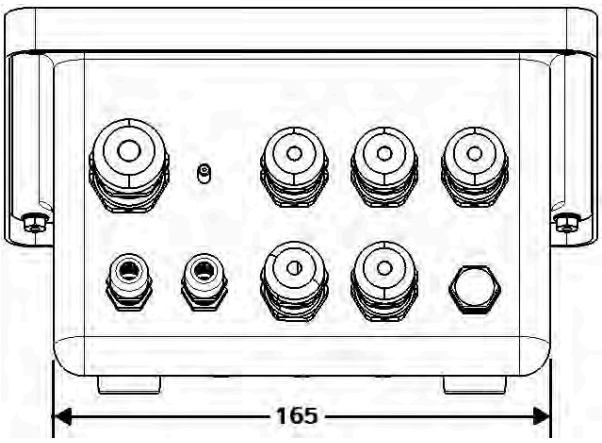
Isometric view

Side view



all dimensions in mm

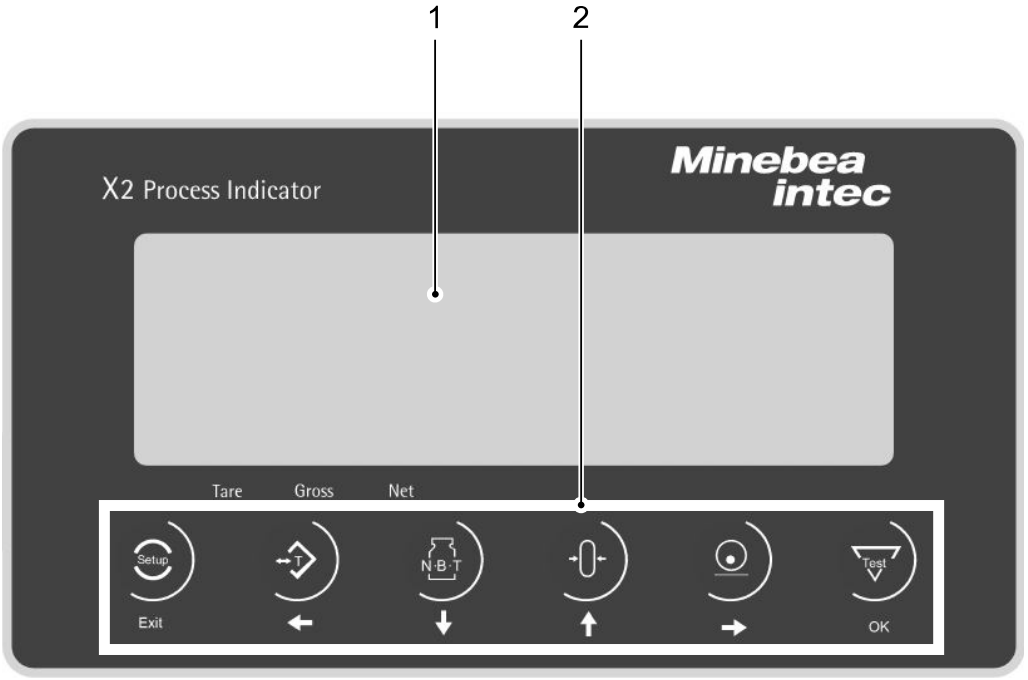
Rear view



all dimensions in mm

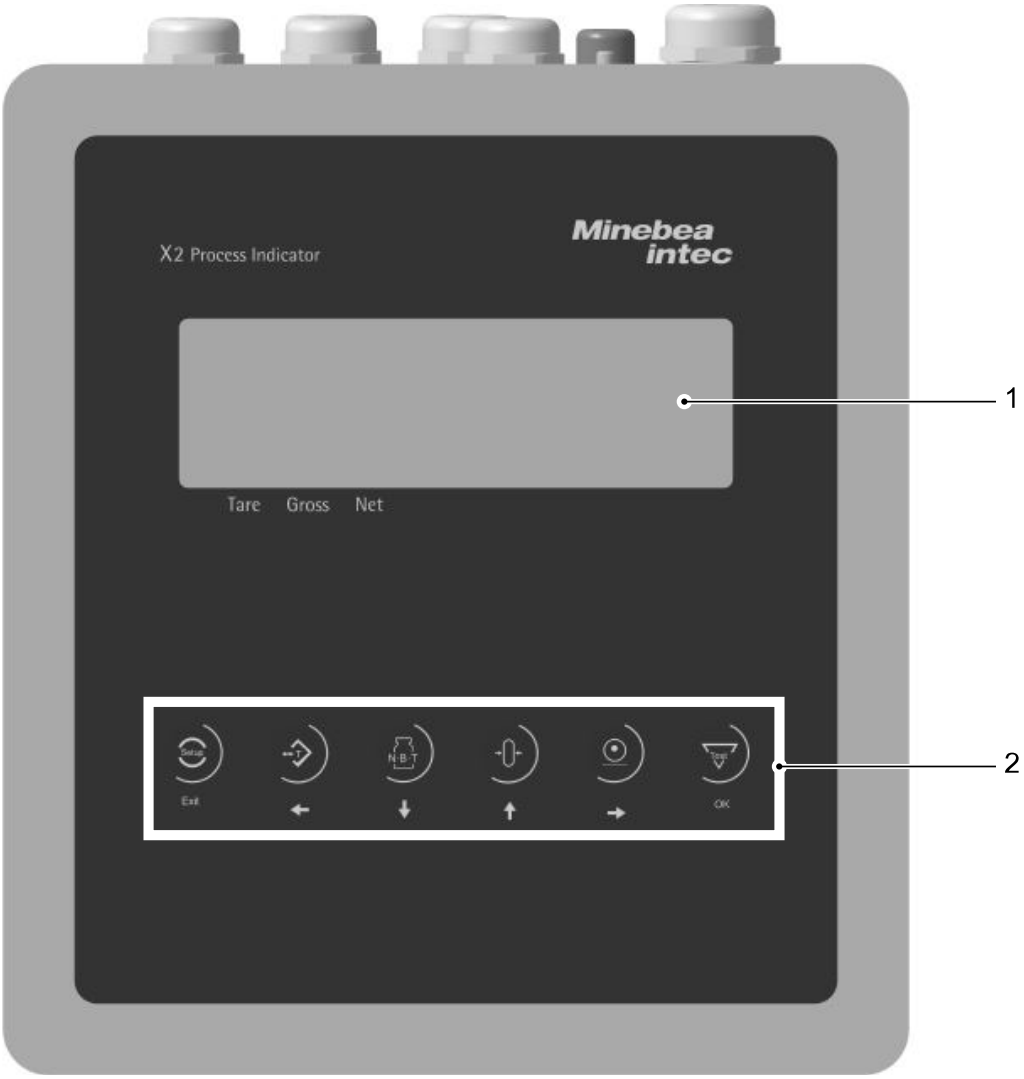
3.3.3 Indicator front

Panel device



Pos.	Name
1	7-segment display
2	Keypad

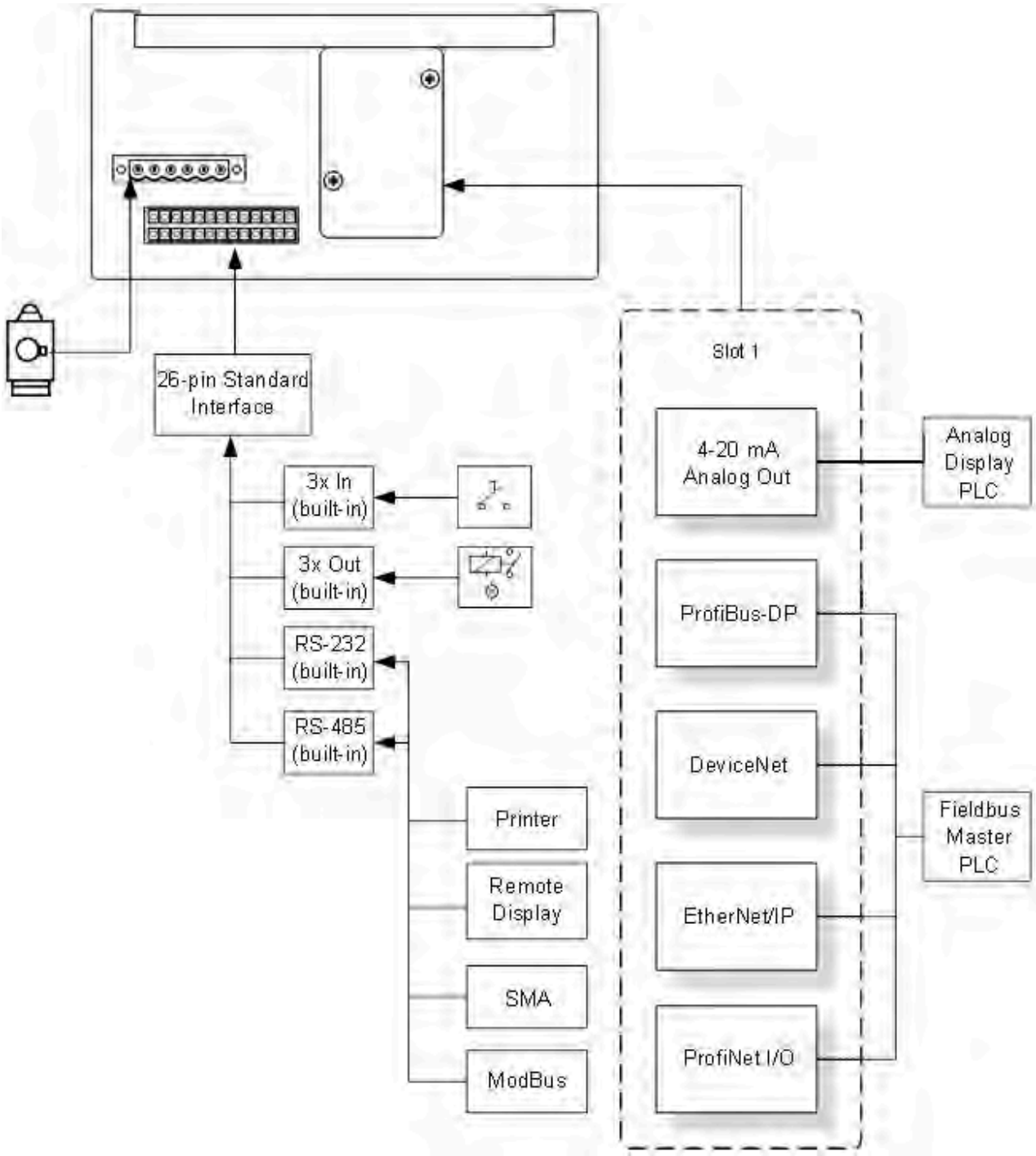
Table-top device



Pos.	Name
1	7-segment display
2	Keypad

3.3.4 Overview of connections

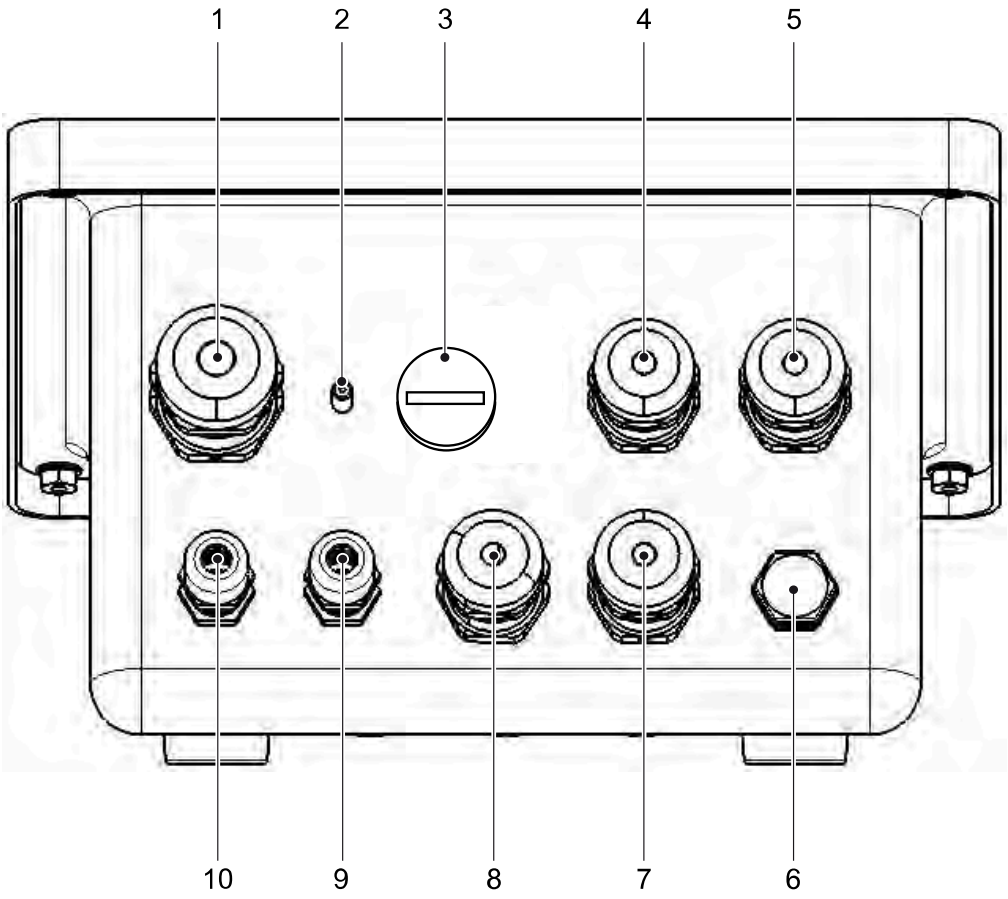
3.3.4.1 Panel device



Connection	Description
Analog weighing electronics	Analog weighing platforms and analog load cells can be connected (via a cable junction box).
3 digital inputs	Contact inputs, for example, can be implemented. See Chapter Digital inputs for an example.
3 digital outputs	Current or voltage inputs, for example, can be implemented. See Chapter Digital outputs for an example.
RS-232 interface	The following devices can be connected via the serial interface: – Remote display – Printer
RS-485 interface	The following devices can be connected via the serial interface: – ModBus RTU – PC via SMA protocol
1 analog output	The analog output can be used to control valves, for example.
Fieldbus interface: – ProfiBus-DP – DeviceNet – ProfiNet I/O – EtherNet/IP	The corresponding device can be included under a communication master (e.g. Siemens S7 ProfiBus) as a fieldbus slave.

3.3.4.2 Table-top device

In principle, the cables can be fed through all the cable glands that match the cable diameter. The figure below shows a cabling suggestion.



Pos.	Connection	Description
1	Analog weighing electronics	Analog weighing platforms and analog load cells can be connected (via a cable junction box).
2	Grounding terminal	The equipotential bonding conductor can be connected here.
3	CAL switch	Access to the CAL switch on the mainboard
4	1 analog output	The analog output can be used to control valves, for example.
4	Fieldbus interface: – ProfiBus-DP – DeviceNet	The corresponding device can be included under a communication master (e.g. Siemens S7 ProfiBus) as a fieldbus slave.

Pos.	Connection	Description
	– ProfiNet I/O – EtherNet/IP	
5	Supply voltage connection	U_{DC} = 24 V U_{AC} = 100...240 V
6	Pressure compensation element	It provides pressure equalization in the device.
7	3 digital outputs	Current or voltage inputs, for example, can be implemented. See Chapter Digital outputs for an example.
8	3 digital inputs	Contact inputs, for example, can be implemented. See Chapter Digital inputs for an example.
9	RS-485 interface	The following devices can be connected via the serial interface: – ModBus RTU – PC via SMA protocol
10	RS-232 interface	The following devices can be connected via the serial interface: – Remote display – Printer

3.3.4.3 Plug-in cards

Product	Description	Position
PR 5310/20, ../21, ../30, ../31 Analog output	Analog output 16 Bits, 0/4-20 mA For more information see Chapter- Analog output.	Slot 1
PR 5310/23, ../24, ../33, ../34 ProfiBus-DP- & Analog output	ProfiBus-DP-V0 Slave with 9,6 kbit/s to 12 Mbit/s, baud rate auto-detection Analog output 16 Bits, 0/4-20 mA For more information see Chapter- Analog output & Profibus-DP interface.	Slot 1
PR 5310/40, ../41, ../50, ../51 ProfiBus-DP fieldbus	ProfiBus-DP-V0 Slave with 9,6 kbit/s to 12 Mbit/s, baud rate auto-detection For more information see Chapter- ProfiBus-DP interface.	Slot 1
PR 5310/60, ../61, ../70, ../71 DeviceNet fieldbus	DeviceNet Slave with max. 500 kbit/s For more information see Chapter DeviceNet interface.	Slot 1
PR 5310/80, ../81, ../90, ../91 EtherNet/IP fieldbus	EtherNet/IP with 10/100 Mbit/s For more information see Chapter EtherNet/IP interface.	Slot 1
PR 5310/83, ../84, ../93, ../94 ProfiNet I/O fieldbus	ProfiNet I/O with 10/100 Mbit/s For more information see Chapter- ProfiNet I/O interface.	Slot 1

4 Device installation

4.1 General instructions

Before starting work, please read Chapter 2 and follow all instructions.

⚠ WARNING

Warning of hazardous area and/or personal injury

- Installation work may only be carried out by qualified service personnel authorized by Minebea Intec who are aware of and able to deal with the related hazards and take suitable measures for self-protection.

⚠ WARNING

Warning of hazardous area and/or personal injury

- All cable connections must be protected from damage.

Note:

- Measurement cables should be kept away from power equipment.
- Signal cables and measurement cables should be installed separately from electric power lines.
- Measurement cables should be laid in separate cable conduits.
- Network cables should be crossed perpendicularly.

Further procedures:

- Check the consignment: make sure that all components are present.
- Safety check: inspect all components for damage.
- Make sure that the on-site installation is correct and complete including cables, e.g. power cable fuse protection, platform scale, load cells, junction box, data cables, console/cabinet, etc.
- Follow all device installation instructions related to application, safety, ventilation, sealing and environmental influences.
- Connect the cable from the junction box or platform scale/load cell.
- Connect additional data cables/network cables etc. as needed.
- Connect the supply voltage.
- Check the installation.

4.2 Mechanical preparation

4.2.1 Storage and transport conditions

NOTICE

Material damage is possible.
Unpacked devices may lose their precision due to strong vibrations; strong vibrations may impair the safety of the device.

▶ Do not subject the device to extreme temperatures, moisture, shocks, and vibrations.

4.2.1.1 Storage temperature

Storage temperature range: –20...+70 °C

4.2.1.2 Transport conditions

The packaging for transportation of Minebea Intec devices was designed to avoid transport damage. It is recommended that the box and all parts of the packaging should be kept for future storage or transportation of the device. To avoid damage to the device, all cables must be removed before packaging it for transportation.

4.2.2 Installation location

Avoid unsuitable influences at the installation location:

- Extreme temperatures and excessive temperature fluctuations (see Chapter Ambient conditions)
- Heat due to proximity to heaters or due to direct sunlight
- Aggressive chemical vapors
- Extreme moisture (see Chapter Ambient conditions)
- Extreme vibrations (see Chapter Ambient conditions)

4.2.3 Unpacking

▶ Unpack the device and check it for visible external damage.

▷ If there is damage, follow the instructions in Chapter Safety inspection.

▶ Keep the original packaging in case the device needs to be returned. Remove all cables before sending.

4.2.4 Checking the equipment supplied

- Indicator
- Options and accessories in accordance with the delivery note
- Safety instructions

4.2.5 Acclimatizing the device

If a cold device is brought into a warm environment, condensation may form.

▶ Keep the device disconnected from the mains and allow it to acclimatize at room temperature for approx. two hours.

4.2.6 Cable gland and Cable connection

The cable conductors for the weighing electronics board are placed on the terminals in the device.
The wires leading to the terminals should be kept as short as possible.

Panel device

Have all required parts, technical documents and tools at hand for control cabinet installation.

Other procedure:
- Make the control panel cut-out for the device in the control cabinet door, see Chapter Control panel housing.
- Install the device.
- Secure the cable at the place of installation, e.g. using cable ties.
- Remove the insulation from the cable ends and keep the strands short.
- Connect the screens to the grounding terminal; see Chapter EMC-compliant installation.

Table-top device

The screen connection is made in the cable gland, see Chapter Installation of a cable with gland.

NOTICE

Material damage is possible.

- If a cable gland is not used, it must be sealed with one of the supplied plugs.

NOTICE

Material damage is possible.

- Regularly check the installed cable glands for tightness and re-tighten, if necessary.

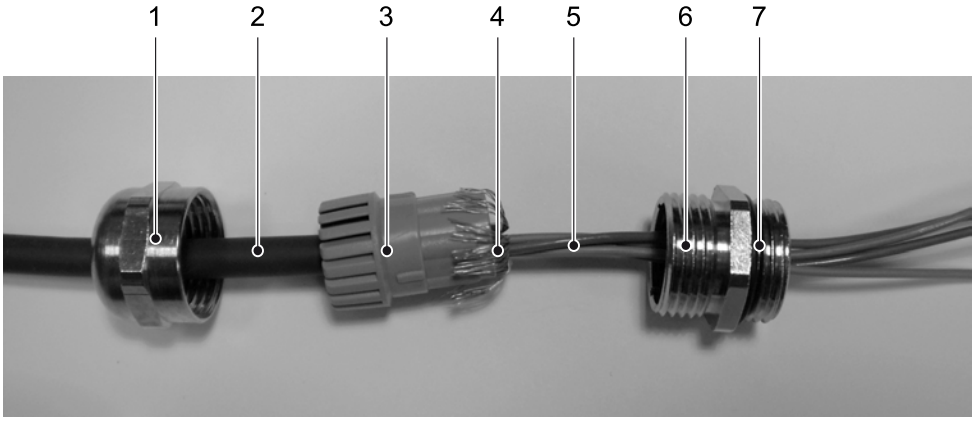
4.2.6.1 Installation of a cable with gland

NOTICE

Material damage is possible.

Do not guide the screen (4) into the device!

- The cable screen (4) must be connected in the metal sleeve (6) of the cable gland.
- Before, during and after installation, make sure that the sealing ring is seated correctly.



1. Unscrew the sleeve screw cap (1).
2. Slide the cap (1) and plastic cone (3) onto the cable (2).
3. Guide the cable (5) through the gland (6).
4. Fold the cable screen (4) over the lower part of the terminal insert (3) (approx. 10 mm).
5. Connect the cable conductors.
6. Tighten the sleeve screw cap (1).
7. Secure the gland (6) including the o-ring (7) using the counter nut (in the housing).

NOTICE

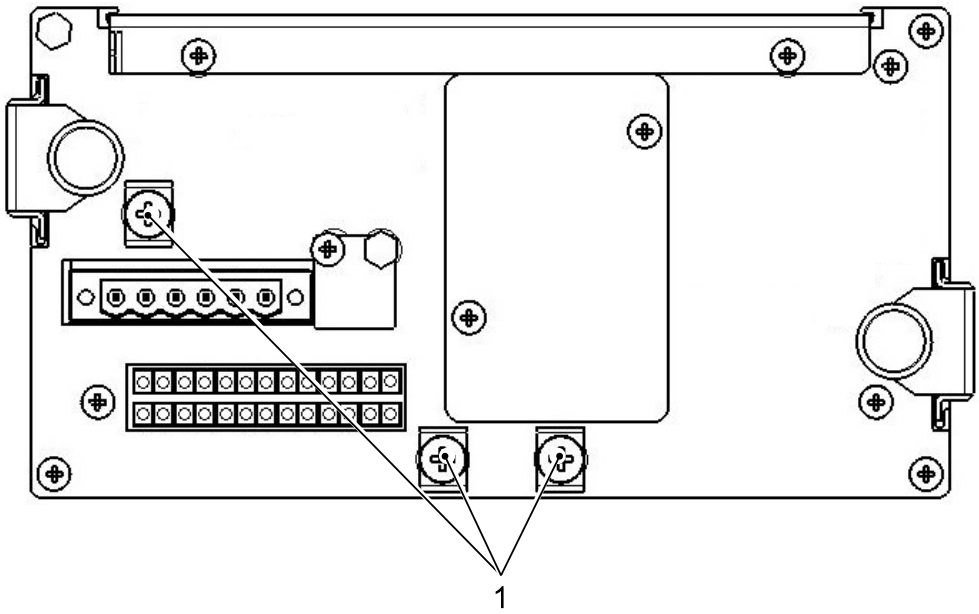
Material damage is possible.

- Regularly check the cable gland for tightness and re-tighten it, if necessary.

4.2.7 EMC-compliant installation

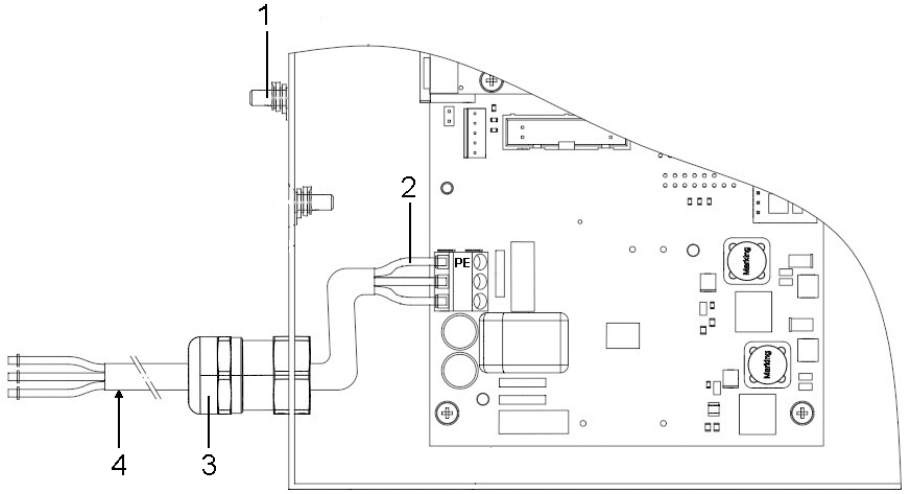
4.2.7.1 Connecting the screens and the equipotential bonding conductor

Panel device



Screens and potential equalization must be connected in the grounding terminals (1).

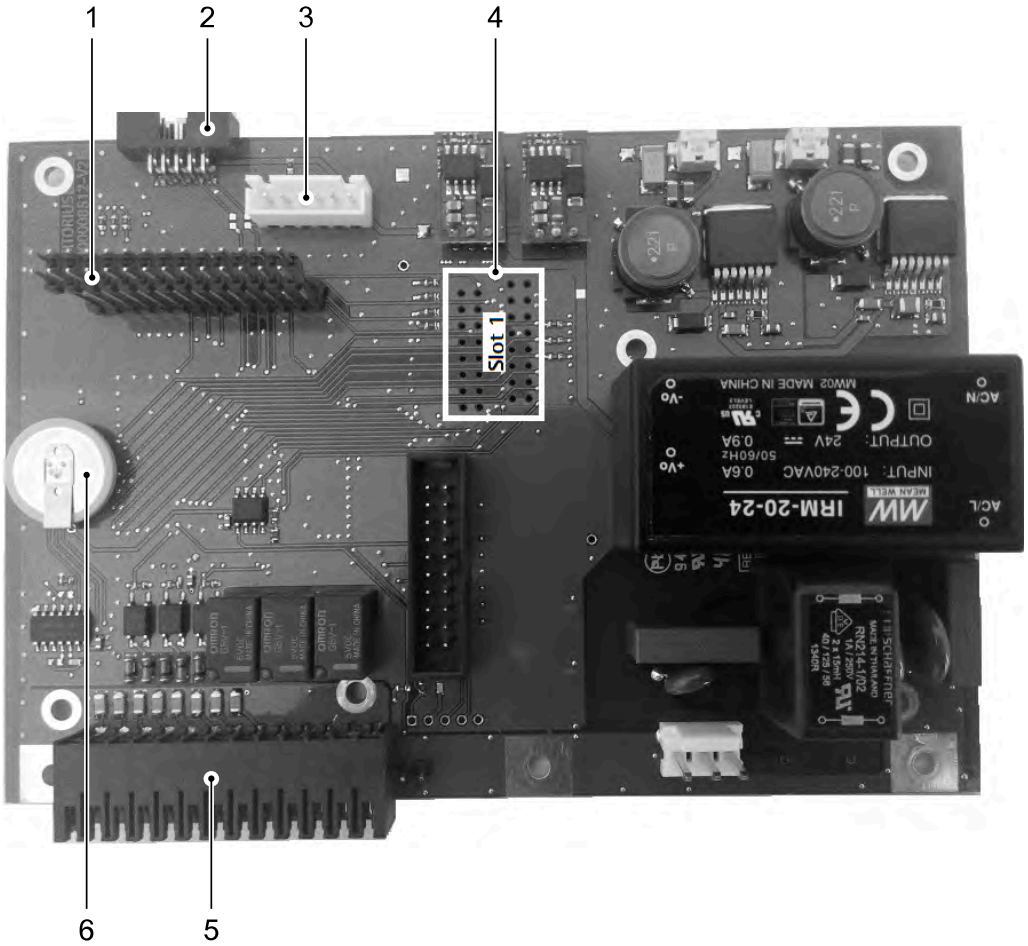
Table-top device



The screens (4) must be connected in the cable gland (3).
The equipotential bonding conductor must be connected in the grounding terminal (1).
The protective grounding conductor (2) must be connected in the plug connector (PE).

4.3 Hardware construction

4.3.1 Main board

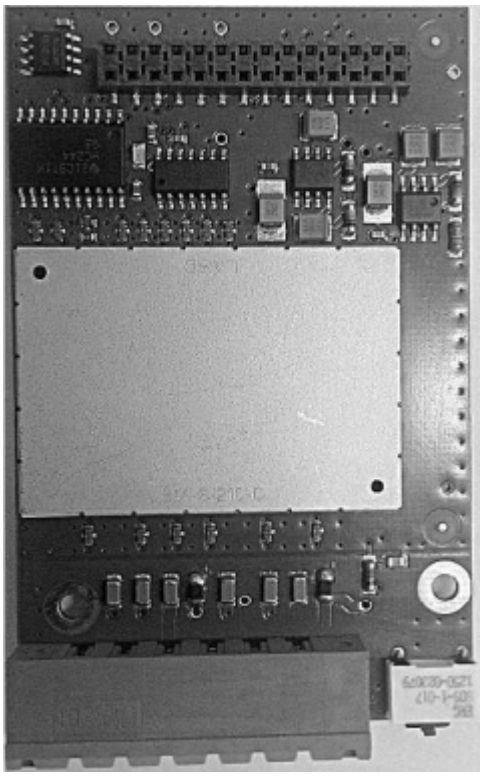


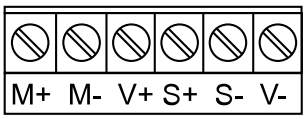
The following components are located on the main board:

Pos.	Name
1	Slot for analog weighing electronics board
2	Slot for keypad
3	Slot for display board
4	Slot for plug-in cards (slot 1), see Chapter Plug-in cards
5	Standard interface with RS-232, RS-485, digital inputs and outputs
6	Lithium battery

The lithium battery (6) is always activated and powers the date/clock module.

4.3.2 Analog weighing electronics board



Terminal contact	Connection	Description
		
M+	+ Meas.	+ Signal/LC output
M-	- Meas.	- Signal/LC output
V+	+ Supply	+ Supply/excitation
S+	+ Sense	+ Sense
S-	- Sense	- Sense
V-	- Supply	- Supply/excitation

The analog weighing electronics board, including CAL switch, is located on the main board.

Calibration data and parameters are saved to the EAROM (non-volatile memory) of the weighing electronics board.

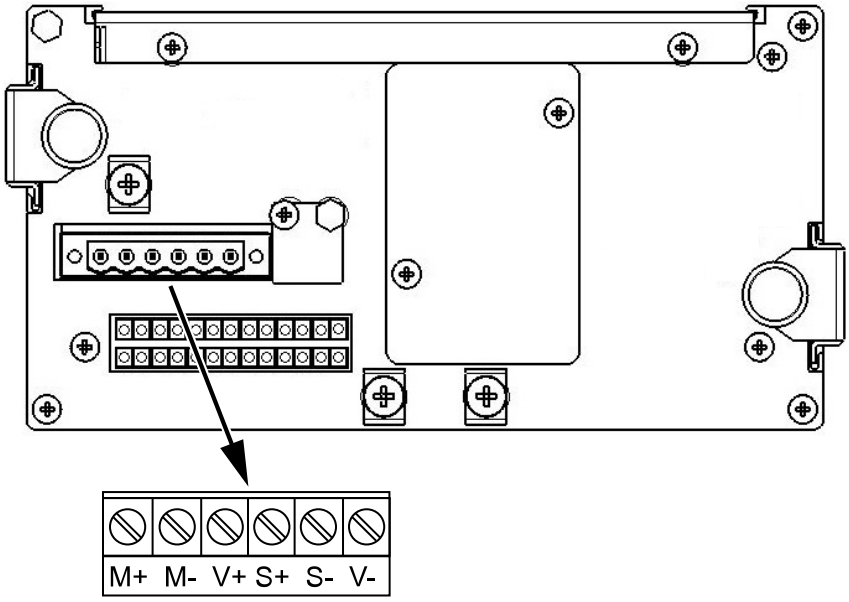
Technical data

Name	Data
Internal connection	Pin strip, 28-pin
External connection	Plug connector, 6-pin Switch cabinet device: screen connection on the grounding terminal Table-top device: screen connection in the cable gland
Number of channels	6-wire or 4-wire
Load cell supply	U_{DC} = 12 V, symmetrical to zero (U_{DC} = ±6 V, I_{max} = 160 mA)
Capacity (number of load cells)	≥75 Ω, corresponding to 8 load cells with 650 Ω or 4 load cells with 350 Ω
Sense input	U_{DC} = ±6 V, with monitoring
Measurement input	U_{DC} = 0...36 mV, symmetrical to zero
Dead load suppression	U_{DC} = max. 36 mV (dead load + range)
Accuracy	0.2 µV/d equivalent to 1.2 mV for 6000 d, class III; according to OIML R76/EN45501
Min. measuring signal (OIML)	0.1 mV/V = 1,2 mV equivalent to 0.2 µV/d @ 6000 d
Max. resolution	7.5 million internal counts at 3 mV/V (max. 3.356 mV/V)
Linearity	<0.003%
Temperature effect TK_0	<0.05 µV/K RTI, <0.004%/10K @ 1 mV/V
Temperature effect TK_{Span}	<±4.0 ppm/K
Cable length	Max. 300 m
Cable type	6-wire with screen for entire cable and screen for measurement cables, e.g., PR 6135/..

