Minebea intec
The true measure

Instrument Manual

X3 Process Indicator PR 5410

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Foreword

Must be followed!

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1 Introduction

1.1 Read the manual

- Please read this manual carefully and completely before using the product.
- This manual is part of the product. Keep it in a safe and easily accessible location.

1.2 This is what 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 menus and soft keys look like

[ ] frame menu items and soft keys.

Example:

[Start]- [Applications]- [Excel]

1.5 This is what safety instructions 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 that death or severe, irreversible personal injury will occur if appropriate safety measures are not observed.

▶ Take appropriate safety measures.

⚠ WARNING

Warning of potential health risk or risk of personal injury!

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

▶ Take appropriate safety measures.

⚠ CAUTION

Warning of personal injury and/or property damage.

CAUTION indicates that minor, reversible injury or damage to property may occur if appropriate safety measures are not observed.

▶ Take appropriate safety measures.

NOTICE

Warning of property and/or environmental damage.

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

▶ Take appropriate safety measures.

Note:

User tips, useful information and notes.

1.6 Hotline

Phone: +49.40.67960.444

Fax: +49.40.67960.474

E-mail: help@minebea-intec.com

2 Safety instructions

2.1 General notes

⚠ 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 IEC 1010/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 indicator for weighing functions.

Product operation, commissioning and maintenance must be performed by trained and qualified personnel who are aware of and able to deal with the related hazards and take suitable measures for self-protection.

The device reflects the state of the art.

The manufacturer does not accept any liability for damage caused by third-party system components or due to incorrect use of the product. The use of this product signifies recognition of the stipulations listed above.

2.3 Incoming goods inspection

The shipment must be checked for completeness. A visual inspection must be performed to determine if the shipment has been damaged. If there are grounds for a complaint, this must be brought to the attention of the delivery company immediately. A Minebea Intec sales or service point must be informed.

2.4 Before operational startup

NOTICE

Perform visual inspection.

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

2.4.1 Installation

The device is suitable for installation in control panels or cabinets.

The device has to be installed in an EMC-compliant manner, see Chapter 4.3.

Component	Protection class	Installation
Housing front	IP65	Suitable for any operating environment.
Back of the housing	IP30	

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 17.4.1 must be taken into account at all times.

With outdoor mounting, make sure that adequate weather protection is provided (for temperatures, see Chapter 17.4.1).

2.4.2 Opening the device

⚠ WARNING

Working on the device while it is switched on may have life-threatening consequences.

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

▶ Disconnecting the device from the power supply.

This device contains electrostatically sensitive components. For this reason, an equipotential bonding conductor must be connected when working on the open device (antistatic protection).

2.4.3 Supply voltage connection

The device has no power switch. It is ready for operation immediately after connecting to a power supply.

2.4.3.1 Version 230 V AC

Safe interruption of both supply voltage conductors must be provided for, either by disconnecting the power connector or using a separate switch.
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 100 to 240 V AC +10/-15% 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

The PR 5410/01 version is designed for 24 V direct current.
The supply is established via two screw terminals (- 24 V +). The device is protected against incorrect polarity.
The device is protected in the - line via a fuse on the back of the device (primary side).

2.4.4 Protective conductor connection

2.4.4.1 Version 230 V AC

The device must be connected to a protective ground via a protective grounding conductor (PA) 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 housing rear panel inside the device.

2.4.4.2 Version 24 V DC

The device must be connected to the protective grounding conductor. The connection can be established via the housing rear panel.

2.5 RF interference suppression

The device is designed for operation in the industrial sector and can cause RF interferences in a residential environment, see Chapter 17.4.3. In this case, the operator can be required to carry out the appropriate measures.

2.6 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).

2.7 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.

2.8 Repairs and maintenance

2.8.1 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 a trained technician with expert knowledge of the hazards involved and the required precautions.

2.8.2 Electrostatically sensitive parts

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

2.8.3 Replacing fuses

2.8.3.1 Replacing fuses in the Ex area

⚠ WARNING

Possible explosion due to improper replacement!

▶ PR 5410 used in the Ex area: The replacing of fuses are not allowed!

2.8.3.2 Replacing fuses in a safe area

⚠ WARNING

Damage due to overheating.

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

▶ Only the fuses specified in Chapter 17.3.2 and 17.3.3 are permitted.

3 Device description

3.1 General information

The device is equipped with a 6-position, 7-segment display and additional status indicators. Local operation can be carried out using 6 dual-function keys.

The device contains two applications:

- Standard
- EasyFill

Most functions are supported by both applications.

Some functions depend on the application.

3.2 Overview of the device

- Accuracy 10,000 e (class III) for the weighing electronics
- High-speed conversion with measurement times from 10 msec
- Weight display with status via transflective, 6-digit, 7-segment display
- Alibi memory
- 6 function keys for operation on the front panel
- Enclosed front: IP65, back: IP30
- LAN adapter with 10/100 Mbit/s for data transfer, calibration, parameterization
- Integrated RS-232 interface for, e.g., printer or remote display
- Can be expanded using the following plug-in cards (2 slots):
  - Serial input and output board 2× PR 5510/02 or 2× PR 5510/04

    1× PR 5510/02 and/or 1× PR 5510/04
  - Analog input and output board PR 5510/07
  - BCD output board PR 5510/08 or PR 5510/09
  - Opto-decoupled input and output board PR 5510/12
  - Fieldbus cards PR 1721/3x
- Electrically isolated interfaces (except RS-232)
- Wide range power supply for 100 to 240 V AC, protection class I (protective grounding conductor)
- Version PR 5410/01 for 24 V direct current
- Plug-in connections inside the device for load cells, inputs/outputs, LAN adapter
- Installation as control panel or control cabinet device
- Calibration using the front-panel keys or PC tool (browser/VNC); calibration of Pendeo® load cells using the PC tool only
- Calibration using weights according to the mV/V method or directly using load cell data (smart calibration)
- Software configuration of the interface cards, e.g., for remote display or printer

- The "EasyFill" application allows for quick and reliable filling and emptying of vessels (for functional description, see Chapter 6.1).
- Analog test for the weighing electronics
- Overwrite protection using CAL switch on the main board

3.2.1 Communication protocols

For the internal RS-232 or external RS-232 + RS-485 (accessories):

- Remote display protocol
- Printer
- ModBus-RTU (slave)
- SMA protocol
- xBPI protocol
- EW-Com protocol

Fieldbus slave (accessories):

- PR 1721/31 ProfiBus-DP
- PR 1721/32 InterBus-S
- PR 1721/34 DeviceNet
- PR 1721/35 CC-Link
- PR 1721/36 ProfiNet I/O
- PR 1721/37 EtherNet IP

For the internal LAN:

- ModBus-TCP
- Ethernet TCP/IP
- OPC

3.3 Housing

3.3.1 General information

The device has an aluminum housing with IP65 front. It can also be used as a control cabinet version.

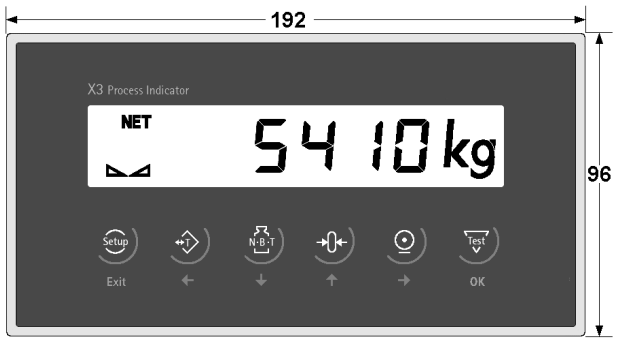
The keypad and the display form one unit with the front. A rectangular cut-out is required for the installation. Cable connections are made at the back of the housing.

The ambient conditions specified for the device must be observed (see Chapter 17.4.1).

Openings for max. 2 plug-in cards are sealed by dummy plates.

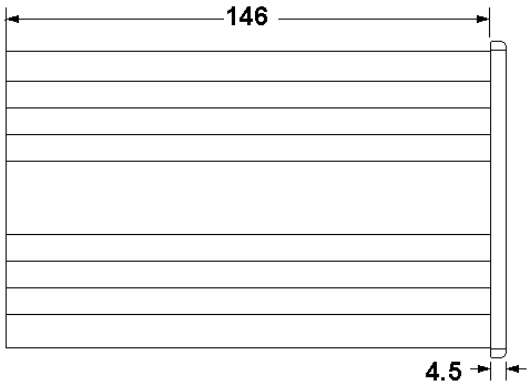
3.3.2 Dimensions

Front View



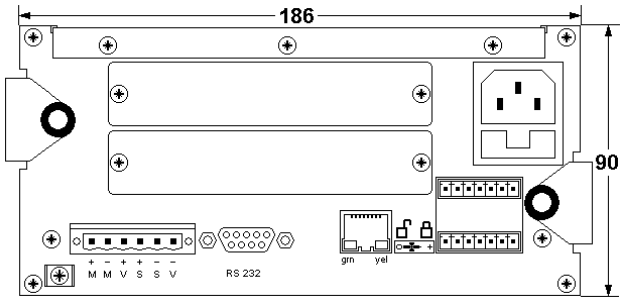
all dimensions in mm

Side View



all dimensions in mm

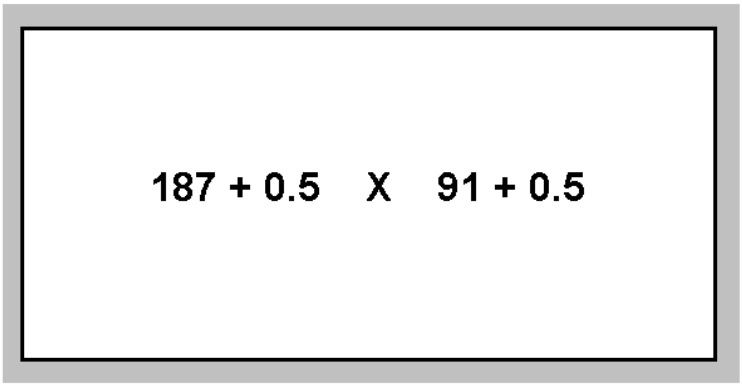
Back View



all dimensions in mm

3.3.3 Control panel cut-out

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



all dimensions in mm

3.4 Display and control panel

3.4.1 General information

The PR 5410 process indicator can only be operated using the front-panel keys or by Notebook/PC.

- Operation using the front-panel keys (see Chapter 7.5.2)
- VNC viewer (see Chapters 3.4.4.4 and 7.11) or
- WEB browser (see Chapter 7.12)

3.4.2 Overview

3.4.3 Display

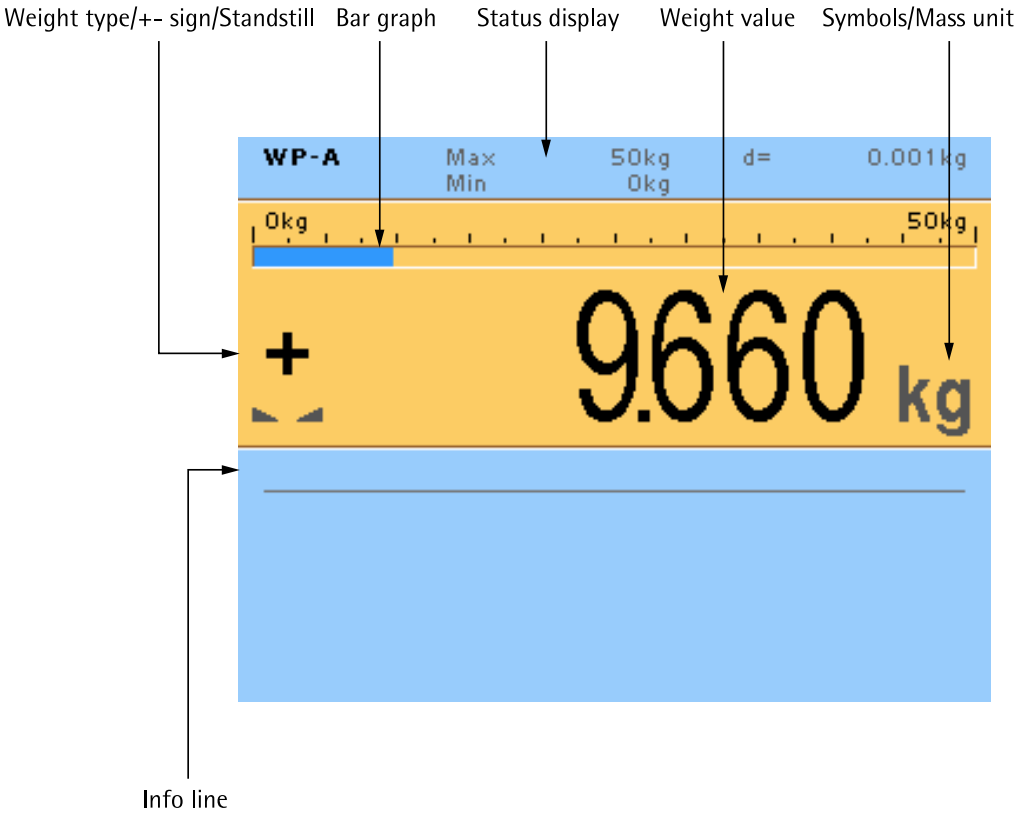
3.4.3.1 User interface

The display of the user interface shows weight values of up to 7-digits with decimal point and plus or minus sign.

Available weight units are t, kg, g or lb.

lb unit is not permitted as legal-for-trade in the EU and EEA.

Above the weight display of the user interface, the currently displayed weight is shown as a bar graph in relation to the maximum load (Max). When Max reaches 100%, the bar graph is located on the right.



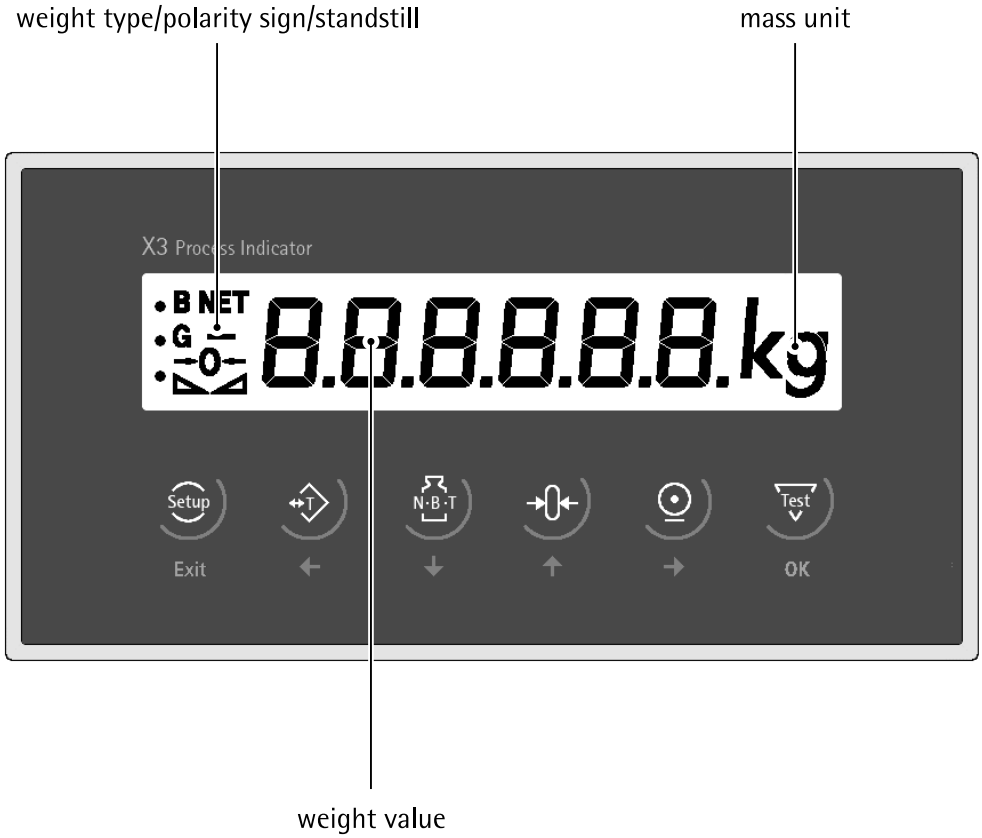
Weight type/plus or minus sign	Description
B	Gross weight
G	Gross weight in NTEP or NSC mode
NET	Net weight (Net = gross - tare)
T	Tare weight
PT	Preset tare
TST	The display shows the test value without weight unit.
No display	- Test value - Gross, not tared
+	Positive value
–	Negative value

Standstill/Zero	Description
◣◢	Weight value standstill
→0←	The gross weight value is within ±¼ d of zero.
◇	Batching mode; flashes when "On hold"; flashes rapidly to indicate error.

Symbols/mass unit	Description
⚠	Value not permissible in legal metrology (e.g.,-10-fold resolution, deactivated load cell).
R1	Range 1
R2	Range 2
R3	Range 3
WP A	Weighing point A
Max	Maximum load (weighing range)
Min	Minimum weight
t, kg, g, lb	These weight units are available.

3.4.3.2 Device display

The display of the device permits indication of 6-digit weight values (digit height 18 mm) with decimal point.



Weight type/plus or minus sign	Description
B	Gross weight
G	Gross weight in NTEP or NSC mode
NET	Net weight (Net = gross - tare)
T	Tare weight

Weight type/plus or minus sign	Description
PT	Fixed tare
No display	- Test value - Gross, not tared
TST	The display shows the test value without weight unit.
+	Positive value
–	Negative value

Standstill/zero/dosing	Description
▙▟	Weight value standstill
→0←	The gross weight value is within ±¼ d of zero.
◇	Filling mode; flashes when batching is stopped; rapidflashing indicates error.

Symbols/mass unit	Description
•	Range 1
• •	Range 2
• • •	Range 3
t, kg, g, lb	These weight units are available.

3.4.4 Operating elements

3.4.4.1 User interface

The following tables show the basic meanings of symbols on the operator interface.

Indicator keys			
	Display gross weight		Sets gross weight to zero, provided that - weight value is stable; - weight is within zero setting range. This function depends on the configuration.
	Display tare weight.		Starts a printout.

Indicator keys	
	Taring The current gross weight is stored in the tare memory, provided that - weight value is stable; - the instrument is not in error status. This function depends on the configuration.

Navigation/menu keys			
	Scroll up in the menu.		Confirm input/selection.
	Scroll down in the menu.		- Backspace - Pressing the delete key deletes individual characters (within an entry).
	- Cursor to the left - Selection		- Cancel entry/selection (after a confirmation prompt) without saving the change. - Exit parameters/menu window.
	- Cursor to the right - Selection		

Function keys/softkeys			
	Access the Setup menu.		Depending on the settings under -[Weighingpoint]- [Calib]- [Param]- [Test mode] the following is displayed by calling the test with the key later on: - with "Absolute" the maximum load - with "Relative" the deviation from test value.
	Information on version number, fitted hardware, 10-fold resolution		**Softkeys 1...5** Select appropriate menu function, see also Chapter 3.4.4.2.
	No function		

Alphanumeric keypad

Toggle key
Toggle by pressing:
- between alpha and numerical mode
- during configuration between weight units

Pressing once displays the corresponding first character, e.g., "A", at the cursor position. After pressing twice, "B" is displayed at the cursor position and after pressing three times, "C" is displayed.

Press the ↓/↑ cursor key to finish entering a character or wait approx. 2 seconds.
If only numeric values are required for input, letters are not enabled.

Press the ← cursor key within an entry to return to the previous character.

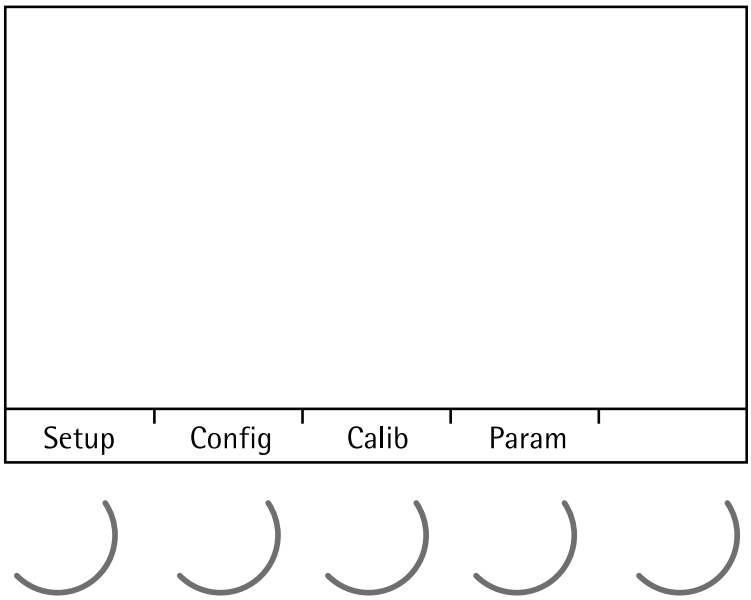
Press the → cursor key within an entry to select the next character.

Within an input, pressing the C delete key deletes the character to the left of the cursor.

Input field

In principle
If alphanumeric characters are already present in the input field of the selected line, they will be completely overwritten after immediate entry.
If alphanumeric characters are already present in the input field of the selected line, you can press the → cursor key to select the characters to be overwritten and overwrite them.

3.4.4.2 Operation using softkeys



The functions of the five softkeys below the graphic display are indicated in the bottommost text line of the display. Softkey functions shown in gray cannot be selected at the active menu level or with the current access privileges.

In the descriptions of operating sequences which entail the use of softkeys, the softkey function to be selected is shown in square brackets; the softkey symbol is not displayed; example: [Calib].

3.4.4.3 Navigation key operation

Menu

The cursor keys, the OK and Exit keys are used to navigate through the menus.

Parameters

Use the ↓/↑ cursor keys to select the individual parameters.

Use the OK key to confirm the selection.

The required values | texts are entered via the alphanumeric keys.

The OK key is used to check the ☑ box.

If the list of parameters is long, a vertical bar graph on the left (black and gray) shows which part of the list is displayed.

An arrow in front of a menu item indicates that there are menu sublevels.

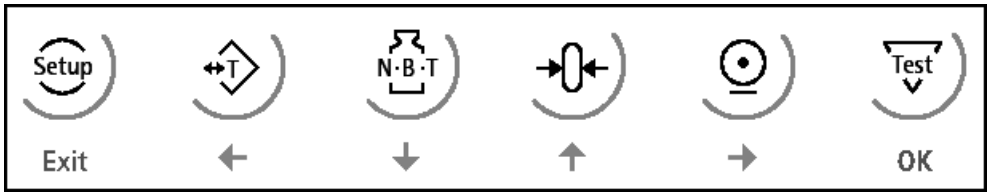
Possible settings and an available selection list is indicated by double arrows.

The parameter is selected using the OK key.

3.4.4.4 Operation using VNC

User interface, see Chapters 3.4.2, 3.4.3.1 and 3.4.4.1.

3.4.4.5 Operation using the front-panel keys



The following table shows the basic meanings of the symbols on the front-panel keys.

Indicator keys			
	Taring The current gross weight is stored in the tare memory, provided that - weight value is stable; - the instrument is not in error status. The key is locked during the filling process.		Starts a printout.
	Toggling the display Net - gross - tare The key is locked during the filling process.		Depending on the settings under Setup -[Weighingpoint]- [Calib]- [Param]- [Test mode] the following is displayed by calling the test with the key later on: - with "Absolute" the maximum load - with "Relative" the deviation from test value.
	Sets gross weight to zero, provided that - weight value is stable; - weight is within zero setting range. The key is locked during the filling process.		
Navigation/menu keys			
	Scroll up in the menu.		Access the Setup menu.
	Scroll down in the menu.	**OK**	- Confirm input/selection. - Start/restart the ongoing filling process.

Navigation/menu keys			
←	- Cursor to the left - Selection	**Exit**	- Cancel entry/selection (after a confirmation prompt) without saving the change. - Exit parameters/menu window. - Stop/abort the ongoing filling process.
→	- Cursor to the right - Selection		

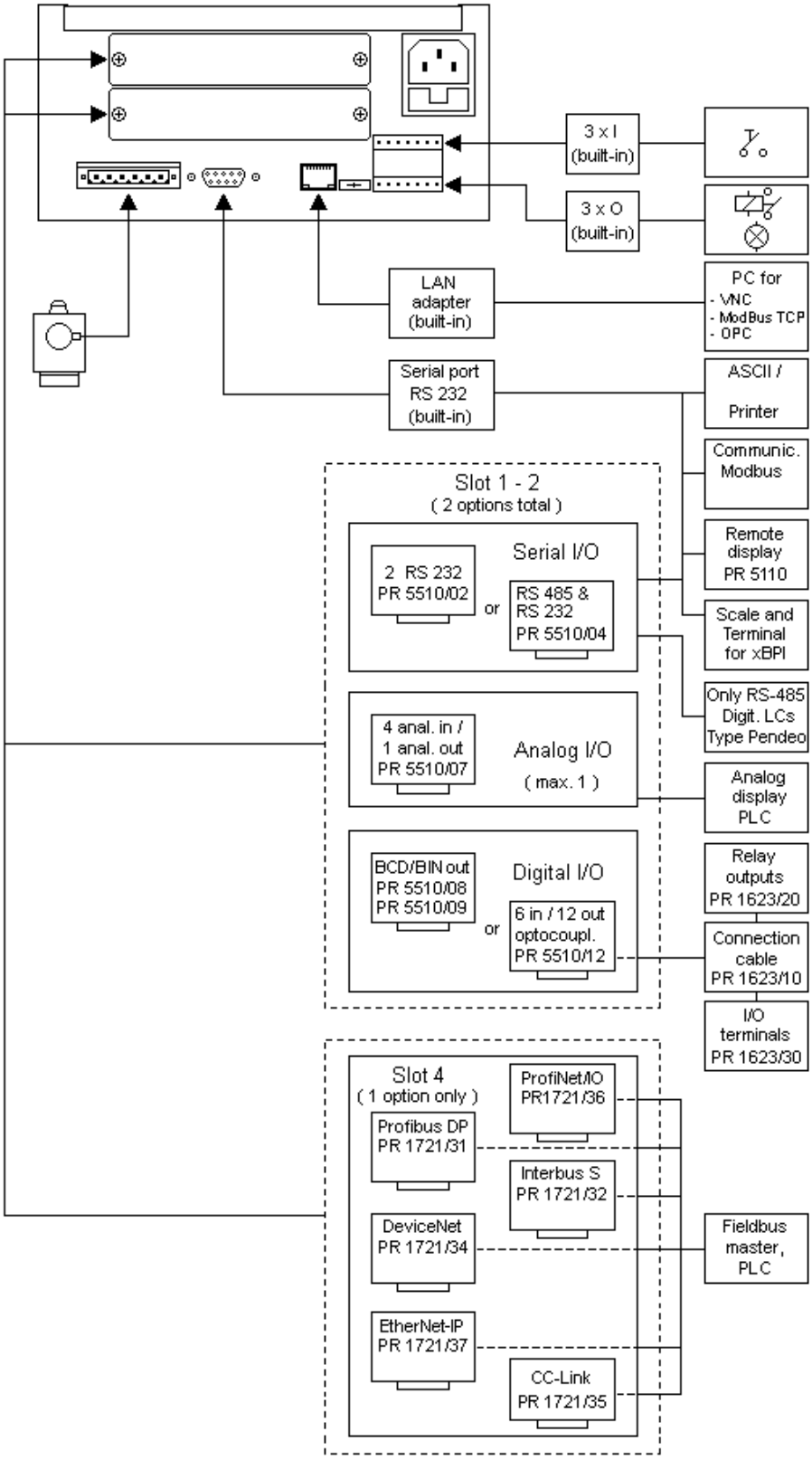
3.4.4.5.1 Selecting parameters

The selection and modification of parameters are described in the following.

1. Press Setup.
   ▷ `SEtuP` appears on the display.
2. Press Test/OK.
   ▷ `Cd 000` appears on the display.
   The "Cd" calibration menu flashes.
3. Press ↑ to access the next parameter group.
   ▷ `CP` flashes on the display.
4. Press → to access the parameter number.
   ▷ `CP 010` appears on the display. The right digit flashes.
5. Press ←/→ to select the digits.
6. Press ↑/↓ to increase/decrease the number.
7. Press Test/OK to select the menu item.
   ▷ The menu item appears on the display.
8. Press Test/OK to switch to the parameter selection.
9. Press ↑/↓ to select the parameter values.
10. Press Test/OK to select the parameter values.
11. Press "Exit" to exit a menu.
    ▷ If a parameter was changed, `SAVE`
    appears on the display.
12. Press Test/OK.
    ▷ `YES` appears on the display.

13. Press ↓ if necessary, to select "no."
14. Press Test/OK to save the change.

3.5 Overview of connections



3.5.1 Plug-in cards

The main board can be fitted with max. 2 plug-in cards.

Two cards of the same type must not be plugged into slot 1 and 2 at the same time (except for PR 5510/04).

If slot 4 has a card, only one other card can be plugged into slot 1 or 2.

Product	Function	Position
PR 5510/02 2 x RS-232 serial interfaces	The interfaces can be configured by software. For more information, see Chapter 4.6.2.	Slot 1 and/or 2
PR 5510/04 - 1 x RS-232 serial interface - 1 x RS-485/ RS-422 serial interface	The interfaces can be configured by software. For more information, see Chapter 4.6.3.	Slot 1 and/or 2
PR 5510/07 Analog input and output board	Analog input: internal 14 bits binary = 20,000 counts, @ e.g. 0...20 mA/0...10 V Analog output: internal 16 bits = 65,536 parts, resolution of 20,000 @ 20 mA For more information, see Chapter 4.6.4.	Slot 1 or 2
PR 5510/08 BCD output (open emitter)	Outputs: 5 digits BCD + preceding sign or 3 bytes binary Input: 1 bit (DATA IN) For more information, see Chapter 4.6.5.	Slot 1 or 2
PR 5510/09 BCD output (open collector)	Outputs: 5 digits BCD + preceding sign or 3 bytes binary Input: 1 bit (DATA IN) For more information, see Chapter 4.6.6.	Slot 1 or 2
PR 5510/12 - 6 digital inputs - 12 digital outputs	6 passive opto-decoupled inputs 12 passive opto-decoupled outputs The interfaces can be configured by software. For more information, see Chapter 4.6.9.	Slot 1 or 2
PR 1721/31 ProfiBus-DP	ProfiBus-DP slave acc. to IEC 61158 with max. 12 Mbit/s For more information, see Chapter 4.6.11.	Slot 4
PR 1721/32 InterBus-S	InterBus-S slave with max. 500 kbit/s For more information, see Chapter 4.6.12.	Slot 4

Product	Function	Position
PR 1721/34 DeviceNet	DeviceNet slave with max. 500 kbit/s For more information, see Chapter 4.6.13.	Slot 4
PR 1721/35 CC-Link	CC-Link with up to 10 Mbps For more information, see Chapter 4.6.14.	Slot 4
PR 1721/36 ProfiNet I/O	ProfiNet I/O with 10/100 Mbit/s For more information, see Chapter 4.6.15.	Slot 4
PR 1721/37 EtherNet IP	EtherNet-IP with 10/100 Mbit/s For more information, see Chapter 4.6.16.	Slot 4

4 Device installation

4.1 General information

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

⚠ WARNING

Warning of a hazard area and/or risk of personal injury

▶ All cable connections must be protected against damage.

Note:

- Measurement cables should be kept away from power equipment.
- Signal cables and measurement cables should be installed separately from electric power lines.
- It is recommended that measurement cables are laid in separate cable conduits.
- Power cables should be crossed at right angles.

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, load cells, junction box, data cables, console/cabinet, etc.
- If necessary, install the plug-in cards (device must be disconnected from all voltage sources).
- Follow all device installation instructions related to application, safety, ventilation, sealing, and environmental influences.
- Connect the cable from the junction box or platform/load cell.
- If applicable: connect other data cables, network cables, etc.
- Connect to supply voltage.
- Check the installation.

4.2 Mechanical preparation

4.2.1 Mechanical preparation

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

Other procedures:

- Make the control panel cut-out for the device in the control cabinet door, for example; see Chapter 3.3.3.
- 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.
- Establish grounding/equipotential bonding between devices/system components (this is essential for Ex applications).

4.3 EMC-compliant installation

4.3.1 Connecting the screens

The screen for the D-Sub connector must be connected as described in Chapter 4.6.1.2.

The screens for the connecting cable/load cell cable must be connected to the grounding terminal on the back of the device.

4.3.2 Connecting the equipotential bonding conductor

The equipotential bonding conductor must be connected to the grounding terminal on the back of the device.

4.4 Hardware construction

The main electronics is accommodated on the following units:

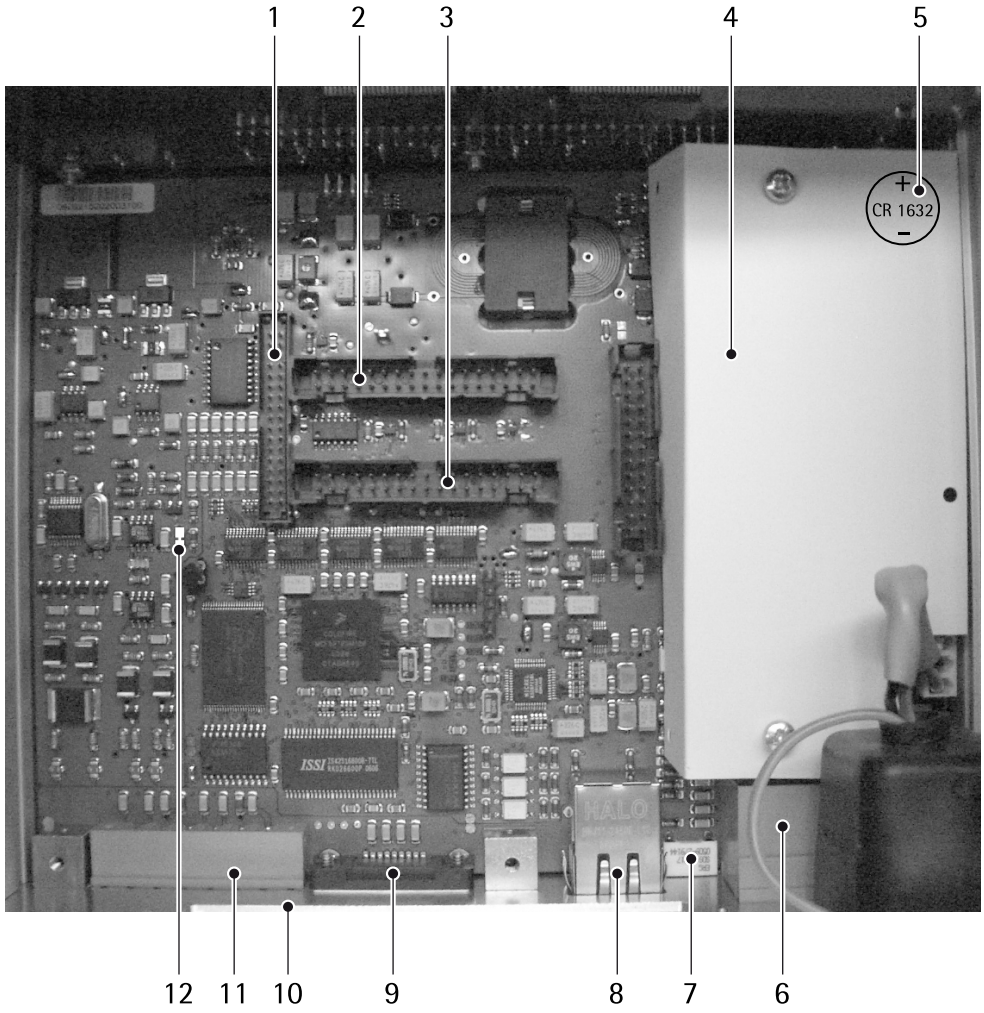
- Main board
- Display board

4.4.1 Main board

The main board provides the slots for the

- Interface cards (accessories; see Chapter 4.6)
- Fieldbus card (accessories; see Chapter 4.6)

The lithium battery (5, under the cover for the power supply) is always activated and powers the calendar/clock module.



No.	Description
1	Slot 4: Slot for fieldbus card
2	Slot 1: Slot for serial interface card
3	Slot 2: Slot for serial interface card
4	Power supply (under the cover)
5	Lithium battery (under the cover for the power supply)
6	Digital inputs and outputs
7	CAL switch
8	Ethernet port
9	RS-232 serial interface
10	Display board
11	Load cell connection
12	Solder bridge

4.4.2 Display board

The display board is connected to the main board by a plug.

4.4.3 Network port

The device has an internal Ethernet port.

NOTICE

Damaged data will bring a stop to IT operations.

Protect the IT network to prevent unauthorized access.

▶ The current IT security guidelines must be followed so as to minimize the risks.

4.4.3.1 Ethernet port

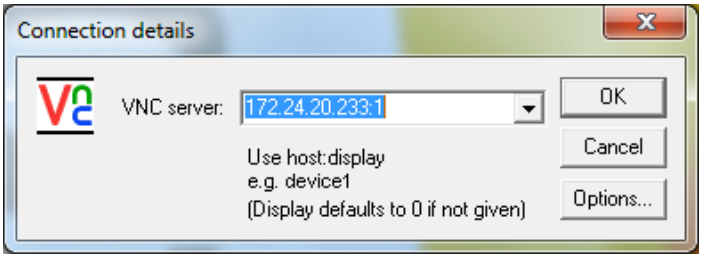
The Ethernet port contains a powerful TCP/IP interface connection with transfer rates of 10 or 100 Mbit/s.

Function tests can be performed via the LEDs (green and yellow) in the RJ-45 socket.

Technical data

Description	Data
Connection	RJ-45 socket on the device back Green (grn): flashing on data traffic (activity) Yellow (yel): lights up when there is an existing connection (link)
Transfer rate	10 Mbit/s, 100 Mbit/s, full/half duplex, auto-detection
Connection mode	Point to point
Potential isolation	Yes
Cable type	CAT 5 patch cable, twisted pair, screened
Cable impedance	150 Ω
Cable length	Max. 115 m

4.4.3.2 Notebook/PC connection



Remote operation of the device from a notebook/PC is possible (install VNC software version 3.3.7* on the notebook/PC).

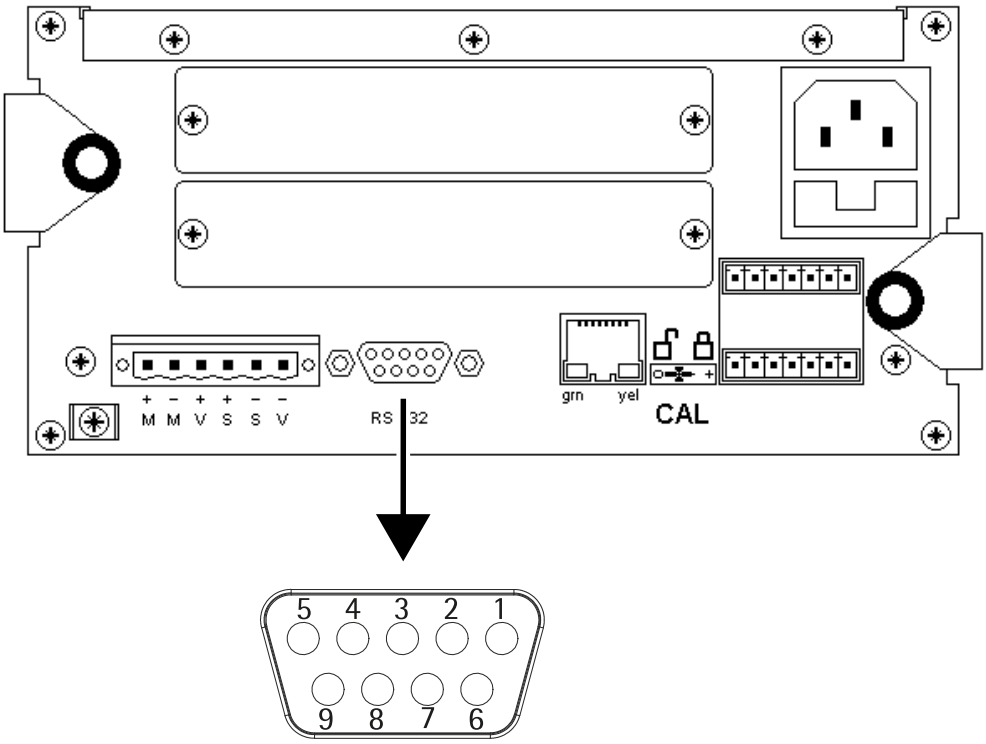
For the network address, see Chapter 7.9.571

* Minebea Intec guarantees the functionality only if this version is used.

4.4.4 RS-232 interface

The device is equipped with an integrated RS-232 interface.

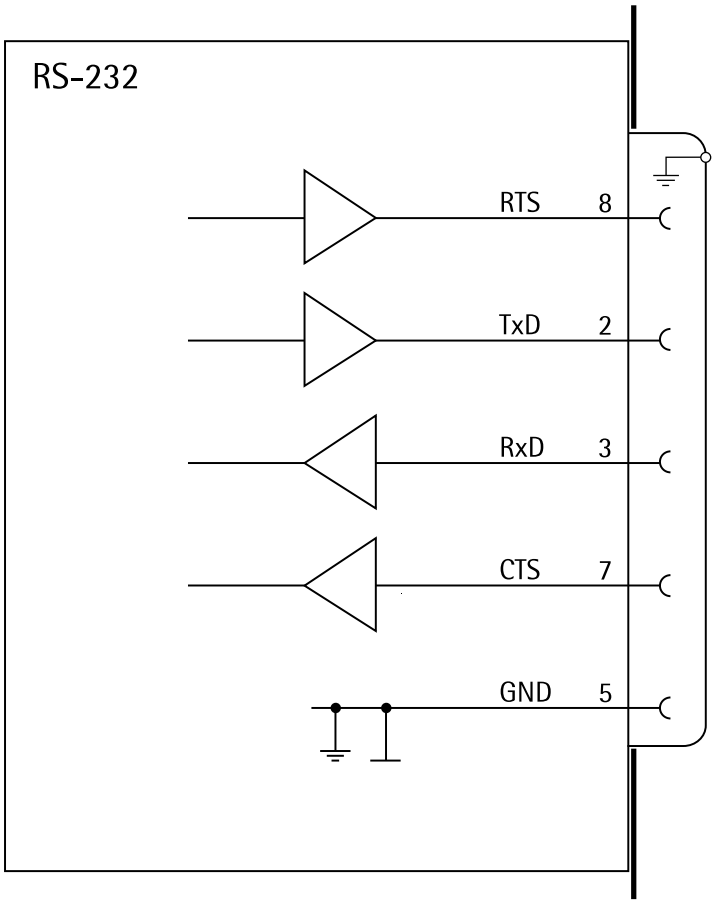
This interface is configurable, and can be used, for example, for data transmission to a remote display or printer.



Technical data

Description	Data
Connection	D-Sub female connector, 9-pin
Number of channels	1
Type	RS-232, full duplex
Transmission rate [Bit/s]	300 to 115K2 bit/s
Data bits	7/8
Input signal level	Logic 1 (high) -3 to -15 V Logic 0 (low) +3 to +15 V
Output signal level	Logic 1 (high) -5 to -15 V Logic 0 (low) +5 to +15 V
Number of signals	Input: RxD, CTS Output: TxD, RTS
Potential isolation	None
Cable type	Twisted pair, screened (e.g., LifYCY 3×2×0.20), 1 pair of wires for ground (GND)
Cable gauge	1.5 mm^2
Cable length	Max. 15 m

Block diagram RS-232

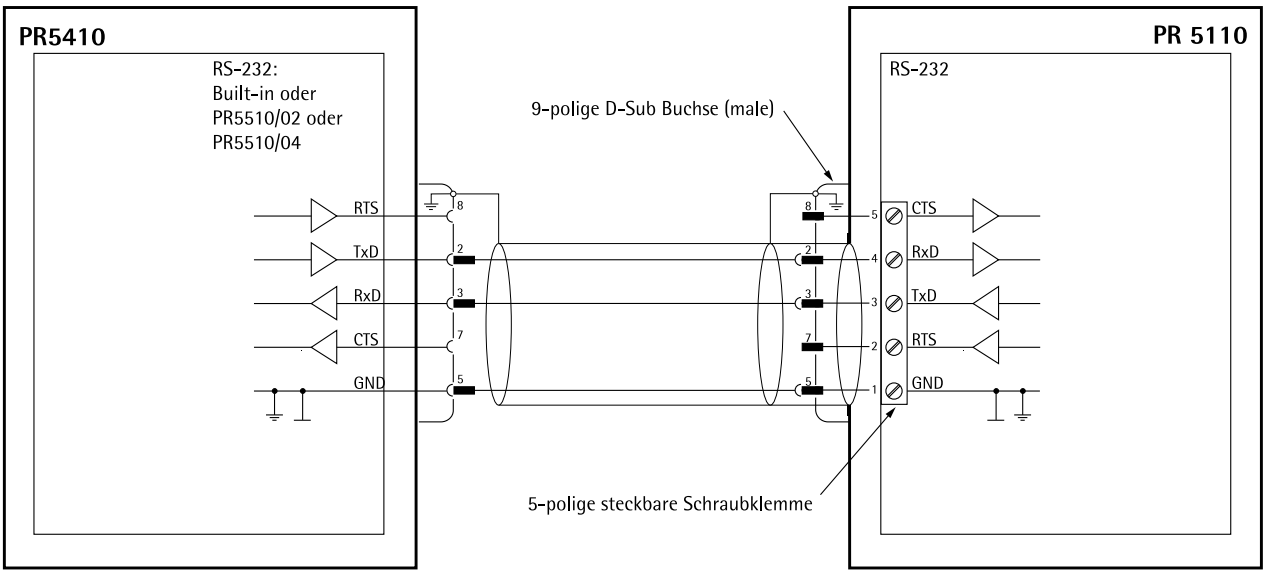


Note:

After 30 seconds without data exchange, RTS and TxD are switched off.

4.4.4.1 Connecting a PR 5110 remote display

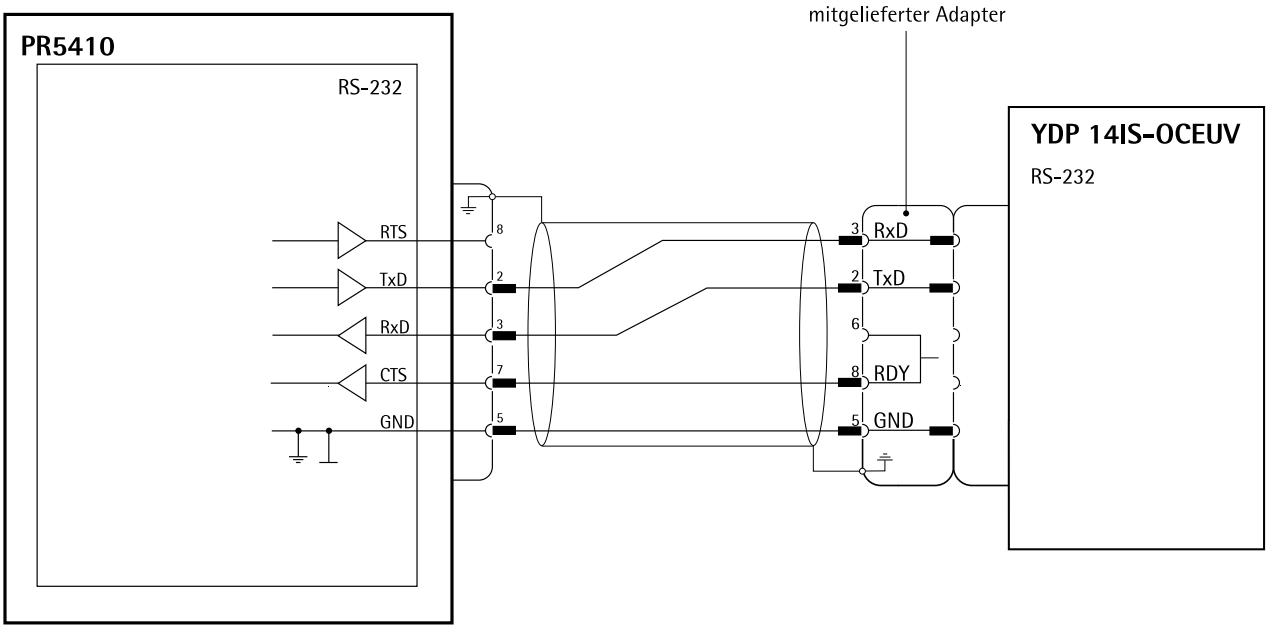
The remote display PR 5110 can be connected to the device via the internal RS-232 interface or the PR 5510/02 card or the PR 5510/04 card.



Configuration PR 5410	PR 5110 configuration
Setup - [Serial ports parameters]- [Remote display]- [Built-in RS-232]- [Param]- [Mode]- [single transmitter]	[Setup]- [oP 10]- [LInE]- [rS232] [Setup]- [oP 12]- [tokEn]- [oFF] [Setup]- [oP 13]- [SEndModE]- [SEnd] [Setup]- [oP 14]- [WEIght]- [FolloW] [Setup]- [oP 15]- [WPkEy]- [SEIEct]

4.4.4.2 Connecting a YDP14IS ticket printer

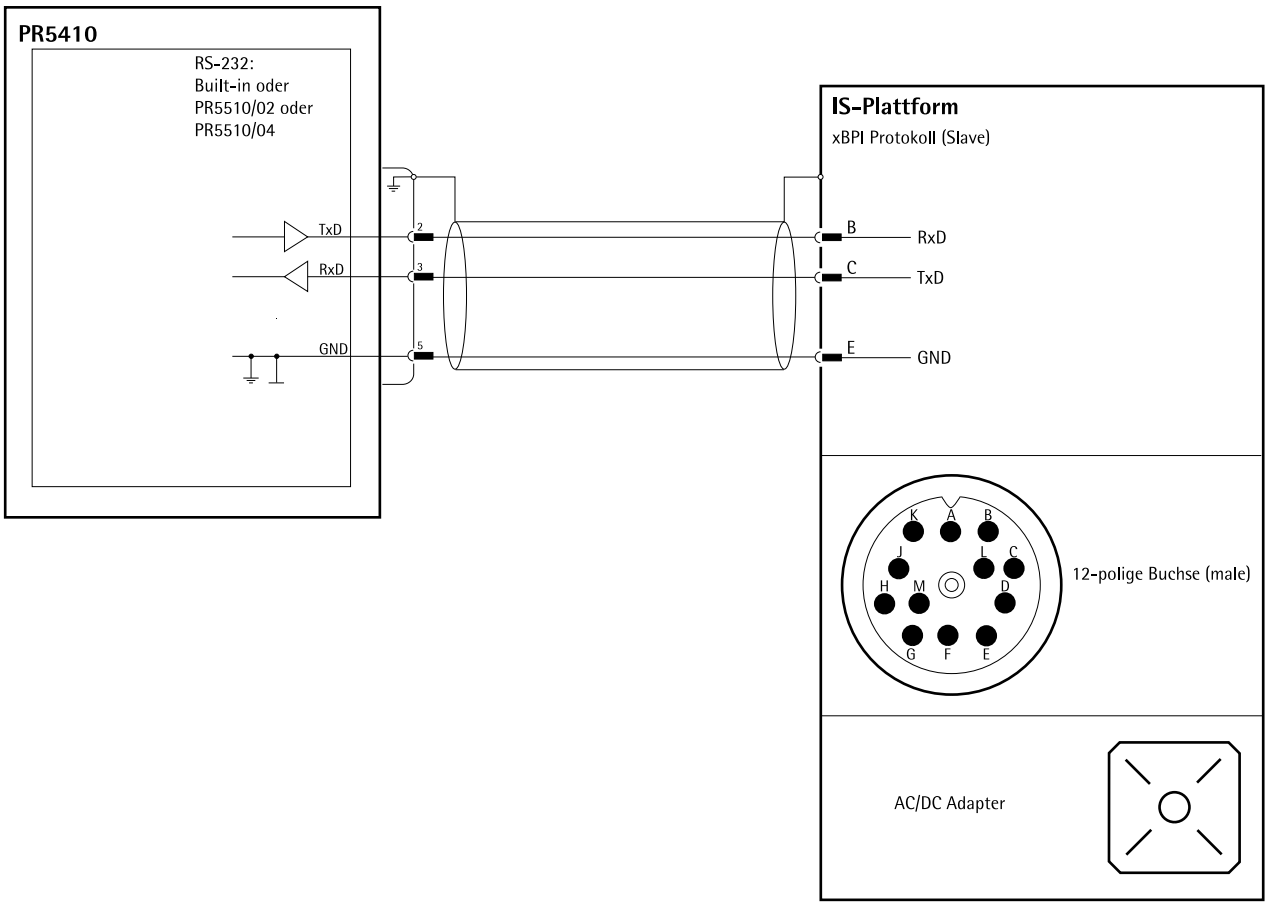
The YDP14IS-OCEUV ticket printer can be connected via the internal RS-232 interface or the PR 5510/02 card or the PR 5510/04 card.



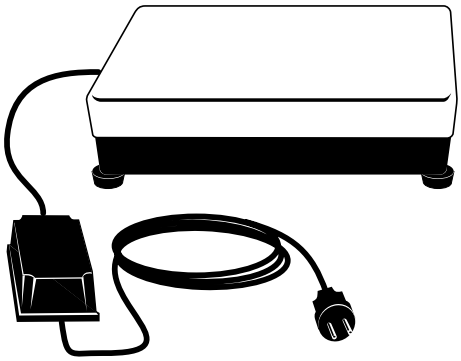
Configuration PR 5410	Printer configuration
Setup - [Serial ports parameters]- [Printer]- [Built-in RS-232]- [Param]: - [Protocol] to "RTS/CTS" - [Baudrate] to "9600" - [Bits] to "8" - [Parity] to "none" - [Stop bits] to "1" - [Output mode] to "Raw"	The printer must be set to "Line Mode" (the factory setting is Page Mode). Press the "FEED" key to switch from one to the other. The procedure can be found in the printer operating instructions.

4.4.4.3 Connecting an IS platform

One IS platform scale with xBPI or SBI protocol can be connected via the internal RS-232 interface or the PR 5510/02 card or the PR 5510/04 card.



Configuration PR 5410
Setup - [Serial ports parameters]- [xBPI port]- [Built-in RS-232]



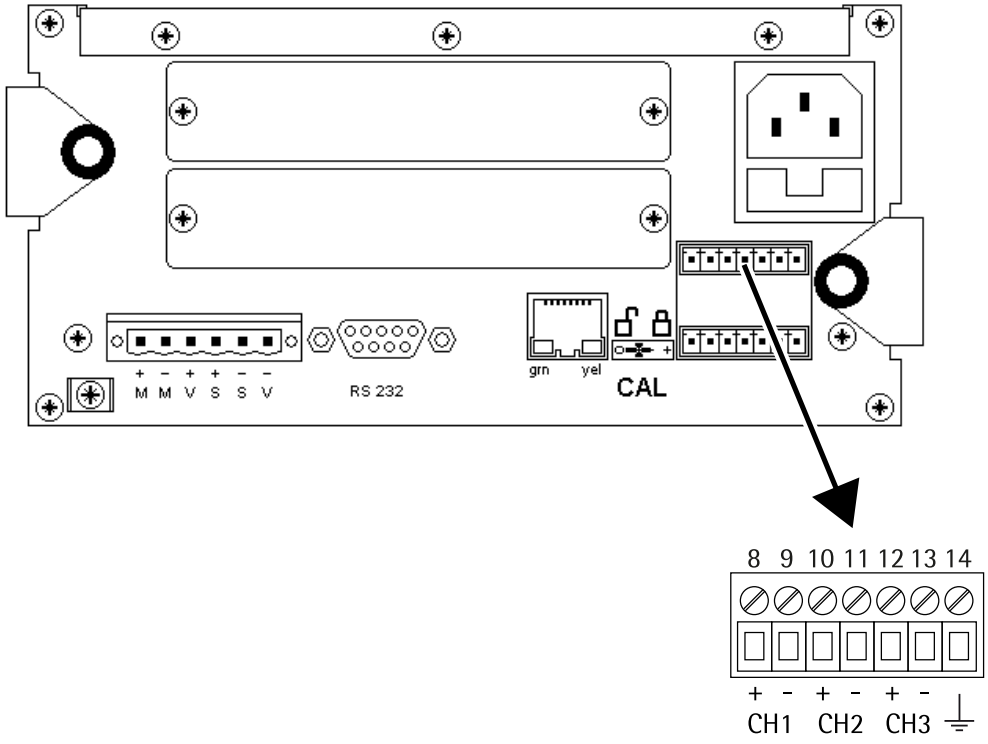
Note:

For further information, see the platform scale operating instructions.

4.4.5 Digital inputs

The main board is equipped with 3 digital inputs for the process control. They are electrically isolated by optocouplers and each 2-pin potential-free.

The interface can be configured by software.



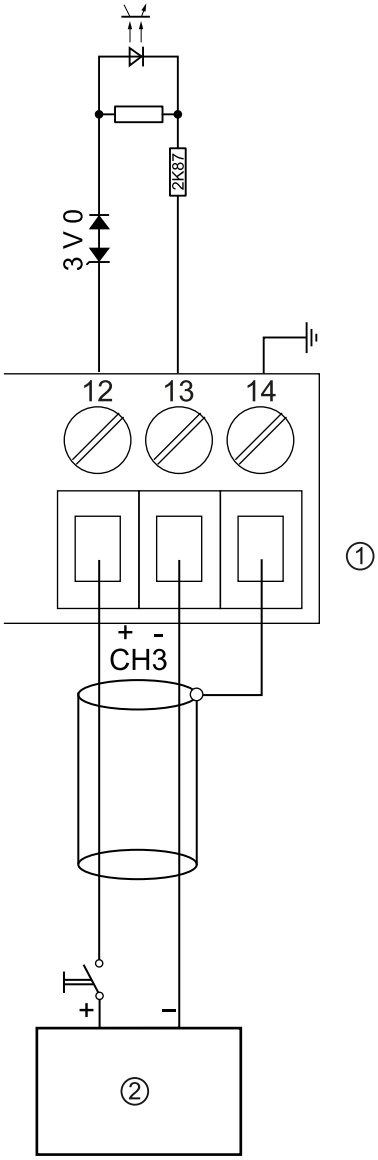
Technical data

Description	Data
Connection	Terminal, 7-pin
Number of inputs	3 (CH1, CH2, CH3)
Input voltage	Logic 0: 0 to 5 V DC or open Logic 1: 10 to 28 V DC Passive, external power supply required.

Description	Data
Input current	≤11 mA @ 24 V DC ≤5 mA @ 12 V DC Protection against incorrect polarity.
Potential isolation	Via optocoupler.
Cables	Screened Connect cable screen (wire gauge max. 1.5 mm^2) to the terminal (terminal contact 14; see example).
Cable length	Max. 50 m

Example:

Contact input "passive"



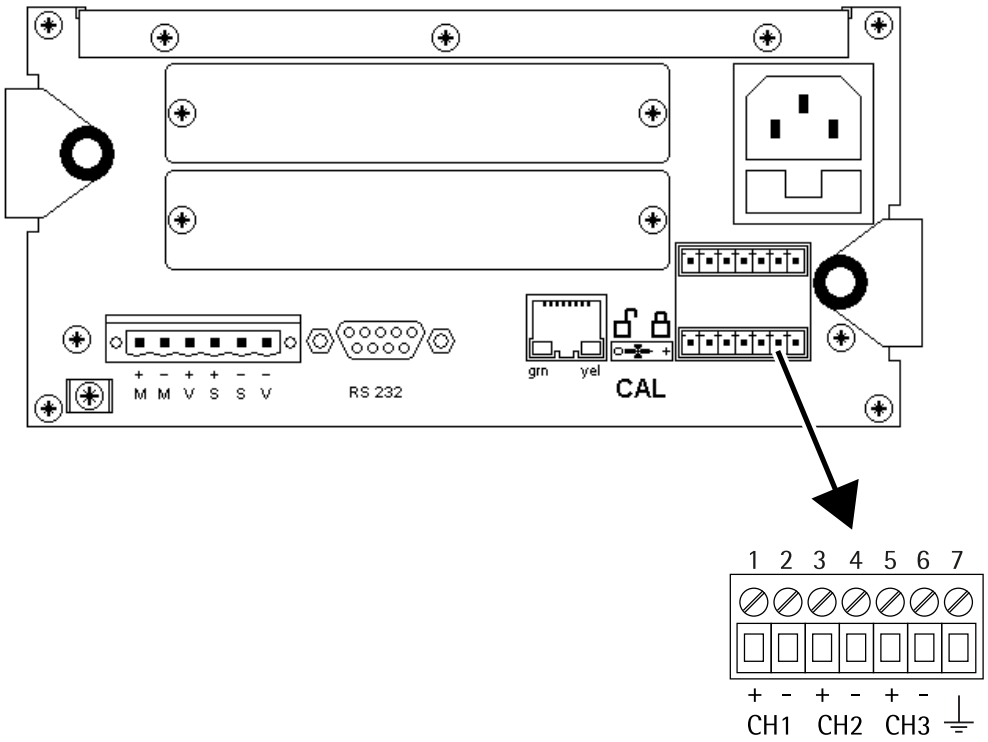
① Digital inputs

② Supply unit 24 V DC 0.5 V

4.4.6 Digital outputs

The main board is equipped with 3 digital outputs for the process control. They are electrically isolated by optocouplers and each 2-pin potential-free.

The interface can be configured by software.

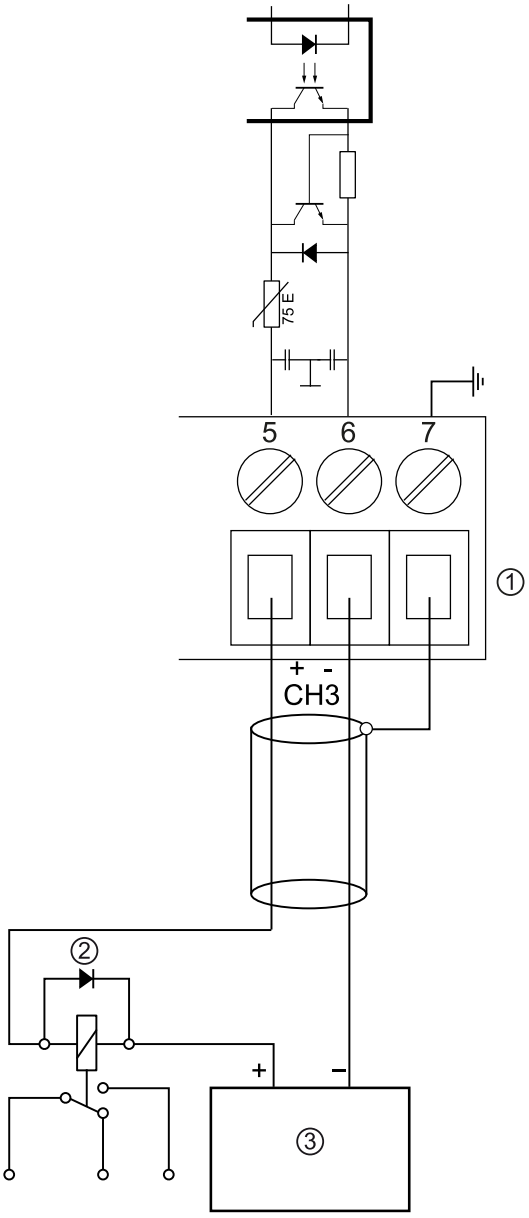


Technical data

Description	Data
Connection	Terminal, 7-pin
Number of outputs	3 (CH1, CH2, CH3)
Max. switching voltage	31 V DC Protection against incorrect polarity.
Max. switching current	25 mA Voltage drop @ 25 mA: 3 V Passive, external power supply required.
Potential isolation	Via optocoupler.
Cables	Screened Connect cable screen (wire gauge max. 1.5 mm^2) to the terminal (terminal contact 7; see example).
Cable length	Max. 50 m

Example:

Relay control (power output)



① Digital outputs

② Inductive load for free-wheel diode

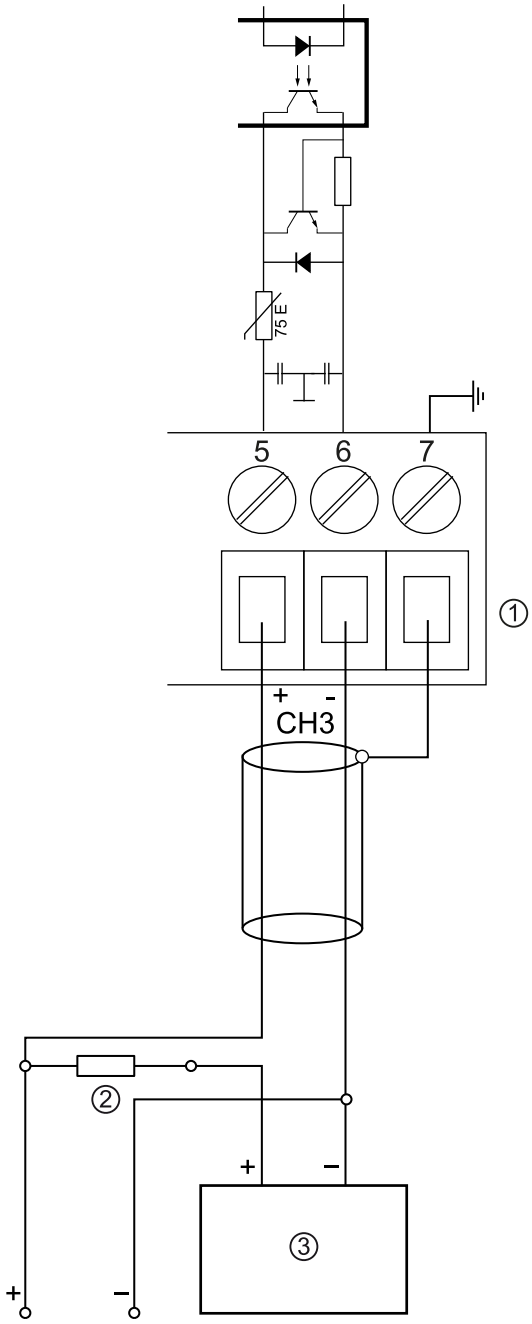
③ Supply unit 24 V DC 0.5 V

The relay switches when the output is active (true).

To protect the output circuit, relays must be equipped with free-wheel diodes.

Example:

Voltage output



① Digital outputs

② The load resistance must be 2.2/1 kΩ.

③ Supply unit 24 V DC 0.5 V

When the output is active (true), the output voltage drops from 24/12 V DC to <3 V DC.

4.5 Connecting analog load cells and platforms

4.5.1 General information

Load cells or analog platforms (e.g. from the CAPP series) can be connected.
The supply voltage is protected against short circuit and overload.

Note:

The colors listed here apply for the Minebea Intec load cell and connection cables of type "PR ..."

Color code

bk	=	Black
bu	=	Blue
gn	=	Green
gy	=	Gray
rd	=	Red
wh	=	White

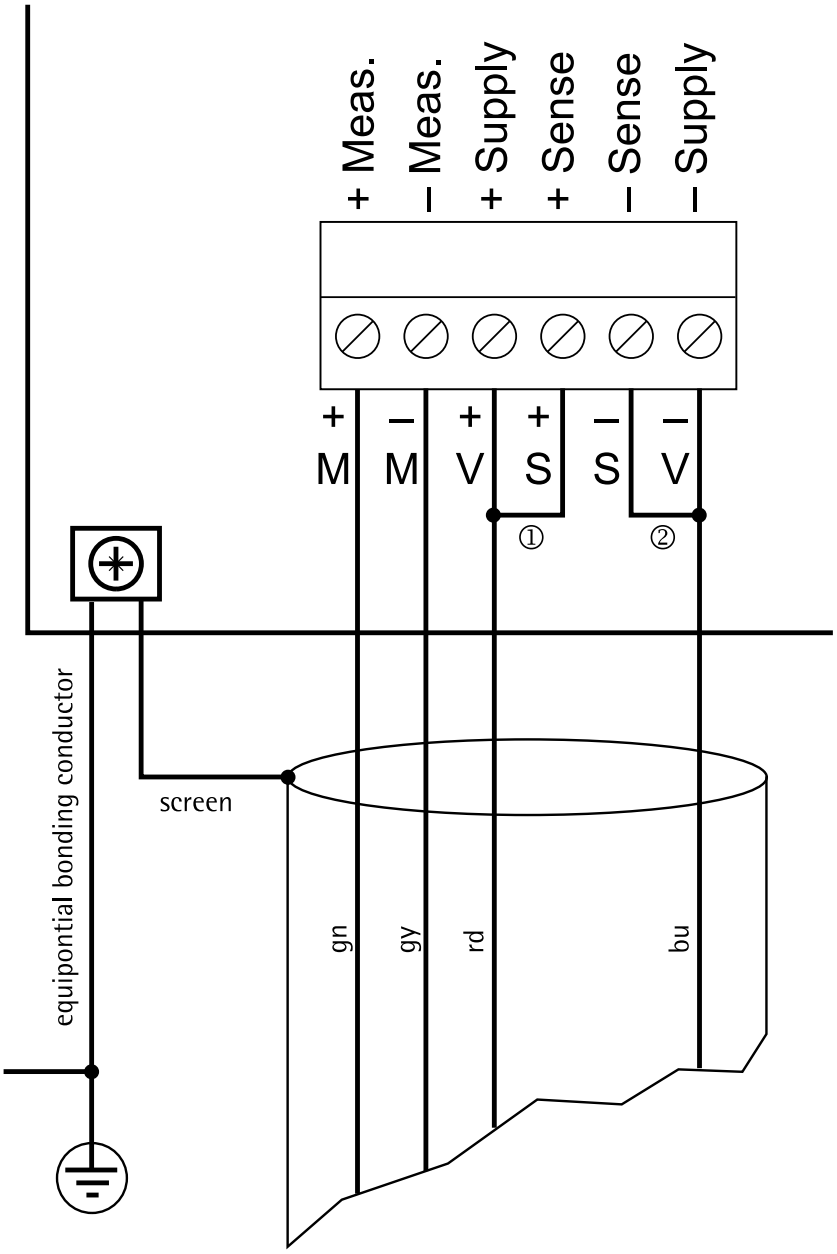
For additional information on the connection of load cells and cable junction boxes, refer to the corresponding installation manuals.