4.3.3 Connection of analog load cells and platforms

4.3.3.1 General instructions

The device is equipped with an integrated connection for analog weighing electronics. The interface can be configured by software.



> **Note:** The load cell/platform cable is routed in the table-top unit through the cable gland to the plug connector and then connected, see chapter Table-top device und Connecting an analog weighing platform with a 6-wire cable.

The supply voltage is protected against short circuit/overload.

Weighing platforms and load cells can be connected to the device as follows:

- One weighing platform, see Chapter Connecting an analog weighing platform with a 6-wire cable
- One load cell directly, see Chapter Connecting a load cell with a 4-wire cable and Connecting a load cell with a 6-wire cable
- several load cells in the junction box via connecting cable, see Chapter- Connecting between 2 and 8 load cells (650 Ω) using a 6-wire connection cable

> **Note:** Do **not shorten** the load cell cable. Connect the prepared cable end and roll up the excess length.

Weight indicator plug connector

Terminal contact	Connection		Description		Color
M+	+	Meas.	+	Signal/LC output	green
M-	–	Meas.	–	Signal/LC output	gray
V+	+	Supply	+	Supply/excitation	red
S+	+	Sense	+	Sense	white
S-	–	Sense	–	Sense	black
V-	–	Supply	–	Supply/excitation	blue

Note:
The colors listed here apply for the Minebea Intec products.

Color code

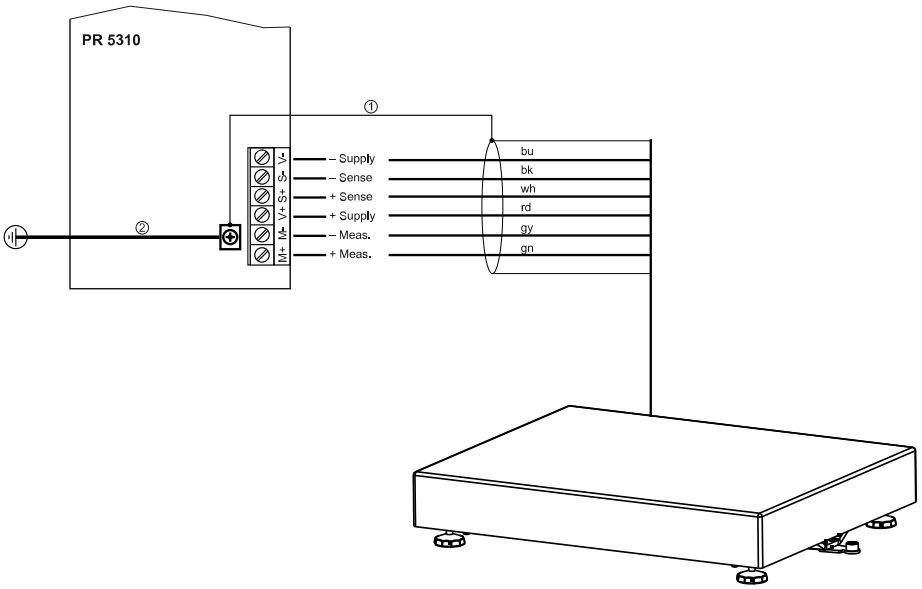
bk	=	black
bu	=	blue
gn	=	green
gy	=	gray
rd	=	red
wh	=	white

For additional information on the connection, refer to the corresponding technical documentation.

Note: All components are only shown schematically.

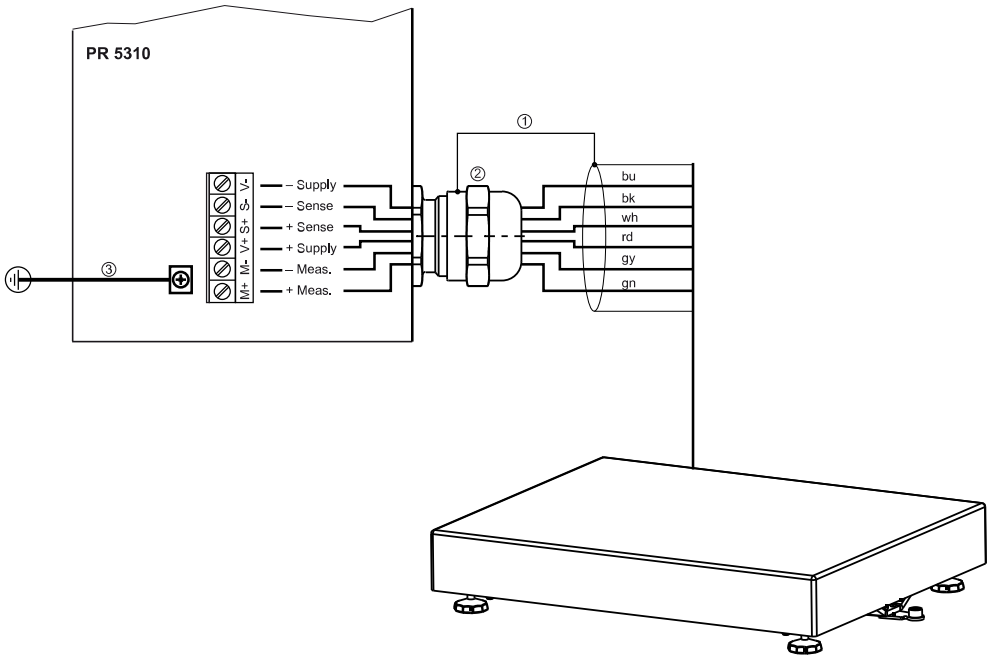
4.3.3.2 Connecting an analog weighing platform with a 6-wire cable

Connection example Panel device



① Screen
② Potential equalization

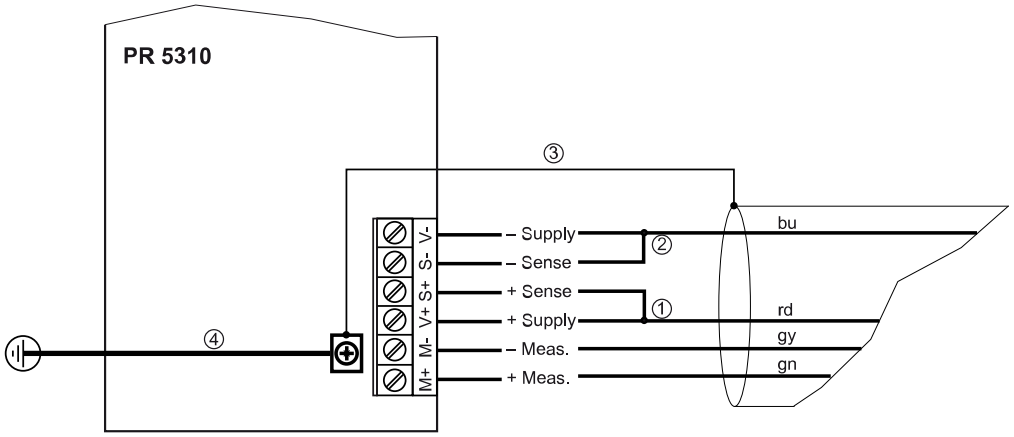
Connection example table-top device



① Screen
② Cable gland
③ Potential equalization

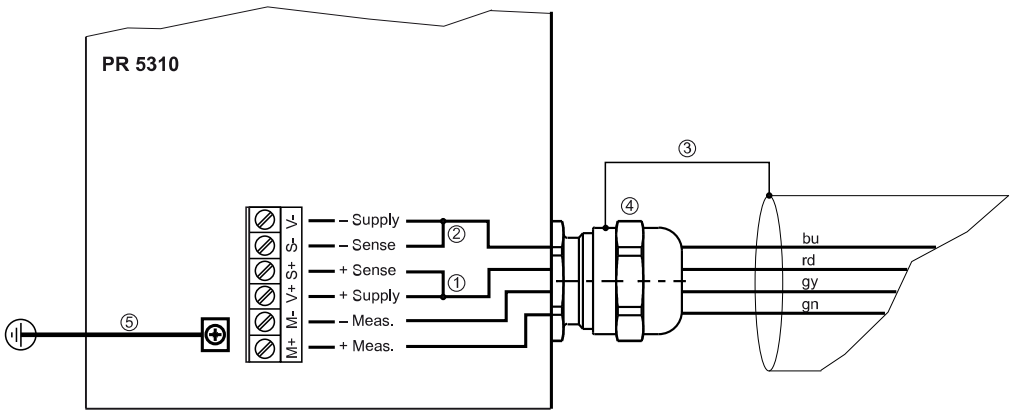
4.3.3.3 Connecting a load cell with a 4-wire cable

Connection example panel device



Provide the following links between the terminal contacts:
① from + Supply (+V) to + Sense (+S)
② from – Supply (-V) to – Sense (-S)
Further connections:
③ Screen
④ Potential equalization

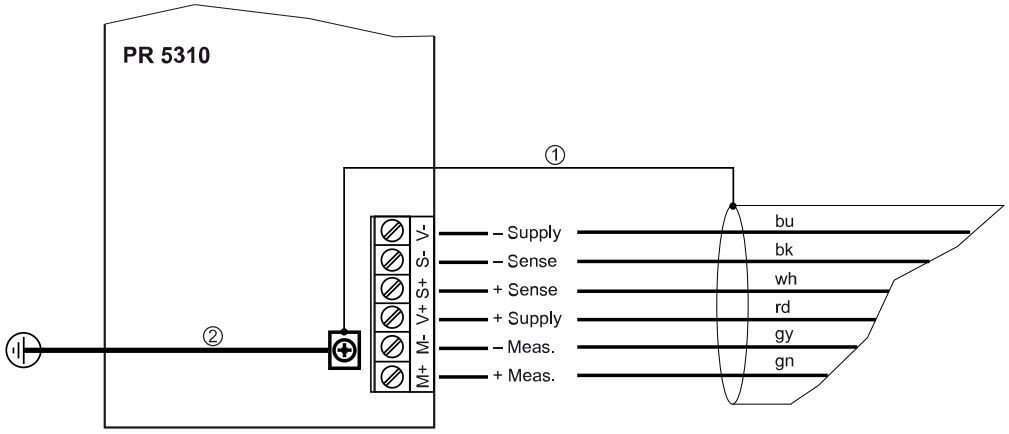
Connection example table-top device



Provide the following links between the terminal contacts:
① from + Supply (+V) to + Sense (+S)
② from – Supply (-V) to – Sense (-S)
Further connections:
③ Screen
④ Cable gland
⑤ Potential equalization

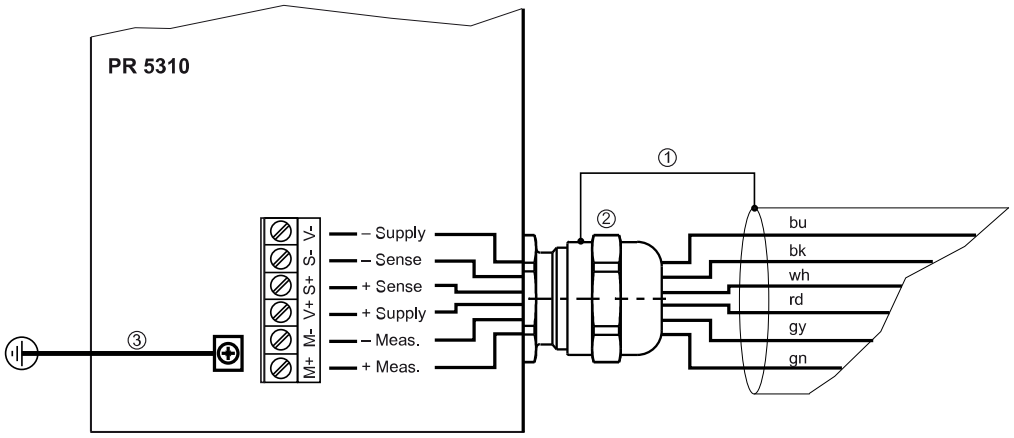
4.3.3.4 Connecting a load cell with a 6-wire cable

Connection example panel device



① Screen
② Potential equalization

Connection example table-top device



① Screen
② Cable gland
③ Potential equalization

4.3.3.5 Connecting between 2 and 8 load cells (650 Ω) using a 6-wire connection cable

Connections are made via cable junction box PR 6130/.. using connection cable PR 6135/.. or PR 6136/... .

Recommendation

- Install cable in steel pipe connected to a ground potential.
- The distance between the measuring cables and the power cables should be at least 1 m.

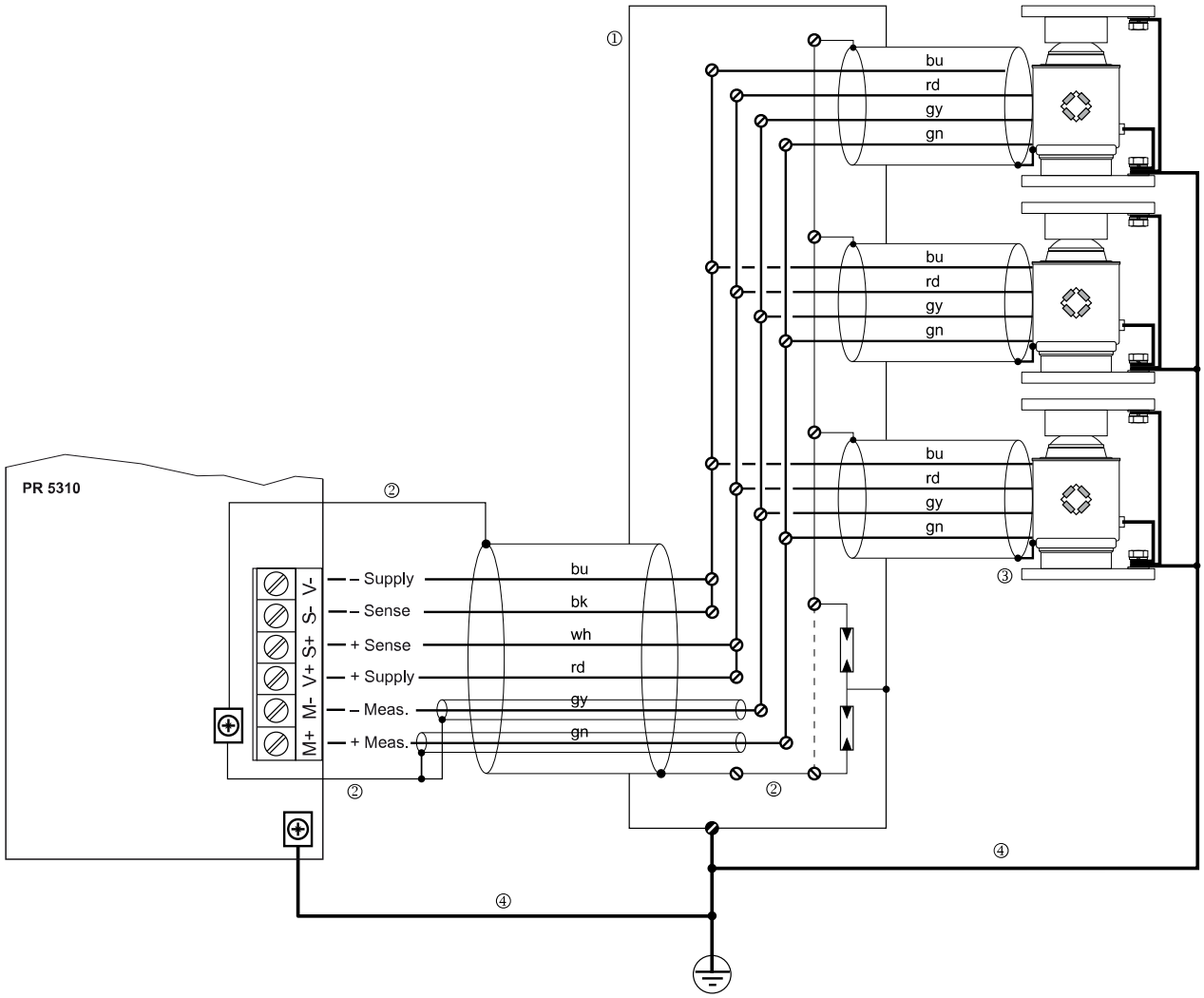
Load cell supply circuit

- Load resistance of load cell circuit ≥75 Ω, e.g., 8 load cells of 650 Ω each
- The supply voltage is fixed at U_{DC} = 12 V and protected against short circuits.

For further technical data, see Chapter General technical data.

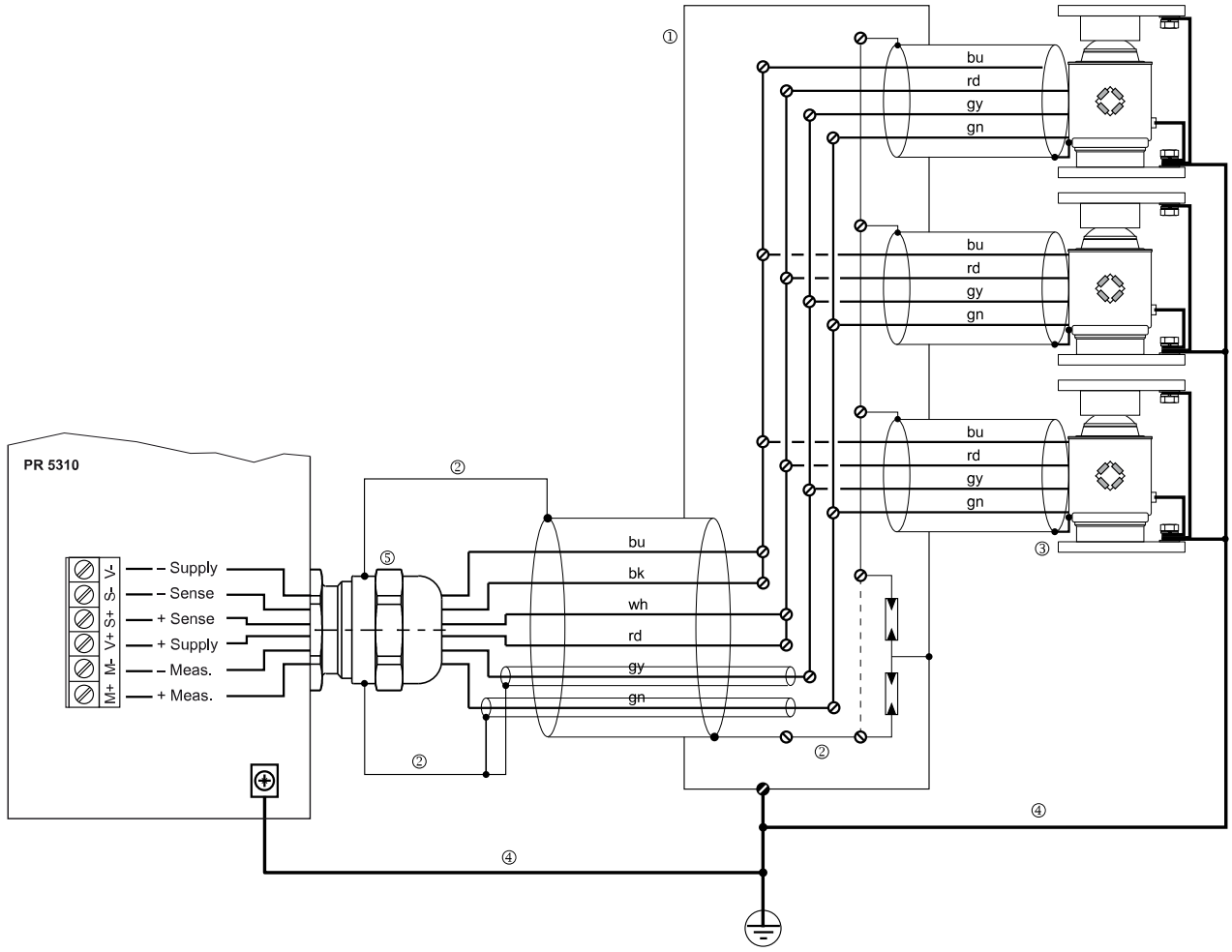
> **Note:**
>
> If hum interference occurs, the cable screens should only be connected on one side.
>
> Depending on the design of the cable junction box used, either the jumper J3 must be removed or the cable screens must be disconnected from the terminal contacts highlighted in yellow.

Connection example panel device



① Cable junction box
② Screen
③ The cable screen is connected to the load cell housing.
④ Potential equalization

Connection example table-top device



① Cable junction box
② Screen
③ The cable screen is connected to the load cell housing.
④ Potential equalization
⑤ Cable gland

4.3.3.6 Connecting load cells of type series PR 6221

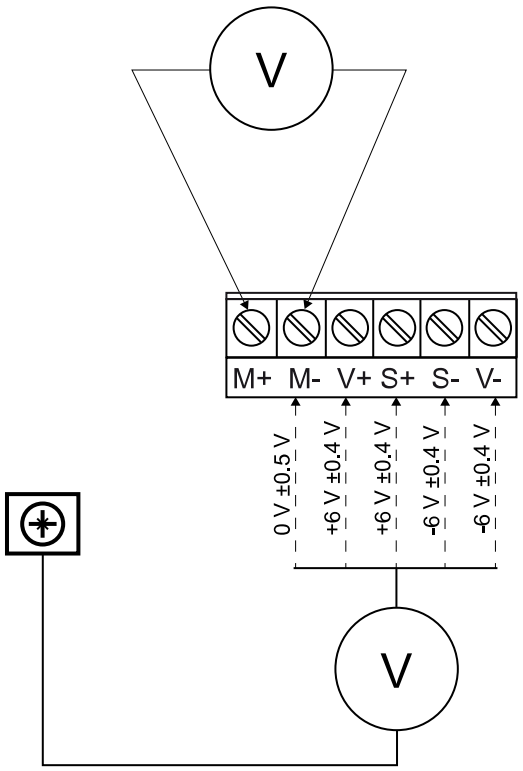
See installation manuals of PR 6221 and PR 6021/08, ../18, ../68S.

4.3.3.7 Testing the measuring circuit

A simple test with the load cells connected can be carried out with a multimeter.

> **Note:** In the case of an external load cell supply voltage or use of an isolating unit, the internal load cell supply is not relevant.

Measuring voltage



0...12 mV = @ LC with 1.0 mV/V
0...24 mV = @ LC with 2.0 mV/V

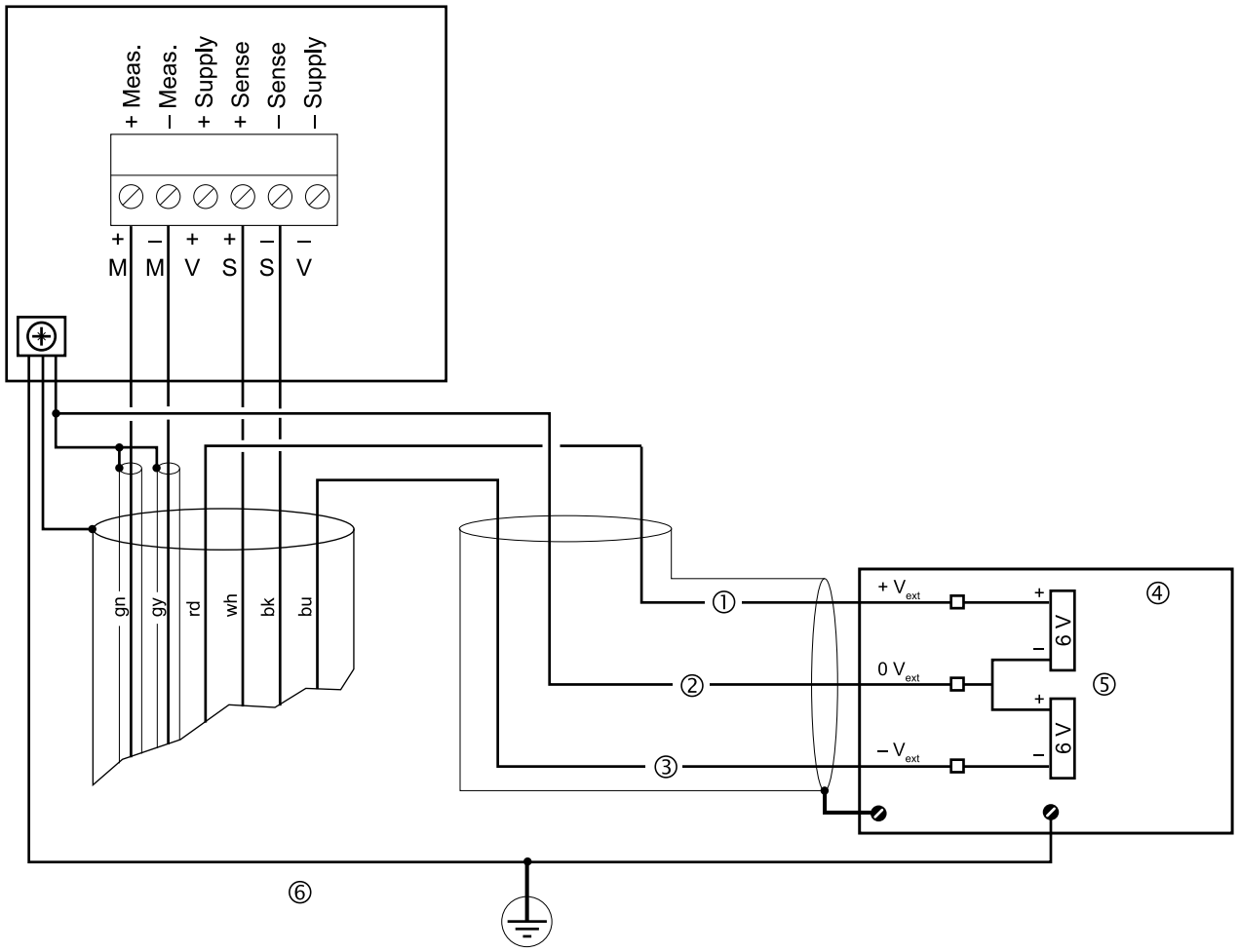
4.3.3.8 Connecting load cells to an external supply

If the total resistance of the load cells is ≤75 Ω (e.g., more than 4 load cells with 350 Ω), an external load cell supply is required. In this case, the internal supply is replaced by a potential-free external supply.

The center of the external supply voltage (0 ext. supply) should be connected to the device housing to ensure that the voltage reacts symmetrically to 0.

The internal supply is not connected.

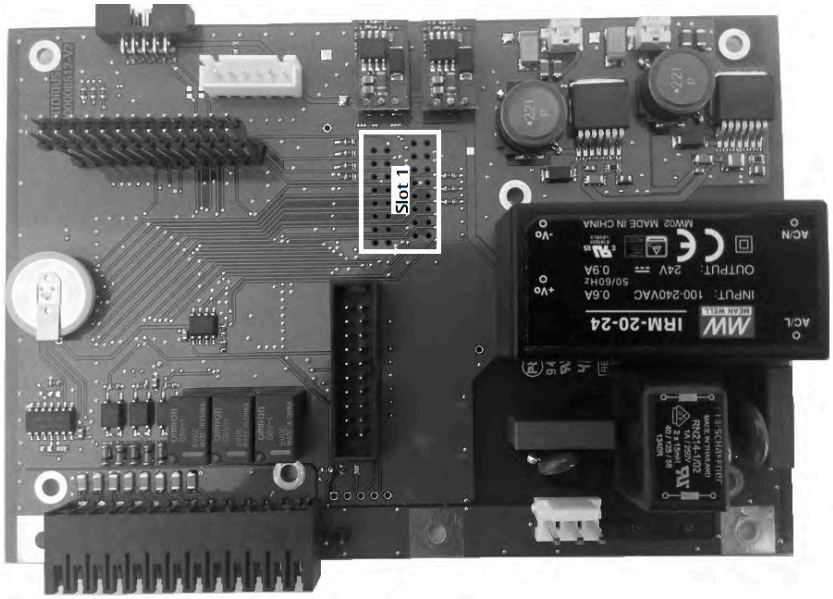
Connection example



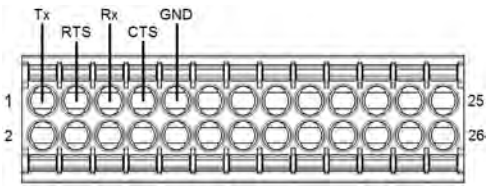
① + external supply
② 0 external supply
③ - external supply
④ Power supply U_{DC} = 24 V 0,5 A
⑤ Potential-free
⑥ Potential equalization

4.3.4 1×RS-232 interface und 1×RS-485 interface

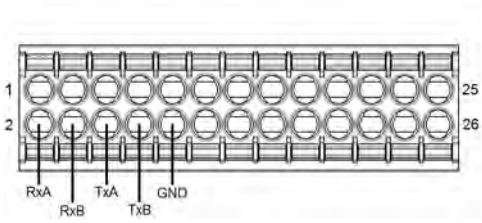
The interfaces can be configured via the front-panel keys.



RS-232



RS-485



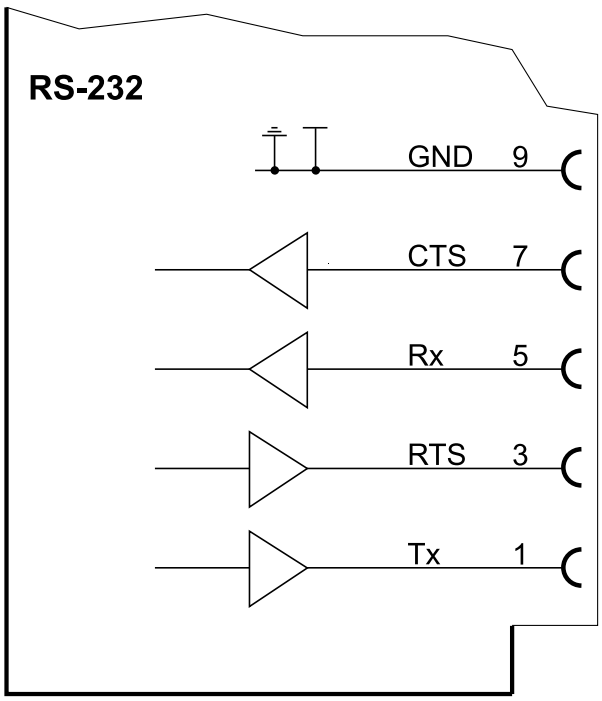
Terminal contact	Connection	Terminal contact	Connection
1	RS-232 - Tx	2	RS-485 - RxA
3	RS-232 - RTS	4	RS-485 - RxB
5	RS-232 - Rx	6	RS-485 - TxA
7	RS-232 - CTS	8	RS-485 - TxB
9	RS-232 - GND	10	RS-485 - GND

4.3.4.1 RS-232 interface

Technical data

Name	Data
External connection	Plug connector, 26-pin
Number of channels	1
Type	RS-232, full duplex
Transfer rate	1200...38 K4 bit/s
Parity	None, odd, even
Data bits	7/8 bits
Input signal level	Logic 1 (high) -3 to -15 V Logic 0 (low) +3 to +15 V
Output signal level	Logic 1 (high) -5 V to -15 V Logic 0 (low) +5 V to +15 V
Signals	Input: Rx, CTS Output: Tx, RTS
Potential isolation	None
Cable gauge	max. 1.5 mm^2
Cable length	max. 15 m
Cable type	Twisted pair, screened (e.g. LifYCY 3x2x0.20), 1 pair of wires for ground (GND). Cable screen must be connected to the housing at the rear wall or in the cable gland.