4.5.2 Connecting a load cell with a 4-wire cable

The following links between the terminal contacts are provided:

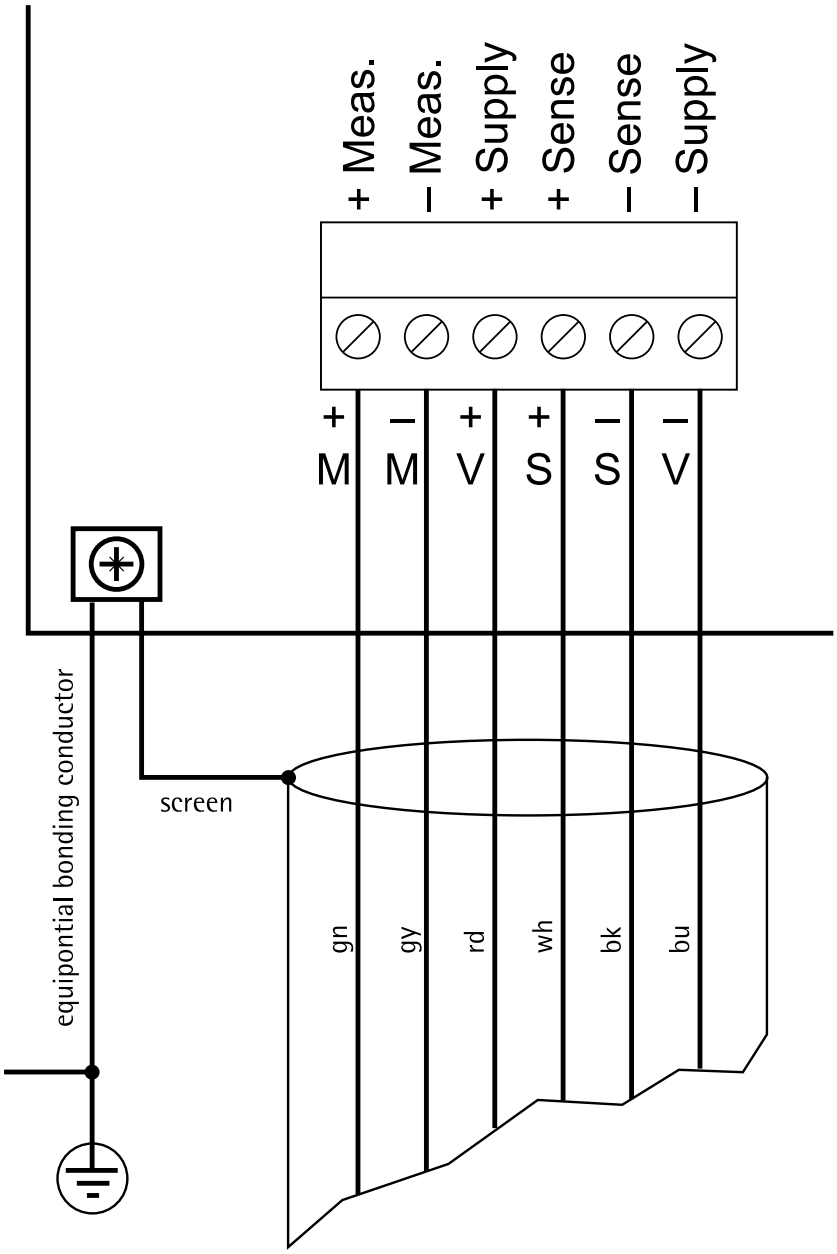
① from Sense S+ to Supply V+

② from Sense S- to Supply V-



Terminal	Connection/color code	Description
M+	+ Meas./gn	+ Measuring voltage (load cell output)
M-	- Meas./gy	- Measuring voltage (load cell output)
S+	+ Sense	+ Sense voltage
S-	- Sense	- Sense voltage
V+	+ Supply/rd	+ Supply voltage
V-	- Supply/bu	- Supply voltage
Housing	Ground (GND)	Screen (ground)

4.5.3 Connecting a load cell with a 6-wire cable



Terminal	Connection/color code	Description
M+	+ Meas./gn	+ Measuring voltage (load cell output)
M-	- Meas./gy	- Measuring voltage (load cell output)
S+	+ Sense/wh	+ Sense voltage
S-	- Sense/bk	- Sense voltage
V+	+ Supply/rd	+ Supply voltage
V-	- Supply/bu	- Supply voltage
Housing	Ground (GND)	Screen (ground)

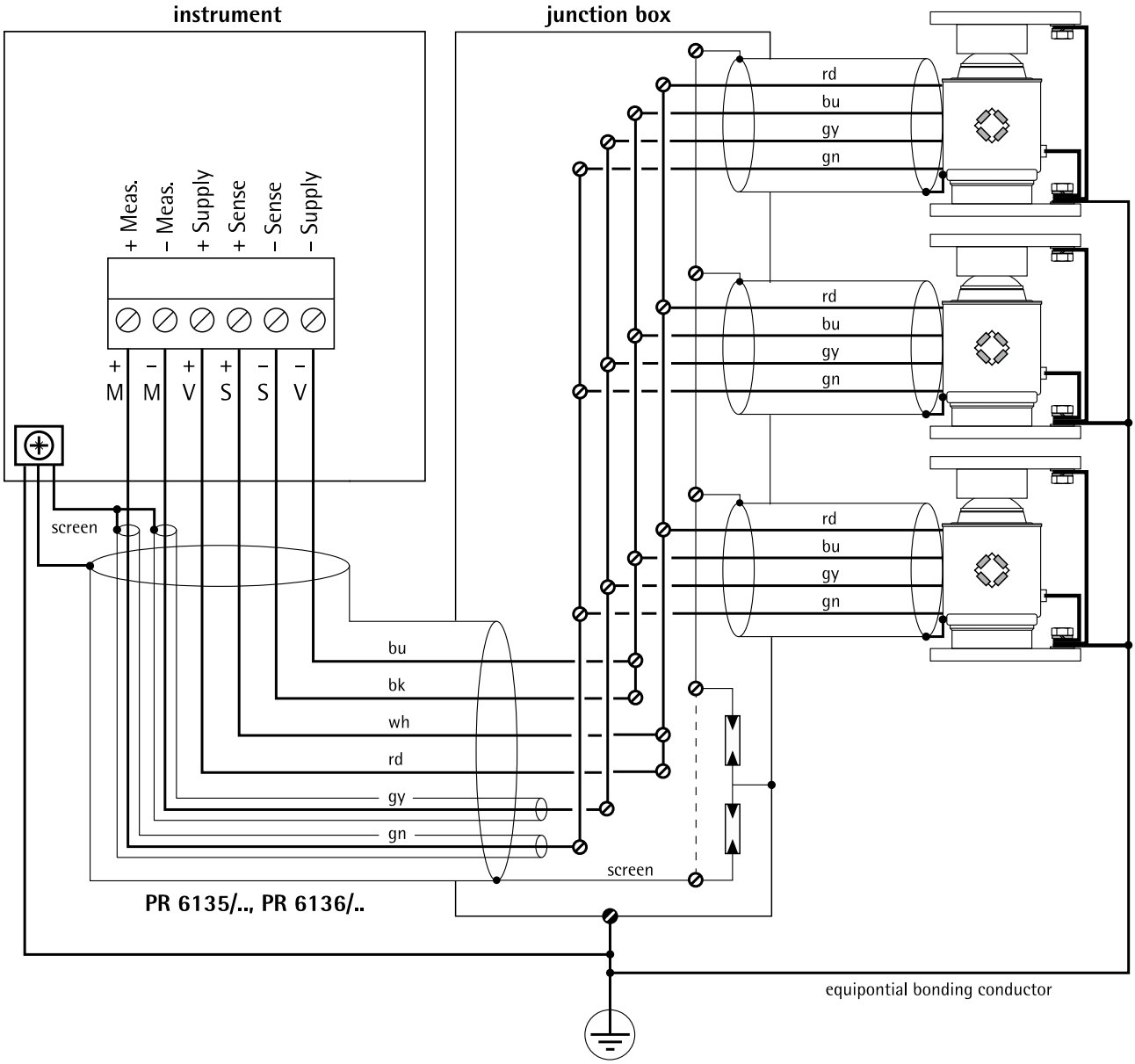
4.5.4 Connecting between 2 and8 load cells (650 Ω) using a 6-wire connection cable

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

Load cell supply circuit

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

For further technical data, see Chapter 17.5.1.



4.5.5 Connecting load cells of type series PR 6221

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

4.5.6 Testing the measuring circuit

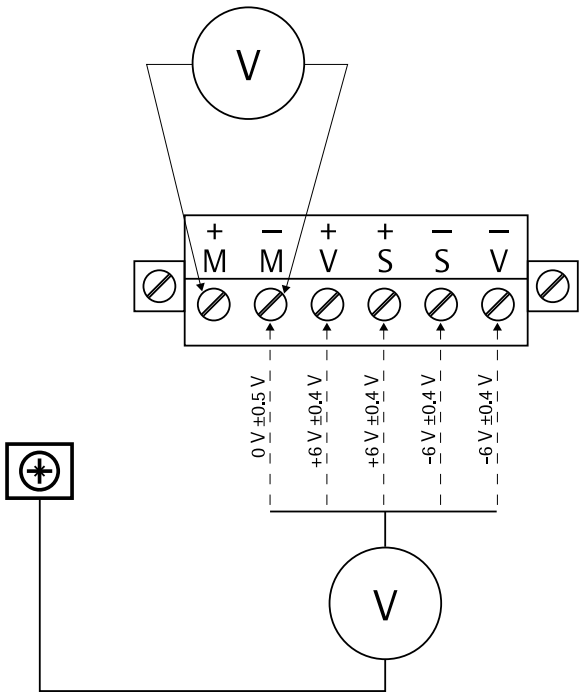
A simple test with the load cells connected can be carried out with a multimeter.

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



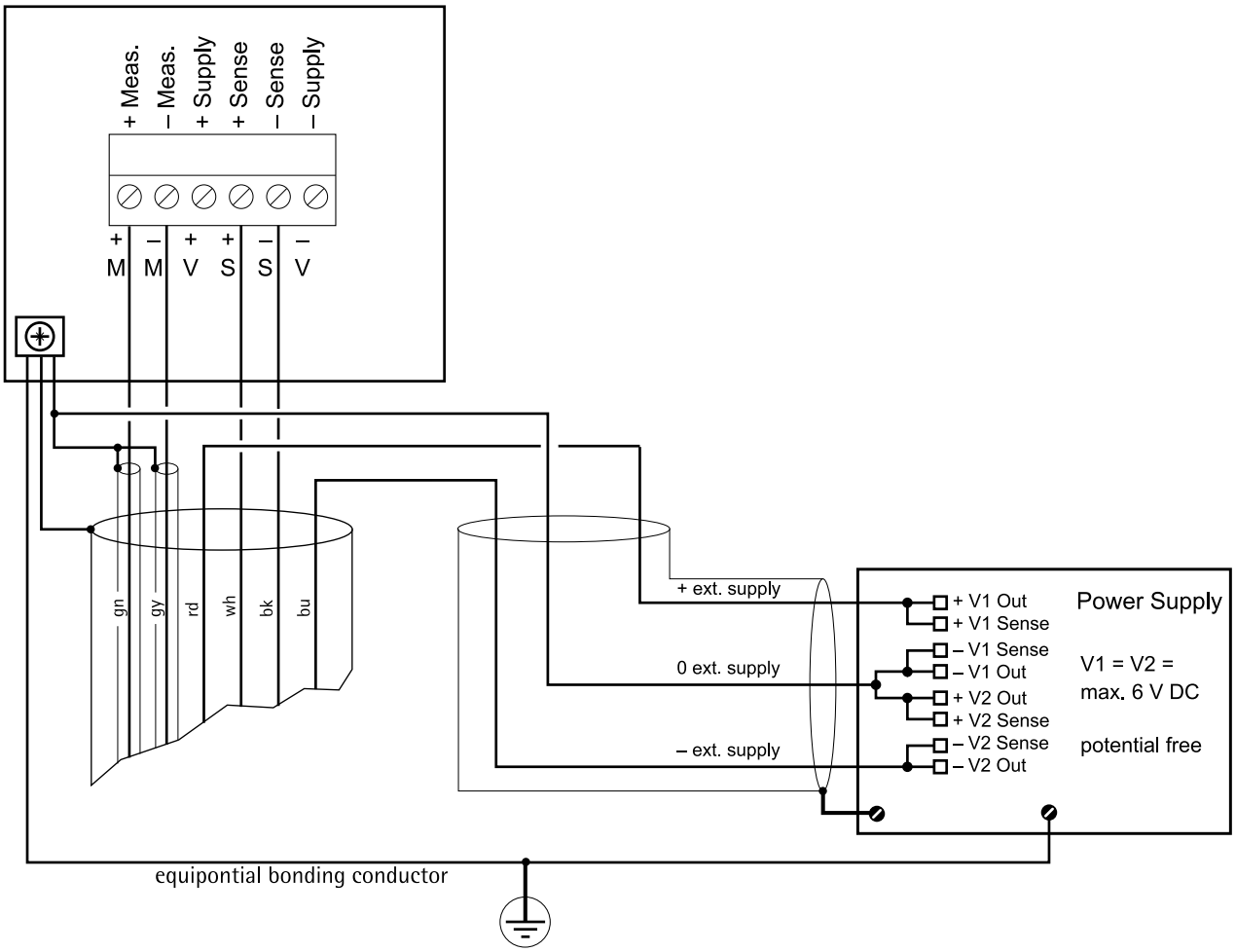
4.5.7 External supply to load cells

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.

If the external supply is <8 V DC (±4 V DC), a solder bridge (closed when delivered) must be opened on the main board (see Chapter 4.5.8) to reduce the sense voltage to below approx. ±4 V DC.



4.5.8 Connecting to input/output interface PR 1626/60

Connections are made via connecting cable PR 6135/.. .

The internal load cell supply voltage (V+, V-) of the PR 5410 must **not** be connected.

Note:

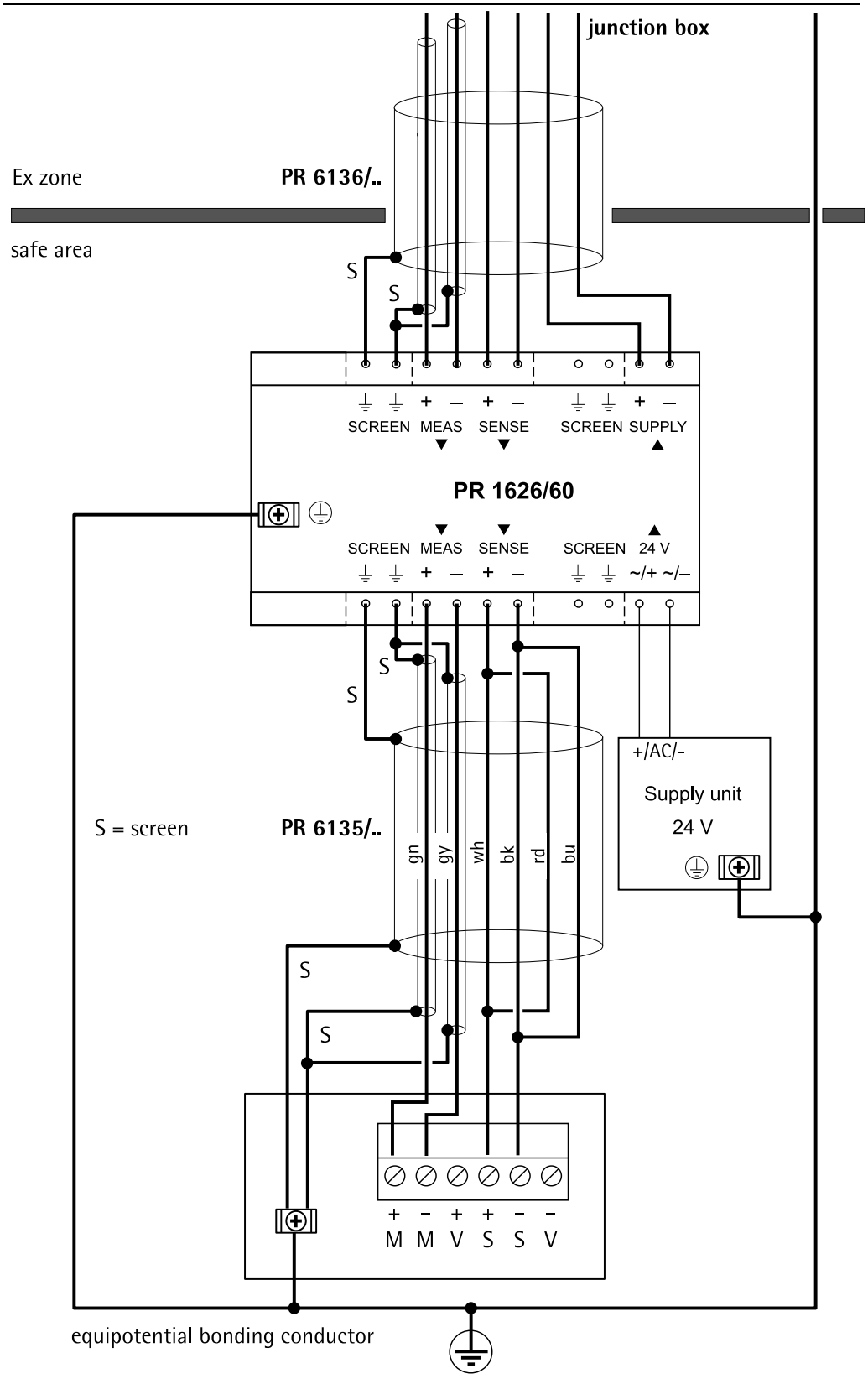
For additional connections, refer to the PR 1626/60 instrument manual.

If the solder bridge MX8 in the PR 1626/60 is closed (7.5 V DC), the solder bridge (12) on the PR 5410 main board must be opened (see Chapter 4.4.1). The sense voltage detection is now switched.

NOTICE

Installation in explosion-hazarded areas

- The screen of the load cell cable and the screen of the connecting cable must not be connected inside the junction box whenever regulations governing installation in explosion-hazarded areas prohibit any connection of the two ends.


junction box
Ex zone
PR 6136/..
safe area
S
S
SCREEN MEAS SENSE SCREEN SUPPLY
PR 1626/60
SCREEN MEAS SENSE SCREEN 24 V
~/+ ~/–
S
S
+/AC/-
Supply unit
24 V
S = screen
PR 6135/..
gn
gy
wh
bk
rd
bu
S
S
+ – + + – –
M M V S S V
equipotential bonding conductor

NOTICE

Flow rate measurement problems may occur.

- It is imperative to connect the equipotential bonding conductor between PR 1626/60 and PR 5410.

4.5.9 Connecting an analog weighing platform (CAP... series)

You can connect an analog weighing platform to the device.

NOTICE

The cable colors shown here are valid, for example, for a CAPP4 500 x 400 and a CAPP1 320 x 420.

- The assignments of cable colors are listed in the relevant weighing platform operating instructions.

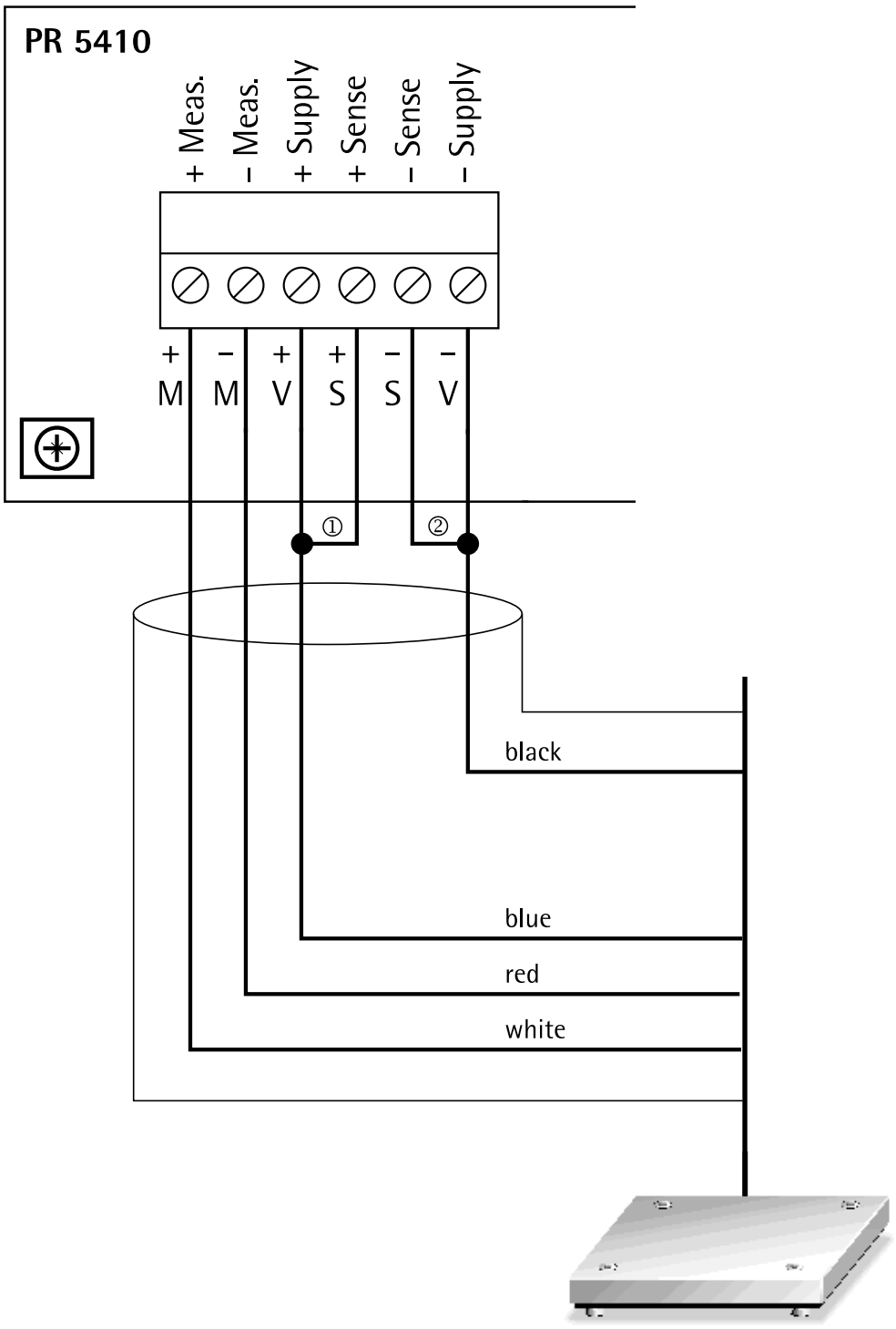
Connection designations

Combics 1 to 3 devices	PR 5410
BR_POS	V+ Supply
SENSE_POS	S+ Sense
OUT_POS	M+ Meas.
OUT_NEG	M- Meas.
SENSE_NEG	S- Sense
BR_NEG	V- Supply

The cable screens must be connected to the grounding terminal of the device. If the measuring lines (+M, -M) are screened individually, these screens must be connected to the grounding terminal as well (see also Chapter 4.3).

Example:

Platform with 4-wire connection



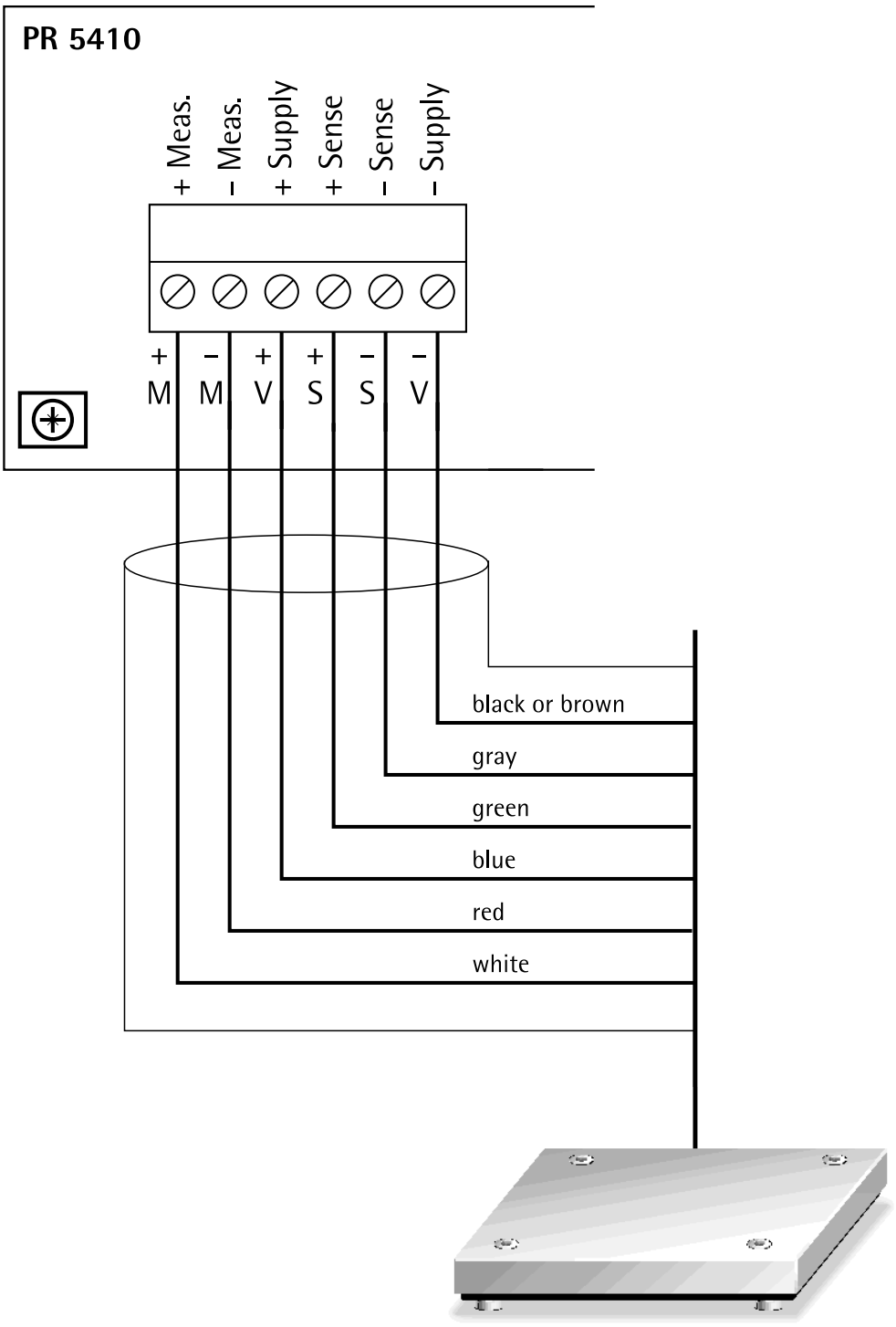
The following links between the terminal contacts are provided:

① from Sense S+ to Supply V+

② from Sense S- to Supply V-

Example:

Platform with 6-wire connection

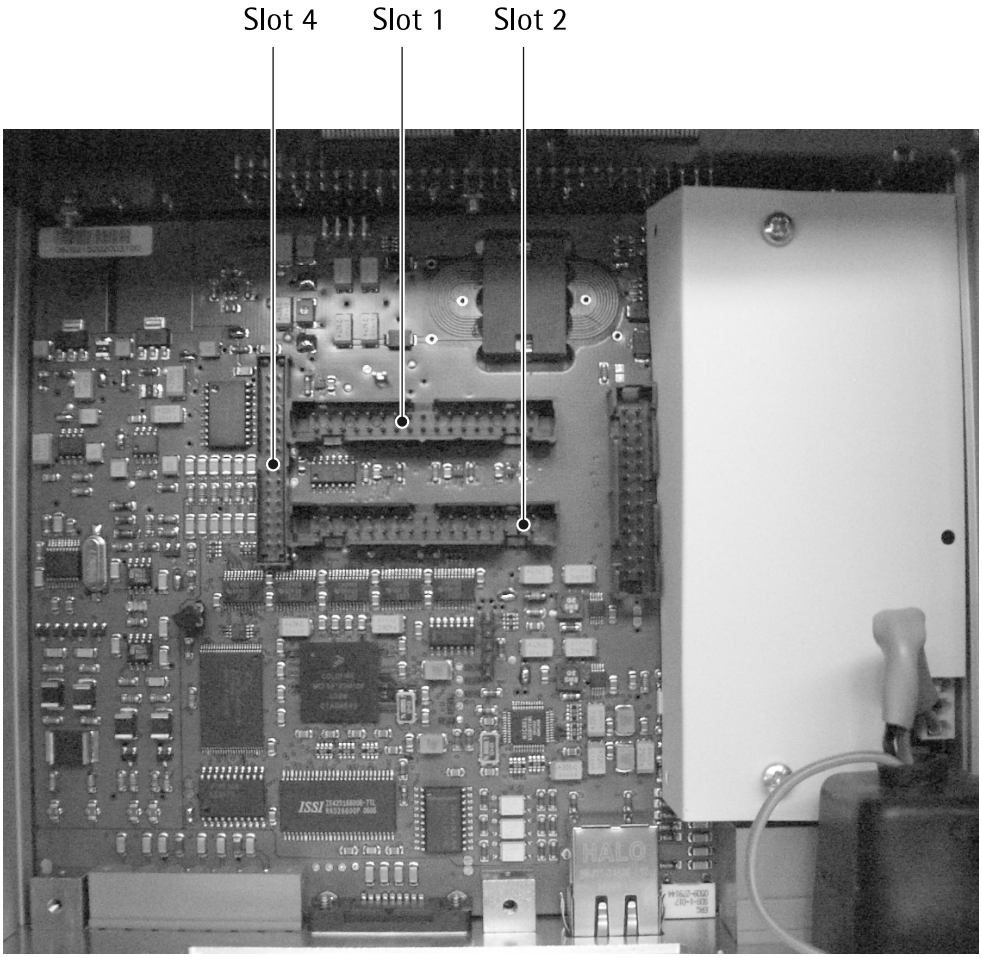


4.6 Accessories

4.6.1 General information

The main board has three additional function-specific slots. These slots can accommodate the following cards:

- "Slot 1" and "slot 2": PR 5510/02 (see Chapter 4.6.2), PR 5510/04 (see Chapter 4.6.3), PR 5510/07 (see Chapter 4.6.4), PR 5510/08 (see Chapter 4.6.5), PR 5510/09 (see Chapter 4.6.6), PR 5510/12 (see Chapter 4.6.9)
- "Slot 4": PR 1721/3x fieldbus card (see Chapter 4.6.11, 4.6.12, 4.6.13, 4.6.14, 4.6.15, 4.6.16)



⚠ WARNING

Working on the device while it is switched on may have life-threatening consequences.

▶ Before installing or removing a plug-in card, the device must be disconnected from all voltage sources.

Note:

After installation/modification, the plug-in cards are detected automatically.

The installed plug-in cards can be displayed via Setup - [Show HW-Slots]; see Chapter 7.18.3.

4.6.1.1 Installing plug-in cards

Note:

The ribbon cables are plugged into the ports (slot 1...2, 4) on the main board.

The cables are coded to protect against incorrect polarity.

A maximum of 2 cards can be mounted. Accordingly, there are two openings in the back panel for the card support plates.

Procedure:

1. Open the device (see Chapter 2.4.2).
2. Remove the corresponding dummy plates on the rear panel (2× M3) and replace them with the support plates for the plug-in cards.
3. Insert the ribbon cables into the appropriate ports on the main board.
4. Close the device again.

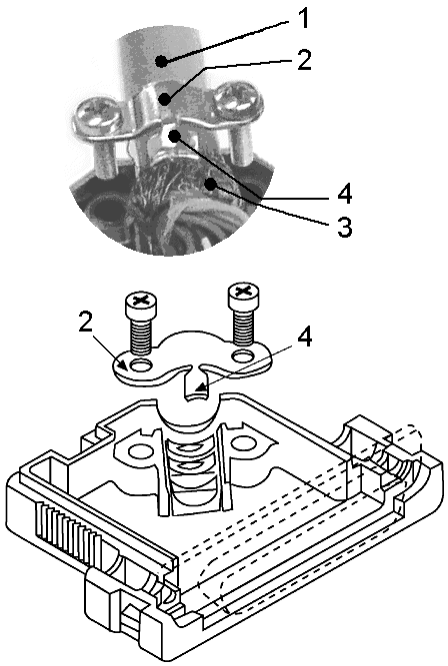
4.6.1.2 Connecting a cable in the D-Sub male connector

The ports on the rear panel are plug-in connections. The conductors taken to the terminals must be as short as possible. The connector housings must be conductive (containing metal) and therefore act as part of the screen. They must be screwed firmly into the rear panel as appropriate.

NOTICE

Property damage is possible.

▶ The cable screen with the metal housing must be connected at both cable ends.



Procedure:

1. Open the connector housing (snap clamps).

2. Loosen and open the cable clip (2).
3. Strip the insulation from the cable approx. 50–60 mm.
4. Cut back the cable screen (3) to 5 mm and bend it over the cable sheath (1).
5. Strip the cable strands 3 mm and solder.
6. Insert the pin housing.
7. Place the cable under the cable clip (2).
   ▷ The grounding tang (4) presses on the wrapped cable screen (3), and the cable clip (2) presses on the cable sheath (1).
8. Close and tighten the cable clip (2).
9. Check the strain relief.
10. Close the connector housing (snap clamps).

4.6.2 2× RS-232-interface

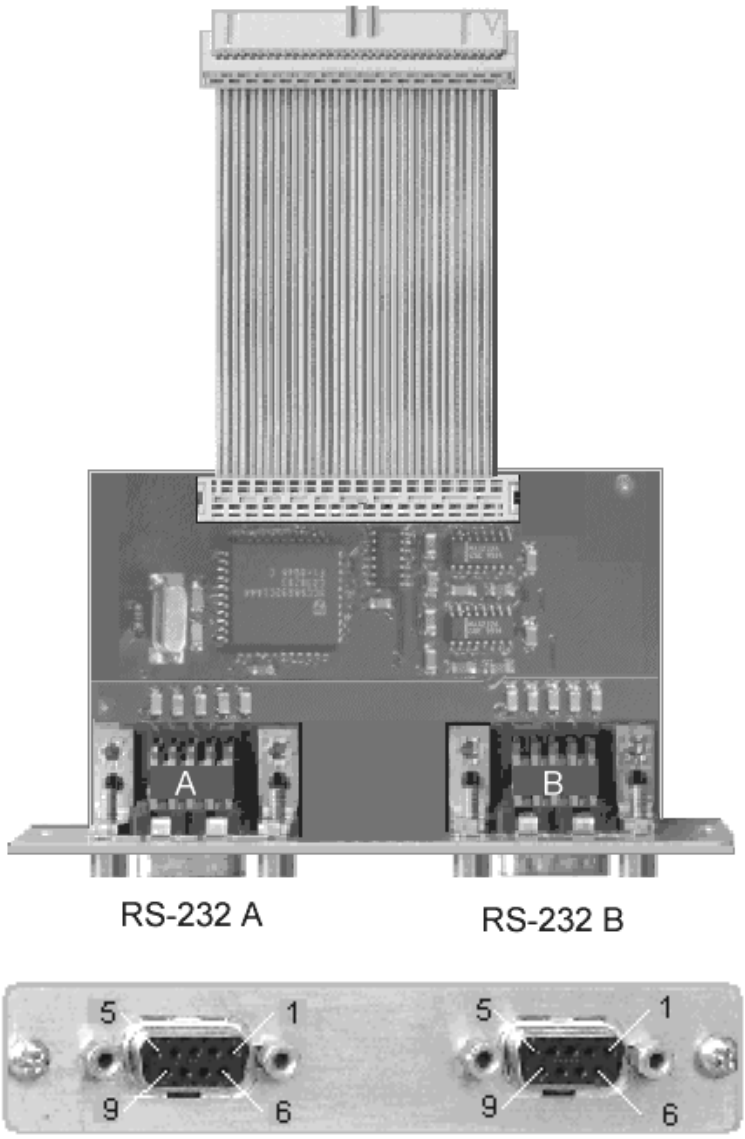
The RS-232 interface card has the type designation PR 5510/02.

The plug-in card has two RS-232 channels (A and B) which can be used simultaneously and independently from each other.

Up to two PR 5510/02 cards can be plugged into "Slot 1" and "Slot 2."

These interfaces are configurable, and can be used, for example, for data transmission to a remote display or printer.

The RS-232 interface can only be used as a point-to-point connection.

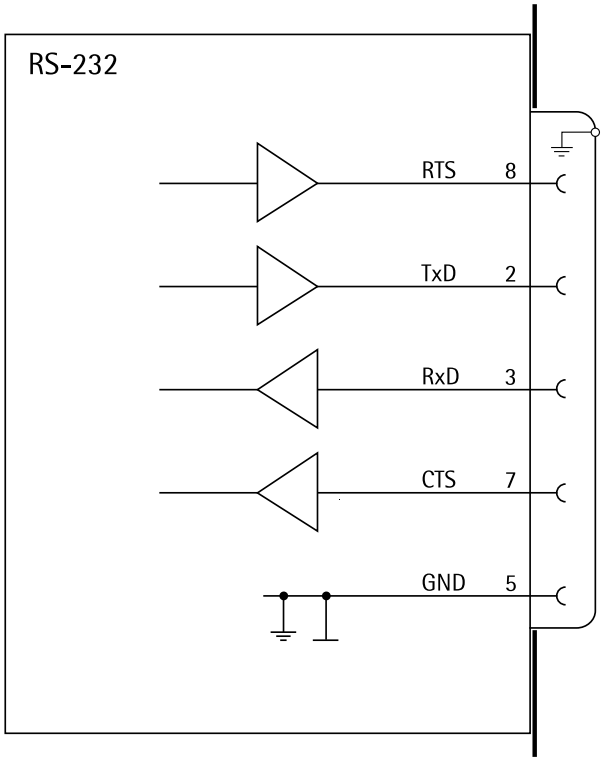


Specifications

Description	Data
Connection	2× D-Sub female connector, 9-pin
Number of channels	2 (RS-232 A and RS-232 B)
Type	RS-232, full duplex
Transmission rate [Bit/s]	300...19K2 Bit/sec
Data bits	7/8
Input signal level	Logic 1 (high) -3...-15 V Logic 0 (low) +3...+15 V
Output signal level	Logic 1 (high) -5...-15 V Logic 0 (low) +5...+15 V
Number of signals	Input: RxD, CTS Output: TxD, RTS

Description	Data
Potential isolation	None
Cable type	Twisted pair, screened (e.g. LifYCY 3×2×0.20), 1 pair of wires for ground (GND).
Cable gauge	1.5 mm^2
Cable length	max. 15 m

Block diagram RS-232



Note:

For more information, see Chapter 4.4.4.

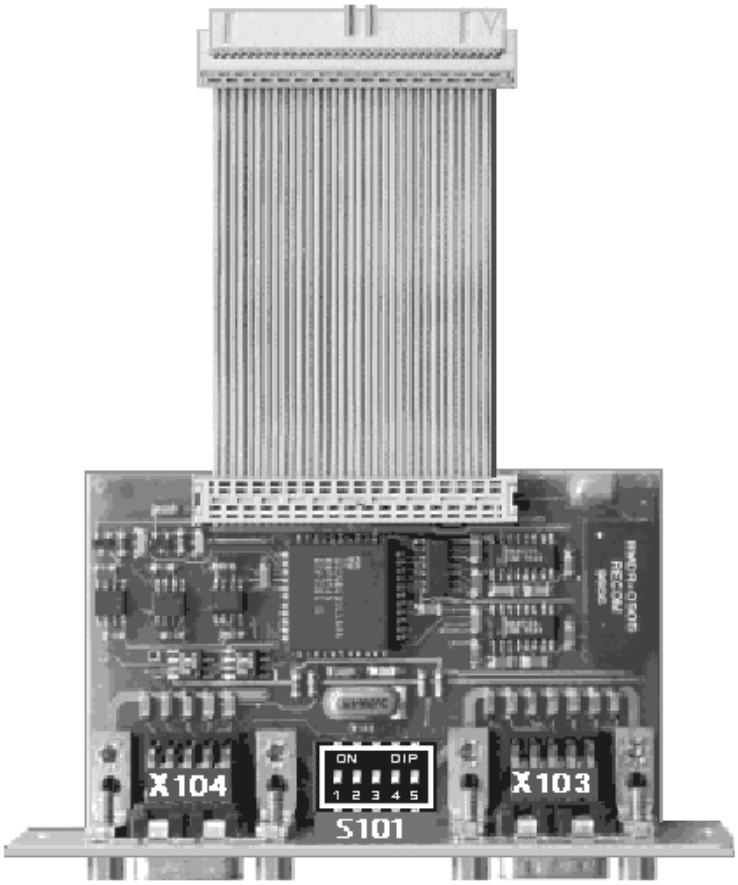
4.6.3 1× RS-232 interface and 1× RS-485 interface

This interface card has the type designation PR 5510/04.

The plug-in card has one RS-232 channel and one RS-422/485 channel which can be used simultaneously and more or less independently (depending on the transfer rate) from each other.

Up to two PR 5510/04 cards can be plugged into "Slot 1" and "Slot 2."

These interfaces are configurable, and can be used, for example, for data transmission to a remote display or printer.



Specifications

Description	Data
Connection	2× D-Sub female connector, 9-pin
Number of channels	2 (RS-232 and RS-422/485)
Transmission rate [Bit/s]	300, 600, 1200, 2400, 4800, <9600>, 19200 bit/sec
Cable type	Twisted pair, screened (e.g. LifYCY 3×2×0.20), 1 pair of wires for ground (GND).
Cable gauge	1.5 mm^2

<...> = preset values (factory settings)

4.6.3.1 RS-232 channel

The RS-232 interface depends on the "S101" switch settings.

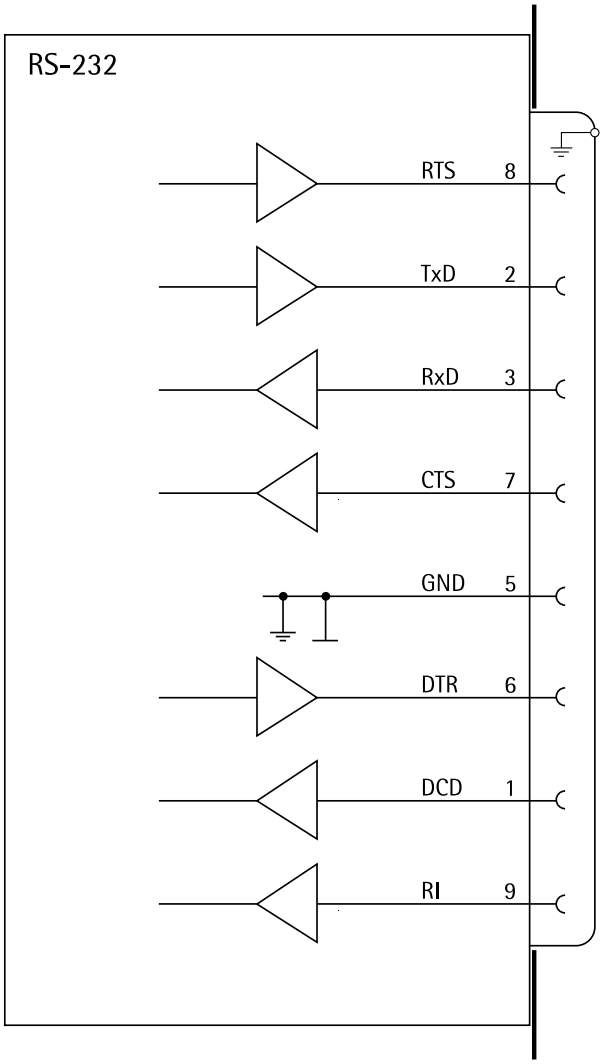
It can only be used as a point-to-point connection.

PR 5510/04 is set up in the RS-232 channel the same as the fixed interface, but it has additional signals: DCD, RI, DTR.

Specifications

Description	Data
Type	RS-232, full duplex
Data bits	7/8
Input signal level	Logic 1 (high) -3...-15 V Logic 0 (low) +3...+15 V
Output signal level	Logic 1 (high) -5...-15 V Logic 0 (low) +5...+15 V
Number of signals (24 V)	Input: RxD, CTS, DCD, RI Output: TxD, RTS, DTR
Potential isolation	None
Cable length	max. 15 m

Block diagram RS-232



Note:

For more information, see Chapter 4.4.4.

4.6.3.2 RS-485 channel

The RS-485/422 interface must be configured using switch "S101" after being installed on the card.

The RS-485 interface can also be used as a point-to-point connection.

Using RS-485 is compulsory with a multi-point connection (Tristate status).

Specifications

Description	Data
Type	RS-422/485, full duplex (4-wire) RS-485, half duplex (2-wire)
Bits/stopbit	<8/1> or 7/1

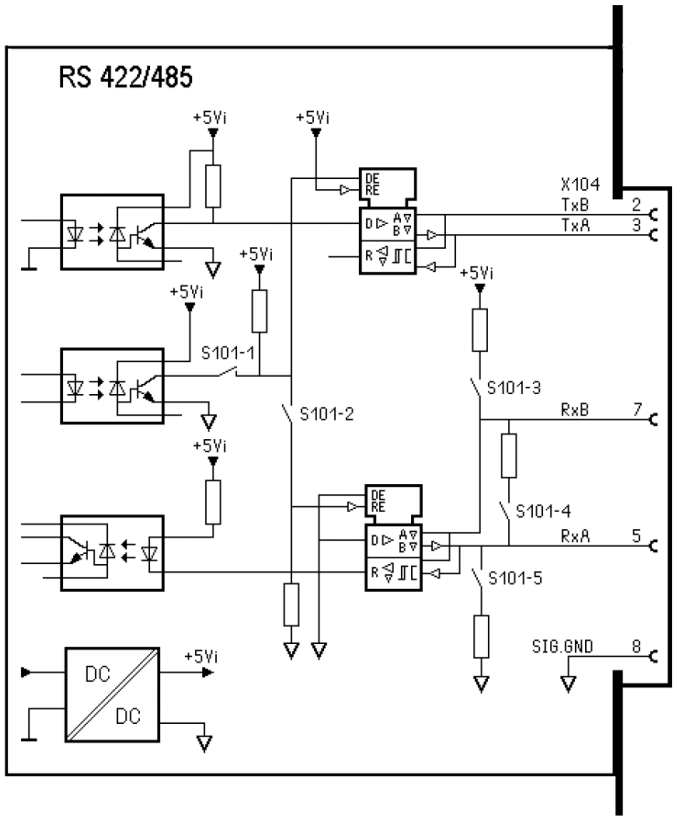
Description	Data
Parity	Even, <odd>, none
Signals	TxA, RxA, TxB, RxB
Potential isolation	Yes
Cable length	max. 1000 m

<...> = preset values (factory settings)

Switch S101

Factory setting:

RS-422/485 block diagram



S	Function	Settings for RS-422/485	
1	Tx enable (unblock)	OFF: RS-422	ON: RS-485
2	Rx enable (unblock)	OFF: 4-wire	ON: 2-wire
3	Rx pull-up resistor	OFF: not connected	ON: (RxB 1K54 Ω +V)
4	Rx bus termination	OFF: not connected	ON: (RxA 205E Ω RxB)
5	Rx pull-down resistor	OFF: not connected	ON: (RxA 1K54 Ω -V)

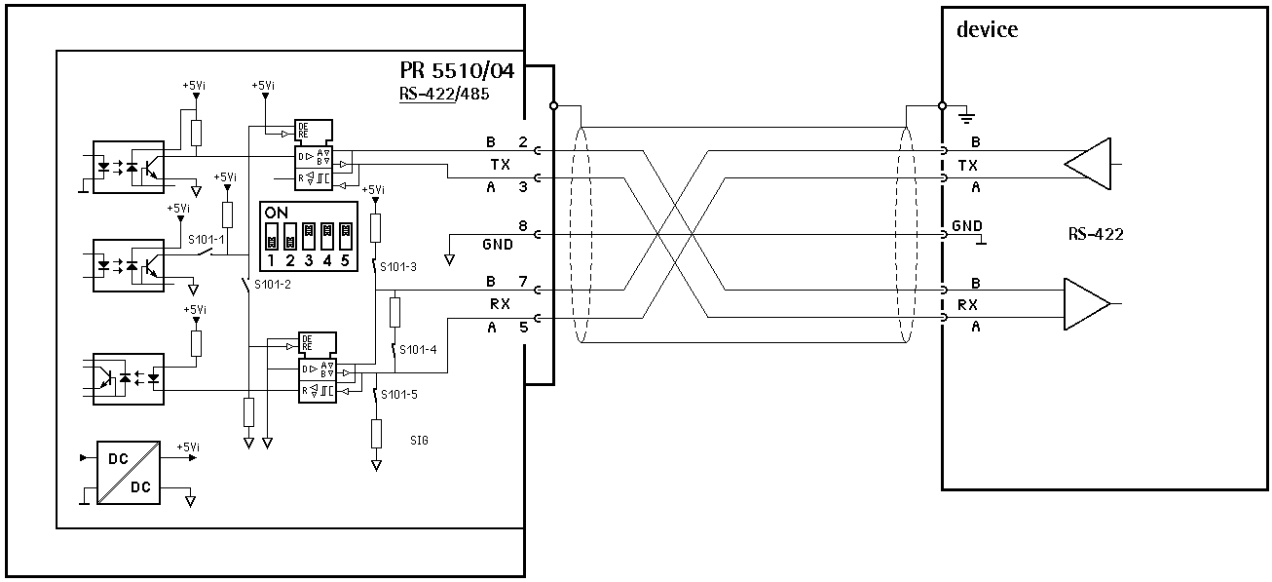
Switch setting mode

S101	2-wire system Point to point	Bus	4-wire system Point to point	Bus
Master	RS-485 1, 2, 3, 4, 5 = ON	RS-485 1, 2, 3, 4, 5 = ON	RS-422 4 = ON 1, 2, 3, 5 = OFF	RS-422 3, 4, 5 = ON 1, 2 = OFF
Individual slave	RS-485 1, 2 = ON 3, 4, 5 = OFF	...	RS-422 4 = ON 1, 2, 3, 5 = OFF	...
Other slaves	...	RS-485 1, 2 = ON 3, 4, 5 = OFF	...	RS-485 1 = ON (default) 2, 3, 4, 5 = OFF
Last slave	...	RS-485 1, 2, 3, 4, 5 = ON	...	RS-485 1, 3, 4, 5 = ON 2 = OFF

4.6.3.2.1 RS-422 point-to-point connection (4-wire)

4-wire transfer mode:

Full duplex (simultaneous sending and receiving possible) RS-422 can only be used for point-to-point connection.



Switch settings	Configuration
ON: S3, S4, S5 OFF: S1, S2	Setup - [Serial ports parameter]- [...]- [Slot 1/2 RS485]

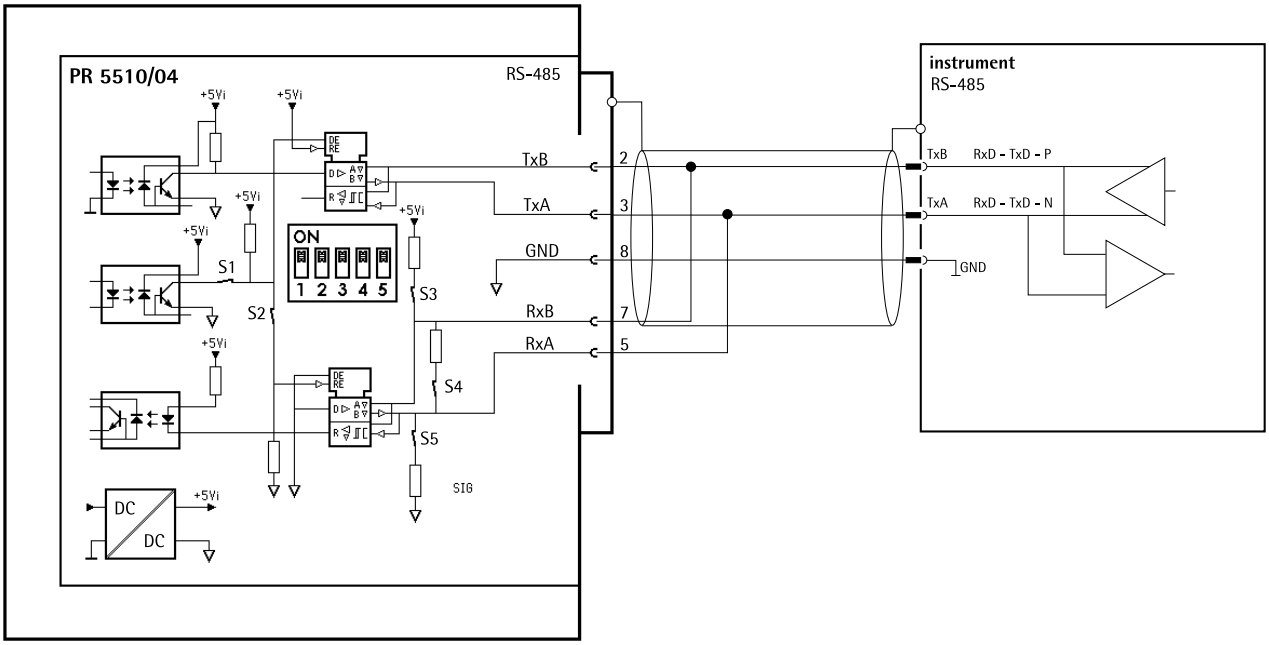
Note:

For more information on the switch settings, see Chapter 4.6.3.2.

4.6.3.2.2 RS-485 point-to-point connection (2-wire)

2-wire transfer mode:

Half duplex (simultaneous sending and receiving not possible)



Switch settings	Configuration
ON: S1, S2, S3, S4, S5 OFF: ...	Setup - [Serial ports parameter]- [...]- [Slot 1/2 RS485]

Note:

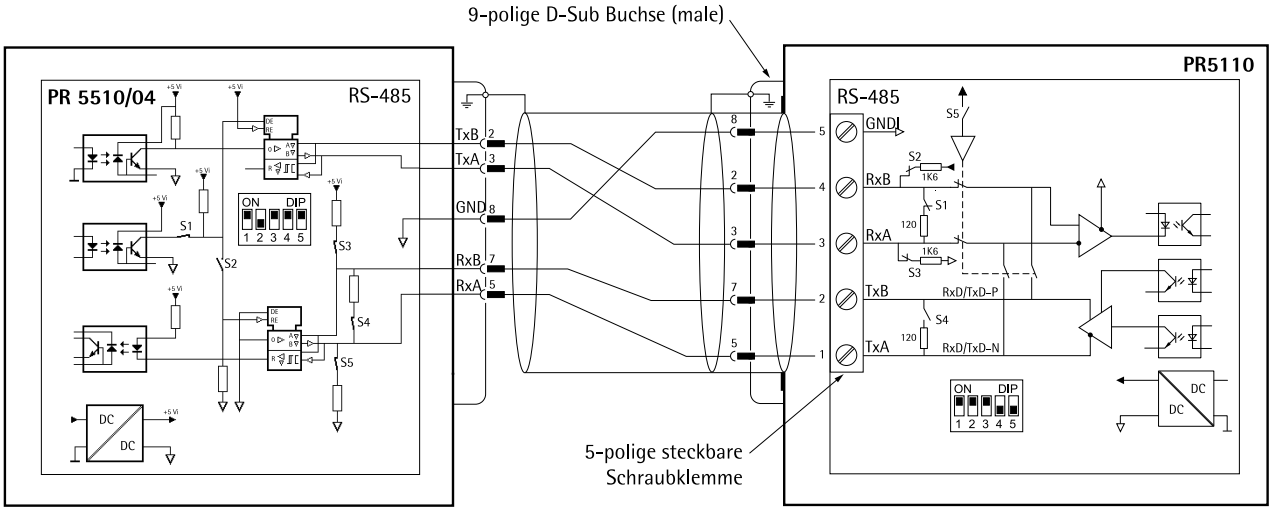
For more information on the switch settings, see Chapter 4.6.3.2.

4.6.3.2.3 Connecting a PR 5110 remote display

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

Four-wire transmission, point-to-point connection, full duplex (simultaneous sending and receiving) is possible with the remote display.

Example:



Switch settings PR 5410	PR 5110 switch settings
ON: S1, S3, S4, S5 OFF: S2	ON: S1, S2, S3 OFF: S4, S5

Configuration PR 5410	PR 5110 configuration
Setup - [Serial ports parameters]- [Remote display]- [Slot 1/2 RS-485] [Param]- [Mode]- [single transmitter]	[Setup]- [oP 10]- [LInE]- [rS485] [Setup]- [oP 12]- [tokEn]- [oFF] [Setup]- [oP 13]- [SEndModE]- [SEnd] [Setup]- [oP 14]- [WEIght]- [FolloW] [Setup]- [oP 15]- [WPkEy]- [SElEct]

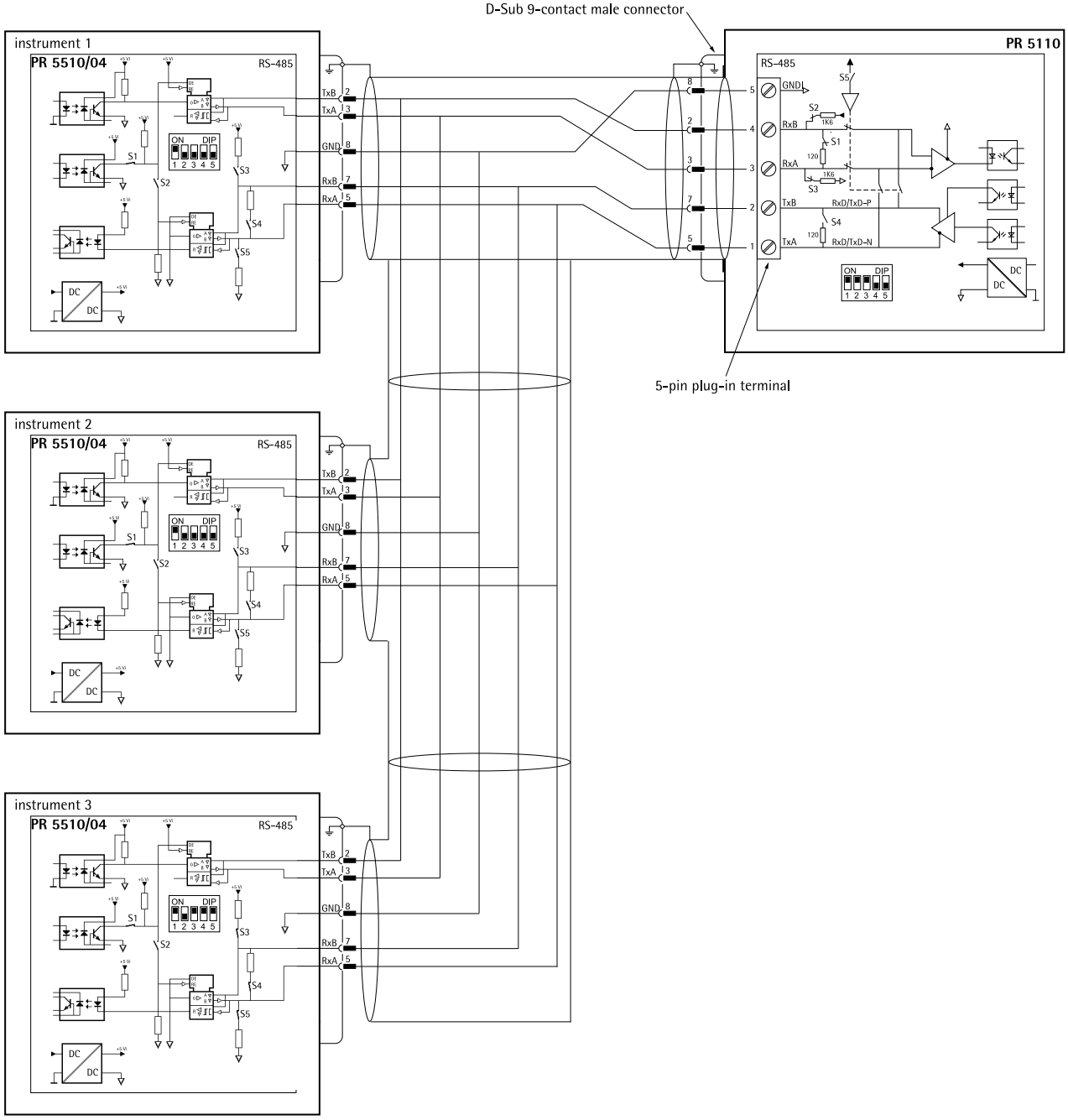
The following operations are possible from the connected remote display:

- Display current weight mode
- Set tare
- Reset tare
- Set zero
- Start printout

4.6.3.2.4 Connecting a PR 5110 remote display to several PR 5410

The remote display PR 5110 can be connected to multiple RS-485 interfaces.

Four-wire transmission and full duplex (simultaneous sending and receiving possible) is possible.



Switch settings

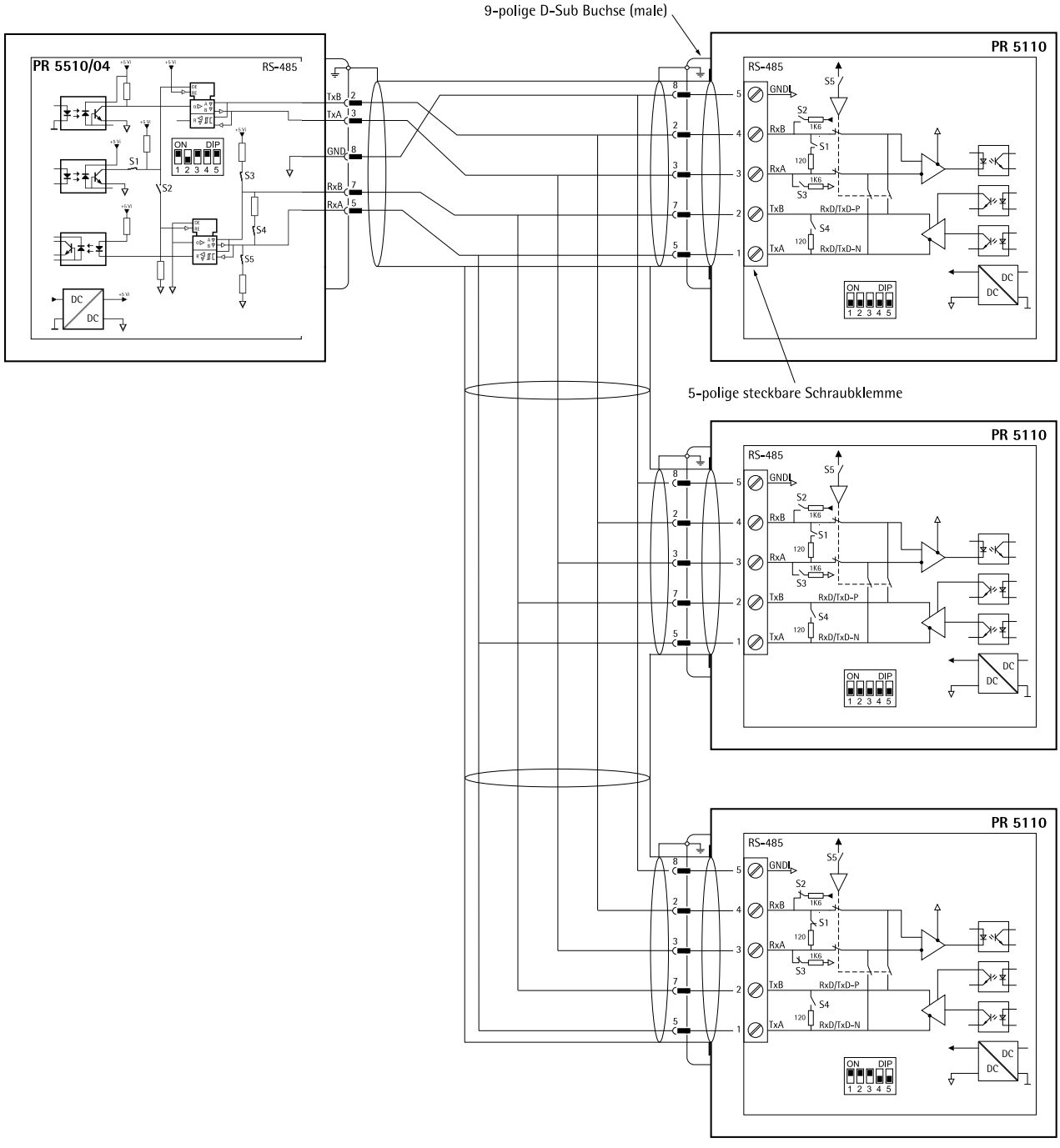
PR 5410-1	PR 5410-2	PR 5410-3	PR 5110
ON: S1 OFF: S2, S3, S4, S5	ON: S1 OFF: S2, S3, S4, S5	ON: S1, S3, S4, S5 OFF: S2	ON: S1, S2, S3 OFF: S4, S5

Configuration

PR 5410-1	PR 5410-2	PR 5410-3	PR 5110
Setup - [Serial ports parameter]- [Remote display]- [Slot 1/2 RS485] [Param][Mode multiple transmitters] [Param] - [Device Id A] [Param] - [Next Device Id B]	Setup - [Serial ports parameter]- [Remote display]- [Slot 1/2 RS485] [Param][Mode multiple transmitters] [Param] - [Device Id B] [Param] - [Next Device Id C]	Setup - [Serial ports parameter]- [Remote display]- [Slot 1/2 RS485] [Param][Mode multiple transmitters] [Param] - [Device Id C] [Param] - [Next Device Id A]	[Setup]- [oP 10]- [LInE]- [rS485] [Setup]- [oP 12]- [tokEn]- [ActIvE] [Setup]- [oP 13]- [SEnd-ModE]- [SEnd] [Setup]- [oP 14]- [WEIght]- [FolloW] [Setup]- [oP 15]- [WPkEy]- [SElEct]

4.6.3.2.5 Connecting multiple PR 5110 remote displays

Multiple PR 5110 remote displays can be connected via the RS-485 interface.
Four-wire transmission and full duplex (simultaneous sending and receiving) is possible.
Example:



Switch settings

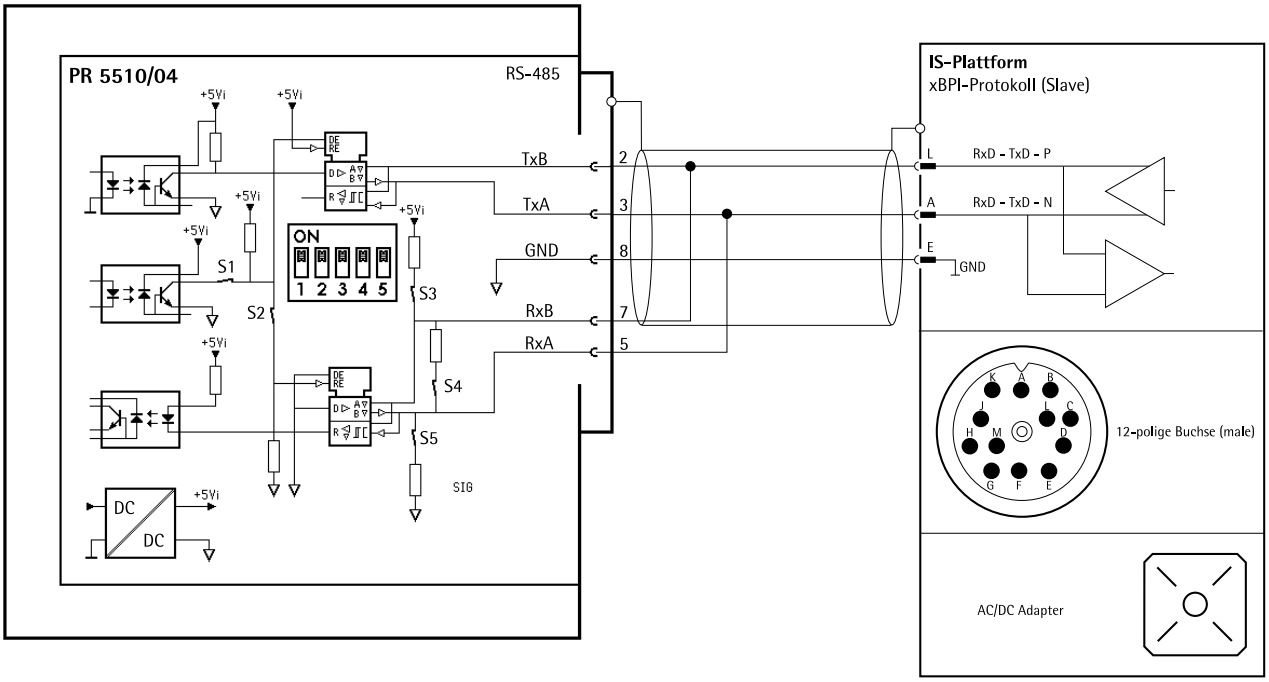
PR 5410	PR 5110-1	PR 5110-2	PR 5110-3
ON: S1, S3, S4, S5 OFF: S2	ON: --- OFF: S1, S2, S3, S4, S5	ON: --- OFF: S1, S2, S3, S4, S5	ON: S1, S2, S3 OFF: S4, S5

Configuration

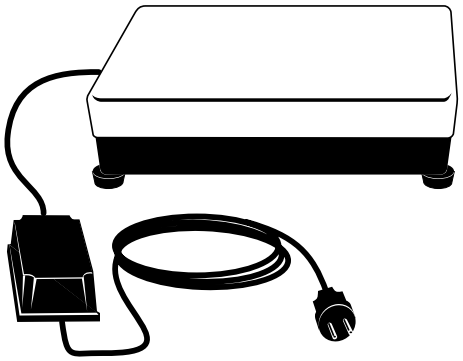
PR 5410	PR 5110-1	PR 5110-2	PR 5110-3
[Setup] - [Serial ports parameters]- [Remote display]- [Slot 1/2 RS-485] [Param]- [Mode]- [single transmitter]	[Setup]- [oP 10]- [LInE]- [rS485] [Setup]- [oP 12]- [tokEn]- [oFF] [Setup]- [oP 13]- [SEnd-ModE]- [SEnd] [Setup]- [oP 14]- [WEIght]- [FolloW] [Setup]- [oP 15]- [WPkEy]- [SElEct]	[Setup]- [oP 10]- [LInE]- [rS485] [Setup]- [oP 12]- [tokEn]- [oFF] [Setup]- [oP 13]- [SEnd-ModE]- [SEnd] [Setup]- [oP 14]- [WEIght]- [FolloW] [Setup]- [oP 15]- [WPkEy]- [SElEct]	[Setup]- [oP 10]- [LInE]- [rS485] [Setup]- [oP 12]- [tokEn]- [oFF] [Setup]- [oP 13]- [SEnd-ModE]- [SEnd] [Setup]- [oP 14]- [WEIght]- [FolloW] [Setup]- [oP 15]- [WPkEy]- [SElEct]

4.6.3.2.6 Connecting an IS platform

One IS platform scale with xBPI or SBI protocol can be connected via the RS-485 interface (2-wire).



Switch settings PR 5410	Configuration PR 5410
ON: S1, S2, S3, S4, S5 OFF: ...	[Setup] - [Serial ports parameters]- [xBPI port]- [Slot 1/2 RS-485]



Note:

For further information, see the platform scale operating instructions.

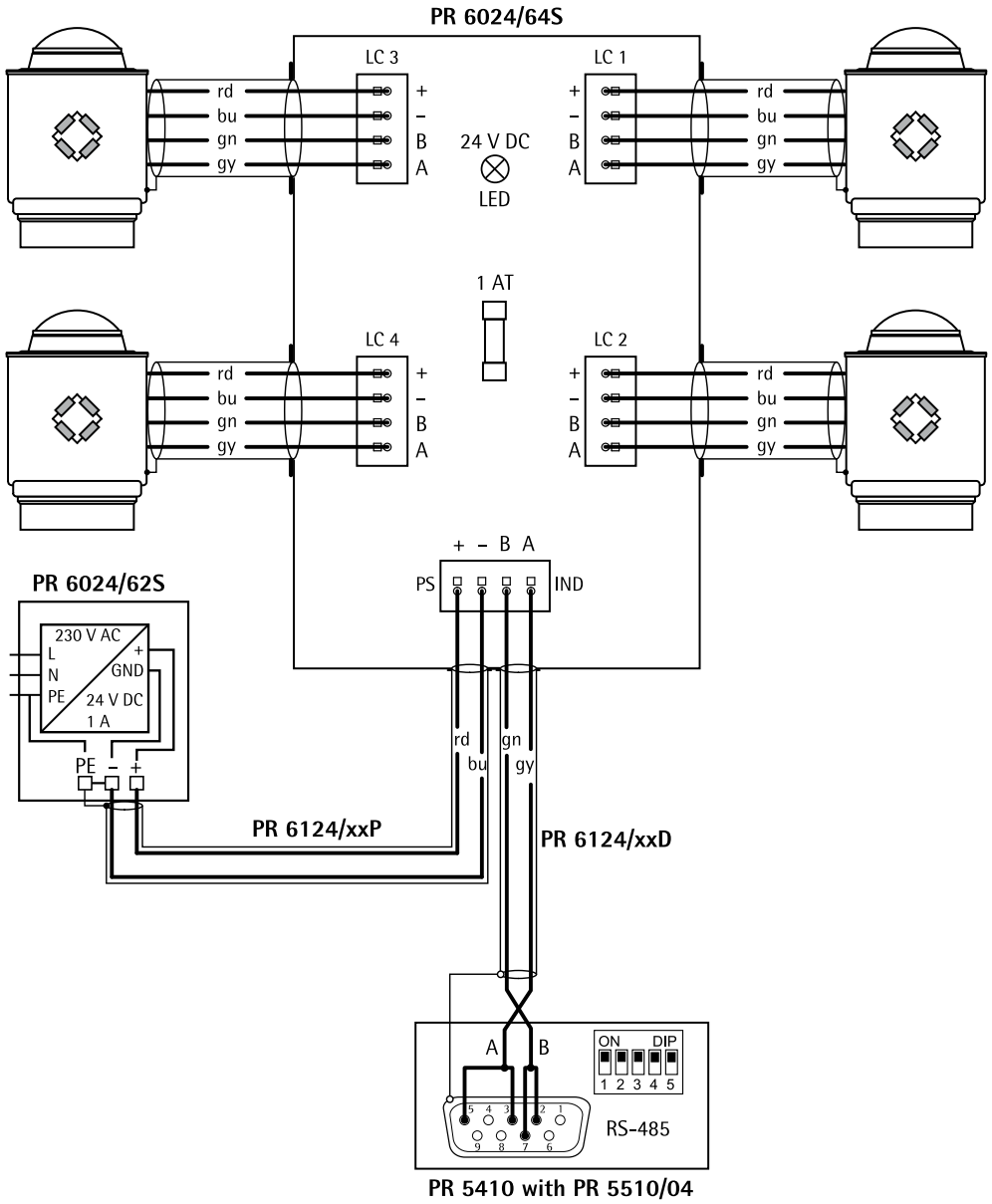
4.6.3.2.7 Connecting digital load cells from type Pendeo®

The device can be ported to Pendeo® type digital load cells via the xBPI port and the RS-485 interface (2-wire).

Connections

Color code	Color	Terminal designation	Description
rd	red	+	+ Supply voltage
bu	blue	-	- Supply voltage
gr	green	B	B Signal
gy	gray	A	A Signal

The following example shows the connection to the PR 6024/64S junction box using 4 digital load cells, type Pendeo®.



PR 5410 switch settings	PR 5410 configuration
ON: S1, S2, S3, S4, S5 OFF: ...	Setup - [Serial ports parameter]- [xBPI-Port]- [Slot 1/2 RS485]

Note:

For further information, see the installation manuals relating to the load cells and junction boxes.

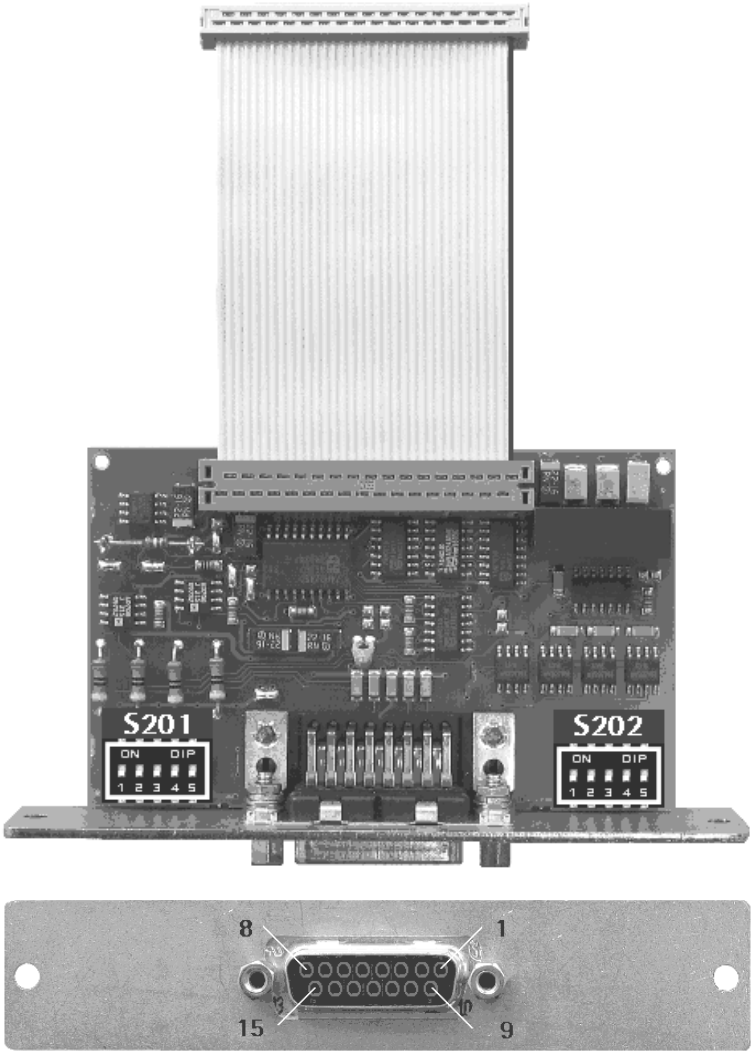
4.6.4 Analog inputs and outputs

This interface card has the type designation PR 5510/07.

The plug-in card has one active analog output and four analog inputs. The analog inputs are not supported by the standard device.

Only one PR 5510/07 card can be plugged into "Slot 1" or "Slot 2."

The analog inputs must be configured using switches "S201" and "S202" after being installed on the card.



Analog inputs

PIN	2	9	3	10	4	11	5	12
4 channels	+CH1	GND	+CH2	GND	+CH3	GND	+CH4	GND

Analog output

PIN	13	14
1 channel	+0/4...20 mA	Sig GND

Note:

For more information, see Chapter 4.6.1.

Specifications

Description	Data
Connection	D-Sub female connector, 15-pin
Output: Qty	1 active current output: 0/4...20 mA (max. 24 mA), 10 V output voltage via external 500 Ω resistor
Output: Function	Gross/net weight/display tracking, configurable
Output: Range	0/4...20 mA, configurable
Output: Resolution	intern 16 bits = 65536 parts, Resolution of 20,000 @ 20 mA
Output: Linearity error	@ 0...20 mA: <0.04 % @ 4...20 mA: 0.02 %
Output: Temperature error	<100 ppm/K
Output: Zero point error	0.05%
Output: Max. error	<0.1%
Output: Load	max. 0...500 Ω
Output: Short-circuit protected	yes
Output: Potential isolation	yes
Inputs:	4× channel current or voltage input 0...20 mA, input impedance 250 Ω 0...10 V, input impedance 100 kΩ 0...5 V, input impedance >10 MΩ
Input: Resolution	3000 internal digits accordingly e.g., 0...20 mA/0...10 V
Input: Accuracy	0.2%
Input: Linearity error	<0.03%
Input: Temperature error	<50 ppm/K
Input: Reserve	±15 %, i.e., –1.5 V...+11.5 V
Input: Potential isolation	no
Cable type	Screened twisted pair (e.g. LifYCY 2x2x0.20)
Cable length	<150 m screened
Accessories	D-Sub male connector, 15-pin

Switch for analog inputs

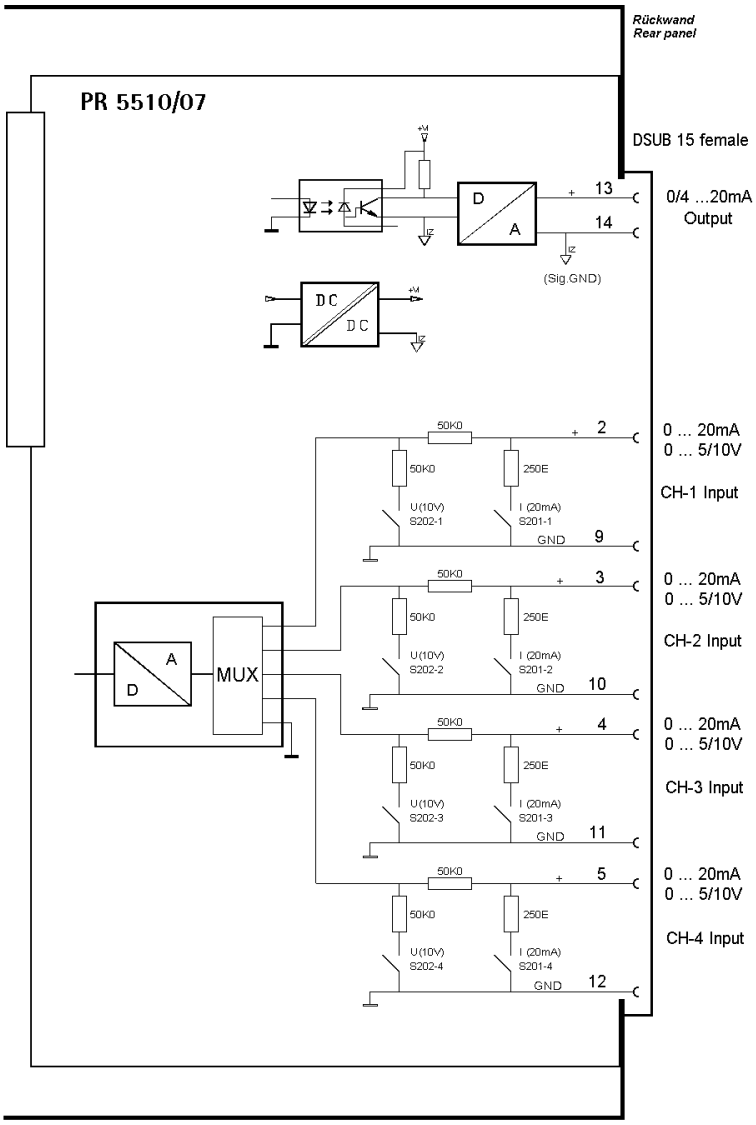
Factory setting:

S201

Factory setting:

S202

PR 5510/07 block diagram



S	Channel	Current 0...+20 mA DC	Voltage 0...+10 V DC	Voltage 0...+5 V DC
S201-1	CH1	ON	OFF	OFF
S201-2	CH2	ON	OFF	OFF
S201-3	CH3	ON	OFF	OFF
S201-4	CH4	ON	OFF	OFF
S201-5	...	...	...	...
S202-1	CH1	OFF	ON	OFF
S202-2	CH2	OFF	ON	OFF
S202-3	CH3	OFF	ON	OFF
S202-4	CH4	OFF	ON	OFF

S	Channel	Current 0...+20 mA DC	Voltage 0...+10 V DC	Voltage 0...+5 V DC
S202-5	...	...	...	...
Input impedance		250 Ω	100 kΩ	>10 MΩ

4.6.5 BCD output (open emitter)

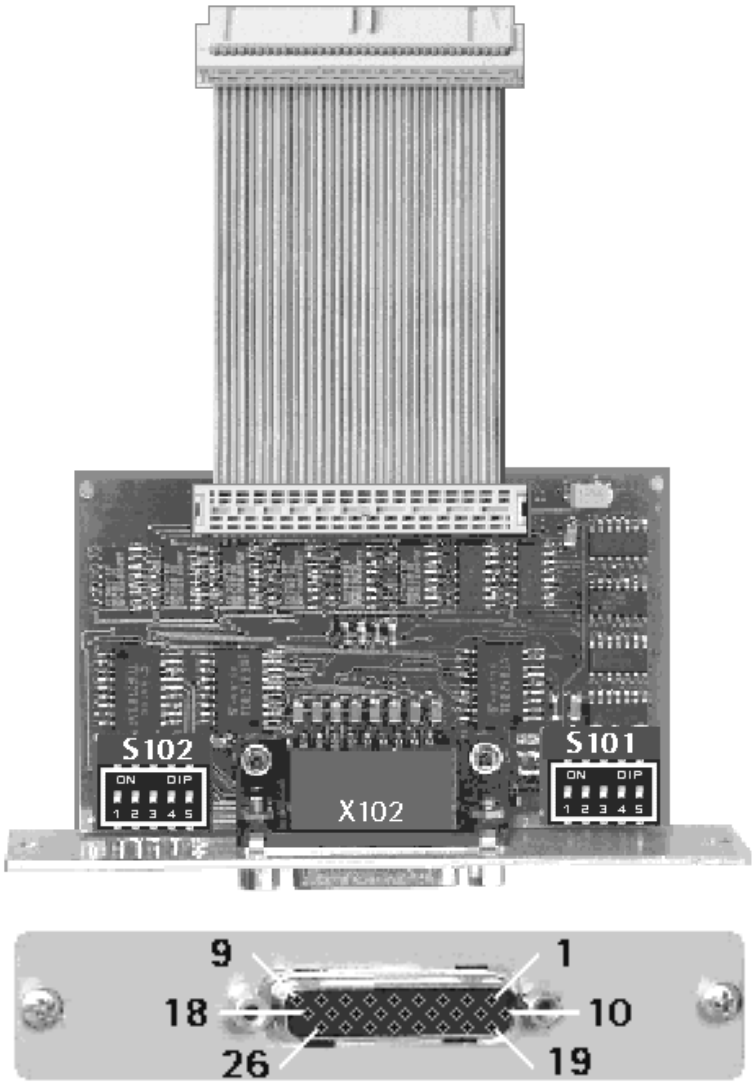
This interface card has the type designation PR 5510/08.

A PR 5510/08 card can be plugged into "Slot 1" or "Slot 2."

The plug-in card is used for BCD-coded output of a 5-decade weight value.

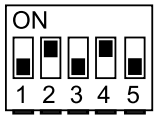
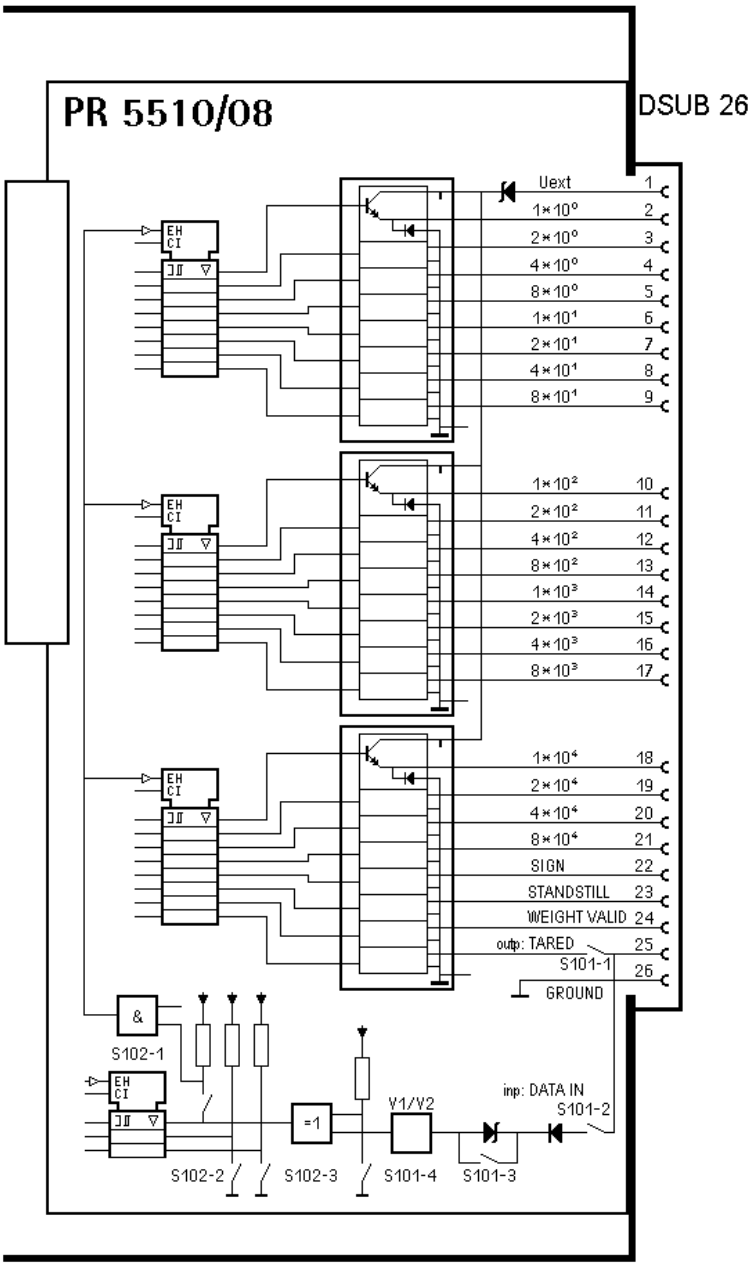
Cyclical output of the weight value with 4-bit (plus or minus sign, stability, error). The value is intrinsically consistent and can be output continuously or the digital input "DATA_IN" control can be used to freeze (hold) the value.

Before installing the card, set switches "S101" and "S102".



Specifications

Description	Data
Connection	D-SUB female connector, 26-pin
Output: Qty	5 digit BCD + preceding sign
Input: Qty	1 bit "DATA_IN"
Output level	Shared collector at +Uext., open emitter
External supply	+5 V...+24 V DC
Voltage drop	Approx. 1.7 V
Output current	Max. 50 mA
Enable input	5 V/24 V configurable via switch S101 @ 5 V active-high >3.1 V; active-low <1.5 V @ 24 V active-high >16 V; active-low <10 V Protection against incorrect polarity
Potential isolation	No
Cable type	Screened twisted pair (e.g. LifYCY 2x2x0.20)
Cable length	max. 50 m screened
Accessories	D-SUB male connector, 26-pin Incl. shielded housings

Switch for input	PR 5510/08 block diagram
Factory setting: S102 Factory setting: S101 	 An external power supply is required: PIN 1 (Uext), reference potential PIN 26 (GND)

4.6.5.1 Outputs

The outputs for PR 5510/08 (PIN 2...24) work with a shared power supply at the collector as a reference potential and open emitter outputs.

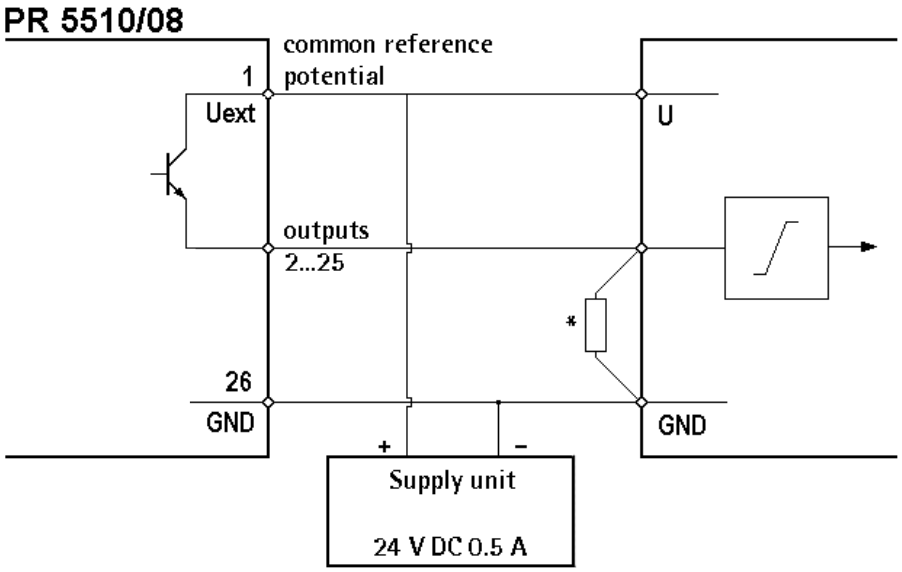
A non-active output is highly resistant.

A voltage of approx. 1.7 V, which is less than the supply voltage, is applied to an active output.

The load to be connected is between the outputs (PIN 2...24, 25) and GND (PIN 26).

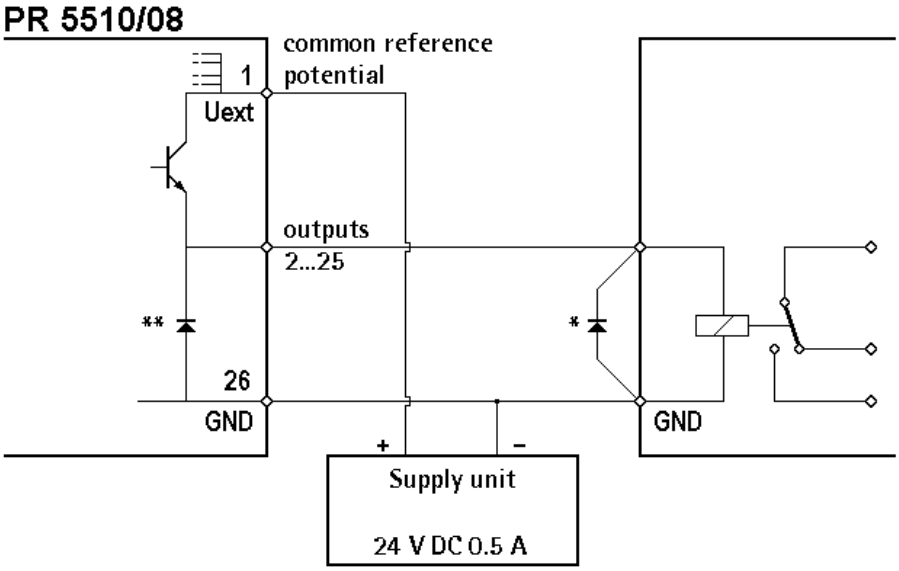
Output circuitry

Voltage output



* The load resistance must be 2.2 kΩ/1 kΩ with 24 V/5 V.

Current output



Recommendation:
* additional external free-wheel diode
** additional internal free-wheel diode, only for very small inductive loads

4.6.5.2 Input

The Enable input for PR 5510/08 (PIN 25) can control the 23 outputs as DATA_IN.

As an output, data is "follow/hold/tristate" and its signal can be configured 5 V (TTL)/24 V and active-high/active-low.

It is applied to pin 25 (DATA_IN) of the 26-pin connector and is effective only with switches S101-1 = OFF and S101-2 = ON.

The switch settings can be found in the table in Chapter 4.6.7.

4.6.6 BCD output (open collector)

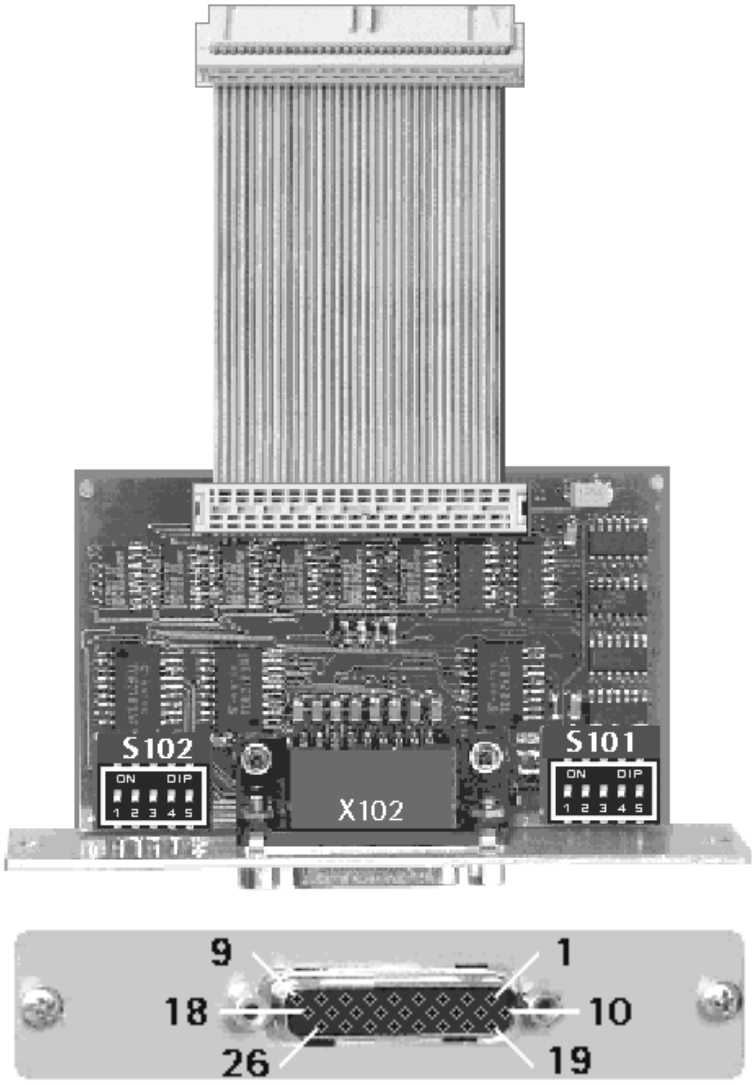
This interface card has the type designation PR 5510/09.

A PR 5510/09 card can be plugged into "Slot 1" or "Slot 2."

The plug-in card is used for BCD-coded output of a 5-decade weight value.

Cyclical output of the weight value with 4-bit (plus or minus sign, stability, error). The value is intrinsically consistent and can be output continuously or the digital input "DATA_IN" control can be used to freeze (hold) the value.

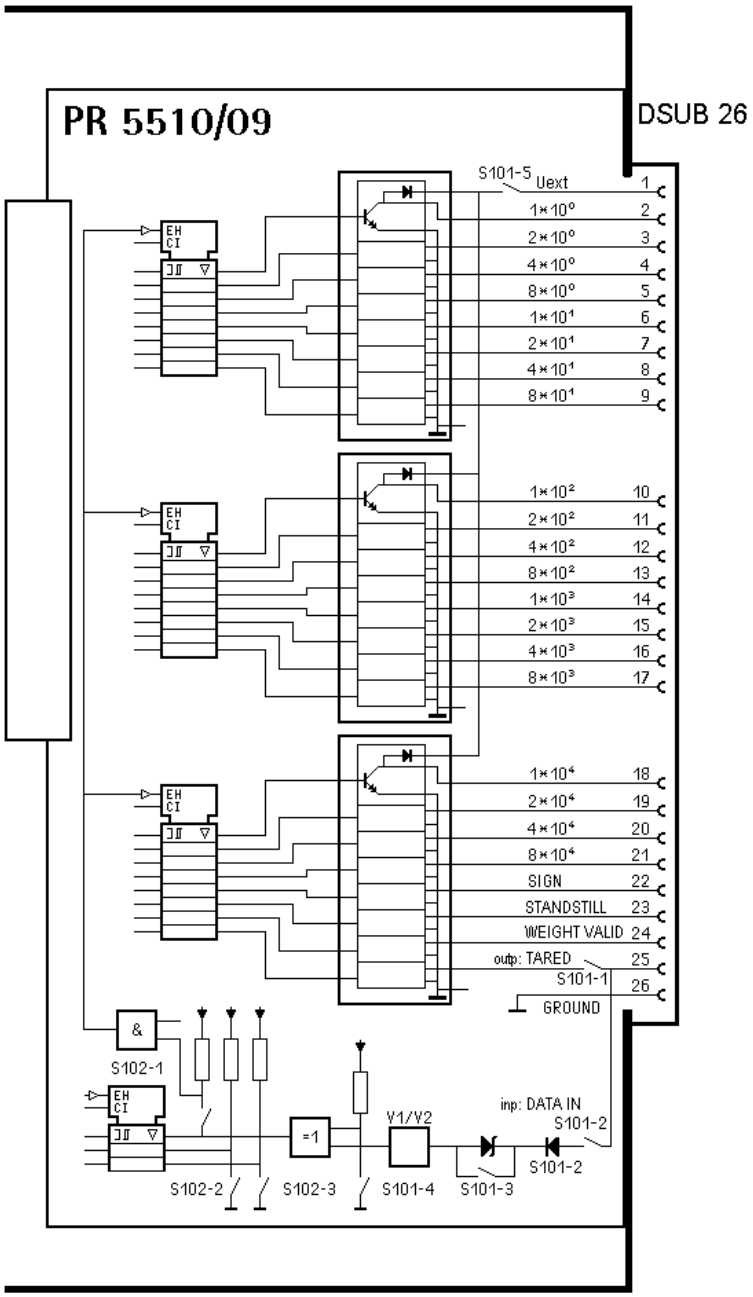
Before installing the card, set switches "S101" and "S102".



Specifications

Description	Data
Connection	D-SUB female connector, 26-pin
Output: Qty	5 digit BCD + preceding sign
Input: Qty	1 bit "DATA_IN"
Output level	Shared emitter to ground, open collector

Description	Data
External supply	+5 V...+24 V DC
Voltage drop	Approx. 0.9 V
Output current	Max. 50 mA
Enable input	5 V/24 V configurable via switch S101 @ 5 V active-high >3.1 V; active-low <1.5 V @ 24 V active-high >16 V; active-low <10 V Protection against incorrect polarity
Potential isolation	No
Cable type	Screened twisted pair (e.g. LifYCY 2x2x0.20)
Cable length	max. 50 m screened
Accessories	D-SUB male connector, 26-pin Incl. shielded housings

Switch for input		PR 5510/09 block diagram
Factory setting: ON 1 2 3 4 5 S102	Factory setting: ON 1 2 3 4 5 S101	

An external power supply is required: PIN 1 (Uext), reference potential PIN 26 (GND)

4.6.6.1 Outputs

The outputs for PR 5510/09 (PIN 2...24) work as a reference potential and open collectors with a shared ground.

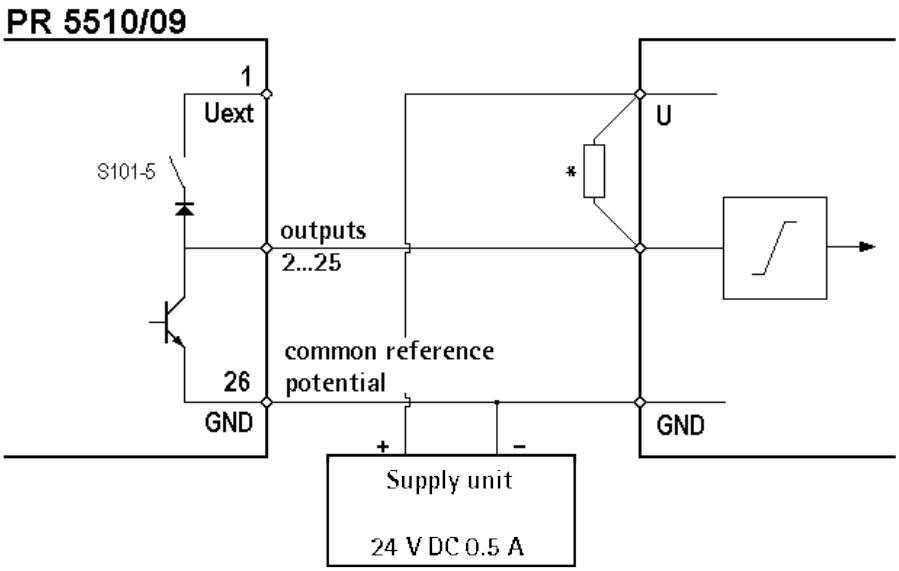
A non-active output is highly resistant.

A voltage of 0.9 V is applied to an active output via GND.

The load to be connected is between the outputs (PIN 2...24, 25) and Uext (PIN 1).

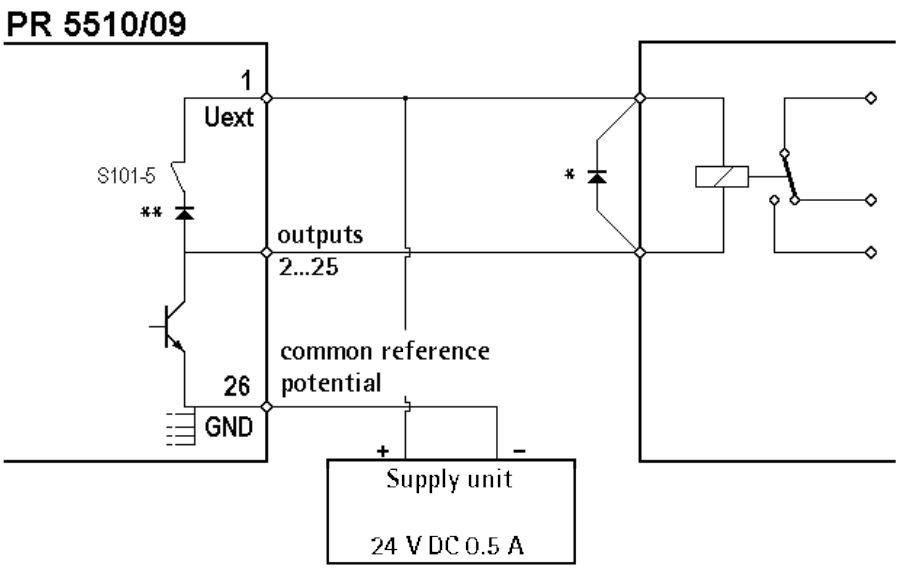
Output circuitry

Voltage output



* The load resistance must be 2.2 kΩ/1 kΩ with 24 V/5 V.
The internal free-wheel diode is not activated: S101-5 = OFF

Current output



Recommendation:
* additional external free-wheel diode
** additional internal free-wheel diode, only for very small inductive loads

4.6.6.2 Input

The Enable input for PR 5510/09 (PIN 25) can control the 23 outputs as DATA_IN.

As an output, data is "follow/hold/tristate" and its signal can be configured 5 V (TTL)/24 V and active-high/active-low.

It is applied to pin 25 (DATA_IN) of the 26-pin connector and is effective only with switches S101-1 = OFF and S101-2 = ON.

The switch settings can be found in the table in Chapter 4.6.7.

4.6.7 Switch settings

Switch S101

Input	External supply		S101 for	-1	-2	-3	-4	-5
DATA_IN	5 V	active-high	PIN 25	OFF	ON	ON	ON	ON or OFF
DATA_IN	5 V	active-low	PIN 25	OFF	ON	ON	OFF	ON or OFF
DATA_IN	24 V	active-high	PIN 25	OFF	ON	OFF	ON	ON or OFF
DATA_IN	24 V	active-low	PIN 25	OFF	ON	OFF	OFF	ON or OFF

activate internal free-wheel diode	ON
do not activate internal free-wheel diode	OFF

Switch S102

Input (PIN 25)	Function for the output data		S102 for	-1	-2	-3	-4	-5
DATA_IN	follow	hold	PIN 2...24	OFF	OFF	ON	ON or OFF	ON or OFF
DATA_IN	tristate	follow	PIN 2...24	ON	ON	OFF	ON or OFF	ON or OFF
DATA_IN	tristate	hold	PIN 2...24	ON	ON	ON	ON or OFF	ON or OFF

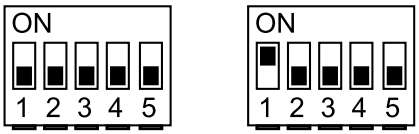
Input level

Input (PIN 25)	External supply		Voltage	Current
DATA_IN	5 V	active-high	>3.1 V	>0.5 mA
DATA_IN	5 V	active-low	<1.5 V	<0.3 mA
DATA_IN	24 V	active-high	>16 V	>1.0 mA
DATA_IN	24 V	active-low	<10 V	<0.5 mA

4.6.8 Output modes

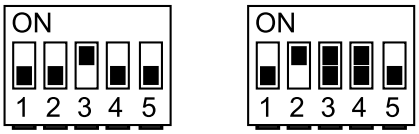
In all modes, the data is output during each internal PLC cycle.

Mode 1: Continuous data output (follow), no DATA_IN



Continuous output of consistent data, provided continuously without request, e.g., for remote display.
The driver modules are always "enabled"; PIN 25 is the output.

Mode 2: Data output on external request DATA_IN (hold)

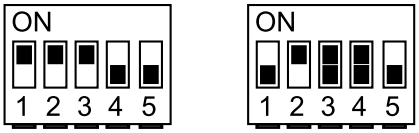


Output of consistent data in "frozen" state upon request, otherwise provided continuously.
The last output value remains frozen (hold) for as long as DATA_IN is active.
The driver modules are always "enabled"; PIN 25 (DATA_IN) is data-hold, level S101-3, polarity S101-4

Note:

The internal data transfer (data modification) on the output memory may occur at the same time that the external request signal changes from "data hold" to "data valid." This means that the requested device still has to wait 100 µs until the data is considered valid.

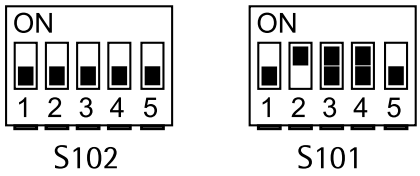
Mode 3: Parallel BUS system (tristate), external request DATA_IN (hold)



Parallel switching of n BCD cards, controlled via DATA_IN (tristate/hold) input.
Output of consistent data in "frozen" state upon request, otherwise "tristate" (highly resistant).

- The last output value remains frozen (hold) for as long as DATA_IN is active.
- The driver modules are only "enabled" (not tristate) when DATA_IN (hold) is active
- PIN 25 (DATA_IN) is data-enable+hold, level S101-3, polarity S101-4

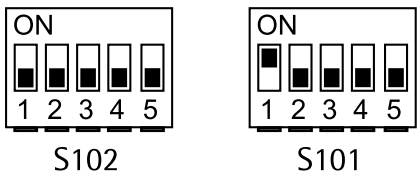
Mode 4: Continuous single-bit output (23xDA), DATA_IN (1xDE)



Continuous output of bits, provided continuously without request (1xIN, 23xOUT, configurable).

- The driver modules are always "enabled."
- PIN 25 (DATA_IN) is an input.

Mode 5: Continuous single-bit output (24xDA), no DATA_IN



Continuous output of bits, provided continuously without request (24xOUT, configurable).

- The driver modules are always "enabled."
- PIN 25 (DATA_IN) is an output.

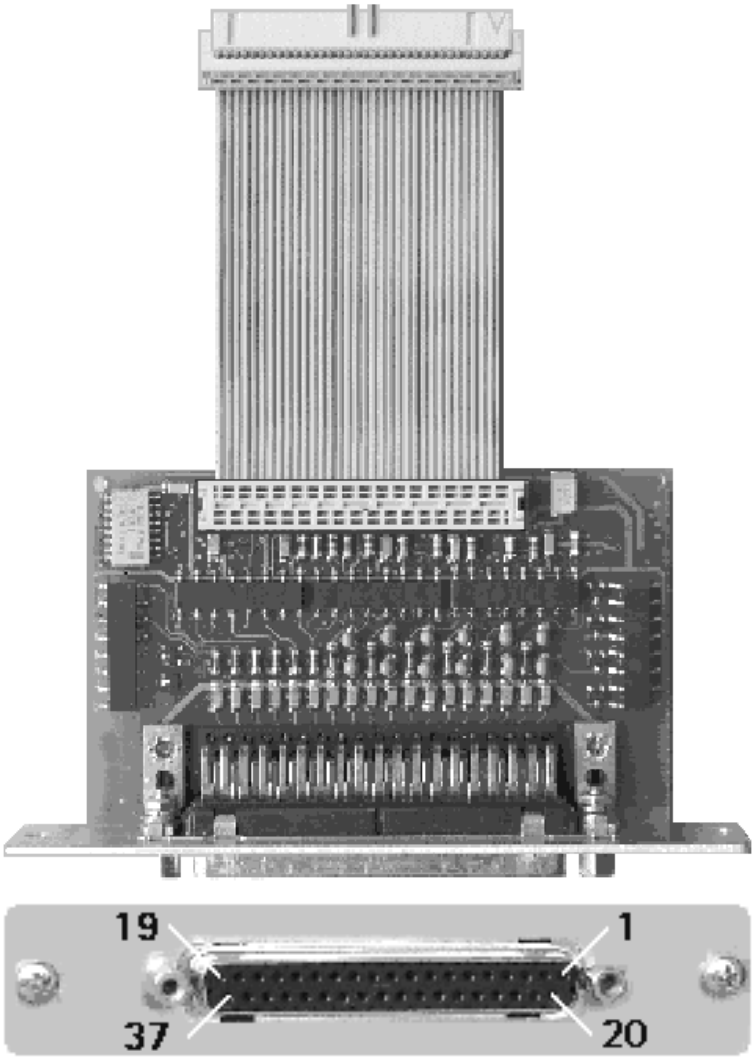
4.6.9 Opto-decoupled inputs and outputs

This interface card has the type designation PR 5510/12.

The card converts the external binary signals from the process into the internal signal level and vice versa. Inputs and outputs are each bipolar potential-free.

The plug-in card has 6 passive opto-decoupled inputs and 12 passive opto-decoupled outputs. An external power supply is required.

The input signal is logically "0" when the input is open.

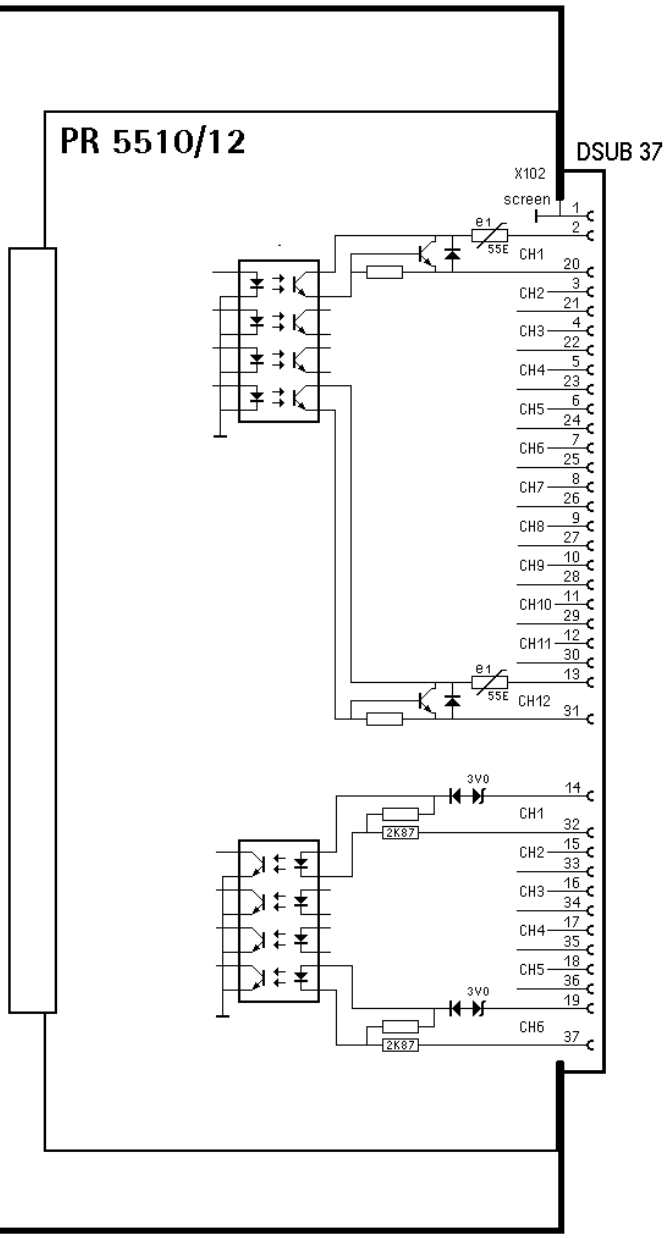


Specifications

Description	Data
Connection	D-Sub female connector, 37-pin
Input: Qty	6
Input: Voltage	Low: 0...5 V DC or open High: 10...31 V DC Passive, external power supply required
Input: Current	<7 mA @ 24 V <3 mA @ 12 V protected against incorrect polarity
Output: Qty	12
Output: Voltage	Max. switching voltage: 32 V DC Max. switching current: 25 mA Voltage drop @ 25 mA: 3 V Protected against incorrect polarity Passive, external power supply required

Description	Data
Potential isolation	Yes, via optocoupler
Cable type	Screened twisted pair (e.g. LifYCY 2x2x0.20)
Cable length	max. 50 m screened
Scope of delivery	D-Sub male connector, 37-pin Incl. shielded housings
Accessories	PR 1623/10 connection cable 4 m PR 1623/20 relay unit PR 1623/30 terminal module

PR 5510/12 block diagram



An external power supply is required: I/O channels potential-free; no shared reference

Digital inputs

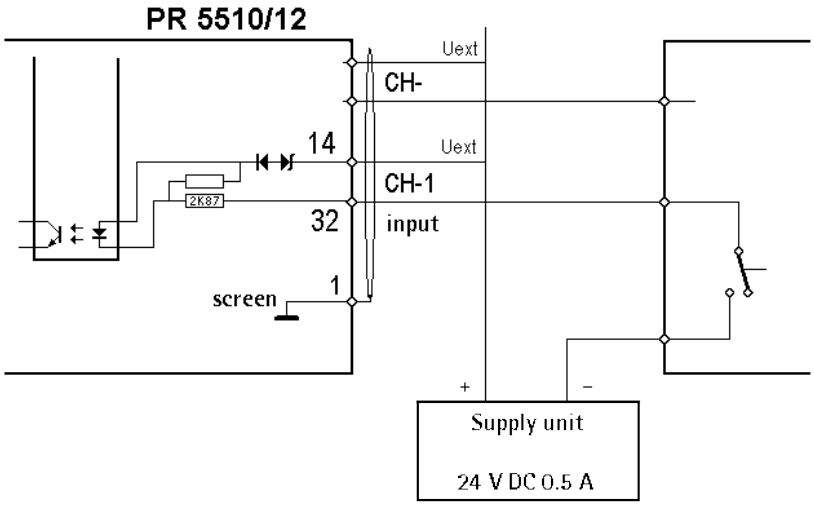
Channel	CH1	CH2	CH3-CH6
Assignment	Tare/reset tare, positive flank	Print command, positive flank	Not used

Digital outputs

Channel	CH1	CH2	CH3	CH4	CH5	CH6	CH7-CH12
Assignment	"Dim" Weight is <0 or >Max.	Weight is within the zero-setting range.	Output limit 1	Output limit 2	Gross weight value is within ±¼ d of zero	Scale error (ADC error)	Not used

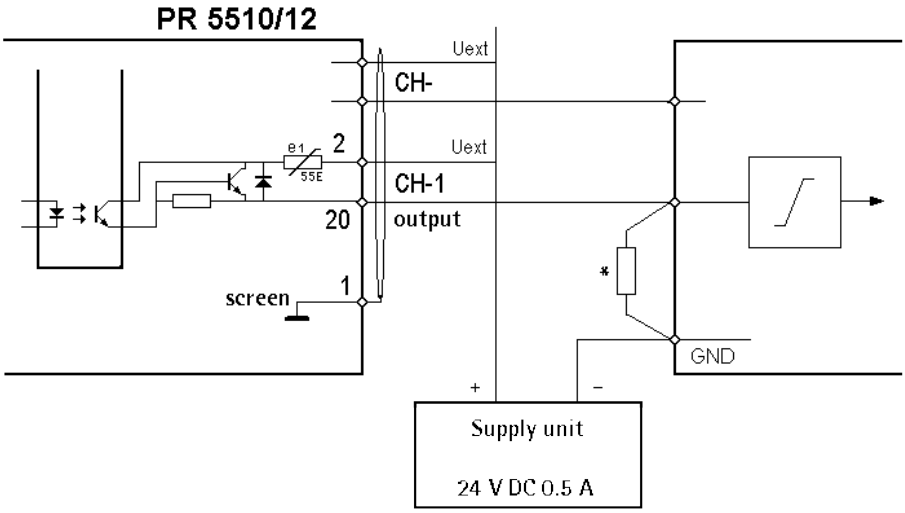
Input circuitry

Contact input



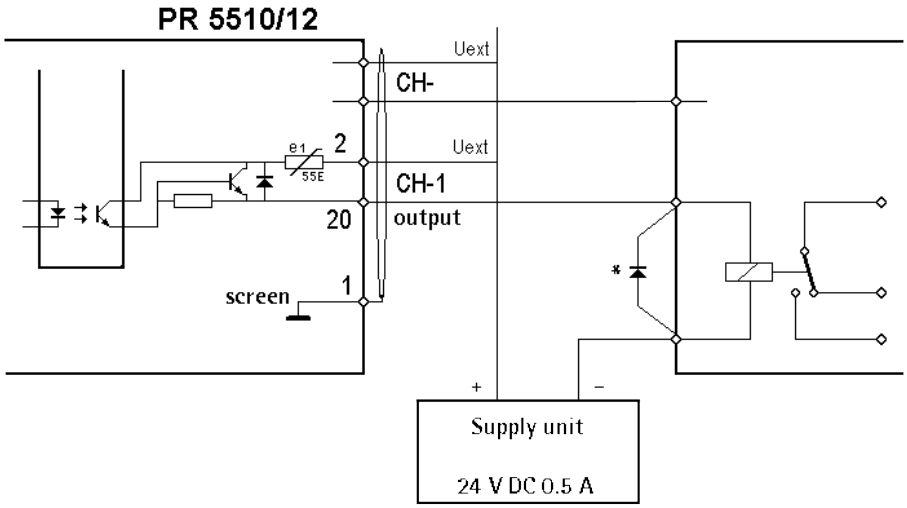
Output circuitry

Voltage output



* The load resistance must be 2.2 kΩ/1 kΩ with 24 V/5 V.

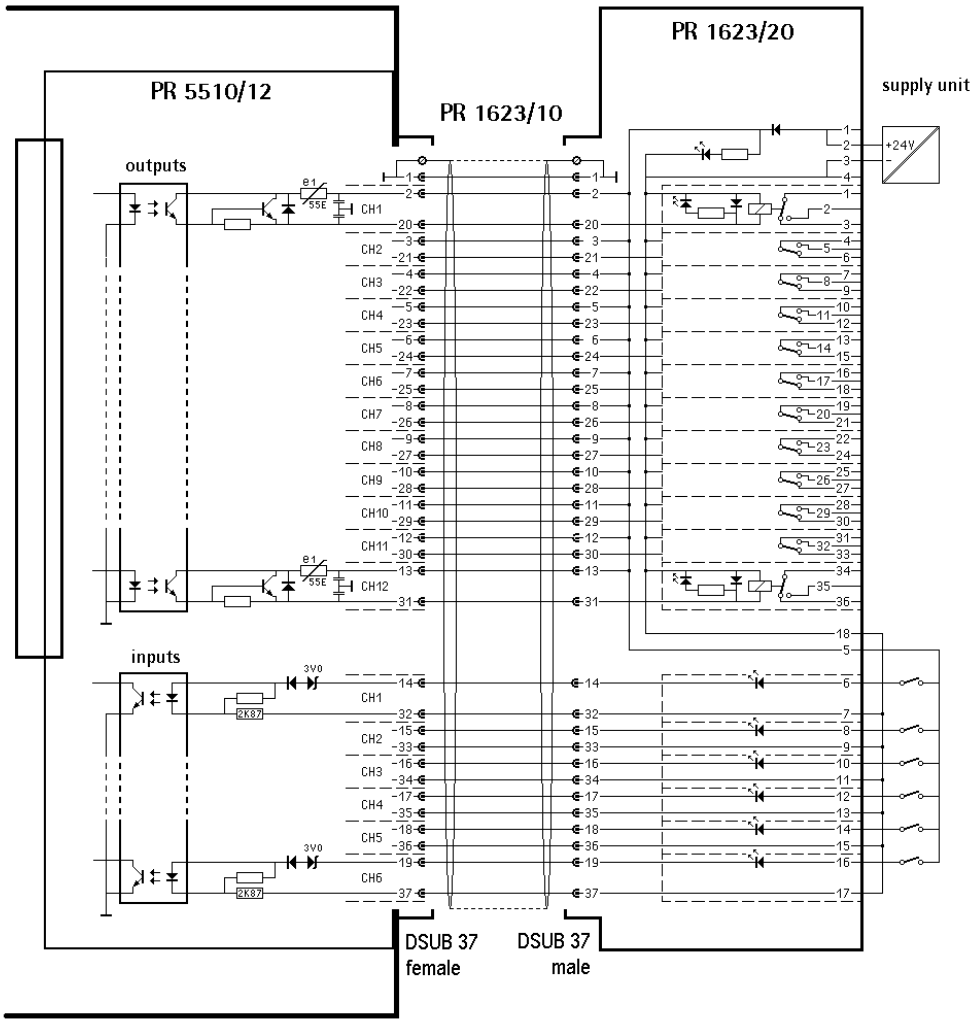
Current output



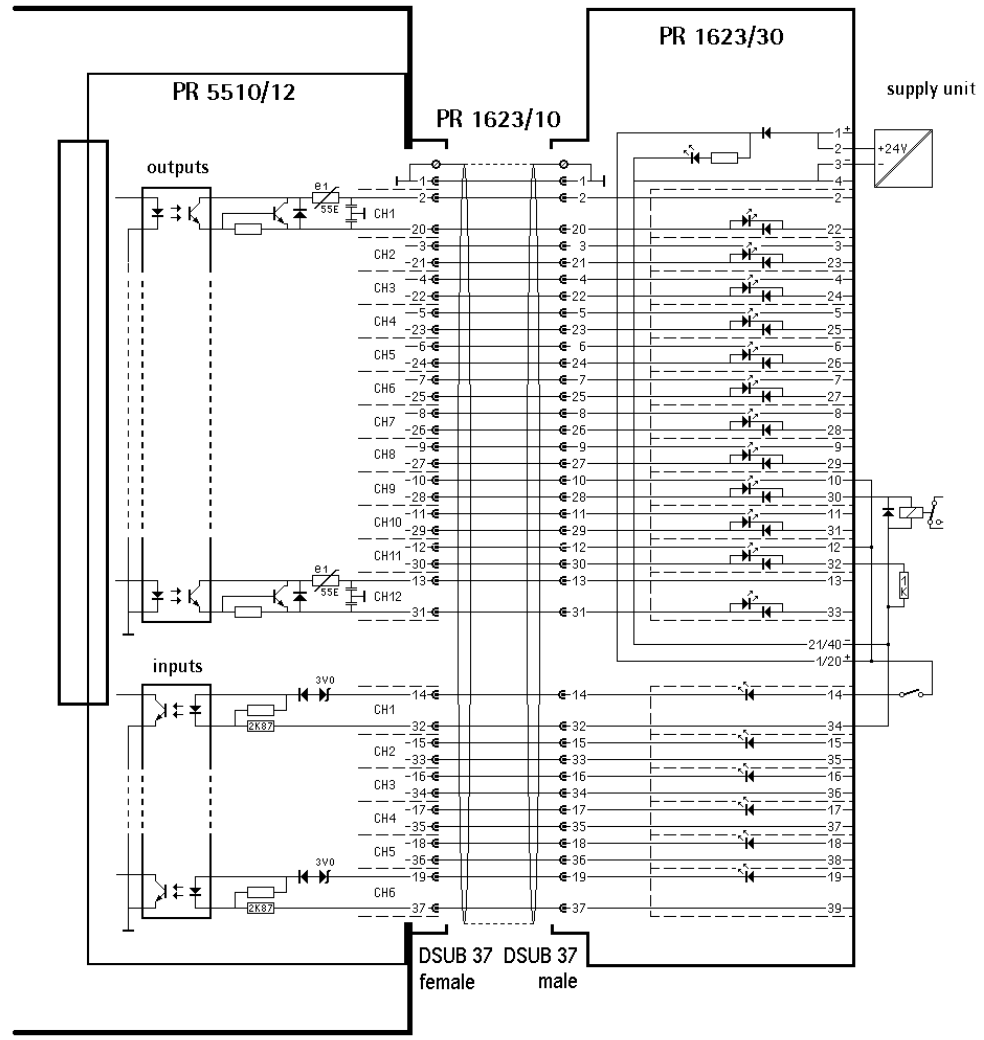
* additional free-wheel diode for inductive loads

4.6.9.1 Circuit diagrams

PR 5510/12 – PR 1623/10 – PR 1623/20



PR 5510/12 – PR 1623/10 – PR 1623/30



4.6.10 Status LEDs on fieldbus card

Watchdog LED

Frequency		Color	Meaning
Flashing	1 Hz	green	Module is initialized and ready for operation.
Flashing	2 Hz	green	Module is not initialized.
Flashing	1 Hz	red	RAM check error
Flashing	2 Hz	red	Check error in ASIC and FLASH ROM: Module is defective.
Flashing	4 Hz	red	ProfiBus-DP RAM check error

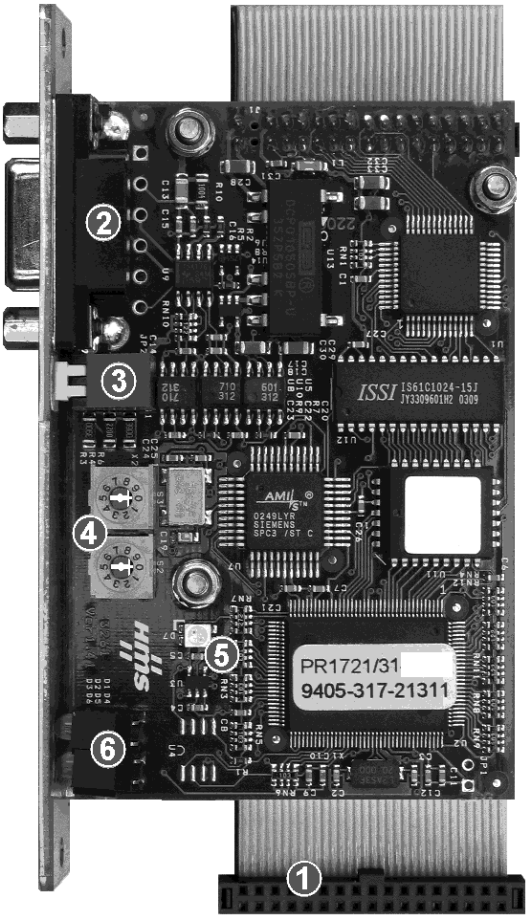
4.6.11 ProfiBus-DP interface

The ProfiBus-DP interface card has the type designation PR 1721/31.

Communication protocols and syntax comply with the ProfiBus-DP standard to IEC 61158, with transfer rates up to 12 Mbit/s.

Connection to the ProfiBus is established using the 9-pin D-Sub female connector ② on the back of the device.

The card is inserted into "Slot 4" ① (see Chapter 4.6.1).



Technical data

Description	Data
Transfer rate	9.6 kbit/s to 12 Mbit/s, auto baud rate 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 ⑤ (see Chapter 4.6.10)
Configuration	GSD file "SART5410.gsd"
Potential isolation	Yes, optocoupler in lines A and B (RS-485)

Description	Data
Bus termination	Via bus terminating resistor switch ③ (see Chapter 4.6.11.3)
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

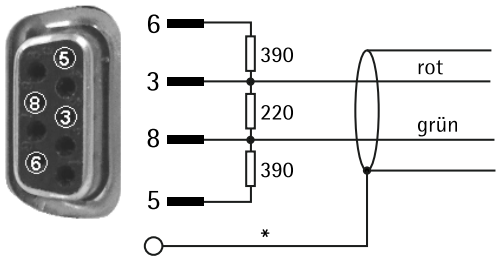
Note:

The GSD file is stored on the CD supplied with the device (fieldbus directory of the respective device). The current file is also available to download online:

http://www.minebea-intec.com

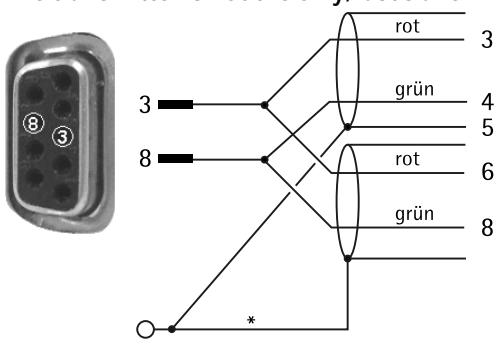
ProfiBus connection

The transmitter is the only/last slave in the bus:

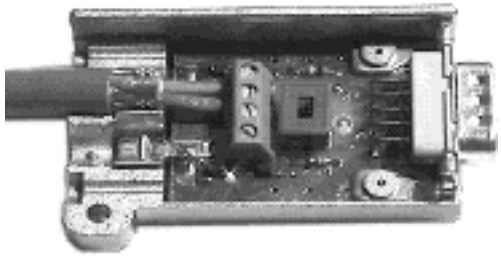


* screen on connector housing

The transmitter is not the only/last slave in the bus:



e.g.: D-Sub bus plug SIMATIC NET PROFIBUS FAST CONNECT



Allocation of the 9-pin D-sub female connector

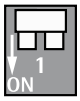
Pin assignment	Signal	Color	Description
Housing ----------	S		Screen
1			Not connected
2			Not connected

Pin assignment	Signal	Color	Description
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	Green	Send/receive data Data core A/D (N)
9			Not connected

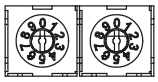
Note:

You can only use plug connections with integrated terminating resistors.

4.6.11.1 Controls on fieldbus card



The terminating resistors can be switched on (ON) and off by pressing the bus termination switch ③; see Chapter 4.6.11.3.



NOTICE

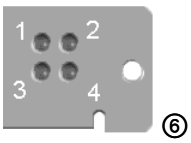
The ④ rotary switch settings will not be used.

▶ Ensure that the three rotary switches for node address 1...99 are set to position "0."

Settings are defined via Setup - [Fieldbus parameter][Profibus-DP].

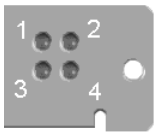
4.6.11.2 LEDs in the module cover

The module cover can be found at the rear of the device.



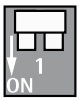
⑥

LED 1 No function	LED 2	LED 3	LED 4
Off		No diagnostics available	

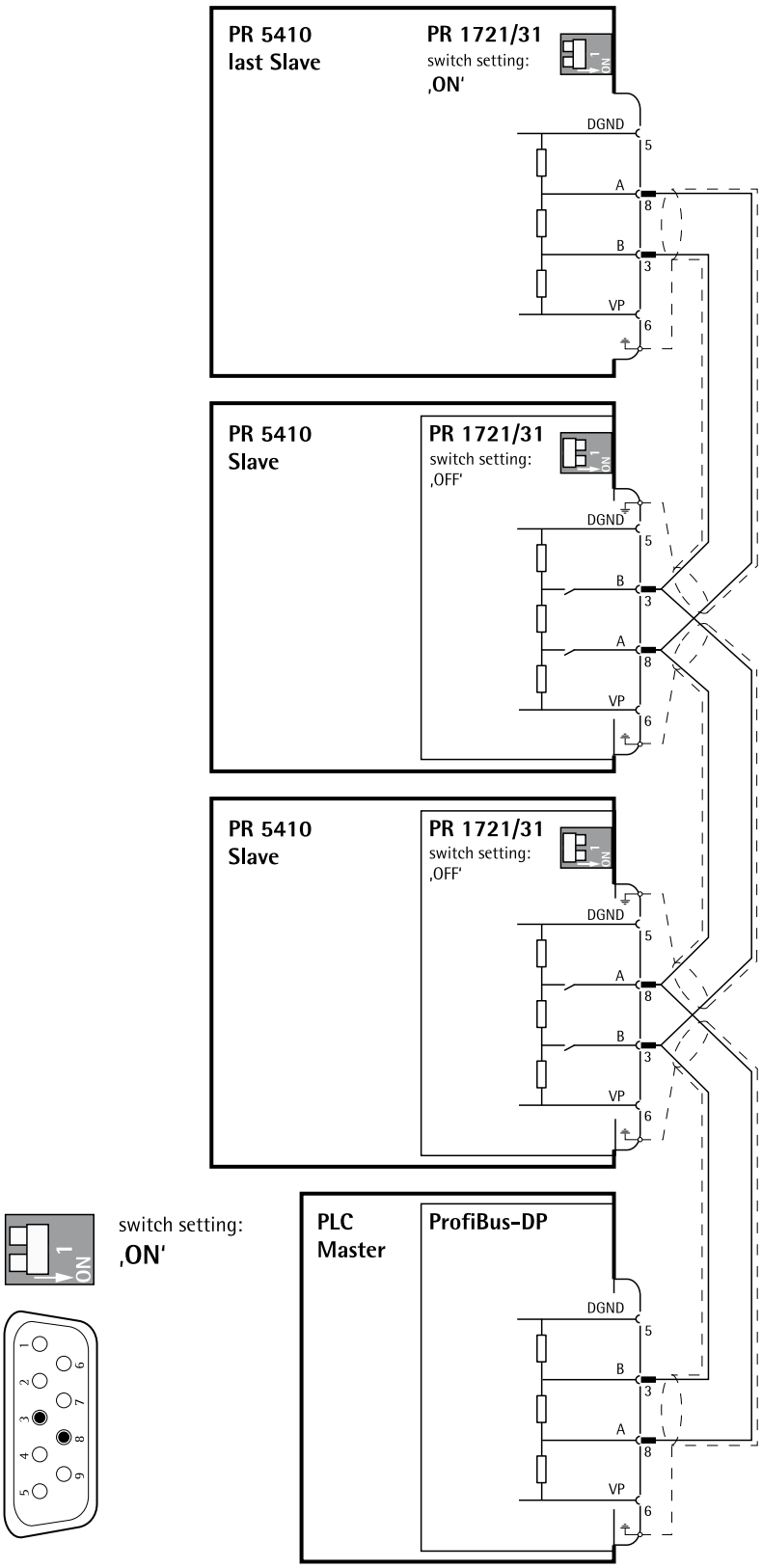
 ⑥	**LED 1** **No function**	**LED 2**	**LED 3**	**LED 4**
Constant green		Module is online, data transmission is possible		
Constant red				Module is offline
Flashing 1 Hz red			I/O length configuration error	
Flashing 2 Hz red			Parameter, data length error	
Flashing 4 Hz red			Communication, ASIC error	

4.6.11.3 Bus termination

The end nodes in a ProfiBus-DP network must be fitted with termination resistors, to prevent reflections in the bus cable.

	Bus termination switch ③ is located in the module cover and can be accessed from outside.
Bus termination switch "ON"	The bus termination is switched on. If the module is the last or first in the network, this switch must be set to "ON." An "external" terminating resistor can also be used in the ProfiBus connector, however.
Bus termination switch "OFF"	The bus termination is switched off. When using an external terminating resistor in the ProfiBus connector, the switch on the module cover must be in position "OFF."

4.6.11.4 Connection diagram for a master with three slaves



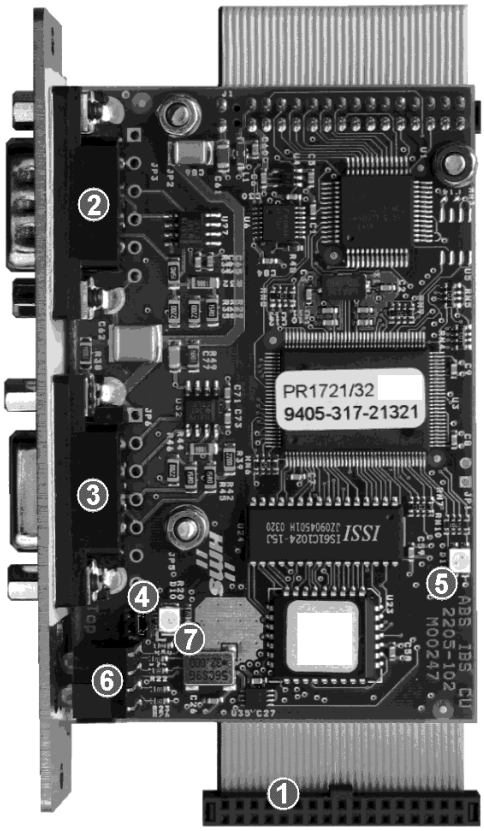
4.6.12 InterBus-S interface

The InterBus-S interface card has the type designation PR 1721/32.

The interface is based on the InterBus chip technology and enables transfer rates of 500 kbit/s.

The InterBus-S connection is established by the 9-pin D-Sub male connector (IN) ② and the 9-pin D-Sub female connector (OUT) ③ on the back of the device.

The card is inserted into "Slot 4" ① (see Chapter 4.6.1).

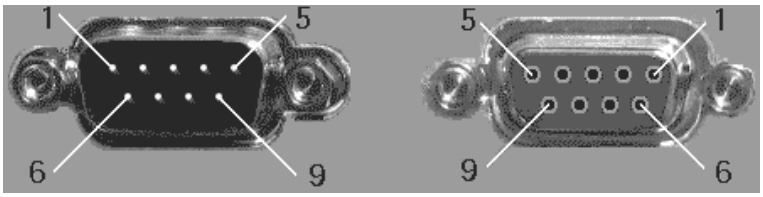


Specifications

Description	Data
Transmission rate	500 kbit/s or 2 Mbit/s, switchable ④
Protocol	Interbus-S master–slave - Fixed telegram length - Deterministic cyclical process data transmission with max. 10 words I/O. - Watch-Dog Timer ④ (see Chapter 4.6.10)
Potential isolation	Yes, optocoupler and DC/DC converter
Lead termination	Not required, due to active ring topology
Cable type	InterBus; color: green; 3x2 twisted pair; screened
Cable impedance	150 Ω

Description	Data
Cable length	400 m (between two remote bus subscribers); overall length: 13 km
Certificates	From INTERBUS CLUB e.V.: - Compatibility with InterBus standard. - IEC 61158 (Parts 3 to 6), EN 50254 (DIN 19258) - Industry-compatible CE, UL and cUL

InterBus-S connections

Bus "IN"	Bus "OUT"
	

Example: Phoenix Contact IBS RTC-T

Allocation of the 9-pin D-sub male connector "IN" ②

Pin allocation acc. to DIN 41642	Signal	Color acc. to DIN 47100	Description
Cable sheath		pea green	Special InterBus cable (certified)
Housing	S		Screen
1 ----------	DO1	yellow	not inverted, data output
2 ----------	DI1	gray	not inverted, data input
3 ----------	GND	brown	signal ground
4			not connected
5 ----------*	GND		signal ground (continuation jumper: 5-9)
6 ----------	IDO1	green	inverted, data output
7 ----------	IDI1	pink	inverted, data input
8			not connected
9 ----------*	RBST		(continuation jumper: 5-9)

* only if necessary

Allocation of the 9-pin D-sub female connector "OUT"③

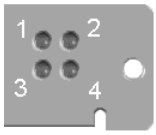
Pin allocation acc. to DIN 41642	Signal	Color acc. to DIN 47100	Description
Cable sheath		pea green	Special InterBus cable (certified)
Housing	S		Screen

Pin allocation acc. to DIN 41642	Signal	Color acc. to DIN 47100	Description
1 ----------	DO1	yellow	not inverted, data output
2 ----------	DI1	gray	not inverted, data input
3 ----------	GND	brown	signal ground
4			not connected
5			not connected
6 ----------	IDO1	green	inverted, data output
7 ----------	IDI1	pink	inverted, data input
8			not connected
9			not connected

* only if necessary

4.6.12.1 LEDs in the module cover

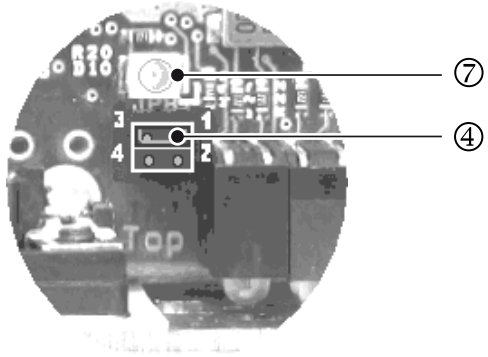
The module cover can be found at the rear of the device.



⑥

	LED 1 CC/RC	LED 2 BA	LED 3 RD	LED 4 TR
Off				
Constant green	Cable OK, no reset mode in the master	Bus is active		PCP communication is active, hold = 500 ms
Constant red			Remote bus is not active	

4.6.12.2 Selecting the status LED and transfer rate



LED ⑦ lights up when the operating voltage is applied.

The transfer rate is selected using the 2-pole jumper ④.

- 3 — 1 = 2 Mbit/s
- 4 — 2 = 500 kbit/s

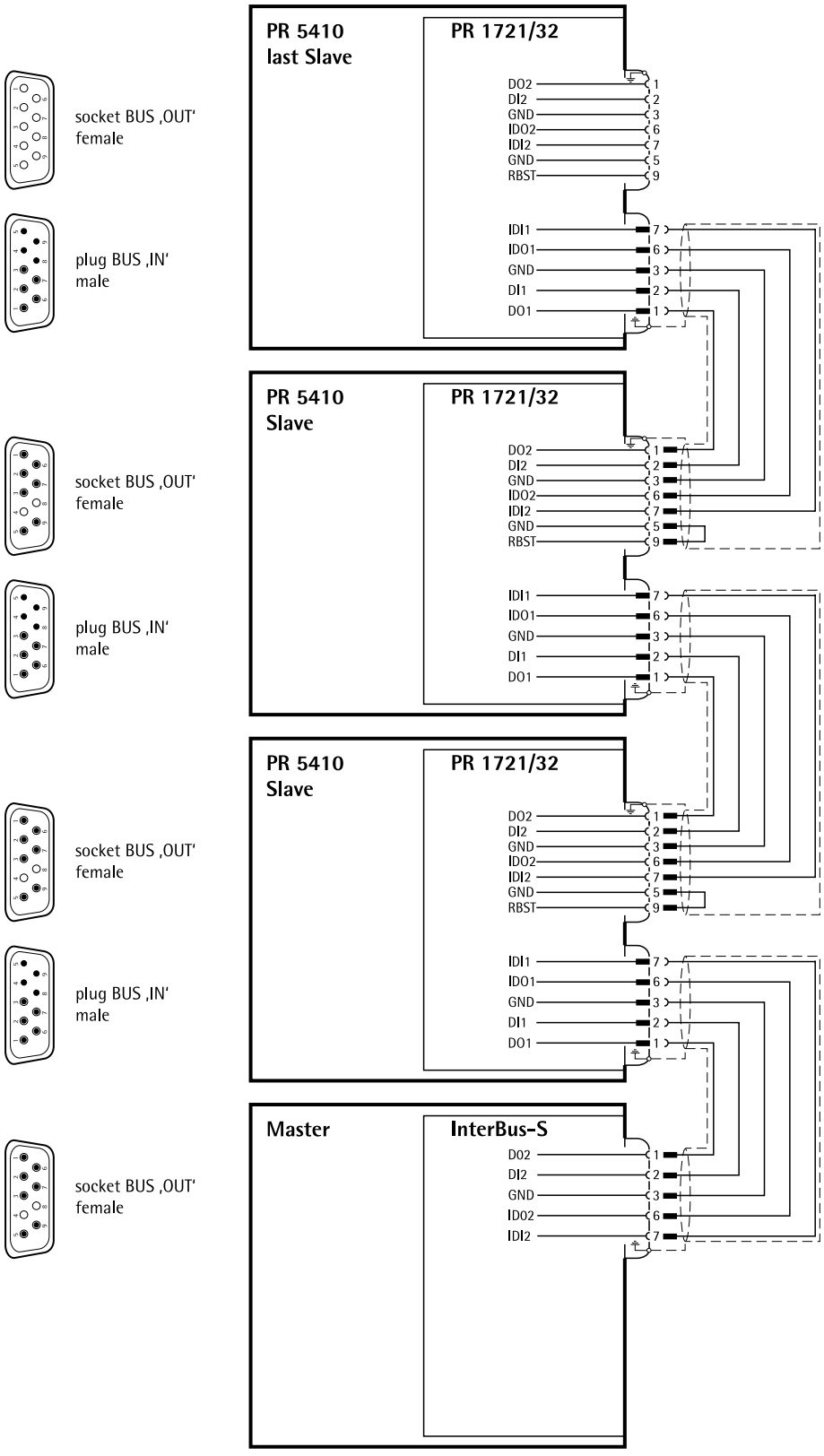
The selection is saved only by switching on the supply voltage.