Block diagram

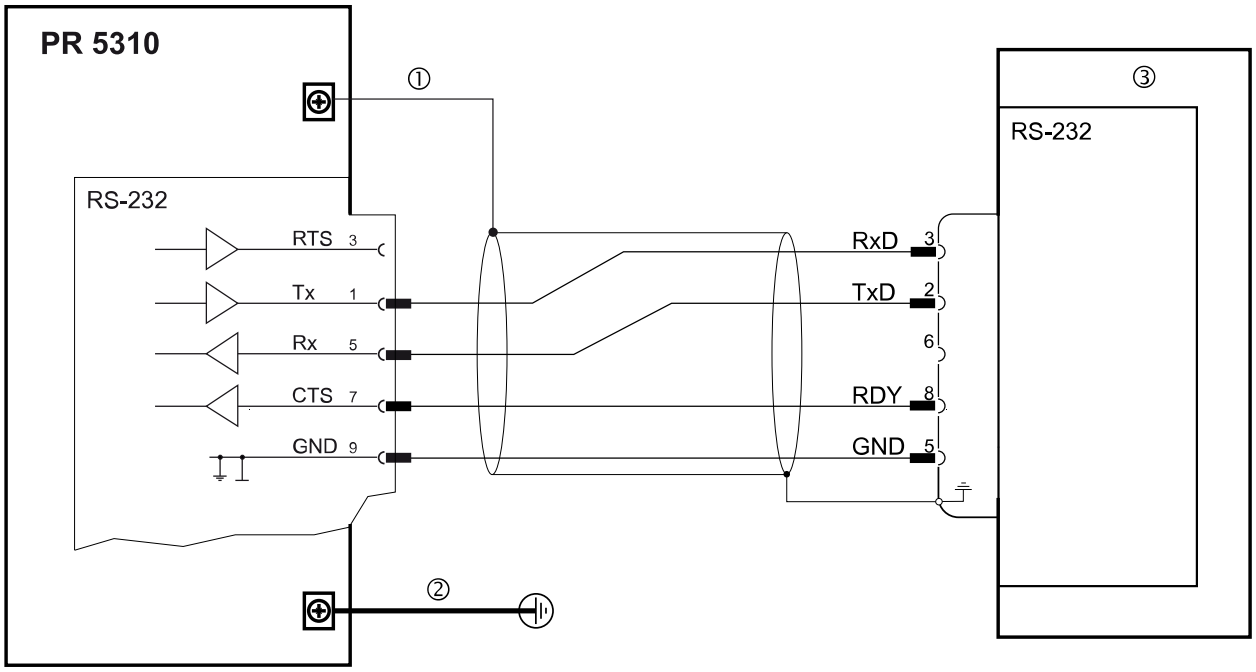


4.3.4.1.1 Connection of a ticket printer via RS-232

The following printers can be connected:

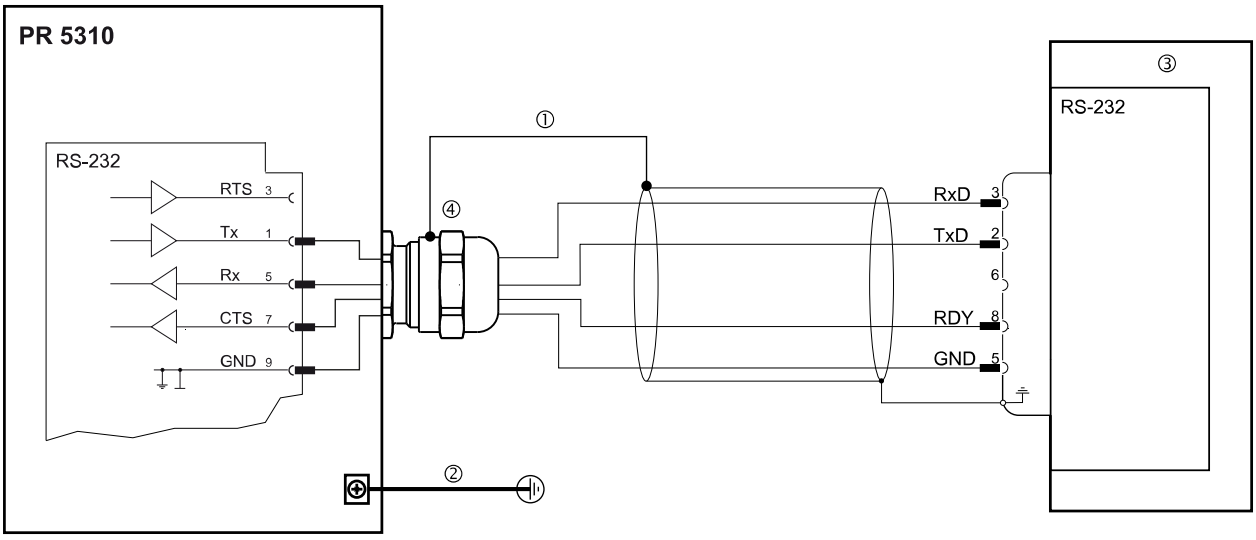
YDP05	YDP21
	

Connection example Panel device



① Screen
② Potential equalization
③ Printer

Connection example table-top device



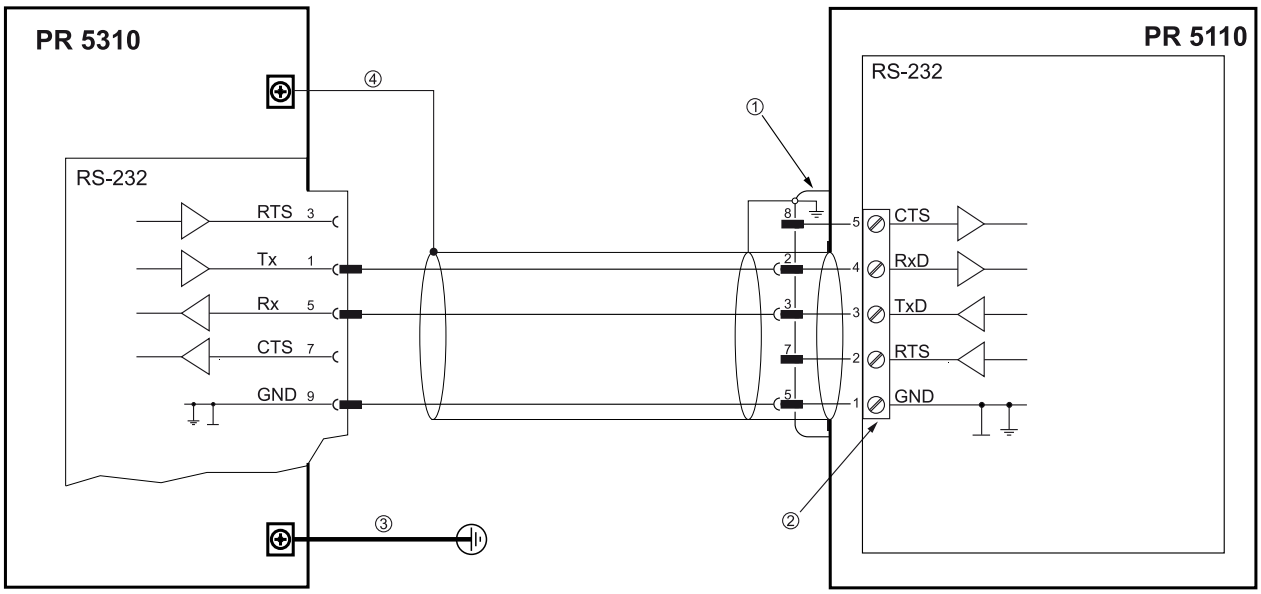
① Screen
② Potential equalization
③ Printer
④ Cable gland

Configuration example PR 5310	Configuration printer
Setup - [SI 070] ➞ [PrInt] ➞ [Port] ➞ [rS232] ➞ [ProtoC] ➞ [rtS.CtS] ➞ [bAud] ➞ [9600] ➞ [PArIty] ➞ [nonE] ➞ [bitS] ➞ [8] ➞ [StoP] ➞ [1] ➞ [Coln 1...Coln 12] See also Chapter Configuring the serial interface for the printer.	The configuration of the printer is not provided.

4.3.4.1.2 Connection of the remote display PR 5110 via RS-232

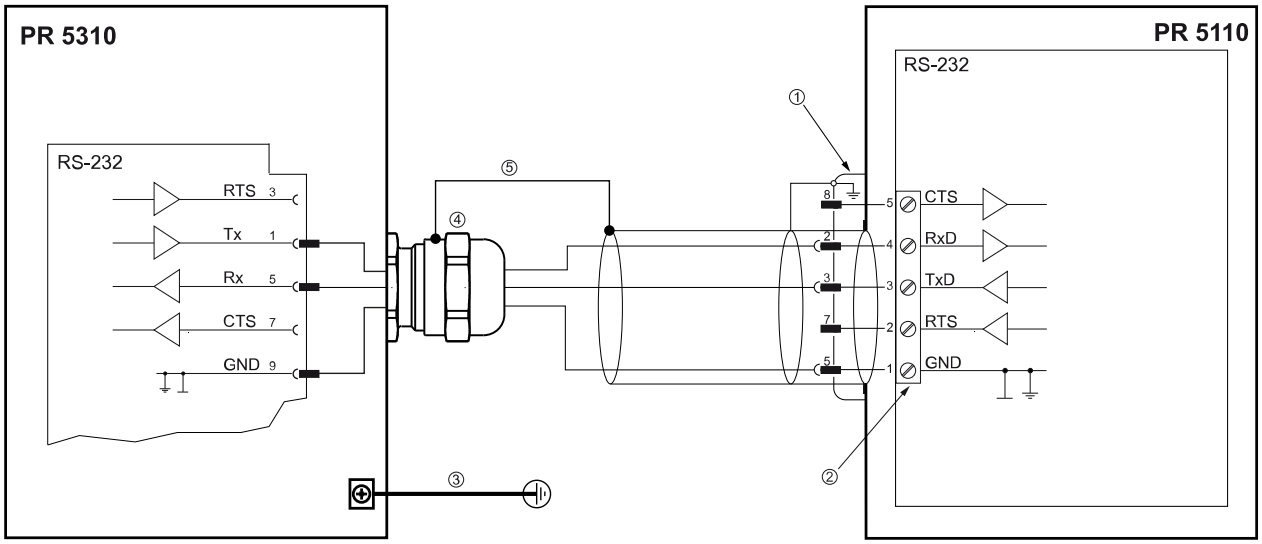
The PR 5110 remote display can be connected to the device via the internal RS-232 interface.

Connection example Panel device



① D-Sub 9-pin plug connector (male)
② 5-pin plug connector
③ Potential equalization
④ Screen

Connection example table-top device



① D-Sub 9-pin plug connector (male)
② 5-pin plug connector
③ Potential equalization
④ Cable gland
⑤ Screen

Configuration example

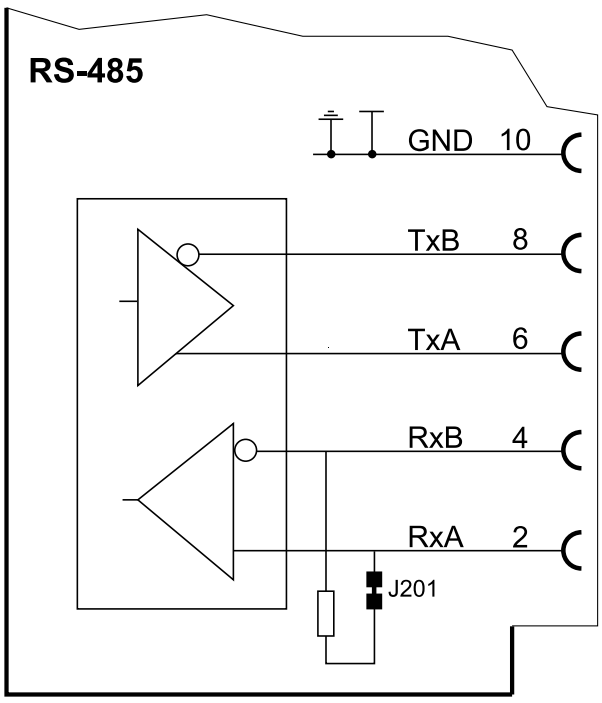
PR 5310	PR 5110
Setup - [S1 071] ➞ [rENdSP] ➞ [Port] ➞ [rS232] ➞ [bAud] ➞ [9600] See also Chapter Configuring the serial interface for the remote display.	[Setup] ➞ [oP 10] ➞ [LInE] ➞ [rS232] [Setup] ➞ [oP 12] ➞ [tokEn] ➞ [oFF] [Setup] ➞ [oP 13] ➞ [SEndModE] ➞ [SEnd]

4.3.4.2 RS-485 interface

Technical data

Name	Data
External connection	Plug connector, 26-pin
Number of channels	1
Type	RS-485, full duplex (4-wire) RS-485, half duplex (2-wire)
Transfer rate	1200...38 K4 bit/s
Signals	TxA, RxA, TxB, RxB
Potential isolation	no
Cable gauge	max. 1.5 mm^2
Cable length	max. 1000 m
Cable type	Twisted pair, screened (e.g. LifYCY 3x2x0.20), 1 pair of wires for ground (GND). Cable screen must be connected to the housing at the rear wall or in the cable gland.

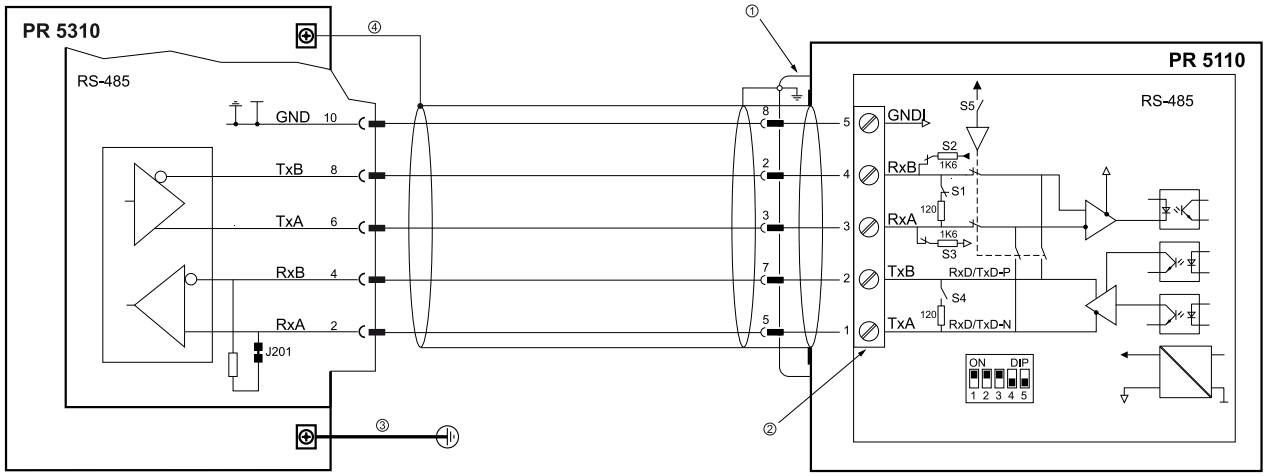
Block diagram



4.3.4.2.1 Connection of the remote display PR 5110 via RS-485

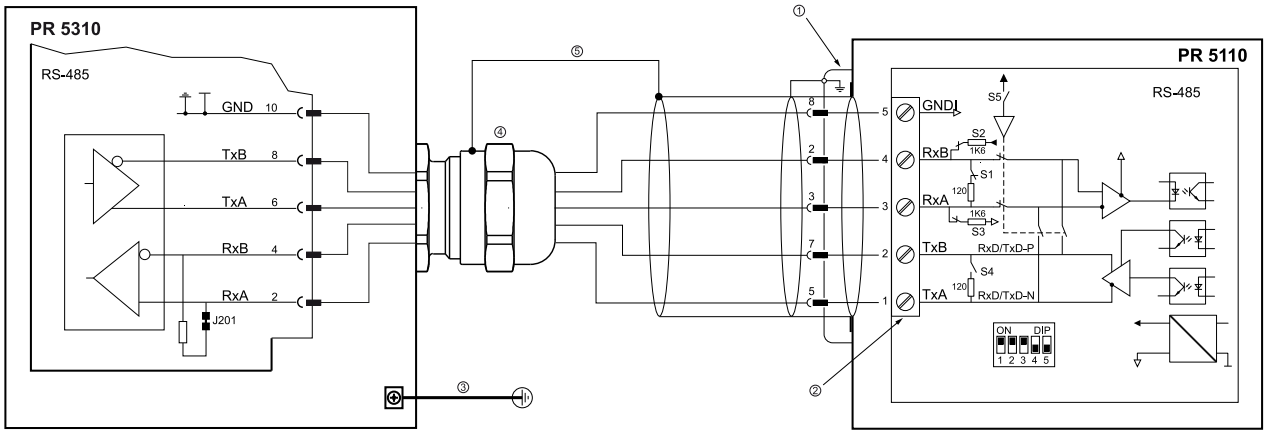
The PR 5110 remote display can be connected to the device via the internal RS-485 interface.

Connection example panel device



① D-Sub 9-pin plug connector (male)
② 5-pin plug connector
③ Potential equalization
④ Screen

Connection example table-top device



① D-Sub 9-pin plug connector (male)
② 5-pin plug connector
③ Potential equalization
④ Cable gland
⑤ Screen

Switch settings

PR 5110
ON: S1, S2, S3 OFF: S4, S5

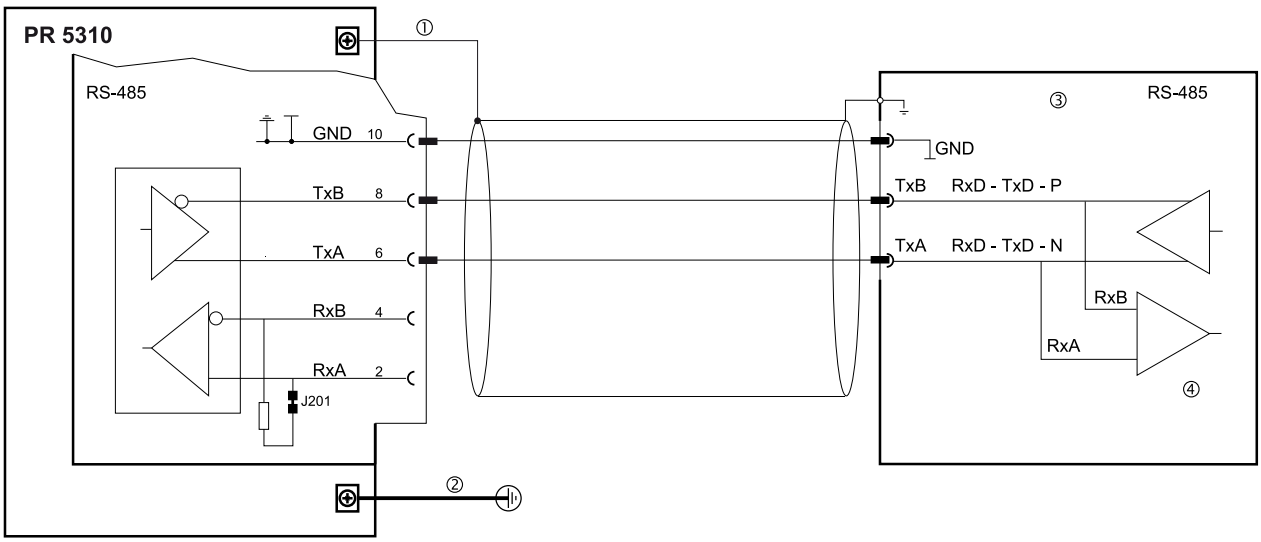
Configuration example

PR 5310	PR 5110
Setup - [SI 071] ➞ [rENdSP] ➞ [Port] ➞ [r-S485] ➞ [bAud] ➞ [9600] ➞ [Mod-E] ➞ [HALF]	[Setup] ➞ [oP 10] ➞ [LInE] ➞ [rS485] [Setup] ➞ [oP 12] ➞ [tokEn] ➞ [oFF] [Setup] ➞ [oP 13] ➞ [SEndModE] ➞ [SEnd]

4.3.4.2.2 ModBus point-to-point connection (2-wire)

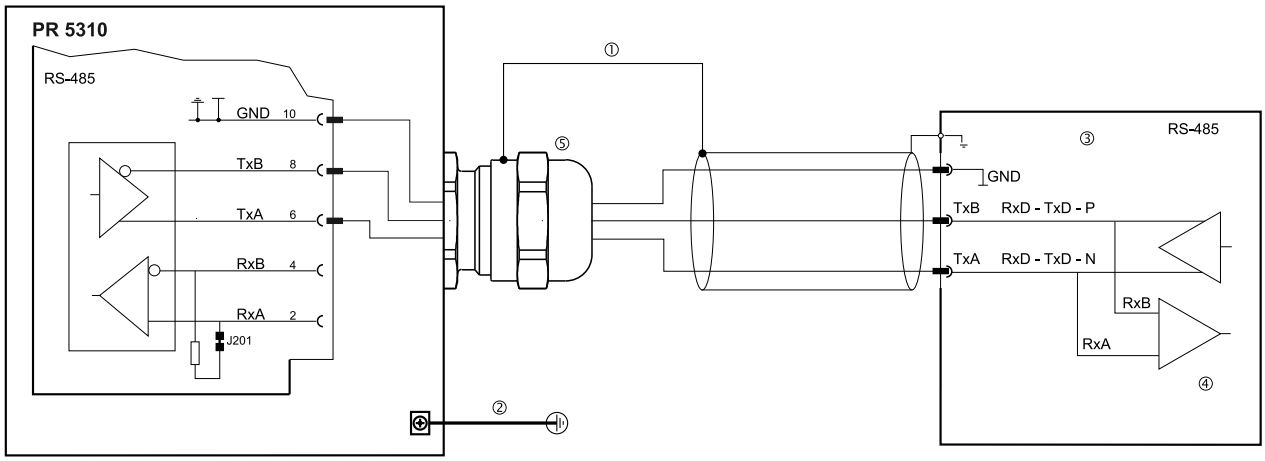
2-wire transfer mode:
Half duplex (simultaneous sending and receiving not possible)

Connection example panel device



① Screen
② Potential equalization
③ Indicator
④ Half duplex

Connection example table-top device



① Screen
② Potential equalization
③ Indicator
④ Half duplex
⑤ Cable gland

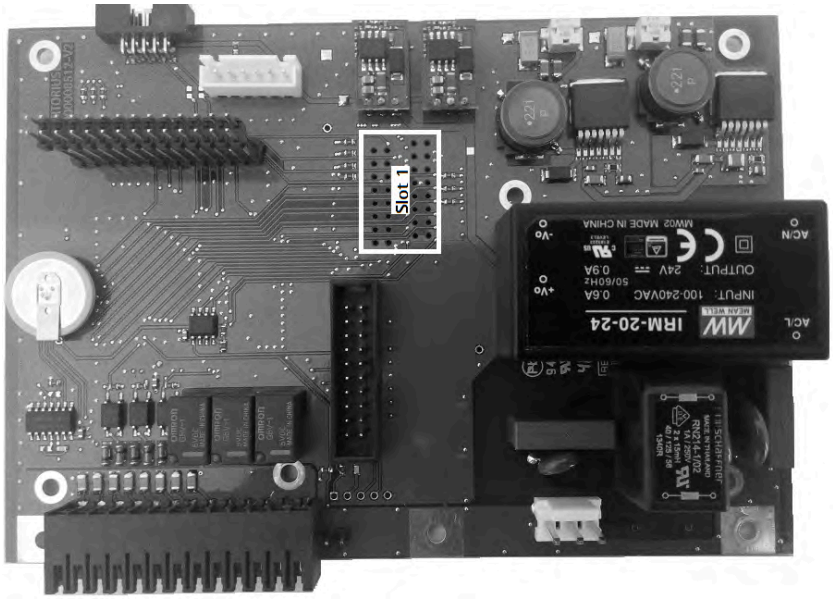
Configuration example

Setup - [S1 073] ➞ [ModbuS] ➞ [Port] ➞ [rS485] ➞ [bAud] ➞ [9600] ➞ [PArIty] ➞ [non-E] ➞ [SLAV] ➞ [065] ➞ [ModE] ➞ [HALF]

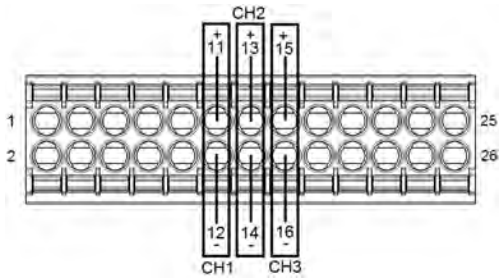
Siehe auch Kapitel Configuring the serial interface for ModBus-RTU.

4.3.5 Digital inputs and outputs (3 IN/3 OUT)

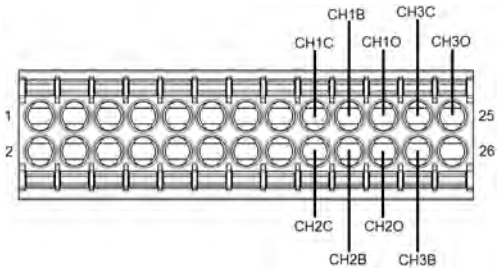
The interfaces can be configured via the front-panel keys.



Digital inputs



Digital outputs



Terminal contact	Connection	Terminal contact	Connection
11	CH 1 +	17	CH 1C
12	CH 1 -	18	CH 2C
13	CH 2 +	19	CH 1B
14	CH 2 -	20	CH 2B
15	CH 3 +	21	CH 1O
16	CH 3 -	22	CH 2O
		23	CH 3C
		24	CH 2B
		25	CH 3O
26	GND	26	GND

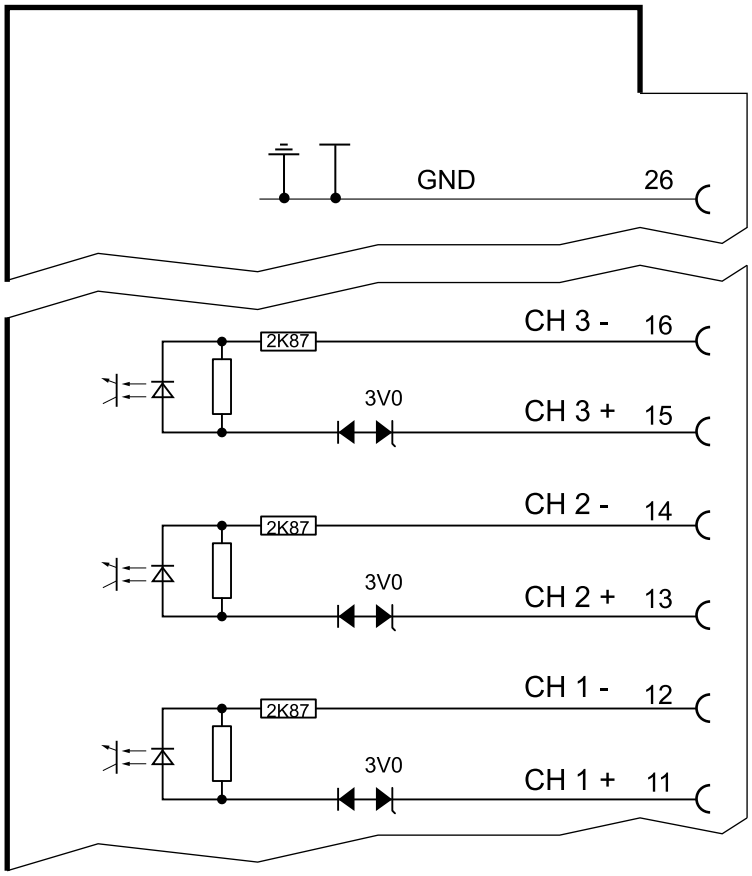
Technical data

Name	Data
Inputs	
Number of inputs	3 (CH 1, CH 2, CH 3)
Input supply voltage	Logic 0: U_{DC} = 0...5 V or open Logic 1: U_{DC} = 10...28 V Passive, external power supply required
Input current	<7 mA @ 24 V <3 mA @ 12 V Protection against incorrect polarity
Input frequency	Max. 200 Hz (50% ratio)
Potential isolation	Yes, via optocoupler
Outputs	
Number of outputs	3 (CH 1, CH 2, CH 3)
Output	Change-over contact Max. switching voltage: U_{DC} = 31 V/U_{AC} = 24 V Max. switching current: 1 A
Switching frequency	Max. 10 Hz
Potential isolation	Free relay two-way contact
Cable Connection	
Cables	Screened Cable screen must be connected to the housing at the rear wall or in the cable gland.
Cable length	max. 50 m
Connections	
Internal connection	Contact strip
External connection	Plug connector, 26-pin

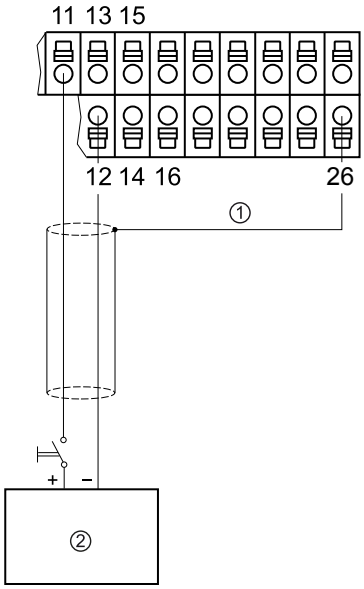
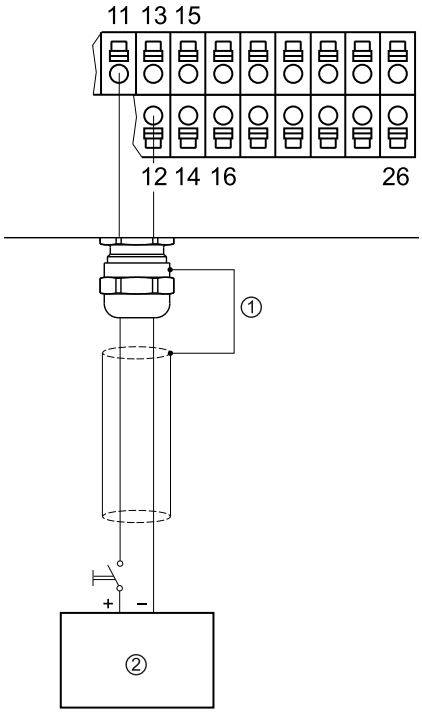
4.3.5.1 Digital inputs

3 passive opto-decoupled inputs are permanently built into the device for process control.

Block diagram



Contact input

Panel device	Table-top device
	

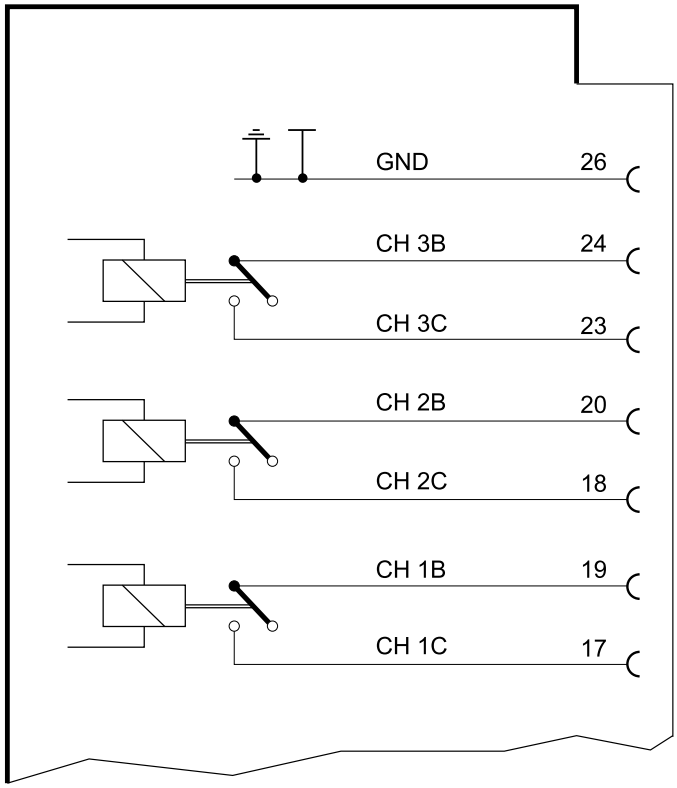
① Screen

② Power supply U_{DC} = 24 V 0.5 A

4.3.5.2 Digital outputs

3 relay outputs with potential-free change-over contacts for process control.

Blockschaltbild



Connection example for relay control (current output)

Panel device

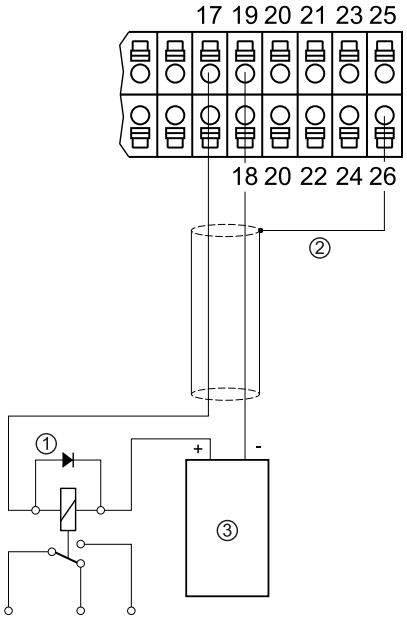
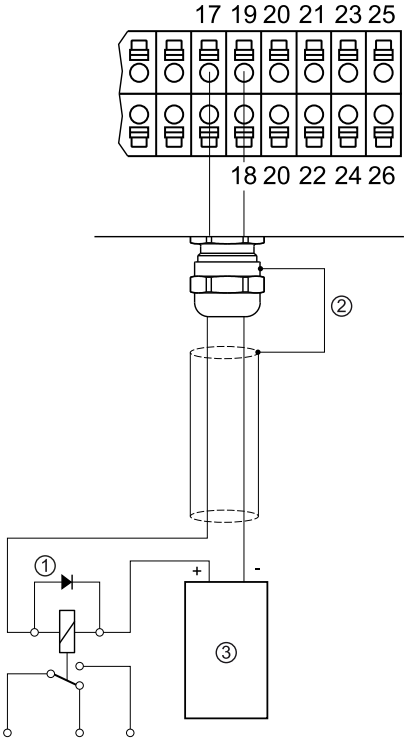


Table-top device



① Inductive load for free-wheel diode
② Screen
③ Power supply unit U_{DC} = 24 V 0.5 A
The relay switches when the output is active (true).
To protect the output circuit, relays must be equipped with free-wheel diodes.

Connection example for voltage output

Panel device

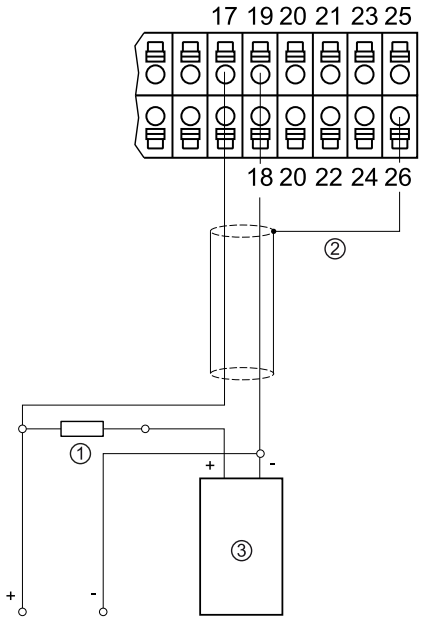
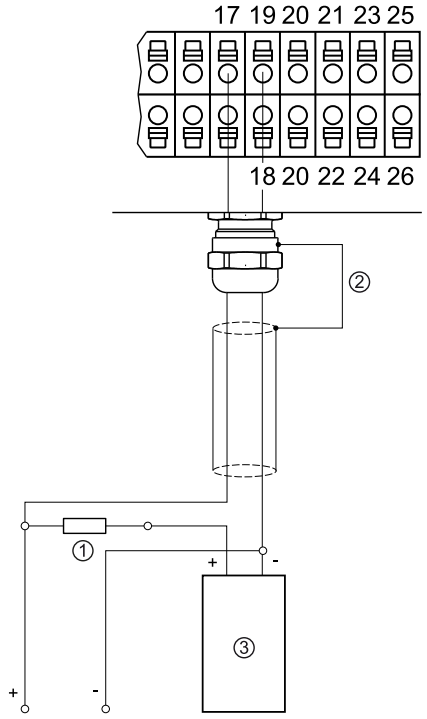


Table-top device



① 2,2 kΩ /1 kΩwith 24 V/12 V

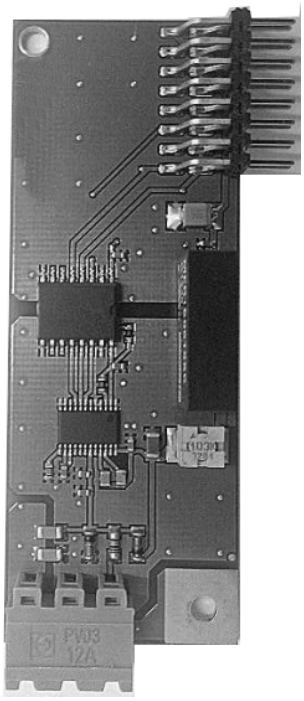
② Screen

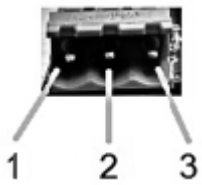
③ Power supply unit U_{DC} = 24 V 0.5 A

When the output is active (true), the output voltage drops from 24 V/12 V to 0 V. The load resistance must be 2.2 kΩ/1 kΩ.

4.3.6 Analog output

An active analog output is integrated into the device. The interface can be configured by front keys.

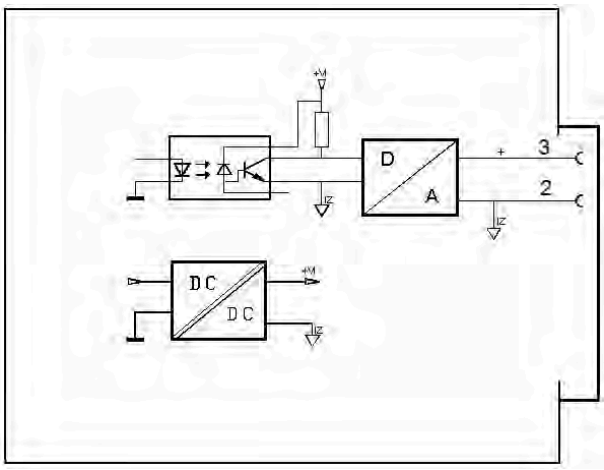


Terminal contact	Connection
	
1	Screen
2	GNDI
3	+0/4 to 20 mA

Technical data

Description	Data
External connection	3-pin plug connector (male)
Number	1 active current output: 20 mA, 10 V output voltage via external 500 Ω resistor
Function	Gross/Net weight/Transparent/Selected, configurable
Range	0/4-20 mA, configurable
Resolution	Internal 16 bits binary = 20,000 counts, @ 20 mA
Linearity error	@ 0-20 mA: 0.04 %; @ 4-20 mA: 0.02 %
Temperature error	<100 ppm/K
Zero point error	0.05 %
Max. error	<0.1 %
Load	max. 0...500 Ω
Protected against shortcircuit	yes
Potential isolation	yes
Cable type	Twisted pair, screened (e.g., LifYCY 2×2×0.20)
Cable length	<150 m, screened

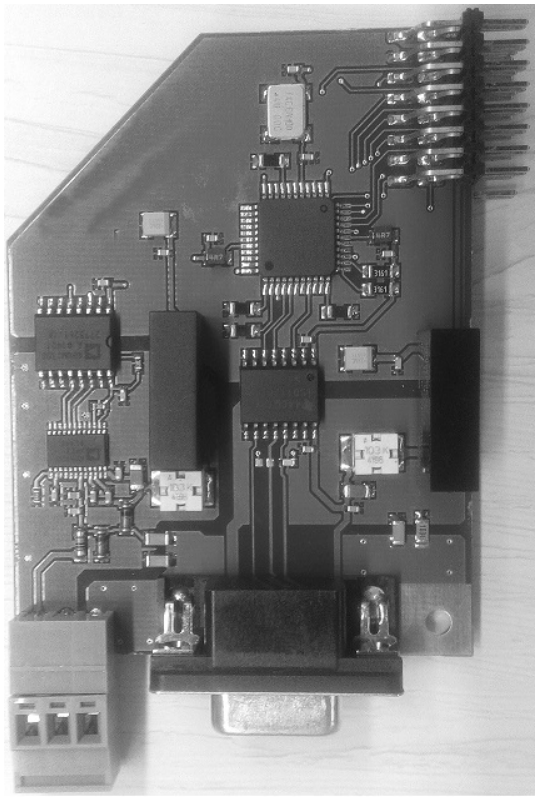
Block diagram

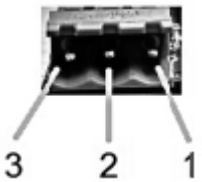


3 0/4-20 mA
2 GNDI

4.3.7 Analog output & Profibus-DP interface

An active analog output and a Profibus-DP interface are integrated into the device. The interface can be conigured by front keys.

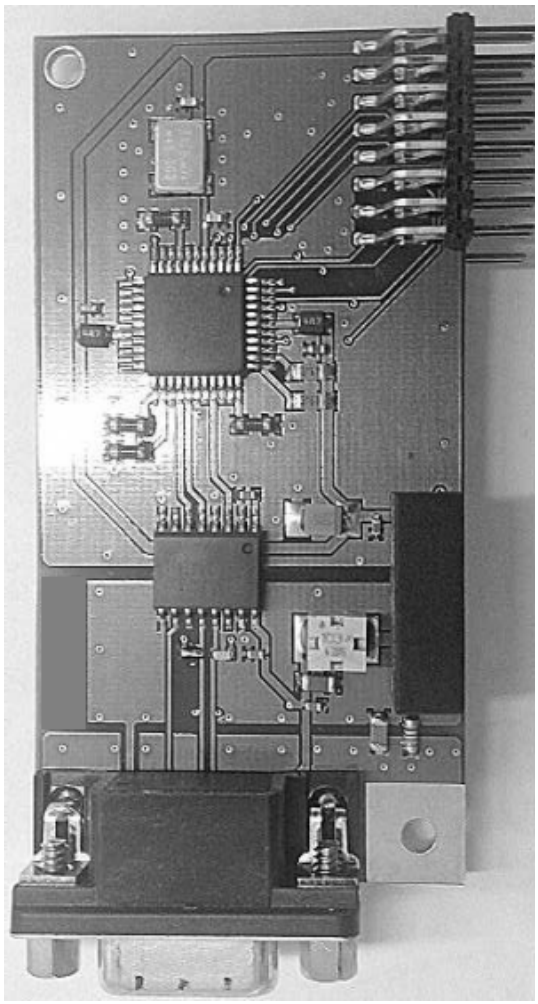


Terminal contact	Connection
	
1	Screen
2	GNDI
3	+0/4-20 mA

Technical data see Chapter Analog output and ProfiBus-DP interface.

4.3.8 ProfiBus-DP interface

With the Profibus-DP a centrally directed data exchange between master and slaves is possible. The master (e.g. automation system PLC) carries out the cyclic exchange of process data with the slaves (drives, I/O) one after the other, in a fixed sequence.
Communication protocols and syntax comply with the ProfiBus-DP standard to IEC 61158.
The interface can be configured by front keys.

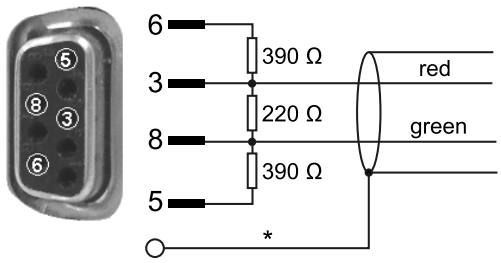


Technical data

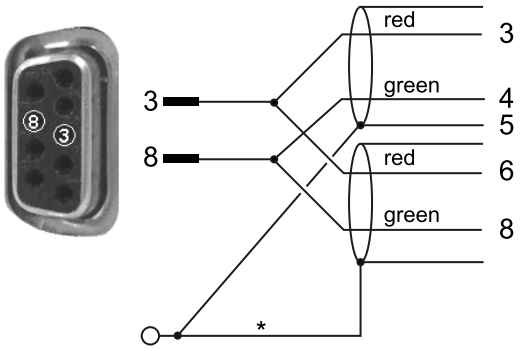
Description	Data
External connection	D-Sub 9-pin plug connector (female)
Baud rate	9.6 kbit/s to 12 Mbit/s, baud rate auto-detection
Connection mode	ProfiBus network, connections can be made/released without affecting other stations.
Protocol	PROFIBUS-DP-V0 SLAVE to IEC 61158 – Mono or multi-master systems are supported. – Master and slave devices, max. 126 nodes possible. – Watchdog Timer
Configuration	GSD file "53100F3E.gsd"
Bus termination	Panel device: The bus termination in the last device is implemented via the integrated terminating resistor in the ProfiBus plug connector. Table-top device: The bus termination in the last device is implemented via the integrated terminating resistor in the ProfiBus adapter board, see Chapter- ProfiBus adapter board for table-top devices.
Potential isolation	Yes, optocoupler in lines A and B (RS-485)
Cable type	ProfiBus "special"; color: violet; screened twisted pair cable
Cable impedance	150 Ω
Cable length	The max. distance of 200 m can be extended at 1.5 Mbit/s by means of an additional repeater.
Certificates	Profibus test center Comdec in Germany and PNO (Profibus User Organization). Industry-compatible CE, UL, and cUL

Note: The GSD file is available to download online:
http://www.minebea-intec.com

ProfiBus connection



The device is the only/last slave in the bus.
* screen on connector housing



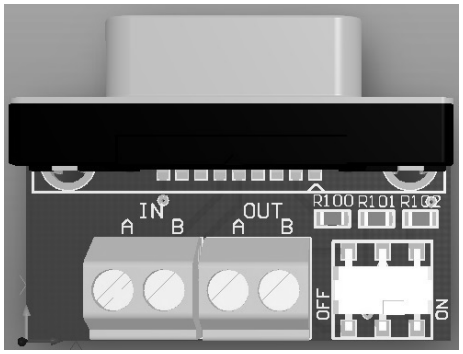
The device is not the only/last slave in the bus.
* screen on connector housing

Allocation of the D-sub 9-pin plug connector

Pin assignment	Signal	Color	Description
Housing	S		Screen
1			not connected
2			not connected
3	RxD/TxD-P (positive) according to RS-485 specification	red	Send/receive data Data core B/D (P)
4 if required	RTS		"Request To Send" (only when using a repeater)
5	DGND		Insulated GND to RS-485 side
6	VP		Insulated power supply +5 V to RS-485 side
7			not connected
8	RxD/TxD-N (negative) according to RS-485 specification	grün	Send/receive data Data core A/D (N)
9			not connected

Note:
Panel device:
Only plug connections with integrated terminating resistors may be used.
The terminating resistor must be turned on in the last slave.

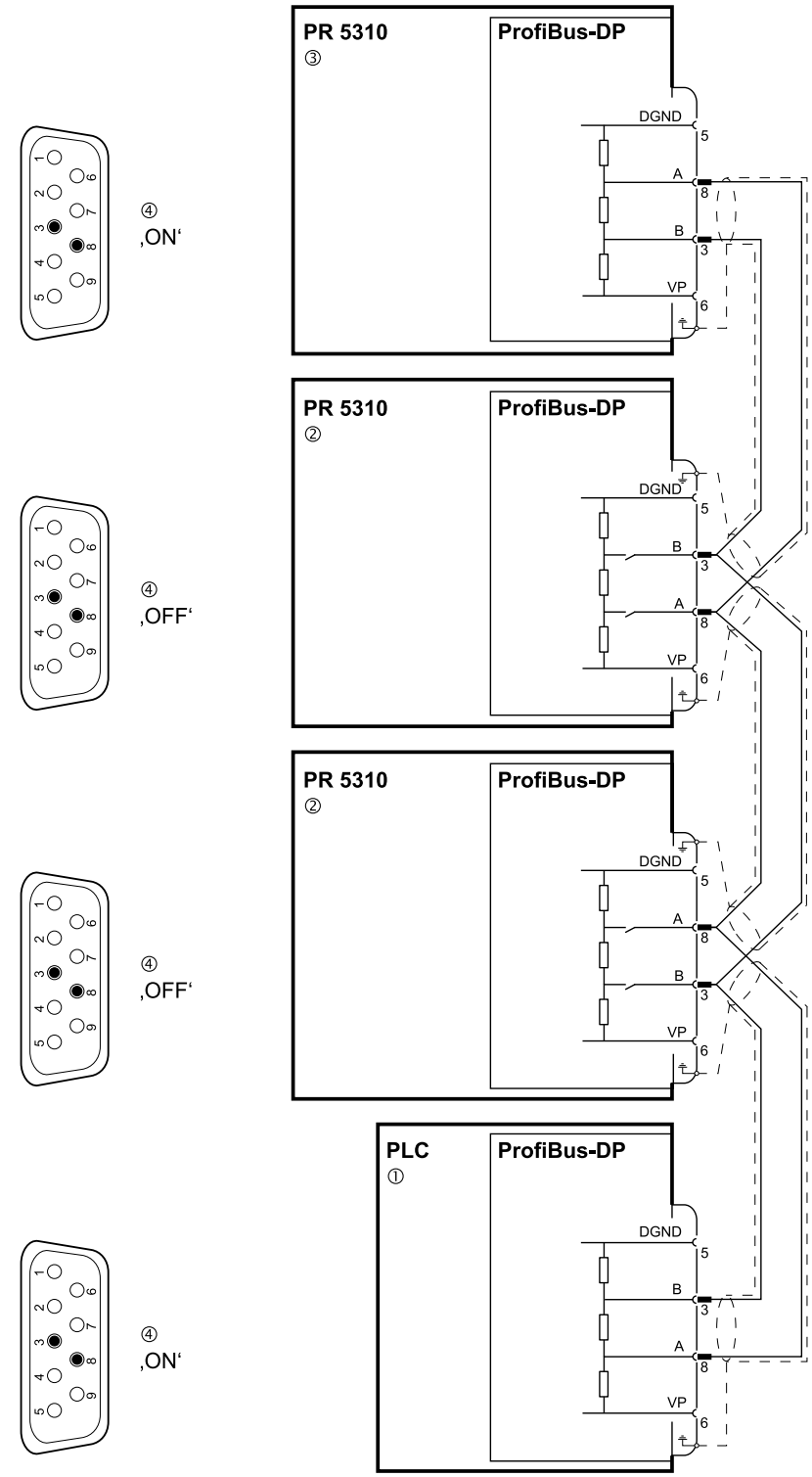
4.3.8.1 ProfiBus adapter board for table-top devices



Signal	Color code	Description
Negative RxD/TxD-N to RS-485 specification	Green	A-line Send/receive data
Positive RxD/TxD-P to RS-485 specification	Red	B-line Send/receive data

The terminating resistor must be turned ON in the last slave.

4.3.8.2 Connection diagram for a master with three slaves



① Master (PLC)
② Slave
③ last slave
④ Terminating resistor
ON = switched on
OFF = switched off

4.3.9 DeviceNet interface

The DeviceNet fieldbus is a complete DeviceNet adapter (slave) with CAN controller.
The interface can be configured by front keys.

Technical data

Description	Data
Internal connection	Pin strip, 50-pin
External connection	5-pin plug connector (female)
Baud rate	125, 250 and 500 kbit/s
Topology	Parallel bus
Protocol	DeviceNet Master Slave – Polling procedure (polled IO) – CRC error recognition according to IEC 62026 (EN 50325) – Max. 64 station nodes – Data width max. 8 bytes "input & output"
Configuration	EDS file "sag_5310.eds" MAC-ID (1...62)
Potential isolation	yes, optocoupler and DC/DC converter
Bus termination	120 Ω at the cable ends
Bus load	33 mA @ U_{DC} = 24 V
Cable type	DeviceNet; color: petrol green; 2x2 twisted pair; screened
Cable impedance	150 Ω

Description	Data
Cable length	Depends on cable type and transmission rate: 100 to 500 m
Certificates	– Compatible with DeviceNet specification Vol. 1: 2.0, Vol 2: 2.0 – ODVA Certificate according to conformity test software version A-12 – Industry-compatible CE, UL, and cUL

Note:
The EDS file is available to download online:
http://www.minebea-intec.com

Allocation of the 5-pin plug connector

Pin assignment	Signal	Color	Description
			
Cable sheath			Special DeviceNet cable (certified)
1	V–	black	negative power supply
2	CAN_L	blue	CAN_L bus signal
3	S		Cable screen
4	CAN_H	white	CAN_H bus signal
5	V+	red	positive power supply

4.3.9.1 LEDs

Identif.	Description
NS	Network status LED
MS	Module status LED

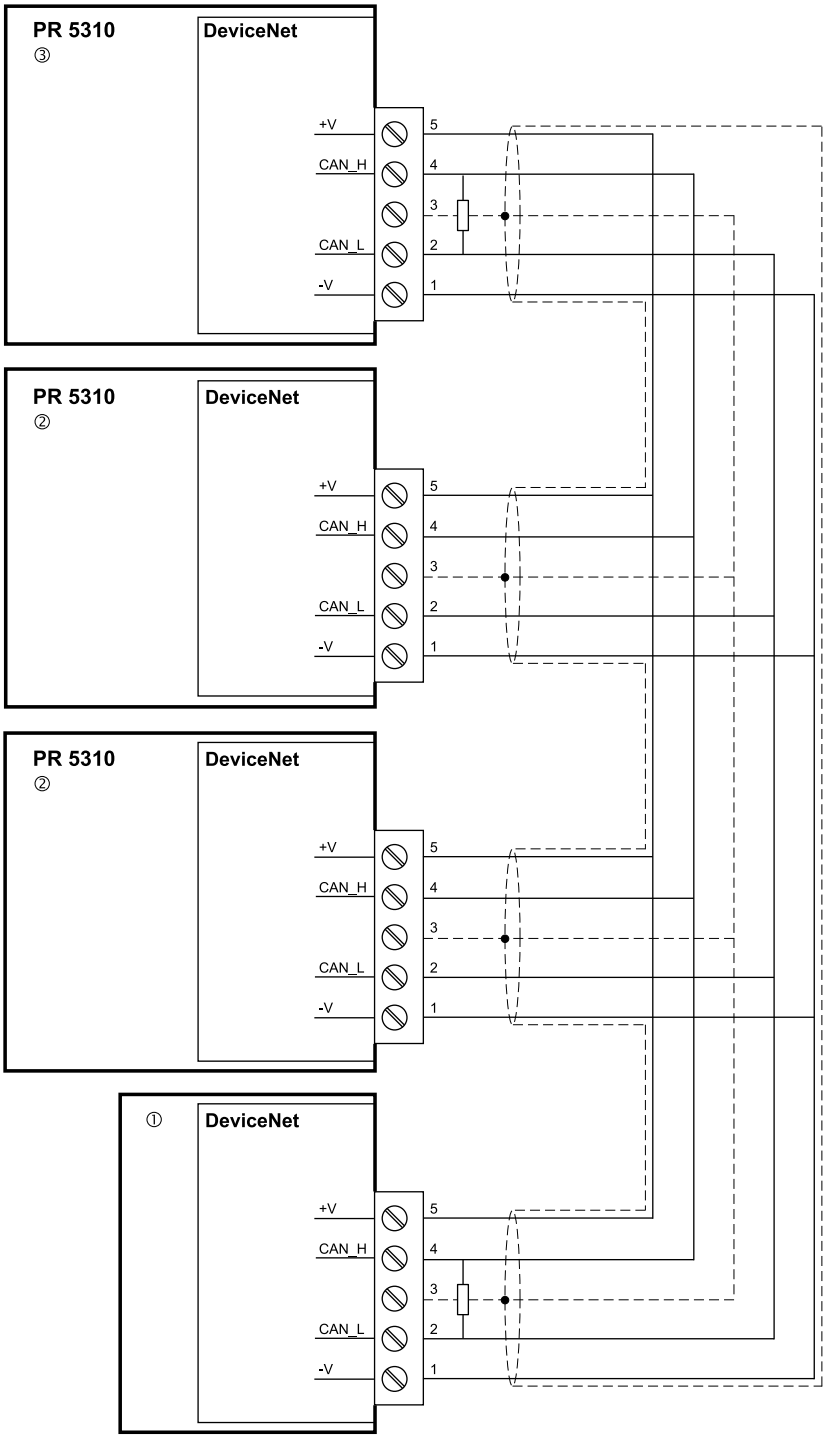
Network status (NS)

LED status	Description	Comments
Off	Module is offline.	No power
Constant green	Module is online.	There are one or more connections.
1 Hz flashing green	Module is online.	No connections
Constant red	Critical connection error	
1 Hz flashing red	Connection time limit	For one or more connections
Flashing red/green in alternation	Self-test running.	

Module status (MS)

LED status	Description	Comments
Off	Module is not initialized.	– No power – Module has the status "SETUP" or "NW_INIT".
Constant green	Module is initialized.	Normal operation
1 Hz flashing green	Missing or incomplete configuration	The device must be set up again.
Constant red	Exception error	– Module has the status "EXCEPTION" – The exception error monitoring system closes all open connections to the module.
1 Hz flashing red	Error that can be corrected	
Flashing red/green	Self-test running.	

4.3.9.2 Connection diagram for a master with three slaves



① Master (Transciever)

② Slave

③ last slave

PR 5310/.. is energized with 33 mA from the DeviceNet bus supply.

4.3.10 EtherNet/IP interface

The EtherNet/IP fieldbus is a complete EtherNet/IP adapter (slave) for network connection.
The interface can be configured by front keys.

Technical data

Description	Data
Internal connection	Pin strip, 50-pin
Baud rate	100 Mbit/s, full duplex
Protokoll	EtherNet/IP
Connection mode	Network
Configuration	EDS file "sag_5310_EthernetIP-2P.eds"
Potential isolation	yes
Cable type	Twisted pairs, screened, e.g., patch cable CAT5 Autolink (straight or crossover)
Cable impedance	150 Ω
Cable length to HUB	max. 115 m
Certificate	EtherNet IP Specification ODVA File No. 10286 Test Date: 06.09.2005 Vendor ID 90

Note:
The EDS file is available to download online:
http://www.minebea-intec.com

4.3.10.1 LEDs

Identif.	Description
NS	Network status LED
MS	Module status LED
grn	Green: flashes when there is data traffic (activity)
yel	Yellow: lights up when there is an existing connection (link)

Network status (NS)

LED status	Description	Comments
Off	Module is offline	– No power – No IP address
Constant green	Module is online	One or more connections exist (CIP class 1 or 3).
1 Hz flashing green	Module is online	No connection
Constant red	Critical connection error	Duplicate IP address
1 Hz flashing red	Connection time limit	For one or more connections (CIP class 1 or 3)

Module status (MS)

LED status	Description	Comments
Off	Module is uninitialized	– No power – Module has the status "SETUP" or "NW_INIT".
Constant green	Module is initialized	Normal operation
1 Hz flashing green	Error after test	Error occurred after test.
2 Hz flashing green		This is used for node identification in the network.
Constant red	Exception error	– Module has the status "EXCEPTION" – The exception error monitoring system closes all open connections to the module.
1 Hz flashing red	Configuration error	Expected identification deviates from the available identification.
2 Hz flashing red	IP address error	IP address was not defined.
3 Hz flashing red	Device name error	Device name was not defined.
4 Hz flashing red	Internal error	Module has caused an unrecoverable internal error.

4.3.11 ProfiNet I/O interface

The ProfiNet I/O fieldbus is a complete ProfiNet I/O adapter (slave) with CAN controller.
The interface can be configured by front keys.

Technical data

Description	Data
Internal connection	Pin strip, 50-pin
External connection	2× RJ-45 plug connector
Baud rate	100 Mbit/s, full duplex
Protocol	ProfiNet I/O
Connection mode	Network
Configuration	XML file "GSDML-V2.31-Sartorius-PR5310-2P-20160807.xml"
Potential isolation	yes
Cable type	Twisted pairs, screened, e.g., patch cable CAT5 Autolink (straight or crossover)
Cable impedance	150 Ω
Cable length to HUB	max. 115 m
Certificate	ProfiBus User organization for HMS Industrial Networks AB Certificate no.: Z10006 Report: PN005-1, 12.02.2007

Note:
The XML file is available to download online:
http://www.minebea-intec.com

NOTICE

Fieldbus parameters
Recommendation for a Siemens S7, for example

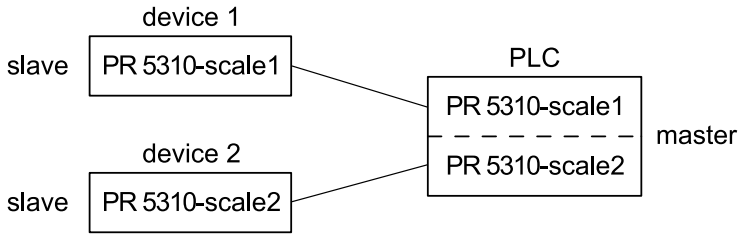
- Fieldbus slave setting:
- Use DHCP [on] as per the default settings and activate the master as a DHCP server (W [Allocate IP adr via IO controller]).

NOTICE

Slave – master device names
A unique device name must be assigned out of the master. This name is given highest priority when establishing a connection.

- When replacing devices or servicing, please note:
- As well as the IP address, the device name must correspond to that of the replacement device. Explicit assignment out of the master is required.

Example:



4.3.11.1 LEDs

Identif.	Description
NS	Network status LED
MS	Module status LED
grn	Green: flashes when there is data traffic (activity)
yel	Yellow: lights up when there is an existing connection (link)

Network status (NS)

LED status	Description	Comments
Off	Module is offline.	– No power – No connection to the I/O controller
Constant green	Module is online (RUN).	– There is a connection to the I/O controller. – I/O controller is operational (RUN status).
1 Hz flashing green	Module is online (STOP).	– There is a connection to the I/O controller. – I/O controller is not operational (STOP status).

Module status (MS)

LED status	Description	Comments
Off	Module is not initialized.	– No power – Module has the status "SETUP" or "NW_INIT".
Constant green	Module is initialized.	Normal operation
1 Hz flashing green	Error after test	Error occurred after test.
2 Hz flashing green		This is used for node identification in the network.
Constant red	Exception error	– Module has the status "EXCEPTION" – The exception error monitoring system closes all open connections to the module.
1 Hz flashing red	Configuration error	Expected identification deviates from the available identification.
2 Hz flashing red	IP address error	IP address was not defined.
3 Hz flashing red	Device name error	Device name was not defined.
4 Hz flashing red	Internal error	Module has caused an unrecoverable internal error.

5 Getting started

5.1 Switching on the device

The device is started up via the key pad of the indicator.

When the supply voltage is applied to the device, the following information is displayed:

`Pr5310`	Device type PR 5310
`01.00.00.`	Firmware release
`1350.50 kg`	Weight display
`Error6`	Error message, if no sense voltage is connected, see also Chapter Error messages measuring circuit.

Check the date and time after first turning on the indicator, see Chapter Date & time.

5.2 Switching off the device

The device is switched off by disconnecting the supply voltage.

5.3 Device warm-up time

A warm-up time of 30 minutes for the device is required before adjustment/ calibration is started.

5.4 Power failure

In the event of a power failure, all entered configuration, adjustment and calibration parameters are retained.

5.5 Data backup

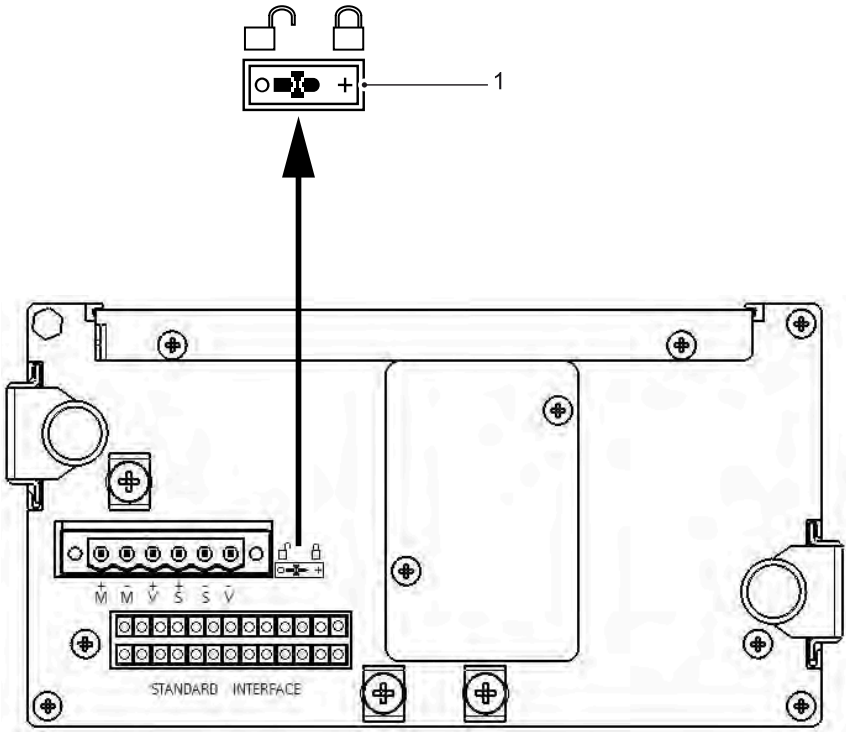
Additional overwrite protection is provided for adjustment/calibration data and parameters (see Chapter CAL switch).

5.6 Overwrite protection

5.6.1 CAL switch

Overwrite protection can be activated via a CAL switch to protect the metrological parameters against unauthorized access.

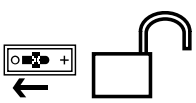
Panel device



The CAL switch (1) is located on the rear of the device.

Table-top device

CAL switch is located on the mainboard and is accessible on the rear of the device, see Chapter Table-top device.

	Write protection activated	Write protection not activated
CAL switch	 closed	 opened

5.7 Performing a factory reset on the device

> **Note:**
>
> A factory reset can only be performed if the CAL switch is open.

Restarting has the following effects on the device

- Current process steps are deleted.
- The factory default settings are restored.

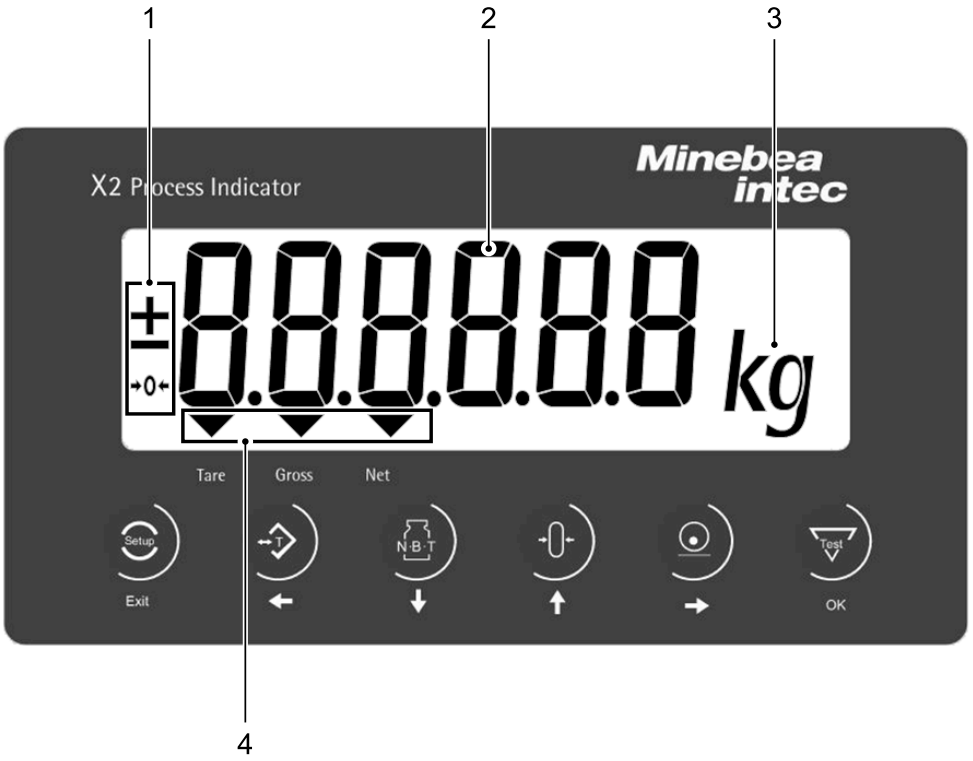
1. Press Setup.
   ▷ `SEtuP` appears on the display.
2. Press "OK".
   ▷ `Cd 000` appears on the display (`Cd` flashes).
3. Press ↑ (14×) to select `FS 100`.
4. Press "OK".
   ▷ `rESEt?` appears on the display.
5. Press "OK".
   ▷ `no` appears on the display.
6. Press ↑.
   ▷ `yES` appears on the display.
7. Press "OK" to restore the device to the factory settings.