4.6.12.3 Connection diagram for a master with three slaves

NOTICE

At bus "OUT" ③, pins 5 and 9 must be bridged if another slave follows.

▶ See connection diagram.


socket BUS ‚OUT'
female
plug BUS ‚IN'
male
socket BUS ‚OUT'
female
plug BUS ‚IN'
male
socket BUS ‚OUT'
female
plug BUS ‚IN'
male
socket BUS ‚OUT'
female
PR 5410
last Slave
PR 1721/32
DO2
DI2
GND
IDO2
IDI2
GND
RBST
IDI1
IDO1
GND
DI1
DO1
PR 5410
Slave
PR 1721/32
PR 5410
Slave
PR 1721/32
Master
InterBus-S
ID02
IDI2

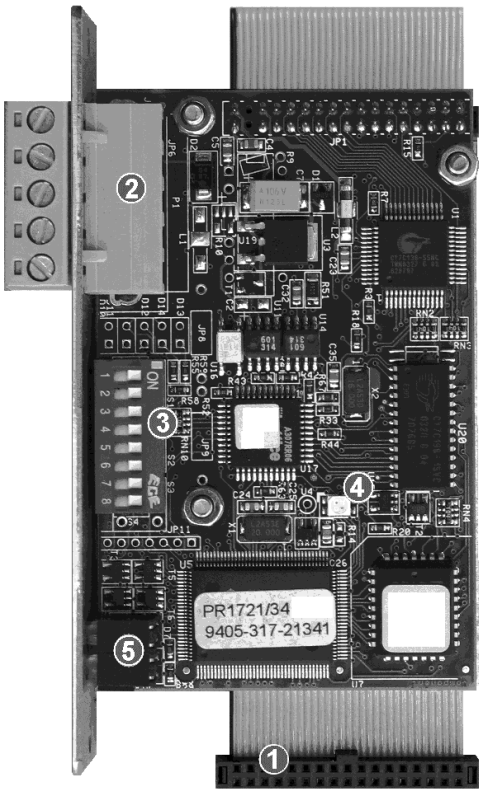
4.6.13 DeviceNet interface

The DeviceNet interface card has the type designation PR 1721/34.

The fieldbus card contains all functionalities to make a complete DeviceNet slave with a CAN controller and transmission speeds up to 500 kbit/s.

The DeviceNet connection is established by 5-pin terminal ②.

The card is inserted into "Slot 4" ① (see Chapter 4.6.1).



Technical data

Description	Data
Transfer rate	125, 250 and 500 kbit/s
Protocol	DeviceNet Master Slave - Polling procedure (polled IO) - CRC error recognition according to IEC 62026 (EN 50325) - Max. 64 station nodes - Data width max. 512 byte "input & output" - Watchdog Timer ④ (see Chapter 4.6.10)
Configuration	EDS file "sag_5410.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 @ 24 V DC
Cable type	DeviceNet; color: petrol green; 2x2 twisted pair; screened

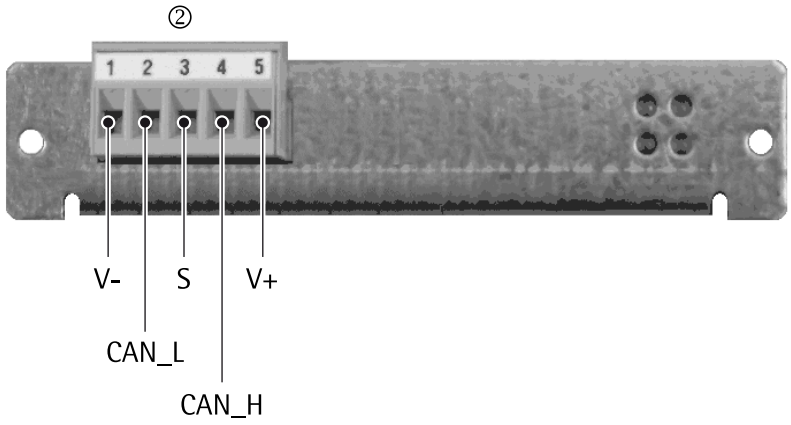
Description	Data
Cable impedance	150 Ω
Cable length	Depends on cable type and transmission rate: 100...500 m
Certificates	- Compatible with DeviceNet specification Vol. 1: 2.0, Vol 2: 2.0 - ODVA Certificate according to conformity test software version A-12 - Industry-compatible CE, UL, and cUL

Note:

The EDS file is stored on the CD supplied with the device (fieldbus directory of the respective device). The current file is also available to download online:

http://www.minebea-intec.com

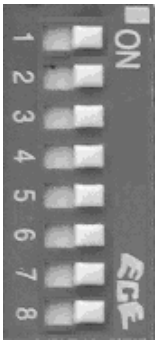
DeviceNet terminal



Allocation of the 5-pin terminal

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

4.6.13.1 Controls on fieldbus card



③

NOTICE

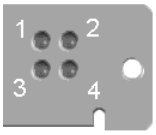
The ③ DIL switch settings will not be used.

▶ Make sure that the switches 1...8 are set to position "ON."

Settings are defined via Setup - [Fieldbus parameter].

4.6.13.2 LEDs in the module cover

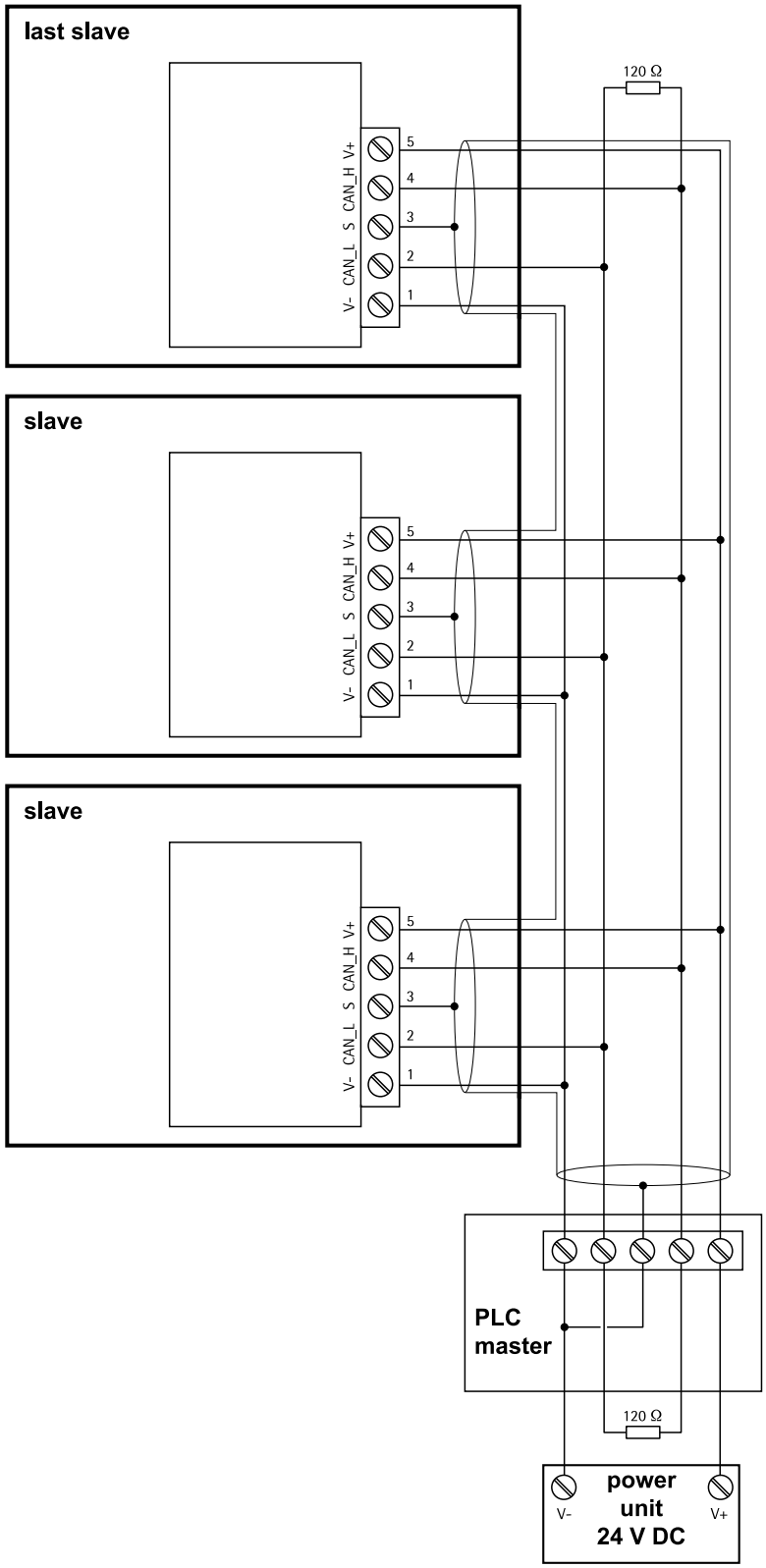
The module cover can be found at the rear of the device.



⑤

LED 1 **No function**	**LED 2** **Network status**	**LED 3** **No function**	**LED 4** **Module status**
Off	No power		
Constant green	Link detected; online and connected		Module is working
Flashing green	Online, not connected		Data length > configuration
Constant red	Critical link error		Fatal error
Flashing red	Connection timeout		Minor error

4.6.13.3 Connection diagram for a master with three slaves



4.6.14 CC-Link interface

The CC-Link interface card has the type designation PR 1721/35.

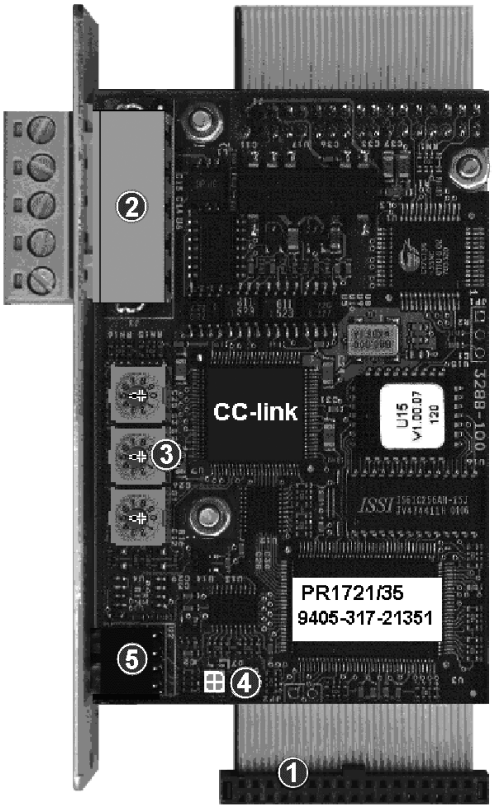
The fieldbus card contains all functions to provide a complete CC-Link slave with transfer rates up to 10 Mbps.

The CC-Link connection is established by the 5-pin terminal ②.

The card is inserted into "Slot 4" ① (see Chapter 4.6.1).

Note:

This fieldbus card does **not** support the "EasyFill" application.



Technical data

Designation	Data
Transfer rate	156; 625 kbps; 2.5; 5, 10 Mbps
Protocol	CC-Link slave - CRC error recognition according to IEC 62026 (EN 50325) - Max. 64 station nodes - 128 I/O bits and 16 (32 bit) words - Watchdog Timer ④ (see Chapter 4.6.10)
Configuration	CSP file "PR1721_1.csp"
Potential isolation	Yes, optocoupler and DC/DC converter

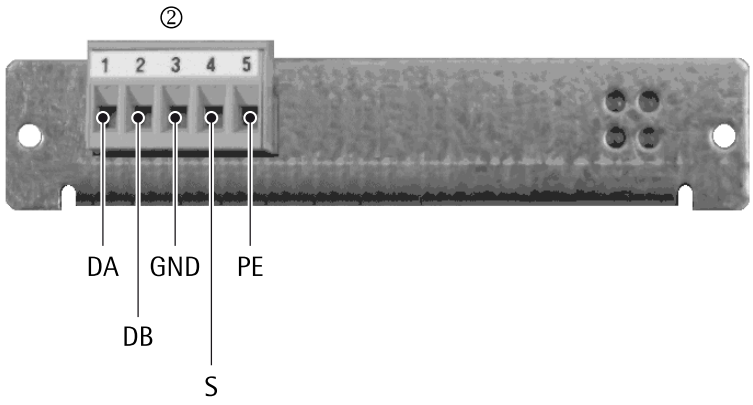
Designation	Data
Bus termination	110 Ω at the cable ends
Bus load	100 mA
Cable type	2x2 screened twisted pair
Cable length	100 m @ 10 Mbps, 1200 m @ 156 kbps
Certificates	- Type: ABS-CCL (H/W: 1.01, S/W: 2.00.05, CC-Link: 2.0) - Reference no. 372

Note:

The CSP file is stored on the CD supplied with the device (Fieldbus directory of the respective device). The current file is also available for download via the Internet:

http://www.minebea-intec.com

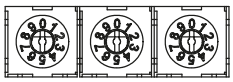
CC-Link terminal



Allocation of the 5-pole terminal block

Pin assignment	Signal	Description
1 ----------	DA	Communication RS-485 RxD/TxD (+)
2 ----------	DB	Communication RS-485 RxD/TxD (–)
3 ----------	GND	Digital ground
4 ----------	S	Cable screen
5 ----------	PE, according to AnyBus S-specification	Housing ground

4.6.14.1 Controls on fieldbus card



NOTICE

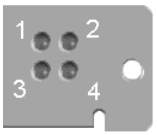
The ③ rotary switch settings will not be used.

▶ Ensure that the three rotary switches (station no. and baud rate) are set to position "9."

This setting is defined via Setup - [Fieldbus parameter] [CC-Link].

4.6.14.2 LEDs in the module cover

The module cover can be found at the rear of the device.



⑤

	LED 1 No function	LED 2 Network status	LED 3 No function	LED 4 Module status
Off	- No power supply - "Timeout" - No connection (HW)	- No power supply - Normal function	- No power supply - No transmission data	- No power supply - No data reception
Constant green	Normal function		Send data	Receive data
Constant red		- CRC error - No admissible station - No admissible baud rates		

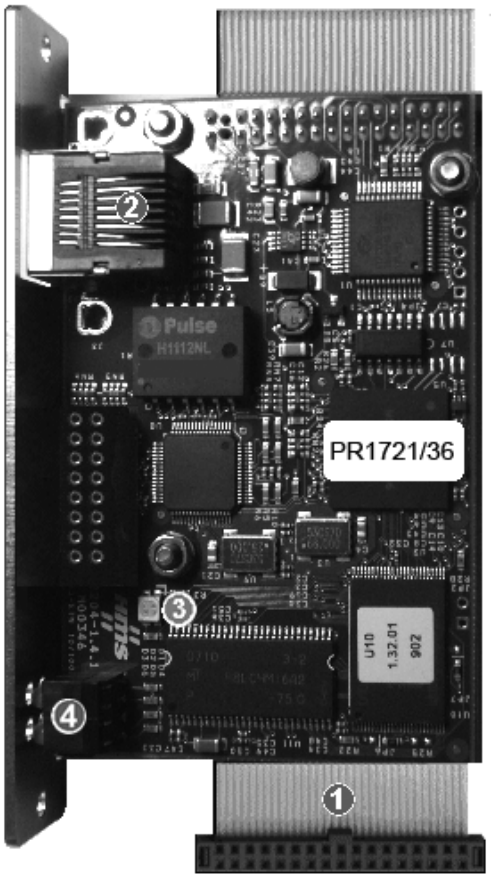
4.6.15 ProfiNet I/O interface

The ProfiNet I/O interface card has the type designation PR 1721/36.

The fieldbus card is equipped with a standard RJ-45 socket ② for network connection.

It contains powerful UDP/IP connecting circuitry with transfer rates of 10 and 100 Mbit/s.

The card is inserted into "Slot 4" ① (see Chapter 4.6.1).



Technical data

Description	Data
Transfer rate	10 Mbit/s and 100 Mbit/s Auto-detection (100, FullDX)
Protocol	ProfiNet I/O
Connection mode	Network
Configuration	XML file "GSDML-Vx.xx-Sartorius-PR5410-xxxxxx.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 Nutzerorganisation e.V. for HMS Industrial Networks AB Certificate no.: Z10931

Note:

The ProfiNet I/O card is supported by PR 5410 firmware release 1.40 or higher.

The IP address and subnet mask are set under Setup -[Fieldbus parameters] (see also Chapter 7.17.5 and 12.2).

The XML file is stored on the CD supplied with the device (fieldbus directory of the respective device). The current file is also available to download online:

http://www.minebea-intec.com

Note:

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]).

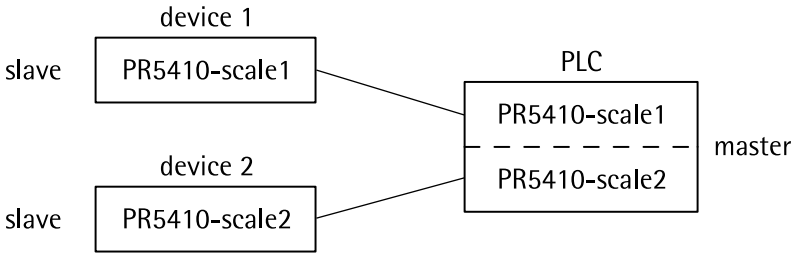
NOTICE

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.

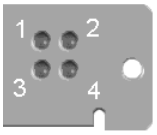
- When replacing devices or servicing, please note:
- As well as the IP address, the device name must correspond to that of the replacement device. Explicit assignment out of the master is required.

Example:



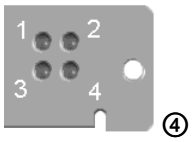
4.6.15.1 LEDs in the module cover

The module cover can be found at the rear of the device.



④

	LED 1	LED 2	LED 3 No function	LED 4
Off	No connection (HW)	Offline, no connection		Not initialized

	**LED 1**	**LED 2**	**LED 3** **No function**	**LED 4**
Constant green	Connection (HW)	Online, link established		Initialized, no error
Flashing green	Send/receive data	Online in stop		
Flashing green, quickly				Engineering tool for identification is active
Flashing red				Configuration error, no station name/IP address, internal error

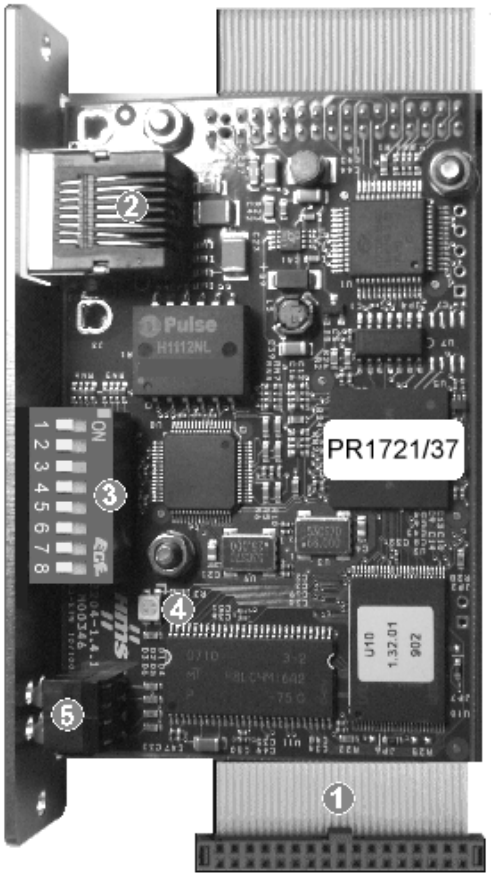
4.6.16 EtherNet IP interface

The EtherNet IP interface card has the type designation PR 1721/37.

The fieldbus card is equipped with a standard RJ-45 socket ② for network connection.

It contains a powerful TCP/IP and EtherNet-IP interface connection with transfer rates of 10 or 100 Mbit/s.

The card is inserted into "Slot 4" ① (see Chapter 4.6.1).



Technical data

Description	Data
Transfer rate	10 Mbit/s and 100 Mbit/s Auto-detection (10/100, HalfDX/FullDX)
Protocol	EtherNet IP
Connection mode	Network
Configuration	EDS file "sag_5410_ethernetip.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: 09/06/2005 - Vendor ID 90 - See also: www.odva.org - Industry-compatible CE, UL, and cUL

Note:

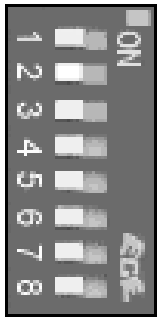
The EtherNet IP card is supported by PR 5410 firmware release 1.30 or higher.

The IP address and subnet mask are set under Setup - [Fieldbus parameters] (see also Chapter 7.17.5 and 12.2).

The EDS file is stored on the CD supplied with the device (fieldbus directory of the respective device). The current file is also available to download online:

http://www.minebea-intec.com

4.6.16.1 Controls on fieldbus card



③

NOTICE

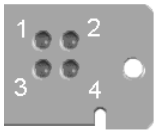
The ③ DIL switch settings will not be used.

▶ Make sure that the switches 1...8 are set to position "OFF."

Settings are defined via Setup - [Fieldbus parameter].

4.6.16.2 LEDs in the module cover

The module cover can be found at the rear of the device.

 ⑤	**LED 1**	**LED 2**	**LED 3**	**LED 4**
Off	No connection (HW)	No power		No power or no IP address
Constant green	Connection (HW)	Controlled by scanner		"Online," link established
Flashing green		Not configured, or scanner not active	Packet is received or transmitted	"Online," no link established
Constant red		Fatal error		Duplicate IP address, major error
Flashing red		Minor recoverable error		Connection timeout
Alternating red/ green		Self-test running		Self-test running

5 "Standard" application

5.1 Functions

5.1.1 General information

The "Standard" application supports the weighing functions of the device.
Filling is not possible.

5.1.2 Display functions

- Display of gross, net or tare weight
- Tare/reset tare
- Set gross to zero
- Print weight
- Display of weight values or remote display
- Functions via digital inputs and outputs
- Information interchange via serial I/O, fieldbus and network

6 "EasyFill" application

6.1 Functions

6.1.1 General information

The "EasyFill" application is used for single-component filling.

The application allows for quick and reliable filling and emptying of containers.

The filling process can be started, stopped, canceled, and restarted via the front-panel keys, VNC user interface, digital inputs, OPC/Modbus, and fieldbus (except CC-Link).

6.1.2 Display functions

- Display of gross, net or tare weight
- Tare/reset tare
- Set gross to zero
- Print weight
- Display of weight values or remote display
- Functions via digital inputs and outputs
- Information interchange via serial I/O, fieldbus and network

6.1.3 Filling mode

The "EasyFill" application supports the following filling modes:

- Net filling "B1"
- Net discharge "B4"

6.2 Application menu [Start]

Filling	
Material ID	Material identification Selection: ID 1...10
Material name	Material name Input: max. 18 alphanumeric characters
Set point	Set point Input: weight; adopt unit from the calibration.
Preset	Preset point for switching from coarse flow to fine flow. Input: weight; adopt unit from the calibration.
Overshoot (OVS)	Material overshoot Input: Weight; adopt unit from the calibration.
+/- tolerance	Tolerance above/below set point Input: tolerance values; adopt unit from the calibration.
Calming time	Calming time Input: in ms
Start	Start filling.
Stop	Stop filling.
Restart	Restart filling.
Abort	Abort filling.

Configuration	
Configuration mode	Configure the mode
Dosing mode	Filling mode Selection: Net filling (B1), Net Discharge (B4)
Interaction mode	Interaction mode Selection: Remote proc. control, VNC, Front keys
Print	Print configuration.
Configuration digital I/Os	
Configuration digital inputs	Configure digital inputs
1...3: SPM address %MX	Input: SPM address, see Chapter 13.4
Print	Print configuration.
Configuration digital outputs	Configure digital outputs
1...3: SPM address %MX	Input: SPM address, see Chapter 13.4
Print	Print configuration.
Configuration material	
Material ID	Material identification Selection: ID 1...10
Material name	Material name Input: max. 18 alphanumeric characters
Set point	Set point Input: weight; adopt unit from the calibration.
Preset	Preset point for switching from coarse flow to fine flow. Input: weight; adopt unit from the calibration.
Overshoot (OVS)	Material overshoot Input: weight; adopt unit from the calibration.
+/- tolerance	Tolerance above/below set point Input: tolerance values; adopt unit from the calibration.
Calming time	Calming time Input: in ms
Default	Reset values to 0.
Print all	Print all ID entries.
Print	Print selected ID entry.
Configuration printing	
Number printouts	Number of printouts Input: 1...10
Sequence number	Sequence number, see Chapter 8.4.4.
Use NLE	Use NLE Check the ☑ box to activate printing with NiceLabelExpress.
Line 1...6	Line 1...6 Selection: see Chapter 8.4.4
Print	Print configuration.

7 Commissioning

7.1 Power failure/Data backup/Restart

7.1.1 Power failure

In the event of a power failure,

- all entered configuration and calibration data and
- all materials saved in the hard drive memory

are retained.

The clock and calendar continue to run.

7.1.2 Data backup

The calibration data and parameters as well as all configuration and interface data are stored in non-volatile (EAROM) memory.

Unauthorized data changing can be prevented by an access code.

The front-panel keys can be disabled.

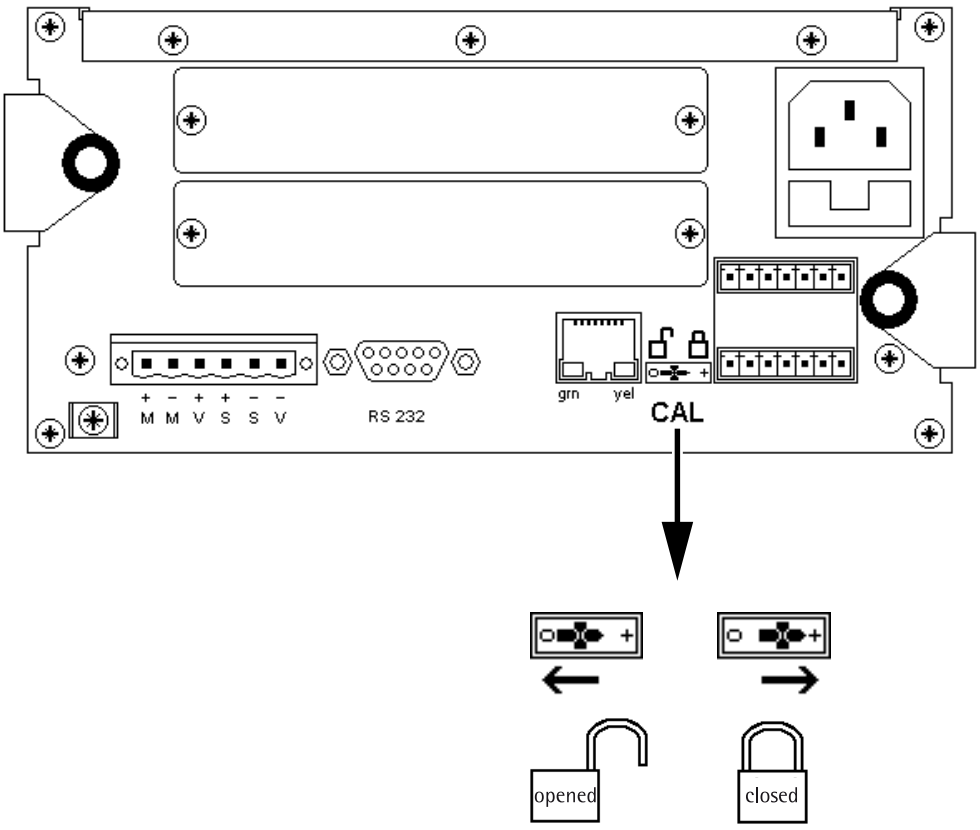
Additional write protection is provided for calibration data and parameters (see Chapter 7.1.3.1).

7.1.3 Overwrite protection

7.1.3.1 CAL switch

The CAL switch protects the calibration data and parameters against unauthorized access.

The CAL switch is located on the back of the device.



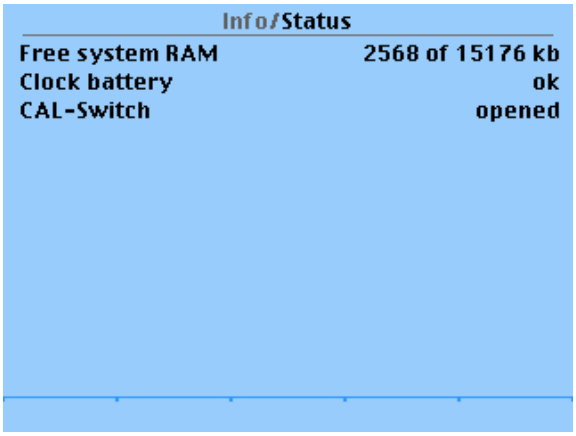
When the CAL switch is in "opened" position, the calibration data and parameters can be changed using the PC program or via the ProfiBus connection.

With the CAL switch in the "closed" position, the calibration data (e.g. dead load, span) and parameters (measuring time, zero tracking etc.) cannot be changed.

With legal-for-trade applications, the CAL switch must be sealed in the closed position.

Note:

If the weighing electronics board has been changed after calibration or the device is not calibrated the weight value display will show "Error 15" if the CAL switch is closed.



The position of the CAL switch is shown with VNC/WEB browser under Info – [Show status]:

[opened] = opened, no write protection.

[closed] = closed, write protection is active.

7.1.3.2 Factory settings (defaults)

Calibration data <default>	Calibration parameter <default>
Upper scale limit (Max) <3000> <Kg>	Measurement time <160> ms
Scale interval <1>	Digital filter <off>
Dead load <0.000000> mV/V	Test mode <Absolute>
Span <1.000000> mV/V	W&M* <none>
	Standstill time <0.5> s
	Standstill range <1.00> d
	Zero-setting range <50.00> d
	Automatic zero tracking range <0.25> d
	Scale interval for automatic zero tracking <0.25> d
	Overload (range > Max) <9>d
	Min <20> d

* Parameter [W&M] must be set to [none] before the calibration data is entered; see Chapter 7.14.15.

7.1.4 Restart

The PR 5410 is restarted using the front-panel keys.

Press the following keys one after the other:

- Setup

  `SEtuP` appears on the display.

- N·B·T/↓

  `bIoS` appears on the display.

- Test/OK

  `bIoS...` appears on the display.

  `FLASH` follows on the display.

- N·B·T/↓

  `boot` appears on the display.

- Test/OK

Restarting has the following effects on the device:

- Current process steps are deleted.
- The device is reset to its factory settings.
- The network settings are not changed.

7.2 Switching on the device

The device can be set up as follows:

- Via keys on the front of the device
- Via a notebook/PC using the VNC software (included on the CD)
- Via a notebook/PC using an Internet browser

As soon as the device is provided with power, the display shows:

`Pr5410`	Message with device type PR 5410
`b 1.00.00.`	BIOS version

F 1.00.00.	Firmware version
8.8.8.8.8.8.lb	Automatic display test
1350.50kg	Weight display
Error6	Error message: no sense voltage, see also Chapter 16.1.
Error9	Error message: if there is no communication with the xBPI scale (see also Chapter 16.2). Error message: unable to read weight values from the ADC (analog-digital converter); see also Chapter 16.1.

The weight display appears.

Set the date and time after turning on the device for the first time; see Chapter 7.2.1.

7.2.1 Setting the date and time

Entering the date and time via Notebook/PC (VNC/WEB browser)

See Chapter 7.17.2.

Entering the date and time using the front-panel keys

1. Press Setup.
   ▷ SEtuP appears on the display.
2. Press "OK."
   ▷ Cd 000 appears on the display ("Cd" flashes).
3. Press ↑ repeatedly (9×) until "dt 086" appears.
4. Press "OK."
   ▷ YEAr appears on the display.
5. Press "OK."
   ▷ 2007 (YYYY) is displayed.
6. Use ←/→ and ↑/↓ to make changes accordingly.
7. Press "OK."
   ▷ dAtE appears on the display.
8. Press "OK."
   ▷ 05/15 (MM/DD) appears on the display.
9. Use ←/→ and ↑/↓ to make changes accordingly.
10. Press "OK."
    ▷ tIME appears on the display.

11. Press "OK."

    ▷ `17.35` (SS.MM) appears on the display.

12. Use ←/→ and ↑/↓ to make changes accordingly.
13. Press "OK."

    ▷ `dt 086` appears on the display.

14. Press "Exit" to exit the menu.

7.3 Switching off the device

The device is switched off/disconnected from power supply by pulling the plug.

7.4 Warm-up time

The device requires a warm-up time of 30 minutes before calibration.

7.5 Configuring and calibrating using the front-panel keys

The device can be configured directly using the front-panel keys, with the exception of the connected xBPI weighing point.

Note:

If an xBPI weighing point is selected, "Err86" appears on the display and it can only be calibrated via VNC.

7.5.1 Parameter table (SEtuP)

CD*	Calibration data
000 CALIb	nEW new calibration, VIEW display data, Mod modify calibration
001 MAX.FSd	Decimal point position, Max (scale range) and weight unit
002 StEP	Scale interval
003 dEAdLo	Set dead load with weight (LoAd) or mV/V (MVoLt)
004 SPAn	Calibrate range with weight (LoAd) or mV/V (MVoLt)
005 0-rnG	Display the used zero-setting range
006 uVolt.d	Display µV/d
007 WEIGHt	Display current gross weight; 10-fold resolution is possible using N·B·T key.
CP*	Calibration parameter
010 MEAtIM	Measurement time
011 FILtEr	Digital filter
012 FCut	Filter frequency
013 tStMod	Test mode
014 WAM	W&M, legal-for-trade
015 StStIM	Standstill time

016 StSrnG	Standstill range
017 TArtIM	Timeout for taring/zero-setting
018 ZESrnG	Zeroset range
019 ZEtrnG	Zerotrack range
020 ZEtStP	Zerotrack interval
021 ZEttIM	Zerotrack time
022 oVrLd	Overload
023 MIn	Min.
024 MuLrnG	Multi-range mode
025 rAnG 1	Range 1
026 rAnG 2	Range 2
LI	Limits (settings via VNC), for Standard application only
030 LIM.1on, LIM.1oF	Limit 1 "On", limit 1 "Off"
031 LIM.2on, LIM.2oF	Limit 2 "On", limit 2 "Off"
032 LIM.3on, LIM.3oF	Limit 3 "On", limit 3 "Off"
LA	Limits, action/condition (settings via VNC), for Standard application only
033 LIM.1on	Action/condition
034 LIM.1oF	Action/condition
035 LIM.2on	Action/condition
036 LIM.2oF	Action/condition
037 LIM.3on	Action/condition
038 LIM.3oF	Action/condition
do	Digital outputs (settings via VNC), for Standard application only
040 bCd.out	BCD mode: GroSS; NEtIt = net if tared, otherwise gross; SELECt; trnSP
041 outP. 1	Output 1
042 outP. 2	Output 2
043 outP. 3	Output 3
dI	Digital inputs (settings via VNC), for Standard application only
044 InP.1on	Input 1, condition
045 InP.1oF	Input 1, condition
046 InP.2on	Input 2, condition
047 InP.2oF	Input 2, condition
048 InP.3on	Input 3, condition
049 InP.3oF	Input 3, condition
Ao	Analog output, for Standard application only
050 AnA.Mod	Mode: GroSS; NEtIt = net if tared, otherwise gross; SELECt; trnSP
051 AnA.rnG	Range 0/4–20 mA
052 out.Err	Output on error
053 out.< 0	Output if <0
054 out.>20	Output if >Max
055 WGt.0/4	Weight if 0/4 mA
056 WGt. 20	Weight if 20 mA
oP	Operating parameters
060 Addr	Device address, for Standard application only

061 PIn	Access code, for Standard application only
062 ALIbI	Alibi, nonE, GroSS, nEt, Gr.nE.tA., Gr.nE. or Gr.tA
063 SEqnr	Next free sequence number
064 tArKEY	Tare key, function, disable
065 ZErKEY	Zeroset key, function, disable
066 nbtKEY	N.B.T key, disable
067 PrtKEY	Print key, disable
068 tStKEY	Test key, disable
PP	Print parameters
073 PrtMod	LAYout (direct)/nICELb (Nice Label)
074 LAYou1	Select element 1
075 LAYou2	Select element 2
076 LAYou3	Select element 3
077 LAYou4	Select element 4
078 LAYou5	Select element 5
079 LAYou6	Select element 6
nP	Print parameters
080 dHCP	DHCP
081 IP.Addr	IP address
082 SubnEt	Subnet
083 Gt.Addr	Gateway
084 CLIEnt	VNC client
085 Et.Addr	Hardware address (MAC ID) This address is also located on the label on the side of the device; see Chapter 7.9.
dt	Date and time
086 YEAr	YYYY, dAtE: MM-TT, tIME: HH.MM
VS	Program versions
087 FIrM	Firmware
088 bIoS	Bios
089 boArd	Board number
FP	Fieldbus parameters
090 Prot	Protocol (e.g., [Pro.nET] for ProfiNet I/O)
091 PdPAdr	PDP [Address]
092 dVnbdr	DeviceNet [Baudrate]
093 dVnAdr	DeviceNet [Address]
094 CCLbdr	CC-link [Baudrate]
095 CCLAdr	CC-link [Address]
097 IPAddr	ProfiNet/EtherNet-IP [IP address]
098 SubMSK	ProfiNet/EtherNet-IP [Subnet Mask]
AL	Alibi Memory
100 SEq	Sequence number of alibi entry: Content display/printout
101 ErASE	Delete alibi memory content yes/no
SI	Serial interfaces
110 Print	Printer
Port	See Chapter 7.17.1.
111 rEMdSP	Remote display
Port	See Chapter 7.17.1.

112 ModbuS	ModBus RTU
Port	See Chapter 7.17.1.
113 SMA	SMA
Port	See Chapter 7.17.1.
114 EW-CoM	EW-Com
Port	See Chapter 7.17.1.
115 xBPI	xBPI
Port	See Chapter 7.17.1.
HS	Hardware status
120 Slot 1	EMPtY = empty or PR 5510 card type
121 Slot 2	EMPtY = empty or PR 5510 card type
122 Slot 4	EMPtY = empty or PR 1721 card type
123 bAt	bAt oK battery status
Pd	Pendeo search
124 SEArCH	Search for Pendeo load cells and set dead load; see Chapter 5.5.8
CA	Filling mode, only for EasyFill
150 dModE	Select filling mode nE.t = Net filling (B1) or ne.t d.l. = Net decrease (B4)
IM	Interaction mode, only for EasyFill
151 IModE	Select interaction mode See Chapter 8.2.2.
PC	Configure printout, only for EasyFill
160 nuMPrt	Number of printouts
161 SEqnr	Enter sequence number.
162 PrtMod	Select printing mode. LAyout = appl. layout or nICELb = NiceLabelExpress
163...168 LAyou 1...6	Configure line 1...6. nEt = net weight, GroSS = gross weight, MAtnAM = material name, nonE = no printout, FF = formfeed, SEq = sequence number, dAtE = date and time, SEtP = set point, tArE = tare weight, nL = CR/LF (carriage return and line feed)
do	Configure digital outputs, only for EasyFill
170...172 out 1...3	Enter SPM addresses %MXxxx; see Chapter 13.4
dI	Configure digital inputs, only for EasyFill
174...176 InP 1...3	Enter SPM address %MXxxx; see Chapter 13.4
ou	Configure digital outputs (PR 5510/12), only for EasyFill
180...191 out 1...12	Enter SPM address %MXxxx; see Chapter 13.4
In	Configure digital inputs (PR 5510/12), only for EasyFill
192...197 out 1...6	Enter SPM address %MXxxx; see Chapter 13.4

Note:

The meaning of the individual data and parameters and the associated value ranges can be found in the description of operation via Notebook/PC.

7.5.2 Recalibrating the internal weighing point using the front-panel keys

Note:

If linearization is active (see Chapter 7.14.11), `Error 91` appears on the display.

Example:
Max (maximum load) 2000.0 g
Scale interval 0.5 g
Set the dead load with empty scale.

Note:

The device has the following default setting when recalibration is started:

Max 3000 kg

Scale interval 1 kg

Start

1. Switch on the device; see Chapter 7.2. Allow for the warm-up phase for the device to be completed.
2. Open the CAL switch; see Chapter 7.1.3.1.
3. Press Setup.

   ▷ `SEtuP` appears on the display.

Recalibrating (Cd 000)

4. Press OK.

   ▷ `Cd 000` appears on the display.

   The "Cd" calibration menu flashes.
5. Press OK to select the menu item.

   ▷ `CALIb` appears on the display.
6. Press OK.

▷ `nEW` (for new calibration) appears on the display.

Defining the max (maximum load) and weight unit (Cd 001)

7. Press OK.

   ▷ `Cd 001` appears on the display.

   The "Cd" calibration menu flashes.

8. Press OK.

   ▷ `MAX.FSd` (full scale deflection) appears on the display.

9. Press OK.

   ▷ `------.kg` appears on the display.

10. Press ← to move the decimal point to the left by one decimal place.

    ▷ `-----.-kg` appears on the display.

11. Press OK.

    ▷ `00300.0 kg` appears on the display (the "3" flashes).

12. Press ↓ (3×) to select the "0" digit.
13. Press ← to select another digit to the left.
14. Press ↑ (2×) to select the "2" digit.
15. Press → (5×) to select the weight unit and change it to "g" with ↑.

Defining the scale interval (Cd 002)

16. Press OK.

    ▷ `Cd 002` appears on the display.

17. Press OK.

    ▷ `StEP` appears on the display.

18. Press OK.

    ▷ `1` appears on the display.

19. Press ↑ to change the scale interval to "5" (0.5 g).

Defining the dead load (Cd 003)

20. Press OK.

    ▷ `Cd 003` appears on the display.

21. Press OK.

▷ `dEAdLo` appears on the display.

22. Press OK.

▷ `LoAd` (dead load with empty scale) appears on the display.

23. Press ↑ to select the "mV/V" entry if necessary.

▷ `MVolt` appears on the display.

Continue for "dead load with empty scale":

24. Press OK.

▷ `unLoAd` appears on the display.

25. Empty the scale.
26. Press OK.

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

27. Press OK.

▷ The dead load is set.

`00000.0 kg` appears on the display.

Defining the span (Cd 004)

28. Press OK.

▷ `Cd 004` appears on the display.

29. Press OK.

▷ `SPAn` appears on the display.

30. Press OK.

▷ `LoAd` (range with weights) appears on the display.

31. Press ↑ to select the "mV/V" entry if necessary.

▷ `MVolt` appears on the display.

Continue for "range with weights":

32. Press OK.
33. Place the calibration weight on the scale.

▷ A weight value that has not been calibrated yet appears on the display.

34. Press OK.

▷ `WEIGHt` appears on the display.

35. Press OK.

▷ The max. calibration weight of `02000.0 g` appears on the display.

36. Use the cursor keys to set the calibration weight value.
37. Press OK.

▷ `Cd 005` appears on the display.

Saving and exiting

38. Press "Exit."

▷ `SAVE` appears on the display.

39. Press OK.

▷ `YES` appears on the display.

40. Press OK.

▷ `SAVE ...` appears on the display during the save process.

41. Press "Exit" to exit the Setup menu.
42. If calibration parameters CP 010–CP 026 are not intended to be set or are already set, the CAL switch must be closed now; see Chapter 7.1.3.1.

7.5.3 Changing the dead load of the internal weighing point using the front-panel keys

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Note:

If linearization is active (see Chapter 7.14.11), `Error 91` appears on the display.

If modifying the mechanics results in the dead load (weight of the empty scale/container) being changed, proceed as described in the following.

Start

1. Switch on the device; see Chapter 7.2. Allow for the warm-up phase for the device to be completed.
2. Open the CAL switch; see Chapter 7.1.3.1.
3. Press Setup.

▷ `SEtuP` appears on the display.

4. Press OK.

▷ `Cd 000` appears on the display.

The "Cd" calibration menu flashes.

5. Press → to change the parameter number ("000" flashes).
6. Press ↑ to select the parameter number.

Changing the dead load (Cd 003)

7. Press OK.
   ▷ `dEAdLo` appears on the display.
8. Press OK.
   ▷ `LoAd` (dead load with empty scale) appears on the display.
9. Press OK.
   ▷ `unLoAd` appears on the display.
10. Empty the scale.
11. Press OK.
    ▷ A weight value for the dead load appears on the display.
12. Press OK.
    ▷ The dead load is set.

    `00000.0 kg` 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 during the save process.
17. Press "Exit" to exit the Setup menu.
18. If no other calibration data or parameters are going to be set, the CAL switch must be closed now; see Chapter 7.1.3.1.

7.5.4 Displaying the calibration data of the internal WP using the front-panel keys

1. Press Setup.
   ▷ `SEtuP` appears on the display.

2. Press OK.
   ▷ `Cd 000` appears on the display.

   The "Cd" calibration menu 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.
4. Press OK.
   ▷ `nEW` appears on the display.
5. Press ↑.
   ▷ `VIEW` appears on the display.
6. Press OK.
   ▷ `CAL.oPn` (CAL switch open) appears on the display.
7. Press OK.
   ▷ `MAX.FSd` (full scale deflection) appears on the display.
8. Press OK.
   ▷ The set maximum load appears on the display.
9. Press OK.
10. Press OK.
    ▷ `Cd 002` appears on the display.
11. Press OK.
    ▷ `StEP` appears on the display.
12. Press OK.
    ▷ The set scale interval appears on the display.
13. Press OK.
    ▷ `Cd 003` appears on the display.
14. Press OK.
    ▷ `dEAdLo` appears on the display.
15. Press OK.
    ▷ The weight value for the dead load appears on the display.

16. Press OK.

    ▷ `dEAdLo` appears on the display.

17. Press OK.

    ▷ The mV/V value for the dead load appears on the display.

18. Press OK.

    ▷ `Cd 004` appears on the display.

19. Press OK.

    ▷ `SPAn` appears on the display.

20. Press OK.

    ▷ The mV/V value for the maximum load appears on the display.

21. Press OK.

    ▷ `Cd 005` appears on the display.

22. Press OK.

    ▷ `O-rnG` appears on the display.

23. Press OK.

    ▷ The used zero-setting range appears on the display.

24. Press OK.

    ▷ `Cd 006` appears on the display.

25. Press OK.

    ▷ `uVoLt.d` appears on the display.

26. Press OK.

    ▷ The measurement signal appears on the display in µV/d.

27. Other parameters, if any, can be displayed in the same way.

7.5.5 Reading out calibration data for WP dead load and max using the front-panel keys

All settings for the device should normally be written down or printed out during commissioning.

If an error occurs and a device must be replaced and no new calibration is carried out, the values for the dead load and maximum load must be available in mV/V.

Procedure

1. Press Setup.

    ▷ `SEtuP` appears on the display.

2. Press OK.

▷ `Cd 000` appears on the display.

The "Cd" calibration menu flashes.

3. Press → to change the parameter number ("000" flashes).
4. Press ↑ multiple times to select parameter number "003."
5. Press OK.

▷ `dEAdLo` appears on the display.

6. Press OK.

▷ `LoAd` appears on the display.

7. Press ↑ to select "MvoLt."
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.

▷ `MvoLt` appears on the display.

13. Press OK.
    ▷ The mV/V value for the maximum load appears on the display.
14. Note the displayed value.
15. Press "Exit" to exit the Setup menu.

7.5.6 Search for Pendeo load cells and set dead load using the front-panel keys

In this menu, a search for connected load cells is conducted and the dead load is set.
The load cell type (Pendeo Truck or Pendeo Process) is automatically detected.

Note:

Assigning the Pendeo load cells is only possible with a notebook/PC; see Chapter 7.16.6.
In the process, the dead load is deleted and a recalibration must be carried out.

Procedure

1. Press Setup.

▷ `SEtuP` appears on the display.

2. Press OK.

   ▷ `Cd 000` appears on the display.

   The "Cd" calibration menu flashes.

3. Press ↓ (1×) to select the "Pd 124" menu.
4. Press OK.

   ▷ `SEArCH` appears on the display.

5. Press OK.

   ▷ `YES` appears on the display.

6. Press OK.
   ▷ A search for connected load cells is conducted and the dead load is set immediately thereafter.
7. Press "Exit" to exit the Setup menu.

7.5.7 Creating a PIN code using the front-panel keys

The Setup menu can be protected from unauthorized access with a PIN code defined by the user.

Setting up a PIN code

1. Press Setup.

   ▷ `SEtuP` appears on the display.

2. Press OK.

   ▷ `Cd 000` appears on the display.

   The "Cd" calibration menu flashes.

3. Press ↑ multiple times to select "oP."

   ▷ `oP 060` appears on the display.

4. Press → to change the parameter number ("000" flashes).
5. Press ↑ to select the parameter number.

   ▷ `oP 061` appears on the display.

6. Press OK.

   ▷ `PIn` appears on the display.

7. Press OK.

   ▷ `000000` (= no prompt) appears on the display.

8. Press the cursor keys to enter a PIN code.
9. Press OK to save the PIN code.

Entering the PIN code

10. Press Setup.
    ▷ `SEtuP` appears on the display.
11. Press OK.
    ▷ `PIn` appears on the display.
12. Press OK.
    ▷ `000000` appears on the display.
13. Press the cursor keys to enter the PIN code.
14. Press OK.
    ▷ If a wrong PIN code has been entered, `PInWro` appears on the display.
15. Press OK.
    ▷ `000000` appears on the display.
16. Press the cursor keys to enter the correct PIN code.
    ▷ If the right PIN code has been entered, `Cd 000` appears on the display.

    The "Cd" calibration menu flashes.

Entering the SUPER PIN code

If the PIN code is lost, the Setup menu can be unlocked with SUPER PIN code "212223."

17. Press Setup.
    ▷ `SEtuP` appears on the display.
18. Press OK.
    ▷ `PIn` appears on the display.
19. Press OK.
    ▷ `000000` appears on the display.
20. Press the cursor keys to enter SUPER PIN code "212223."
21. Press OK.

7.5.8 Deleting the PIN code using the front-panel keys

1. Press Setup.
   ▷ `SEtuP` appears on the display.
2. Press OK.
   ▷ `PIn` appears on the display.
3. Press OK.
   ▷ `000000` appears on the display.
4. Press the cursor keys to enter the PIN code.
5. Press OK to save the PIN code.
6. Press OK.
   ▷ `Cd 000` appears on the display.

   The "Cd" calibration menu flashes.
7. Press ↑ multiple times to select "oP."
   ▷ `oP 060` appears on the display.
8. Press → to change the parameter number ("000" flashes).
9. Press ↑ to select the parameter number.
   ▷ `oP 061` appears on the display.
10. Press OK.
    ▷ `PIn` appears on the display.
11. Press OK.
    ▷ The PIN code appears on the display.
12. Press the cursor keys to enter PIN code "000000" (=no prompt).
13. Press OK to save the entry.

7.5.9 Entering fieldbus parameters using the front-panel keys

Example:

Fieldbus card PR 1721/36 ProfiNet I/O

1. Press Setup.
   ▷ `SEtuP` appears on the display.
2. Press OK.
   ▷ `Cd 000` appears on the display.

The "Cd" calibration menu flashes.

3. Press ↑ multiple times to select "FP 090."
4. Press OK.

   ▷ `Prot` (protocol) appears on the display.

5. Press OK.

   ▷ `Pro.nEt` appears on the display.

6. Press OK.

   ▷ `FP 097` appears on the display.

7. Press OK.

   ▷ `IP.Addr` appears on the display.

8. Press OK.

   ▷ The more significant part of the address* `000.000.` appears on the display.

9. Press the cursor keys to select and set the desired numbers.
10. Once the last number is selected and set, press → to set the less significant part of the address*.

    ▷ `000.000.` appears on the display.

11. Press the cursor keys to select the desired numbers.
12. Press OK.

    ▷ `FP 098` appears on the display.

13. Press OK.

    ▷ `SubnEt` (subnet mask) appears on the display.

14. Press OK.

    ▷ The more significant part of the mask* `255.255.` appears on the display.

15. Press the cursor keys to select and set the desired numbers.
16. Once the last number is selected and set, press → to set the less significant part of the mask*.

    ▷ `255.000.` appears on the display.

17. Press the cursor keys to select the desired numbers.
18. Press OK.

    ▷ `SAVE` appears on the display.

19. Press OK.

    ▷ `YES` appears on the display.

20. Press OK.

    ▷ `SAVE ...` appears on the display during the save process.

21. Press "Exit" to exit the Setup menu.

*

An error message appears if the digit group for the IP address/mask is not within 0–255, or is invalid.

7.5.10 Entering the network address using the front-panel keys

Note:

A new address may be assigned by the server in the event of a restart.

1. Press Setup.

    ▷ `SEtuP` appears on the display.

2. Press OK.

    ▷ `Cd 000` appears on the display.

    The "Cd" calibration menu flashes.

3. Press ↑ multiple times to select "nP 080."
4. Press OK.

    ▷ `dHCP` (DHCP) appears on the display.

5. Press OK.

    ▷ `on` appears on the display.

    DHCP is activated. The network address is assigned automatically.

    If DHCP is not activated ("oFF"), the addresses must be entered manually.

6. Press OK.

    ▷ `nP 081` appears on the display.

7. Press OK.

    ▷ `IP.Addr` appears on the display.

8. Press OK.

▷ The more significant part of the address* `172.024.` (example) appears on the display.

9. If DHCP "oFF" is selected: Press the cursor keys to select and set the desired numbers.
10. Once the last number is selected and set, press → to set the less significant part of the address*.

▷ `020.128.` (example) appears on the display.

11. If DHCP "oFF" is selected: Press the cursor keys to select and set the desired numbers.
12. Press OK.

▷ `nP 082` appears on the display.

13. Press OK.

▷ `SubnEt` (subnet mask) appears on the display.

14. Press OK.

▷ The more significant part of the mask* `255.255.` appears on the display.

15. Press the cursor keys to select and set the desired numbers.
16. Once the last number is selected and set, press → to set the less significant part of the mask*.

▷ `255.255.` appears on the display.

17. Press the cursor keys to select and set the desired numbers.
18. Press OK.

▷ `nP 083` appears on the display.

19. Press OK.

▷ `GtAddr` (gateway) appears on the display.

20. Press OK.

▷ The more significant part of the address* `000.000.` appears on the display.

21. Press the cursor keys to select and set the desired numbers.
22. Once the last number is selected and set, press → to set the less significant part of the mask*.

▷ `000.000.` appears on the display.

23. Press the cursor keys to select and set the desired numbers.
24. Press OK.

▷ `nP 084` appears on the display.

25. Press OK.

    ▷ `CLIEnt` (VNC client) appears on the display.

26. Press OK.

    ▷ The more significant part of the address* `255.255.` (example) appears on the display.

27. Press the cursor keys to select and set the desired numbers.
28. Once the last number is selected and set, press → to set the less significant part of the mask*.

    ▷ `255.255.` (example) appears on the display.

29. Press the cursor keys to select and set the desired numbers.
30. Press OK.

    ▷ `nP 085` appears on the display.

31. Press OK.

    ▷ `EtAddr` (hardware address/MAC ID) appears on the display.

32. Press OK.

    ▷ The more significant part of the address* `00.90.6C.` (example) appears on the display.

33. Press → to display the less significant part of the mask*.

    ▷ `70.49.45.` (example) appears on the display.

34. Press OK.

    ▷ `SAVE` appears on the display.

35. Press OK.

    ▷ `YES` appears on the display.

36. Press OK.

    ▷ `SAVE ...` appears on the display during the save process.

37. Press "Exit" to exit the Setup menu.

Note:

* `Err 31` appears on the display if the digit group for the IP address/mask is not within 0–255, or is invalid.

7.5.11 Displaying the network address using the front-panel keys

1. Press Setup.
   ▷ `SEtuP` appears on the display.
2. Press OK.
   ▷ `Cd 000` appears on the display.
   The "Cd" calibration menu flashes.
3. Press ↑ multiple times to select "nP 080."
4. Press OK.
   ▷ `dHCP` (DHCP) appears on the display.
5. Press OK.
   ▷ `on` appears on the display.
6. Press OK.
   ▷ `nP 081` appears on the display.
7. Press OK.
   ▷ `IP.Addr` appears on the display.
8. Press OK.
   ▷ The more significant part of the address `172.024.` (example) appears on the display.
9. Press → to display the less significant part of the address.
   ▷ `020.128.` (example) appears on the display.
10. Press "Exit" multiple times to exit the Setup menu.

7.6 Displaying/deleting alibi entries using the front-panel keys

The alibi memory of the device can be displayed and/or deleted directly using the front-panel keys.

7.6.1 Displaying/deleting alibi entries

1. Press Setup.
   ▷ `SEtuP` appears on the display.
2. Press OK.
   ▷ `Cd 000` appears on the display.
   The "Cd" calibration menu flashes.
3. Press ↓ multiple times to select "AL 100."
4. Press OK.
   ▷ `SEQ` appears on the display.
5. Press OK.
   ▷ The sequence number of the last alibi entry appears on the display (right digit flashes).
6. Press the cursor keys to select the desired sequence number.
7. Press OK.
   ▷ `YEAr` appears on the display.
8. Press OK.
   ▷ The year of the alibi entry appears on the display.
9. Press OK.
   ▷ `dAtE` appears on the display.
10. Press OK.
    ▷ The date of the alibi entry appears on the display.
11. Press OK.
    ▷ `tIME` appears on the display.
12. Press OK.
    ▷ The time of the alibi entry appears on the display.
13. Press OK.
    ▷ `GroSS` appears on the display.
14. Press OK.
    ▷ The gross weight of the alibi entry appears on the display.
15. Press OK.
    ▷ `PrInt` appears on the display.
16. Press OK.

▷ `no` appears on the display.

17. Press ↑ to select "YES."
18. Press OK.
    ▷ The alibi entry is printed out.
19. Press "Exit" to exit the Setup menu.

7.6.2 Deleting alibi entries

1. Press Setup.
   ▷ `SEtuP` appears on the display.
2. Press OK.
   ▷ `Cd 000` appears on the display.

   The "Cd" calibration menu flashes.
3. Press ↓ multiple times to select "AL 100."
4. Press → to change the parameter number ("100" flashes).
5. Press ↑ to select parameter number "101."
6. Press OK.
   ▷ `ErASE` appears on the display.
7. Press OK.
   ▷ `no` appears on the display.
8. Press ↑ to select "YES."
9. Press OK.
   ▷ All alibi entries are deleted.
10. Press "Exit" to exit the Setup menu.

7.7 Finding and connecting a device with a notebook/PC

If the device is connected to a notebook/PC via a point-to-point connection, an IP address is negotiated via function "AutoIP". This can take up to 2 minutes!

NOTICE

When the IT/DHCP network cable is temporarily connected between the notebook/PC and a device, the DHCP server is lost and the notebook/PC returns to the auto-IP address within approx. two minutes!

▶ Reason: The DHCP server/client relationship is checked cyclically at 2...3-minute intervals.

1. On the notebook/PC, set the LAN local and Internet Protocol properties to "Obtain an IP address automatically" depending on the operating system.
2. On the device, under Setup - [Network parameters] activate the "Use DHCP" parameter (factory/default settings).
   ▷ The DHCP devices find each other because they fall into an "auto-IP address" in the range 169.254.0.1...169.254.255.254 with the associated auto-subnet mask 255.255.0.0 after a cyclical automatic DHCP server search run due to time overflow (2...3 minutes).

   Example:

   If the search time is exceeded (because there is "no server found"), the PR 5410 is assigned to an IP address automatically (e.g. 169.254.0.123). The same applies to the notebook or PC (e.g. 169.254.0.54).

   These IP addresses are different on both sides:

   - equal regarding the first 2 octets of the IP address (e.g. network ID 169.254.)
   - different in the last 2 octets of the IP address (e.g. host ID 0.123.)

7.8 Finding and connecting the device automatically in the network

If the DHCP server is active in the network, the connected device (default setting under Setup - [Network parameters]: "Use DHCP" is activated.) is automatically assigned an IP address.

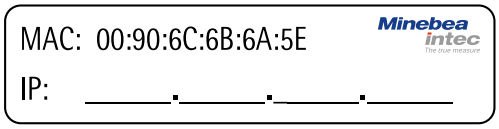
On the notebook/PC, the host names of the connected devices in the network are listed under [Network].

Double-click the host name to open the device page in the web browser. The IP address is displayed on the bottom right.

7.9 Searching the device in the network with "IndicatorBrowser"

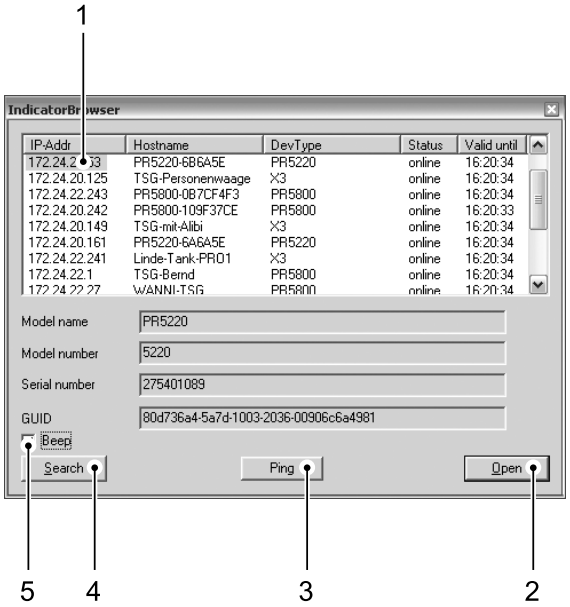
The IP address can be found out using the "IndicatorBrowser" application (supplied on CD-ROM) and via the "host name" of the device.

The "host name" is composed of the device name and the last 3 bytes of the MAC ID. A label with the complete MAC ID is located on the outside of the device.



Host name: PR5410-6B6A5E

For this, the program must be installed and started on a notebook/PC.



Legend

No.	Description
1	The program searches within the current network ID, e.g. 169.254. and 172.24., on all available network adapters in the PC (several possible/recommended, e.g. LAN global/LAN local) **Result:** List of all connected devices with status: search??? – online - byebye – lost???
2	Click the button to open the "standard" Internet Browser, e.g. Microsoft Internet Explorer, directly with the marked IP-address.
3	Click the button to localize the associated device. Short-term visual feedback from the device: Regular running light in LED 1, 2, 3.
4	Click the button to re-start the network search run. **Waiting 2...3 minutes is essential!**
5	Acoustic signal for each device that was detected as "online."

Note:

If the browser window remains empty after the minimum wait time, or if the expected device is not listed, the network ID of the local notebook/PC must be checked and changed, if necessary.

Only certain Minebea Intec devices are supported by the "indicator browser"!

7.10 Resetting the network address

This means

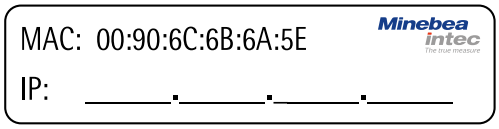
- "DHCP" is activated.
- "Hostname" is initialized to, e.g. PR 5410-6B6A5E (type MAC-ID).

  Example of MAC ID: 00-90-6C-6B-6A-5E

This ensures that a valid address for identification of the device in the network can be assigned to the device from a server, see also Chapter 7.17.6.

Note:

The last 3 bytes of the MAC ID are displayed. A label with the complete MAC ID is located on the outside of the device.



If the device is connected to an IT network (company network) with an DHCP server and was activated under Setup - [Network parameter] of the "Use DHCP" parameter (default/ factory setting), it does not require further actions except for a 2...3-minute waiting time. Subsequently, a network connection is established automatically (device <-> workstation/PC).

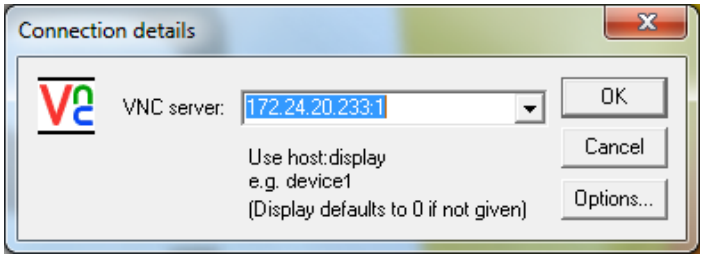
7.11 Operation using VNC

VNC (on the enclosed CD-ROM) stands for "virtual network computing" and is a program for remote operation of computers.

The program distinguishes between the VNC server and VNC client (viewer). The server program is part of the device software, the client program (viewer) must be run on the notebook/PC in order to operate the device.

Note:

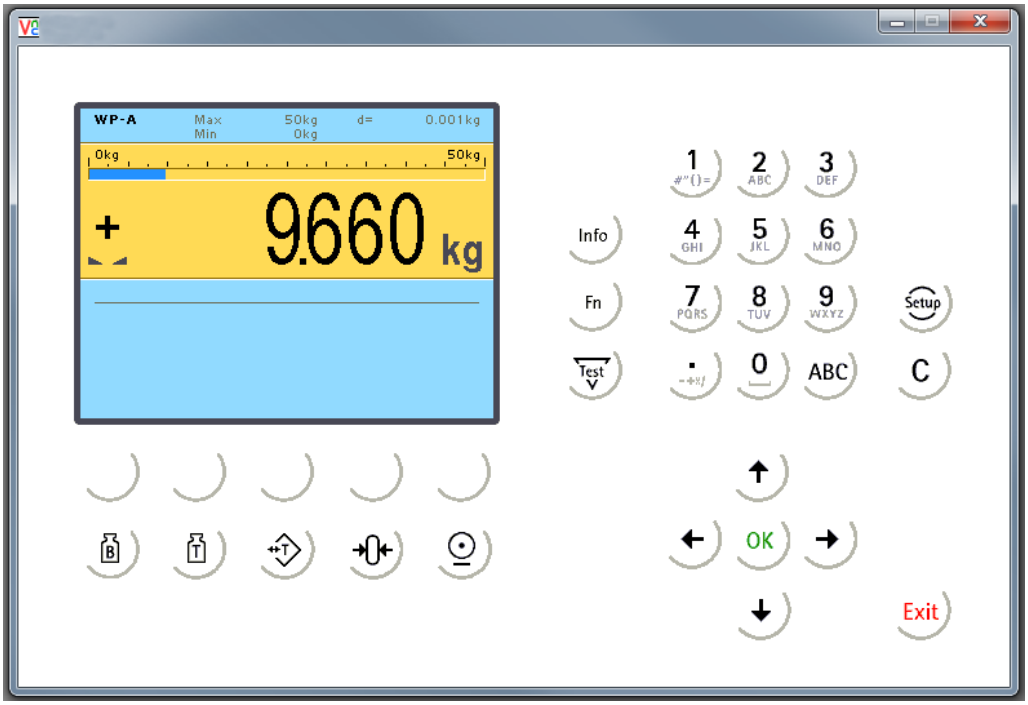
The VNC version provided on CD must be used. More recent VNC versions (freeware) from the internet are not supported by the device!



For direct operation using the VNC program, the IP address (extended by **:1**) must be specified when you run the program, e.g., 172.24.20.233:1.

Note:

In the device, the VNC access to certain notebooks/PCs can be limited, see Chapter 7.17.6.



NOTICE

If the VNC viewer is terminated on the setup level (e.g. by closing the window or the back function in the web browser), the device reboots and the web menu is not accessible for several seconds.

▶ Before terminating the VNC viewer keep pressing the **Exit** key to quit the setup level.

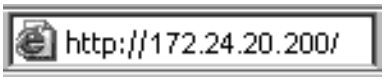
7.12 Operation via a web browser

Instead of the VNC viewer, the web browser, e.g. Microsoft Internet Explorer, Mozilla Firefox Web browser etc., can be used directly.

The disadvantage is that an additional "Java" installation is required.

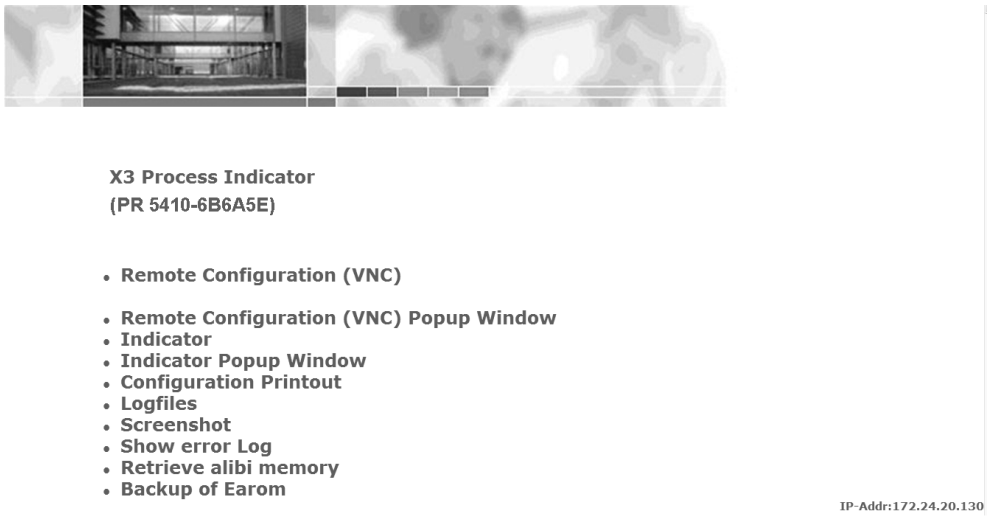
In addition to VNC, this includes:

- easy operation for printing out the configuration
- easy operation for displaying and saving protocols
- easy operation for saving and loading configuration and calibration data

Example: 

Enter the IP address in the Internet browser and confirm.

The web menu is displayed.



For description of the web menu see Chapter 9.2.1.

NOTICE

If the VNC viewer is closed on the setup level, the device reboots and the web menu is not accessible for several seconds.

- If the web menu and the device view are required, the [Remote Configuration (VNC) Popup Window] menu item must be selected in order for two windows to be opened and the VNC viewer always remains open, even if individual menu items are selected in the web menu.

7.13 System setup

7.13.1 Serial ports parameter

Remote display	Remote display
Param	Selection: Assigned to, Baudrate, Bits, Parity, Stopbits, Mode
ModBus RTU	
Param	Selection: Assigned to, Baudrate, Bits, Parity, Stop bits, Slave-ID
SMA	
Param	Selection: Assigned to, Baudrate, Bits, Parity, Stopbits
xBPI-Port	
Param	Selection: Assigned to, Baudrate, Bits, Parity, Stopbits

7.13.2 Date & time

Date	Date Input: yyyy, mm, dd
Time	Time Input: hh, mm, ss

7.13.3 Operating parameter

Application	Selection: Standard, EasyFill

Address	Device address, e.g. for the printout Input: A...Z
PIN	Access code, to protect the system setup from unauthorized operation. Input: 6 numerical characters
Sequence number	Automatic counter for print jobs
SetTareKey	Tare key Selection: Tare&reset tare, tare&tare again, disabled
SetZeroKey	Zero-setting key Selection: only when not tared, reset tare on zeroset, disabled.

7.13.4 Printing parameter

Note:

This menu item is only available if under Setup-[Operating parameter]- [Application] "Standard" has been selected.

Printing mode	Printing mode Selection: Triggered (trigger one printout), Cyclic, Cyclic with enable
Printing interval	Printing interval This menu item only appears if the [Cyclic] or [Cyclic with enable] printing mode has been selected. Input: 1...250
Printing interval unit	Unit of the printing interval Selection: Seconds, Minutes, Hours, Meas. time
Printlayout Item 1...6	Print layout for line 1...6; see Chapter 7.17.4.