6 Operating

6.1 Operating and display elements

6.1.1 Indicator display

6-digit weight values (digit height 18 mm) with the decimal points can be shown on the display.



Pos.	Description
1	+ positive value
	− negative value
	→0← The gross weight value is within ±¼ d of zero
2	Weight value
3	Mass unit, possible are: t, kg, g, lb
4	▼ points to the selected weight type: tare, gross, net

6.1.2 Keypad

Indicator keys

Key	Function
	Set tare The current gross weight is stored in the tare memory, provided that – the weight value is stable. – the device is not in error status. The function depends on the configuration.
	Select weight type Net - gross - tare
	Set zero Sets gross weight to zero, provided that – the weight value is stable. – the weight is within the zero setting range. The function depends on the configuration.
	Print Starts a printout.
	Testing Analog test, weighing function

Menu/navigation keys

Key	Function
	**Setup Menu** Access the setup menu.
Exit	**Exit** Exit the current menu.
OK	**Confirm** Confirm input/selection.
←	**Cursor left** – Cursor to the left – Selection
↓	**Cursor down** Scroll down in the menu.
↑	**Cursor up** Scroll up in the menu.
→	**Cursor right** – Cursor to the right – Selection

6.1.3 Selecting parameters

1. Press  and hold for 2–3 seconds.
   ▷ `SEtuP` appears on the display.
2. Press "OK".
   ▷ `Cd 000` appears on the display (`Cd` flashes).
3. Press ↑ to navigate to the next parameter group.
4. Press → to navigate to the parameter number.

The parameter table is described in Chapter Parameter table (setup).
All parameters/data are unambiguously identified by a max. 3-digit number. This is also preceded by two letters for the parameter group for ease of assignment.

5. Press ↑ / ↓ to make your selection.
6. Press ← / → to select the digit positions.
7. Press ↑ / ↓ to increase/decrease the number.
8. Press "OK to confirm the input.
9. Press "Exit" to exit a menu.
   ▷ If a parameter has been changed, `SAVE` appears on the display.
10. Press "OK".
    ▷ `yES` appears on the display.
11. If necessary, press ↓ to select `no`.
12. Press "OK" to save the changes.

6.2 Configuration and adjustment via the keypad

6.2.1 Parameter table (setup)

Cd · Calibration data

- **000 CALIb**

  `nEW` New calibration
  `VIEW` View data
  `Mod` Edit calibration

- **001 MAX.FSd**

  Position of decimal point, Max (maximum load/scale interval) and weight unit

- **002 StEP**

  Scale interval

- **003 dEAdLo**

  `byLoAd` Set dead load with weight
  `byMV-V` Set dead load with mV/V

- **004 SPAn**

  `byLoAd` Calibrate range with weight
  `byMV-V` Calibrate range with mV/V

- **005 uVoLt.d**

  Display µV/d

- **006 WEIGHT**

  Display current gross weight, use the  key for 10x resolution.

CP · Metrology parameters

- **010 MEAtIM**
  Measurement time
- **011 FILtEr**
  Digital filter
- **012 FCut**
  Filter frequency
- **013 tStMod**
  Test mode
- **014 StStIM**
  Standstill time
- **015 StSrnG**
  Standstill range
- **016 TArtIM**
  Timeout for tare/zeroset
- **017 ZESrnG**
  Zeroset range
- **018 ZEtrnG**
  Zerotrack indic. range
- **019 ZEtStP**
  Zerotrack step
- **020 ZEttIM**
  Zerotrack time
- **021 oVrLd**
  Overload
- **022 MIn**
  Minimum weight
- **023 LC-SuP**
  Load cell supply voltage

LI · Limit values

- **030 LIM.1on**
  Limit 1 "on"
  `1on.VAL` Value
  `1on.ACt` Action
  `1on.Cnd` Condition
- **031 LIM.1oF**
  Limit 1 "off"
  `1oF.VAL` Value
  `1oF.ACt` Action

`1oF.Cnd` Condition

032 LIM.2on

Limit 2 "on"
`2on.VAL` Value
`2on.ACt` Action
`2on.Cnd` Condition

033 LIM.2oF

Limit 2 "off"
`2oF.VAL` Value
`2oF.ACt` Action
`2oF.Cnd` Condition

034 LIM.3on

Limit 3 "on"
`3on.VAL` Value
`3on.ACt` Action
`3on.Cnd` Condition

035 LIM.3oF

Limit 3 "off"
`3oF.VAL` Value
`3oF.ACt` Action
`3oF.Cnd` Condition

do · Digital outputs

040 outP1

Output 1

041 outP2

Output 2

042 outP3

Output 3

dI · Digital inputs

043 InP.1on

Input 1 "on"
`1on.ACt` Action
`1on.Cnd` Condition

044 InP.1oF

Input 1 "off"
`1oF.ACt` Action
`1oF.Cnd` Condition

045 InP.2on

Input 2 "on"
`2on.ACt` Action
`2on.Cnd` Condition

- **046 InP.2oF**

  Input 2 "off"
  `2oF.ACt` Action
  `2oF.Cnd` Condition

- **047 InP.3on**

  Input 3 "on"
  `3on.ACt` Action
  `3on.Cnd` Condition

- **048 InP.3oF**

  Input 3 "off"
  `3oF.ACt` Action
  `3oF.Cnd` Condition

Ao · Analog output

- **050 AnA.Mod**

  Mode
  `nonE` None
  `GroSS` Gross
  `nET` Net
  `SELECt` Selected
  `trAnSP` Transparent

- **051 AnA.rnG**

  Range
  `0-20MA` 0 - 20 mA
  `4-20MA` 4 - 20 mA

- **052 out.Err**

  Output on error
  `0 MA` 0 mA
  `4 MA` 4 mA
  `20 MA` 20 mA
  `HoLd` Hold

- **053 out-0**

  Output at <0
  `0 MA` 0 mA
  `4 MA` 4 mA
  `20 MA` 20 mA
  `LInEAr` Linear

- **054 out.-20**

  Output at >Max
  `0 MA` 0 mA
  `4 MA` 4 mA
  `20 MA` 20 mA
  `LInEAr` Linear

- **055 Wgt-04**

  Weight at 0/4 mA

- **056 Wgt-20**

  Weight at 20 mA

- **057 CAL-04**

  Weight at 4 mA. Adjustment of the analog output, see Chapter Adapting the analog output.

- **058 CAL-20**

  Weight at 20 mA. Adjustment of the analog output, see Chapter Adapting the analog output.

oP · Operating parameters

- **060 Addr**

  Device address

- **061 SEqnr**

  Next free sequence number

- **062 tArKEy**

  Tare key
  `tAr.rES` Set tare/reset tare
  `tAr.tAr` Set tare/set tare again
  `diSAbL` Disabled

- **063 ZErKEy**

  Zeroset key
  `not.tAr` Only if tare was not set
  `rES.tAr` Reset tare on zero set
  `diSAbL` Disabled

- **064 nbtKEy**

  NBT key
  `diSAbL` Disabled
  `EnAbLE` Enabled

- **065 PrtKEy**

  Print key
  `diSAbL` Disabled
  `EnAbLE` Enabled

- **066 tStKEy**

  Test key
  `diSAbL` Disabled
  `EnAbLE` Enabled

- **067 tiMout**

  Timeout (HH.MM) for automatically exiting the setup menu

dt · Date & time

- **068**

  `YEAr` Year (YYYY)
  `dAtE` Month-day (MM-DD)
  `tiME` Hour.minute (HH.MM)

SI · Serial ports parameter

- **070 PrInt**

  Printer: Configuring the interface, see Chapter Configuring the serial interface for the printer

- **071 rEMdSP**

  Remote display: Configuring the interface, see Chapter Configuring the serial interface for the remote display

- **072 SMA**

  SMA: Configuring the interface, see Chapter Configuring the serial interface for SMA

- **073 ModbuS**

  ModBus-RTU: Configuring the interface, see Chapter Configuring the serial interface for ModBus-RTU

FP · Fieldbus parameters

- **080 FLd.Pro**

  Protocol of the installed field bus card
  `PdP-U1` ProfiBus-DP
  `dEV.nEt` DeviceNet
  `dEUnEt` EtherNet/IP
  `PronEt` ProfiNet I/O

- **081 PdP.Adr**

  ProfiBus: PDP address

- **082 dVnbdr**

  DeviceNet: Baud rate

- **083 dVnAdr**

  DeviceNet: Address

- **084 dHCP**

  DHCP (On/Off)

- **085 IP-Adr**

  IP address

- **086 SubnEt**

  Subnet mask

IF · Information

- **090 SoFt.VE**

  Software version

- **091 SLot**

  `EMPty` Empty or PR 5310 card type

- **092 rS-232**

  Protocol assigned to the RS232 interface

- **093 rS-485**

  Protocol assigned to the RS485 interface

- **094 Rtc.bat**

  Battery status of the RTC battery at low voltage `bAT ok`/`bAT not.ok` OK/not OK

FS · Factory reset

- **100 rESEt.?**

  Reset all configuration parameters and calibration data to default values?
  `no` No
  `yES` Yes

PP · Print device configuration

- **110 Print?**

  Print all configuration parameters? This is only possible if a printer has been assigned.

> **Note:**
>
> The meanings of the specific data and parameters and the associated value ranges are explained in the corresponding chapters.

6.2.2 Date & time

1. Press Setup and hold for 2–3 seconds.
   ▷ `SEtuP` appears on the display.
2. Press "OK".
   ▷ `Cd 000` appears on the display (`Cd` flashes).
3. Press ↑ (7×) until `dt 068` appears.
4. Press "OK".
   ▷ `YEAr` appears on the display.
5. Press "OK".
   ▷ `2014` (YYYY) is displayed.
6. Use ← / → and ↑ / ↓ to make the necessary changes.
7. Press "OK".
   ▷ `dAtE` appears on the display.
8. Press "OK".
   ▷ `12-25` (MM-DD) appears on the display.
9. Use ← / → and ↑ / ↓ to make the necessary changes.
10. Press "OK".
    ▷ `tIME` appears on the display.
11. Press "OK".
    ▷ `17.35` (HH.MM) appears on the display.
12. Use ← / → and ↑ / ↓ to make the necessary changes.
13. Press "OK".
    ▷ `dt 068` appears on the display.
14. Press "Exit" to exit the menu.
    ▷ The changes are saved.

6.2.3 New adjustment of the internal weighing point

Example:
Max (max. capacity) 600 kg
Scale interval 0.2 kg
Set dead load with empty scale.

> **Note:**
>
> When a new adjustment is started, the device has the following default settings:
>
> Max 3000 kg
>
> Scale interval 1 kg

Start

1. Switch on the device, see Chapter Switching on the device. Observe the warm-up time of the device!
2. Open the CAL switch, see Chapter CAL switch.
3. Press Setup and hold for 2–3 seconds.
   ▷ `SEtuP` appears on the display.

New adjustment (Cd 000)

4. Press "OK".
   ▷ `Cd 000` appears on the display (`Cd` flashes).
5. Press "OK".
   ▷ `Calib` appears on the display.
6. Press "OK".
   ▷ `nEW` (for new adjustment) appears on the display.

Defining Max (max. capacity) and weight unit (Cd 001)

7. Press "OK".
   ▷ `Cd 001` appears on the display.
8. Press "OK".
   ▷ `MAX.FSd` (max. capacity of the weight display = full scale deflection) appears on the display.
9. Press "OK".

▷ `------.kg` appears on the display.

10. Press ← to move the decimal point one place to the left `-----.-kg`.
11. Press "OK".
    ▷ `00300.0kg` appears on the display (`3` flashes).
12. Press ↑ (3×) to set the number `6` for 600.0 kg.
13. Press → (4×) to select the weight unit (`kg` flashes) and change using ↑ if necessary.

Defining the scale interval (Cd 002)

14. Press "OK".
    ▷ `Cd 002` appears on the display.
15. Press "OK".
    ▷ `StEP` appears on the display.
16. Press "OK".
    ▷ `1` appears on the display.
17. Press ↑ to change the verification interval to `2` for 0.2 kg.

Defining the dead load (Cd 003)

18. Press "OK".
    ▷ `Cd 003` appears on the display.
19. Press "OK".
    ▷ `dEAdLo` appears on the display.
20. Press "OK".
    ▷ `LoAd` (dead load with empty scale) appears on the display.
21. If necessary, press ↑ to select `MVoLt` (mV/V input).

Continue for "dead load with empty scale":

22. Press "OK".
    ▷ `unLoAd` appears on the display.
23. Clear the scale.
24. Press "OK".

▷ A weight value for the dead load appears on the display.

25. Press "OK".
    ▷ The dead load is set. `00000.0kg` appears on the display.

Defining the Span (Cd 004)

26. Press "OK".
    ▷ `Cd 004` appears on the display.
27. Press "OK".
    ▷ `SPAn` appears on the display.
28. Press "OK".
    ▷ `byLoAd` (range with weights) appears on the display.
29. If necessary, press ↑ to select `byMV-V` (mV/V input).

Calculating Span

Span indicates the equivalent input voltage in mV/V related to the maximum capacity (Max) of the scale. It is calculated as follows:
Span [mV/V] = max. capacity (Max) × load cell sensitivity C_n [mV/V] / load cell capacity (max. capacity E_{max} × number of load cells)
Load cell sensitivity C_n = rated output C_n(see technical data for the load cell).

Continue for "range with weights":

30. Press "OK".
    ▷ `LoAd` appears on the display.
31. Position the calibration weight.
32. Press "OK".
    ▷ A weight value that has not yet been calibrated appears on the display.
33. Press "OK".
    ▷ `WEIGHt` appears on the display.
34. Press "OK".
    ▷ The max. test weight of `00600.0kg` appears on the display.
35. Use the cursor keys to set the calibration weight value.
36. Press "OK".

▷ `Cd 005` appears on the display.

37. Press "OK".
    ▷ `uVolt.d` appears on the display.
38. Press "OK".
    ▷ The measuring signal in µV/d appears on the display.
39. Press "OK".
    ▷ `Cd 006` appears on the display.
40. Press "OK".
    ▷ `WEIGHt` appears on the display.
41. Press "OK".
    ▷ The measuring signal as weight value appears on the display (the weight unit flashes).

Saving and exiting

42. Press "Exit".
    ▷ `SAVE` appears on the display.
43. Press "OK".
    ▷ `yES` appears on the display.
44. If necessary, press ↓ to select `no`.
45. Press "OK".
    ▷ `SAVE ...` appears on the display while saving is in progress.
46. Press "Exit" to exit the setup menu.
47. If the metrology parameters CP 010 - CP 023 do not need to be set/have already been set, the CAL switch must now be closed, see Chapter CAL switch.

6.2.4 Changing the dead load of the internal WP

If the dead load (weight of empty scale/empty container) has changed due to modifications to the mechanics, proceed as described below.
WP = weighing point

Start

1. Switch on the device, see Chapter Switching on the device. Observe the warm-up time of the device!
2. Open the CAL switch, see Chapter CAL switch.
3. Press Setup and hold for 2–3 seconds.
   ▷ `SEtuP` appears on the display.
4. Press "OK".
   ▷ `Cd 000` appears on the display (`Cd` flashes).
5. Press → to change the parameter number (`000` flashes).
6. Press ↑ to select parameter number `003`.

Changing the dead load (Cd 003)

7. Press "OK".
   ▷ `dEAdLo` appears on the display.
8. Press "OK".
   ▷ `byLoAd` (dead load with empty scale) appears on the display.
9. Press "OK".
   ▷ `unLoAd` appears on the display.
10. Clear the scale.
11. Press "OK".
    ▷ A weight value for the dead load appears on the display.
12. Press "OK".
    ▷ The dead load is set. `00000.0kg` appears on the display.
13. Press "OK".
    ▷ `Cd 004` appears on the display.

Saving and exiting

14. Press "Exit".
    ▷ `SAVE` appears on the display.
15. Press "OK".
    ▷ `yES` appears on the display.
16. Press "OK".
    ▷ `SAVE ...` appears on the display while saving is in progress.
17. Press "Exit" to exit the setup menu.
18. If no further adjustment data or parameters are to be set, the CAL switch must now be closed, see Chapter CAL switch.

> **Note:**
> If the mV/V value of the dead load was calculated, or if it is known from the previous adjustment, the value can be overwritten by pressing `byMV-V` (mV/V input).

Calculate dead load

Voltage equivalent [mV/V] = dead load × load cell sensitivity C_n [mV/V]/ load cell capacity (maximum capacity E_{max} × number of load cells)

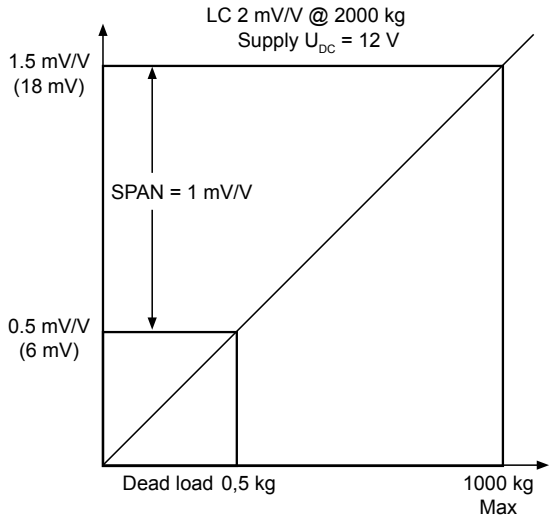
Load cell sensitivity C_n = rated output C_n (see technical data for the load cell)

Normally, calculation of the dead load (scale without load or empty vessel) is not necessary.

Subsequent dead load correction can be used for later re-determination of the dead load, when the scale or vessel is empty.

Example:

- 1 load cell with rated output C_n = 2 mV/V
- At max. capacity 2000 kg (LC)
- Max. capacity (Max) 1000 kg
- Dead load 500 kg
- Load cell supply voltage U_{DC} = 12 V



6.2.5 Displaying adjustment data of the internal WP

WP = weighing point

Procedure

1. Press Setup and hold for 2–3 seconds.
   ▷ `SEtuP` appears on the display.
2. Press "OK".
   ▷ `Cd 000` appears on the display (`Cd` flashes).
3. Press "OK" to select the menu item.
   ▷ `Calib` appears on the display. When the CAL switch is closed, `CAL.CLS` appears on the display (continue with step 7).
4. Press "OK".
   ▷ `nEW` appears on the display.
5. Press ↑ until `VIEW` appears.
6. Press "OK".
   ▷ `CAL.oPn` (CAL switch open) appears on the display.
7. Press "OK".
   ▷ `MAX.FSd` (max. capacity of the weight display = full scale deflection) appears on the display.
8. Press "OK".
   ▷ The set max. capacity appears on the display.
9. Press "OK".
   ▷ `Cd 002` appears on the display.
10. Press "OK".
    ▷ `StEP` appears on the display.
11. Press "OK".
    ▷ The set scale interval appears on the display.
12. Press "OK".
    ▷ `Cd 003` appears on the display.
13. Press "OK".

▷ `dEAdLo` appears on the display.

14. Press "OK".
    ▷ The mV/V value for the dead load appears on the display.
15. Press "OK".
    ▷ `Cd 004` appears on the display.
16. Press "OK".
    ▷ `SPAn` appears on the display.
17. Press "OK".
    ▷ The mV/V value for the max. capacity (Max) appears on the display.
18. Press "OK".
    ▷ `Cd 005` appears on the display.
19. Press "OK".
    ▷ `uVolt.d` appears on the display.
20. Press "OK".
    ▷ The measuring signal in µV/d appears on the display.
21. Press "OK".
    ▷ `Cd 006` appears on the display.
22. Press "OK".
    ▷ `WEIGHt` appears on the display.
23. Press "OK".
    ▷ The measuring signal as weight value appears on the display (the weight unit flashes).
24. If necessary, bring up the display for the other parameters in the same way.
25. Press "Exit" to exit the setup menu.

6.2.6 Displaying adjustment data for dead load and Max

Normally, all device settings are documented/printed out upon commissioning.
If a faulty device is replaced by a new one and no new adjustment is performed, the values for the dead load and the max. capacity (Max) in mV/V must be obtained.

1. Press  and hold for 2–3 seconds.
   ▷ `SEtuP` appears on the display.
2. Press "OK".
   ▷ `Cd 000` appears on the display (`Cd` flashes).
3. Press → to change the parameter number (`000` flashes).
4. Press ↑ (3×) to select parameter number `003`.
5. Press "OK".
   ▷ `dEAdLo` appears on the display.
6. Press "OK".
   ▷ `byLoAd` appears on the display.
7. Press ↑ to select `byMV-V`.
8. Press "OK".
   ▷ The mV/V value for the dead load appears on the display.
9. Note the displayed value.
10. Press "OK".
    ▷ `Cd 004` appears on the display.
11. Press "OK".
    ▷ `SPAn` appears on the display.
12. Press "OK".
    ▷ `byMV-V` appears on the display.

13. Press "OK".
    ▷ The mV/V value for the max. capacity (Max) appears on the display.
14. Note the displayed value.
15. Press "Exit" to exit the setup menu.

6.2.7 Entering metrology parameters

1. Press Setup and hold for 2–3 seconds.
    ▷ `SEtuP` appears on the display.
2. Press "OK".
    ▷ `Cd 000` appears on the display (`Cd` flashes).
3. Press ↑.
4. Select the individual parameters and modify if required, see Chapters Parameter table (setup) and Selecting parameters.

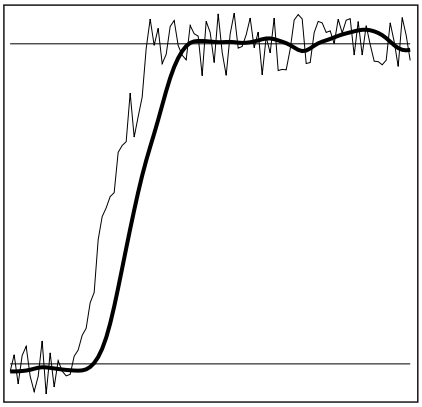
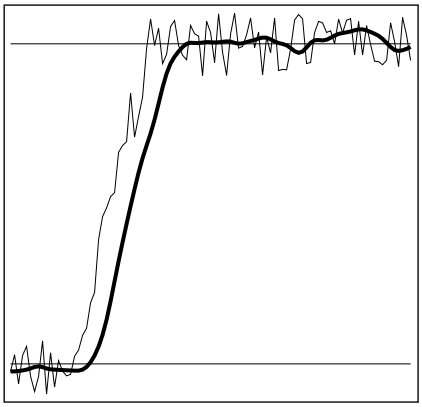
    [**Measure time**] `CP 010` `MEAtIM`

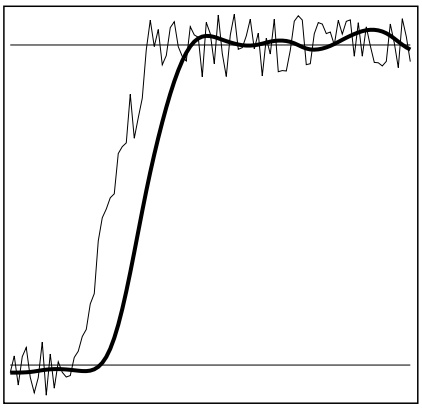
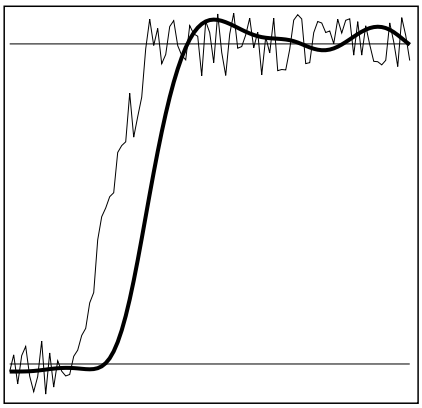
    The duration of a measurement can be selected.
    Selection: 5 ms, 10 ms, 20 ms, 40 ms , 80 ms, 160 ms, 320 ms, 640 ms

    [**Digital filter**] `CP 011` `FILtEr`

    > **Note:** After changing the filter parameters, the maximum accuracy should be reestablished through re-adjustment.

The following includes examples of interference signals for the different filter types:

Bessel filter	Aperiodic filter
	

Butterworth filter	Tschebyscheff filter
	

A digital filter can be switched on only with the measure time set to ≤160 ms.
Selection of the digital filter (filter characteristic): none, Bessel, aperiodic, Butterworth, Tschebyscheff

If no particularly frequent fluctuations are expected in ongoing operation, the following settings are recommended:

- [Measure time]: ≤160 ms
- [Digital filter]: Aperiodic
- [Cut-off frequency]: 2.00 Hz

[**Cut-off frequency**] `CP 012` `FCut`
The smaller the cutoff frequency, the slower the measurement and the more stable the measurement result.
Input: 0.1...80.00 Hz
The available options depend on the measure time.
The parameter `FCut` can only be selected if the digital filter is switched on.

[**Test mode**] `CP 013` `tStMod`

`AbS` (absolute) is used to calculate the test value when the test is called up.
`Rel` (relative) displays the deviation from the originally saved test value.

[**Standstill time**] `CP 014` `StStIM`

The parameters [Standstill time] and [Standstill range] define the standstill of the scale (stable balance).
Input: 0.01–2.00 s; the standstill time cannot be smaller than the measure time.

[**Standstill range**] `CP 015` `StSrnG`

As long as the weight fluctuations remain within this range, the device is determined to be stable.
Input: 0.01...10.00 d

[**Tare timeout**] `CP 016` `TArtIM`

Timeout for a tare/zeroset command that cannot be executed (e.g. due to mechanical instability of the scale, incorrect filter setting, resolution too high, standstill condition too strict).
Input: 0.1...25.0 s.

[**Zeroset range**] `CP 017` `ZESrnG`

Determine a ±range around the zero point determined by the dead load during adjustment; within this range

- the respectively displayed gross weight can be set to zero by a corresponding external command and
- automatic zero tracking is switched on.

Input: 0.00...10000.00 d

[**Zerotrack indic. range**] `CP 018` `ZEtrnG`

Display area within which automatic zerotrack compensates for deviations.
Input: 0.25...10000.00 d

[**Zerotrack step**] `CP 019` `ZEtStP`

If a weight change exceeds the adjusted value, automatic tracking does not function any more.
Setting range for automatic tracking increments: 0.25...10.00 d

[**Zerotrack time**] `CP 020` `ZEttIM`

Time interval for automatic zerotrack.
Input: 0.1...25.0 s
At 0.0 s tracking is switched off.

[**Overload**] `CP 021` `oVrLd`

Weighing range above the max. capacity (Max) without error message.
Input: 0...9999999 d

[**Minimum weight**] `CP 022` `MIn`

Minimum weight at which a print command can be triggered.
Input: 0...9999999 d

[**External load cell supply**] `CP 023` `LC-SuP`

If the load cells are supplied externally, it is possible to switch to <8 V to calibrate the sense voltage monitoring to the lower supply voltage.
Selection: `AbV 8 V` (>8 V), `bLo 8 V` (<8 V)

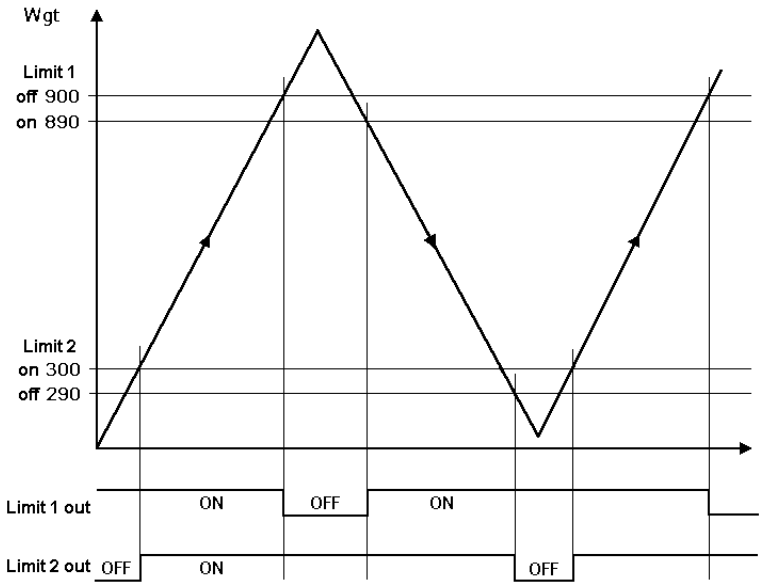
5. Press "Exit".
6. Save the changes.

6.2.8 Limits

6.2.8.1 Functions of the limits

Each limit consists of a switch-on and a switch-off point for definition of a hysteresis. The 3 pairs of values must be entered according to the same principle. The limit values always refer to the gross weight. SPM addresses for the limits, see Chapter System data.

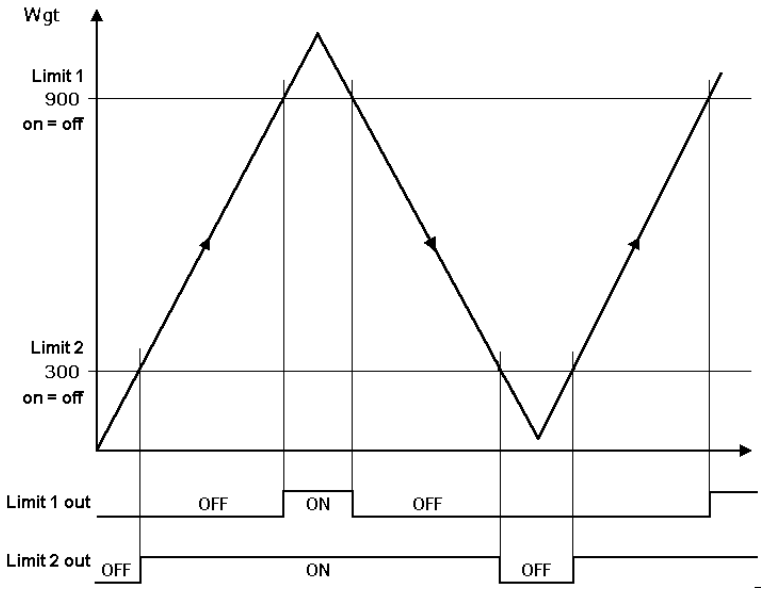
Example 1:



The output signal (Limit 1 out) of limit 1 (Limit 1) switches OFF above a weight (Wgt) of 900 kg.
The output signal (Limit 2 out) of limit 2 (Limit 2) switches OFF below a weight of 290 kg.
The two limit values have a hysteresis of 10 kg.

In the event of a power failure, the two outputs go to OFF, thus indicating under filling and over filling at the same time.

Example 2:



If limits 1 and 2 are the same for 'On' and 'Off' (on = off),

- output 1 (Limit 1 out) switches ON if the weight (Wgt) exceeds the value.
- output 2 (Limit 2 out) switches OFF if the weight falls below the value.

6.2.8.2 Configuring limits

1. Press Setup and hold for 2–3 seconds.
   ▷ `SEtuP` appears on the display.
2. Press "OK".
   ▷ `Cd 000` appears on the display (`Cd` flashes).
3. Press ↑.
4. Select the individual parameters and modify if required, see Chapters Parameter table (setup) and Selecting parameters.

   [**Limit 1 on**] `LI 030` `LIM.1on`

   Input: Weight value under `1on.VAL`
   Selection: Action under `1on.ACt`, see Chapter Defining actions
   Selection: Condition under `1on.Cnd`, see Chapter Setting conditions

   [**Limit 1 off**] `LI 031` `LIM.1oF`

   Input: Weight value under `1oF.VAL`
   Selection: Action under `1oF.ACt`, see Chapter Defining actions
   Selection: Condition under `1oF.Cnd`, see Chapter Setting conditions

   [**Limit 2 on**] `LI 032` `LIM.2on`

   Input: Weight value under `2on.VAL`
   Selection: Action under `2on.ACt`, see Chapter Defining actions
   Selection: Condition under `2on.Cnd`, see Chapter Setting conditions

   [**Limit 2 off**] `LI 033` `LIM.2oF`

   Input: Weight value under `2oF.VAL`
   Selection: Action under `2oF.ACt`, see Chapter Defining actions
   Selection: Condition under `2oF.Cnd`, see Chapter Setting conditions

   [**Limit 3 on**] `LI 034` `LIM.3on`

   Input: Weight value under `3on.VAL`
   Selection: Action under `3on.ACt`, see Chapter Defining actions
   Selection: Condition under `3on.Cnd`, see Chapter Setting conditions

[**Limit 3 off**] `LI 035` `LIM.3oF`

Input: Weight value under `3oF.VAL`
Selection: Action under `3oF.ACt`, see Chapter Defining actions
Selection: Condition under `3oF.Cnd`, see Chapter Setting conditions

5. Press "Exit".
6. Save the settings.

6.2.8.2.1 Defining actions

Markers can be set for all limits (in this case, see Example 2 from Chapter Configuring limits).
Define the action for the rising edge of the reference signal under `1on.ACt`...`3on.ACt` from the following list (in this case, marker 1 is set if 900 kg is exceeded).
An action for `1oF.ACt`...`3oF.ACt` can be defined accordingly.

Selection list for the actions

Action	SPM bit	Description
no act	---	No function
b64 = 1	X64 = 1	Set marker 1
b65 = 1	X65 = 1	Set marker 2
b66 = 1	X66 = 1	Set marker 3
b64 = 0	X64 = 0	Clear marker 1
b65 = 0	X65 = 0	Clear marker 2
b66 = 0	X66 = 0	Clear marker 3

> **Note:** The limit values can be assigned to the outputs directly in the I/O parameters.

6.2.9 Configuring digital inputs

For each of the 3 inputs, an action can be defined for the signal change from 0 to 1 (on) and from 1 to 0 (off), see Chapter Defining actions.

For the signal change from 0 to 1 (on) or from 1 to 0 (off), the selected action for each digital input can be linked with a condition that must be met. The condition is selected from the selection list of conditions in Chapter Setting conditions.

If [no condition] is selected, no condition is agreed. The action is then executed directly.

SPM addresses for the limits, see Chapter System data.

Example:
Tare via the digital input only if the gross weight exceeds the limit.

1. Press Setup and hold for 2–3 seconds.
   ▷ `SEtuP` appears on the display.
2. Press "OK".
   ▷ `Cd 000` appears on the display (`Cd` flashes).

   Input 1 on
3. Press ↑ (4×) to select `dI 043`.
4. Press "OK".
   ▷ `InP.1on` appears on the display.
5. Press "OK".
   ▷ `Ion.ACt` appears on the display.
6. Press "OK".

   The action for the rising edge of input 1 is defined (in this case, if the input signal changes from 0 to 1, a tare command is triggered).

   ▷ `no.ACt` appears on the display.
7. Press ↑ / ↓ to select the action `b113=1`, see Chapter Defining actions.
8. Press "OK".
   ▷ `Ion.Cnd` appears on the display.
9. Press "OK".

▷ `nonE` appears on the display.

10. Press ↑ / ↓ to select the condition `b16=1` (in this case, condition limit 1 off = active), see Chapter Setting conditions.
11. Press "OK".
    ▷ `dI 044` appears on the display.

Input 1 off

12. Press "OK".
    ▷ `InP.1of` appears on the display.
13. Press "OK".
    ▷ `IoF.ACt` appears on the display.
14. Press "OK".
    ▷ `no.ACt` appears on the display.
15. Press ↑ / ↓ to select an action, see Chapter Defining actions.
16. Press "OK".
    ▷ `IoF.Cnd` appears on the display.
17. Press "OK".
    ▷ `nonE` appears on the display.
18. Press ↑ / ↓ to select a condition, see Chapter Setting conditions.
19. Press "OK".
    ▷ `dI 045` appears on the display.
20. Perform the same steps for [Input 2 on/off] and [Input 3 on/off] in the menus `dI 046` ... `dI 048`.
21. Press "Exit".
22. Save the changes.

6.2.9.1 Defining actions

Actions can be selected (bits set) for all digital inputs (see table).
SPM addresses for the digital inputs, see Chapter System data.

Selection list for the actions

Action	SPM bit	Description
no act	---	No function
b64 = 1	X64 = 1	Set marker 1
b65 = 1	X65 = 1	Set marker 2
b66 = 1	X66 = 1	Set marker 3
b72 = 1	X72 = 1	Select net
b112 = 1	X112 = 1	Set zero
b113 = 1	X113 = 1	Set tare
b114 = 1	X114 = 1	Reset tare
b115 = 1	X115 = 1	Activate analog test
b116 = 1	X116 = 1	End analog test
b117 = 1	X117 = 1	Reset power fail
b118 = 1	X118 = 1	Set preset tare (use value in address D31 as tare value)
b119 = 1	X119 = 1	Gross value according to address D31 as preset tare
b64 = 0	X64 = 0	Clear marker 1
b65 = 0	X65 = 0	Clear marker 2
b66 = 0	X66 = 0	Clear marker 3
b72 =0	X72 = 1	Save gross weight under address D11.

6.2.10 Setting conditions

The markers can also be linked to a condition under `1on.Cnd`...`3on.Cnd` and `1oF.Cnd`...`3oF.Cnd`.

Selection list for the conditions

Condition	SPM bit	Description
none	---	No condition
b00 = 0	X00 = 0	Digital input 1: inactive
b01 = 0	X01 = 0	Digital input 2: inactive
b02 = 0	X02 = 0	Digital input 3: inactive
b16 = 0	X16 = 0	Limit signal 1: inactive
b17 = 0	X17 = 0	Limit signal 2: inactive
b18 = 0	X18 = 0	Limit signal 3: inactive
b32 = 0	X32 = 0	General error in weighing point: inactive (no error)
b33 = 0	X33 = 0	Weight above Max: inactive
b34 = 0	X34 = 0	Weight above Max plus overload value: inactive
b35 = 0	X35 = 0	Weight not below zero
b36 = 0	X36 = 0	Weight not within ¼ d around zero
b37 = 0	X37 = 0	Weight not in zeroset range
b38 = 0	X38 = 0	Standstill inactive
b39 = 0	X39 = 0	Weight not below zero or above Max
b48 = 0	X48 = 0	For internal use only.
b49 = 0	X49 = 0	For internal use only.
b50 = 0	X50 = 0	Set after power on (= power fail): inactive
b56 = 0	X56 = 0	Analog test not started.
b57 = 0	X57 = 0	For internal use only.
b58 = 0	X58 = 0	Instrument not tared.
b64 = 0	X64 = 0	Marker bit 1 not set, markers are reset after power on.

Condition	SPM bit	Description
b65 = 0	X65 = 0	Marker bit 2 not set, markers are reset after power on.
b66 = 0	X66 = 0	Marker bit 3 not set, markers are reset after power on.
b00 = 1	X00 = 1	Digital input 1: active
b01 = 1	X01 = 1	Digital input 2: active
b02 = 1	X02 = 1	Digital input 3: active
b16 = 1	X16 = 1	Limit signal 1: active
b17 = 1	X17 = 1	Limit signal 2: active
b18 = 1	X18 = 1	Limit signal 3: active
b32 = 1	X32 = 1	General error in weighing point
b33 = 1	X33 = 1	Weight above Max
b34 = 1	X34 = 1	Weight above Max plus overload value
b35 = 1	X35 = 1	Weight below zero
b36 = 1	X36 = 1	Weight within ¼ d around zero
b37 = 1	X37 = 1	Weight in zeroset range
b38 = 1	X38 = 1	Standstill active
b39 = 1	X39 = 1	Weight below zero or above Max
b48 = 1	X48 = 1	For internal use only.
b49 = 1	X49 = 1	For internal use only.
b50 = 1	X50 = 1	Set after power on (= power fail)
b56 = 1	X56 = 1	Analog test started.
b57 = 1	X57 = 1	For internal use only.
b58 = 1	X58 = 1	Instrument is tared.
b64 = 1	X64 = 1	Marker bit 1 set, markers are reset after power on.
b65 = 1	X65 = 1	Marker bit 2 set, markers are reset after power on.

Condition	SPM bit	Description
b66 = 1	X66 = 1	Marker bit 3 set, markers are reset after power on.

6.2.11 Configuring digital outputs

The desired function for output 1 to output 3 is configured by selecting a signal from the list.
The output then adopts the corresponding state, see example.
SPM addresses for the digital outputs, see Chapter System data.

Selection list for output functions

Function	SPM bit	Description
b00 = 0	X00 = 0	Digital input 1: inactive
b01 = 0	X01 = 0	Digital input 2: inactive
b02 = 0	X02 = 0	Digital input 3: inactive
b16 = 0	X16 = 0	Limit signal 1: inactive
b17 = 0	X17 = 0	Limit signal 2: inactive
b18 = 0	X18 = 0	Limit signal 3: inactive
b32 = 0	X32 = 0	General error in weighing point: inactive (no error)
b33 = 0	X33 = 0	Weight above Max: inactive
b34 = 0	X34 = 0	Weight above Max plus overload value: inactive
b35 = 0	X35 = 0	Weight not below zero
b36 = 0	X36 = 0	Weight not within ¼ d around zero
b37 = 0	X37 = 0	Weight not in zeroset range
b38 = 0	X38 = 0	Standstill inactive
b39 = 0	X39 = 0	Weight not below zero or above Max
b48 = 0	X48 = 0	For internal use only.
b49 = 0	X49 = 0	For internal use only.
b50 = 0	X50 = 0	Set after power on (= power fail): inactive
b56 = 0	X56 = 0	Analog test not started.

Function	SPM bit	Description
b57 = 0	X57 = 0	For internal use only.
b58 = 0	X58 = 0	Indicator not tared.
b64 = 0	X64 = 0	Marker bit 1 not set, markers are reset after power on.
b65 = 0	X65 = 0	Marker bit 2 not set, markers are reset after power on.
b66 = 0	X66 = 0	Marker bit 3 not set, markers are reset after power on.
b00 = 1	X00 = 1	Digital input 1: active
b01 = 1	X01 = 1	Digital input 2: active
b02 = 1	X02 = 1	Digital input 3: active
b16 = 1	X16 = 1	Limit signal 1: active
b17 = 1	X17 = 1	Limit signal 2: active
b18 = 1	X18 = 1	Limit signal 3: active
b32 = 1	X32 = 1	General error in weighing point
b33 = 1	X33 = 1	Weight above Max
b34 = 1	X34 = 1	Weight above Max plus overload value
b35 = 1	X35 = 1	Weight below zero
b36 = 1	X36 = 1	Weight within ¼ d around zero
b37 = 1	X37 = 1	Weight in zeroset range
b38 = 1	X38 = 1	Standstill active
b39 = 1	X39 = 1	Weight below zero or above Max
b48 = 1	X48 = 1	For internal use only.
b49 = 1	X49 = 1	For internal use only.
b50 = 1	X50 = 1	Set after power on (= power fail)
b56 = 1	X56 = 1	Analog test started.
b57 = 1	X57 = 1	For internal use only.
b58 = 1	X58 = 1	Indicator is tared.

Function	SPM bit	Description
b64 = 1	X64 = 1	Marker bit 1 set, markers are reset after power on.
b65 = 1	X65 = 1	Marker bit 2 set, markers are reset after power on.
b66 = 1	X66 = 1	Marker bit 3 set, markers are reset after power on.

Example:

Output 1: SPM bit [X35 = 1]

Output 1 becomes true (active) if the weight value drops below zero.

Output 2: SPM bit [X33 = 0]

Output 2 remains true (active) as long as the weight does not exceed Max.

Output 3: SPM bit [X36 = 1]

Output 3 becomes true (active) if the weight value goes to zero ±¼ d.

1. Press Setup and hold for 2–3 seconds.
   ▷ `SEtuP` appears on the display.
2. Press "OK".
   ▷ `Cd 000` appears on the display (`Cd` flashes).
3. Press ↑ (3×) to select `do 040`.
4. Press "OK".
   ▷ `outP. 1` appears on the display.
5. Press "OK".
   ▷ `b00=0` appears on the display.
6. Press ↑ / ↓ to select the function for output 1, see selection list.
7. Perform the same steps for output 2 and output 3 in the menus `do 041` and `do 042`.
8. Press "Exit".
9. Save the changes.

> **Example: Overload function**
>
> SPM bit [X34 = 1]
> Function and output are active (e.g. if overload is reached, a bulb lights up).
> SPM bit [X34 = 0]
> Function is active and output is inactive (e.g. if overload is reached, a bulb goes out).

6.2.12 Configuring the analog output

Parameter table

Parameter	Selection	Description
[**Mode**]	[Off]	Analog output is unused.
	[Transparent]	Value output in D30. Instrument is controlled via PLC.
	[Gross]	Gross weight output in D8.
	[Net]	Net weight output in D9; only if tared, otherwise gross weight is output.
	[Selected]	Gross/net value output on the display (D11) depending on SPM bit X72.
[**Range**]	[0...20 mA]	Outputs 0...20 mA.
	[4...20 mA]	Outputs 4...20 mA.
[**Output on wgt. err.**]	[Hold]	If an error occurs, the analog output retains the last value.
	[0 mA]	If an error occurs, the analog output is set to 0 mA.
	[4 mA]	If an error occurs, the analog output is set to 4 mA.
	[20 mA]	If an error occurs, the analog output is set to 20 mA.
[**On <0**]	[linear]	In the event of a negative weight, the analog output is retained. This is only possible if the output value for the zero weight is >0 mA.
	[0 mA]	In the event of a negative weight, the analog output is set to 0 mA.
	[4 mA]	In the event of a negative weight, the analog output is set to 4 mA.
	[20 mA]	In the event of a negative weight, the analog output is set to 20 mA.

Parameter	Selection	Description
[**On > Max**]	[linear]	In the event of a weight >Max, the analog output is retained. This is only possible if the output value for Max is <20 mA.
	[0 mA]	In the event of a weight >Max, the output is set to 0 mA.
	[4 mA]	In the event of a weight >Max, the output is set to 4 mA.
	[20 mA]	In the event of a weight >Max, the output is set to 20 mA.
[**Analog value**]	Input: fixed analog value	Only possible if [Transparent] mode is selected.
[**Weight value at 0/4 mA**]	Input: Weight value	Weight value at which the analog output should display 0 mA. or Weight value at which the analog output should display 4 mA (for the analog range 4... 20 mA).
[**Weight value at 20 mA**]	Input: Weight value	Weight value at which the analog output should display 20 mA.
[**Adjust for 4 mA**]	Input: Weight value	Value at 4 mA. Adjusting the analog output, see Chapter Adapting the analog output.
[**Adjust for 20 mA**]	Input: Weight value	Value at 20 mA. Adjusting the analog output, see Chapter Adapting the analog output.

1. Press Setup and hold for 2–3 seconds.
   ▷ `SEtuP` appears on the display.
2. Press "OK".
   ▷ `Cd 000` appears on the display (`Cd` flashes).
3. Press ↑ (5×) to select `Ao 050`.
4. Press "OK".
   ▷ `AnA.Mod` appears on the display.
5. Press "OK".

▷ `GroSS` appears on the display.

6. Press ↑ / ↓ to select the corresponding mode, see parameter table.
7. Press "OK".
   ▷ `Ao 051` appears on the display.
8. Press "OK".
   ▷ `AnA.rnG` appears on the display.
9. Press "OK".
   ▷ `0-20MA` appears on the display.
10. Press ↑ / ↓ to select the corresponding range, see parameter table.
11. Press "OK".
    ▷ `Ao 052` appears on the display.
12. Press "OK".
    ▷ `out.Err` appears on the display.
13. Press "OK".
    ▷ `4 MA` appears on the display.
14. Press ↑ / ↓ to select the corresponding output value, see parameter table.
15. Press "OK".
    ▷ `Ao 053` appears on the display.
16. Press "OK".
    ▷ `out.< 0` appears on the display.
17. Press "OK".
    ▷ `4 MA` appears on the display.
18. Press ↑ / ↓ to select the corresponding output value, see parameter table.
19. Press "OK".
    ▷ `Ao 054` appears on the display.
20. Press "OK".
    ▷ `out.>20` appears on the display.

21. Press "OK".
    ▷ `20 MA` appears on the display.
22. Press ↑ / ↓ to select the corresponding output value, see parameter table.
23. Press "OK".
    ▷ `Ao 055` appears on the display.
24. Press "OK".
    ▷ `WGt.0/4` appears on the display.
25. Press "OK".
    ▷ `000000` appears on the display (the last digit flashes).
26. Press ← / → and ↑ / ↓ to input the corresponding weight value.
27. Press "OK".
    ▷ `Ao 056` appears on the display.
28. Press "OK".
    ▷ `WGt. 20` appears on the display.
29. Press "OK".
    ▷ `030000` appears on the display (the last digit flashes).
30. Press ← / → and ↑ / ↓ to input the corresponding weight value.
31. Press "Exit".
32. Save the changes.

6.2.12.1 Adapting the analog output

The output current can be adjusted in small ranges. This is required if small deviations from the nominal value occur in a connected PLC.

1. Press Setup and hold for 2–3 seconds.
   ▷ `SEtuP` appears on the display.
2. Press "OK".
   ▷ `Cd 000` appears on the display (`Cd` flashes).
3. Press ↑ (5×) to select `Ao 050`.
4. Press ← / → and ↑ / ↓ to select `Ao 057`.
   ▷ `CAL-04` appears on the display.
5. Press "OK".
   ▷ `04000` appears on the display (the last digit flashes).
6. Press ← / → and ↑ / ↓ to input the value reported by the connected PLC for 4 mA.
7. Press "OK".
   ▷ `Ao 058` appears on the display.
8. Press "OK".
   ▷ `CAL-20` appears on the display.
9. Press "OK".
   ▷ `20000` appears on the display (the last digit flashes).
10. Press ← / → and ↑ / ↓ to input the value reported by the connected PLC for 20 mA.
11. Press "Exit".
12. Save the changes.

6.2.13 Entering operating parameters

1. Press Setup and hold for 2–3 seconds.
   ▷ `SEtuP` appears on the display.

2. Press "OK".
   ▷ `Cd 000` appears on the display (`Cd` flashes).

3. Select the individual parameters and modify if required, see Chapters Parameter table (setup) and Selecting parameters.

   [**Address**] `oP 060` `Addr`
   Enter device address, e.g. for printing.
   Input: 01...99
   [**Sequence number**] `oP 061` `SEqnr`
   The sequence number (counter for print jobs) is automatically incremented (max. 999999) and can be set to a starting value here if necessary.
   The sequence number can also appear on the printout (selectable).
   [**Tare key**] `oP 062` `tArkEy`
   The function of the tare key can be configured.
   Selection: Set tare/reset tare, set tare/set tare again, disabled
   [Set tare/reset tare] `tAr.rES` means that the device will be tared if it has not been tared previously and the tare will be reset if the device has already been tared.
   [Set tare/ set tare again] `tAr.tAr` that upon every tare command, the instant value in the tare memory is applied and the net display switches to "0".
   [Disabled] `diSAbL` means that the key has no function.
   [**Set zero key**] `oP 063` `ZErkEy`
   The function of the zeroset key can be configured.
   Selection: Only when not tared, reset tare on zero set, disabled
   [Only when not tared] `not.tAr` limits the key function to gross mode.
   [Reset tare on zero set] `rES.tAr` automatically switches the system to gross mode.
   [Disabled] `diSAbl` means that the key has no function.
   [**N.B.T key**] `oP 064` `nbtkEy`
   The function of the key can be disabled `diSAbl` and enabled `EnAbLE`.
   [**Print key**] `oP 065` `PrtkEy`
   The function of the key can be disabled `diSAbl` and enabled `EnAbLE`.
   [**Test key**] `oP 066` `tStkEy`
   The function of the key can be disabled `diSAbl` and enabled `EnAbLE`.

[**Timeout**] `oP 067` `tiMout`
Automatically exits the setup menu (in weighing mode) after a defined duration.
Input: 00...59

4. Press "Exit" to exit the setup menu.
5. Save the changes.

6.2.14 Configuring serial interfaces

6.2.14.1 Configuring the serial interface for the printer

1. Press Setup and hold for 2–3 seconds.
   ▷ `SEtuP` appears on the display.
2. Press "OK".
   ▷ `Cd 000` appears on the display (`Cd` flashes).
3. Press ↑ (8×) to select `SI 070`.
4. Press "OK".
   ▷ `PrInt` appears on the display.
5. Select the individual parameters and modify if required, see Chapters Parameter table (setup) and Selecting parameters.

   [**Interface**] `Port`
   Selection: none `nonE`, RS-232 `rS232`, RS-485 `rS485`
   [**Protocol**] `ProtoC`
   Selection: none `nonE`, RTS/CTS `rtS.CtS`
   [**Baud rate**] `bAud`
   Baud rate of the data transfer
   Selection: 1200, 2400, 4800, 9600 (default), 19200, 38400
   [**Parity**] `PArItY`
   Selection: `nonE`, odd `odd`, even `EVEn`
   [**Data bits**] `bItS`
   Selection: 7, 8

[**Stop bits**] `StoP`
Units for transmission protocols
Selection: 1, 2
Only with RS-232: [**Line 1...12**] `Coln 1`...`Coln 12`
Only with RS-485: [**Mode**] `ModE`
Selection: [Half duplex] `HALF`, full duplex `FuLL` with the lines `Coln 1`...`Coln 12` respectively
RS-232 and RS-485
A printout with max. 12 lines can be compiled.

Selection:
- Blank line `nonE`; selected if fewer than 12 lines are to be printed.
- Gross weight `GroSS`
- Net weight `nEt`
- Tare weight `tArE`
- Date & time `dAtE`; printed in the format DD.MM.YYYY HH:MM:SS.
- Sequence number `SEq`; counter for the individual print jobs, max. 6 digits, #999999 is followed by #000001
- Line switch and feed `nL`
- Device address `dEVAdr`
- Form feed `FF`

6. Press "Exit" to exit the setup menu.
7. Save the changes.

> **Example: Parameter selection + printout**
>
> **Parameter selection**
>
`Coln 1`	`dAtE`
`Coln 2`	`SEq`
`Coln 3`	`GroSS`
`Coln 4`	`nEt`
`Coln 5`	`nL`
`Coln 6`	`nonE`
>
> **Printout**
>
`04.03.2022 14:23:56`	`#009140`	`<436 kg> B`	`<291 kg> N`

6.2.14.2 Configuring the serial interface for the remote display

1. Press Setup and hold for 2–3 seconds.
   ▷ `SEtuP` appears on the display.
2. Press "OK".
   ▷ `Cd 000` appears on the display (`Cd` flashes).
3. Press ↑ (9×) to select `SI 071`.
4. Press "OK".
   ▷ `rEMdSP` appears on the display.
5. Select the individual parameters and modify if required, see Chapters Parameter table (setup) and Selecting parameters.

   [**Interface**] `Port`
   Selection: none `nonE`, RS-232 `rS232`, RS-485 `rS485`
   [**Baud rate**] `bAud`
   Baud rate of the data transfer
   Selection: 1200, 2400, 4800, 9600 (default), 19200, 38400
   Only with RS-485: [**Mode**] `ModE`
   Selection: [Half duplex] `HALF`, full duplex `FuLL`
6. Press "Exit" to exit the setup menu.
7. Save the changes.

6.2.14.3 Configuring the serial interface for SMA

1. Press Setup and hold for 2–3 seconds.
   ▷ `SEtuP` appears on the display.
2. Press "OK".
   ▷ `Cd 000` appears on the display (`Cd` flashes).
3. Press ↑ (10×) to select `SI 072`.
4. Press "OK".
   ▷ `SMA` appears on the display.
5. Select the individual parameters and modify if required, see Chapters Parameter table (setup) and Selecting parameters.

[**Interface**] `Port`
Selection: none `nonE`, RS-232 `rS232`, RS-485 `rS485`
[**Baud rate**] `bAud`
Baud rate of the data transfer
Selection: 1200, 2400, 4800, 9600 (default), 19200, 38400
Only with RS-485: [**Mode**] `ModE`
Selection: [Half duplex] `HALF`, full duplex `FuLL`

6. Press "Exit" to exit the setup menu.
7. Save the changes.

6.2.14.4 Configuring the serial interface for ModBus-RTU

1. Press Setup and hold for 2–3 seconds.
   ▷ `SEtuP` appears on the display.
2. Press "OK".
   ▷ `Cd 000` appears on the display (`Cd` flashes).
3. Press ↑ (11×) to select `SI 073`.
4. Press "OK".
   ▷ `ModbuS` appears on the display.
5. Select the individual parameters and modify if required, see Chapters Parameter table (setup) and Selecting parameters.

   [**Interface**] `Port`
   Selection: none `nonE`, RS-232 `rS232`, RS-485 `rS485`
   [**Baud rate**] `bAud`
   Baud rate of the data transfer
   Selection: 1200, 2400, 4800, 9600 (default), 19200, 38400
   [**Parity**] `PArItY`
   Selection: `nonE`, odd `odd`, even `EVEn`
   [**Slave address**] `SLAV`
   Selection: 001...099
   [**Data bits**] `bItS`
   Selection: 7, 8

[**Stop bits**] `StoP`
Units for transmission protocols
Selection: 1, 2
Only with RS-485: [**Mode**] `ModE`
Selection: [Half duplex] `HALF`, full duplex `FuLL`

6. Press "Exit" to exit the setup menu.
7. Save the changes.

6.2.15 Entering fieldbus parameters using front-panel keys

1. Press Setup and hold for 2–3 seconds.
   ▷ `SEtuP` appears on the display.
2. Press "OK".
   ▷ `Cd 000` appears on the display (`Cd` flashes).
3. Press ↑ (12×) to select `FP 080`.
4. Press "OK".
   ▷ `FLd.Pro` appears on the display.
5. Select the individual parameters and modify if required, see Chapters Parameter table (setup) and Selecting parameters.

   ProfiBus DP
   [**Fieldbus**] `PdP-U1`
   [**PDP address**] `PdP.Adr`
   Input: 001...126

   DeviceNet
   [**Fieldbus**] `dEV.nEt`
   [**Baud rate**] `dVnbdr`
   Selection: 125, 250, 500
   [**Slave address**] `dVnAdr`
   Input: 001...062

EtherNet IP
[**Fieldbus**] `dEUnEt`
[**DHCP**] `dHCP`
Selection: `on`, `oFF`
on = DHCP is activated. The network address is assigned automatically.
off = if DHCP is not activated, the addresses must be input manually.
[**IP address**] `IP-Adr`
Input higher-value part of the address: `192.168` (example)
Input lower-value part of the address: `185.000` (example)
[**Subnet mask**] `SubnEt`
Input higher-value part of the address: `255.255` (example)
Input lower-value part of the address: `254.000` (example)

ProfiNet I/O
[**Fieldbus**] `PronEt`
[**IP address**] `IP-Adr`
Input higher-value part of the address: `192.168` (example)
Input lower-value part of the address: `185.000` (example)
[**Subnet mask**] `SubnEt`
Input higher-value part of the address: `255.255` (example)
Input lower-value part of the address: `254.000` (example)

6. Press "Exit" to exit the setup menu.
7. Save the changes.

6.2.16 Displaying system information

1. Press Setup and hold for 2–3 seconds.
   ▷ `SEtuP` appears on the display.

2. Press "OK".
   ▷ `Cd 000` appears on the display (`Cd` flashes).

3. Select the individual parameters and modify if required, see Chapters Parameter table (setup) and Selecting parameters.

   [**Software version**] `IF 090` `Soft.Ve`
   Display: Software Version
   [**Interface**] `IF 091` `Slot`
   Display: `EMPtY` or PR 5310 card type
   [**RS-232 interface**] `IF 092` `Rs-232`
   Display: none, printer, remote display, SMA, ModBus-RTU

[**RS-485 interface**] `IF 093` `Rs-485`
Display: none, printer, remote display, SMA, ModBus-RTU
[**Battery status**] `IF 094` `Rtc.bat`
Display: OK `bAt oK`, not OK `bAt nOt oK`

4. Press "Exit" to exit the setup menu.

6.2.17 Printing configuration data

> **Note:**
>
> Printing is only possible if a printer is connected, see Chapter Configuring the serial interface for the printer.

1. Press Setup and hold for 2–3 seconds.
   ▷ `SEtuP` appears on the display.
2. Press "OK".
   ▷ `Cd 000` appears on the display (`Cd` flashes).
3. Press ↑ (15×) to select `PP 110`.
4. Press "OK".
   ▷ `rESEt?` appears on the display.
5. Press "OK" to print the configuration data.
   ▷ `Err 90` appears on the display if no printer is connected.

6.3 Other functions via keypad

6.3.1 Testing the front-panel keys

1. Press Setup and hold for 2–3 seconds.
   ▷ `SEtuP` appears on the display.
2. Press ↑ / ↓.
   ▷ `tESt` appears on the display.
3. Press "OK".
   ▷ `kEy` appears on the display.

4. Press "OK".
   ▷ `kEy-0` appears on the display.
5. Press the keys.

   The corresponding key ID appears on the display, see below.

					
`kEy-1`	`kEy-2`	`kEy-3`	`kEy-4`	`kEy-5`	`kEy-6`

   If the correct key ID is not shown for a key, the keypad is defective.
6. Press "Exit" and hold for 2–3 seconds to exit the front-panel key test menu.

6.3.2 Testing digital inputs

1. Press  and hold for 2–3 seconds.
   ▷ `SEtuP` appears on the display.
2. Press ↑ / ↓.
   ▷ `tESt` appears on the display.
3. Press "OK".
   ▷ `kEy` appears on the display.
4. Press ↑.
   ▷ `InPut` appears on the display.
5. Press "OK".
   ▷ `0 0 0` appears on the display.

6. Switch on the inputs externally.
   ▷ The following appears on the display:

Digital input	Identifier
Input 1 on	`1 0 0`
Input 2 on	`0 1 0`
Input 3 on	`0 0 1`
Input 1–3 on	`1 1 1`

> **Note:** If the switched input is not displayed correctly, it is defective.

7. Press "Exit" to exit the test menu.

6.3.3 Testing digital outputs

1. Press Setup and hold for 2–3 seconds.
   ▷ `SEtuP` appears on the display.
2. Press ↑ / ↓.
   ▷ `tESt` appears on the display.
3. Press "OK".
   ▷ `kEy` appears on the display.
4. Press ↑ (2×).
   ▷ `outPut` appears on the display.
5. Press "OK".
   ▷ `0 0 0` appears on the display.

6. Switch on the inputs externally.
   ▷ The following appears on the display:

Digital input	Identifier
Input 1 on	`1 0 0`
Input 2 on	`0 1 0`
Input 3 on	`0 0 1`
Input 1–3 on	`1 1 1`

> **Note:** If the switched input is not displayed correctly, it is defective.

7. Press "Exit" to exit the test menu.

6.3.4 Testing the RS-232 interface

1. Press Setup and hold for 2–3 seconds.
   ▷ `SEtuP` appears on the display.
2. Press ↑ / ↓.
   ▷ `tESt` appears on the display.
3. Press "OK".
   ▷ `kEy` appears on the display.
4. Press ↑ (3×).
   ▷ `rS232` appears on the display.
5. Press "OK".
   ▷ `1 1` appears on the display. The test starts automatically. The results are displayed: `-paSS-` = OK, `-FAIL-` = error
6. Press "Exit" to exit the test menu.

6.3.5 Testing the RS-485 interface

1. Press Setup and hold for 2–3 seconds.
   ▷ `SEtuP` appears on the display.
2. Press ↑ / ↓.
   ▷ `tESt` appears on the display.
3. Press "OK".
   ▷ `kEy` appears on the display.
4. Press ↑ (4×).
   ▷ `rS485` appears on the display.
5. Press "OK".
   ▷ `1 1` appears on the display. The test starts automatically. The results are displayed: `-paSS-` = OK, `-FAIL-` = error
6. Press "Exit" to exit the test menu.

6.3.6 Testing the analog output

> **Note:** The menu is only available if the analog output card is connected.

1. Connect an ammeter between pin 3 (+) and pin 2 (GNDI) of the analog connection (see Chapter Analog output)
2. Press Setup and hold for 2–3 seconds.
   ▷ `SEtuP` appears on the display.
3. Press ↑ / ↓.
   ▷ `tESt` appears on the display.
4. Press "OK".
   ▷ `kEy` appears on the display.
5. Press ↑ (5×).
   ▷ `AnALog` appears on the display.
6. Press "OK".
   ▷ `0` appears on the display. The ammeter reads 0.000 mA

7. Press "OK".
   ▷ Pressing the key increases the counting in line with the parameter settings. Every time the "OK" key is pressed, 1,000 mA are added to the output (up to a maximum of 20,000 mA).

8. Press "OK" again to repeat steps 7 and 8.
   ▷ The analog output is faulty if the analog output current cannot be measured as described.

9. Press "Exit" to exit the test menu.

7 ModBus protocol

7.1 General description

The ModBus protocol implemented in the device enables rapid, simple, and reliable communication between a PC or PLC and up to a maximum of 99 devices.

The ModBus protocol allows access to all data published in the SPM table of the relevant application.

Implementation:

The functions 1, 2, 3, 4, 5, 6, 8, 15, and 16 are supported.
Bits can only be read or set individually or in groups of eight.

8 SMA protocol

8.1 General description

The protocol of the "Scale Manufacturers Association" (SMA) provides a simple access to the scale. It can be used for reading data, or for executing functions.

The RS-485 interface is used as an interface.

Fixed interface settings are 8 bits, no parity and 1 stop bit.

The commands to the transmitter are printable ASCII characters starting with <LF> = 0A hex and ending with <CR> = 0D hex.

The transmitter sends a reply on each received command after approx. 100 ms. With commands that wait for standstill of the weight value, the reply can be delayed by the timeout.

The following commands are supported:

W, Z, D, A, B, <ESC>, H, P, Q, R, S, T, M, C, I, N

9 Fieldbus interface

9.1 General notes

The PR 5310 can be included under a communication master (e.g. Siemens S7 ProfiBus) as a field bus slave.
The update rate is 50 ms.
The field bus exchanges its data cyclically with each slave. That means: In each cycle, the entire data range is written and read, even if there are no changes to the data content.

Concept definition

Term/Abbreviation	Description
Master	Field bus master, usually an SPS
Slave	Field bus device
MOSI	Master Out Slave In = data is written from the SPS via the field bus to the device.
MISO	Master In Slave Out = data is returned from the device via the field bus to the SPS.

9.2 Scale protocol

The interface works with an 8-byte write window and an 8-byte read window for a weighing point.

> **Note:** For a detailed description of how it works, see Reading and writing data with function numbers.

9.2.1 Data exchange range

Overview

Byte	0, 1, 2, 3	4	5	6, 7
MOSI	Write data	Read_Value_Select	Write_Value_Select	Control bits
MISO	Read data	Read_Value_Selected	Status bits	Status bits

Write window (MOSI)

Byte	Field								Description
0	Write data (MSB)								Contains the data to be written, e.g., analog output.
1	Write data								
2	Write data								
3	Write data (LSB)								
4	Read_Value_Select								Selects the function for reading data.
5	Write_Value_Select								Selects the function for writing data.
6	free	free	free	free	free	free	free	free	
7	free	free	Res Pow-er	Res Test	Set Test	Res Tare	Set Tare	Set Zero	In direct access, control bits are independent of the write request.
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	

Field	Size	Function
Write data	4 bytes	Data to be written as a binary 32-bit value with plus or minus sign. Data type: DINT
Read_Value_Select	1 byte	Function for selecting the read request
Write_Value_Select	1 byte	Function for selecting the write request
ResPower	1 bit	**PowerFail** is reset.
ResTest	1 bt	The **test** operating mode is finished.
SetTest	1 bit	The **test** operating mode is started. Now the test value can be read out by reading the gross weight.
ResTare	1 bit	Tare is reset.
SetTare	1 bit	The weighing point is tared.
SetZero	1 bit	The weighing point is set to zero.