7.13.5 Fieldbus parameter

- **Fieldbus protocol**

7.13.6 Network parameter

HW address	MAC-ID, display: e.g.: 00:90:6C:31:1F:55
Hostname	Unique device name, input: 2...24 alphanumerical characters
Use DHCP	Check the ☑ box to activate DHCP.
IP address	IP address, display: network address assigned by the server
Subnet mask	Subnet mask, display: Mask for valid IP address range
Default gateway	Standard gateway, display: IP number for gateway
Remote access	Remote access to VNC client
↳ **VNC client**	

	Access restriction, Input: authorized client for instrument operation

7.13.7 Weighing points

Weighing point A	Selection: Internal A, xBPI-scale, Pendeo Load Cells
Calib	Calibration, selected "Internal A:" New, Modify, Param, see Chapter 7.13.7.1.
Setup	Setup, "xBPI-Scale" selected: Calibration, Configuration, Select, Show device info, see Chapter 7.13.7.2.
Config	Configuration, "xBPI-Scale" selected: Type, W&M, Tare timeout, Serial number, SBN Address, see Chapter 7.13.7.2.
Param	Configuration, "xBPI-Scale" selected: Assigned to, Baudrate, Bits, Parity, Stopbits, see Chapter 7.13.7.2
Assign	Assign, "Pendeo Load Cells" selected: Search, View, Calib, LC name, Service, see Chapter 7.13.7.3.

7.13.7.1 "Internal A" weighing point

Calib	Calibration of the weighing electronics
New	Query window for new calibration: Reset Span and dead load Contin, Cancel
Max	Input of the maximum load: 0.00001...<3000>...999999 <kg>, t, lb, oz, g, mg
Scale interval	Input of the scale interval: <1>, 2, 5, 10, 20, 50
Dead load at	<0.000000 mV/V> or [by load] [by load]: 0.00001...999999 <kg>, t, lb, oz, g, mg
Max at	<1.000000 mV/V> or [by load] [by load]: 0.00001...999999 <kg>, t, lb, oz, g, mg
Calibrated at	Display only
Sensitivity (µV/d)	Display only
Test	Determine test value
Exit calibration	Save or discard changes due to new calibration.
Modify	May be used only for minor changes (e.g. changing the dead load, adapting mV/V values for dead load and/or Max). Otherwise, always use [New]!
Param	Parameter settings
Measuretime	Input of the measuring period: 5, 10, 20, 40, 80, 160, <320>, 640, 960, 1280, 1600 ms
Digital filter	Selection of the digital filters: <off>, Bessel, aperiod., Butterw., Tcheby.
External supply	Selection: below or equal 8 V (≤8 V), <above 8 V> (>8 V)
Fcut	Input of cut off frequency, only unless filter not "off", 0.1–80.0 Hz

Test mode	Selection for display of the deviation from the test value: <Absolute>, relative
W&M	Selection legal-for-trade mode: <none>, OIML (impossible when [Range mode] "Multi-interval" has been selected or Max has more than 3 decimals), NSC, NTEP
Standstill time	Input of the standstill period: 0.01 s...<0.50 s>...2.0 s (The range depends on the measuring time.)
Standstill range	Input of the standstill range: 0.00 d...<1.00 d>...10.00 d
Tare timeout	Input of timeout when there is no standstill: 0.1 s...<2.5 s>...25 s
Zeroset range	± Range of zero point when there is no standstill. Input: 0.00 d...<50.00 d>...10000.00 d
Zerotrack range	Input of the zerotrack range: 0.00 d...<0.25 d>...10000.00 d
Zerotrack step	Input of the zerotrack step: 0.00 d...<0.25 d>...10.00 d
Zerotrack time	Input zerotrack time: <0.0 s>...25 s
Overload	Input of the weighing range above the maximum load (Max) without error message: 0...999999 d
Minimum weight	Input of the minimum load: 0 d...<50 d>...999999 d
Range mode	Range selection: <Single range>, Multiple range, Multi-interval See also Chapters 7.14.15.2 and 7.14.15.3.
Range limit 1	Input of the limit 1: In weight, unit same as Max, transition from small to medium scale interval Only for [Multiple range] or [Multi-interval]!
Range limit 2	Input of the limit 2: In weight, unit same as Max, transition from small to medium scale interval Only for [Multiple range] or [Multi-interval]!
View	(when CAL-switch is closed)
Max	Display only
Scale interval	Display only
Dead load at	Display only
Max at	Display only
Calibrated at	Display only
Sensitivity (µV/d)	Display only
Param	Items as for [Param] (display only)

7.13.7.2 "xBPI scale" weighing point

Setup	Setup of the xBPI scale
Calibration	Calibration of xBPI scale
Dead load	Dead load/preload
Set	Set dead load/preload: Accept, ResError, Abort
Delete	Clear dead load/preload: Accept, ResError, Abort

Span	
Calibrate with user weight	Calibrate with user-defined weight.
Calibrate with auto weight	Calibrate with automatic weight detection.
Adjust with default weight	Calibrate with standard weight.
Adjust with internal weight	Calibrate with internal weight.
Linearity	Setting linearity.
Default	Resetting the Device to the Factory Settings: Accept, ResError, Abort
User	User defined settings: Accept, ResError, Abort
Configuration	Configuration of the scale
Weighing parameters	Weighing parameters
Ambient conditions	Select environmental conditions: Very stable, stable, unstable, very unstable
Application filter	Select application filter: Final readout, Filling mode, Low filtering, w/o filtering
Standstill range	Select standstill range: 0.25 digit, 0.5 digit, 1 digit, 2 digit, 4 digit, 8 digit
Stability symb. delay	Select Stability delay: no delay, short delay, average delay, long delay
Tare parameter	Select taring: at any time, not until stable
Auto zero function	Auto-Zero: auto zero on, auto zero off
Adjustment function	Adj. sequence: ext.adj.w.fact.wt., ext.adj.w.user.wt., ext.adj.w.pres.wt., internal adjust, ext.lin.w.fact.wt., ext.lin.w.user.wt., confirm preload, delete preload, adjust disabled
Confirming adjust.	Confirm calibration: manual, automatically
Zero range	Zero point range: 1% of max load = 1%/Max. load, 2% of max load = 2%/Max. load, 5% of max load = 5%/Max. load, 10% of max load = 10%/Max. Load
Power-On zero range	Initial zero point range: 2% of max load = 2%/Max. load, 5% of max load = 5%/Max. load, 10% of max load = 10%/Max. load, 20% of max load = 20%/Max. Load
Power-On tare/zero	Tare/zero at power on: active, inactive, only for zeroing
Measure rate	Measurement speed: normal output, fast output
Calibration check	Calibration check: calibration prompt, off
External adjustment	External adjustment: accessible, blocked
Application settings	Setting up application
Application Tare	Application Tare: accessible, blocked
Number of units	Number of weight units: 1 weight unit, 2 weight units, 3 weight units
Weight unit 1...3	Chose weight unit 1...3: Gramm [g], Kilogram [kg], Carat [ct], Pound [lb], ounce [oz], Troy ounce [ozt], Tael Hongkong [tlh], Tael

	Singapore [tls], Tael Taiwan [tlt], Grain [GN], Pennyweight [dwt], Milligram [mg], Parts/ pound [/lb], Tael china [tlc], Momme [mom], Karat [k], Tola [tol], Baht [bat], Mesghal [m], Ton [t]
Display accuracy 1...3	Chose display accuracy 13: all digits, reduced when moved, one level lower , two level lower, three level lower, 1%, 0.5%, 0.2%, 0.1%, 0.05%, 0.02%, 0.01%, Multi-interval, increased by 10
Interface settings	Configure the interfaces
Communication type	Communication type: SBI protocol, xBPI protocol
Baudrate for SBI	150 baud, 300 baud, 600 baud, 1200 baud, 2400 baud, 4800 baud, 9600 baud, 19200 baud
Parity for SBI	Select parity: Mark, Space, Odd, Even
Stop bits	Selection: 1 stop bit, 2 stop bits
Handshake	Selection: Software handshake, CTS with 2 chr.pau = CTS with 2 characters , CTS with 1 chr.pau = CTS with 1 character
Data output interval	Select Data output interval: with each display, after 2 updates, after 5 updates, after 10 updates, after 20 updates, after 50 updates, after 100 updates
Parameter change	parameter change: can be changed, cannot be changed
Select specification group	
Specif. group 1...6	Select specification group of the scale (see operating manual of the relevant scale)
Show device info	
Set user	Enter the user name of the connected device
Set SBN	The xBPI address of the interface has to be <0 >, because there is no bus operation.
Config	Configuration of the xBPI scale
Type	xBPI-Scale
W&M	Selection legal-for-trade mode: <none>, OIML, NSC, NTEP
Tare timeout	Timeout due to instability: 0.1 s...<2.0 s>...25 s
Serial number	<0>, if >0 the serial number will be checked (at legal-for trade scale)
SBN Address	<0> no bus operation.
Param	parameter settings of the xBPI scale
Assigned to	Assigned to: xBPI-Port 1
Baudrate	Select transmission speed: <9600>, 19200
Bits	8
Parity	odd (odd parity)
Stop bits	Selection: <1>, 2

7.13.7.3 "Pendeo® Truck/Process" weighing point

Assign	Assignment of the Pendeo scale Type, number of load cells, serial number of each load cell and weighing point serial number

	(when it was already calculated) are displayed (when "Search" was executed).
Search	Search connected load cells. Search for a new network and reset the load cell data to the factory settings.
View	Serial number and current weigh of connected load cells are displayed.
Info	The data for the selected Loading cell are displayed.
Assign	load cells (serial number) are assigned to the installation site.
Calib	Serial number and current weigh of connected load cells are displayed.
New	Query window for new calibration: Corner correction will be reset Yes, No
Local gravity	Enter the on-site gravitational acceleration (Standard: Hamburg 9.81379 m/s^2)
Number of platforms	Only for Pendeo Truck: Only shown if the number of load cells is equal to 8.
Number of vessel feet	Only for Pendeo process: Enter the number.
Max	Enter maximum load: 0.000010...<3000>...9999998 <kg>, t, lb, g, mg, oz
Scale interval	Enter verification interval (1 d): <1>, 2, 5, 10, 20, 50 displayed according to the decimal places at Max and the weight unit.
Dead load	dead load: Weight of the empty scale
CAL weight	Enter CAL weight: 0.000010...9999998 <kg>, t, lb, g, mg, oz
Corner correction	Platform 1, platform 2 (only shown if the number of load cells is = 8). O.k., when realized.
Modify	May be used only for minor changes (e.g. changing the dead load). Otherwise, always use [New]!
Param	Parameter settings
Ambient conditions	Select environmental conditions: Very stable, stable, unstable, very unstable
W&M	Selection legal-for-trade mode: <none>, OIML, NSC, NTEP
Unbal. Check deviat.	Average Deviation: The plausibility check is activated when the average deviation is >0%. Input: 0...100 %
Standstill time	Input of the standstill period: 0.01 s...<0.50 s>...2.0 s (The range depends on the measuring time.)
Standstill range	Input of the standstill range: 0.00 d...<1.00 d>...10.00 d (The range depends on the measuring time.)
Tare timeout	

	Input of timeout when there is no standstill: 0.1 s...<2.5 s>...25 s
Zeroset range	Input of timeout period when there is no standstill: 0.00 d_c...<50.00 d_c>...10000.00 d_c
Zerotrack range	Input of the zerotrack range: 0.00 d_c...<0.25 d_c>...10000.00 d_c
Zerotrack step	Input of the zerotrack step: 0.00 d_c...<0.25 d_c>...10.00 d_c
Zerotrack time	Input zerotrack time: <0.0 s>...25 s
Overload	Input of the weighing range above the maximum load (Max) without error message: 0...<9 d_c>...999999 d_c
Min	Input of the minimum load: 0 d_c...<50 d_c>...999999 d_c
Range mode	Range selection: <Single range>, Multiple range, Multi-interval See also Chapters 7.14.15.2 and 7.14.15.3.
Range limit 1	Input of the limit 1: In weight, unit same as Max, transition from small to medium verification interval Only for [Multiple range] or [Multi-interval]!
Range limit 2	Input of the limit 2: In weight, unit same as Max, transition from small to medium verification interval Only for [Multiple range] or [Multi-interval]!
LC name	Give each load cell a name.
LC 1...n	load cell 1...n, e.g.: PR6224-xx Input of max. 20 alphanumeric characters.
Default	Settings are reset to factory settings.
Service	Service function for load cells: Deactivate/ activate load cell.
LC 1...n	load cell 1...n Select the faulty load cell and reset ☑ to ☐. Select the new (replaced) load cell and mark the checkbox ☑.
Accept	Accept: After deactivation the simulation for the deactivated load cell starts. Once the replaced load cell has been activated the search process starts.
Assign (CAL-switch is closed)	
View	Item number, serial number and current weight of connected load cells are displayed.
Info	The data for the selected Loading cell are displayed.
by name	Change the display from [ID] (LC 1...n + serial number) to [by name] of the load cells; only possible if a load cell name has been assigned.
LC name	Change the display from [ID] (LC 1...n + serial number) to [by name] of the load cells; only possible if a load cell name has been assigned.

Service	The service window for the load cells is displayed. No change is possible!

7.13.8 Limit parameter

Note:

This menu item is only available if under Setup-[Operating parameter]- [Application] "Standard" has been selected.

Limit 1...3 on	Enter 0 – Max (maximum load); take unit from calibration.
Action	Action, selection: no action, set marker 1...3, clr (clear) marker 1...3
Condition	Condition, selection: see Chapter 7.17.7.
Limit 1...3 off	Enter 0 – Max (maximum load); take unit from calibration.
Action	Action, selection: no action, set marker 1...3, clr (clear) marker 1...3
Condition	Condition, selection: see Chapter 7.17.7.

7.13.9 Digital I/O parameters

Note:

This menu item is only available if under Setup-[Operating parameter]- [Application] "Standard" has been selected.

Output 1...3	Configure outputs, selection: see Chapter 7.17.9.
Input 1...3 on	Configure inputs
Action	Action, selection: see Chapter 7.17.8.1.
Condition	Condition, selection: see Chapter 7.17.8.2.
Input 1...3 off	Configure inputs
Action	Action, selection: see Chapter 7.17.8.1.
Condition	Condition, selection: see Chapter 7.17.8.2.

7.13.10 Analog output parameter

Analog mode	Analog output parameter: Gross D08 = gross, Net if tared D09 = Net if tared, Selected D11 = value on the display, Transparent D30 = Transparent, no output = analog output unused, see Chapter 7.17.10.
Analog range	Output range: 0...20 mA, <4...20 mA>
Output on error	Output on error: 0 mA = set to 0 mA, <4 mA> = set to 4 mA, 20 mA = set to 20 mA, hold = last output value remains unchanged
Output if <0	

	Output if <0: set 0 mA = 0 mA, set <4 mA> = 4 mA, set 20 mA = 20 mA, linear = goes below 4 mA down to the limit (with 4...20 mA)
Output if >Max	Output if >Max: set 0 mA = 0 mA, set 4 mA = 4 mA, set <20> mA = 20 mA, linear = exceeds 20 mA up to the limit
Weight at 0/4 mA	Weight value for 0/4 mA output
Weight at 20 mA	Weight value for 20 mA output

7.14 Calibrating internal weighing point

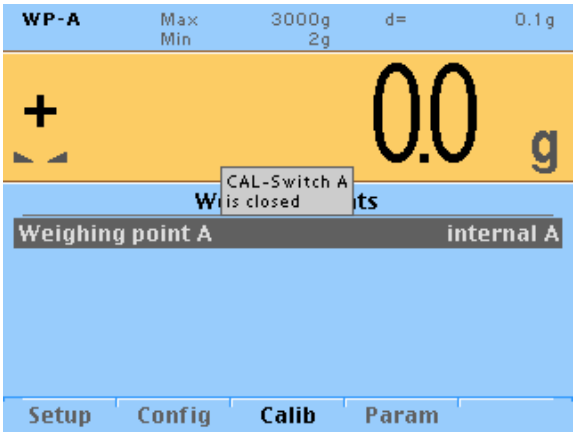
7.14.1 General information

For legal-for-trade application select Setup - [Weighing point]- [Calib]- [Param], where the [W & M] must be set to "OIML" before calibration is started; see Chapter 7.14.15.

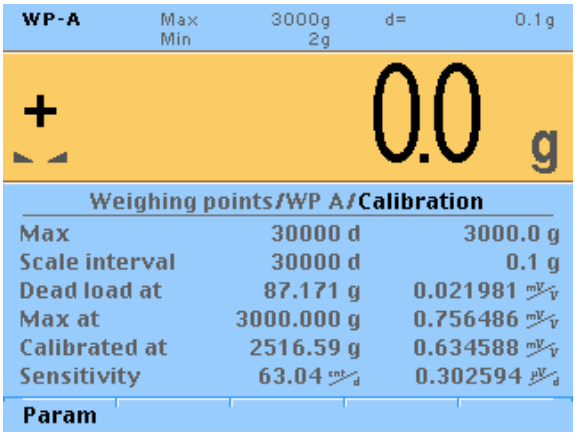
The calibration data are protected by the CAL switch (see Chapter 7.1.3.1), which is sealed in the closed (write-protected) position for legal-for-trade applications.

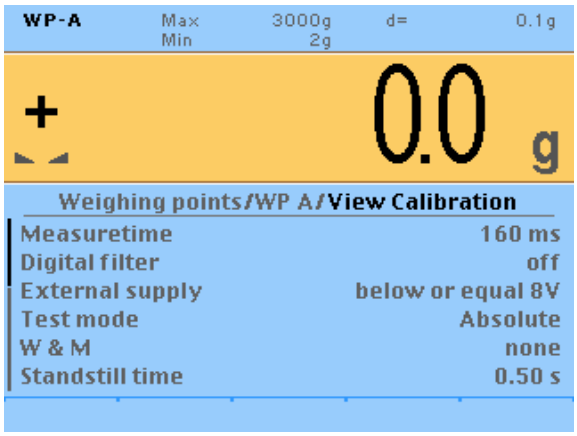
7.14.2 Displaying calibration data

7.14.2.1 Overwrite protection via a CAL switch



When the CAL switch is closed, a tool tip is displayed.





The Data under [Calib] and [Param] is displayed only.

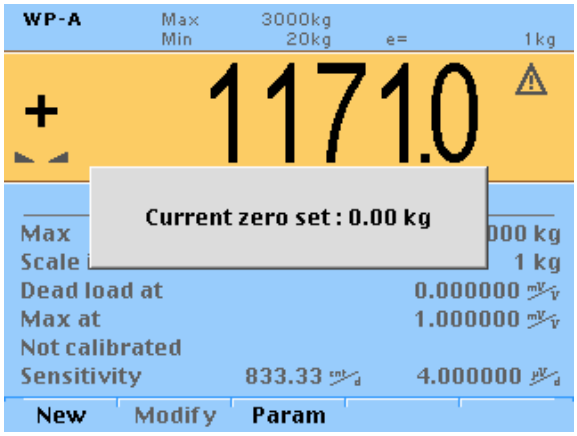
The calibration data and parameters are displayed in the format entered/determined during calibration.

Note:

[Calibrated at]: CAL weight and corresponding mV/V

After input with mV/V, the full scale interval and the mV/V value entered are displayed.

7.14.2.2 Increased resolution (10-fold)



In the Setup-[Weighing point]- [Calib] menu the weight is displayed with 10-fold resolution (also with the CAL switch closed) with Info.

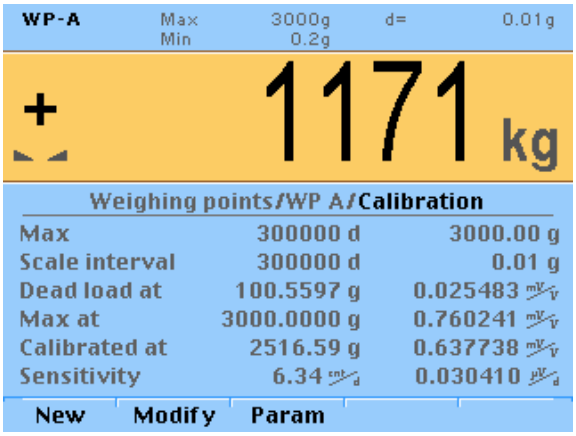
After 5 seconds the display returns to normal resolution. Press ↓ if you want to switch to normal resolution immediately.

If the parameter "OIML" for the weighing point under [W&M] is selected, the weight value is marked as an invalid weight with the ⚠ symbol.

7.14.3 Selecting the calibration mode

Note:

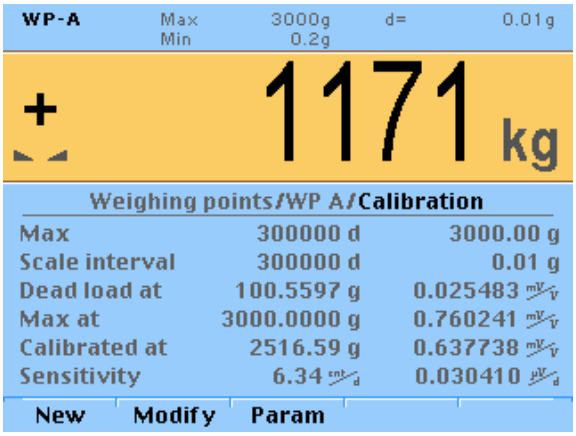
The [Modify] menu item is only used for small changes (e.g. changing the dead load/ preload, changing the mV/V values for dead load/preload and/or Max, changing the scale interval). Otherwise select the [New] menu item.



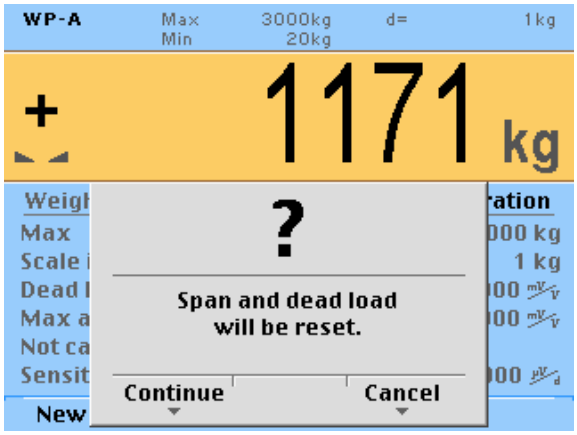
Under Setup-[Weighing point]- [Calib] choose between [New] and [Modify].

7.14.3.1 Performing a new calibration

1. Select Setup-[Weighing point]- [Calib] and confirm.



2. Press the [New] softkey.
   ▷ A prompt window opens.



3. By pressing [Continue] the data are reset to default first (default) before performing calibration. Press [Cancel] to cancel selection.
4. Determining the maximum load [Max], see Chapter 7.14.4.
5. Determining the scale interval [Scale interval], see Chapter 7.14.5.
6. Determining the dead load [Deadload at], see Chapter 7.14.6.
7. Calibrating with load [Max at], see Chapter 7.14.7.
8. Calibrating with mV/V [Max at], see Chapter 7.14.8.
9. Calibrating with load cell data (smart calibration) [Max at], see Chapter 7.14.8.1.
10. Carrying out linearization, see Chapter 7.14.11.

7.14.3.2 Modifying a calibration

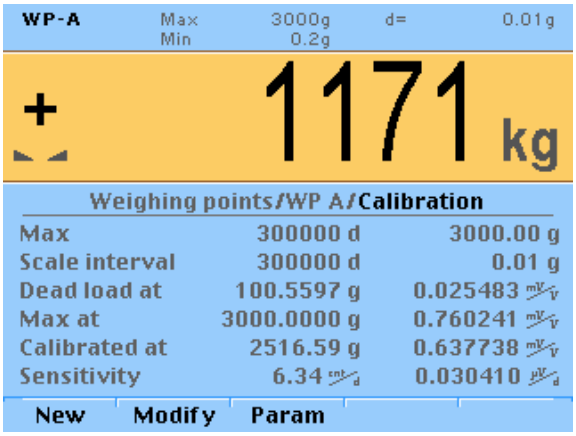
Note:

[Modify] may be used only for minor changes (e.g. changing the dead load, adapting mV/V values for dead load and/or Max). Otherwise, always use [New]!

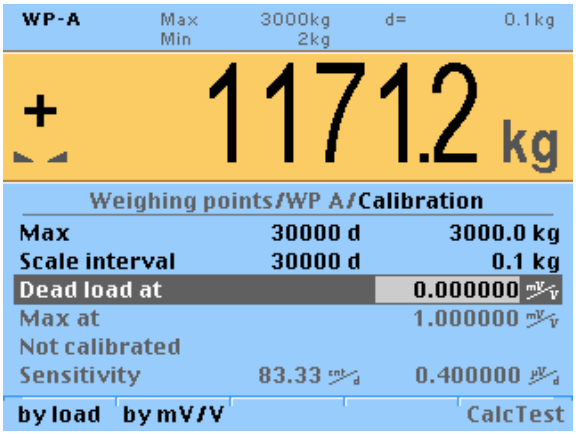
Example:

Resetting the Dead Load

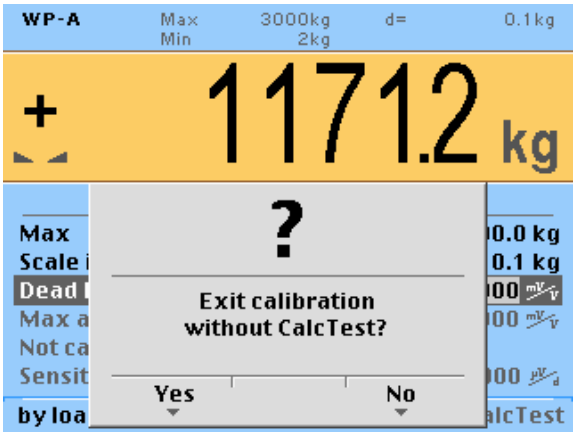
1. Select Setup-[Weighing point]- [Calib] and confirm.



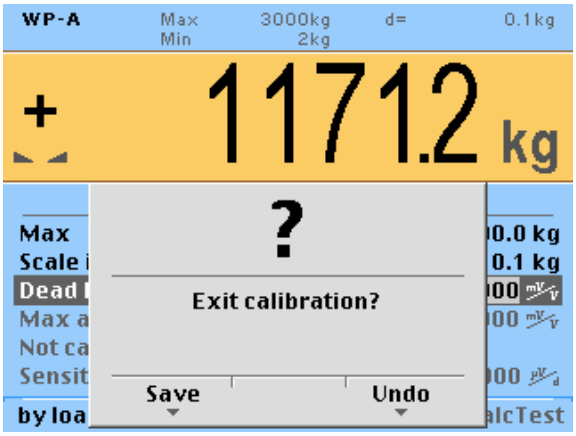
2. Press the [Modify] softkey.



3. Choose the [Deadload at] menu item.
4. Either press the [by mV/V] softkey to enter the value again or clear the scale/hopper and press the [by load] softkey to reset the dead load.
5. Press Exit to exit the calibration.
   ▷ A prompt window opens.



6. Press the [Yes] softkey to close the menu without calculation of the test value.
7. Press Exit to exit the calibration for good.
   ▷ A prompt window opens.



8. Press the [Save] softkey to save changes in calibration data.

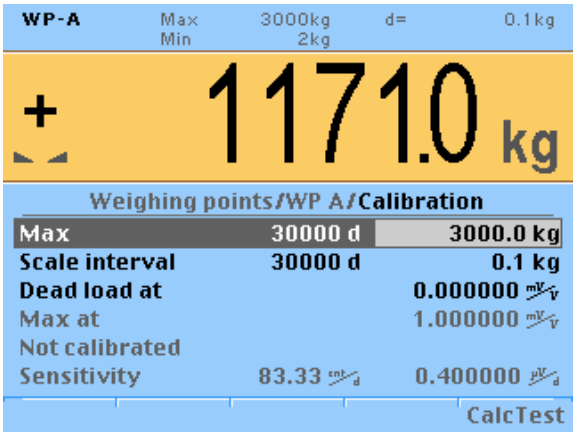
7.14.4 Setting maximum load

The maximum load (Max) determines the maximum weight without dead load of the weight to be measured and the displayed number of digits behind the decimal point. Normally, Max is less than the load cell capacity (maximum capacity x number of load cells).

Permissible values for the maximum load are:

Max weight value from 0.00010 to 999999 in t, kg, g, or lb.

Maximum weight value must be an integer multiple of the scale interval (1 d). It may have up to 6 digits and is entered as a numeric value with or without a decimal point.



1. Enter the [Max] load with decimal places (in this example: 3000.0).
2. Press ABC to select the weight unit.
3. Confirm entries with OK or ↓.
   ▷ The verification is displayed by "Setting Max...".

Note:

Error messages, calibration see Chapter 16.4.

7.14.5 Determining the scale interval

The scale interval (d) is the difference between two successive display values.

With a scale used in legal metrology, this value is called the verification scale interval (e), which corresponds to the scale interval: d = e.

Example:

Max = 6000 kg

Scale interval (1 d) = 2 kg

Calculation for scale interval for Max (automatic):

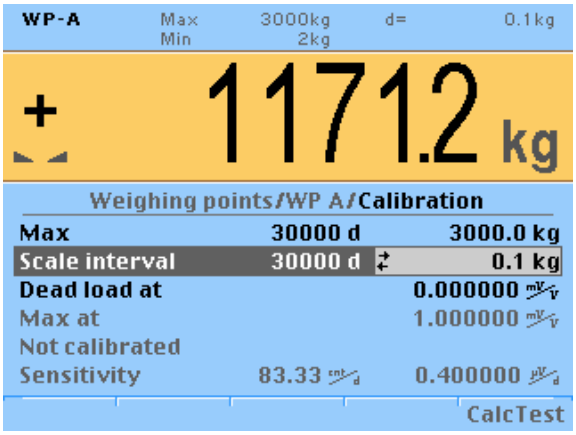
d = Max/scale interval (1 d)

d_c = 6000 kg/2 kg

d_c = 3000

Procedure:

The weight unit is taken from [Max]. The number of digits behind the decimal point is also automatically determined when [Max] is entered.



1. Select [Scale interval] and confirm by pressing OK or →.
   ▷ A selection window opens.
2. Select the scale interval (1 d) and confirm with OK.
   ▷ The scale interval (d) is then calculated, based on the Max weight value.

   The verification is displayed by "Setting Scale interval...".

Note:

Error messages, calibration see Chapter 16.4.

7.14.6 Determining the dead load

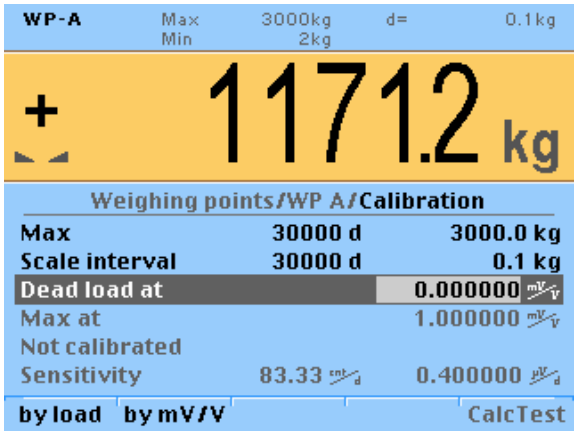
Note:

If a linearization was carried out (see Chapter 7.14.11), the following note appears on the display after the [Dead load at] line is selected:

```
Cannot be changed here
while linearization is active.
```

Changes cannot be made while linearization is switched on.

Only deleting of the linearization points deactivates the linearization mode!



To use the empty scale/hopper as dead load (normal case):

1. Clear the scale/hopper.
2. Press the [by load] softkey.
3. Confirm entries with OK or ↓.
   ▷ The verification is displayed by "Setting dead load...".

Note:

If the mV/V value of the dead load was calculated, or if it is known from the previous calibration, the value can be overwritten by pressing [by mV/V].

Error messages, calibration see Chapter 16.4.

7.14.7 Calibrating with weight

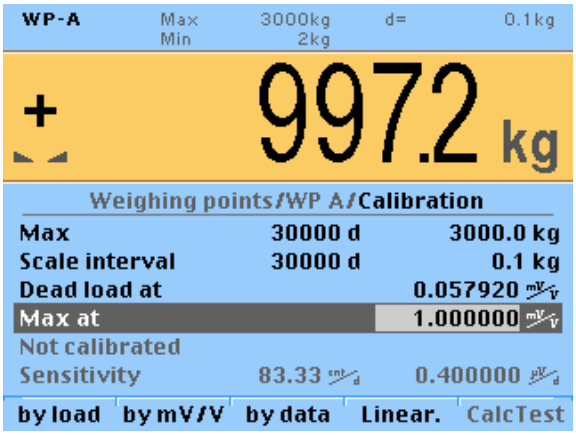
Note:

If a linearization was carried out (see Chapter 7.14.11), after selection of the line [Max at] the following tip is displayed:

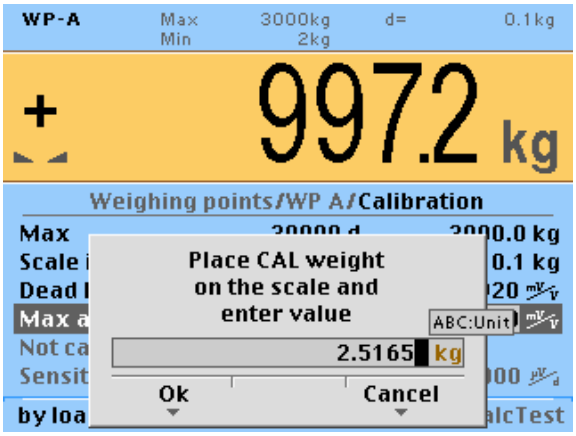
```
Cannot be changed here
while linearization is active.
```

Changes cannot be made while linearization is switched on.

Only deleting of the linearization points deactivates the linearization mode!



1. Press the [by load] softkey.



2. Place the CAL weight on the scale.
3. Enter the weight of the CAL weight.
4. Confirm the entries.
5. Press ABC to select the weight unit.

   The weight unit for the CAL weight may differ from the unit in the device. Conversion is automatic.

6. Confirm entries with OK or ↓.
   ▷ The verification is displayed by "Setting Span by load...".

   Weight value, weight unit and measuring signal in mV/V corresponding to this value are displayed in the line [Calibrated at].

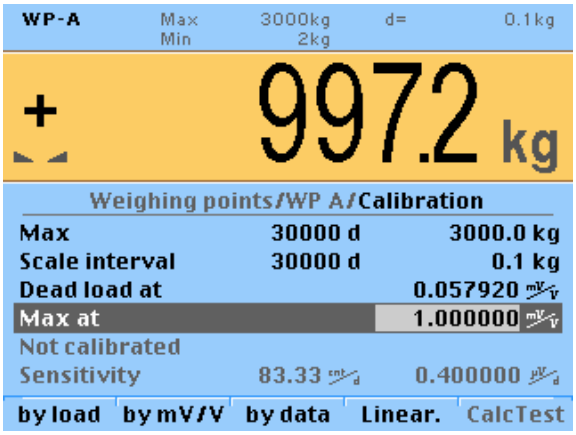
Note:

Error messages, calibration see Chapter 16.4.

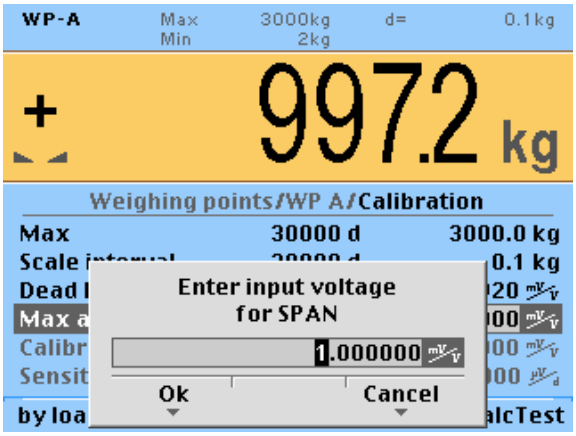
7.14.8 Calibrating with mV/V

The scale can be calibrated without weights. During input of the load cell mV/V value, the acceleration of gravity at the place of installation can be taken into account.

The STAR load cell data is based on the acceleration of gravity in Hamburg, Germany: 9.81379 m/s^2.



1. Calculating SPAN value for Max and, if necessary, for the dead see Chapter 7.14.8.1.
2. Press the [by mV/V] softkey.



3. Entering the SPAN value for Max and, if necessary, for the subsequent correction of dead load (see Chapter 7.14.10).
4. Confirm the entries.
   ▷ The verification is displayed by "Setting Span mV/V...".

   Weight value, weight unit and measuring signal in mV/V corresponding to this value are displayed in the line [Calibrated at].

Note:

Error messages, calibration see Chapter 16.4.

7.14.8.1 Calculating SPAN value

SPAN indicates the equivalent input voltage in mV/V related to the maximum load (Max) of the scale.

It is calculated as follows:

$$\text{SPAN [mV/V]} = \frac{\text{maximum load x load cell sensitivity } C_n\text{* [mV/V]}}{\text{load cell capacity (max. capacity } E_{max} \text{ x number of load cells)}}$$

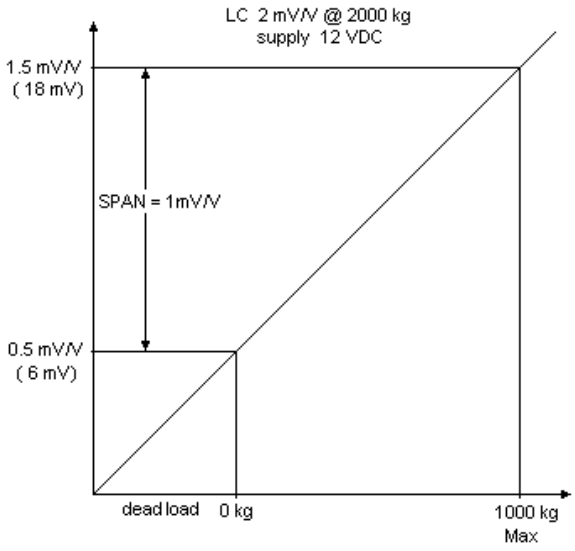
* load cell sensitivity C_n = rated output C_n (see technical data of the load cell)

The input voltage in mV/V equivalent to the dead load can be calculated by using the dead load rather than the maximum load using the formula specified earlier.

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

Subsequent dead load correction (as described in Chapter 7.14.8.1) can be used for later re-determination of the dead load, when the scale/hopper is empty.

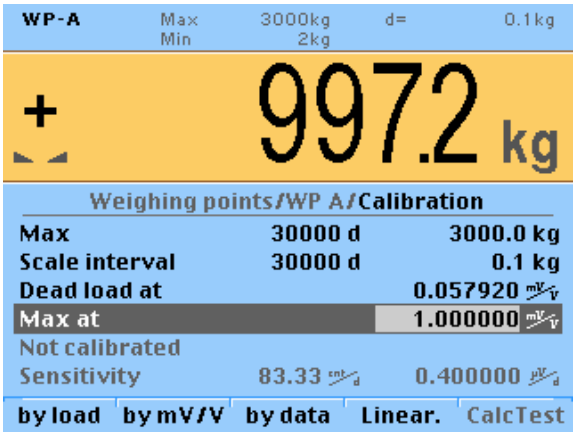
Example:



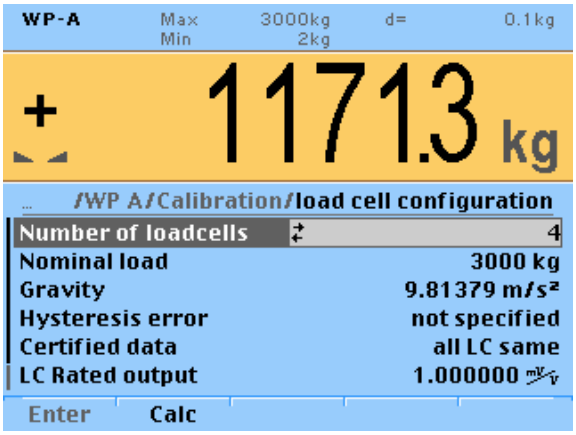
- 1 load cell with nominal characteristic value C_n = 2 mV/V
- at maximum capacity of 2000 kg
- Maximum load 1000 kg
- Dead load 500 kg
- Load cell supply voltage 12 V DC

7.14.9 Calibrating with load cell data (smart calibration)

If the scale is not used in legal metrology, calibration without weights can be performed. The easiest method is the one using load cell data without calculation.



1. Press the [by data] softkey.



[Number of load cells]

Number of load cells connected in parallel

Input: 1, 2...<4>...9, 10

[Nominal load]

Maximum capacity E_{max} of a load cell (not the total maximum capacity of the scale!)

Input: For the value refer to the technical data of the load cell.

[Gravity]

Gravity at place of installation

Default is the value for Hamburg, Germany: 9.81379 m/s^2.

[Hysteresis error]

Hysteresis error

When switching from [not specified] to [specified] values for [Correction A/B] must be entered. For this data refer to the load cell certificate.

[Certified data], [LC sensitivity], [LC resistance]

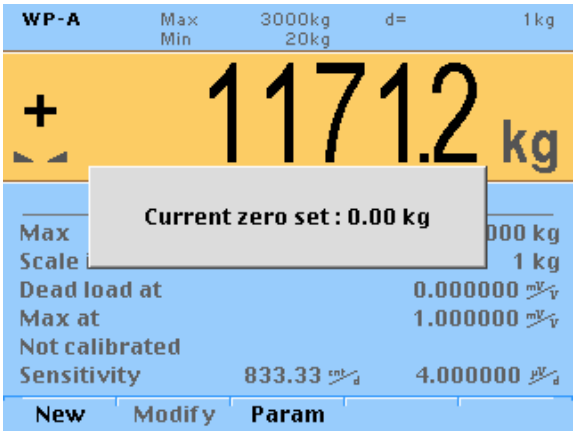
When [all LC same] is set, only one value for the characteristic value [LC sensitivity] and the output resistance [LC resistance] are required.

For [each LC specific] press the [Enter] softkey to enter individual data for each load cell.

2. Press the [Calc] softkey to start the calculation.
3. Confirm the calculation by pressing the [Ok] softkey to save the calculated mV/V value to the calibration data.

7.14.10 Subsequent dead load correction

If the hopper/platform weight changes by an amount that is higher than the zero-setting range; e.g. due to dead load reduction, dead load increase, or mechanical changes, the functions for automatic zero tracking and manual zero setting no longer work.



To view the range which is already utilized by zero tracking or zero setting, in [Calibration] press the Info key; this also activates 10-fold increased resolution of the weight value.

Note:

The scale must not be loaded!

If the full zero-setting range is already being utilized, you can still correct the dead load (overwrite protection must be deactivated, see Chapter 7.1.3.1) without affecting other calibration data/parameters. To do this select Setup-[Weighing points]- [Calib]- [Modify] and determine the dead load with [Dead load at] using the [by load] option (see Chapter 7.14.6).

Note:

If a linearization was carried out (see Chapter 7.14.11), the following note appears on the display after the [Dead load at] line is selected:

```
Cannot be changed here
while linearization is active.
```

Changes cannot be made while linearization is switched on.

Only deleting of the linearization points deactivates the linearization mode!

7.14.11 Linearization

The measurement range for a straight can be optimized by setting the linearization points.

Requirements:

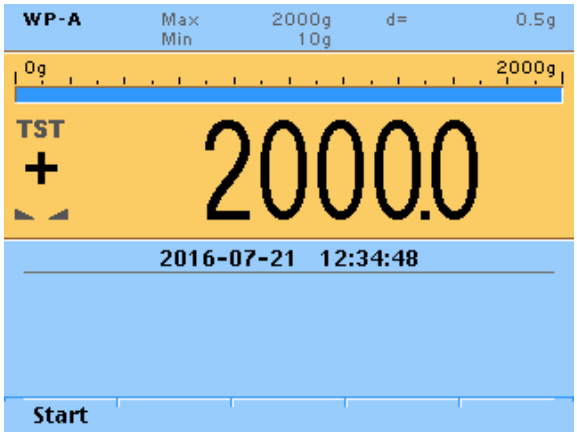
Calibration of Max and dead load was done.

7.14.12 Calculating the test value

The calculation of the test value is called by pressing the [CalcTest] softkey.

The maximum load (Max) is displayed with the ID **TST** without a weight unit. The value determined during calibration by pressing the [CalcTest] softkey after starting the test is displayed.

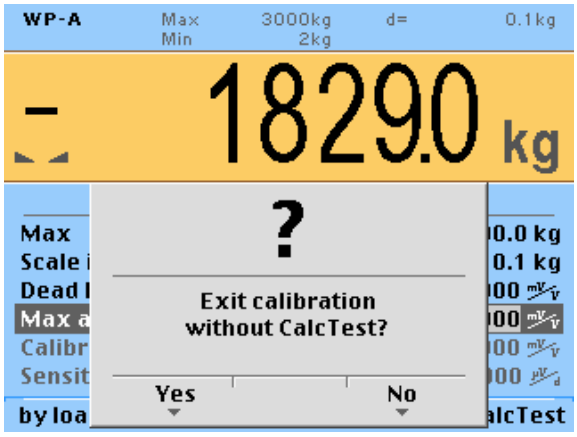
Depending on the settings under Setup-[Weighing point]- [Calib]- [Param]- [Test mode] the following is displayed by calling the Test with the Test key later on:



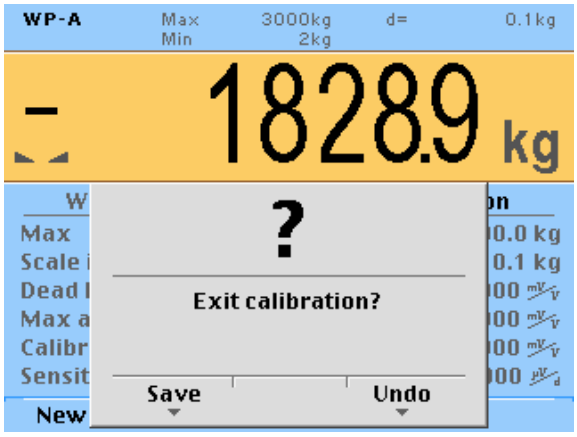
- with [Absolute] the maximum load
- with [Relative] the deviation from the test value

7.14.13 Saving the calibration

Quit calibration by pressing the Exit softkey.



You are prompted to confirm whether calibration should be closed without determining the test value.



By pressing [Save] altered calibration data are saved.

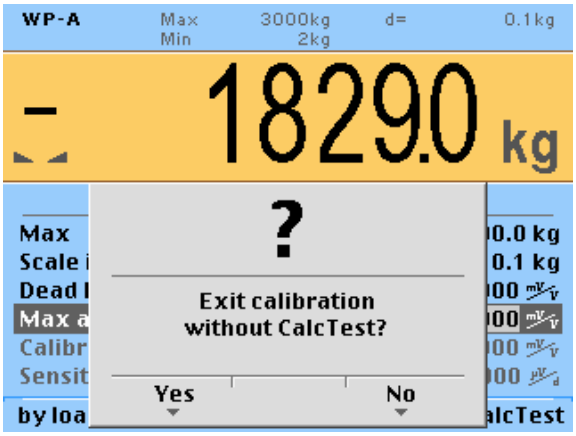
The verification is displayed by "Saving calibration".

Leaving the menu is displayed by "Exit calibration".

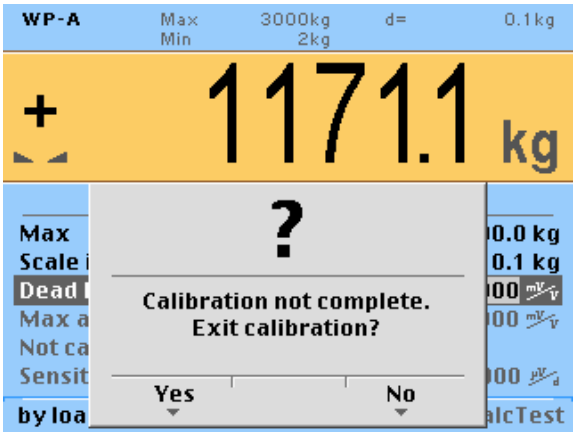
After finishing the calibration, set the CAL switch to the closed position; see also Chapter 7.1.3.1.

7.14.14 Cancelling a calibration

Quit calibration by pressing the Exit softkey.

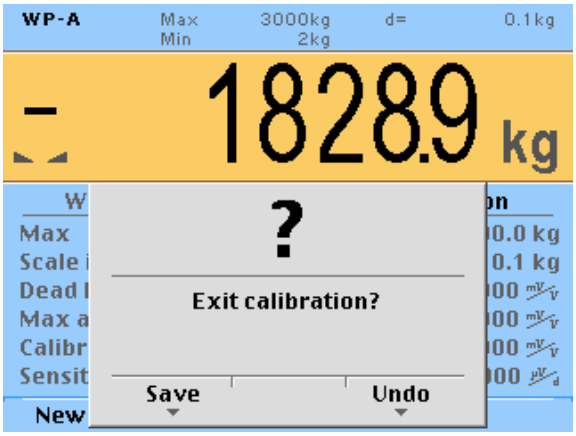


You are prompted to confirm whether calibration should be closed without determining the test value.



If not all data was determined when calibrating with [New] (e.g. dead load not set/ entered), this message is shown:

Press [Yes] to confirm and then press again the Exit softkey, another prompt is displayed:

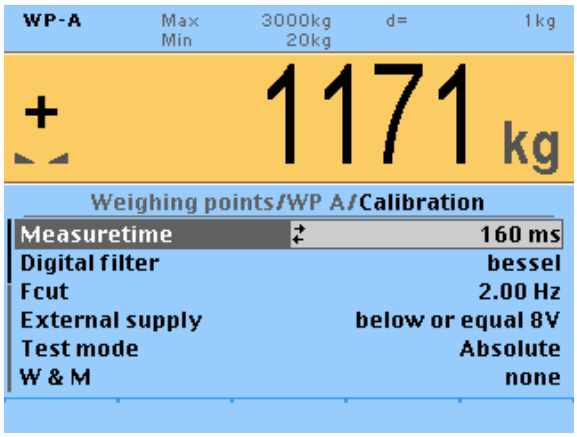


If you press [Undo], changes are not saved and the display returns to the selection menu for the weighing points.

Leaving the menu is displayed by "Exit calibration".

7.14.15 Parameter Input

The menu is accessible via Setup-[Weighing point]- [Calib]- [Param].



[Measuretime]

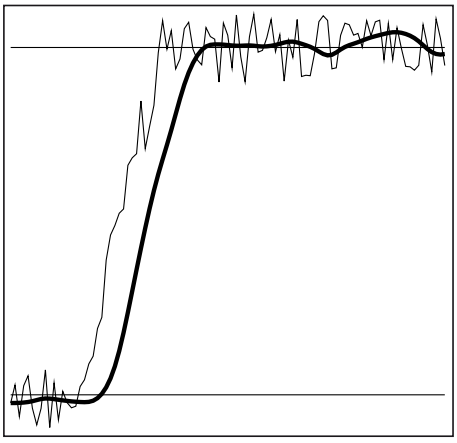
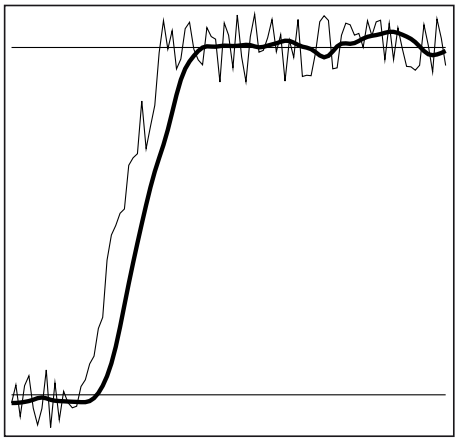
Measuring time: The duration of a measurement can be selected.

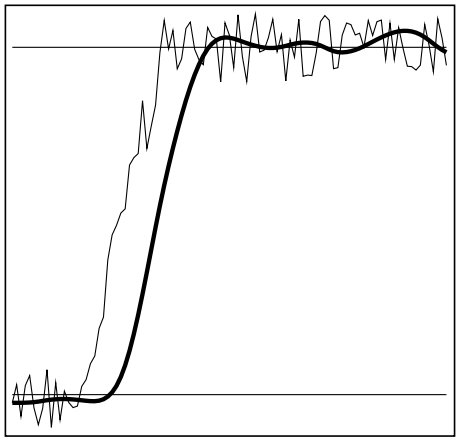
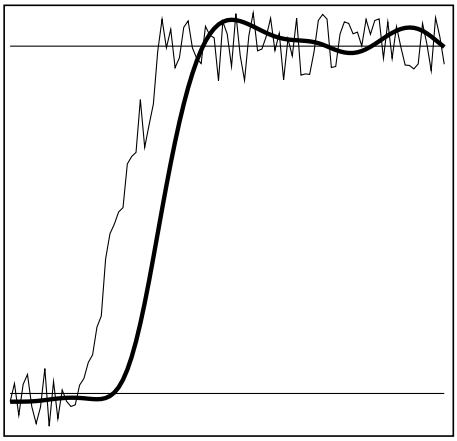
Selection: 5 ms, 10 ms, 20 ms, 40 ms, 80 ms, 160 ms, <320 ms>, 640 ms, 960 ms, 1280 ms, 1600 ms.

[Digital filter]

Selection of the digital filter (filter characteristic): <off> (no Filter), Bessel, aperiod. (aperiodic), Butterw. (Butterworth), Tcheby. (Tschebyscheff)

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 measuring time set to <160 ms.

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

[Measuretime]: <160 ms

[Digital filter]: aperiod.

[Fcut]: 2.00 Hz

[Fcut]

This line only is shown if the digital filter is switched on.

The smaller the cut-off frequency, the slower the measurement and the more stable the measurement result.

The cut-off frequency can be specified for the low pass filter.

Valid range: 0.1...2.5 Hz.

The available options depend on the measuring time.

[External supply]

When the load cells are connected to an external supply, it is possible to switch to ≤8 V, to tune Sense voltage monitoring to the lower supply voltage.

Selection: below or equal 8 V (≤8 V), <above 8 V> (>8 V)

[Test mode]

With [absolute], the test value is determined when the test is called.

With [relative], the deviation from the initially stored test value is displayed; see Chapter 7.14.12.

[W&M]

See Chapter 7.14.15.1.

If [OIML] was selected, the device needs to warm up for 30 seconds.

[Standstill time]

The parameters [Standstill time] and [Standstill range]are used to define the stability of the scale (stable balance).

The input for the parameter [Standstill time] is expressed in seconds.

Valid range: 0.00...2 s

If the tome is set to "0" there is no check. The standstill time must not be less than the measuring time.

[Standstill range]

As long as the weight fluctuations remain within this range, the device is determined to be stable.

The input for the parameter [Standstill range] is expressed in "d."

Valid range: 0.01...10.00 dc.

[Tare timeout]

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).

The input is done as seconds.

Valid range: 0.0...<2.5>...25 s.

At 0.0 s taring is only carried out when the scale is already stable.

[Zeroset range]

Define a ±range around the zero point determined by the dead load during calibration; within this range

- the displayed gross weight can be set to zero by pressing the zero-setting key (or by a corresponding external command), and
- automatic zero tracking is active.

Setting range: 0.00...10000.00 d

For use in legal metrology a value ≤2% of the Max must be entered, example: 60 d for 3000 e of class III.

[Zerotrack range]

Range within which automatic zero tracking compensates deviations.

Setting range: 0.25...10000.00 d

In "legal-for-trade" mode a value of 0.25 d has to be entered.

[Zerotrack step]

If a weight change exceeds the adjusted value, automatic tracking does not function any more.

Setting range for automatic tracking increments: 0.25...10 d

In "legal-for-trade" mode a value of 0.25 d has to be entered.

[Zerotrack time]

Time interval for automatic zero tracking.

Setting range: 0.1...25 s

At 0.0 s the zero tracking is switched off.

For use in legal metrology a value of 1 s must be entered.

[Overload]

Weighing range above the maximum load (Max) without error message.

Setting range: 0...9999999 d

For use in legal metrology a value of max. 9 d = e must be set.

[Minimum weight]

Minimum weight at which a print command can be triggered.

Setting range: 0...9999999 d

For use in legal metrology a value of at least 20 d must be set.

[Range mode]

Selection: <Single range>, Multiple range, Multi-interval

For scale range selection, see Chapter 7.14.15.2 and 7.14.15.3.

Press the Exit softkey to exit the menu and to save the settings.

7.14.15.1 Legal-for-trade mode

In the menu Setup-[Weighing point]- [Calib]- [Param]- [W&M] you can choose between [none] and the legal-for-trade modes [OIML], [NTEP], or[NSC].

	[none]	[OIML]	[NTEP]	[NSC]
Gross weight display	**B**	**B**	**G**	**G**
Recommended min. measure-ment signals	0.125 mV/V @ 30,000 d	0.125 mV/V @ 3000 e	0.125 mV/V @ 3000 e	0.125 mV/V @ 3000 e
	0.25 mV/V @ 60,000 d	0.25 mV/V @ 6000 e	0.25 mV/V @ 6000 e	0.25 mV/V @ 6000 e
		0.42 mV/V @ 10,000 e	0.42 mV/V @ 10,000 e	0.42 mV/V @ 10,000 e

If legal-for-trade mode is switched on, the parameter settings (zero tracking etc.) must be selected accordingly. The device does not peform a check of this.

The CAL switch (see Chapter 7.1.3.1) must be sealed in the closed position.

Note:

In the W&M mode an invalid weight without weight unit is shown.

7.14.15.2 Multiple range scale (Class III or single range scale Class I and II with variable scale interval)

The multiple range scale is a scale with two or more weighing ranges with different maximum loads and scale intervals. There is only one load receptor, with each range covering zero to its maximum load.

When [Range mode] = [Multiple range], the scale has up to three ranges with different resolution.

The weight display header includes the current range (R1, R2, and R3), Max, Min, and d (or e with instruments used in legal metrology) (example: multiple range scale in range 2):

The [Range limit 1] and [Range limit 2] switch points are the range limits.

As soon as the gross weight exceeds range 1, the next highest range with the next highest scale interval becomes valid (1->2->5->10->20->50).

When reducing the weight, the interval of the previous range is kept. When the gross weight is ≤0.25 d of range 1, the scale is stable and not tared, the scale returns to range 1 with the corresponding scale interval.

Note:

During calibration, the multiple range function is always switched off.

Example:

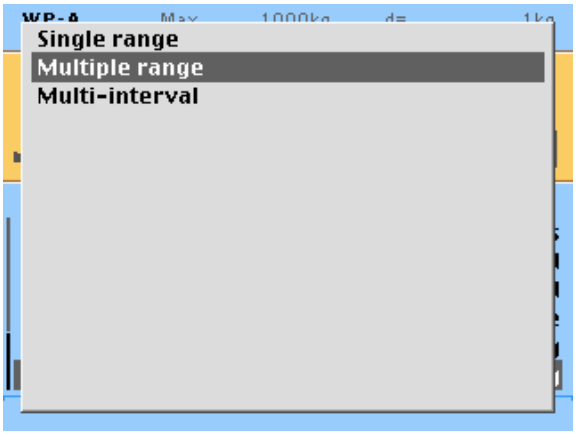
Range mode: "Multiple range"

Range 1: 0...1000 kg (when calibrating set scale interval: 1 kg)

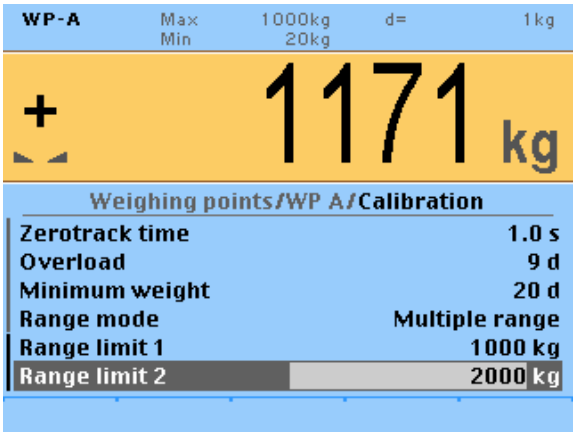
Range 2: 0...2000 kg (next highest scale interval: 2 kg)

Range 3: 0...3000 kg (next highest scale interval: 5 kg)

1. Choose "Range mode" from the Setup-[Weighing point]- [Calib]- [Param] menu.



2. Select "Multiple range" and confirm.



3. Setting Switch point from range 1 to 2: enter "1000 kg" for the Range limit 1.
4. Setting Switch point from range 2 to 3: enter "2000 kg" for the Range limit 2.
5. Press the Exit softkey to exit and save calibration.

7.14.15.3 Multi-interval scale (Class III or single range scale Class I and II with variable scale interval)

The multi-interval scale is a scale with a weighing range that is divided into intervals. Each interval range has a different scale interval, where the weighing range is automatically switched depending on the load on the scale and also when the load is placed on/ removed from the scale.

When [Range mode] = [Multi-interval], the scale has up to three ranges with different resolution.

The weight display header includes the current interval range (R1, R2, or R3), Max, Min, and d (or e with instruments used in legal metrology) (Example: multi-interval scale in range 2):

The parameters [Range limit 1] and [Range limit 2] are the interval ranges.

As soon as the gross weight exceeds range 1, the next highest range with the next highest scale interval becomes valid (1->2->5->10->20->50).

Note:

During calibration, the multi-interval function is always switched off.

Example:

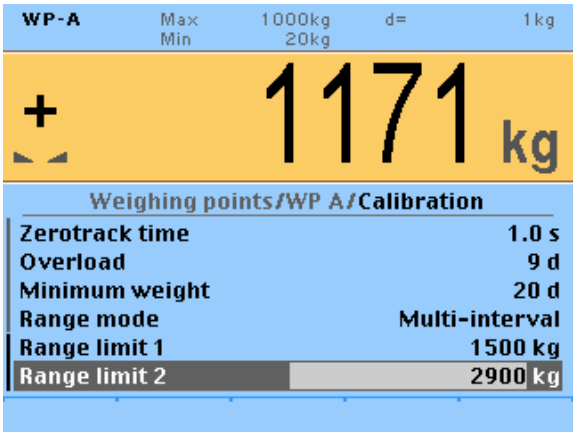
Range mode: "Multi-interval"

Interval range 1: 0...1500 kg (when calibrating set scale interval: 1 kg)

Interval range 2: 1500...2900 kg (next highest scale interval: 2 kg)

1. Choose "Range mode" from the Setup-[Weighing point]- [Calib]- [Param] menu.

2. Select "Multi-interval" and confirm.



3. Setting interval range 1: Enter "1500 kg" for range limit 1.
4. Setting interval range 2: Enter "2900 kg" for range limit 2.
5. Press the Exit softkey to exit and save calibration.

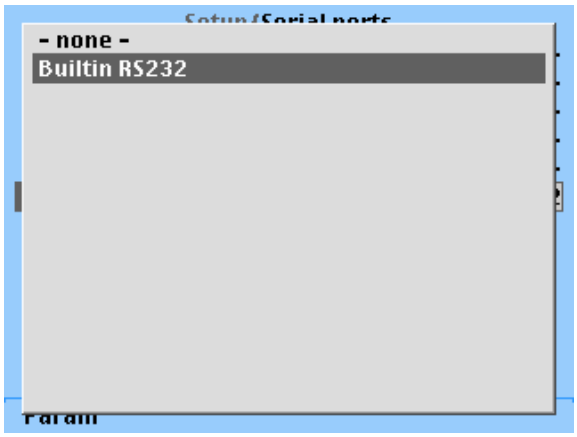
7.15 Calibrating xBPI-scale

7.15.1 General information

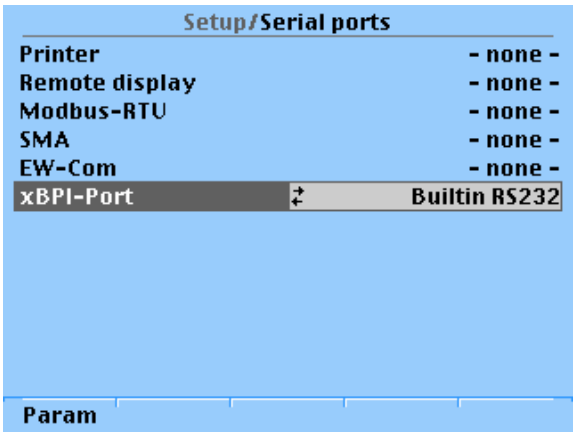
The legal-for-trade application of PR 5410 with a xBPI-scale is not possible.

7.15.2 Parameters for serial interface

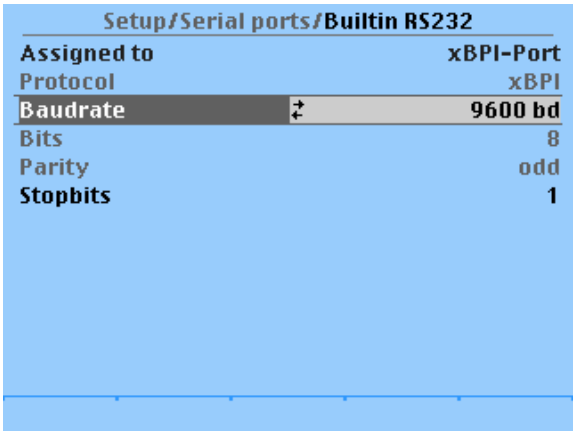
1. Select Setup-[Serial ports parameter]- [xBPI-Port] and confirm.
   ▷ The following window opens:



2. Select the desired interface and confirm.



3. Press the [Param] softkey.
   ▷ The following window opens:



4. If necessary, change the parameters. Only the "baudrate" and "stop bits" can be set for an xBPI scale.

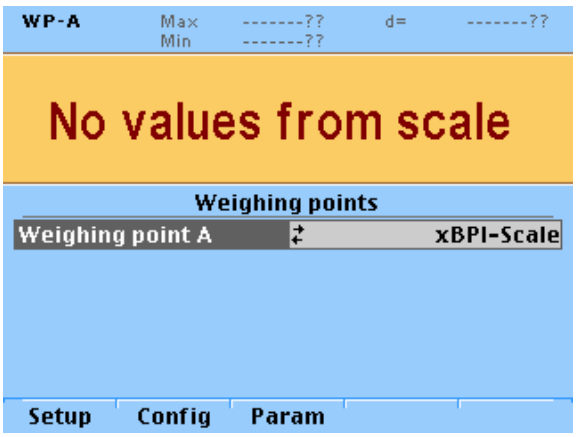
5. Press Exit to exit the menu and to save the settings.

7.15.3 Parameters for the xBPI-weighing function

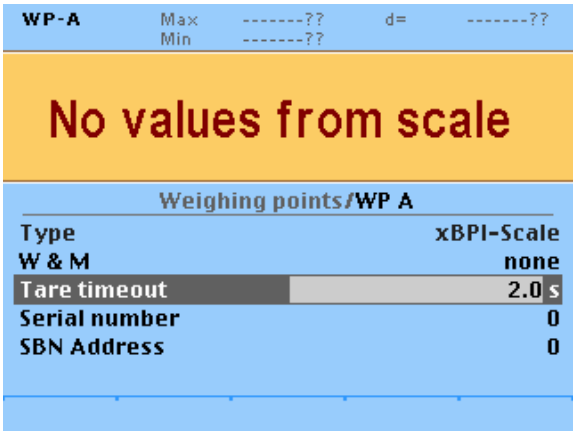
The following parameters must be entered for this menu item:

- Timeout for tare function depending on the application
- SBN-address for each xBPI-scale in bus operation mode
- Serial number of the xBPI-scale or weighing mode with legal-for-trade application

1. Select Setup-[Weighing point]- [xBPI-Scale] and confirm.



2. Press the [Config] softkey.



3. Enter the following parameters.

   [Tare timeout]

   Timeout for a zeroset or tare command to be executed.

   If the xBPI scale has not executed the command in the specified time, the action will be aborted.

   Setting range: 0...9.9 s

   [Serial number]

   Serial number of the connected xBPI scale/weighing module.

   The number is required for checking when used in legal metrology.

   With serial number "0", checking is omitted.

   Setting range: 0...99999999

   [SBN Address]

   When the address is not set to 0, bus operation is active. Possible addresses: 1–31, i.e., max. 31 xBPI scales can be operated on an RS-485 branch.

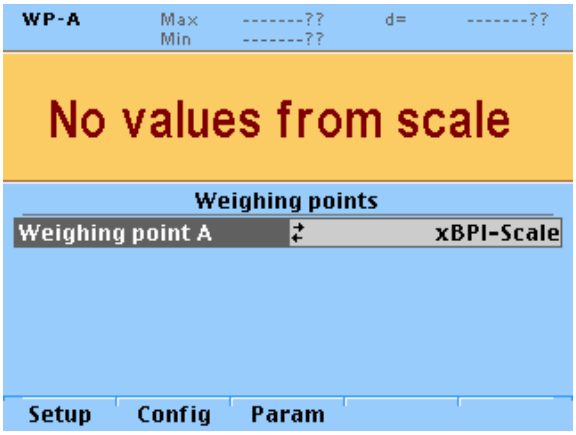
   The SBN Address is shown on the display.

   Example: Address 31 at WP-A

4. Press Exit to exit the menu and to save the settings.

7.15.4 Setting up an xBPI platform

1. Select Setup -[Weighing point]- [xBPI-Scale] and confirm.

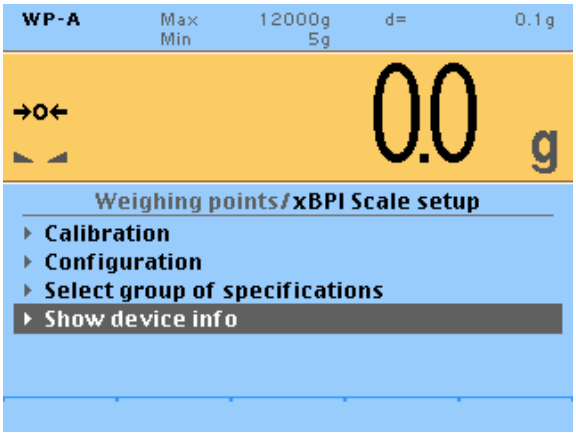


2. Press the [Setup] softkey.
   ▷ The parameters of the xBPI-scale are read into the device.

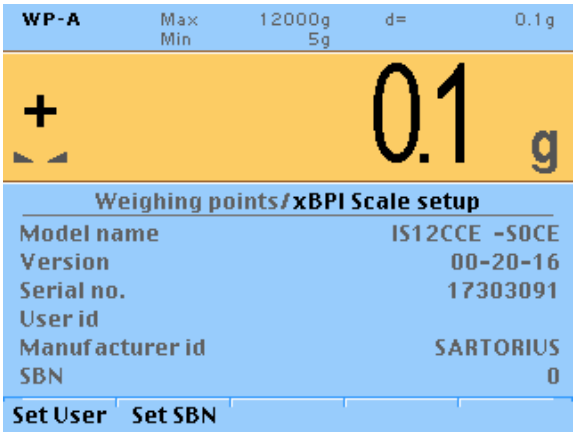
   Ticks indicate the progress.

   An error message is displayed if communication with the xBPI scale is not possible!

   The following window opens:



3. Select [Show device info] with the cursor and confirm.
   ▷ The following window opens:



4. Change the user ID and SBN address if necessary.

5. Press the Exit softkey to exit the menu and to save the settings.

6. Select [Select group of specification] using the cursor and confirm.

Note:

Some xBPI platforms have what is known as "specification blocks" for selecting various modes of operation (single range, multiple range, etc.).

The following is required for the subsequent specification group selection:

- Note the model name of the scale.
- Refer to the operating instructions for the number of the corresponding specification block.

7. Select and confirm the desired specification group.
8. Press the Exit softkey to exit the menu and to save the settings.
   ▷ A prompt window opens.
9. Press the [Yes] softkey to save the data.

   Press [No] for exit from the menu without data change.
   ▷ The parameters are saved. Ticks indicate the progress.
10. Select [Configuration] using the cursor and confirm.
11. Select [Weighing parameters] with the cursor and confirm.

    The parameters are listed as an overview in the following, see Chapter 7.15.5.1.

Note:

Only the parameters supported by the connected scale are displayed.

12. Press the Exit softkey to exit the menu and to save the settings.
    ▷ A prompt window opens.
13. Press the [Yes] softkey to save the data.

    Press [No] for exit from the menu without data change.
14. Select [Application settings] with the cursor and confirm.

    The parameters are listed as an overview in the following, see Chapter 7.15.5.2.

Note:

Only the parameters supported by the connected scale are displayed.

15. Press the Exit softkey to exit the menu and to save the settings.
    ▷ A prompt window opens.
16. Press the [Yes] softkey to save the data.

    Press [No] for exit from the menu without data change.
17. Select [Interface settings] with the cursor and confirm.

The parameters are listed as an overview in the following, see Chapter 7.15.5.3.

Note:

Only the parameters supported by the connected scale are displayed.

18. Press the Exit softkey to exit the menu and to save the settings.
    ▷ A prompt window opens.
19. Press the [Yes] softkey to save the data.

    Press [No] for exit from the menu without data change.

7.15.5 xBPI-parameter tables

The parameters which must be entered are listed in the following tables under [Weighing point]- [Weighing point A]- [xBPI-Scale]- [Setup]- [Configuration]- [Weighing parameters]/[Application settings]/[Interface settings].

7.15.5.1 Scale parameters

- **[Weighing parameters]**
  - **Ambient conditions**
    - **Very stable cond.**
    - **Stable conditions**
    - **Unstable cond.**
    - **Very unstable cond.**
  - **Application/Filter**
    - **standard mode**
    - **manual filling**
    - **automatic dosing**
    - **checkweighing**
  - **Stability range**
    - **0.25 digit**
    - **0.5 digit**
    - **1 digit**
    - **2 digits**
    - **4 digits**
    - **8 digits**
  - **Stability symb.delay**
    - **no delay**
    - **short delay**
    - **long delay**
    - **extrem long delay**
  - **Tare parameter**
    - **at any time**
    - **not until stable**
  - **Auto zero function**
    - **Auto Zero on**
    - **Auto Zero off**
  - **Adjustment function**
    - **ext.adj.w.fact.wt.**
    - **ext.adj.w.user.wt.**

- ext.adj.w.pres.wt.
- internal adjust
- ext.lin.w.fact.wt.
- ext.lin.w.pres.wt.
- Confirm preload
- Delete preload
- adjust disabled

- Confirming adjust.
  - automatically
  - manual
- Zero range
  - 1% of max load
  - 2% of max load
  - 5% of max load
  - 10% of max load
- Power-On zero range
  - factory settings
  - 2% of max load
  - 5% of max load
  - 10% of max load
- Power-On tare/zero
  - active
  - inactive
  - only for zeroing
- Measure rate
  - normal output
  - fast output
- Calibration check
  - Off
  - Calibration prompt
- External adjustment
  - Accessible
  - Blocked
- Maximum capacity
  - reduced by preload
  - constant

7.15.5.2 Application settings

[Application settings]

- Application Tare
  - Accessible
  - Blocked
- Number of units
  - 1 weight unit
  - 2 weight units
  - 3 weight units
- Weight unit 1...3
  - Grams g
  - Kilogram kg
  - Carat ct
  - Pound lb
  - Ounce oz

- **Troy ounce** ozt
- **Hong Kong tael** tlh
- **Singapore tael** tls
- **Taiwan tael** tlt
- **grain** GN
- **pennyweight** dwt
- **milligram** mg
- **Parts/pound** /lb
- **Tael china** tlc
- **Momme** mom
- **Carat** k
- **Tola** tol
- **Baht** bat
- **Mesghal** m
- **Ton** t

- **Display accuracy 1...3**
  - **all digits**
  - **reduced when moved**
  - **one level lower**
  - **two levels lower**
  - **three levels lower**
  - **1%**
  - **0.5%**
  - **0.2%**
  - **0.1%**
  - **0.05%**
  - **0.02%**
  - **0.01%**
  - **Multi interval**
  - **increased by 10**

7.15.5.3 Interface parameters

[Interface settings]

- **Communication type**
  - **SBI protocol**
  - **xBPI protocol**
- **Baudrate for SBI**
  - **150 baud**
  - **300 baud**
  - **600 baud**
  - **1200 baud**
  - **2400 baud**
  - **4800 baud**
  - **9600 baud**
  - **19200 baud**
- **Parity for SBI**
  - **Mark** g
  - **Space** kg
  - **Odd** ct
  - **Even** lb
- **Stop bits**
  - **1 stop bit**

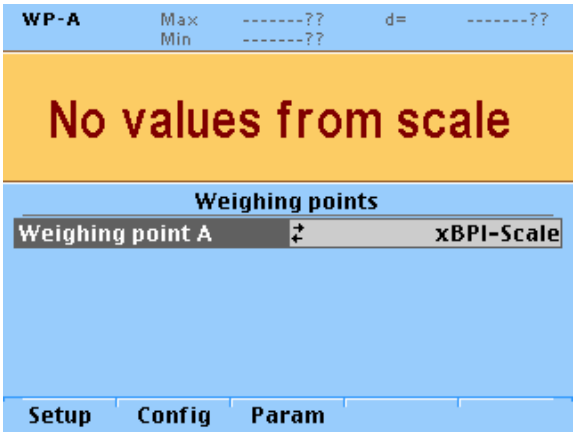
- 2 stop bits
- Handshake
  - software handshake
  - CTS with 2 chr.pau
  - CTS with 1 chr.pau
- Data output print
  - on requ always
  - on requ when stab
  - on requ with store
  - auto
  - auto when stable
- Auto print
  - start/stop by ESCP
  - not stoppable
- Output format
  - without ID 16 byte
  - with ID 22 byte
- Data output interval
  - with each display
  - after 2 updates
  - after 5 updates
  - after 10 updates
  - after 20 updates
  - after 50 updates
  - after 100 updates
- Parameter change
  - can be changed
  - cannot be changed

7.15.6 Setting the xBPI dead load

Note:

For Minebea Intec both terms "dead load" and "preload" are used.

1. Select Setup-[Weighing point]- [xBPI-Scale] and confirm.



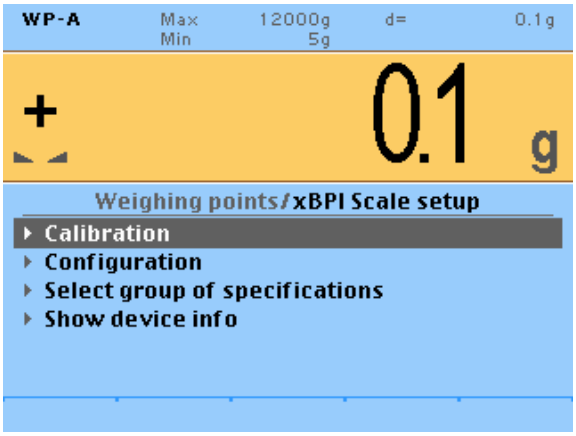
2. Press the [Setup] softkey.

▷ The parameters of the xBPI-scale are read into the device.

Ticks indicate the progress.

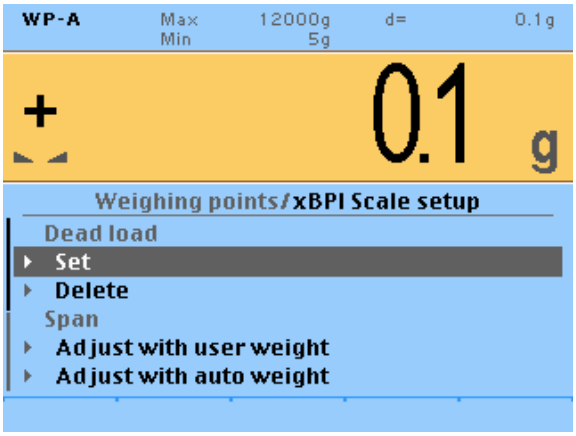
An error message is displayed if communication with the xBPI scale is not possible!

The following window opens:



3. Select [Calibration] with the cursor and confirm.

▷ The following window opens:



4. For setting the dead load, remove the weight from the scale and select [Set] using the cursor and confirm.

▷ After sending the command, 0 is indicated on the gross weight display.

5. Alternatively, the stored dead load can be deleted: Remove the weight from the scale and select [Delete] using the cursor and confirm.

▷ The stored dead load is deleted. The current dead load is shown on the weight display.

6. Press the Exit softkey to exit the menu and to save the settings.

7.15.7 xBPI calibration with user specified weight

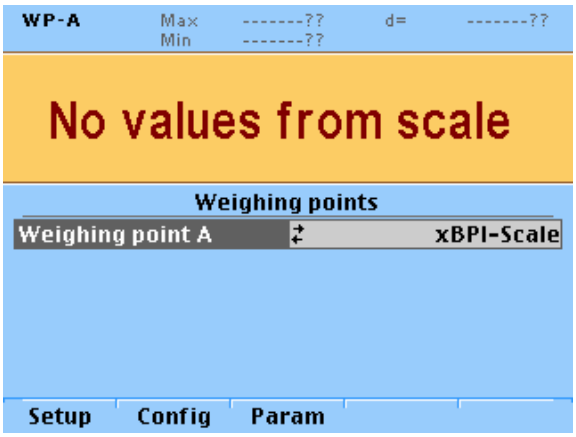
Requirements:

- The xBPI protocol has been selected (see Chapter 7.15.2).
- The "xBPI-scale" weighing point has been selected (see Chapter 7.15.3).
- The platform has been set up (see Chapter 7.15.4).

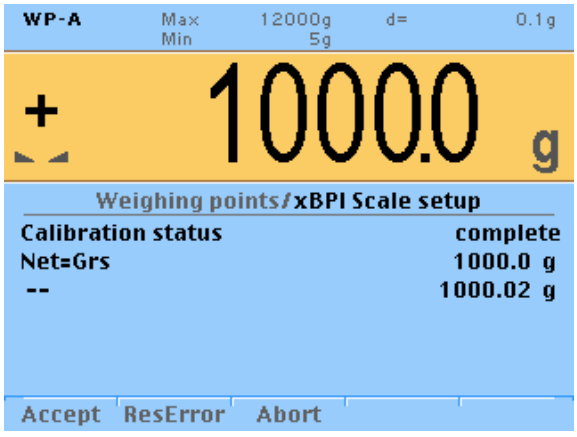
- In the menu [Weighing point A] - [xBPI-Scale] - [Setup] at [Configuration] - [Weighing parameters] - [Confirming adjust.] was set to "manual".
- The communication between the device and platform is active.

Procedure:

1. Select Setup -[Weighing point]- [xBPI-Scale] and confirm.



2. Press the [Setup] softkey.
   ▷ The parameters of the xBPI-scale are read into the device.
3. Select [Calibration]- [Adjust with user weight] and confirm.
   ▷ An input window appears. The previously stored user weight is displayed.
4. Change the weight value if necessary using the keyboard and confirm.
   ▷ The calibration process is carried out without a weight. The calibration status is displayed.
5. Place the weight on the scale.
   ▷ The deviation is displayed in the last line with increased resolution (10-fold).
6. Press the [Accept] softkey.
   ▷ The data are saved and the instrument returns the following message:



   The weight is displayed in high-resolution (10x).
7. Remove the weight.
8. Press the Exit softkey to exit the menu and to save the settings.

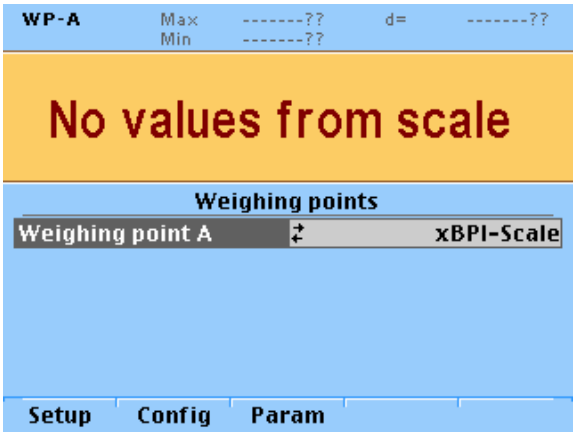
7.15.8 xBPI calibration with automatic weight detection

Requirements:

- The xBPI protocol has been selected (see Chapter 7.15.2).
- The "xBPI-scale" weighing point has been selected (see Chapter 7.15.3).
- The platform has been set up (see Chapter 7.15.4).
- In the menu [Weighing point A] - [xBPI-Scale] - [Setup] at [Configuration] - [Weighing parameters] - [Confirming adjust.] was set to "manual".
- The communication between the device and platform is active.

Procedure:

1. Select Setup-[Weighing point]- [xBPI-Scale] and confirm.



2. Press the [Setup] softkey.
   ▷ The parameters of the xBPI-scale are read into the device.
3. Select [Calibration]- [Adjust with auto weight] with the cursor and confirm.
   ▷ The calibration process is carried out without a weight. The calibration status is displayed.

   The weight is specified automatically.
4. Place the displayed weight on the scale.
5. Press the [Accept] softkey.
   ▷ The date are saved.

   The weight is displayed in high-resolution (10x).
6. Remove the weight.
7. Press the Exit softkey to exit the menu and to save the settings.

7.15.9 xBPI calibration with default weight

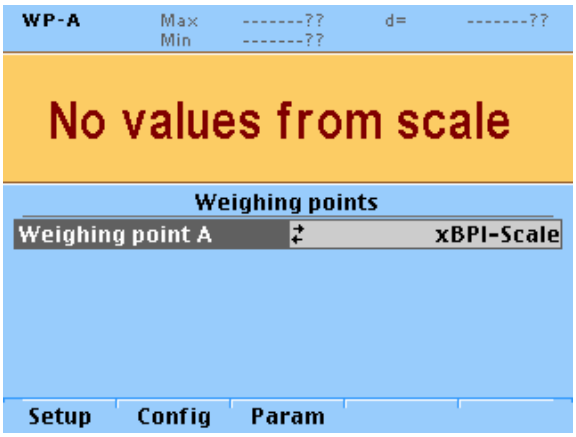
Requirements:

- The xBPI protocol has been selected (see Chapter 7.15.2).
- The "xBPI-scale" weighing point has been selected (see Chapter 7.15.3).
- The platform has been set up (see Chapter 7.15.4).

- In the menu [Weighing point A] - [xBPI-Scale] - [Setup] at [Configuration] - [Weighing parameters] - [Confirming adjust.] was set to "manual".
- The communication between the device and platform is active.

Procedure:

1. Select Setup -[Weighing point]- [xBPI-Scale] and confirm.



2. Press the [Setup] softkey.
   ▷ The parameters of the xBPI-scale are read into the device.
3. Select [Calibration]- [Adjust with default weight] with the cursor and confirm.
   ▷ The calibration process is carried out without a weight. The calibration status is displayed.

   The weight is specified automatically.
4. Place the displayed weight on the scale.
   ▷ The deviation is displayed in the last line with increased resolution (10-fold).
5. Press the [Accept] softkey.
   ▷ The date are saved.

   The weight is displayed in high-resolution (10x).
6. Remove the weight.
7. Press the Exit softkey to exit the menu and to save the settings.

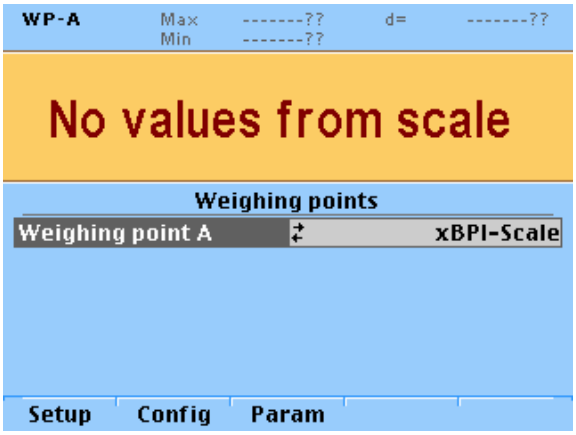
7.15.10 xBPI calibration with built-in weight

Requirements:

- The xBPI protocol has been selected (see Chapter 7.15.2).
- The "xBPI-scale" weighing point has been selected (see Chapter 7.15.3).
- The platform has been set up (see Chapter 7.15.4).
- In the menu [Weighing point A] - [xBPI-Scale] - [Setup] at [Configuration] - [Weighing parameters] - [Confirming adjust.] was set to "manual".
- The communication between the device and platform is active.

Procedure:

1. Select Setup -[Weighing point]- [xBPI-Scale] and confirm.



2. Press the [Setup] softkey.
   ▷ The parameters of the xBPI-scale are read into the device.
3. Select [Calibration]- [Adjust with intern weight] with the cursor and confirm.
   ▷ The procedure is displayed by status messages in a row.

   The deviation is displayed in the last line with increased resolution (10-fold).
4. Press the [Accept] softkey.
   ▷ The date are saved.

   The weight is displayed in high-resolution (10x).
5. Press the Exit softkey to exit the menu and to save the settings.

7.15.11 xBPI linearization

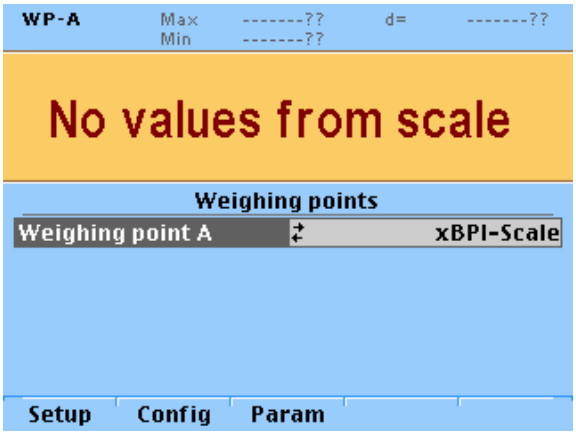
The measurement range for a straight can be optimized by setting the linearization points. The following describes standard linearization.

Requirements:

- The xBPI protocol has been selected (see Chapter 7.15.2).
- The "xBPI-scale" weighing point has been selected (see Chapter 7.15.3).
- The platform has been set up (see Chapter 7.15.4).
- In the menu [Weighing point A] - [xBPI-Scale] - [Setup] at [Configuration] - [Weighing parameters] - [Confirming adjust.] was set to "manual".
- The communication between the device and platform is active.

Procedure:

1. Select Setup-[Weighing point]- [xBPI-Scale] and confirm.



2. Press the [Setup] softkey.
   ▷ The parameters of the xBPI-scale are read into the device.
3. Select [Calibration]- [Linearity: Default] using the cursor and confirm.
   ▷ The first linearization point to be calibrated is displayed.
4. Place the displayed weight on the scale.
   ▷ The deviation is displayed in the last line with increased resolution (10-fold).
5. Press the [Accept] softkey.
   ▷ The second linearization point to be calibrated is displayed.
6. Place the displayed weight on the scale.
   ▷ The deviation is displayed in the last line with increased resolution (10-fold).
7. Press the [Accept] softkey.
   ▷ The third linearization point to be calibrated is displayed.
8. Place the displayed weight on the scale.
   ▷ The deviation is displayed in the last line with increased resolution (10-fold).
9. Press the [Accept] softkey.
   ▷ The last linearization point to be calibrated is displayed.
10. Place the displayed weight on the scale.
    ▷ The deviation is displayed in the last line with increased resolution (10-fold).
11. Press the [Accept] softkey.
12. Press the Exit softkey to exit the menu and to save the settings.

7.16 Calibrating digital load cells of type "Pendeo"

7.16.1 General information

The digital load cells have been calibrated at the factory based on the acceleration of gravity at Hamburg (9.81379 m/s^2). The calibration data in the load cells are invariable. The calibration data for the gravity acceleration at the place of installation can be adapted only in the instrument and protected against overwriting (see Chapter 7.1.3.1).

With legal-for-trade applications, the legal requirements and the conditions given on the test/approval certificate must be taken into account when selecting the settings.

For connecting digital load cells (xBPI load cells), firmware version 2.10 or higher must be installed.

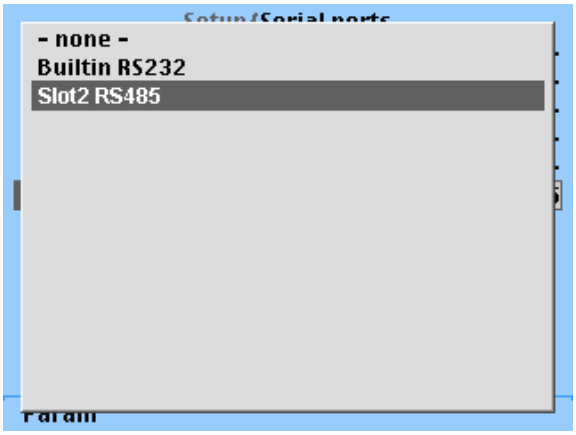
The available interfaces are visible under Info-[Show HW-slots].

7.16.2 Selecting and configuring RS-485 interface

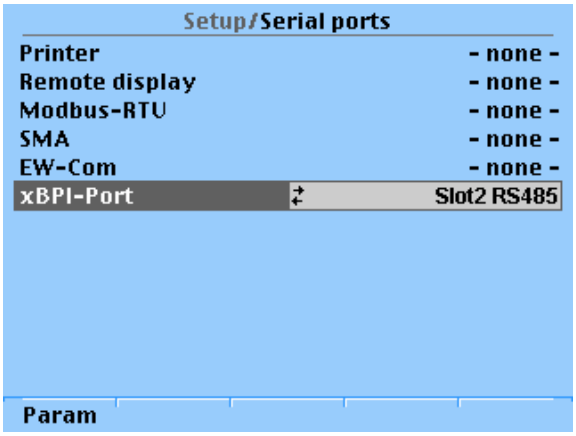
Note:

The PR 5510/04 interface card must be installed in the device (see Chapter 4.6).

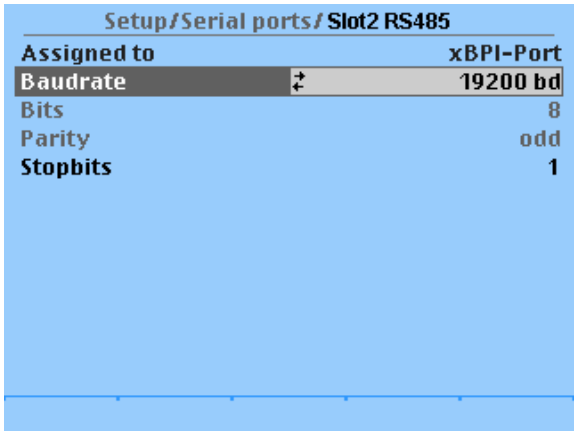
1. Select Setup-[Serial ports parameter]- [xBPI-Port] and confirm.
   ▷ The following window opens:



2. Select the desired interface and confirm.



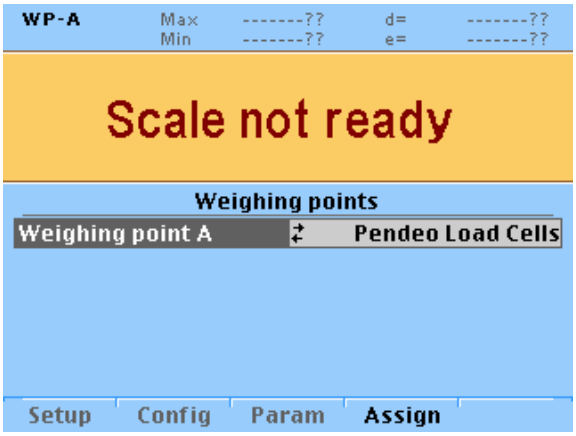
3. Press the [Param] softkey.
   ▷ The following window opens:



4. Select [Baudrate] and confirm.
   ▷ A selection window opens.
5. Select "19200 bd" and confirm.
6. Select [Stopbits] and confirm.
   ▷ A selection window opens.
7. Select "1" and confirm.
8. Press Exit to exit the menu and to save the settings.

7.16.3 Selecting the load cell type

1. Select Setup-[Weighing point]- [Weighing point A].
   ▷ A selection window opens.
2. Select "Pendeo Load Cells" and confirm.



3. Press Exit to exit the menu and save.

7.16.4 Calibration procedure

During calibration, no data is changed in the digital load cells. The calibration data and parameters are saved in the instrument. The unique serial numbers of the connected load cells are monitored.

For the calibration the following order must be followed:

- Search for load cells, see Chapter 7.16.5.
- Assign load cells, see Chapter 7.16.6.

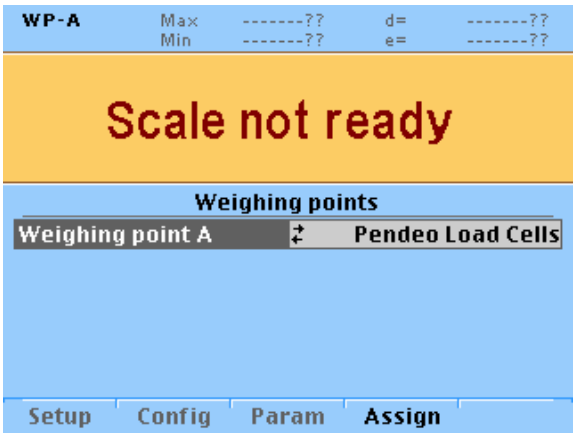
- Recalibrate: Maximal load with weight unit, scale interval, dead load, CAL weight, see Chapter 7.16.7.
- Perform a corner correction if necessary; see Chapter 7.16.10.3.

Note:

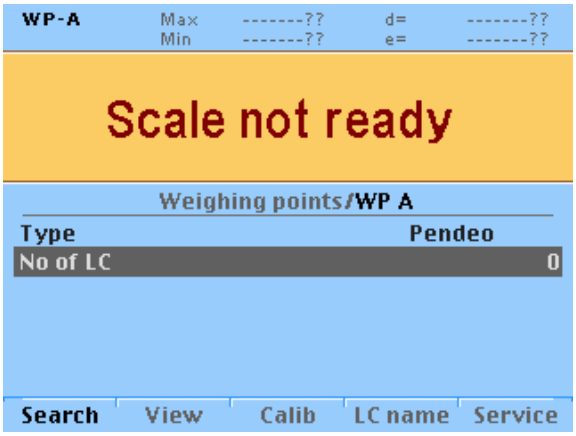
For further information about calibrating weighing points, see Chapter 7.14.3.

7.16.5 Searching load cells

1. Select Setup-[Weighing point]- [Weighing point A].

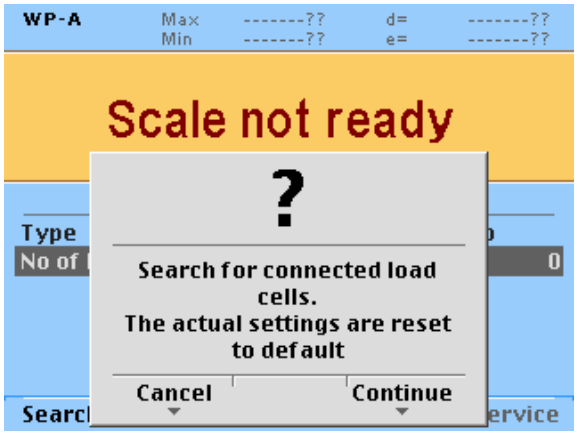


2. Press the [Assign] softkey.
   ▷ The following window opens:



3. Press the [Search] softkey.

▷ A prompt window opens.



4. Press the [Continue] softkey to start a new search process.

   Press the [Cancel] softkey to accept and display the existing values.

   ▷ A window with load cell information opens

   [Type]

   Type of load cells

   [No of LC]

   Number of load cells

   [LC 1...n]

   Serial number/name of the load cells

   [WP serial number]

   Weighing point serial number(is displayed after search)

5. Press the [View] softkey.

   ▷ The load cells are displayed with their item number, serial number, and load.

6. Select the desired load cell and press the [Info] softkey.

   ▷ The load cell data is displayed.

> **Note:**
>
> If load cell names have been assigned (see Chapter 7.16.8), the view can be switched with the [by name] softkey.

7. Press Exit to exit the menu and save.

7.16.6 Assigning load cells

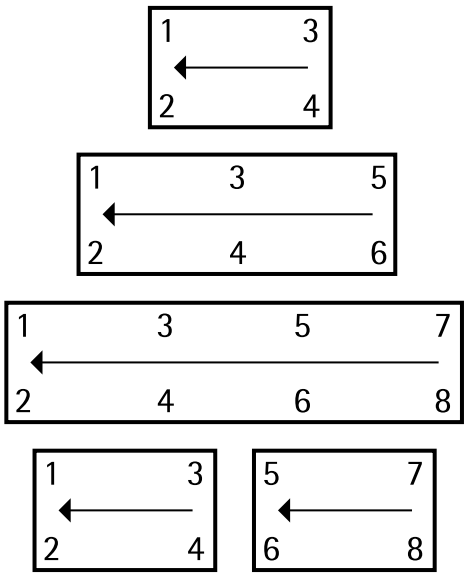
The load cells (serial number) can be assigned to the place of installation in this menu. This is important for correcting the dead load (distribution to the individual load cells), for corner correction and in the event of load cell replacement.

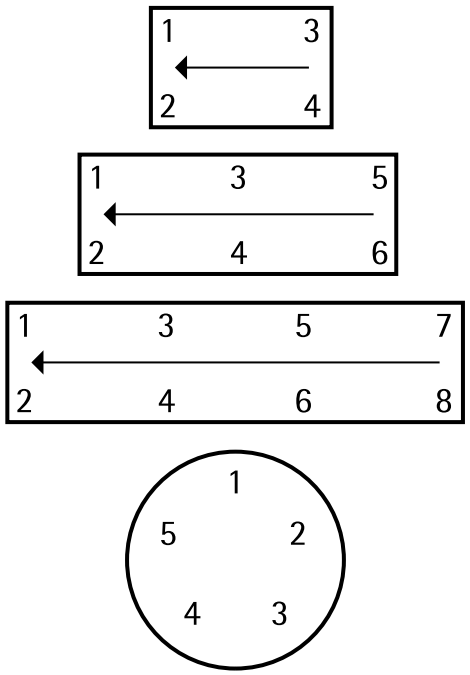
An example of a possible assignment is shown below.

Note:

The assignment from the installation should be documented in the case of load cells being replaced.

with load cells of type Pendeo Truck	with load cells of type Pendeo Process





The menu is accessed via Setup - [Weighing point] - [Weighing point A] - [Assign] - [View] .

1. Unload the scale.
2. Press the [Assign] softkey.
   ▷ You are prompted to confirm.
3. Press the [Continue] softkey to reset the dead load information and start the assignment procedure.
4. Press the [Cancel] softkey to not start the assignment.

   The load cells are assigned by placing minimum weights on the scale (approx. 50 kg).
5. Place the weight on the corner/load cell which will be assigned no. 1 later.

   As soon as the device detects the weight change, the corresponding line is selected.
6. Confirm the assignment of the first load cell by selecting OK .
   ▷ The future LC no. is shown at the far right of the line.
7. Remove the weight.
8. Repeat these steps for load cells 2...4.
9. Press the [Accept] softkey.
10. Press the Exit softkey to exit the menu and save.
11. Press the [View] softkey.
    ▷ The new assignment will be displayed.

12. Check the corner load (dead load); see Chapter 7.16.10.1.
13. Press the Exit softkey to exit the menu and save.

7.16.7 Calibrating load cells

The menu is accessed via Setup - [Weighing point] - [Weighing point A] - [Assign] .

Note:

The [Modify] menu item is only used for small changes (e.g., changing the dead load/ preload, changing the mV/V values for dead load/preload and/or Max, changing the scale interval). Otherwise select the [New] menu item.

Example:

Maximum capacity of a load cell: E_{max} = 50 t

Number of load cells: 4

Max: 200.000 t

Scale interval: 0.020 t

Dead load: Empty weight

CAL weight: 11.000 t

Procedure:

1. Press the [Calib] softkey.
   ▷ A window opens.

   For Max the sum of the maximum capacities for load cell are factory settings:

   4x 50 t = 200 t
2. Press the [New] softkey.
   ▷ The data is set to factory settings (default) first before calibration is started.

   A prompt window opens.
3. Press the [Yes] softkey to reset the corner correction and the calibration to continue.
   ▷ The "Calibration window" opens.
4. Entering and verifying parameters.

   [Local gravity]

   Entering the local value of gravitational acceleration (in this example: Hamburg 9.81379 m/s^2), see e.g. http://www.ptb.de/cartoweb3/SISproject.php.

   [Number of platforms] (only for Pendeo Truck-load cell)

   This parameter is shown only in the case of 8 load cells.

   Entering the number of platforms.

   [Number of vessel feet] (only for Pendeo Process-load cells)

   Enter the number of vessel feet.

Note:

The number of vessel feet and the number of load cells may differ, e.g.: 4 vessel feet on 1 pivots and 3 load cells.

[Max]

The load cell capacity is suggested as Max (E_{max} × number of load cells).

The maximum load (Max) determines the maximum measured weight without dead load. Normally, the selected Max must be smaller than the load cell capacity (maximum capacity × number of load cells) – dead load, in order to prevent overloading the load cells.

Enter the maximum load with decimal places (in this example: 200.000 t).

The ABC key can be pressed to switch between units.

[Scale interval]

Selecting the scale interval (1 d) (in this example: 0020).

The scale interval (d) is calculated, based on the maximum weight value.

[Dead load]

To use the empty scale as dead load (normal case):

- Do not load scale.
- Press the [by load] softkey.

Note:

If the dead load is known, the value can be overwritten [by value].

[CAL weight]

- Center the CAL weight on the scale and enter the weight value with decimal places (here: 11.000 t).
- Press the **[Ok]** softkey and remove CAL weight.

[Corner correction]

Perform a corner correction if necessary; see Chapter 7.16.10.3.

Note:

During calibration the weight can be displayed with 10 fold resolution by pressing the Info key.

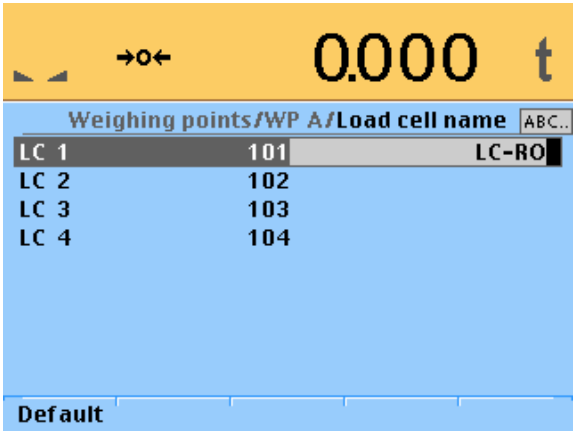
After 5 seconds the display returns to normal resolution. Press ↓ if you want to switch to normal resolution immediately.

5. Press the Exit softkey to exit the menu.

7.16.8 Assigning load cell names

In this menu the load cells can also be assigned names in addition to the load cell no. and serial numbers.

The menu is accessible via Setup-[Weighing point]- [Weighing point A]- [Assign]- [LC name].



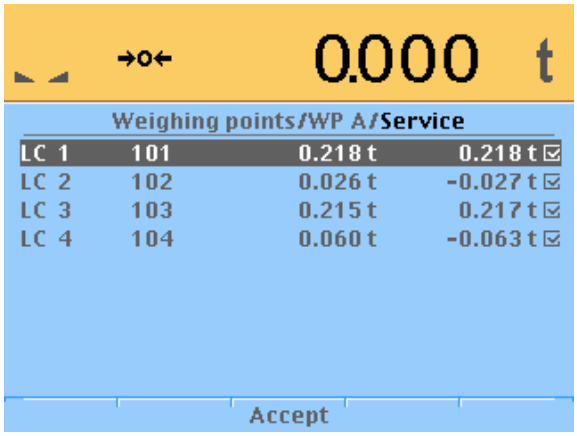
1. Select the line, enter the name with the keyboard (max. 20 alphanumerical characters) and confirm.
2. Repeat these steps for load cells 2...4.
3. Press Exit to exit the menu and save.

7.16.9 Service function

In this menu faulty load cells can be deactivated and replaced load cells activated.

The menu is accessible via Setup-[Weighing point]- [Weighing point A]- [Assign]- [Service].

The service window appears.



Item number, serial number, dead load and current weigh of connected load cells are displayed.

7.16.9.1 Deactivating the load cell

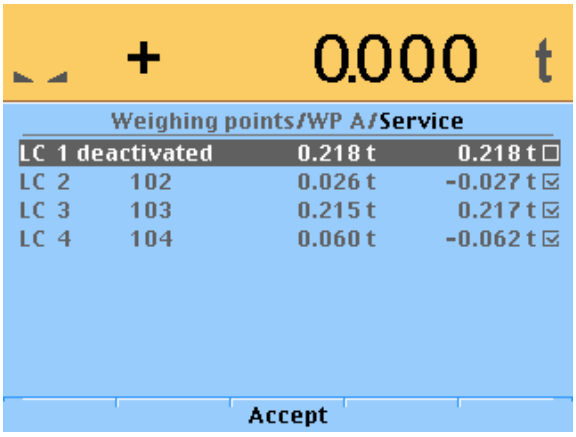
A load cell can be deactivated if it is defective. The weight is then distributed to the remaining load cells.

Note:

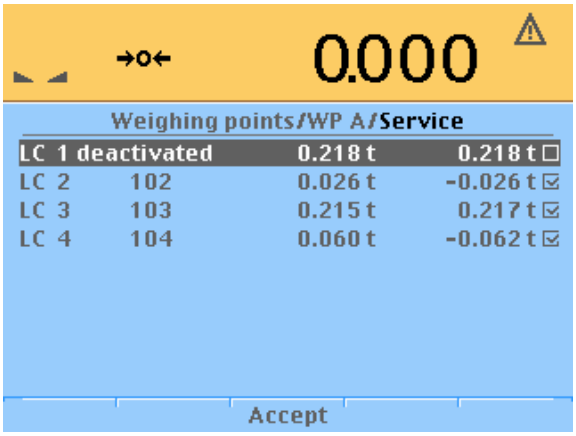
For vehicle weighbridges:

Trucks should only be allowed to move onto the center of the weighing platform, in order to distribute the weight evenly.

1. Select the faulty load cell and confirm, to deactivate the cell.



2. Press the [Accept] softkey.
   ▷ The warning symbol replaces the weight unit.



7.16.9.2 Activating the load cell

1. After inserting and connecting the new load cell, select the line of the deactivated load cell and confirm.
2. Press the [Accept] softkey.
   ▷ A search process is started and only then is the new load cell detected.

7.16.10 Corner correction

7.16.10.1 Checking the corner load (dead load)

Note:

For scale structures with containers pay attention to the following:

- For asymmetric scale structures a corner correction is not necessary.
- But for symmetric scale structures corner correction may be required.

After assignment and calibration, the load cell positions have been defined clearly.

7.16.10.2 Mechanical corner correction

A Mechanical corner correction has to be carried out, if the load is not evenly distributed over the load cells, e.g. if the platform is wobbling.

The dead load on the load cells can be corrected using shims. If two coupled platforms are connected, corner load checking or installation of shims for the platforms must be performed independently.

A fine calibration can be done by software corner correction, see Chapter 7.16.10.3.

7.16.10.3 Software corner correction

If the corners are loaded in succession, the same value should be displayed on the device at all times. An excessive deviation almost always means that the scale is tilted or indicates load cell force shunts.

If the signal deviations cannot be resolved by carefully leveling the scale, the software must be calibrated.

The menu is accessible via Setup-[Weighing point]- [Weighing point A]- [Assign].

1. Press the [Modify] softkey.
2. Select and confirm [Corner correction].
3. Set the CAL weight on an area of the scale structure.
   ▷ The position (e.g.: LC 4) is highlighted.
4. Confirm this position.
   ▷ Is displayed by ☑.
5. Remove the CAL weight.
6. Repeat steps 3 to 5 for the remaining load cells. You are free to choose any desired order.
7. If all load cells have been loaded one time, press the [Calc] softkey to perform the corner correction.
   ▷ The total weight remains unchanged. Only the effect of the individual load cells is corrected.

   When corner correction is completed, it is marked with "OK".

8. Press Exit to exit the menu and save.

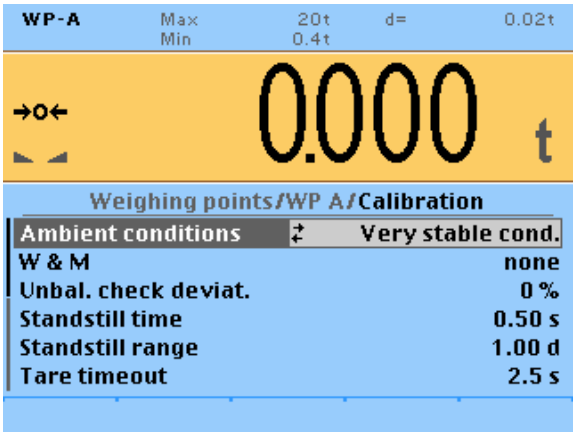
7.16.11 Terminating/saving calibration

The calibration is terminated by pressing the Exit key.

Unless all data were determined during recalibration using [New] (e.g. dead load not set/ entered), the following prompt is displayed:

7.16.12 Parameter Input

The menu is accessible via Setup - [Weighing point] - [Weighing point A] - [Assign] - [Calib] - [Param] .



[Ambient conditions]

This parameter is used to define the ambient conditions of the scale.

Possible Selections: very stable condition, stable condition, unstable condition, very unstable condition

[W&M]

Setting for legal-for-trade mode.

Note:

The transmitter of the series PR 5410 are not approved for calibration.

[Unbal. Check deviat.]

The plausibility check is activated when the average deviation is >0%. The average deviation of the individual load cells is calculated.

Setting range: 0...100%.

[Standstill time]

The parameters [Standstill time] and [Standstill range]are used to define the stability of the scale (stable balance).

The input for the parameter [Standstill time] is expressed in seconds.

Valid range: 0.00...2 s

If the tome is set to "0" there is no check. The standstill time must not be less than the measuring time.

[Standstill range]

As long as the weight fluctuations remain within this range, the device is determined to be stable.

The input for the parameter [Standstill range] is expressed in "d."

Valid range: 0.01...10.00 dc.

[Tare timeout]

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).

The input is done as seconds.

Valid range: 0.0...<2.5>...25 s.

At 0.0 s taring is only carried out when the scale is already stable.

[Zeroset range]

Define a ±range around the zero point determined by the dead load during calibration; within this range

- the displayed gross weight can be set to zero by pressing the zero-setting key (or by a corresponding external command), and
- automatic zero tracking is active.

Setting range: 0.00...10000.00 d

For use in legal metrology a value ≤2% of the Max must be entered, example: 60 d for 3000 e of class III.

[Zerotrack range]

Range within which automatic zero tracking compensates deviations.

Setting range: 0.25...10000.00 d

In "legal-for-trade" mode a value of 0.25 d has to be entered.

[Zerotrack step]

If a weight change exceeds the adjusted value, automatic tracking does not function any more.

Setting range for automatic tracking increments: 0.25...10 d

In "legal-for-trade" mode a value of 0.25 d has to be entered.

[Zerotrack time]

Time interval for automatic zero tracking.

Setting range: 0.1...25 s

At 0.0 s the zero tracking is switched off.

For use in legal metrology a value of 1 s must be entered.

[Overload]

Weighing range above the maximum load (Max) without error message.

Setting range: 0...9999999 d

For use in legal metrology a value of max. 9 d = e must be set.

[Minimum weight]

Minimum weight at which a print command can be triggered.

Setting range: 0...9999999 d

For use in legal metrology a value of at least 20 d must be set.

[Range mode]

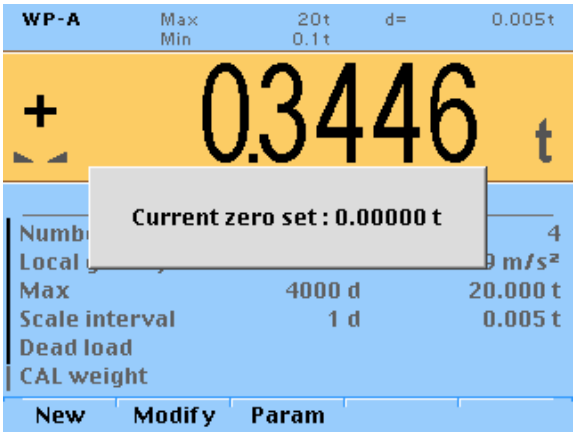
Selection: <Single range>, Multiple range, Multi-interval

For scale range selection, see Chapter 7.14.15.2 and 7.14.15.3.

Press Exit to exit the menu and to save the settings.

7.16.13 Subsequent dead load correction

If the hopper/platform weight changes by an amount that is higher than the zero-setting range; e.g. due to dead load reduction, dead load increase, or mechanical changes, the functions for automatic zero tracking and manual zero setting no longer work.



To view the range which is already utilized by zero tracking or zero setting, in [Calibration] press the Info key; this also activates 10-fold increased resolution of the weight value.

Press Info again to return to the previous state.

Note:

The scale must not be loaded!

If the entire zero-setting range is already utilized, you can still correct the dead load subsequently without affecting other calibration data/parameters. To do this open calibration via Setup-[Weighing point]- [Weighing point A]- [Assign]- [Calib]- [Modify] and determine the dead load with [Dead load] using the [by load] option (see Chapter 7.16.7).

7.16.14 Displaying weighing point serial number

After searching via Setup-[Weighing point]- [Weighing point A]- [Assign]- [Search] the corresponding weighing point serial number is displayed.

7.17 General parameter settings

The parameter settings which are not related to the weighing electronics are divided into several ranges.

- Serial interfaces [Serial ports parameter]
- Date and Time [Date & Time]

- Operating parameter [Operating parameter]
- Printing parameter [Printing parameter]

Note:

This menu item is only available if under Setup-[Operating parameter]- [Application] "Standard" has been selected.

- Fieldbus parameter [Fieldbus parameter]
- Network parameter [Network parameter]
- Configuring limits [Limit parameter]

Note:

This menu item is only available if under Setup-[Operating parameter]- [Application] "Standard" has been selected.

- Configuring digital inputs and outputs [Digital i/o parameter]

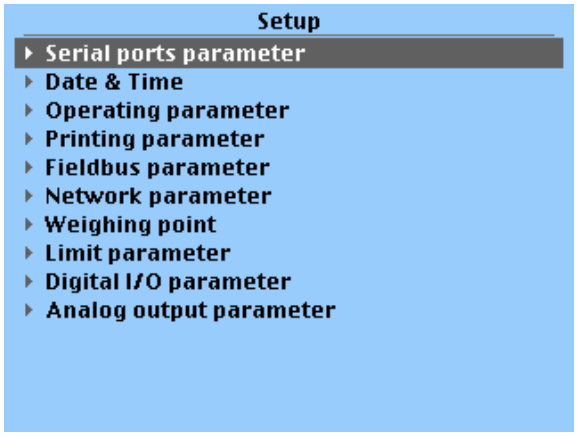
Note:

This menu item is only available if under Setup-[Operating parameter]- [Application] "Standard" has been selected.

- Configuring analog output [Analog output parameter]

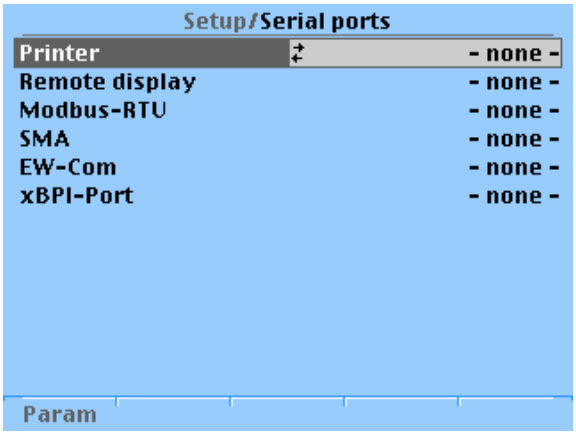
7.17.1 Selecting and configuring serial interfaces

The interfaces are configured under this menu item.

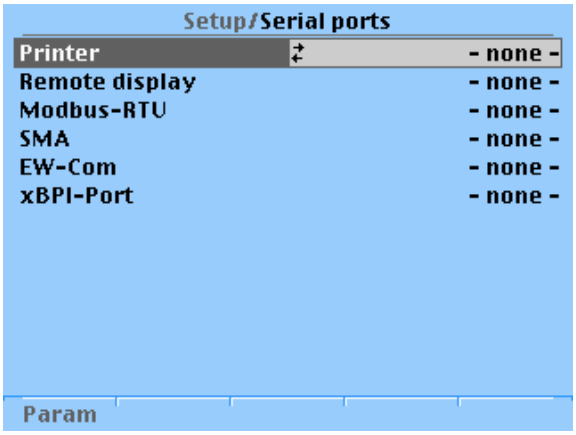


▶ Select Setup - [Serial ports parameter] and confirm.

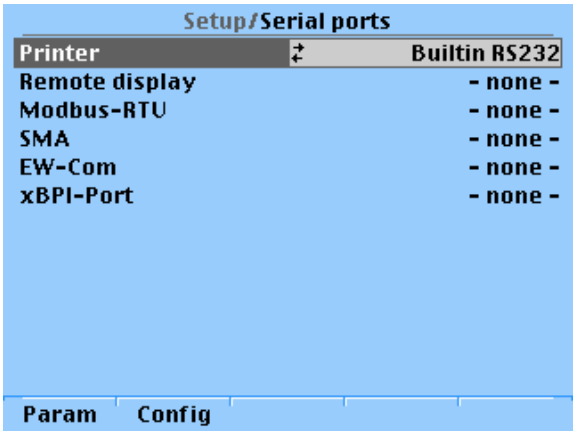
▷ The following window opens.



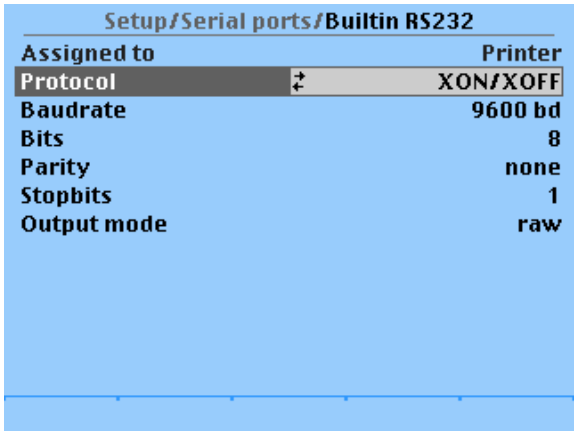
7.17.1.1 Printer protocol



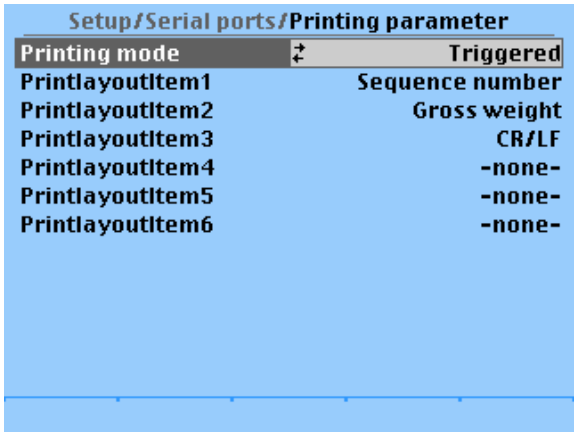
1. Select [Printer] and confirm.
   ▷ A selection window opens.
2. Select the desired interface and confirm.
   ▷ The selected interface is displayed.



3. Press the [Param] softkey to set the parameters.
   ▷ The following window opens:

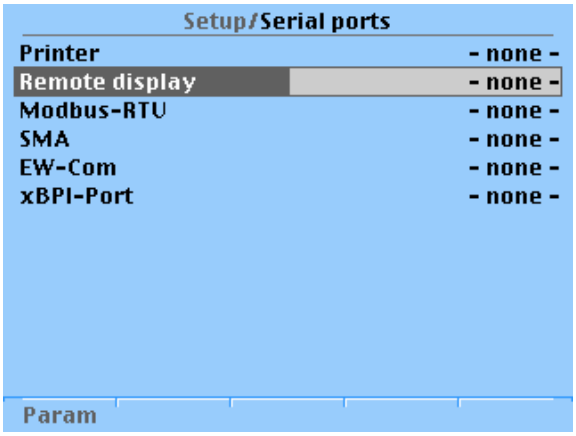


4. Select parameters and confirm.
5. Select and confirm the desired printer settings in the respective selection window.
6. Press Exit to return to the previous window.
7. Press the [Config] softkey to define the print settings.
   ▷ The following window opens:

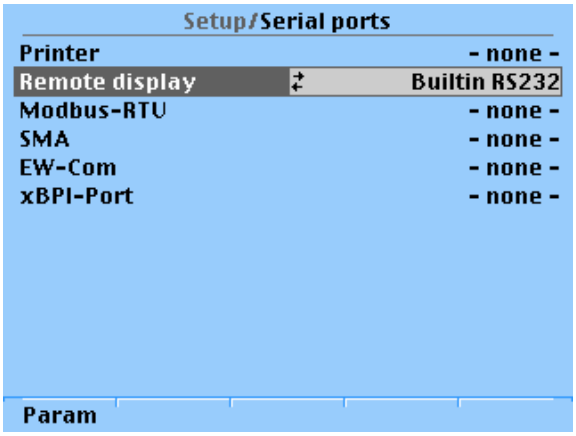


8. Select parameters and confirm.
9. Select and confirm the desired printer settings in the respective selection window.
10. Press Exit two times to exit the menu and save.

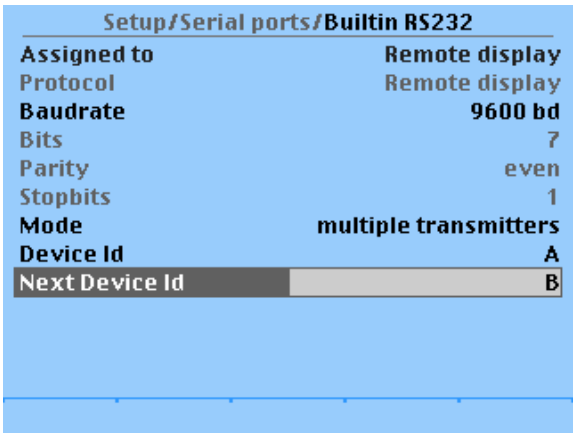
7.17.1.2 Remote display protocol



1. Select [Remote display] and confirm.
   ▷ A selection window opens.
2. Select the desired interface and confirm.
   ▷ The selected interface is displayed.



3. Press the [Param] softkey to set the parameters.
   ▷ The following window opens:

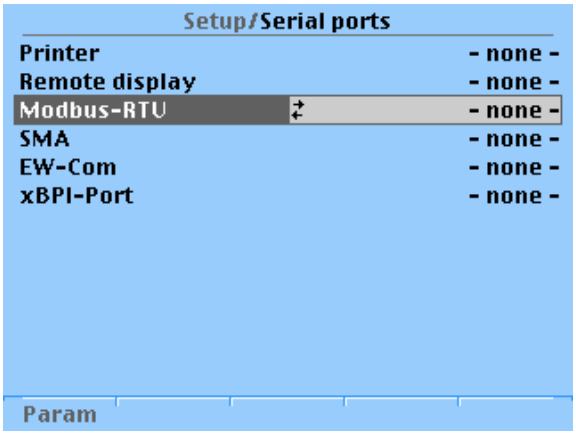


4. Select [Baudrate] and confirm.
   ▷ A selection window opens.
5. Select the desired transmission speed and confirm.
6. Select [Mode] and confirm.
7. If several remote displays are connected, select the "multiple transmitters" mode. If only 1 instrument is connected to a remote display (normal case), [Mode] must be set to "single transmitter".
8. Enter the unique device address (in this case: A) and the address of the device that follows (in this case: B) and confirm.
9. Press Exit two times to exit the menu and save.

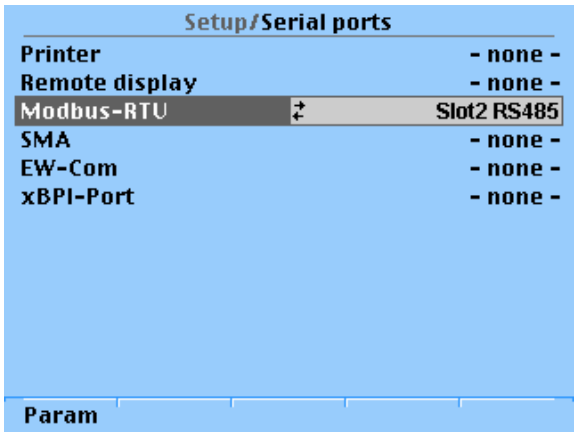
7.17.1.3 ModBus RTU protocol

Note:

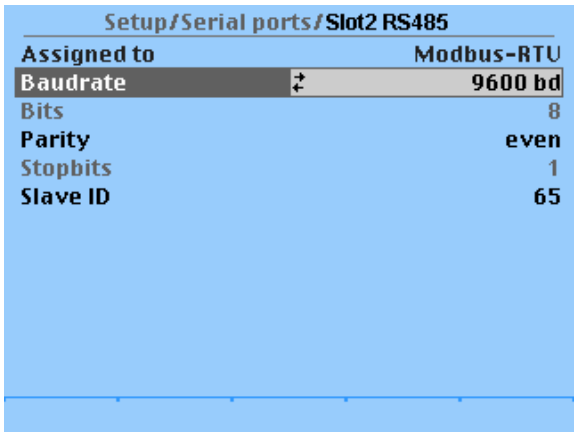
The PR 5510/04 interface card must be installed in the device (see Chapter 4.6).



1. Select [ModBus-RTU] and confirm.
   ▷ A selection window opens.
2. Select the desired interface and confirm.
   ▷ The selected interface is displayed.



3. Press the [Param] softkey to set the parameters.
   ▷ The following window opens:



4. Select [Baudrate] and confirm.
   ▷ A selection window opens.
5. Select the desired transmission speed and confirm.
6. Select [Parity] and confirm.

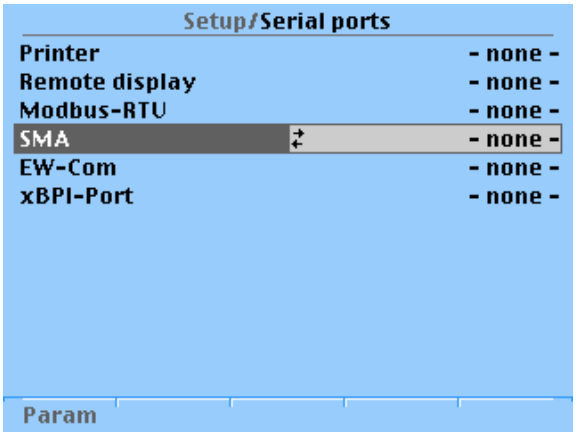
▷ A selection window opens.

7. Select the desired parity and confirm.
8. Select [Slave ID] and confirm.
9. Enter and confirm the slave address (in this case: 65).
10. Press Exit 2× to exit the menu and save.

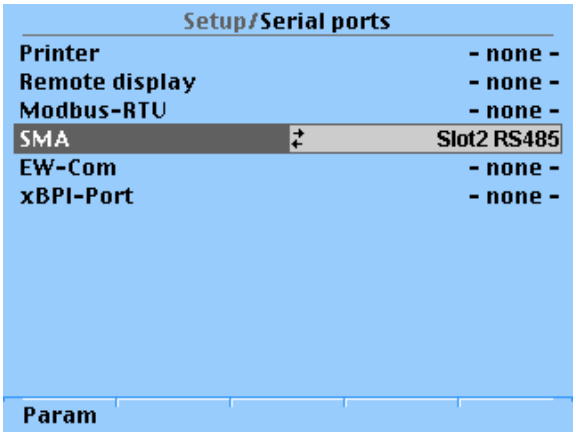
7.17.1.4 SMA protocol

Note:

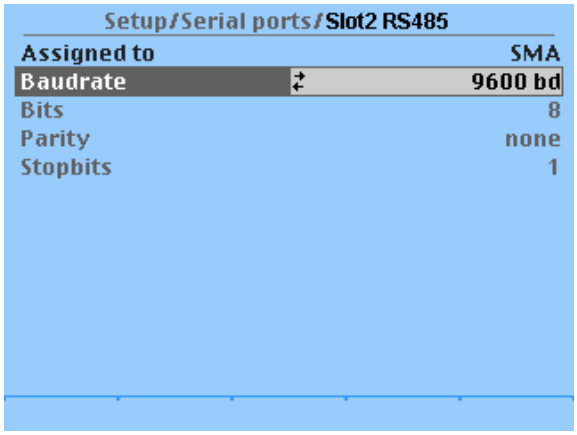
The PR 5510/04 interface card must be installed in the device (see Chapter 4.6).



1. Select [SMA] and confirm.
   ▷ A selection window opens.
2. Select the desired interface and confirm.
   ▷ The selected interface is displayed.

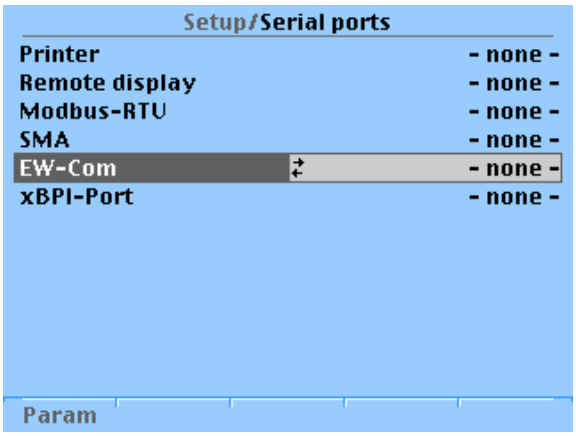


3. Press the [Param] softkey to set the parameters.
   ▷ The following window opens:

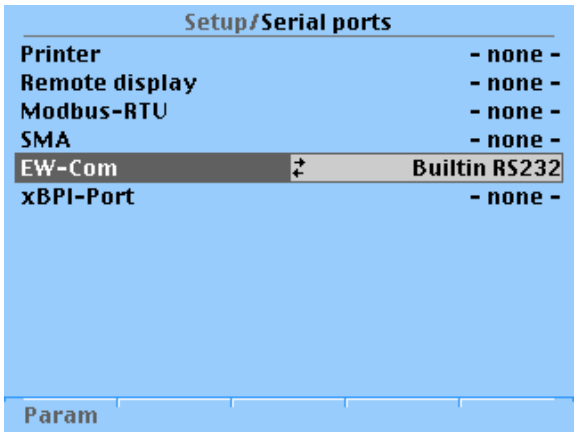


4. Select [Baudrate] and confirm.
   ▷ A selection window opens.
5. Select the desired transmission speed and confirm.
6. Press Exit two times to exit the menu and save.

7.17.1.5 EW-Com protocol

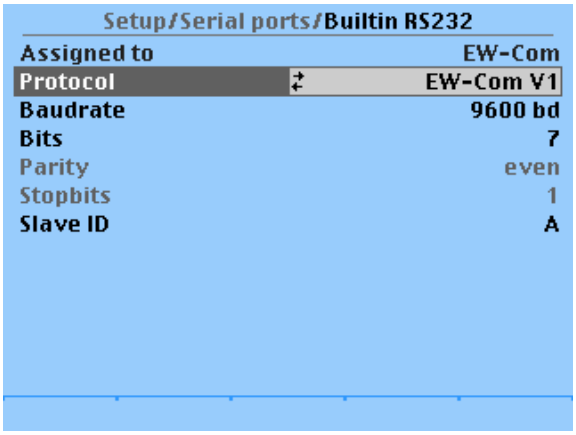


1. Select [EW-COM] and confirm.
   ▷ A selection window opens.
2. Select the desired interface and confirm.
   ▷ The selected interface is displayed.



3. Press the [Param] softkey to set the parameters.

▷ The following window opens:



4. Select [Protocol] and confirm.
   ▷ A selection window opens.

   V1 = for old communication programs

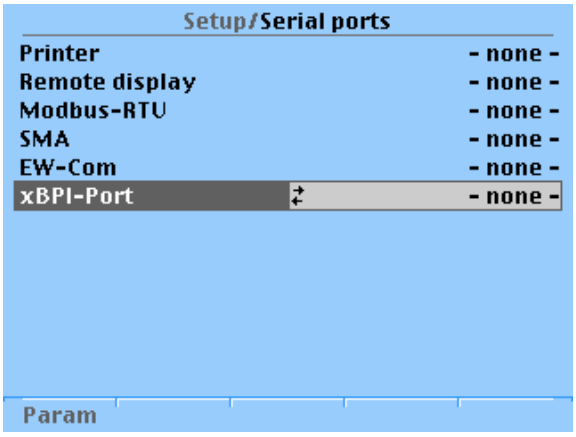
   V2 = for formulation controller

   V3 = for OPC
5. Confirm the desired selection.
6. Select [Baudrate] and confirm.

   A selection window opens.
7. Select the desired transmission speed and confirm.
8. Select [Bits] and confirm.

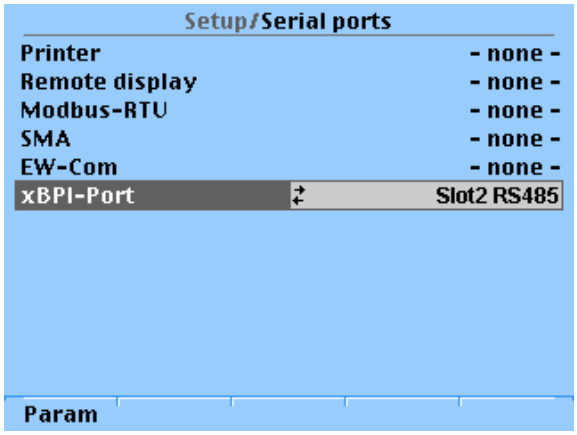
   A selection window opens.
9. Select the desired bit quantity and confirm.
10. Select [Slave ID] and confirm.
11. Enter the address (A–Z) and confirm.
12. Press Exit two times to exit the menu and save.

7.17.1.6 xBPI protocol

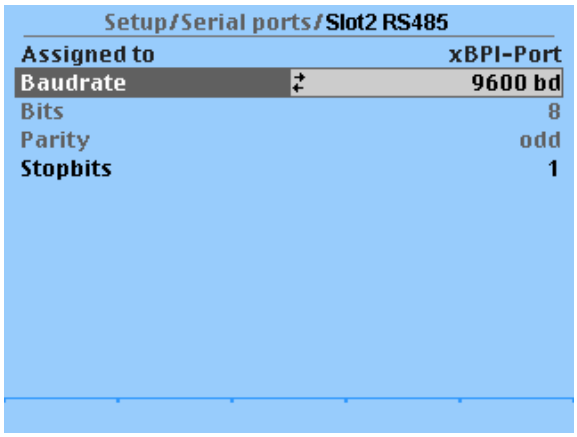


1. Select [xBPI-Port] and confirm.
   ▷ A selection window opens.
2. Select the desired interface and confirm.

▷ The selected interface is displayed.



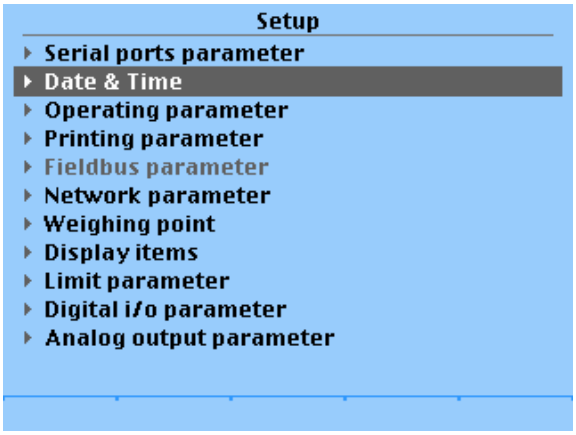
3. Press the [Param] softkey to set the parameters.
   ▷ The following window opens:



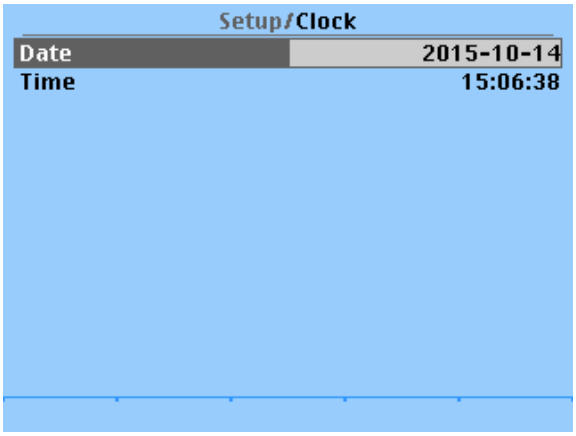
4. Select [Baudrate] and confirm.
   ▷ A selection window opens.
5. Select the desired transmission speed and confirm.
6. Select [Stopbits] and confirm.
   ▷ A selection window opens.
7. Select the desired stopbit and confirm.
8. Press Exit two times to exit the menu and save.

7.17.2 Date and time

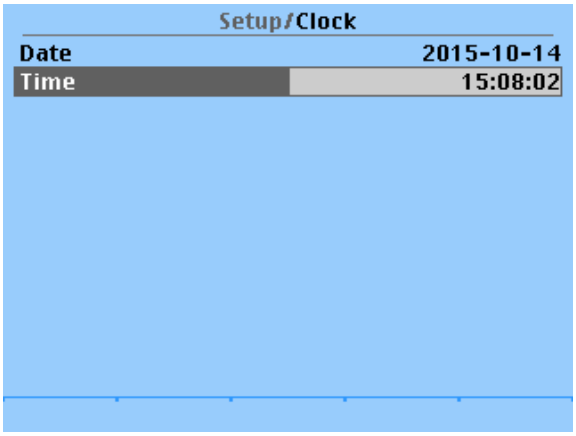
The date and time are set under this menu item.



1. Select [Date & Time] and confirm.
   ▷ The following window opens:



2. Select the individual digits and use the keypad to overwrite them and confirm.

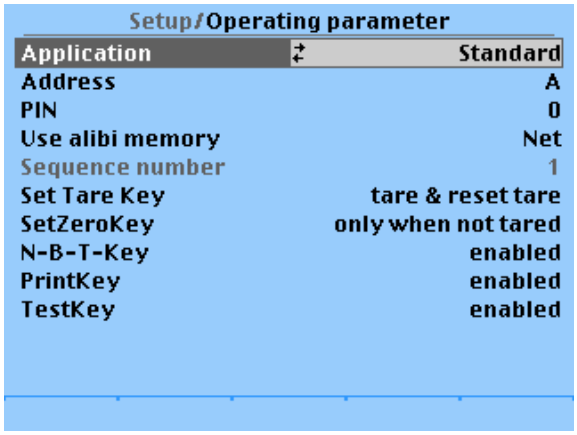


3. Select the individual digits and use the keypad to overwrite them and confirm.
4. Press Exit to exit the menu and save.

7.17.3 Operating parameters

The operating parameters are set under this menu item.

Open the menu via Setup-[Operating parameter].



[Application]

Application selection: Standard, EasyFill

[Address]

Enter device address, e.g. for printout.

Input: A..Z

[PIN]

The access code can be used to protect the system setup from unauthorized operation.

Input: number with up to 6 digits

As long as you are in this menu, the value can be overwritten as required.

If the [PIN] is set to "0", no access code prompt is displayed.

Note:

SUPER PIN

If the PIN-Code is lost, the setup can be unlocked with Super-PIN "212223."

[Use alibi memory]

Using the alibi memory

The weight values stored in the alibi memory are defined here:

none (do not store any data records); Gross; Net; Gross,Net,Tare; Gross,Net; Gross,Tare

[Sequence number]

The sequence number (counter for print jobs) is incremented automatically (max. 999999999) and can be set to a start value here as appropriate.

The sequence number can also be shown on the printout (selectable).

Note:

This menu item is only available if under Setup-[Operating parameter]- [Application] "Standard" has been selected.

[SetTareKey]

Selection: disabled, tare & reset tare, tare & tare again

The tare function (operation via VNC/Internet Browser) can be toggled:

- [tare & reset tare] 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.
- [tare & tare again] means that each time a tare command is given, the instant value in the tare memory is applied and the net display switches to 0.

The tare key has no function when set to [disabled].

[SetZeroKey]

Selection: disabled, only when not tared, reset tare on zeroset

The function of the zero-setting key (operation via VNC/Internet Browser) can be restricted with [only when not tared] to the gross mode or automatically toggle with [reset tare on zeroset] to the gross mode.

If the zero-setting key with these settings has no effect, the configured zero-setting range (around the zero-point set with the dead load) is already utilized due to a previous zero-setting operation and/or automatic zero setting.

The setting to zero is deactivated by [disabled].

[N-B-T-Key], [PrintKey], [TestKey]

The following front-panel keys can be disabled by selecting "disabled":

-

-
-

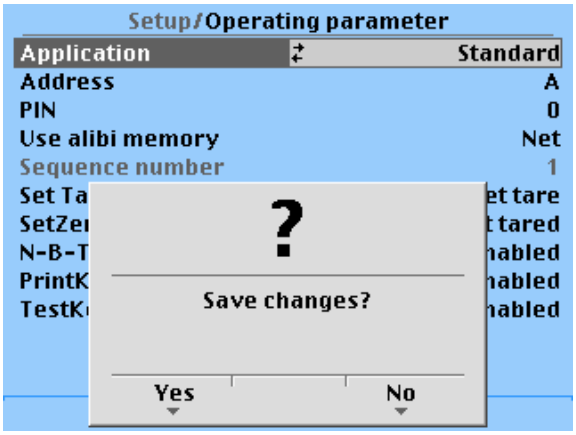
Selecting [enabled] allows operation of these keys again.