Read window (MISO)

Byte	Field								Description
0	Read data (MSB)								Contains the data to be written, e.g. gross value.
1	Read data								
2	Read data								
3	Read data (LSB)								
4	Read_Value_Selected								**Read_Value_Select** (function) from the write window is mirrored if the data in "Read data" is available.
5	Write Active	Power Fail	Out 3	Out 2	Out 1	Limit 3	Limit 2	Limit 1	In direct access, status bits are independent of the write or read request.
6	Cmd Busy	Cmd Error	Inp 3	Inp 2	Inp 1	Tare Active	Cal Changed	Test Active	
7	OutOf Range	Standstill	Inside ZSR	Center Zero	Below Zero	Overload	Above Max	ADC Error	
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	

Field	Size	Function
Read data	4 bytes	Data to be read as a binary 32-bit value with plus or minus sign. Data type: DINT
Read_Value_Selected	1 byte	Acknowledgment of the transmitted function number.
WriteActive	1 bit	The function selected with **Write_Value_Select** has been executed once. This bit is deleted if **Write_Value_Select** is set to 0.
PowerFail	1 bit	Is set when switching on the device. Is reset by **ResPower** with transition from 0→1.
CmdBusy	1 bit	The device is busy executing a function (e.g., waiting for a standstill for taring)

Field	Size	Function
CmdError	1 bit	The device has interrupted the execution of a command (e.g., **standstill** could not be reached within the defined standstill time). The error number can be read from "LASTERROR", see Chapter Function number 4: adjustment information, error byte (read).
Tare_Active	1 bit	The scale has been tared.
Cal_Changed	1 bit	The device has been calibrated. When this bit is 1, the weighing point parameters (EXPO/UNIT/STEP+FSD) must be read again. Set after "Power on" and reset after reading the FSD.
Test_Active	1 bit	The device executes the ADC test. The read weight value is not the gross value, but the test value.
OutOfRange	1 bit	Below zero or above Max (FSD).
Standstill	1 bit	The scale is stable.
InsideZSR	1 bit	The gross weight value is within the zero setting range.
CenterZero	1 bit	The weight value is within **center zero** (0 ±0.25 d).
BelowZero	1 bit	The weight value is negative (gross < 0 d).
Overload	1 bit	The weight value has exceeded the measuring range. No valid weight data is specified (gross > FSD+overload).
AboveMax	1 bit	The weight value has exceeded Max (FSD), but is still within Max + permissible overload (gross ≤ FSD+overload).
ADCError	1 bit	AD conversion error, see Chapter Function number 1: scale status (read).

> **Note:** All fieldbus data is only valid, if 'Read_Value_Selected' has been reflected.

9.2.2 Reading and writing data with function numbers

9.2.2.1 Reading data

Procedure:

1. Write the function number as **Read_Value_Select** in byte 4 of the write window (e.g., 9 = net weight).
2. Wait until **Read_Value_Selected** in byte 4 of the read window is equal to **Read_Value_Select** of the write window.
   ▷ The requested value is available in bytes 0-3.

Action of the master	Slave reaction
Write function number to **Read_Value_Select**.	
	Write requested data in **Read_Data** (bytes 0-3).
	Copy **Read_Value_Select** to **Read_Value_Selected**.
Wait until **Read_Value_Selected** = **Read_Value_Select**.	
Read requested data in **Read_Data** (bytes 0-3).	

9.2.2.2 Writing data

Procedure:

1. Wait until **Write_Active** = 0 in the read window (slave is ready to receive new data).
2. Write value in bytes 0-3 of the write window.
3. Write the function number as **Write_Value_Select** in byte 5 of the write window.
4. Wait until **Write_Active** = 1 in the read window.
5. Write 0 in byte 5 (**Write_Value_Select**).
   ▷ **Write_Active** is reset.

Action of the master	Slave reaction
Write value in **Write_Data** (bytes 0-3).	
Write function number to **Write_Value_Select**.	
	Read data from **Write_Data** (bytes 0-3).
	Set the **Write_Active** bit.
Wait until **Write_Active** has been set.	
Write 0 in **Write_Value_Select**.	
	Reset the **Write_Active** bit.

9.2.2.3 Writing bits

In addition to the control bits in bytes 6/7, further bits can be set and, if necessary, reset directly with **Write_Value_Select**.
To set bits 80 to 124, the corresponding function number is written to **Write_Value_Select** (see Chapter Function numbers).
To reset bits 80 to 89, the corresponding function number +128 (208 to 217) is written to **Write_Value_Select**.

Action of the master	Slave reaction
Writing the bit address as a function number to **Write_Value_Select**.	
	The bit from **Write_Value_Select** is set and the corresponding function carried out.
	Set the **Write_Active** bit.
Wait until **Write_Active** has been set.	
Write 0 in **Write_Value_Select**.	
	Reset the **Write_Active** bit.

9.2.2.4 Reading bits

Reading individual bits which are not contained directly in the read window is only possible with a corresponding function number and the data in **Read_Data** (Byte 0-3) of the read window. In those bytes, the bits must be evaluated individually.
The procedure is the same as that described in Chapter Reading data.

9.2.3 Reading and writing bits directly

For reading status bits and for writing direct control bits, no procedure is required. The general status bits are always provided and need not be requested. The direct control bits are also available continuously.

9.2.3.1 Reading status bit

The status bits in bytes 5-7 of the read window are always available and can be read directly by the master.

9.2.3.2 Writing control bits

Some device functions can be executed by setting bits directly in bytes 6 and 7 (control bytes) of the write window.

Action of the master	Slave reaction
Set bits in the **control byte**.	
	Function is executed.
Reset bits in the **control byte**.	

9.2.4 Waiting for the result of the action

When an action requiring more time is started, the end of execution can also be waited for.

Action of the master	Slave reaction
For setting bits, see Chapter Writing bits or Writing control bits.	
	Set the **CmdBusy** bit.
	Function is executed.
	In the event of an error: Set the **CmdError** bit and the **LastError** byte.
	If the function is executed or timeout: Reset the **CmdBusy** bit.
Wait until **CmdBusy** = 0.	
Check the **CmdError** bit.	
If **CmdError** is set: Evaluate the **LastError** (for function number 4, see Chapter Function number 4: adjustment information, error byte (read))	
Set the **ResetError** bit (for function number 121, see Chapter Function number 112–124: transition-controlled action bits (write)).	
	The **ResetError** bit is reset.
	The **CmdError** bit is reset.

9.2.5 Function numbers

Function numbers are written to MOSI by the master (SPS) and reflected in MISO by the PR 5310.

- Function number 0: I/O status bits (read), see Chapter Function number 0: I/O status bits (read)
- Function number 1: scale status (read), see Chapter Function number 1: scale status (read)
- Function number 2: state-controlled action bits (read), see Chapter Function number 2: state-controlled action bits (read)
- Function number 3: state of edge-controlled action bits (read), see Chapter Funktion number 3: state of edge-controlled action bits (read)
- Function number 4: calibration information, error byte (read), see Chapter Function number 4: adjustment information, error byte (read)
- Function number 5: device type and software version (read), see Chapter- Function number 5: device type and software version (read)
- Function number 6: serial number of the weighing point (read), see Chapter Function number 6: serial number of the weighing point (read)
- Function numbers 8 to 22: weight data (read), see Chapter Function number 8–22: weight data (read)
- Function numbers 24 to 29: Limit value (read/write), see Chapter Function number 24–29: Limit value (Read/Write)
- Function numbers 30, 31: values of the current weighing point (read), see Chapter Function number 30, 31: Fixed values (Read/Write)
- Function numbers 80 to 92: state-controlled action bits (write), see Chapter Function number 80–92: state-controlled action bits (write)
- Function numbers 112 to 124: transition-controlled action bits (write), see Chapter Function number 112–124: transition-controlled action bits (write)

9.2.5.1 Function number 0: I/O status bits (read)

Dynamic status

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0						Input 3	Input 2	Input 1
Byte 1						Output 3	Output 2	Output 1
Byte 2						Limit 3	Limit 2	Limit 1
Byte 3								

9.2.5.2 Function number 1: scale status (read)

Dynamic status

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	OutOf Range	Standstill	Inside ZSR	Center Zero	Below Zero	Overload	Above Max	ADU Error
Byte 1					E6	E1	E3	E7
Byte 2						Power-Fail	Action Active	CmdError
Byte 3						Tare Active	Cal Changed	Test Active

> **Note:** Byte 0 corresponds to byte 7 in the output area. Weight error see table below.

Field	Function
ADUError	AD conversion error (OR function of bits E1, E3, E7).
AboveMax	The weight value has exceeded the Max (FSD), but is still within Max + permissible overload (gross ≤Max + overload).
Overload	The weight value has exceeded the measuring range. No valid weight data is specified (gross >Max + overload); **ERR 2**.
BelowZero	The weight value is negative (gross < 0d).
CenterZero	The weight value is within center zero (0 ± 0.25 d)

Field	Function
InsideZSR	The gross weight value is within the zero setting range.
Standstill	The scale is stable.
OutOfRange	Below zero or above Max (FSD).
E9	The measuring signal is higher than the permissible range of 36 mV. Cannot read weight values from ADC (analog-digital converter) (**Error 9**).
E7	The measuring signal is negative (inverse conversion) (**Error 7**)
E6	Sense voltage not present or too low (**Error 6**)
E3	The measuring signal is >36 mV (no end of conversion) (**Error 3**)
E1	Arithmetic error (overflow) (**Error 1**)
CmdError	Error during execution (CmdError); e.g., the "taring" operation is not processed, because the scale is not at a standstill. The error is stored in **LastError** (function number 4). The bit is reset with the **ResetError** bit (function number 121, see Chapter Function number 112–124: transition-controlled action bits (write)).
ActionActive	The device is busy executing a function (e.g., waiting for downtime for taring).
PowerFail	Power failure; is always set after power on. The **PowerFail** bit is reset with the **ResetPWF** bit (function number 85, see Chapter Function number 80–92: state-controlled action bits (write)) "Reset power failure".
Test_Active	The device executes the ADC test. The read weight value is not the gross value, but the test value.
Cal_Changed	The device has been calibrated. When this bit is 1, the weighing parameters (EXPO/UNIT/STEP) must be read again. Set after "Power on" and reset after reading Max (FSD = Full scale deflection).
Tare_Active	The scale has been tared.

9.2.5.3 Function number 2: state-controlled action bits (read)

Display of signal state

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0								
Byte 1								
Byte 2	87: GetFixTare	86: SetFixTare	85: ResetPwf	84: ResetTest	83: SetTest	82: ResetTare	81: SetTare	80: SetZero
Byte 3							89: ResetError	88: SetPrint

> **Note:** See Chapter Function number 80–92: state-controlled action bits (write).

9.2.5.4 Funktion number 3: state of edge-controlled action bits (read)

The state is always 0.

9.2.5.5 Function number 4: adjustment information, error byte (read)

Byte	Description
0: EXPO	One byte for the position of the decimal point; content in decimal form: 0 to 255.
	0 = 000000
	1 = 00000.0
	2 = 0000.00
	3 = 000.000
	4 = 00.0000
	5 = 0.00000

Byte	Description
1: UNIT	One byte for the weight unit; content in decimal form: 0 to 255
	2 = g (grams)
	3 = kg (kilograms)
	4 = t (tons)
	5 = lb (pounds)
2: STEP	One byte for the scale interval; content in decimal form: 0 to 255
	1 = scale interval "1"
	2 = scale interval "2"
	5 = scale interval "5"
	10 = scale interval "10"
	20 = scale interval "20"
	50 = scale interval "50"

Byte	Description
3: LASTERROR	Last error byte; see also **CmdError** bit, number of LASTERROR:
	30 = weight < dead load
	31 = no standstill was achieved (e.g., when taring).
	35 = weight exceeds allowed range
	40 = CAL switch locked
	41 = transmitter not in calibration mode
	42 = adjustment active, transmitter is in adjustment mode
	46 = tare active (can occur at start adjustment)
	47 = no zero setting; weight not within zero setting range.
	50 = invalid scale interval (step width)
	51 = not enough counts/d
	53 = calibration weight > max. capacity (Max)
	55 = arithmetic overflow
	57 = entered unit does not comply with Max weight unit
	58 = Span above Max
	59 = max. capacity (Max) cannot be divided by scale interval.
	102, 103 = EAROM error (command SaveProcess, function number 2)
	104 = wrong access code
	106 = baud rate of remote display cannot be altered
	107 = no standstill with **GetFixTare**.
	108 = parameter not valid (at entering via PLC)

9.2.5.6 Function number 5: device type and software version (read)

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	TYPE MSB							
Byte 1	TYPE LSB							
Byte 2	MAINVERSION							
Byte 3	SUBVERSION							

e.g.: PR 5310 Rel 1.23 = $53100123_{\mathbf{hex}}$

9.2.5.7 Function number 6: serial number of the weighing point (read)

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Serial number MSB							
Byte 1	Serial number							
Byte 2	Serial number							
Byte 3	Serial number LSB							

e.g.: 148388723 = $08D83B73_{\mathbf{hex}}$

9.2.5.8 Function number 7: For internal use only.

9.2.5.9 Function number 8–22: weight data (read)

The gross, net, and tare weight are stored as a DINT fix point. The real data value is derived from DINT and EXPO as follows:
$Value_{Real} = reading_{DINT} \times 10^{(-EXPO)}$

Function number 8	Current gross value
Function number 9	Current net value, if tared; otherwise gross
Function number 10	Current tare value, if tared; otherwise 0
Function number 11	Value on the front-panel display
Function number 12	Reserved for internal use.
Function number 13	Reserved for internal use.
Function number 14	Max. capacity (Max)
Function number 15	Reserved for internal use.
Function number 16	Reserved for internal use.
Function number 17	Reserved for internal use.
Function number 18	Reserved for internal use.
Funktionsnummer 19	Reserved for internal use.
Function number 20	Reserved for internal use.
Function number 21	Last printed date (BCD format)
Function number 22	Last printed time (BCD format)

9.2.5.10 Function number 24–29: Limit value (Read/Write)

Function number 24	Limit 1 on
Function number 25	Limit 1 off
Function number 26	Limit 2 on
Function number 27	Limit 2 off
Function number 28	Limit 3 on
Function number 29	Limit 3 off

9.2.5.11 Function number 30, 31: Fixed values (Read/Write)

Function number 30	Fixed value for analog output, value (num) 0 20000 corresponds to 20 mA
Function number 31	Fixed value for preset tare, see also **SetFixTare**, **GetFixTare** in Chapter Data exchange range.

9.2.5.12 Function number 80–92: state-controlled action bits (write)

> **Note:** For setting bits, see Chapter Writing bits .

Only setting and resetting of single bits is possible.
When changing a bit from 0 to 1, the corresponding action starts. After handling the command, the bit must be reset. Application: The master writes cyclically.
The bit is set as **Write_Value_Select** with the specified number (see Chapter Writing bits). The bit is reset at the specified number +128.

Function number 80	SetZero	Set the gross weight to zero.
Function number 81	SetTare	The weighing point is tared.
Function number 82	ResetTare	Reset tare.
Function number 83	SetTest	Start the ADC test.
Function number 84	ResetTest	Finish the ADC test.
Function number 85	ResetPwf	Reset the **PowerFail** bit (function number 1; the bit was set after "power on").
Function number 86	SetFixTare	Taring with weight in numerical address D31 "FixTare".
Function number 87	GetFixTare	The current gross weight is copied to the numerical address D31.
Function number 88	SetPrint	Start printing.
Function number 89	ResetError	The **CmdError** error bit is reset.
Function number 90		Reserved for internal use.
Function number 91		Reserved for internal use.
Function number 92		Reserved for internal use.

9.2.5.13 Function number 112–124: transition-controlled action bits (write)

For setting bits, see Chapter Writing bits .
As soon as the bit has been set, it is reset internally and the process is carried out; this process is transition-controlled (for one write operation).
The bit is set as **Write_Value_Select** with the specified number (see Chapter Writing bits).

Function number 112	SetZero
Function number 113	SetTare
Function number 114	ResetTare
Function number 115	SetTest
Function number 116	ResetTest
Function number 117	ResetPwf
Function number 118	SetFixTare (function number 86, see Chapter Function number 80–92: state-controlled action bits (write)).
Function number 119	GetFixTare (function number 87, see Chapter Function number 80–92: state-controlled action bits (write)).
Function number 120	SetPrint
Function number 121	ResetError
Function number 122	Reserved for internal use.
Function number 123	GetDate
Function number 124	SetDate

> **Note:** To prevent frequent writing to the EAROM, the write interval should be no shorter than 15 seconds.

9.2.6 Example: reading the gross weight

Input range (MOSI)

Byte	Value	Description
0		
1		
2		
3		
4	08	Read the gross weight (for function number 8, see Chapter Function number 8–22: weight data (read))
5		
6		
7		

Output range (MISO)

Byte	Value								Description
0	00								Gross weight – byte 0 (MSB)
1	00								Gross weight – byte 1
2	04								Gross weight – byte 2
3	D2								Gross weight – byte 3 (LSB)
4	08								Gross weight request detected.
5									In direct access, status bits are independent of the write or read request.
6								Test Active	
7		Standstill	Inside ZSR	Center Zero	Below Zero	Overload	Above Max	ADC Error	
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	

The gross value (hex:000004D2 <=> 1234) can be read from bytes 0–3.
Negative values are output in the second complement.

9.2.7 Special note for DeviceNet and EtherNet/IP

With these fieldbus types, the sequence of the bytes (only applicable for words and individual bytes) is inverted.
With long words, this problem does not arise due to compensation by the firmware.
Sequence of data bytes 0–3:

Standard sequence		**Sequence for DeviceNet and EtherNet/IP**	
Byte 0	Read data 0 (MSB)	Byte 0	Read data 3 (LSB)
Byte 1	Read data 1	Byte 1	Read data 2
Byte 2	Read data 2	Byte 2	Read data 1
Byte 3	Read data 3 (LSB)	Byte3	Read data 0 (MSB)

Consequently, the sequence on the PLC side must be changed when using the "DeviceNet" and "EtherNet/IP" fieldbus types.

10 SPM

10.1 General notes

The memory accessible to the user is the SPM (Scratch Pad Memory). This memory is used to store lots of internal data from which weights, statuses and reports can be read and control data can be written.
The SPM table can be accessed via ModBus communication and fieldbus with SPM interface.
In addition, individual bits are copied back and forth between digital inputs and outputs and the SPM via the I/O configuration.

10.2 Elementary data types

The elementary data types are characterized by their bit width and possible value range.

Data type	Description	Value range
BOOL	bool	0 (FALSE) or 1 (TRUE)
SINT	short integer	-128 to 127
INT	integer	-32768 to 32767
DINT	double integer	-2^{31} to $2^{31}-1$
LINT	long integer	-2^{63} to $2^{63}-1$
UINT	unsigned short integer	0 to 255
UINT	unsigned integer	0 to 65535
UDINT	unsigned double integer	0 to $2^{32}-1$
ULINT	unsigned long integer	0 to $2^{64}-1$
REAL	real number	±1.18E-38 to 3.4E38 (with approx. 7 significant digits)
LREAL	long real number	±1.18E-308 to 3.4E308 (with approx. 16 significant digits)
TIME	time duration	1 ms to $\pm 2^{47}$ ms
DATE	date (only)	1.1.1900 to 31.12.2099
TIME_OF_DAY	time of day (only)	00:00:00.00 to 23:59:59.99

Data type	Description	Value range
DATE_AND_TIME	date and time of day	see DATE and TIME_OF_DAY
STRING	variable-long character string	max. 255 characters (ISO)
WSTRING	variable-long wide character string	max. 255 characters (Unicode)
BYTE	bit-sequence 8	...
WORD	bit-sequence 16	...
DWORD	bit-sequence 32	...
LWORD	bit-sequence 64	...

10.3 Addressing

The SPM table can be addressed via different counts. Bit addressing is used to count the individual bits (MX). Byte addressing is used to count individual bytes (MB), whereby, e.g. bits MX0–MX7 are identical to byte MB0.

Code	Data type	Address example
%ML	LWORD	L21
%MD	DINT	D42–43
%MW	WORD	W84–87
%MB	BYTE	B168–175
%MX	BOOL (bit)	X1344–1407

10.4 System data

SPM address	Data type	R/W	Function
X0–X2	BOOL	R	Digital input 1–3
X8–10	BOOL	R	Digital output 1–3
X16–18	BOOL	R	Output limit 1 1–3
B4	**BYTE**	R	**Indicator status**
X32	BOOL	R	ADC error
X33	BOOL	R	>Max (max. capacity; FSD = Full Scale Deflection)
X34	BOOL	R	>Max + permitted range (OVL)
X35	BOOL	R	<Zero
X36	BOOL	R	Zero ±¼ d
X37	BOOL	R	Within the zeroset range (ZSR)
X38	BOOL	R	The weight is stable
X39	BOOL	R	Weight <Zero or >Max (max. capacity; FSD = Full Scale Deflection)
B5	**BYTE**	R	**ADC status**
X40	BOOL	R	Measuring signal negative (Error 7)
X41	BOOL	R	Measuring signal >36 mV (Error 3)
X42	BOOL	R	Internal arithmetic error; CAL data are perhaps faulty (Error 1)
X43	BOOL	R	No or too low sense voltage (Error 6)
B6	**BYTE**	R	**Command status**
X48	BOOL	R	Command error
X49	BOOL	R	Command active
X50	BOOL	R	Network failure signal
B7	**BYTE**	R	**Active status**
X56	BOOL	R	Test mode active
X57	BOOL	R	Calibration active
X58	BOOL	R	Device is tared

SPM address	Data type	R/W	Function
X64	BOOL	R/W	Read/write marker bit 1
X65	BOOL	R/W	Read/write marker bit 2
X66	BOOL	R/W	Read/write marker bit 3
X72	BOOL	R/W	Switch D11 to net weight.
X112	BOOL	W	Zero device.
X113	BOOL	W	Tare device
X114	BOOL	W	Reset the tare of the device
X115	BOOL	W	Start the test mode
X116	BOOL	W	Finish the test mode
X117	BOOL	W	Reset the power fail signal
X118	BOOL	W	Set fixed tare weight D31 as tare
X119	BOOL	W	Store the current gross weight in the preset tare memory (D31)
X120	BOOL	W	Start printing
X121	BOOL	W	Reset error B19 = 0.
B16	SINT	R	Exponent Number of decimal places Example: 1.23 is displayed Exponent: 2
B17	SINT	R	Weight unit 2 = g, 3 = kg, 4 = t, 5 = lb
B18	SINT	R	Verification scale interval (for multi-interval/multi-range = d1 or e1)
B19	BYTE	R	Last weighing point error, see Chapter Error numbers @ "LAST_ERROR".
B20	BYTE	R	Higher byte of product code (0x52)
B21	BYTE	R	Lower byte of product code (0x15)
B22	BYTE	R	Major part of version number (1.0)
B23	BYTE	R	Minor part of version number (1.0)

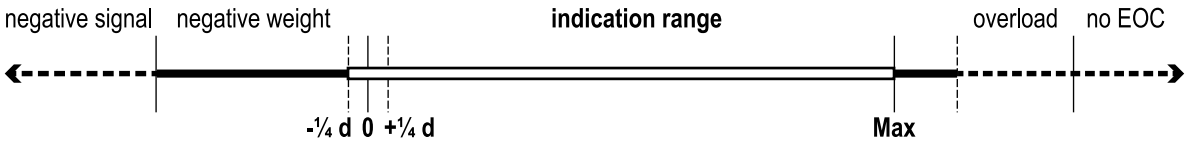
SPM address	Data type	R/W	Function
D6	UDINT	R	Serial number (board number)
W14	INT	R	Counter will be increased for every measured value.
D8	DINT	R	Current gross weight
D9	DINT	R	Current net weight
D10	DINT	R	Current tare weight
D11	DINT	R	Current gross/net weight selected with X72
D14	DINT	R	Max. weight (max. capacity; FSD = Full Scale Deflection)
D15	DINT	R	Min. weight for printing
D16	DINT	R	Last printed gross weight
D17	DINT	R	Last printed net weight
D18	DINT	R	Last printed tare weight
D19	UDINT	R	Last printed sequence number
D21	DWORD	R/W	Date for last print as BCD
D22	DWORD	R/W	Time for last print as BCD
D23	DINT	W	Activity counter, test of communication with device
D24	DINT	W	Limit 1 on
D25	DINT	W	Limit 1 off
D26	DINT	W	Limit 2 on
D27	DINT	W	Limit 2 off
D28	DINT	W	Limit 3 on
D29	DINT	W	Limit 3 off
D30	UDINT	W	Analog output for "transparent" mode
D31	DINT	W	Write value to fixed tare memory (X118, X119)

11 Error messages

11.1 Error messages measuring circuit

The internal weighing electronics can generate error messages, which are shown on the display.

Display	Error	Possible cause
`Error 1`	Internal arithmetic overflow	Faulty calibration values.
`Error 2`	The measuring signal is higher than Max + (x d) (Overload)	– Wrong setting. – Too much weight on the scale.
`Error 3`	Measuring input open	– The measuring signal is higher than the permissible range of 36 mV. – Measuring cable is interrupted (cable break detection). – Other hardware defect.
`Error 4`	Value exceeds display	The weight value is not displayed: – Too many digits have been set.
`Error 6`	No sense voltage	– Load cells not connected. – Sense line or supply line is interrupted. – Wrong polarity or sense voltage is low.
`Error 7`	Negative measuring signal	– Wrong polarity of load cell signal. – Wrong polarity of load cell supply voltage.
`Error 9`	The measuring signal is higher than the permissible range of 36 mV. Cannot read weight values from ADC (analog-digital converter).	Internal weighing point: – Error in weighing electronics board. – Defective load cell. – Cable break.



11.2 General error messages

Display	Error and Possible Cause
Err 10	Test is active, no gross weight.
Err 11	No weight value (e.g. wrong string input).
Err 12	Weighingpoint is not started/in standby.
Err 14	Weighingpoint is busy for a time, dont show error message.
Err 15	Device with wrong serialnumber.
Err 33	Wrong parameter
Err 41	Major system error
Err 42	Major system error in controls.
Err 43	Monitoring time has expired.
Err 44	Cannot save to EAROM.
Err 45	Cannot load from EAROM.
Err 53	The selected interface is in use.
Err 61	CAL switch is closed.
Err 62	Calibration cannot be started.
Err 63	The weighing point parameters could not be saved.
Err 64	The default SPAN could not be set.
Err 66	Weighing point is in use.
Err 67	Weighing point is not tared.
Err 68	No mechanical stability of the scale.
Err 69	Weighing point is not in use.
Err 70	Tare is active.

Display	Error and Possible Cause
`Err 71`	A weight error occurs during calibration via the front panel if the connection to the weighing point is interrupted.
`Err 73`	Dead load <-0.1 mV/V
`Err 74`	Arithmetic overflow
`Err 75`	Current weight < dead load
`Err 76`	Value for "d" is too high.
`Err 77`	Value for "d" is too low.
`Err 78`	Max < calibration weight.
`Err 79`	The weight cannot be displayed with the desired unit.
`Err 80`	Dead load + Max is too high.
`Err 81`	Max and scale interval do not match (1, 2, 5 10, 20, or 50).
`Err 82`	Not sufficient µV/d for W&M (legal-for-trade).
`Err 83`	Digital filter: Measurement time >160 ms.
`Err 84`	Filter frequency: Measurement time <40 ms/F_{cut}.
`Err 85`	Filter frequency F_{cut} is >40.00 Hz
`Err 90`	No printer interface assigned.

11.3 Error numbers @ "LAST_ERROR"

11.3.1 Weighing point errors

Number	Display	Cause
6	test active	Test is active, no weights.
7	cal active	Adjustment is active, no weights.
8	no standstill	No standstill of the scale.
13	tare is active	Tare is active.
16	weight has error	Weight error.
17	scale not ready	Scale is not ready.
18	cannot tare below zero	Taring below zero is not possible.
142	cal active	During adjustment, taring and zeroing is not possible.
147	no zeroset	Zeroset outside of the zero setting range is not possible.
149	busy	The scale is currently busy with another query.
255	hardware error	Weighing point is faulty.

12 Maintenance/repairs/cleaning

12.1 Maintenance

The device must be serviced and inspected on a regular basis by qualified service personnel authorized by Minebea Intec.

12.2 Repairs

Maintenance work may only be carried out by qualified service personnel authorized by Minebea Intec,

- who have access to the necessary maintenance documents and instructions and
- who have attended appropriate training sessions.

Note: The seals placed on the device indicate that the device may only be opened and serviced by qualified service personnel authorized by Minebea Intec to ensure trouble-free and safe operation of the device, and to ensure that the warranty remains valid.

⚠ WARNING

Improper repairs can pose considerable risks to the user.

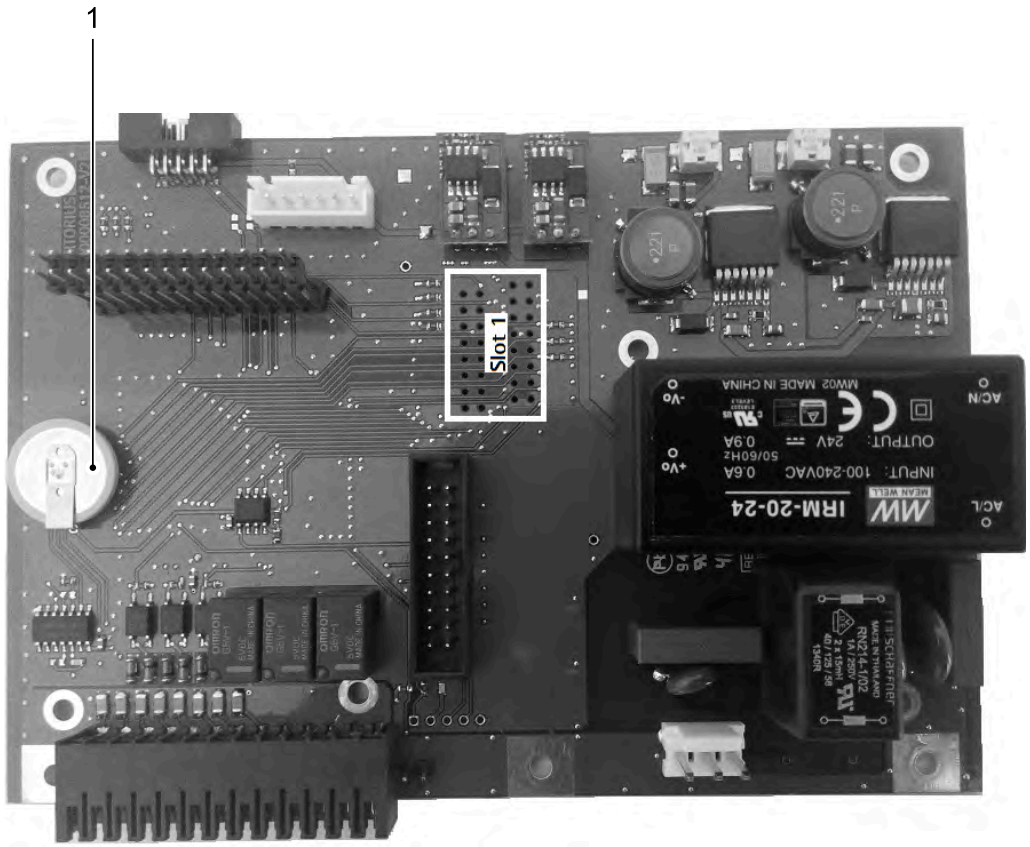
- ▶ Immediately disconnect a defective device from the power supply (disconnect the power plug from the electrical outlet).
- ▶ Repairs should only be performed by qualified service personnel authorized by Minebea Intec using original spare parts.
- ▶ Defective or damaged cables or screw connections must be replaced as a complete unit.

⚠ WARNING

Working on a device that is switched on can have life-threatening consequences

- ▶ Do not open the analysis device while under power.
- ▶ Do not open the analysis device for cleaning.
- ▶ Wait at least 10 seconds after disconnecting from the power supply before opening.
- ▶ The analysis device must be properly opened and closed because the fitting surfaces on the housing parts influence the IP protection.

12.2.1 Battery for date/time



The device contains a lithium battery (1) for buffering the date/time chip. This is located on the main board.
Set the date and time after first turning on the device, see Chapter Date & time.

The battery is activated when the date and time are set.

12.2.2 Replacing the battery for date/time

If the voltage drops below the specified minimum, or in case of defect, the battery must be replaced by qualified service personnel authorized by Minebea Intec.
Disposal, see Chapter Disposal.
Service life, see Chapter Date/time buffer.

12.3 Solder work

Soldering work on the device is neither required nor permitted.

12.4 Cleaning

12.4.1 Instructions for cleaning

The device must be cleaned of contaminants on a regular basis.

⚠ WARNING

Working on a device that is switched on can have life-threatening consequences.

- Disconnect the device from the power supply before cleaning (disconnect the power plug from the electrical outlet).
- Do not open the device.

NOTICE

Property damage caused by unsuitable cleaning utensils/products.

Damage to the device.

- Prevent moisture from penetrating the interior.
- Do not use aggressive cleaning agents (solvents or similar agents).
- For use in the food industry, use a cleaning agent suitable for that particular working environment.
- Use soft sponges, brushes and cloths.
- Spraying with water or blowing off with compressed air is not permissible.