Response on the device display If disabled keys are pressed, `LoCKEd` appears on the display.

Press

to return to the Setup menu.

The following prompt window appears if parameters were changed.



Save the data with [Yes].

Press [No] to exit the menu without changing data.

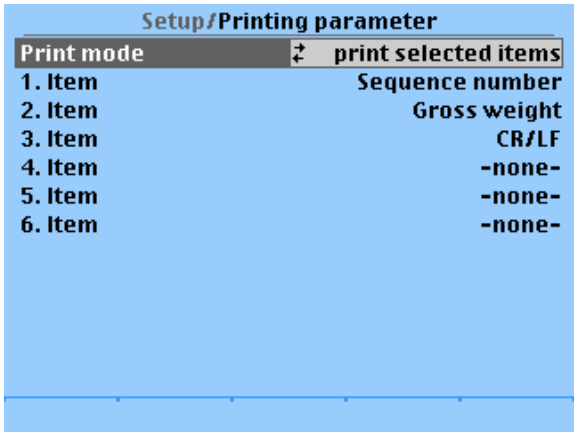
7.17.4 Print parameters

Note:

This menu item is only available if under Setup-[Operating parameter]- [Application] "Standard" has been selected.

The print parameters are set under this menu item.

Open the menu via Setup-[Printing parameter].



[Printing mode]

Printing mode

Selection: <Print selected items>, via Nice Lable [configure printout with Nice Label Express (NLE)].

[1. ... 6. Item]

Print layout for line 1...6

Selection: -none- (no printout; selected if fewer than 6 elements will be printed), Gross weight, Net weight, Tare weight, Date & Time (printed in format DD.MM.YYYY HH:MM:SS), Sequence number (counter for individual print orders, max. 6 digits, #000001 comes after #999999), CR/LF (carriage return and line feed), Device address, displayed weight, Formfeed

Note:

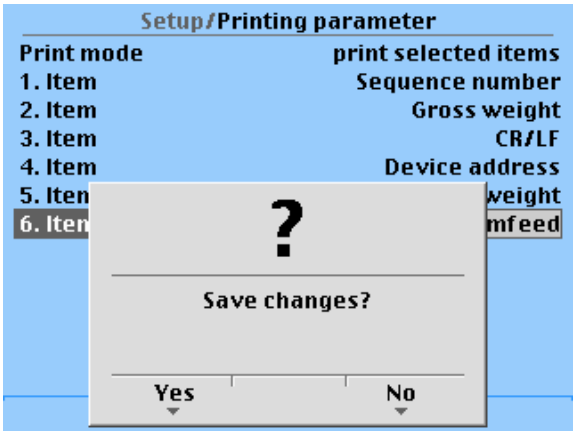
If [OIML], [NTEP], or [NSC] has been selected, printing is done only if the stability criteria is fulfilled.

The weight is shown in "< >".

For [NTEP] or [NSC] the gross weight is indicated with G (otherwise B).

Press Exit to return to the Setup menu.

The following prompt window appears if parameters were changed.



Save the data with [Yes].

Press [No] to exit the menu without changing data.

If a printer has been connected and set up (see Chapter 7.17.1.1), the configuration printout can be triggered via the Setup and keys (clicked one after the other).

7.17.5 Fieldbus parameters

The fieldbus parameters are set under this menu item.

Open the menu via Setup-[Fieldbus parameter].

This menu item can only be selected if a fieldbus card is installed.

The protocol displayed automatically depends on of the installed fieldbus card:

- [ProfiBus-DP] for PR 1721/31
- [InterBus-S] for PR 1721/32
- [DeviceNet] for PR 1721/34
- [CC-Link] for PR 1721/35

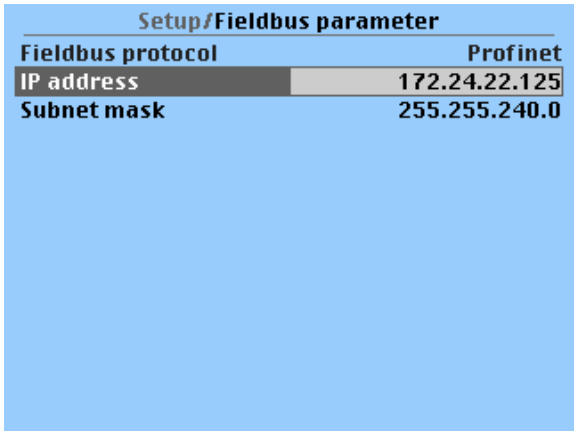
Note:

This fieldbus card does **not** support the "EasyFill" application.

- [ProfiNet I/O] for PR 1721/36
- [EtherNet-IP] for PR 1721/37

Example:

PR 1721/36 ProfiNet I/O

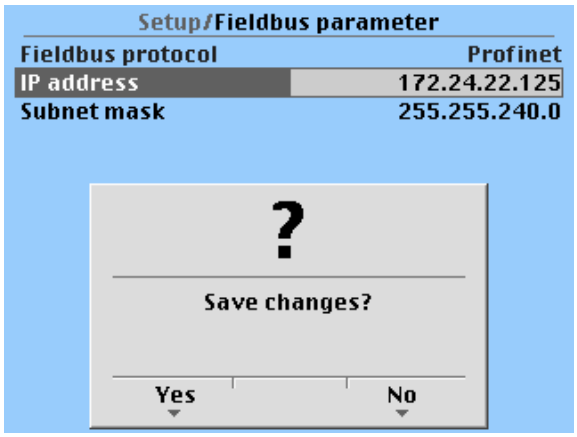


Note:

The individual parameters depend on the fieldbus type.

Press Exit to return to the Setup menu.

The following prompt window appears:



Save the data with [Yes].

Press [No] to exit the menu without changing data.

7.17.5.1 ProfiBus-DP settings for S7

Requirements:

- PR 1721/31 ProfiBus-DP is installed.
- The parameters are selected and saved.

Procedure:

Note:

Further details can be found in the supplementary application manual "How to..." (available upon request from technical.support.hh@minebea-intec.com).

1. Establish communication with the PLC (here: SIEMENS S7-300/400 or S7-1500).
2. Create/open a project in the "SIMATIC MANAGER."

3. Load the file "sart5410.gsd" from CD and install it in the development environment.
4. Add the PR 5410 device to the project and assign the I/O ranges.

Note:

See Chapter "Description of the I/O Area"

Example:

The gross weight should be read.

I/O size = 8 bytes, counted from byte 0–7

7.17.5.2 DeviceNet settings for Rockwell workstation

Requirements:

- PR 1721/34 DeviceNet is installed.
- The parameters are selected and saved.

Procedure:

Note:

Further details can be found in the supplementary application manual "How to..." (available upon request from technical.support.hh@minebea-intec.com).

1. Register the file "sag_5410.eds" using the "Hardware Installation Tool".
2. Select and insert the instrument from the catalog into the I/O configuration.

Note:

See Chapter "Description of the I/O Area"

Example:

The gross weight should be read.

I/O size = 8 bytes, counted from byte 0–7

7.17.5.3 ProfiNet I/O settings for S7

Requirements:

- PR 1721/36 ProfiNet I/O is installed.

Procedure:

Note:

Further details can be found in the supplementary application manual "How to..." (available upon request from technical.support.hh@minebea-intec.com).

1. Establish communication with the PLC (here: SIEMENS S7-300/400 or S7-1500).

NOTICE

Potential network problems

▶ A unique device name must be assigned for the hardware configuration and assignment/download.

2. Enter the IP address and network mask under Setup - [Fieldbus parameter] and confirm.
3. Add the PR 5410 device to the project and assign the I/O ranges.

Note:

See Chapter "Description of the I/O Area"

Example:

The gross weight should be read.

I/O size = 8 bytes, counted from byte 0–7

4. Assign the instrument name to the PR 5410.

7.17.5.4 EtherNet-IP settings for Rockwell workstation

Requirements:

- PR 1721/37 DeviceNet EtherNet-IP is installed.

Procedure:

Note:

Further details can be found in the supplementary application manual "How to..." (available upon request from technical.support.hh@minebea-intec.com).

1. Enter the IP address and network mask under Setup - [Fieldbus parameter] and confirm.
2. Register the file "sag_5410_Ethernetip.eds" using the "Hardware Installation Tool".
3. Select and insert the instrument from the catalog into the I/O configuration.

Note:

See Chapter "Description of the I/O Area"

Example:

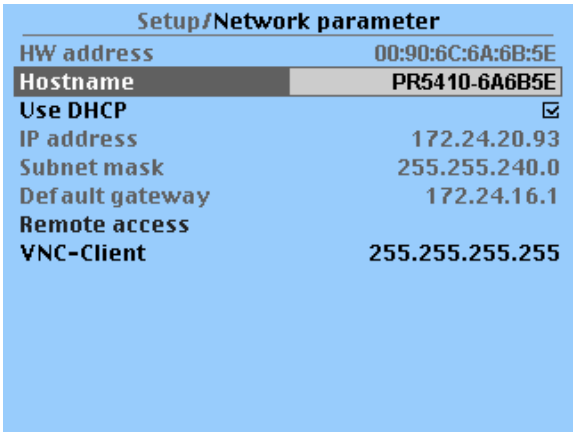
The gross weight should be read.

I/O size = 8 bytes, counted from byte 0–7

7.17.6 Network parameters

Under this menu item, you can define the network parameters for the network connections (built-in LAN adapter).

Open the menu via Setup - [Network parameter].



[HW address]

This parameter cannot be changed because the fixed address is specified by the instrument.

[Hostname]

NOTICE

Potential network problems

▶ The host name must be unique in the network!

The user-defined device name is subject to the following restrictions:

- Minimum number of characters: 2, maximum number of characters: 24.
- The first character must be a letter. Spaces are not permitted.
- 0–9, A-Z (not case-sensitive) are permitted.
- - or . may be included, but neither at the end nor in succession.

Input: via keypad

[DHCP]

If ☑ is checked (presettings: DHCP selected), the server automatically allocates the IP address, subnet mask, and default gateway.

If □ is not checked, the settings [IP address], [Subnetmask] and [Default gateway] must be defined in consultation with the responsible system administrator.

[VNC client]

This address can be used to allow access to the interface for remote access, see following table.

User	address	Description
VNC client	0.0.0.0.	Access via VNC not permitted.
VNC client	172.24.21.101	Access only from client machine with this address.
VNC client	172.24.21.255	Access from any client with address within range 172.24.21.1 - ..254.
VNC client	255.255.255.255	Access from client with any address.

Note:

When setting [IP Address], [Subnetmask], and [Default gateway], please consult with your system administrator.

Press Exit to return to the Setup menu and to save the changes.

7.17.7 Configuring limit values

Note:

This menu item is only available if under Setup-[Operating parameter]- [Application] "Standard" has been selected.

The parameters for limits are set under this menu item.

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. For the SPM addresses for the limits, see Chapter 13.4.

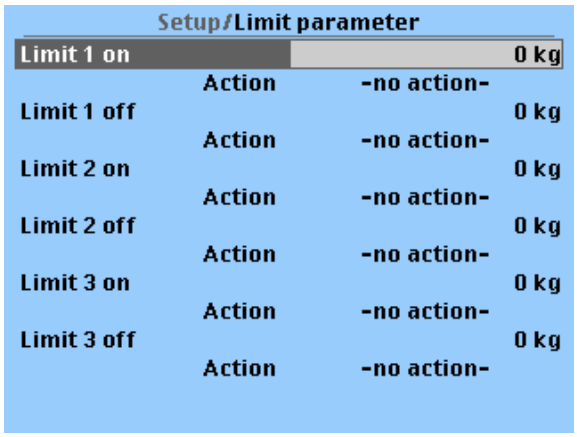
NOTICE

The limit values of an xBPI weighing point are scale-specific.

The scale must be active when entering the limit values.

- The scale and the unit must not be changed after configuration.
- The following settings are required: [Weighingpoint/xBPI-Scale] - [Setup] - [Configuration] - [Application settings] - [Number of units] "1 Weight"

Define the parameters for limits under Setup-[Limit parameter].

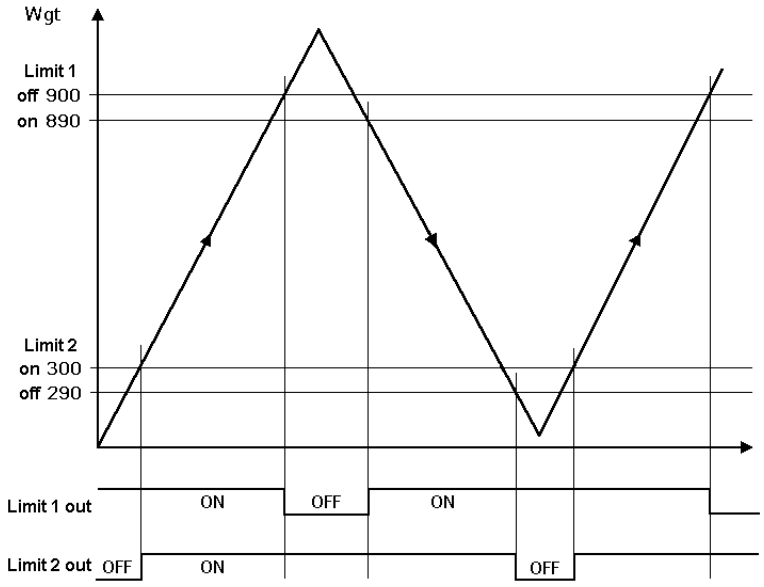


For the configuration the following order must be followed:

1. Define limits.
2. Define an action.
3. Determine a condition.
4. Save parameters.

7.17.7.1 Defining limits

Example 1:



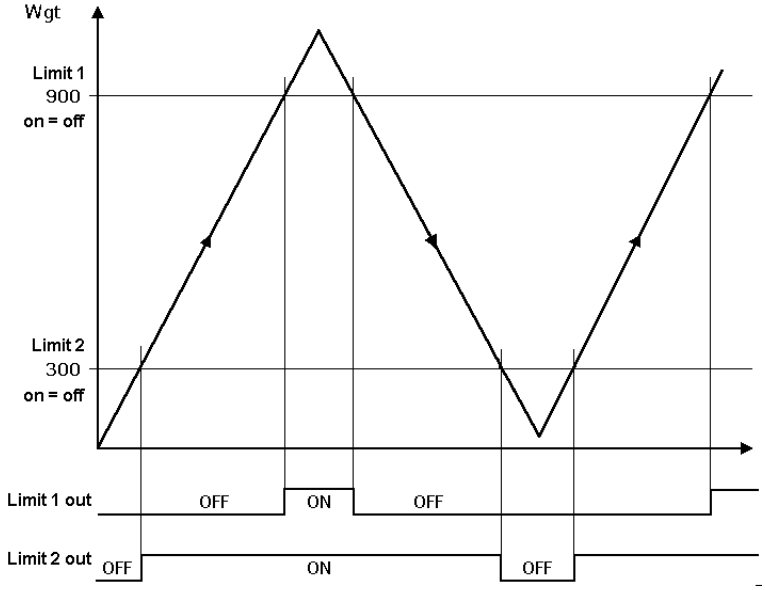
The output signal (Limit 1 out) of limit 1 switches OFF above a weight (Wgt) of 900 kg.

The output signal (Limit 2 out) of Limit 2 switches OFF below 290 kg.

The two limit values have a hysteresis of 10 kg.

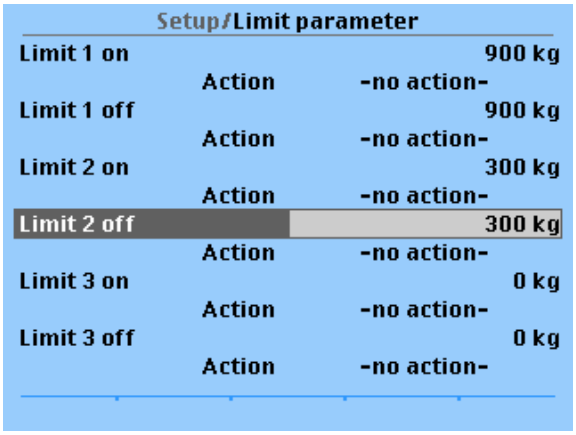
In the event of a power failure both outputs turn to "off" ("OFF"), thus indicating underfill and overfill simultaneously.

Example 2:



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

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



1. Select the appropriate lines.
2. Use the keypad to enter and confirm the desired values (in this case: see Example 2).

7.17.7.2 Defining an action

The possible actions are listed in the following table.

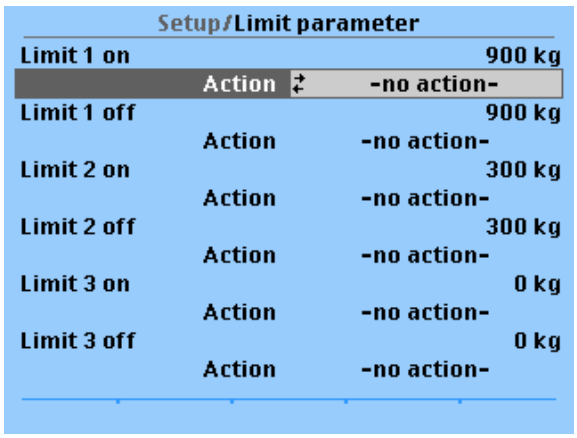
Selection list for the actions [Action]

Function	SPM Bit	Description
-no action-	---	no function
set marker 1	X64 = 1	Set marker 1
set marker 2	X65 = 1	Set marker 2
set marker 3	X66 = 1	Set marker 3
clr marker 1	X64 = 0	Clear marker 1
clr marker 2	X65 = 0	Clear marker 2
clr marker 3	X66 = 0	Clear marker 3

Note:

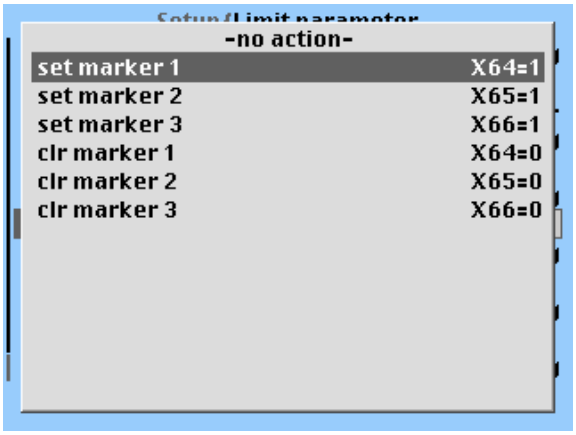
The limit values can be assigned to the outputs directly in the I/O parameters.

Markers can be set for all limits (in this case, see Example 2):



1. Highlight and confirm the action line of the appropriate limit using the cursor.

▷ A selection window opens.



2. Select and confirm the appropriate line to set the marker for the corresponding limit (in this case, Marker 1 is set when 900 g is exceeded).
3. If applicable, set additional markers and confirm.

7.17.7.3 Determining a condition

Additionally, a [Condition] can be assigned to the marker.

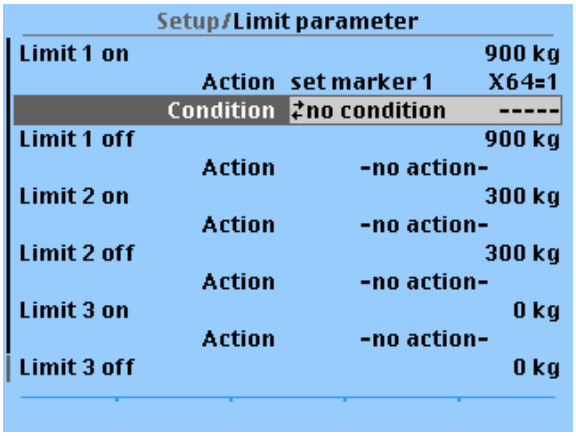
The possible conditions are listed in the following table.

Selection list for [conditions]

Function	SPM Bit	Description
no condition	---	No condition
actual diginp1	X00 = 0	digital input 1: not active
actual diginp2	X01 = 0	digital input 2: not active
actual diginp3	X02 = 0	digital input 3: not active
actual limit 1	X16 = 0	Limiting signal 1: not active
actual limit 2	X17 = 0	Limiting signal 2: not active
actual limit 3	X18 = 0	Limiting signal 3: not active
ADC error	X32 = 0	General error in weighing point: not active (no error)
above Max	X33 = 0	Weight above Max: not active
overload	X34 = 0	Weight above Max plus the 'overload' value: not active
below zero	X35 = 0	Weight not below zero
center zero	X36 = 0	Weight not within ¼ d of zero
inside ZSR	X37 = 0	Weight not within zero-setting range
standstill	X38 = 0	Standstill not active
out	X39 = 0	Weight not below zero or above Max
command error	X48 = 0	For internal use only.
command busy	X49 = 0	For internal use only.

Function	SPM Bit	Description
power fail	X50 = 0	Set after power-on (=power failure): not active
test active	X56 = 0	Analog test was not started.
cal active	X57 = 0	For internal use only.
tare active	X58 = 0	Instrument is not tared.
marker bit 1	X64 = 0	Marker bit 1 not set, after power-on the markers are set to "0".
marker bit 2	X65 = 0	Marker bit 2 not set, after power-on the markers are set to "0".
marker bit 3	X66 = 0	Marker bit 3 not set, after power-on the markers are set to "0".
actual diginp1	X00 = 1	digital input 1: active
actual diginp2	X01 = 1	digital input 2: active
actual diginp3	X02 = 1	digital input 3: active
actual limit 1	X16 = 1	Limiting signal 1: active
actual limit 2	X17 = 1	Limiting signal 2: active
actual limit 3	X18 = 1	Limiting signal 3: active
ADC error	X32 = 1	General error in the weighing point
above Max	X33 = 1	Weight above Max
overload	X34 = 1	Weight above Max plus the 'overload' value
below zero	X35 = 1	Weight below zero
center zero	X36 = 1	Weight within ¼ d of zero
inside ZSR	X37 = 1	Weight within zero-setting range
standstill	X38 = 1	Standstill is active
out	X39 = 1	Weight below zero or above Max
command error	X48 = 1	For internal use only.
command busy	X49 = 1	For internal use only.
power fail	X50 = 1	Set after power-on (=power failure)
test active	X56 = 1	Analog test was started.
cal active	X57 = 1	For internal use only.
tare active	X58 = 1	Instrument is tared.
marker bit 1	X64 = 1	Marker bit 1 set, after power-on the markers are set to "0".
marker bit 2	X65 = 1	Marker bit 2 set, after power-on the markers are set to "0".

Function	SPM Bit	Description
marker bit 3	X66 = 1	Marker bit 3 set, after power-on the markers are set to "0".



1. Highlight and confirm the condition line of the appropriate limit using the cursor.
   ▷ A selection window opens.

2. Select and confirm the appropriate line (here: Standstill is active).
3. If applicable, select additional conditions for the other limits and confirm.

7.17.7.4 Saving parameters

▶ Press the Exit softkey to exit the menu.

7.17.8 Configuring digital inputs

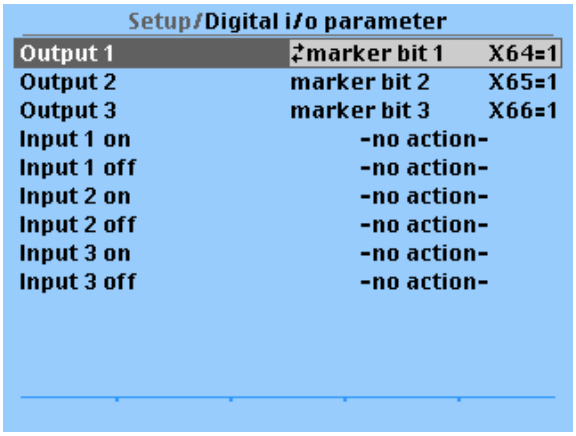
An action both for signal change from 0 to 1 (on) and from 1 to 0 (off) can be determined for each of the three inputs.

Digital inputs can be linked with conditions that must be met before an action can be started.

The parameters for the digital inputs are defined under Setup-[Digital i/o parameter].

Note:

This menu item is only available if under Setup-[Operating parameter]- [Application] "Standard" has been selected.



For the configuration the following order must be followed:

1. Defining an action
2. Determining a condition
3. Saving parameters

7.17.8.1 Defining an action

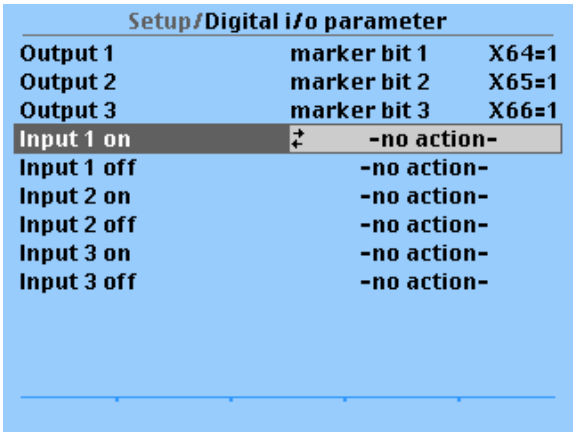
The possible actions are listed in the following table.

Selection list for actions of the inputs [Input 1/2/3 on/off]

Function	SPM Bit	Description
-no action-	---	no function
set marker 1	X64 = 1	Set marker 1
set marker 2	X65 = 1	Set marker 2
set marker 3	X66 = 1	Set marker 3
select net	X72 = 1	Select net
set zero	X112 = 1	Set zero
set tare	X113 = 1	Set tare
reset tare	X114 = 1	Reset tare
set test	X115 = 1	Activate the analog test
reset test	X116 = 1	Finish the analog test
reset PWF	X117 = 1	Reset power fail
set fixtare	X118 = 1	Set fixtare (use the value in address D31 as a tare value)
get fixtare	X119 = 1	Save gross value as fixtare in address D31
clr marker 1	X64 = 0	Clear marker 1

Function	SPM Bit	Description
clr marker 2	X65 = 0	Clear marker 2
clr marker 3	X66 = 0	Clear marker 3
select gross	X72 = 0	Save the gross weight in address D11

Actions can be selected (bits set) for all digital inputs (see table).

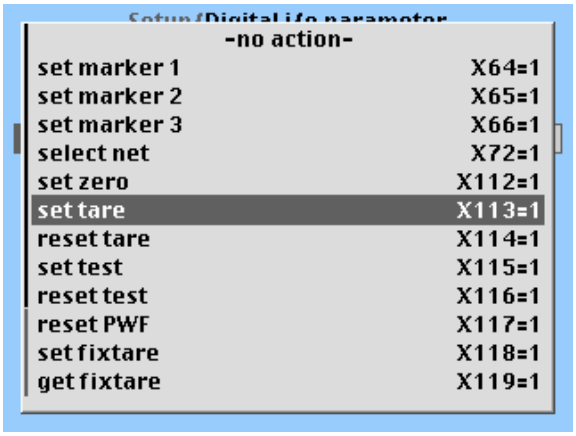


1. Select the appropriate line using the cursor (here: Input 1 on) and confirm.

   Define the action for the rising edge of Input 1 (in this case: When the input signal changes from 0 to 1, a tare command is generated).

   Accordingly, an action for the falling edge can be determined.

   ▷ A selection window opens.

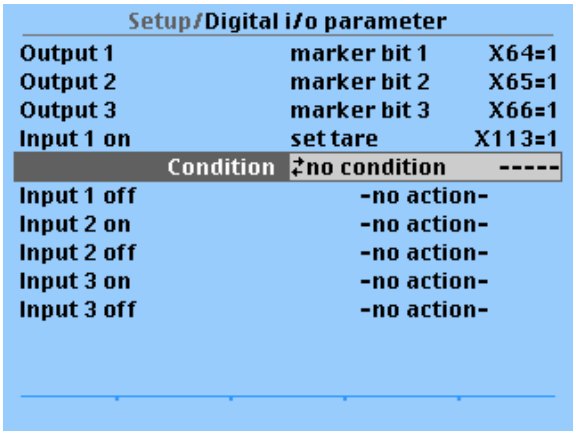


2. Select and confirm the appropriate line.
3. If applicable, select additional actions (setting bits) and confirm.

7.17.8.2 Determining a condition

The selected action of each digital input can be combined with a condition that must be met for signal change from 0 to 1 (on) or for signal change from 1 to 0 (off). The condition is selected from the list in Chapter 7.17.7.3.

No condition is defined when selecting [no condition]. The action is executed directly.



1. Select and confirm the condition line of the appropriate parameter.
   ▷ A selection window opens.

2. Select and confirm the appropriate line (here: If input 1 changes from 0 to 1 [Input 1 on], a taring signal is triggered only, if the condition under [Condition] is met (limit 1 out = active).
3. If applicable, select additional conditions for the other parameter and confirm.

7.17.8.3 Saving parameters

▶ Press the Exit softkey to exit the menu.

7.17.9 Configuring digital outputs

Configure the required function for [Output 1] to [Output 3] by selecting a signal from the list.

The output is set to the corresponding state.

Selection list for output functions

Function	SPM Bit	Description
no condition	---	No condition
actual diginp1	X00 = 0	digital input 1: not active
actual diginp2	X01 = 0	digital input 2: not active
actual diginp3	X02 = 0	digital input 3: not active

Function	SPM Bit	Description
limit 1 out	X16 = 0	Limiting signal 1: not active
limit 2 out	X17 = 0	Limiting signal 2: not active
limit 3 out	X18 = 0	Limiting signal 3: not active
ADC error	X32 = 0	General error in weighing point: not active (no error)
above Max	X33 = 0	Weight above Max: not active
overload	X34 = 0	Weight above Max plus the 'overload' value: not active
below zero	X35 = 0	Weight not below zero
center zero	X36 = 0	Weight not within ¼ d of zero
inside ZSR	X37 = 0	Weight not within zero-setting range
standstill	X38 = 0	Standstill not active
out	X39 = 0	Weight not below zero or above Max
command error	X48 = 0	For internal use only.
command busy	X49 = 0	For internal use only.
power fail	X50 = 0	Set after power-on (=power failure): not active
test active	X56 = 0	Analog test was not started.
cal active	X57 = 0	For internal use only.
tare active	X58 = 0	Instrument is not tared.
marker bit 1	X64 = 0	Marker bit 1 not set, after power-on the markers are set to "0".
marker bit 2	X65 = 0	Marker bit 2 not set, after power-on the markers are set to "0".
marker bit 3	X66 = 0	Marker bit 3 not set, after power-on the markers are set to "0".
actual diginp1	X00 = 1	digital input 1: active
actual diginp2	X01 = 1	digital input 2: active
actual diginp3	X02 = 1	digital input 3: active
limit 1 out	X16 = 1	Limiting signal 1: active
limit 2 out	X17 = 1	Limiting signal 2: active
limit 3 out	X18 = 1	Limiting signal 3: active
ADC error	X32 = 1	General error in the weighing point
above Max	X33 = 1	Weight above Max
overload	X34 = 1	Weight above Max plus the 'overload' value
below zero	X35 = 1	Weight below zero

Function	SPM Bit	Description
center zero	X36 = 1	Weight within ¼ d of zero
inside ZSR	X37 = 1	Weight within zero-setting range
standstill	X38 = 1	Standstill is active
out	X39 = 1	Weight below zero or above Max
command error	X48 = 1	For internal use only.
command busy	X49 = 1	For internal use only.
power fail	X50 = 1	Set after power-on (=power failure)
test active	X56 = 1	Analog test was started.
cal active	X57 = 1	For internal use only.
tare active	X58 = 1	Instrument is tared.
marker bit 1	X64 = 1	Marker bit 1 set, after power-on the markers are set to "0".
marker bit 2	X65 = 1	Marker bit 2 set, after power-on the markers are set to "0".
marker bit 3	X66 = 1	Marker bit 3 set, after power-on the markers are set to "0".

Example: [overload] function

SPM Bit [X34 = 1]

Function and output are active (e.g.: if 'overload' is reached, a lamp is lit).

SPM Bit [X34 = 0]

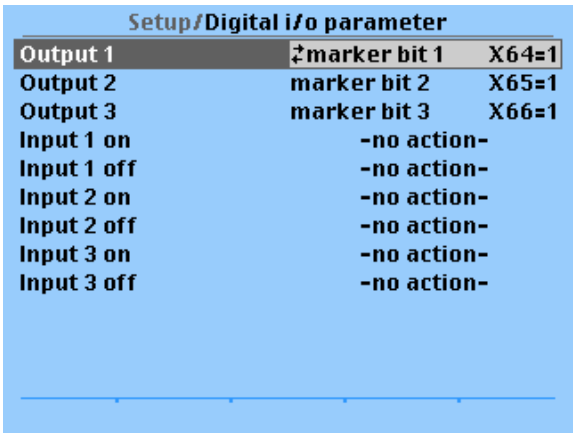
Function is active and output is not active (e.g.: if "overload" is reached, a lamp goes out).

The parameters for the digital outputs are defined under Setup-[Digital i/o parameter].

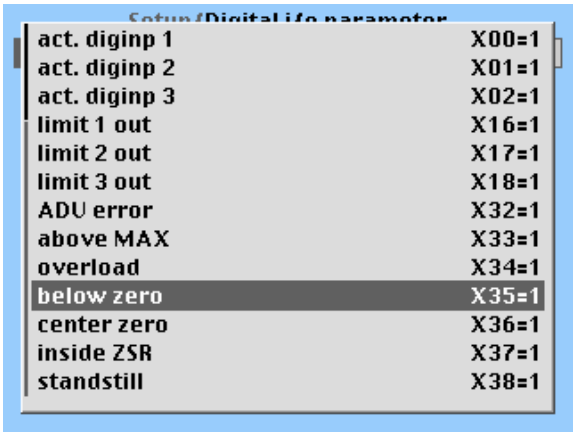
Note:

This menu item is only available if under Setup-[Operating parameter]- [Application] "Standard" has been selected.

Example:



1. Select [Output 1] and confirm.
   ▷ A selection window opens.



   The output 1 [Output 1] is true (active), when the weight value drops below zero (X35=1).

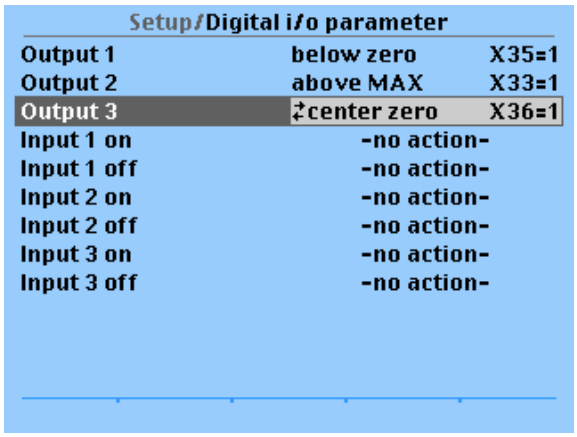
2. Select [below zero] and confirm.
3. Select [Output 2] and confirm.
   ▷ A selection window opens.

   Output 2 [Output 2] remains (active), as long as the weight is not above Max (X33=0).

4. Select [above MAX] and confirm.
5. Select [Output 3] and confirm.
   ▷ A selection window opens.

Output 3 [Output 3] is true (active), when the weight is zero ±¼ d (X36=1).

6. Select [center zero] and confirm.
   ▷ The menu opens.



7. Press Exit to exit the menu and save.

7.17.9.1 Configuring the BCD output

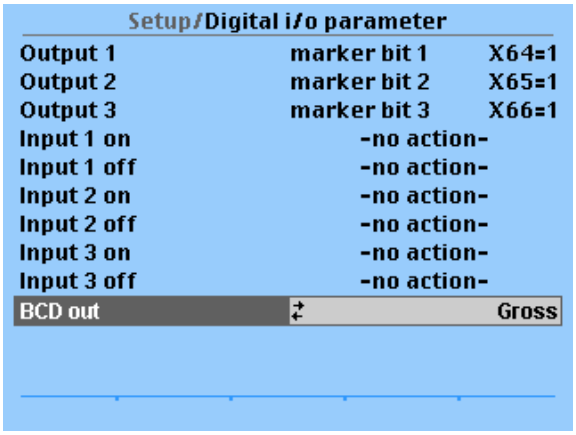
Requirements:

A BCD card is installed.

The parameters for the BCD output are defined under Setup-[Digital i/o parameter].

Note:

This menu item is only available if under Setup-[Operating parameter]- [Application] "Standard" has been selected.



[BCD out]

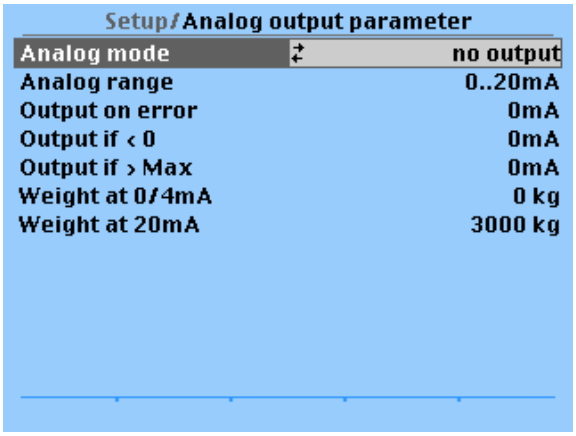
Output as BCD with max. 5 decades plus preceding sign and state

Selection: Gross, Net if tared (net weight if tared, otherwise gross weight), Selected (gross or net weight depending on SPM bit X72), Transparent (value in D20 is output as BCD)

7.17.10 Configuring analog output

The weight value of the weighing point is transmitted to the output.

Define the parameters for the analog output under Setup-[Analog output parameter].



The analog output can be configured according to the table below.

Parameter table

Menu item	Selection	Description
[Analog mode]	[no output]	Analog output is unused.
	[Gross D08]	Output of the gross weight.
	[Net if tared D09]	Output of the net weight, if tared; otherwise gross weight
	[Selected D11]	Output of the gross/net value on the display, dependent on SPM bit X72.
	[Transparent D30]	Output of the value in D30
[Analog range]	[0...20 mA]	Output of 0...20 mA.
	[4...20 mA]	Output of 4...20 mA.

Menu item	Selection	Description
[Output on error]	[0 mA]	Set output to 0 mA.
	[4 mA]	Set output to 4 mA.
	[20 mA]	Set output to 20 mA.
	[hold]	The last output value is held.
[Output if < 0]	[0 mA]	Set output to 0 mA.
	[4 mA]	Set output to 4 mA.
	[20 mA]	Set output to 20 mA.
	[linear]	The output drops below 4 mA down to the limit (at 4...20 mA).
[Output if > Max]	[0 mA]	Set output to 0 mA.
	[4 mA]	Set output to 4 mA.
	[20 mA]	Set output to 20 mA.
	[linear]	Output increases above 20 mA until the limit is reached.
[Weight at 0/4 mA]		Weight value for 0/4 mA output.
[Weight at 20 mA]		Weight value for 20 mA output.

Quit the menu and save parameters by pressing Exit.

Note:

Adapting the analog output, see Chapter 9.1.4.1.

7.18 System information

This menu displays system information.

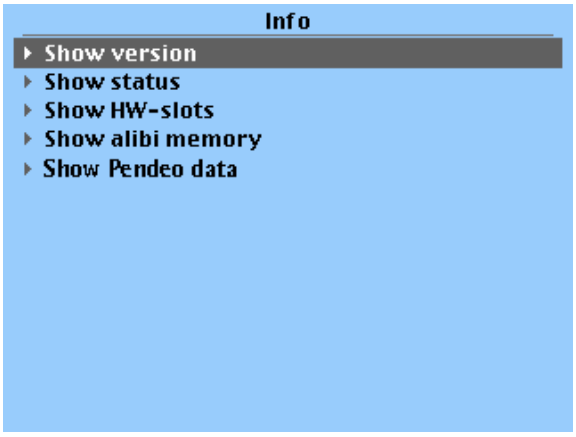
You can also check inputs and outputs, see Chapter 9.1.4.2.

▶ Press Info to access the menu.

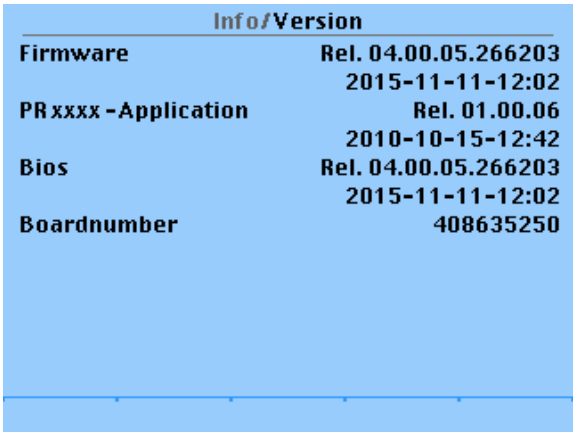
Note:

Info also has other functions; see Chapters 7.14.2.2 and 7.14.10.

7.18.1 Displaying the version



1. Confirm [Show version].



▷ This line shows the following information:

[Firmware]

Version number and firmware creation date

[PRxxxx-Application]

Version number and application creation date

[BIOS]

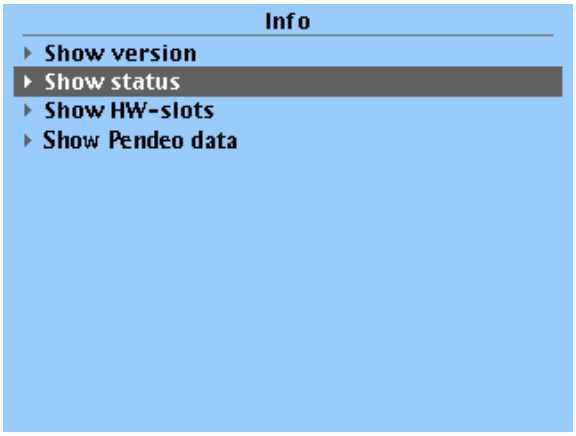
Version number and BIOS creation date

[Board number]

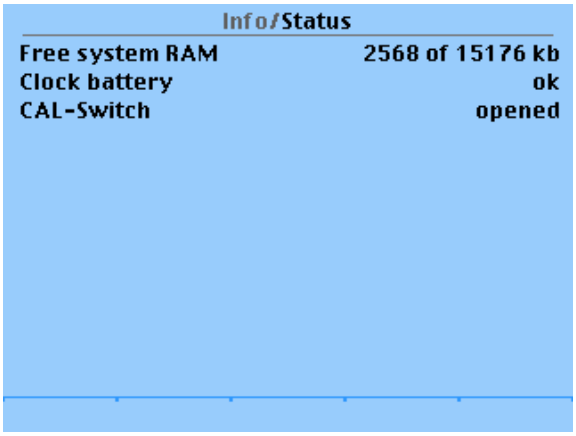
Nine-digit board number

2. Press Exit to return to the previous window.

7.18.2 Displaying the status



1. Select [Show status].



▷ This line shows the following device statuses:

[Free system RAM]

Free working system memory space

[Clock battery]

Status display

ok = voltage OK

low = voltage too low

[CAL switch]

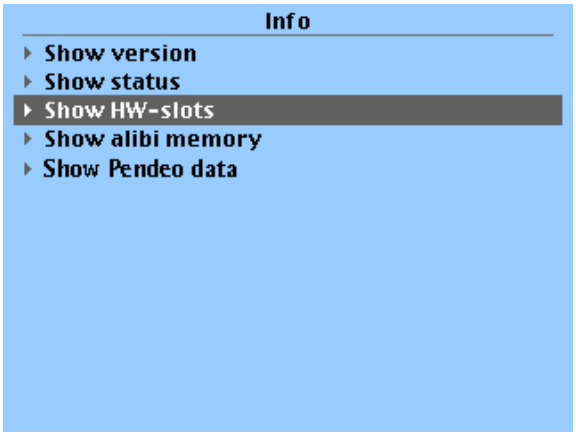
Status display

[opened] = opened, no write protection.

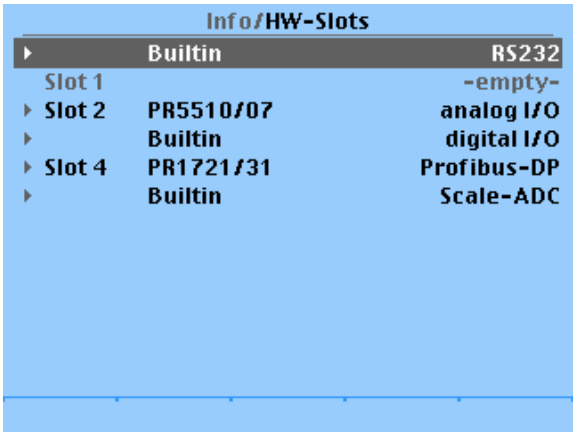
[closed] = closed, write protection is active.

2. Press Exit to return to the previous window.

7.18.3 Showing hardware options



1. Select [Show HW-slots] and confirm.



▷ This line shows the following device statuses:

1st line

Standard interface, serial

2nd line

In this case: Slot 1, not in use

3rd line

In this case: Slot 2, analog inputs and outputs

4th line

Standard interface, digital I/Os

5th line

In this case: Slot 4, ProfiBus-DP interface

The tool tip displays the version number.

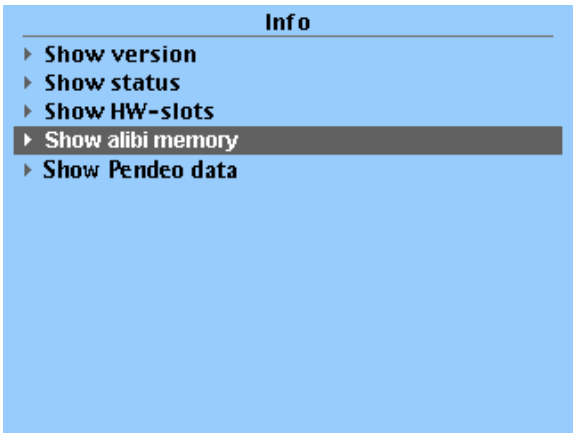
6th line

Standard interface, weighing electronics

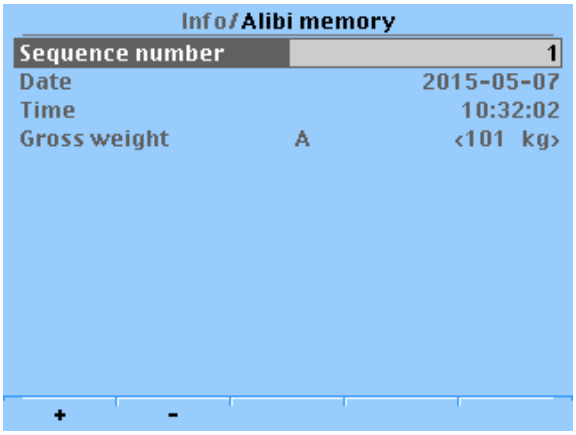
The tool tip displays the weighing point serial number and manufacturing date of the factory.

2. Press Exit to return to the previous window.

7.18.4 Displaying the alibi memory



1. Select [Show alibi memory].



▷ The following saved data records are displayed:

[Sequence number]

Last entry

[Date]

Date of the last entry

[Time]

Time of the last entry

[Gross weight]

Weight type of the last entry

[+/-]

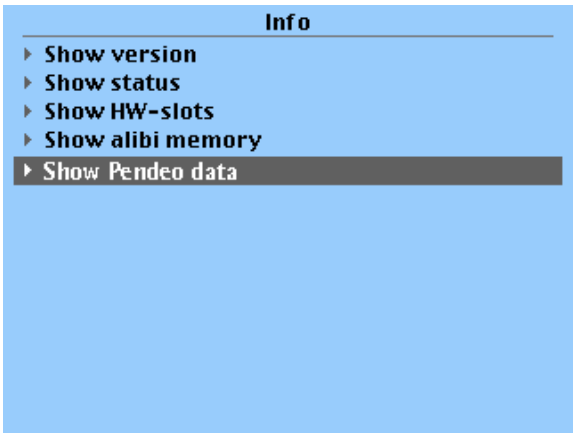
Select the next [+] or previous [-] entry.

Note:

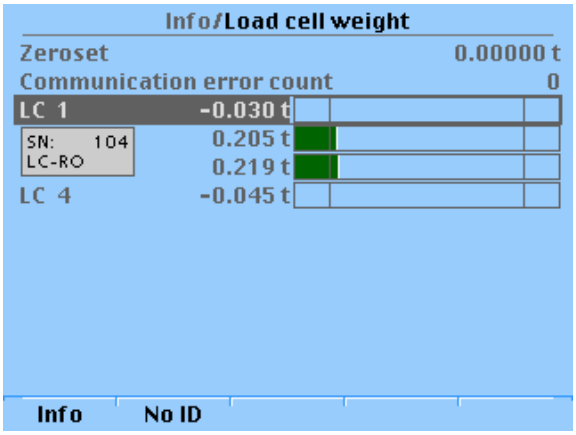
For more information, see Chapter 9.2.7.

2. Press Exit to return to the previous window.

7.18.5 Displaying Pendeo data



1. Select [Show Pendeo data] and confirm.



▷ An info window opens.

[Zero correction] (zero point correction)

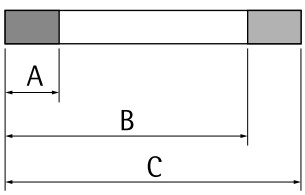
The zero point correction in use is displayed.

[Communication error count] (communication error counter)

The communication errors (time frames exceeded) for the load cells are counted here in ascending order and displayed.

[LC 1...n]

Bar graph display



The bar graph shows three areas:

A

dead load (can be changed by calibration)

B

Maximum capacity E_{max} (max. capacity of load cell) including dead load (load cell, cannot be changed)

C

Max. load including dead load (load cell, cannot be changed)

The colors have the following meanings:

Red

Weight value is above maximum load (overload) or below -¼d

Green

Weight value is within tolerances

Orange

Weight value is above maximum capacity E_{max} (max. capacity of load cell)

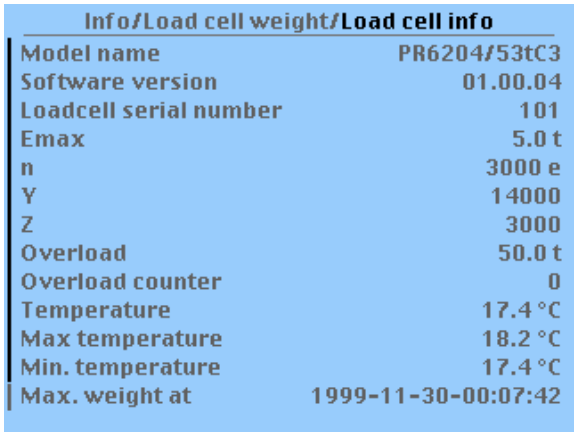
[No ID]

The Serial number is hidden.

[Show ID]

The Serial number is visible.

2. Select the desired load cell and press the [Info] softkey.
   ▷ The load cell data is displayed:



Display	Description
Model name	e.g.: PR6204/50tC3
Software version	Software version of the load cell
Load cell serial number	Serial number of the load cell
E_{max}	Maximum capacity
n	Max. resolution

Display	Description
Y	Minimum LC verification
Z	Minimum preload signal recurrence
Overload	Weight value above max. load
Overload counter	Number of weight values above max. load The higher the number, the higher the probability of a faulty load cell.
Temperature	Current measured temperature
Max. temperature	Max. measured temperature
Min. temperature	Min. measured temperature
Max. weight value at	Date and time display Time of largest load on load cells
Max. weight value	Display

3. Press Exit to return to the previous window.

8 Production

8.1 General notes

All filling functions are only supported by the "EasyFill" application.

NOTICE

Data is lost if the power is interrupted.

There are hard drives for 10 material data records available, which are retained after a power failure.

▶ It is important to save material data.

8.2 Configuration using the front-panel keys

The production parameters can be configured directly using the front-panel keys.

8.2.1 Configuring production mode using the front-panel keys

You can select between the following production modes:

- Net filling (B1)
- Net Discharge (B4)

Note:

See also Chapter 8.4.1.

1. Press Setup.

   ▷ `SEtuP` appears on the display.

2. Press OK.

   ▷ `Cd 000` appears on the display.

   The "Cd" calibration menu flashes.

3. Press ↓ multiple times to select "CA 150."
4. Press OK.

   ▷ `dModE` appears on the display.

5. Press OK.

   ▷ `nE.t` (Net filling, B1) appears on the display.

6. Press ↓ if necessary, to select "ne.t d.l." (net discharge, B4).
7. Press "Exit" to exit the Setup menu.

8.2.2 Configuring interaction mode using the front-panel keys

You can select between the following interaction modes:

- Remote control via OPC/ModBus and/or fieldbus
- VNC (Virtual Network Computing)
- Front-panel keys

Note:

See also Chapter 8.4.1.3.

1. Press Setup.
   ▷ `SEtuP` appears on the display.
2. Press OK.
   ▷ `Cd 000` appears on the display.
   The "Cd" calibration menu flashes.
3. Press ↓ multiple times to select "IM 151."
4. Press OK.
   ▷ `IModE` appears on the display.
5. Press OK.
   ▷ `???` appears on the display.
6. Press ↓ to select the desired mode.
7. Press "Exit" to exit the Setup menu.

8.2.3 Configuring digital inputs and outputs using the front-panel keys

Note:

See also Chapter 8.4.2.

Configuring digital inputs

1. Press Setup.
   ▷ `SEtuP` appears on the display.
2. Press OK.
   ▷ `Cd 000` appears on the display.
   The "Cd" calibration menu flashes.

3. Press ↓ multiple times to select "dI 174."
4. Press OK.

   ▷ `InP 1` appears on the display.

5. Press OK.

   ▷ `0001` appears on the display.

6. Press the cursor keys to enter the desired SPM address (see Chapter 13.4).
7. Press OK.

   ▷ `dI 175` appears on the display.

8. Press OK.

   ▷ `InP 2` appears on the display.

9. Press OK.

   ▷ `0001` appears on the display.

10. Press the cursor keys to enter the desired SPM address (see Chapter 13.4).
11. Press OK.

    ▷ `dI 176` appears on the display.

12. Press OK.

    ▷ `InP 3` appears on the display.

13. Press OK.

    ▷ `0001` appears on the display.

14. Press the cursor keys to enter the desired SPM address (see Chapter 13.4).
15. Press "Exit" to exit the Setup menu.

Configuring digital outputs

16. Press Setup.

    ▷ `SEtuP` appears on the display.

17. Press OK.

    ▷ `Cd 000` appears on the display.

    The "Cd" calibration menu flashes.

18. Press ↓ multiple times to select "do 170."
19. Press OK.

▷ `out 1` appears on the display.

20. Press OK.

▷ `0001` appears on the display.

21. Press the cursor keys to enter the desired SPM address (see Chapter 13.4).
22. Press OK.

▷ `do 171` appears on the display.

23. Press OK.

▷ `out 2` appears on the display.

24. Press OK.

▷ `0001` appears on the display.

25. Press the cursor keys to enter the desired SPM address (see Chapter 13.4).
26. Press OK.

▷ `do 172` appears on the display.

27. Press OK.

▷ `out 3` appears on the display.

28. Press OK.

▷ `0001` appears on the display.

29. Press the cursor keys to enter the desired SPM address (see Chapter 13.4).
30. Press "Exit" to exit the Setup menu.

8.2.4 Configuring printout using the front-panel keys

The printout can be configured using the front-panel keys.

Note:

See also Chapter 8.4.4.

1. Press Setup.

▷ `SEtuP` appears on the display.

2. Press OK.

▷ `Cd 000` appears on the display.

The "Cd" calibration menu flashes.

3. Press ↓ multiple times to select "PC 160."
4. Press OK.
   ▷ `nuMPrt` (number of printouts) appears on the display.
5. Press OK.
   ▷ `0000` appears on the display.
6. Press the cursor keys to enter the desired quantity.
7. Press OK.
   ▷ `SAVE` appears on the display.
8. Press OK.
   ▷ `YES` appears on the display.
9. Press OK.
   ▷ `PC 160` appears on the display.
10. Press ↑ to select "PC 161."
11. Press OK.
    ▷ `SEQnr` (sequence number) appears on the display.
12. Press OK.
    ▷ `0000` appears on the display.
13. Press the cursor keys to enter the desired number.
14. Press OK.
    ▷ `SAVE` appears on the display.
15. Press OK.
    ▷ `YES` appears on the display.
16. Press OK.
    ▷ `PC 161` appears on the display.
17. Press ↑ to select "PC 162."
18. Press OK.
    ▷ `PrtMod` (printing mode) appears on the display.

    LAyout = appl. layout or nICELb = NiceLabelExpress
19. Press OK.

▷ `LAYout` (application layout) appears on the display.

20. Press ↓ if necessary, to select "nICELb" (NiceLabelExpress).
21. Press OK.

▷ `PC 162` appears on the display.

22. Press ↑ to select "PC 163."
23. Press OK.

▷ `Layou 1` (line 1) appears on the display.

24. Press OK.

▷ `nEt` appears on the display.

You can choose from the following:

nEt = net weight, GroSS = gross weight, MAtnAM = material name, nonE = no printout, FF = formfeed, SEq = sequence number, dAtE = date and time, SEtP = set point, tArE = tare weight, nL = CR/LF (carriage return and line feed)

25. Press the cursor keys to select the desired option.
26. Press OK.

▷ `PC 164` appears on the display.

27. Press OK.

▷ `Layou 2` appears on the display.

For "PC 164"..."PC168" (Layou 2...6), follow the same instructions given for "PC 163."

28. Press OK.

▷ `SAVE` appears on the display.

29. Press OK.

▷ `YES` appears on the display.

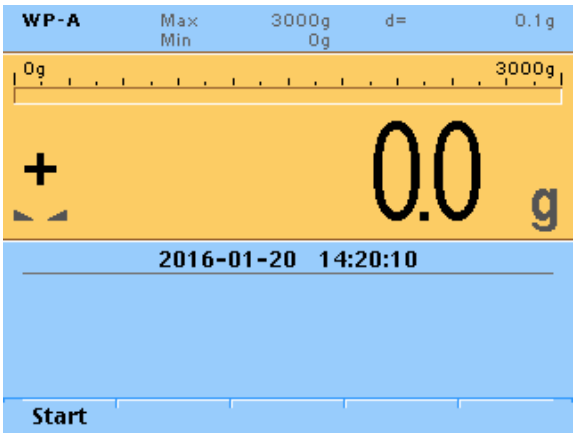
30. Press OK.
31. Press "Exit" to exit the Setup menu.

8.3 Starting the application

Requirements:

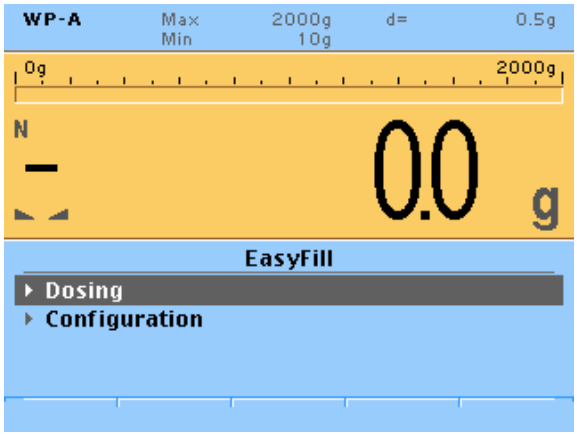
- The "EasyFill" application has been selected; see Chapter 7.17.3.

Procedure:



▶ Press the [Start] softkey.

▷ The menu opens.

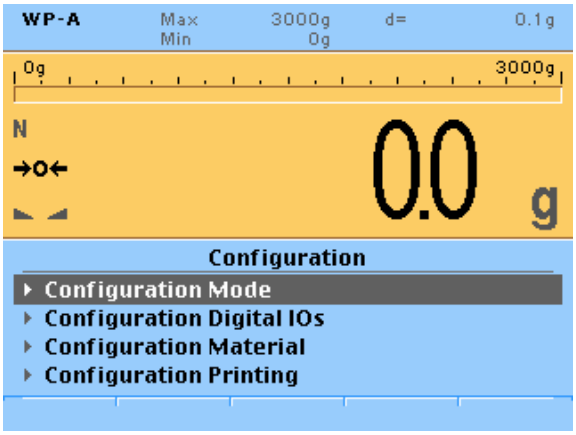


8.4 Configuration via a notebook/PC

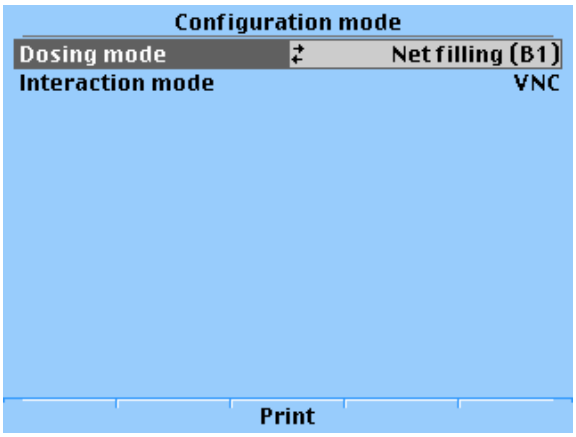
8.4.1 Configuring production mode

The following modes are configured under the [Configuration mode] menu item:

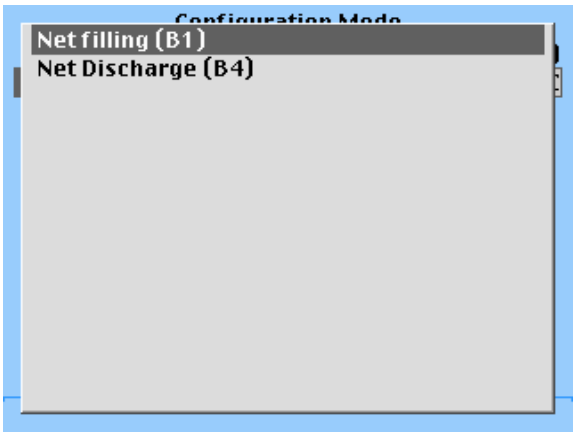
- Filling mode
- Interaction mode



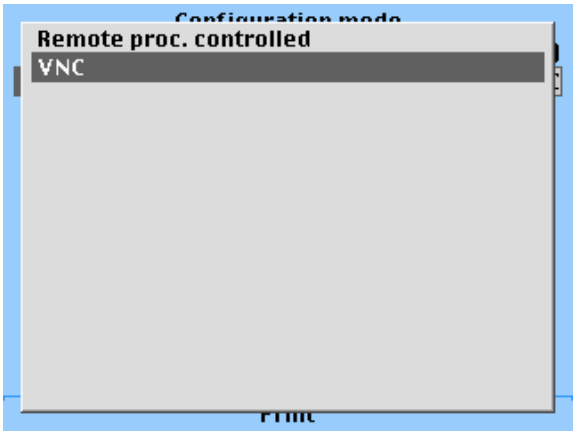
1. Select [Configuration mode] and confirm.



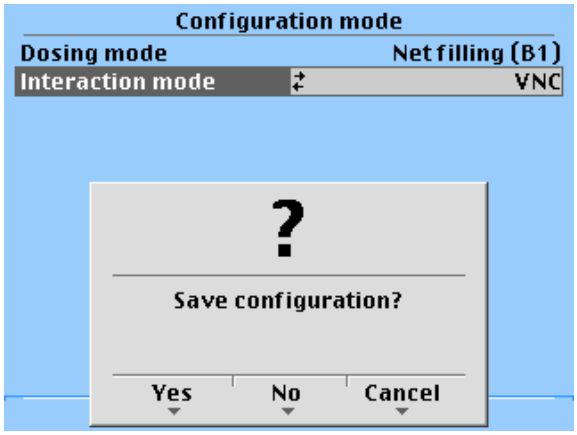
2. Select [Dosing mode] and confirm.
   ▷ A selection window opens.



3. Select the desired filling mode (see Chapters 8.4.1.1 and 8.4.1.2) and confirm.
4. Select [Interaction mode] and confirm.



5. Select the desired interaction mode (see Chapter 8.4.1.3) and confirm.
6. Press Exit to exit the menu.
   ▷ A prompt window opens.



7. Press the [Yes] softkey to save the changes.

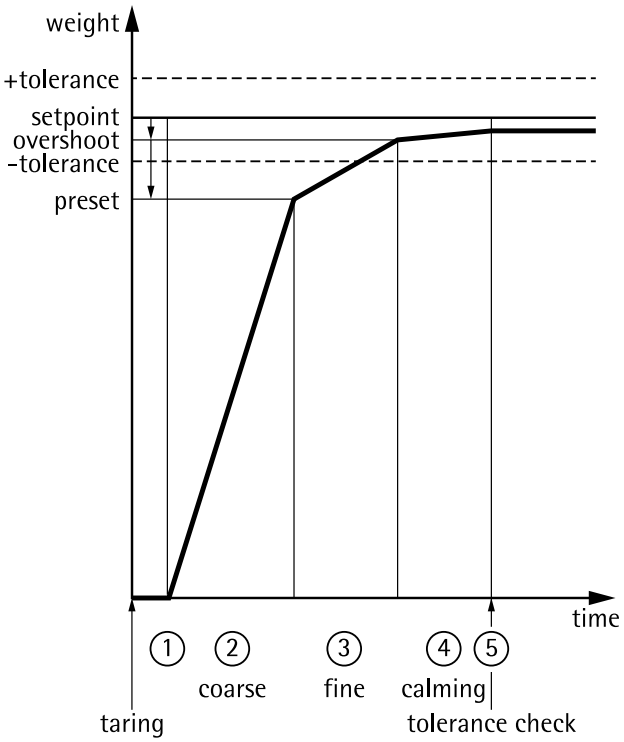
8.4.1.1 Net filling (B1)

The scale is tared and then the amount listed in the process line is automatically added (coarse/fine).

A fixed overshoot value is configured.

Net = gross - tare

Sequence of [net filling] with filling signals "coarse/fine"



① Taring:
The current gross weight is saved as the tare and the net weight starts at zero.

② Coarse:
A coarse flow (coarse and fine) is batched until the preset value is reached.

③ Fine:
A fine flow is batched until the switch-off point (overshoot) is reached.

④ Calming:
Time to wait during which the overshoot is effective and scale vibrations may settle.

⑤ Tolerance checking:
The weight is determined and checked against the tolerance values.

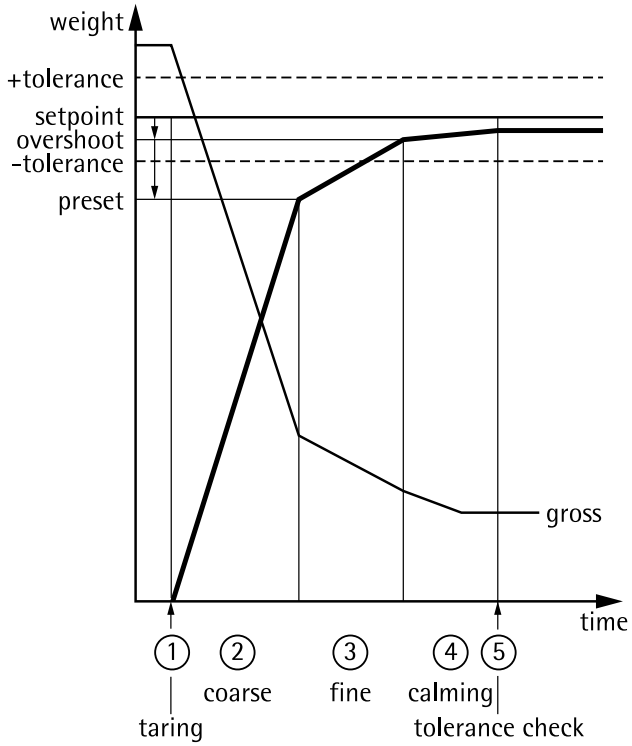
8.4.1.2 Net decrease (B4)

The scale is automatically discharged up to the specified value. The other parameters and the process correspond to the [Net filling] mode; see Chapter 8.4.1.1.

Net = gross - tare

Tare = gross

Sequence of [Net decrease] with dosing signals "coarse/fine"



① Taring:
The current gross weight is saved as the tare and the net weight starts at zero.

② Coarse:
A coarse flow (coarse and fine) is batched until the preset value is reached.

③ Fine:
A fine flow is batched until the switch-off point (overshoot) is reached.

④ Calming:
Time to wait during which the overshoot is effective and scale vibrations may settle.

⑤ Tolerance checking:
The weight is determined and checked against the tolerance values.

8.4.1.3 Interaction mode

You can choose between the following control/operating modes of the device in production:

- [Remote proc. control] via OPC/ModBus and/or fieldbus
- [VNC] (Virtual Network Computing)
- [Front keys]

The following table shows how individual modes are locked when production starts.

Starting production

Mode	Front panel	VNC	Remote control OPC/ModBus	Remote control fieldbus	Digital inputs	Digital outputs
[Remote proc. control]			✗	✗	✗	✗
[VNC]		✗				✗
[Front keys]	✗					✗

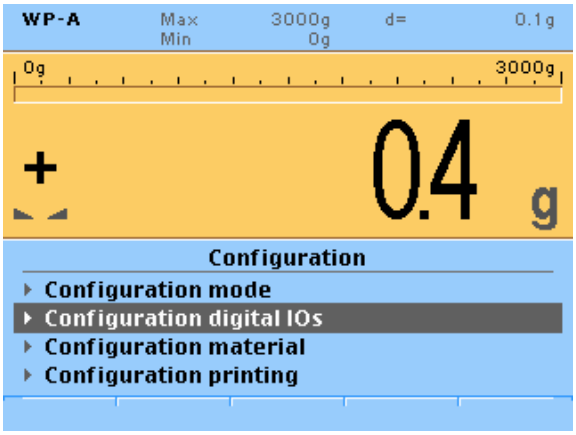
8.4.2 Configuring digital inputs and outputs

SPM addresses are assigned to the digital inputs and outputs under the [Configuration digital IOs] menu item.

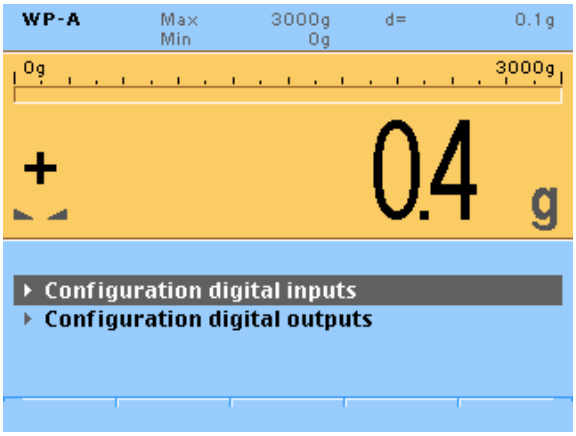
Note:

The selected SPM address must be unique within the system.

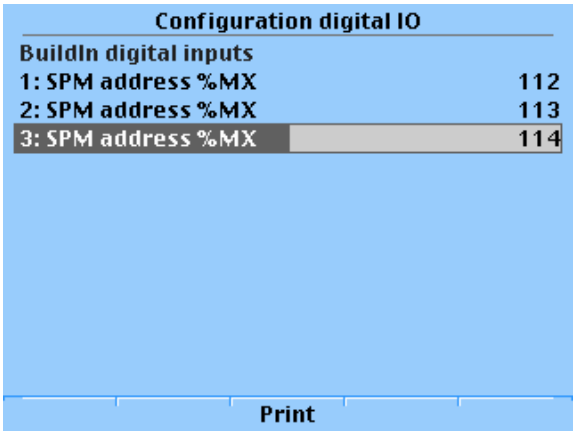
The SPM addresses for the input and outputs are unchanged after a restart.