1. Unplug device from mains supply, disconnect any data cables.
2. Clean the device with a cloth lightly moistened with a soap solution.
3. Wipe down the device with a soft, dry cloth after cleaning.

13 Safety inspection

Safe operation of the scale (weighing platform/weighing facility + weighing indicator) is no longer ensured,

- if there is visible damage to the connection cable.
- if the weighing platform/weighing facility and weighing indicator no longer work.
- after prolonged storage under unfavorable conditions.
- after heavy transport stresses.

▶ Immediately disconnect the defective weighing platform/weighing facility and weighing indicator from the power supply (pull the power plug out of the socket) and secure them against further use.

▶ Contact Minebea Intec customer service.

14 Disposal

Our products and their packaging should not be disposed of in municipal waste (e.g. garbage can for recyclable packaging, garbage can for paper packaging, etc.). They can either be recycled by the customer themselves, providing this complies with requirements set out by electrical or electronic waste or packaging waste laws, or sent back to Minebea Intec at a charge.

This option of returning the product is intended to provide proper recycling or reuse in a manner that is collected separately from municipal waste.

Before disposing of or scrapping the old products, any single-use or rechargeable batteries should be removed and taken to a suitable collection point. The type of battery used is specified in the technical data.

Please see our General Terms and Conditions for further information.

Service addresses for repair acceptance and collection points can be found on the product information enclosed with the product as well as on our website (www.minebea-intec.com).

Should you have any further questions, please contact your local service representative or our service center.

Minebea Intec GmbH
Repair center
Meiendorfer Strasse 205 A
22145 Hamburg, Germany
Phone: +49.40.67960.333
service.HH@minebea-intec.com

We reserve the right not to accept products that are contaminated with hazardous substances (ABC contamination).

15 Specification

15.1 Equipment supplied

Ser. no.	Name
1	Process Indicator
2	Safety instructions 9499 059 40001

15.2 General technical data

The following characteristics are valid after a warm-up time of at least 60 minutes (reference temperature 23 °C).

15.2.1 Date/time buffer

The lithium battery as a buffer for the date/time chip and as a buffer for the supply voltage so the device can be switched on again.

Lifespan	Device continuously connected to mains voltage	up to 10 years
	Device not connected to mains voltage for some time (e.g. in storage)	up to 7 years

15.2.2 Display

Type	Size	Display
Color display	120×37 mm	7-segment

15.2.3 Supply voltage connection version 230 V AC

Panel indicator

Supply voltage	U_{AC} = 100...240 V	+10%/-15%, 50/60 Hz
Max. power consumption	8 W/16 VA	
Primary fuse	T1AL/250 V, 5×20 mm	
Overload category	2	
Pollution level	2	

Table-top indicator

Supply voltage	U_{AC} = 100...240 V	+10%/-15%, 50/60 Hz
Max. power consumption	8 W/16 VA	
Primary fuse	T1AL/250 V, TR5	
Overload category	2	
Pollution level	2	

15.2.4 Supply voltage connection version 24 V DC

Panel indicator

Supply voltage	U_{DC} = 24 V	±20 %
Max. power consumption	8 W	
Primary fuse	T1AL/250 V, 5×20 mm	
Overload category	1	
Pollution level	2	

Table-top indicator

Supply voltage	U_{DC} = 24 V	±20 %
Max. power consumption	8 W	
Primary fuse	T1AL/250 V, TR5	
Overload category	1	
Pollution level	2	

15.3 Effect of ambient conditions

15.3.1 Ambient conditions

Temperature range	
Ambient temperature for operation	Panel indicator: -25...+50 °C Table-top indicator: -25...+40 °C
Power-on temperature	0...+40 °C
Limits for storage/transport	-20...+70 °C
Humidity	<90 %, non-condensing (acc. to IEC 60068-2)
Protection class	
Panel indicator	Front + housing IP64, rear panel IP30
Table-top indicator	IP65
Height	<2000 m
Vibrations	The device should not be exposed to strong vibrations.

15.3.2 Electromagnetic Compatibility (EMC)

All data in compliance with EN 61326 industrial section

Housing	High frequency electromagnetic fields (80...2000 MHz)	EN 61000-4-3	10 V/m
	Electrostatic discharge (ESD)	EN 61000-4-2	4/8 kV
Signal and control lines	Fast transients (burst)	EN 61000-4-4	1 kV
	Peak voltages (surge) 1.2/50 µs	EN 61000-4-5	1/2 kV
	Conducted disturbances by high frequency coupling (0.15... 80 MHz)	EN 61000-4-6	10 V
Mains inputs	Fast transients (burst)	EN 61000-4-4	2 kV
	Peak voltages (surge) 1.2/50 µs	EN 61000-4-5	1/2 kV
	Conducted disturbances by high frequency coupling (0.15... 80 MHz)	EN 61000-4-6	10 V
	Voltage dips	EN 61000-4-11	40% / 0%
	Mains failure link	EN 61000-4-11	20 ms

15.3.3 RF interference suppression

Electromagnetic emission		pursuant to EN 61326, Limit class A, for industrial areas

15.4 Weighing electronics data

15.4.1 Load cells

Load cell type	Strain gauge load cells	6 or 4-wire connection possible.
Supply voltage	U_{DC} = 12 V	– for I_{max} = 160 mA – for max. 8 load cells, each with 650 Ω – 4 load cells, each with 350 Ω
Sense voltage monitoring		Sense voltage below U_{DC} = +4...-4 V will be detected.
Max. load	≥75 Ω	

15.4.2 Principle

Principle	Direct current, Delta-Sigma converter, ratiometric to supply voltage
Conversion time/ measurement time	5, 10, 20, 40, 80, 160, 320, 640, 960, 1200, 1600 ms
Digital filter	Can be activated, active 4th order (low-pass) characteristics: Bessel, aperiodic, Butterworth, Tschebyscheff
Cut-off frequency	adjustable

15.4.3 Accuracy and stability

Accuracy*	≤6,000 d, acc. to OIML R76 Class III
Min. measuring signal *	≥0.1 mV/V = 1.2 mV corr. to 0.2 µV/d für 6,000 d
Linearity*	<0,003 %
Zero point stability error (TK_0)*	<0.05 µV/K RTI ≤0.004 %/10 K @ 1 mV/V
SPAN stability error (TK_{span})*	< ±2.5 ppm/K

* at a measurement time of 160 ms.

15.4.4 Sensitivity

Sensitivity	0.2 µV/d @ 6,000 d (Kl. III) OIML R76
Max. resolution	7.5 million internal counts at 3 mV/V, not verifiable
Measurement input (measuring signal + dead load)	U_{DC} = 0...max. 36 mV, symmetrical to zero
Dead load suppression	max. measuring signal of U_{DC} = 36 mV (dead load + range); entry/calibration via software

15.4.5 Connecting cables

Connection	PR no./cable type	Length
between junction box and device	PR 6135, PR 6135A	max. 500 m – length of the load cell cable

15.5 Mechanics

15.5.1 Housing

Panel housing

Material	Housing Lid Rear panel	Aliminum Steel Steel
Dimensions		See Chapter Housing
Weight	Net weight Shipping weight	1.15 kg 2.00 kg

Table-top housing

Material	Housing Top section Bottom section	Stainless steel Stainless steel Stainless steel
Dimensions		See Chapter Housing
Weight	Net weight Shipping weight	2.8 kg 3.2 kg

16 Appendix

16.1 Order information

16.1.1 Ordering numbers

Panel devices

Model	Order no.	Description
PR 5310/00	9405 1 5310 00 1	Basic, 230 V AC
PR 5310/01	9405 1 5310 01 1	Basic, 24 V DC
PR 5310/20	9405 1 5310 20 1	Basic, analog output, 230 V AC
PR 5310/21	9405 1 5310 21 1	Basic, analog output, 24 V DC
PR 5310/23	9405 1 5310 23 1	Basic, Profibus-DP & analog output, 230 V AC
PR 5310/24	9405 1 5310 24 1	Basic, Profibus-DP & analog output, 24 V DC
PR 5310/40	9405 1 5310 40 1	Basic, Profibus-DP, 230 V AC
PR 5310/41	9405 1 5310 41 1	Basic, Profibus-DP, 24 V DC
PR 5310/60	9405 1 5310 60 1	Basic, DeviceNet, 230 V AC
PR 5310/61	9405 1 5310 61 1	Basic, DeviceNet, 24 V DC
PR 5310/80	9405 1 5310 80 1	Basic, EtherNet/IP, 230 V AC
PR 5310/81	9405 1 5310 81 1	Basic, EtherNet/IP, 24 V DC
PR 5310/83	9405 1 5310 83 1	Basic, ProfiNet I/O, 230 V AC
PR 5310/84	9405 1 5310 84 1	Basic, ProfiNet I/O, 24 V DC

Table-top devices

Model	Order no.	Description
PR 5310/10	9405 1 5310 10 1	Basic, 230 V AC
PR 5310/11	9405 1 5310 11 1	Basic, 24 V DC
PR 5310/30	9405 1 5310 30 1	Basic, analog output, 230 V AC
PR 5310/31	9405 1 5310 31 1	Basic, analog output, 24 V DC
PR 5310/33	9405 1 5310 33 1	Basic, Profibus-DP & analog output, 230 V AC
PR 5310/34	9405 1 5310 34 1	Basic, Profibus-DP & analog output 24 V DC
PR 5310/50	9405 1 5310 50 1	Basic, Profibus-DP, 230 V AC
PR 5310/51	9405 1 5310 51 1	Basic, Profibus-DP, 24 V DC
PR 5310/70	9405 1 5310 70 1	Basic, DeviceNet, 230 V AC
PR 5310/71	9405 1 5310 71 1	Basic, DeviceNet, 24 V DC
PR 5310/90	9405 1 5310 90 1	Basic, EtherNet/IP, 230 V AC
PR 5310/91	9405 1 5310 91 1	Basic, EtherNet/IP, 24 V DC
PR 5310/93	9405 1 5310 93 1	Basic, ProfiNet I/O, 230 V AC
PR 5310/94	9405 1 5310 94 1	Basic, ProfiNet I/O, 24 V DC

Accessories for table-top devices

Model	Order no.	Description
PR 5310/99	9405 3 5310 99 1	Wall mounting accessory

16.1.2 Order numbers, for India only

Panel devices

Model	Order no.	Description
PR 5310/00	9407 1 5310 00 1	Basic, 230 V AC
PR 5310/01	9407 1 5310 01 1	Basic, 24 V DC
PR 5310/20	9407 1 5310 20 1	Basic, analog output, 230 V AC
PR 5310/21	9407 1 5310 21 1	Basic, analog output, 24 V DC
PR 5310/23	9407 1 5310 23 1	Basic, Profibus-DP & analog output, 230 V AC
PR 5310/24	9407 1 5310 24 1	Basic, Profibus-DP & analog output, 24 V DC
PR 5310/40	9407 1 5310 40 1	Basic, Profibus-DP, 230 V AC
PR 5310/41	9407 1 5310 41 1	Basic, Profibus-DP, 24 V DC
PR 5310/60	9407 1 5310 60 1	Basic, DeviceNet, 230 V AC
PR 5310/61	9407 1 5310 61 1	Basic, DeviceNet, 24 V DC
PR 5310/80	9407 1 5310 80 1	Basic, EtherNet/IP, 230 V AC
PR 5310/81	9407 1 5310 81 1	Basic, EtherNet/IP, 24 V DC
PR 5310/83	9407 1 5310 83 1	Basic, ProfiNet I/O, 230 V AC
PR 5310/84	9407 1 5310 84 1	Basic, ProfiNet I/O, 24 V DC

Table-top devices

Model	Order no.	Description
PR 5310/10	9407 1 5310 10 1	Basic, 230 V AC
PR 5310/11	9407 1 5310 11 1	Basic, 24 V DC
PR 5310/30	9407 1 5310 30 1	Basic, analog output, 230 V AC
PR 5310/31	9407 1 5310 31 1	Basic, analog output, 24 V DC
PR 5310/33	9407 1 5310 33 1	Basic, Profibus-DP & analog output, 230 V AC
PR 5310/34	9407 1 5310 34 1	Basic, Profibus-DP & analog output 24 V DC
PR 5310/50	9407 1 5310 50 1	Basic, Profibus-DP, 230 V AC
PR 5310/51	9407 1 5310 51 1	Basic, Profibus-DP, 24 V DC
PR 5310/70	9407 1 5310 70 1	Basic, DeviceNet, 230 V AC
PR 5310/71	9407 1 5310 71 1	Basic, DeviceNet, 24 V DC
PR 5310/90	9407 1 5310 90 1	Basic, EtherNet/IP, 230 V AC
PR 5310/91	9407 1 5310 91 1	Basic, EtherNet/IP, 24 V DC
PR 5310/93	9407 1 5310 93 1	Basic, ProfiNet I/O, 230 V AC
PR 5310/94	9407 1 5310 94 1	Basic, ProfiNet I/O, 24 V DC

Ex devices

Model	Order no.	Description
PR 5310/12	9407 1 5310 12 1	Basic, 24 V DC, table-top device, Zone 2/22
PR 5310/32	9407 1 5310 32 1	Basic, analog output, 24 V DC
PR 5310/35	9407 1 5310 35 1	Basic, Profibus-DP & analog output 24 V DC, table-top device, Zone 2/22
PR 5310/52	9407 1 5310 52 1	Basic, Profibus-DP, 24 V DC, table-top device, Zone 2/22
PR 5310/72	9407 1 5310 72 1	Basic, DeviceNet, 24 V DC, table-top device, Zone 2/22
PR 5310/92	9407 1 5310 92 1	Basic, EtherNet/IP, 24 V DC, table-top device, Zone 2/22
PR 5310/95	9407 1 5310 95 1	Basic, ProfiNet I/O, 24 V DC, table-top device, Zone 2/22

16.1.3 Order numbers, for China only

Panel devices

Model	Order no.	Description
PR 5310/00	9407 1 5310 00 2	Basic, 230 V AC
PR 5310/01	9407 1 5310 01 2	Basic, 24 V DC
PR 5310/20	9407 1 5310 20 2	Basic, analog output, 230 V AC
PR 5310/21	9407 1 5310 21 2	Basic, analog output, 24 V DC
PR 5310/23	9407 1 5310 23 2	Basic, Profibus-DP & analog output, 230 V AC
PR 5310/24	9407 1 5310 24 2	Basic, Profibus-DP & analog output, 24 V DC
PR 5310/40	9407 1 5310 40 2	Basic, Profibus-DP, 230 V AC
PR 5310/41	9407 1 5310 41 2	Basic, Profibus-DP, 24 V DC
PR 5310/60	9407 1 5310 60 2	Basic, DeviceNet, 230 V AC
PR 5310/61	9407 1 5310 61 2	Basic, DeviceNet, 24 V DC
PR 5310/80	9407 1 5310 80 2	Basic, EtherNet/IP, 230 V AC
PR 5310/81	9407 1 5310 81 2	Basic, EtherNet/IP, 24 V DC
PR 5310/83	9407 1 5310 83 2	Basic, ProfiNet I/O, 230 V AC
PR 5310/84	9407 1 5310 84 2	Basic, ProfiNet I/O, 24 V DC

Table-top devices

Model	Order no.	Description
PR 5310/10	9407 1 5310 10 2	Basic, 230 V AC
PR 5310/11	9407 1 5310 11 2	Basic, 24 V DC
PR 5310/30	9407 1 5310 30 2	Basic, analog output, 230 V AC
PR 5310/31	9407 1 5310 31 2	Basic, analog output, 24 V DC
PR 5310/33	9407 1 5310 33 2	Basic, Profibus-DP & analog output, 230 V AC
PR 5310/34	9407 1 5310 34 2	Basic, Profibus-DP & analog output 24 V DC
PR 5310/50	9407 1 5310 50 2	Basic, Profibus-DP, 230 V AC
PR 5310/51	9407 1 5310 51 2	Basic, Profibus-DP, 24 V DC
PR 5310/70	9407 1 5310 70 2	Basic, DeviceNet, 230 V AC
PR 5310/71	9407 1 5310 71 2	Basic, DeviceNet, 24 V DC
PR 5310/90	9407 1 5310 90 2	Basic, EtherNet/IP, 230 V AC
PR 5310/91	9407 1 5310 91 2	Basic, EtherNet/IP, 24 V DC
PR 5310/93	9407 1 5310 93 2	Basic, ProfiNet I/O, 230 V AC
PR 5310/94	9407 1 5310 94 2	Basic, ProfiNet I/O, 24 V DC

Ex devices

Model	Order no.	Description
PR 5310/12	9407 1 5310 12 2	Basic, 24 V DC, table-top device, Zone 2/22
PR 5310/32	9407 1 5310 32 2	Basic, analog output, 24 V DC
PR 5310/35	9407 1 5310 35 2	Basic, Profibus-DP & analog output 24 V DC, table-top device, Zone 2/22
PR 5310/52	9407 1 5310 52 2	Basic, Profibus-DP, 24 V DC, table-top device, Zone 2/22
PR 5310/72	9407 1 5310 72 2	Basic, DeviceNet, 24 V DC, table-top device, Zone 2/22
PR 5310/92	9407 1 5310 92 2	Basic, EtherNet/IP, 24 V DC, table-top device, Zone 2/22
PR 5310/95	9407 1 5310 95 2	Basic, ProfiNet I/O, 24 V DC, table-top device, Zone 2/22

16.2 Certificates

Ser. no.	Name	Document no.
1	EU-Declaration of Conformity	MEU23007

EU-Declaration of Conformity

(in accordance with ISO/IEC 17050-1)

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Minebea intec
The true measure

1. Product model / product number / solely valid for project number:
   X2 Process Indicator / PR 5310 / ----

2. Name and address of the manufacturer (2.1) and his authorized representative (2.2):
   2.1 **Minebea Intec GmbH, Meiendorfer Straße 205 A, 22145 Hamburg, Germany**
   2.2 **/**

3. This declaration of conformity is issued under the sole responsibility of the manufacturer.

4. Object(s) of the declaration:
   4.1 **PR 5310/[01,11,21,24,31,34,41,51,61,71,81,84,91,94]**
   4.2 **PR 5310/[00,10,20,23,30,33,40,50,60,70,80,83,90,93]**

5. The object(s) of the declaration described above is in conformity with the relevant Union harmonization legislation:

		(4.1)	(4.2)
5.1	**2014/30/EU**	**(6.1)**	**(6.1)**
5.2	**2014/35/EU**		**(6.2)**
5.3	**2011/65/EU**	**(6.3)**	**(6.3)**

6. References to the relevant harmonized standards used or references to the other technical specifications in relation to which conformity is declared:

6.1	**2014/30/EU**	**EN 61326-1:2013**
6.2	**2014/35/EU**	**EN 61010-1:2010**
6.3	**2011/65/EU**	**EN IEC 63000:2018**

Minebea Intec GmbH
Hamburg, 11. Dec. 2023

Dr. Karl Sommer	p.p.a Dr. Axel Böttger	i.A. Oliver Freitag
COO	CTO	CE Certification

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български (bg)	čeština (cs)	dansk (da)
Декларация за съответствие 1. Модел на продукта / Номер на продукта / валидно само за номера на проекта: 2. Наименование и адрес на производителя (2.1) и на неговия упълномощен представител (2.2): 3. Настоящата декларация за съответствие е издадена на отговорността на производителя. 4. Предмет(и) на декларацията: 5. Предметът (ите) на декларацията, описан(и) по-горе отговаря(т) на съответното законодателство на Съюза за хармонизация: 6. Позоваване на използваните хармонизирани стандарти или позоваване на други технически спецификации, по отношение на които се декларира съответствие:	Prohlášení o shodě 1. Model výrobku / číslo výrobku / platné pouze pro číslo projektu: 2. Jméno a adresa výrobce (2.1) a jeho zplnomocněného zástupce (2.2): 3. Toto prohlášení o shodě se vydává na výhradní odpovědnost výrobce. 4. Předmět(y) prohlášení: 5. Výše popsaný předmět / Výše popsané předměty prohlášení je/jsou ve shodě s příslušnými harmonizačními právními předpisy Unie: 6. Odkazy na příslušné harmonizované normy, které byly použity, nebo na jiné technické specifikace, na jejichž základě se shoda prohlašuje:	Overensstemmelseserklæring 1. Produktmodel / produktnummer / gælder kun for projektnummer: 2. Fabrikantens (2.1) og dennes bemyndigede repræsentants (2.2) navn og adresse: 3. Denne overensstemmelseserklæring udstedes på fabrikantens ansvar. 4. Genstand(ene) for erklæringen: 5. Genstanden(e) for erklæringen, som beskrevet ovenfor, er i overensstemmelse med den relevante EU-harmoniseringslovgivning: 6. Referencer til de relevante anvendte harmoniserede standarder eller til de andre tekniske specifikationer, som der erklæres overensstemmelse med:

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Deutsch (de)	Ελληνικά (el)	español (es)
Konformitätserklärung 1. Produktmodell / Produktnummer / gilt ausschließlich für Projekt-Nr.: 2. Name und Anschrift des Herstellers (2.1) und seines Bevollmächtigten (2.2): 3. Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller. 4. Gegenstände der Erklärung: 5. Die oben beschriebenen Gegenstände der Erklärung erfüllen die einschlägigen Harmonisierungsrechtsvorschriften der Union: 6. Angabe der einschlägigen harmonisierten Normen oder der anderen technischen Spezifikationen, die der Konformitätserklärung zugrunde gelegt wurden:	Δήλωση συμμόρφωσης 1. Μοντέλο προϊόντος / αριθμός προϊόντος / ισχύει μόνο για τον αριθμό του έργου:: 2. Όνομα και διεύθυνση του κατασκευαστή (2.1) και του εξουσιοδοτημένου αντιπροσώπου του (2.2): 3. Η παρούσα δήλωση συμμόρφωσης εκδίδεται με αποκλειστική ευθύνη του κατασκευαστή. 4. Στόχος της δήλωσης: 5. Ο στόχος της δήλωσης που περιγράφεται παραπάνω είναι σύμφωνος με τη σχετική ενωσιακή νομοθεσία εναρμόνισης: 6. Παραπομπές στα σχετικά εναρμονισμένα πρότυπα που χρησιμοποιήθηκαν ή παραπομπές στις λοιπές τεχνικές προδιαγραφές σε σχέση με τις οποίες δηλώνεται η συμμόρφωση:	Declaración de conformidad 1. Modelo de producto/número de producto / únicamente válido para el número de proyecto: 2. Nombre y dirección del fabricante (2.1) y de su representante autorizado (2.2): 3. La presente declaración de conformidad se expide bajo la exclusiva responsabilidad del fabricante. 4. Objeto(s) de la declaración: 5. El/Los objeto(s) de la declaración descritos anteriormente son conformes con la legislación de armonización pertinente de la Unión Europea: 6. Referencias a las normas armonizadas pertinentes utilizadas o referencias a las otras especificaciones técnicas respecto a las cuales se declara la conformidad:

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eesti keel (et)	français (fr)	hrvatski (hr)
Vastavusdeklaratsioon 1. Tootemudel / tootenumber / kehtib vaid järgmise projekti puhul: 2. Tootja nimi ja aadress (2.1) ning tema volitatud esindaja (2.2): 3. Käesolev vastavusdeklaratsioon on välja antud tootja ainuvastutusel. 4. Deklareeritav toode: 5. Ülalkirjeldatud deklareeritav toode on kooskõlas asjaomaste liidu ühtlustamisaktidega: 6. Viited kasutatud harmoneeritud standarditele või viited muudele tehnilistele spetsifikatsioonidele, millele vastavust deklareeritakse:	Déclaration de conformité 1. Modèle / numéro de produit / valable uniquement pour le numéro de projet: 2. Nom et adresse du fabricant (2.1) et de son mandataire (2.2) : 3. La présente déclaration de conformité est établie sous la seule responsabilité du fabricant. 4. Objet(s) de la déclaration : 5. Le ou les objets de la déclaration décrite ci-dessus est/sont conforme(s) à la législation d'harmonisation de l'Union applicable : 6. Références des normes harmonisées pertinentes appliquées ou des autres spécifications techniques par rapport auxquelles la conformité est déclarée :	Izjava o sukladnosti 1. Model proizvoda / broj proizvoda / vrijedi samo za broj projekta: 2. Naziv i adresa proizvođača (2.1) i njegovog ovlaštenog zastupnika (2.2): 3. Za izdavanje ove izjave o sukladnosti odgovoran je isključivo proizvođač. 4. Predmet(i) izjave: 5. Predmet(i) navedene izjave je/su u skladu s mjerodavnim zakonodavstvom Unije o usklađivanju: 6. Pozivanja na relevantne primjenjene usklađene norme ili pozivanja na ostale tehničke specifikacije u vezi s kojima se izjavljuje sukladnost:

magyar (hu)	italiano (it)	Latvių kalba (lt)
Megfelelőségi nyilatkozat 1. Termékmodell / termékszám / kizárólag az alábbi projektszámhoz érvényes: 2. A gyártó (2.1) vagy adott esetben meghatalmazott képviselőjének (2.2) neve és címe: 3. Ezt a megfelelőségi nyilatkozatot a gyártó kizárólagos felelőssége mellett adják ki. 4. A nyilatkozat tárgya(i): 5. A fent ismertetett nyilatkozat tárgya megfelel a vonatkozó uniós harmonizációs jogszabályoknak: 6. Az alkalmazott harmonizált szabványokra való hivatkozás vagy az azokra az egyéb műszaki leírásokra való hivatkozás, amelyekkel kapcsolatban megfelelőségi nyilatkozatot tettek:	Dichiarazione di conformità 1. Modello di prodotto / numero di prodotto / valido unicamente per numero di progetto: 2. Nome e indirizzo del fabbricante (2.1) e del relativo rappresentante autorizzato (2.2): 3. La presente dichiarazione di conformità è rilasciata sotto la responsabilità esclusiva del fabbricante. 4. Oggetto/i della dichiarazione: 5. L'oggetto o gli oggetti della dichiarazione di cui sopra sono conformi alla pertinente normativa di armonizzazione dell'Unione: 6. Riferimento alle pertinenti norme armonizzate utilizzate o riferimenti alle altre specifiche tecniche in relazione alle quali è dichiarata la conformità:	Atitikties deklaracija 1. Gaminio modelis / gaminio numeris / galioja tik projekto numeriui: 2. Gamintojo (2.1) ir jo įgaliotojo atstovo (2.2) pavadinimas ir adresas: 3. Ši atitikties deklaracija išduota tik gamintojo atsakomybe. 4. Deklaracijos objektas (objektai): 5. Pirmiau aprašytas deklaracijos objektas (objektai) atitinka susijusius derinamuosius Sąjungos teisės aktus: 6. Susijusių taikytų darniųjų standartų nuorodos arba kitų techninių specifikacijų, pagal kurias buvo deklaruota atitiktis, nuorodos:

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The true measure

latviešu valoda (lv)	malti (mt)	nederlands (nl)
Atbilstības deklarācija 1. Produkta modelis / produkta numurs / derīgs tikai projektam Nr.: 2. Ražotāja (2.1.) un tā pilnvarotā pārstāvja (2.2.) nosaukums un adrese: 3. Šī atbilstības deklarācija ir izdota vienīgi uz ražotāja atbildību. 4. Deklarācijas priekšmets vai priekšmeti: 5. Iepriekš aprakstītais deklarācijas priekšmets vai priekšmeti atbilst attiecīgajam Savienības saskaņošanas tiesību aktam: 6. Atsauces uz attiecīgajiem izmantojamiem saskaņotajiem standartiem vai uz citām tehniskajām specifikācijām, attiecībā uz ko tiek deklarēta atbilstība:	Dikjarazzjoni ta' konformità 1. Mudell tal-prodott / numru tal-prodott / validu biss għan-numru tal-proġett: 2. L-isem u l-indirizz tal-manifattur (2.1) u tar-rappreżentant awtorizzat tiegħu (2.2): 3. Din id-dikjarazzjoni ta' konformità tinħareġ taħt ir-responsabbiltà unika tal-manifattur. 4. L-għan(ijiet) tad-dikjarazzjoni: 5. L-għan(ijiet) tad-dikjarazzjoni deskritt(i) hawn fuq huwa(huma) konformi mal-leġislazzjoni ta' armonizzazzjoni rilevanti tal-Unjoni: 6. Ir-referenzi għall-istandards armonizzati rilevanti li ntużaw, jew ir-referenzi għall-ispeċifikazzjonijiet tekniċi l-oħra li skonthom qed tiġi ddikjarata l-konformità:	Conformiteitsverklaring 1. Productmodel / productnummer / uitsluitend geldig voor projectnummer: 2. Naam en adres van de fabrikant (2.1) en zijn gemachtigde (2.2): 3. Deze conformiteitsverklaring wordt verstrekt onder volledige verantwoordelijkheid van de fabrikant. 4. Voorwerp(en) van de verklaring: 5. Het (de) hierboven beschreven voorwerp(en) is (zijn) in overeenstemming met de desbetreffende harmonisatiewetgeving van de Unie: 6. Vermelding van de toegepaste relevante geharmoniseerde normen of van de overige technische specificaties waarop de conformiteitsverklaring betrekking heeft:

polski (pl)	português (pt)	română (ro)
Deklaracja zgodności 1. Model produktu / numer produktu / ważny wyłącznie dla projektu o numerze: 2. Nazwa i adres producenta (2.1) oraz jego upoważnionego przedstawiciela (2.2): 3. Niniejsza deklaracja zgodności wydana zostaje na wyłączną odpowiedzialność producenta. 4. Przedmiot(-y) deklaracji: 5. Wymieniony powyżej przedmiot (lub przedmioty) niniejszej deklaracji jest zgodny z odnośnymi wymaganiami unijnego prawodawstwa harmonizacyjnego: 6. Odwołania do odnośnych norm zharmonizowanych, które zastosowano, lub do innych specyfikacji technicznych, w stosunku do których deklarowana jest zgodność:	Declaração de conformidade 1. Modelo do produto / número do produto / somente válido para o número de projeto: 2. Nome e endereço do fabricante (2.1) e do seu mandatário (2.2): 3. A presente declaração de conformidade é emitida sob a exclusiva responsabilidade do fabricante. 4. Objeto(s) da declaração: 5. O(s) objeto(s) da declaração acima descrito(s) está(ão) em conformidade com a legislação aplicável de harmonização da União: 6. Referências às normas harmonizadas aplicáveis utilizadas ou às outras especificações técnicas em relação às quais é declarada a conformidade:	Declarație de conformitate 1. Modelul de produs / Număr produs / valabil numai pentru numărul proiectului: 2. Denumirea și adresa producătorului (2.1) și a reprezentantului său autorizat (2.2): 3. Prezenta declarație de conformitate este emisă pe răspunderea exclusivă a producătorului. 4. Obiectul (obiectele) declarației: 5. Obiectul (obiectele) declarației descrise mai sus sunt în conformitate cu legislația relevantă de armonizare a Uniunii: 6. Trimiteri la standardele armonizate relevante folosite sau trimiteri la celelalte specificații tehnice în legătură cu care se declară conformitatea:

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Minebea intec
The true measure

slovenčina (sk)
Vyhlásenie o zhode 1. Model výrobku / číslo výrobku / platné len pre číslo projektu: 2. Meno/názov a adresa výrobcu (2.1) a jeho splnomocneného zástupcu (2.2): 3. Toto vyhlásenie o zhode sa vydáva na vlastnú zodpovednosť výrobcu. 4. Predmet(-y) vyhlásenia: 5. Uvedený predmet či uvedené predmety vyhlásenia sú v zhode s príslušnými harmonizačnými právnymi predpismi Únie: 6. Odkazy na príslušné použité harmonizované normy alebo odkazy na iné technické špecifikácie, v súvislosti s ktorými sa zhoda vyhlasuje:

slovenščina (sl)
Izjava o skladnosti 1. Model proizvoda / serijska številka proizvoda / veljavno samo za številko projekta: 2. Ime in naslov proizvajalca (2.1) ter njegovega pooblaščenega zastopnika (2.2): 3. Za izdajo te izjave o skladnosti je odgovoren izključno proizvajalec. 4. Predmet(i) izjave: 5. Predmet(i) navedene izjave je (so) v skladu z ustrezno zakonodajo Unije o harmonizaciji: 6. Sklicevanja na uporabljene ustrezne harmonizirane standarde ali sklicevanja na druge tehnične specifikacije v zvezi s skladnostjo, ki je navedena v izjavi:

suomi (fi)
Vaatimustenmukaisuusvakuutus 1. Tuotemalli / tuotenumero / koskee vain projektinumeroa: 2. Valmistajan (2.1) ja valtuutetun edustajan (2.2) nimi ja osoite: 3. Tämä vaatimustenmukaisuusvakuutus on annettu valmistajan yksinomaisella vastuulla. 4. Vakuutuksen kohde (kohteet): 5. Edellä kuvattu (kuvatut) vakuutuksen kohde (kohteet) on (ovat) asiaa koskevan unionin yhdenmukaistamislainsäädännön vaatimusten mukainen (mukaisia): 6. Viittaus niihin asiaa koskeviin yhdenmukaistettuihin standardeihin, joita on käytetty, tai viittaus muihin teknisiin eritelmiin, joiden perusteella vaatimustenmukaisuusvakuutus on annettu:

svenska (sv)
Försäkran om överensstämmelse 1. Produktmodell / produktnummer / gäller endast för projektnummer: 2. Tillverkarens namn och adress (2.1) och dess auktoriserade representant (2.2): 3. Denna försäkran om överensstämmelse utfärdas på tillverkarens eget ansvar. 4. Föremål för försäkran: 5. Föremålet/föremålen för försäkran ovan överensstämmer med den relevanta harmoniserade unionslagstiftningen: 6. Hänvisningar till de relevanta harmoniserade standarder som använts eller hänvisningar till de andra tekniska specifikationer enligt vilka överensstämmelsen försäkras:

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