1. Select [Configuration digital IOs] and confirm.



2. Select [Configuration digital inputs] and confirm.
   ▷ The following window opens:

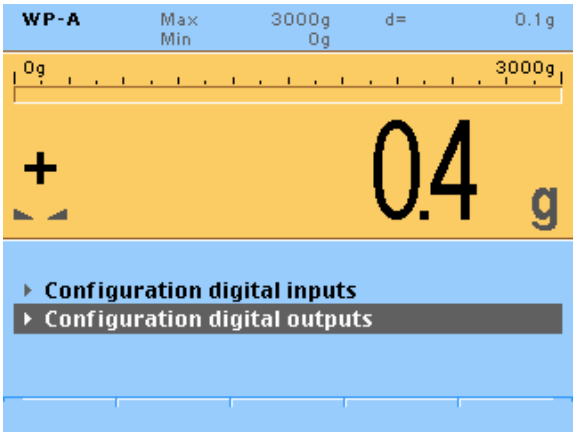


3. Select inputs 1...3. Use the keypad to enter and confirm a corresponding SPM address %MXxxx (see Chapter 13.4).

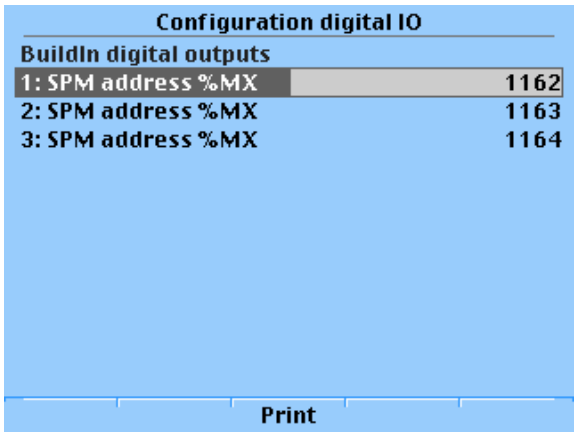
Note:

The SPM address %MX for an unused digital input = 0.

4. Press Exit to exit the window and to save the changes.



5. Select [Configuration digital outputs] and confirm.



▷

6. Select outputs 1...3. Use the keypad to enter and confirm a corresponding SPM address %MXxxx (see Chapter 13.4).

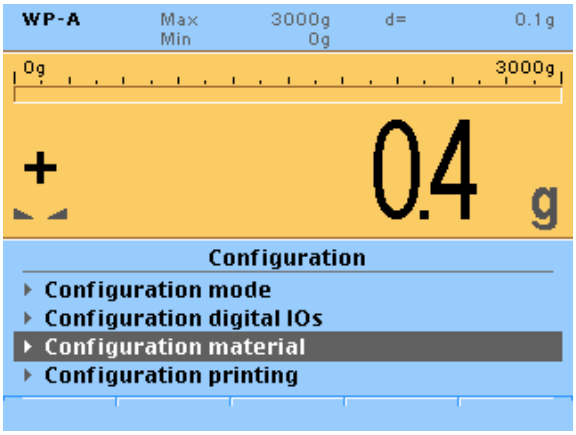
Note:

The SPM address %MX for an unused digital output = 0.

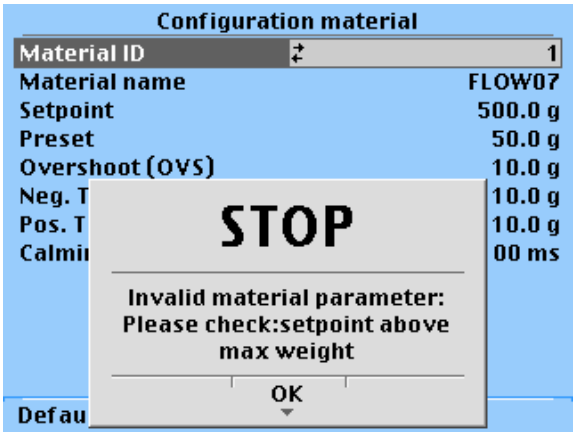
7. Press Exit to exit the window and to save the changes.

8.4.3 Configuring material

The materials (products) 1...10 are configured under the [Configuration material] menu item.

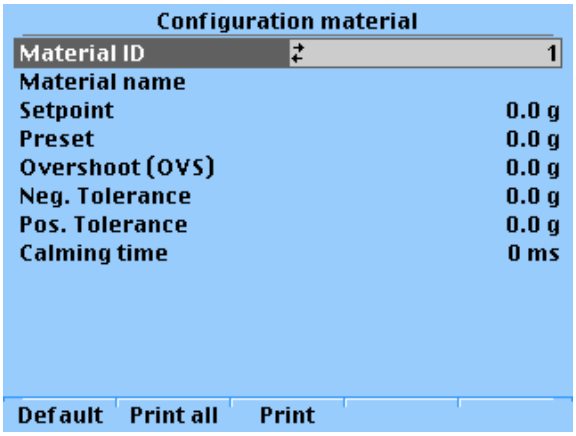


1. Select [Configuration material] and confirm.
   ▷ The configuration window appears.



   An error message appears if the parameters for the selected material do not match the parameters of the current calibration.

2. Press the [OK] softkey.
3. Press the [Default] softkey.
   ▷ All values are reset.



4. Enter the material name and values using the keypad and confirm.

[Material ID]

Material identification 1...10

[Material name]

Input: Material name, max. 18 alphanumeric characters

[Set point]

Input: Set point

[Preset]

Input: Preset point for switching from coarse flow to fine flow

[Overshoot (OVS)]

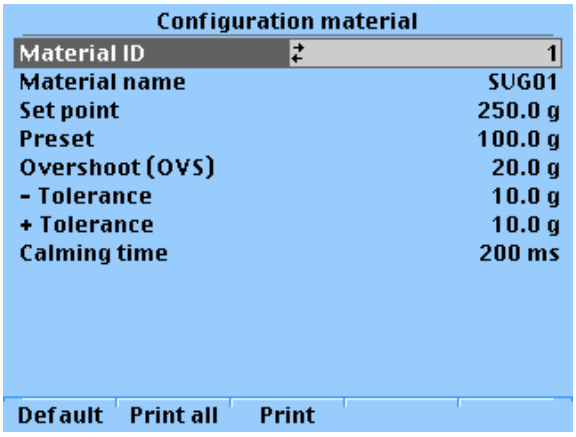
Input: Material overshoot

[+/- tolerance]

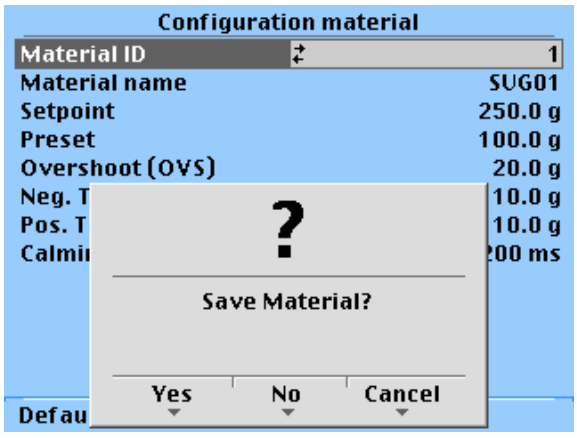
Input: Tolerance above/below set point

[Calming time]

Input: Calming time



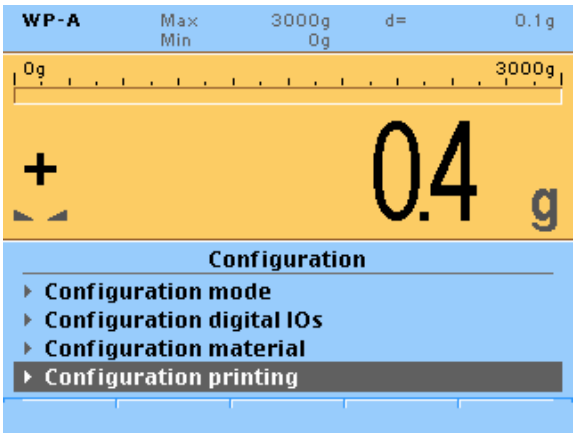
5. Configure additional materials if necessary.
6. Use the [Print all] or [Print] softkeys to print the configuration for the 10 materials or for the selected material.
7. Press Exit to exit the window.
   ▷ A prompt window opens.



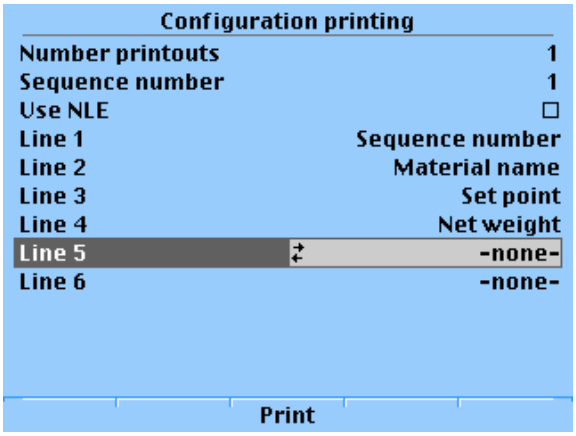
8. Press the [Yes] softkey to save the changes.

8.4.4 Configuring printout

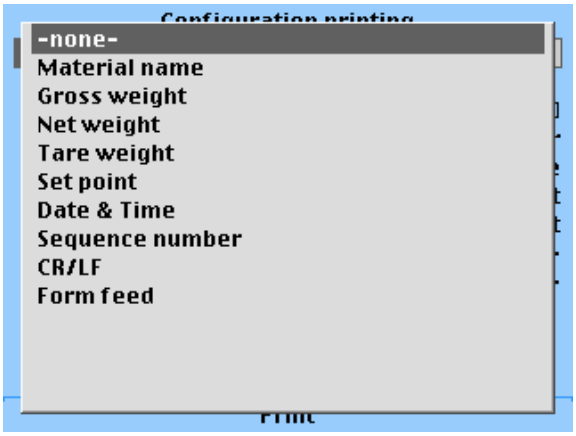
The printout is configured under the [Configuration printing] menu item.



1. Select [Configuration printing] and confirm.
   ▷ The configuration window appears.

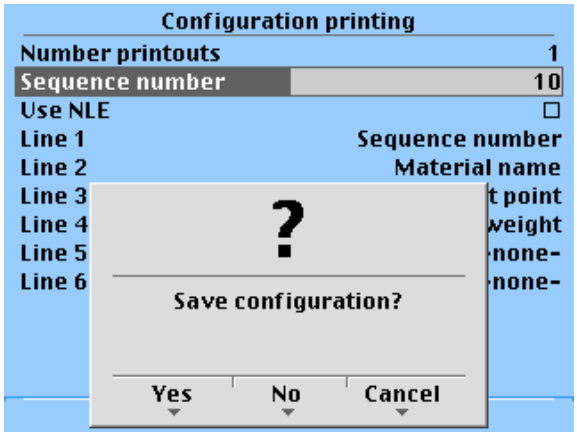


2. Select [Number printouts], enter the number of printouts between 1...10, and confirm.
3. Select [Sequence number], change the sequence number if necessary, and confirm.
4. Select [Use NLE]. Check the ☑ box to activate printing with NiceLabelExpress.
5. Select [Line 1]...[Line 6] and confirm.
   ▷ A selection window opens.



Selection: -none- (no printout; selected if fewer than 6 elements will be printed), Material name, Gross weight, Net weight, Tare weight, Set point, Date & Time (printed in format DD.MM.YYYY HH:MM:SS), Sequence number (counter for individual print orders, max. 6 digits, #000001 comes after #999999), CR/LF (carriage return and line feed), Form feed

6. Confirm selection.
7. Press the [Print] softkey to print out the configuration if necessary.
8. Press Exit to exit the window.
   ▷ A prompt window opens.



9. Press the [Yes] softkey to save the changes.

8.5 Filling

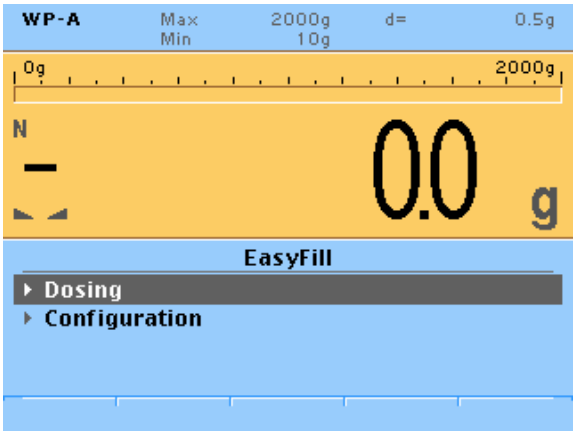
Requirements:

- Weighing point is calibrated.
- Production mode is configured; see Chapter 8.4.1.
- Digital inputs and outputs are configured (optional); see Chapter 8.4.2.
- Material (product) is configured; see Chapter 8.4.3.
- Printout is configured (optional); see Chapter 8.4.4.

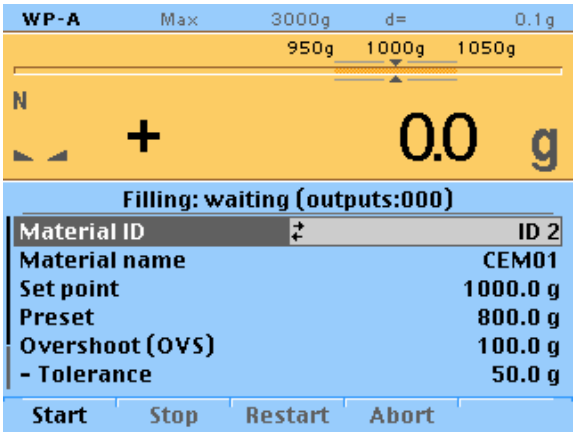
Example:

- Filling mode: Net filling (B1)
- Interaction mode: VNC
- Digital outputs 1, 2: SPM-Adresse %MX 1162 (coarse)/1163 (fine)
- Material ID: 2

Procedure:



1. Select [Dosing] and confirm.
   ▷ The production window appears.



2. Select material ID [ID 2].
3. Press the [Start] softkey.
   ▷ The material (product) is filled.

   Press the [Stop] softkey to stop the process.

   You can then press the [Restart] softkey to restart the process.
4. Once the set point is reached, the [Start] softkey can be pressed again.
5. Press Exit 2× to exit the application.

9 Extended functions

9.1 Hardware test

9.1.1 Display test

1. Press Setup.
2. Press N·B·T 2×.

   ▷ `dSP.tSt.` appears on the display.
3. Press OK.

   ▷ Operate all display elements.

   When no key has been pressed for 5 seconds, the test ends automatically.

   The device goes back to the weight display.

9.1.2 Front-panel key test

1. Press and hold Setup and also press Test.

   ▷ `0.0.0.0.0.0.`

   A number is displayed for each key. The number increases by 1 each time a key is pressed.
2. For example, press →0←.

   ▷ `0.0.0.1.0.0.` appears on the display.
3. For example, press →T and N·B·T at the same time.

   ▷ `-8023-` appears on the display.

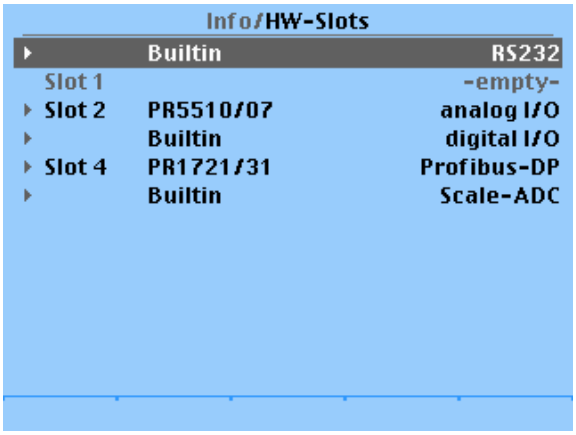
   When no key has been pressed for 5 seconds, the test ends automatically.

   The device goes back to the weight display.

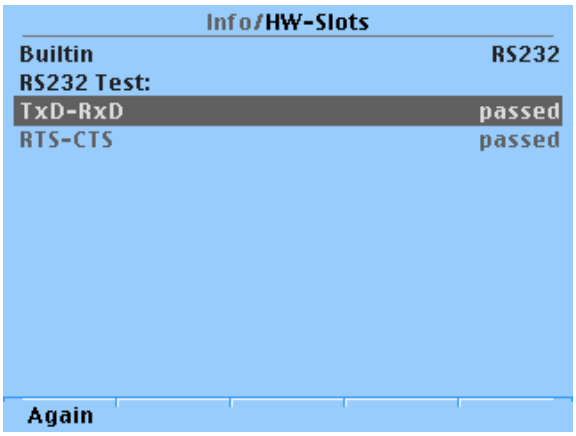
9.1.3 Serial interfaces

9.1.3.1 RS-232 interface

Open the menu with Info - [HW-Slots].



1. Plug the test connector (see Chapter 18.2) into the RS-232 interface.
2. Select the interface and confirm.
   ▷ The results are displayed:
   - passed = ok
   - failed (no data) = error

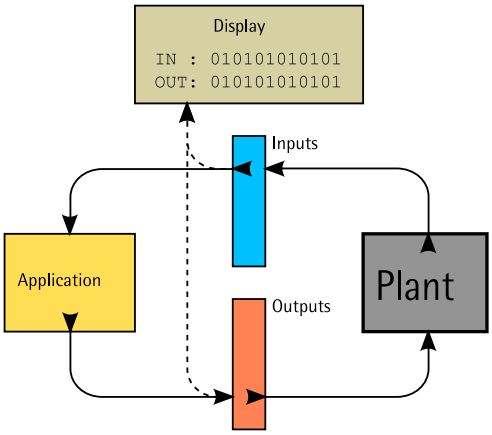
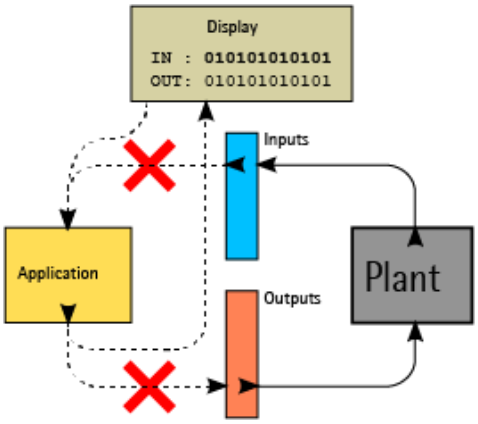
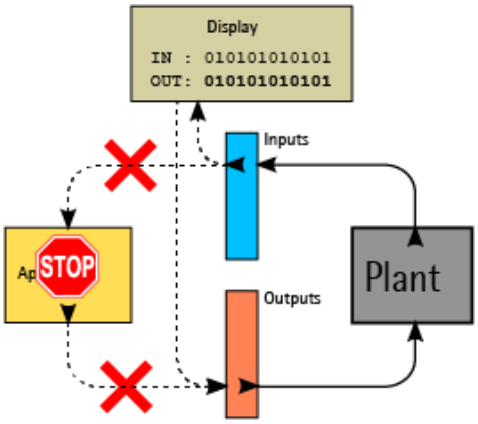


3. Press Exit to return to the previous window.

9.1.4 Inputs and outputs

There are different modes for testing the analog and digital inputs and outputs:

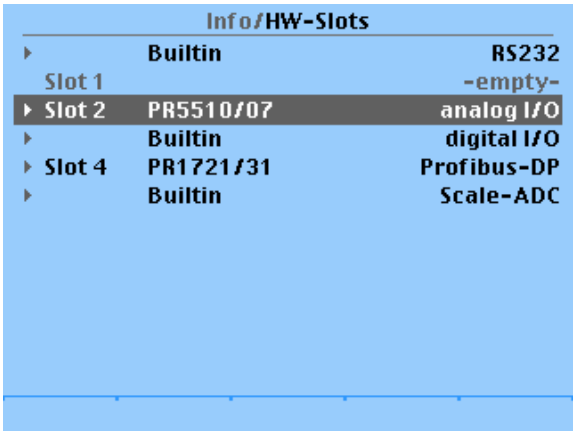
- Test mode "Monitor"
- Test mode "Internal"
- Test mode "External"

Test mode	Description
"Monitor" 	Active PLC: - The physical inputs of the system (plant) are directed to the PLC (application). - The physical outputs of the system (plant) are set by the PLC (application). - The physical inputs and outputs are displayed (display).
"Internal" 	Active PLC: - The entered input values are sent to the PLC (application). - The PLC output is displayed (display). - The physical inputs and outputs of the system (plant) are deactivated and passive (in secured condition).
"External" 	Deactivated PLC: - The physical inputs are displayed (display). - Output values can be entered. - The given output values are set on the physical outputs.

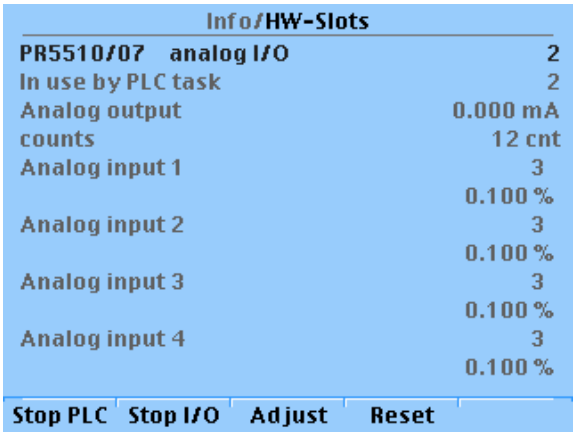
9.1.4.1 Adapting the analog output

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

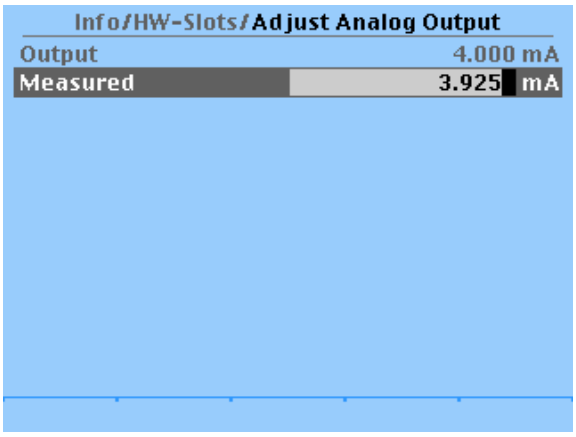
Open the menu with Info - [HW-Slots].



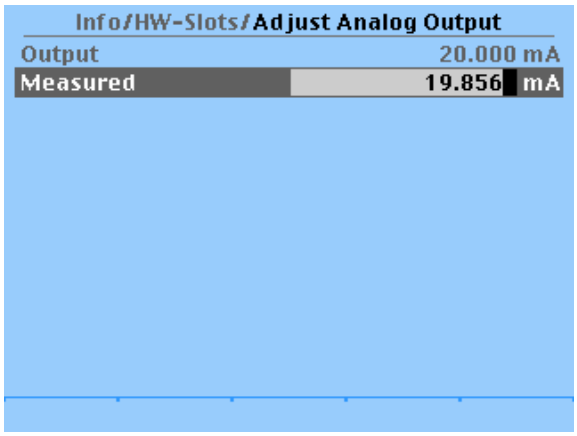
1. Select and confirm the analog output.



2. Press the [Adjust] softkey.
   ▷ The window for the 1st value opens.

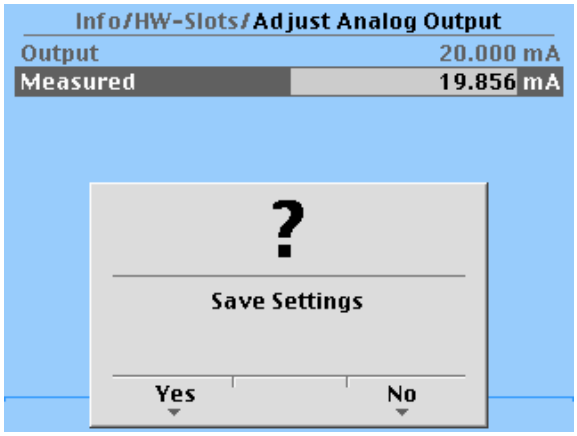


3. Enter and confirm e.g. the value for 4 mA measured by the connected PLC under [Measured].
   ▷ The window for the 2nd value opens.



4. Enter and confirm e.g. the value for 20 mA measured by the connected PLC under [Measured].

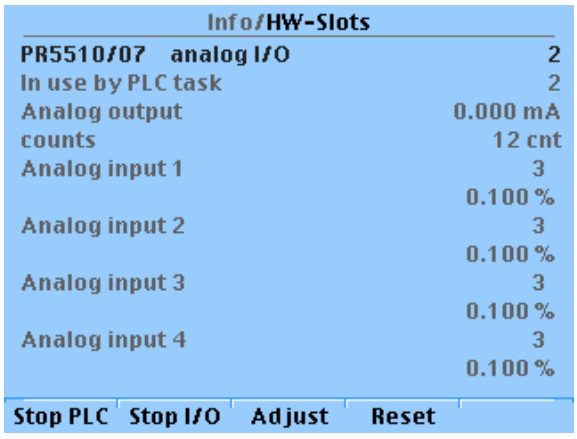
   ▷ A prompt window opens.



5. Press the [Yes] softkey to save the settings.

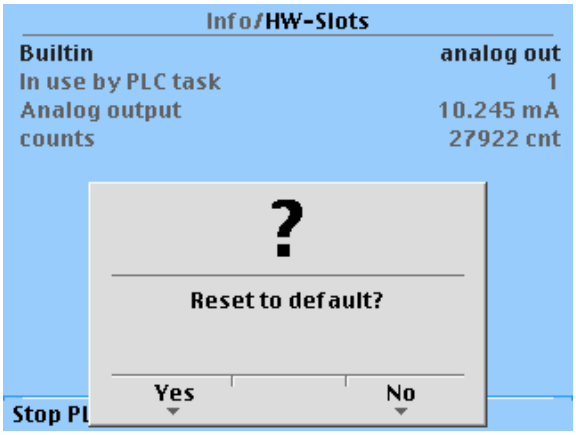
   If applicable, press the [No] softkey to keep the original values.

   ▷ The following window opens:



6. Press the [Reset] softkey to reset to the factory settings (4 mA and 20 mA).

▷ A prompt window opens.



7. Press the [Yes] softkey to reset to the factory settings.

   If applicable, press the [No] softkey to keep the entered values.

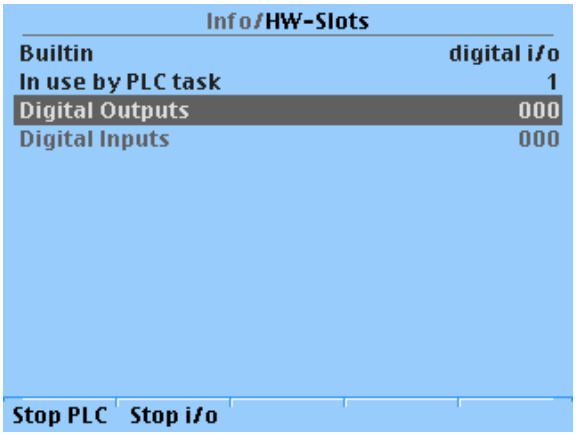
8. Press Exit to return to the previous window.

9.1.4.2 Digital inputs and outputs

Open the menu with Info - [HW-Slots].

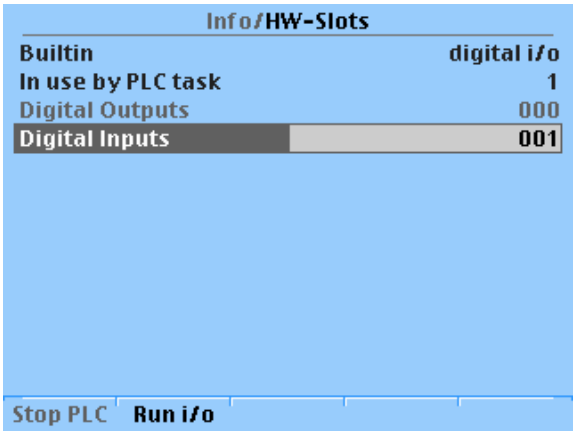
1. Select and confirm the appropriate line.

   ▷ The following window opens.



   The "Monitor" test mode is active.

2. Press the [Stop i/o] softkey.



3. Enter the input values using the keyboard and confirm.

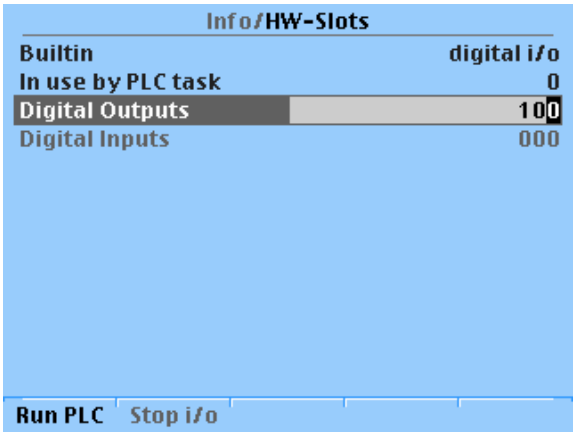
   Input: 0 and 1 (e.g.: 111; 001)

   ▷ An info window is shown briefly. The "Internal" test mode is active.

   The inputs are simulated to test the functionality of the PLC (application); see Chapter 9.1.4.

4. Press Exit to return to the previous window.
5. Press the [Stop PLC] softkey.

   An info window is shown briefly.



6. Enter the output values using the keyboard and confirm.

   Input: 0 and 1 (e.g.: 111; 100)

   ▷ An info window is shown briefly. The "External" test mode is active.

   The physical inputs and outputs (hardware) are tested without the involvement of the PLC (application) (see Chapter 9.1.4).

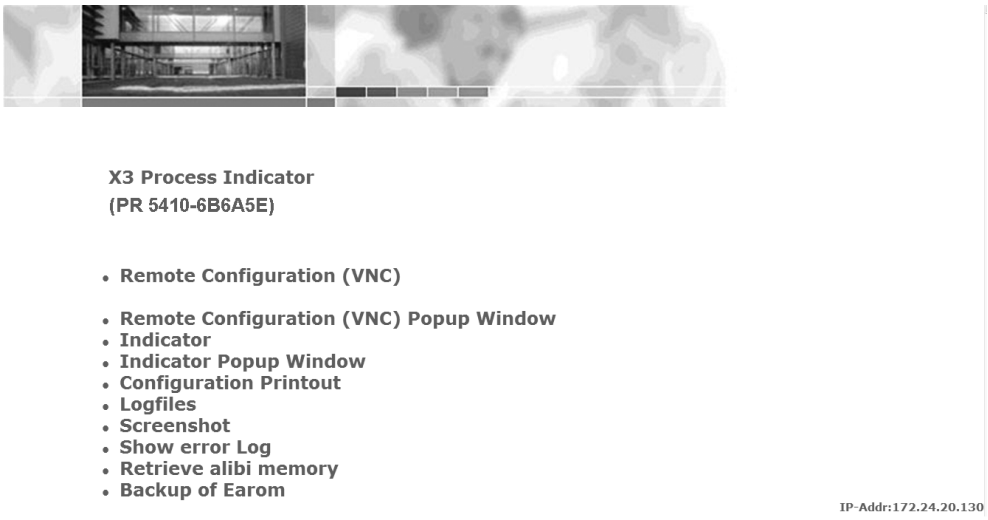
7. Press Exit to return to the previous window.

9.2 Functions via the WEB site

9.2.1 General information

If the device is connected to the network, it can be displayed e.g. in the "Windows" operating system under "Network".

Double-click the device icon to open the WEB menu (in English only) in the available Internet browser (see also Chapter 7.12).



The device name entered under Setup-[Network parameter]- [Hostname] is shown under the header in brackets.

[Remote Configuration (VNC)]

Operation using the VNC program, see Chapter 7.11.

[Remote Configuration (VNC) Pop-up Window]

Operation using the VNC program, see Chapter 7.11.

[Indicator]

Displays the weighing point in a status window, see Chapter 9.2.2.

[Indicator pop-up window]

Displays the weighing point in a status window, see Chapter 9.2.2.

[Configuration printout]

Display configuration printout, saving and printing out as a text file, see Chapter 9.2.3.

[Log files]

Display logfiles, saving and printing out as a text file, see Chapter 9.2.4.

[Screenshot]

Displaying, saving and printing a screenshot, see Chapter 9.2.5.

[Show error Log]

Display and save the error logs, see Chapter 9.2.6.

[Retrieve alibi memory]

This alibi memory can be used to save approx. 80,000 entries and to retrieve them, if necessary; see 9.2.7.

[Backup of Earom]

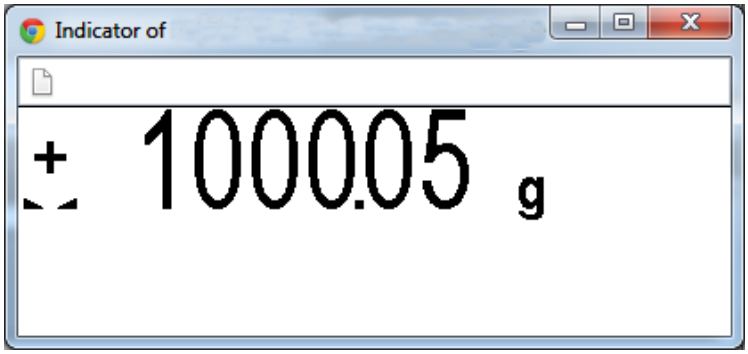
Saving and restoring the configuration and calibration data, see Chapter 9.2.8.1.

9.2.2 Displaying weighing points in a table

1. Click on the [Indicator] menu item in the WEB menu.

▷ A status window opens in which the weight of the weighing point is displayed with unit and the status symbols.

2. Click on the symbol in the Internet browser to return to the WEB menu.
3. Click on the [Indicator Pop-up Window] menu item in the WEB menu.
   ▷ A separate status window opens in which the weight of the weighing point is displayed with unit and the status symbols.



4. Click on the symbol to return to the WEB menu.

9.2.3 Configuration printout

With the [Configuration Printout] menu item the configuration of the device of the device can be displayed, saved and printed out.

Note:

The configuration printout can be activated via Setup and (clicked one after the other); see Chapter 7.17.4.

1. Click the [Configuration Printout] menu item in the WEB menu.
   ▷ The configuration of the device is shown on the display.
2. Click on [File]- [Save as...].
3. Create and open the required directory e.g. on the notebook.
4. Click on [Save] to save the text file in the relevant directory.
5. Click on [Print]- [File...].
6. Select the connected printer and click [Print].
7. Click on the symbol in the Internet browser to return to the WEB menu.

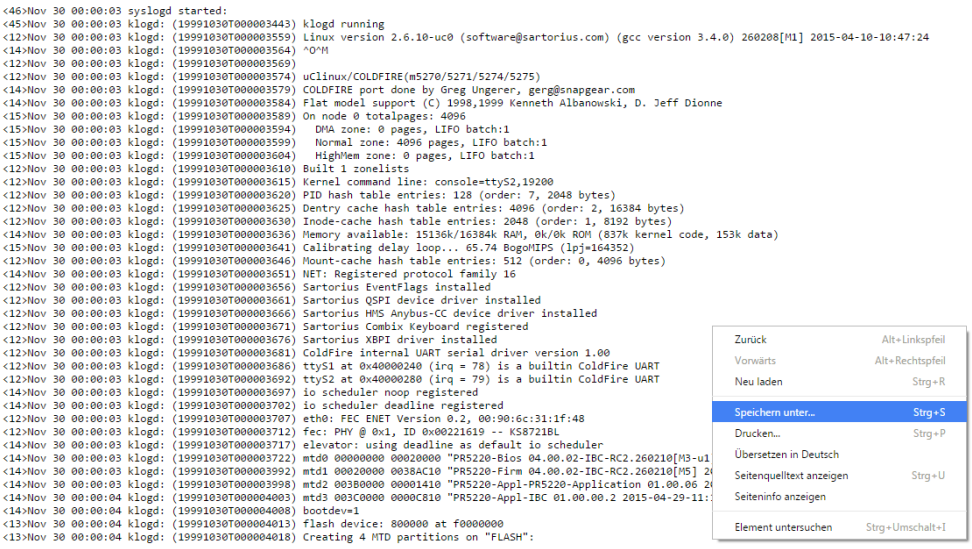
9.2.4 Log files

With the [Logfiles] menu item the logfiles of the device can be displayed, saved and printed out.

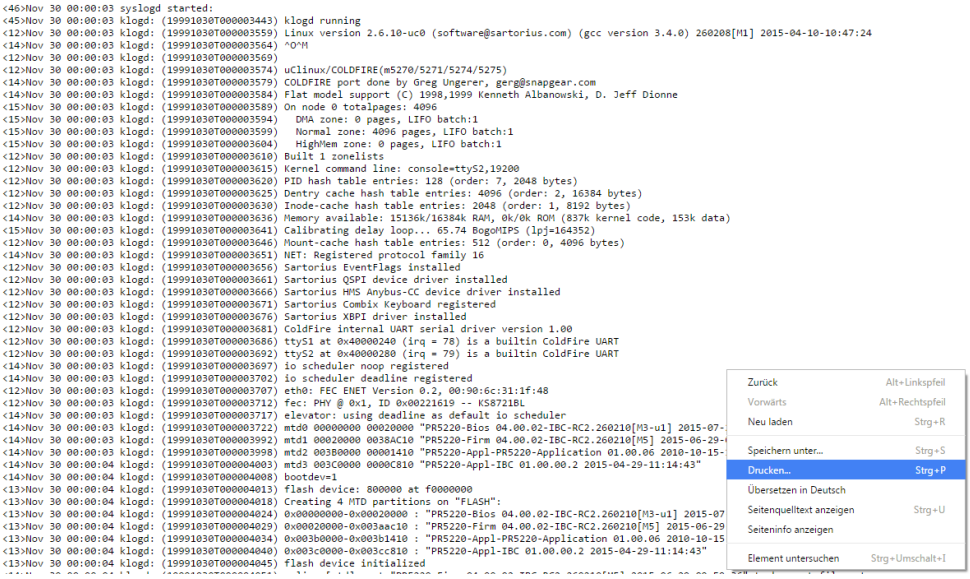
1. Click the [Logfiles] menu item in the WEB menu.

▷ A list of logfiles is shown on the display.

2. Click on the desired file.



3. Click on [Save as].
4. Create and open the required directory e.g. on the notebook.
5. Click on [Save] to save the text file in the relevant directory.
6. Press the right mouse button.



7. Click on [Print...].
8. Select the connected printer and click [Print].

9. Click on the symbol in the Internet browser to return to the WEB menu.

9.2.5 Screenshots

With the [Screenshot] menu item a screenshot of the device can be displayed, saved and printed out.

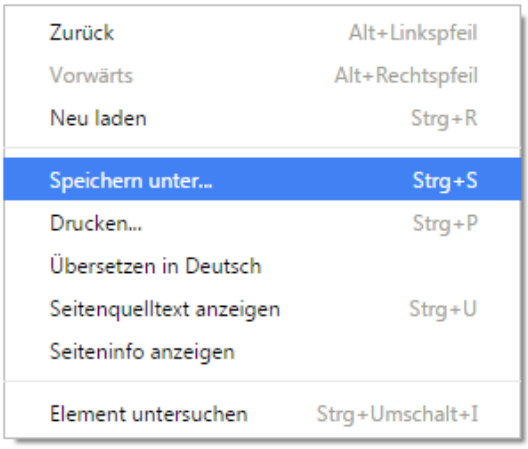
1. Click on the [Screenshot] menu item in the WEB menu.
   ▷ The current device display is shown as a screenshot.
2. Press the right mouse button.
3. Click on [Save image as...].
4. Create and open the required directory e.g. on the notebook.
5. Click on [Save] to save the graphic file in the relevant directory.
6. Press the right mouse button.
7. Click on [Print...].
8. Select the connected printer and click [Print].
9. Click on the symbol in the Internet browser to return to the WEB menu.

9.2.6 Error log

With the [Show error Log] menu item the error log of the device can be displayed, saved and printed out.

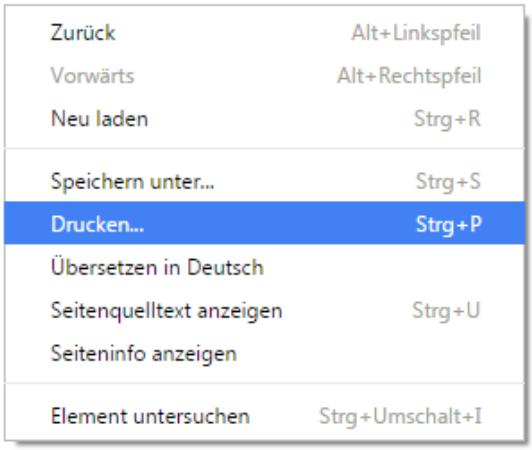
1. Click the [Show error Log] menu item in the WEB menu.
   The error log of the device is shown on the display.
2. Press the right mouse button.

Record	Type	Message
1	RESET	RCM:Watchdog Reset



3. Click on [Save as].
4. Create and open the required directory e.g. on the notebook.
5. Click on [Save] to save the text file in the relevant directory.
6. Press the right mouse button.

Record	Type	Message
1	RESET	RCM:Watchdog Reset



7. Click on [Print...].
8. Select the connected printer and click [Print].
9. Click on the symbol in the Internet browser to return to the WEB menu.

9.2.7 Alibi memory

9.2.7.1 General information

The device is equipped with an alibi memory for approx. 80,000 entries. Once this number has been reached, the oldest entries are overwritten.

No license is required to use the alibi memory.

Each time a print command is executed, a data record with a sequence number is automatically stored, which can consist of up to 3 entries (gross, net, and tare).

Each entry contains:

Sequence number	1–999999
Date	YYYY/MM/DD
Time	hh:mm:ss
Scale address	Always A
Weight type	G = gross, N = net, T = tare, PT = preset tare
Weight with unit	

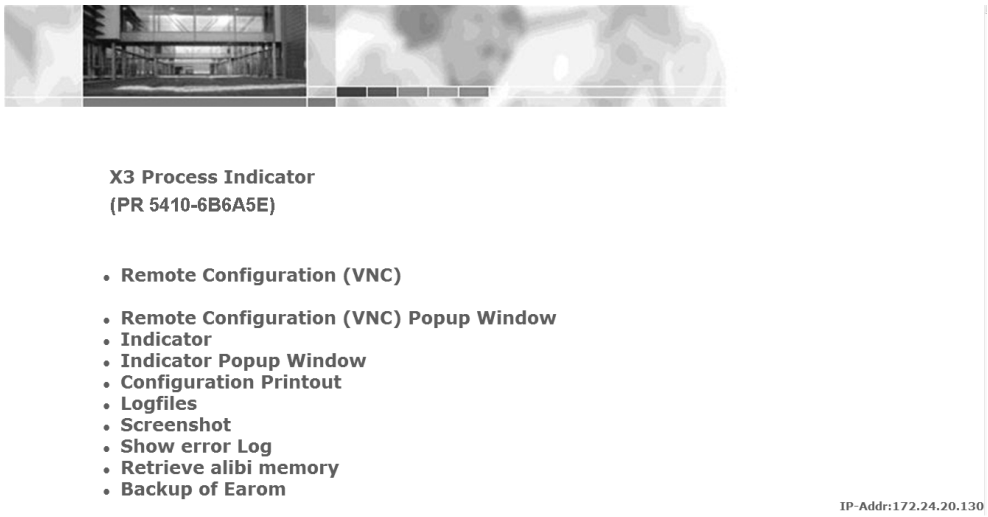
Depending on the configuration, the gross and/or net and/or tare weight are saved

(using the front-panel keys: `oP 063` see Chapter 7.5.1).

To view the data records using the VNC program, see Chapter 7.18.4.

To view the data records using the front-panel keys, see Chapter 7.6.1.

The alibi memory can be completely deleted, as long as the CAL switch is open, using the front-panel keys only (see Chapter 7.6.2).



1. Click on the [Retrieve alibi memory] menu item in the WEB menu.
   ▷ The CSV file appears as an icon at the bottom of the screen.
2. Click on the icon.
   ▷ The file automatically opens, e.g., in Microsoft Excel.

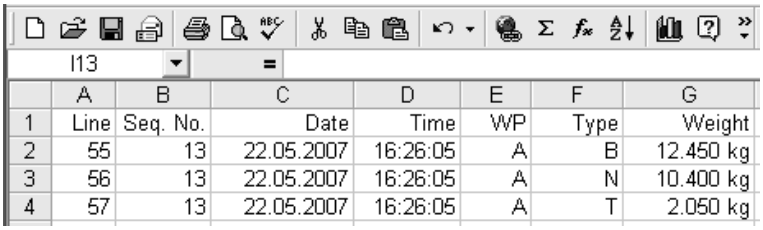
   Commas are used in the CSV file to separate the individual elements of an entry.
3. Carry out a conversion in Microsoft Excel to see only one element per column. The sequence number is placed in front of a consecutive line number.

   Example:

   Data record as CSV file

```
Line,Seq.No.,Date,Time,WP,Type,Weight
55,13,2007-05-22,16:26:05,A,B,"12.450 kg"
56,13,2007-05-22,16:26:05,A,N,"10.400 kg"
57,13,2007-05-22,16:26:05,A,T,"2.050 kg"
```

   After conversion in Microsoft Excel



	A	B	C	D	E	F	G
1	Line	Seq. No.	Date	Time	WP	Type	Weight
2	55	13	22.05.2007	16:26:05	A	B	12.450 kg
3	56	13	22.05.2007	16:26:05	A	N	10.400 kg
4	57	13	22.05.2007	16:26:05	A	T	2.050 kg

Note:

Microsoft Excel can import maximum 65,536 lines.

If this limit is exceeded, the CSV file must be split before processing it in Excel.

4. The file can then be saved and printed.
5. Click on the symbol in the Internet browser to return to the WEB menu.

9.2.7.2 Saving an alibi data record

Requirements:

In menu Setup-[Operating parameter][Use alibimemory], the [Gross, Net, Tare] parameter is selected.

Procedure:

After a weighing operation, press the key or complete filling.
The weight data is written into the alibi memory.

Example:
Operating sequence; see also Chapter 13.4

1	Write request	X120	Start printing and save data record
1a	Wait	X120	= 0
1b	Wait	X49	(Command active) = 0
1c	Check	X48	(Command error) = 0
2	Read request	D16	Gross weight
3	Read request	D17	Net weight
4	Read request	D18	Tare weight
5	Read request	D19	Sequence number for alibi memory
6	Read request	D21	Date (in BCD display)
7	Read request	D22	Time (in BCD display)

9.2.7.3 Exporting alibi data records

Example:
Operating sequence; see also Chapter 13.4

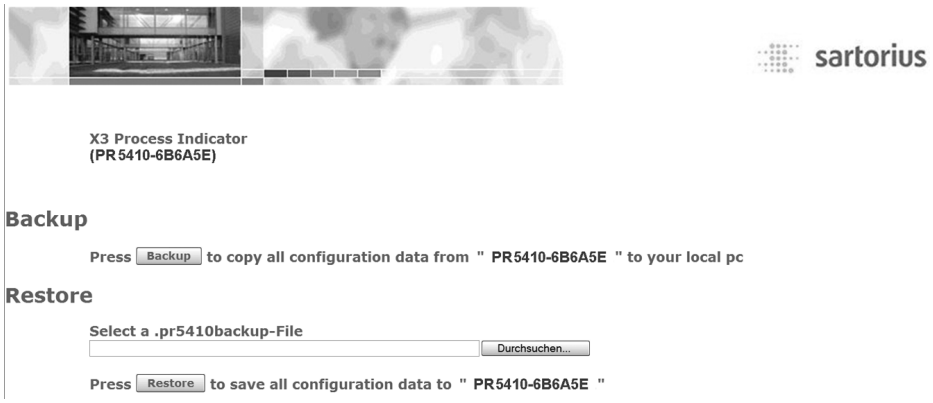
1	Write request	D19	Sequence number for alibi memory
2	Write request	X122	Export selected data record from alibi memory.
2a	Wait	X122	= 0
1b	Wait	X49	(Command active) = 0
1c	Check	X48	(Command error) = 0
2	Read request	D16	Gross weight
3	Read request	D17	Net weight
4	Read request	D18	Tare weight
6	Read request	D21	Date (in BCD display)
7	Read request	D22	Time (in BCD display)

9.2.8 Configuration data

The configuration and calibration data of the EAROMs can be saved for back-up on the Notebook and downloaded, if necessary.

▶ Click the [Backup of Earom] menu item in the WEB menu.

▷ The backup/restore menu is shown on the display.



9.2.8.1 Saving configuration and calibration data

1. Click on [Backup] to create a backup .g. on the notebook.
2. Click on [Save as].
3. Create and open the required directory e.g. on the notebook.
4. Click on [Save] to save the backup file in the relevant directory.

9.2.8.2 Loading configuration and calibration data into the device

NOTICE

All data which can be configured in the Setup menu are overwritten!

▶ If the file is loaded into several devices, changing the network settings and the host name is indispensable!

1. Open the CAL switch; see Chapter 7.1.3.1.
2. Click on [Select File] (depending on the Internet browser).
3. e.g. on the notebook, navigate to the folder where the backup file was saved.
4. Select Backup file.
5. Click on [Restore].

   ▷ The selected file is loaded into the device.
6. Click on the symbol in the Internet browser to return to the WEB menu.
7. Close the CAL switch.

9.3 Resetting the device to the factory settings using the front-panel keys

Note:

Reset to the factory settings is possible only, when the CAL switch is open. The IP address and the Hostname remain unaffected.

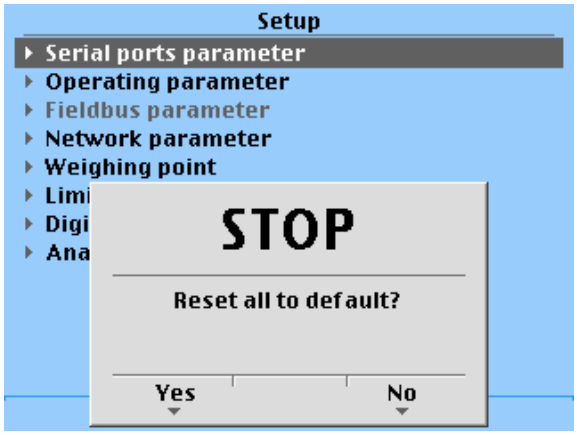
1. Press Setup.
   ▷ `SEtuP` appears on the display.
2. Press ↓.
   ▷ `bIoS` appears on the display.
3. Press OK.
   ▷ `bIoS...` appears on the display.
   `FLASH` follows on the display.
4. Press ↓ 2x.
   ▷ `dEL.EAr.` appears on the display.
5. Press OK.
   ▷ `ErAS.E?` and then `no` appear on the display.
6. Press ↓.
   ▷ `YES` appears on the display.
7. Press OK.
   ▷ `donE` appears on the display once the process is complete.
8. Press Exit to restart the device.

9.4 Resetting the device to the factory settings

Note:

Reset to the factory settings is possible only, when the CAL switch is open. The IP address and the Hostname remain unaffected.

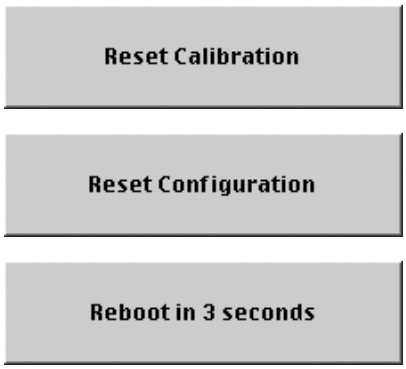
1. Click on Setup.
2. Click on C.
   ▷ The following prompt window appears:



3. Press the [Yes] softkey to reset to the factory settings.

   Press [No] if you want to keep the entered values unchanged.

   ▷ The following messages show the respective progress:



9.5 Updating new software with FlashIt

Note:

Always flash/load the BIOS into the device first, and then the firmware&application.

NOTICE

Once the device has been updated from version <4.00 to >4.00, it must be reset to the factory settings.

Before updating, save the configuration printout as a TXT file if necessary. This allows for the parameters to be re-entered manually in the device.

- ▶ A backup of version <4.00 cannot be loaded onto a device with version >4.00.
- ▶ See Chapters 9.2.3 and 9.4.

9.5.1 Updating in network with a DHCP service

Requirements:

- Device and Notebook/PC are connected to the network.
- The automatic address assignment "DHCP" is activated in the device and in the notebook/PC, see Chapter 7.17.6.

- The "FlashIt!32" program (in a directory on the enclosed CD-ROM) is installed on the notebook/PC.
- The "FlashIt!32" program is started.

9.5.1.1 Operations at the device

⚠ WARNING

Working on the device while it is switched on may have life-threatening consequences.

▶ Product operation must be performed by trained and qualified personnel who are aware of and able to deal with the related hazards and take suitable measures for self-protection.

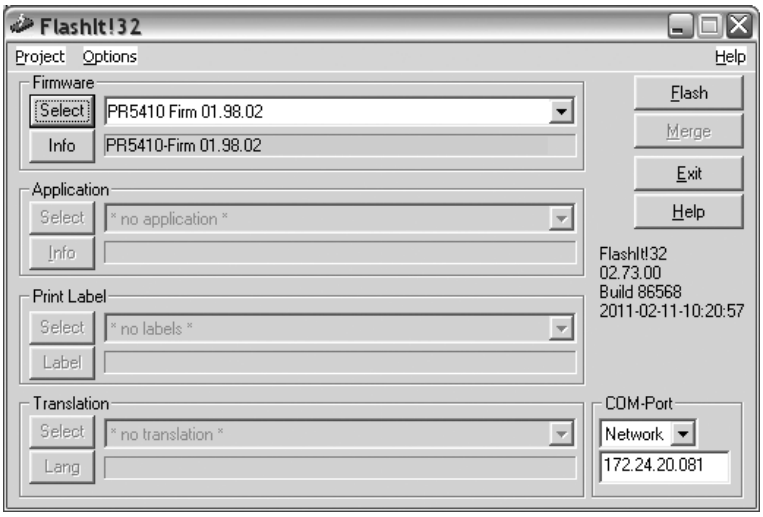
1. Press Setup.
   ▷ `SEtuP` appears on the display.
2. Press ↓.
   ▷ `bIoS` appears on the display.
3. Press OK.
   ▷ `bIoS...` appears on the display.
   `FLASH` follows on the display.
4. Press OK.
   ▷ `EtHEr` appears on the display.
5. Press OK.
   ▷ `dHCP...` appears on the display.
   The device waits for address assignment by the server.
   `172.024.` The more significant part of the IP address is displayed for approx. 2 seconds.
6. Make sure to note down the digit sequence, because it must be entered into the "FlashIt!32" window subsequently.
   ▷ `021.081.` The less significant part of the IP address is displayed for approx. 2 seconds.

7. Make sure to note down the digit sequence, because it must be entered into the "FlashIt!32" window subsequently.

   ▷ `FLASH?` appears on the display.

   Now the device is ready to load the software.

9.5.1.2 Loading the software on your notebook/PC



1. Click the relevant file in the "Explorer" with the mouse and drag it into the [Select] window, (or use 'Copy and paste').
2. Under [COM-Port] select "Network" and enter the devices IP addresses.
3. Click [Flash] to start the procedure.
   ▷ As soon as software loading is completed the device will be re-started.
4. Load next file, as described.

9.5.2 Updating via a point-to-point connection with DHCP service

Requirements:

- Device and notebook/PC are connected to each other.
- The automatic address assignment "DHCP" is activated in the device and in the notebook/PC; see Chapter 7.17.6.
- The "FlashIt!32" program (in a directory on the enclosed CD-ROM) is installed on the notebook/PC.
- The "FlashIt!32" program is started.

9.5.2.1 Operations at the device

⚠ WARNING

Working on the device while it is switched on may have life-threatening consequences.

- Product operation must be performed by trained and qualified personnel who are aware of and able to deal with the related hazards and take suitable measures for self-protection.

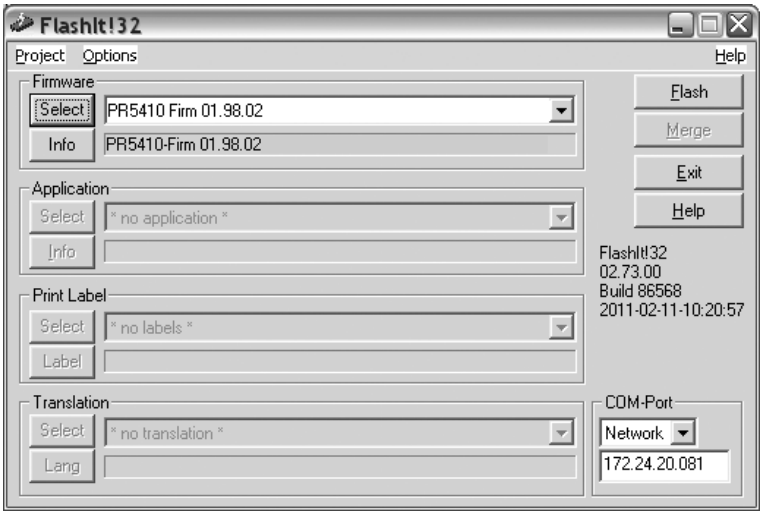
1. Press Setup.
   - ▷ `SEtuP` appears on the display.
2. Press ↓.
   - ▷ `bIoS` appears on the display.
3. Press OK.
   - ▷ `bIoS...` appears on the display.
   - `FLASH` follows on the display.
4. Press OK.
   - ▷ `EtHEr` appears on the display.
5. Press OK.
   - ▷ `dHCP...` appears on the display.

   The device waits for address assignment by the server.

   `172.024.` The more significant part of the IP address is displayed for approx. 2 seconds.
6. Make sure to note down the digit sequence, because it must be entered into the "FlashIt!32" window subsequently.
   - ▷ `021.081.` The less significant part of the IP address is displayed for approx. 2 seconds.
7. Make sure to note down the digit sequence, because it must be entered into the "FlashIt!32" window subsequently.
   - ▷ `FLASH?` appears on the display.

Now the device is ready to load the software.

9.5.2.2 Loading the software on your notebook/PC



1. Click the relevant file in the "Explorer" with the mouse and drag it into the [Select] window, (or use 'Copy and paste').
2. Under [COM-Port] select "Network" and enter the devices IP addresses.
3. Click [Flash] to start the procedure.
   ▷ As soon as software loading is completed the device will be re-started.
4. Load next file, as described.

9.5.3 Updating with a fixed IP address

Requirements:

- Device and notebook/PC are connected to a network/each other.
- The automatic address assignment "DHCP" is deactivated in the device and in the notebook/PC, see Chapter 7.17.6.
- Notebook/PC is set to a fixed IP address.

Note:

On a point-to-point connection the device and notebook/PC must be set to a fixed IP address which has the same address range given by the subnet mask.

Example:

PR 5410: IP address 192.24.22.1

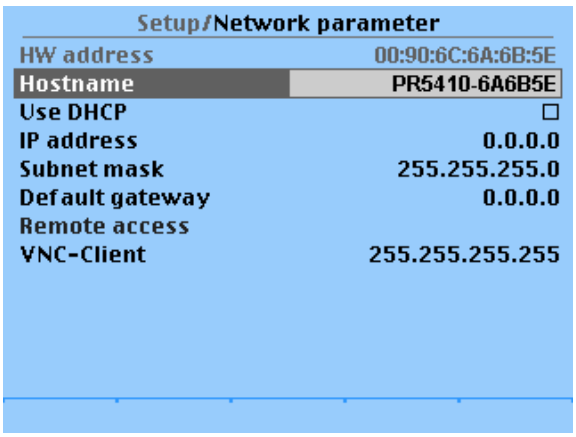
Notebook/PC: IP address 192.24.22.2

Device and notebook/PC have the subnet mask 255.255.255.0.

- The "FlashIt!32" program (in a directory on the enclosed CD-ROM) is installed on the notebook/PC.
- The "FlashIt!32" program is started.

9.5.3.1 Device presettings in the Setup menu

1. Click on Setup - [Network parameter].



2. Deactivate [Use DHCP].
3. Enter the corresponding IP address.

Note:

On a point-to-point connection the device and notebook/PC must be set to a fixed IP address which has the same address range given by the subnet mask.

Example:

PR 5410: IP address 192.24.22.1

Notebook/PC: IP address 192.24.22.2

Device and notebook/PC have the subnet mask 255.255.255.0.

4. Enter the corresponding subnet mask.
5. Press Exit to exit the window and to save the changes.

9.5.3.2 Operations at the device

⚠ WARNING

Working on the device while it is switched on may have life-threatening consequences.

▶ Product operation must be performed by trained and qualified personnel who are aware of and able to deal with the related hazards and take suitable measures for self-protection.

1. Press Setup.

   ▷ `SEtuP` appears on the display.

2. Press ↓.

▷ `bIoS` appears on the display.

3. Press OK.

   ▷ `bIoS...` appears on the display.

   `FLASH` follows on the display.

4. Press OK.

   ▷ `EtHEr` appears on the display.

5. Press OK.

   ▷ `dHCP...` appears on the display.

   The device waits for address assignment by the server.

   `172.024.` The more significant part of the IP address is displayed for approx. 2 seconds.

6. Make sure to note down the digit sequence, because it must be entered into the "FlashIt!32" window subsequently.

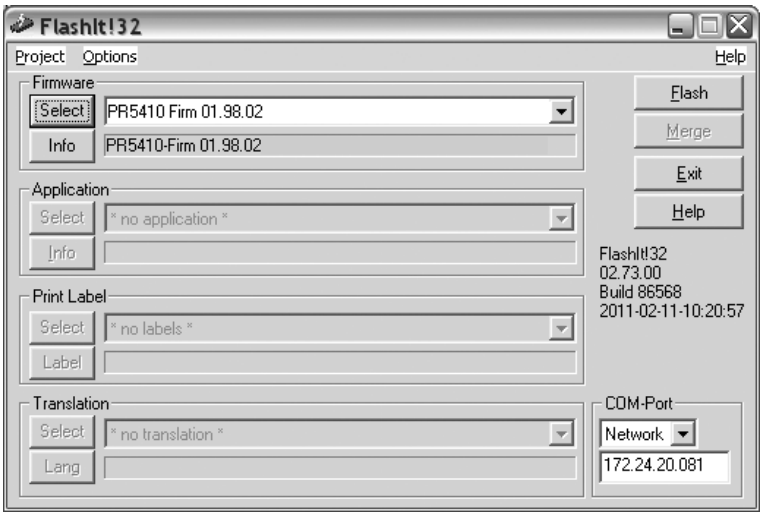
   ▷ `021.081.` The less significant part of the IP address is displayed for approx. 2 seconds.

7. Make sure to note down the digit sequence, because it must be entered into the "FlashIt!32" window subsequently.

   ▷ `FLASH?` appears on the display.

   Now the device is ready to load the software.

9.5.3.3 Loading the software on your notebook/PC



1. Click the relevant file in the "Explorer" with the mouse and drag it into the [Select] window, (or use 'Copy and paste').
2. Under [COM-Port] select "Network" and enter the devices IP addresses.
3. Click [Flash] to start the procedure.
   ▷ As soon as software loading is completed the device will be re-started.
4. Load next file, as described.

10 ModBus protocol

10.1 General description

The ModBus protocol implemented in the instrument permits fast, simple and reliable communication between a PC or a PLC and up to 127 instruments.

10.2 SPM data in PR 1612 ModBus mode

For access via ModBus, the PR 1612 ModBus mode is switched on via Setup - [Serial ports]- [ModBus-RTU]- [Param]- [ModBus mode]- [PR 1612 ModBus].

Read data

Byte address	Weight in 32-bit integer format
60...63	Gross weight
64...67	Net weight (gross if not tared)
68...71	Tare weight (0 if not tared)

Read data

Address	Read "Word" (display in binary format)
W201	`0E00000T 00000000` E: ADC error T: Instrument is tared.
W203	`000S00MZ 00000000` S: Device is in setup mode. M: Weight is stable (standstill). Z: Weight within ¼ d of 0
W204	`0000D000 00000000` D: Gross weight <0 or >Max (dimmed)
W205	`TA000000 00000000` T: Instrument is tared. A: Analog test is active.
W231	`00021MRZ 00000000` 2: Limit 2 1: Limit 1 M: Weight is stable (standstill). R: Weight within zero-setting range Z: Weight within ¼ d of 0

Write data

Bit address	Value in 32-bit integer format
W100	Zero device: Write value 256

Bit address	Value in 32-bit integer format
W101	Tare device: Write value 256 Reset the tare of the device: Write value 512

11 SMA protocol

11.1 General information

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.

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 µs. With commands that wait for standstill of the weight value, the reply can be delayed by the timeout.

The following commands are supported:

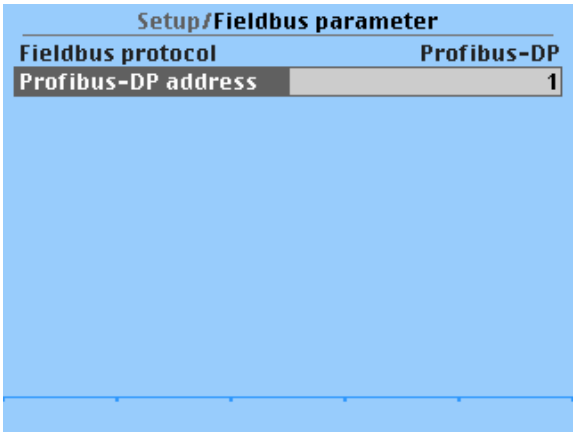
W, Z, D, A, B, <ESC>, H, P, Q, R, S, T, M, C, I, N

12 Fieldbus interface

12.1 Fieldbus interface configuration

This PR 5410 enables one or more devices to be included under a communication master (e.g. Siemens S7 ProfiBus). One scale may be addressed over the fieldbus interface. The data on the fieldbus are processed at intervals of 50 ms.

The interface is configured under Setup-[Fieldbus parameter] in the device. The corresponding fieldbus protocol (in this case: ProfiBus-DP) is displayed.



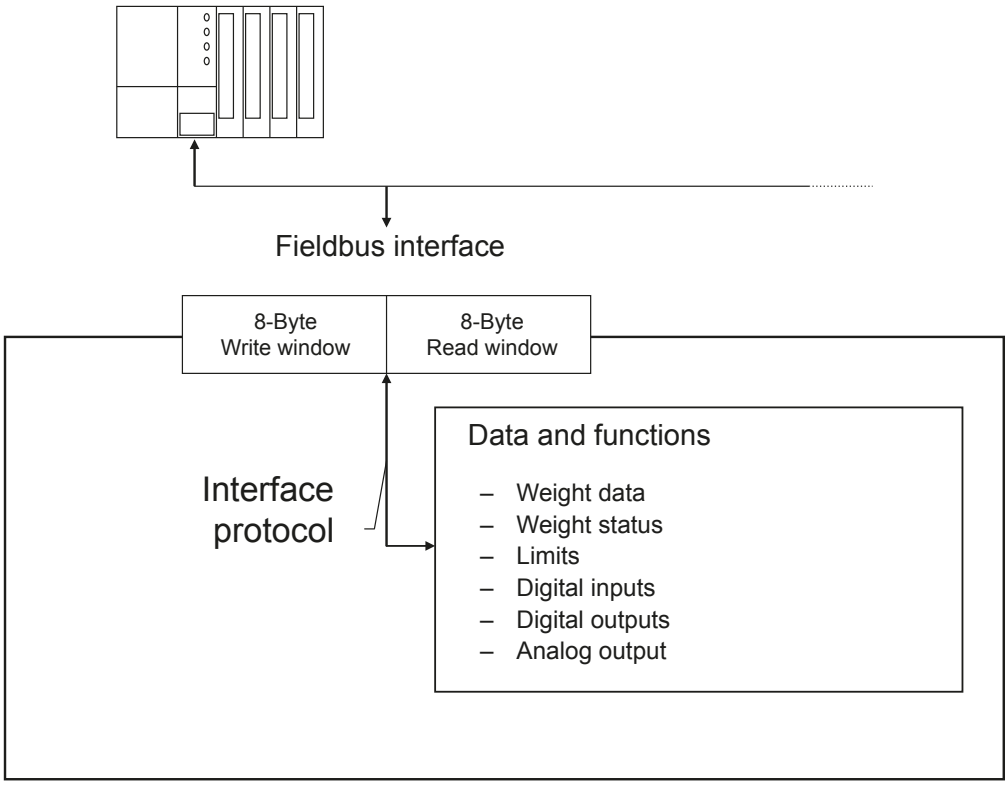
12.2 Scale protocol (8-Byte) for the "standard" application

The interface works with an 8-byte write window and an 8-byte read window. The fieldbus exchanges its data cyclically with each slave. That means: During each cycle, 8-bytes are written and 8-bytes are read, even if data contents are unchanged.

The fieldbus protocol ensures the data transport between the fieldbus master and the 2× 8-byte data windows.

The interface protocol runs under the fieldbus and manages the access to a multitude of different data.

The protocol described below is independent of the selected fieldbus; it is explained as seen from the fieldbus master.



12.2.1 Write window (input area)

Data are transferred from the master to the slave(PR 5410) in this window.

Byte 0	Write data: MSB
Byte 1	Write data: MSB
Byte 2	Write data: MSB
Byte 3	Write data: LSB
Byte 4	Read_Value_Select
Byte 5	Write_Value_Select
Byte 6	Direct control bits
Byte 7	Direct control bits

The first four bytes are used to write a data value.

The type of the register number of the data is written in byte 5.

In direct access, the bits in bytes 6 and 7 are independent of the write value data type.

The command is executed after a 0-1 transition of the corresponding bit.

12.2.2 Read window (output area)

Data are transferred from the slave (PR 5410) to the master in this window.

Byte 0	Read data: MSB
Byte 1	Read data: MSB
Byte 2	Read data: MSB
Byte 3	Read data: LSB
Byte 4	Read_Value_Select
Byte 5	General system bits: - write_active - power_fail - analog error...
Byte 6	Status bits
Byte 7	Status bits

The first four bytes are used to read a data value.

The register number of the data is mirrored in byte 4 by the write window, when data is available.

Bytes 5, 6, and 7 contain status bits independent of the read data.

12.2.3 Reading and writing data

The number of data vastly exceeds the size of the read/write window. For this reason, data is addressed with **Write_Value_Select** and **Read_Value_Select**. To do this, the first six bytes of the write window and the first five bytes of the read window are required.

These can be used by the master to write data in the PR 5410: e.g., a limit value is set to 100 kg. The master can also read weight values or other data from the PR 5410. The write and read windows are always required for this. Safe data exchange is ensured by a write and a read procedure.

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

12.2.3.1 Reading data

Procedure:

1. Write the register number as **Read_Value_Select** in byte 4 of the write window (e.g., net weight).
2. Wait until **Read_Value _Selected** in byte 4 of the read window is equal to **Read_Value_Select** in byte 4 of the write window.
   ▷ Now the value is available in bytes 0 to 3.

12.2.3.2 Writing data

Procedure:

1. Wait until **Write_Active** = 0 in the read window (ready to receive new data).
2. Write the value in bytes 0 to 3.
3. Write the register number in byte 5 (**Write_Value_Select**).

4. Wait until **Write_Active** = 1 (acknowledges data receipt).
5. Write 0 in byte 5 (**Write_Value_Select**)
   ▷ **Write_Active** goes to 0.

12.2.4 Description of the I/O area (read/write window)

12.2.4.1 Input section

Data transmission from the master to the PR 5410 (slave) is via the input area.
Weight or data requests are transmitted to the slave by the master.
The master has write access; the slave has read access.

Byte	Name								Description
0	Write_Value (MSB)								e.g. limit value
1	Write_Value (MSB)								e.g. limit value
2	Write_Value (MSB)								e.g. limit value
3	Write_Value (LSB)								e.g. limit value
4	Read_Value_Select								e.g. gross
5	Write_Value_Select								Write: Limit 1 On
6	Free	Res M3	Res M2	Res M1	Free	Set M3	Set M2	Set M1	Free/digital outputs
7	Get FixTare	Set FixTare	Res Power	Res Test	Set Test	Res Tare	Set Ta-re	Set Zero	"Control byte", response to 0→1 transition
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	

The "Control byte" activates the corresponding action in the device with a "Set-Bit".
After execution of the operation, the bit should be reset.

Variable	Function
Write_Value	The weight value is transmitted as a binary 32-bit value with plus or minus sign. Type of data: DINT
Read_Value_Select	For selecting the value sent by the device.
Write_Value_Select	For selecting the function to be executed by the device.
GetFixTare	The gross weight is copied into the preset tare memory.
SetFixTare	Taring is performed using the value stored in the preset tare memory.
ResPower	The Power_Fail bit in the output area is deleted.
ResTest	The test operating mode is finished.
SetTest	The test operating mode is started. Now the test value can be read out by reading the gross weight.
ResTare	Tare is reset.
SetTare	Tares the scale.
SetZero	The scale is set to zero.
Res M1...3	Marker 1...3 is reset.

Variable	Function
Set M1...3	Marker 1...3 is set.

12.2.4.2 Output area

Data transmission from the PR 5410 to the master is via the output area.

The weight or data information requested by the master is transmitted to the master by PR 5410.

The PR 5410 has write access, the master has read access.

Byte	Name								Description
0	Read_Value (MSB)								e.g., gross value
1	Read_Value (MSB)								e.g., gross value
2	Read_Value (MSB)								e.g., gross value
3	Read_Value (LSB)								e.g., gross value
4	Read_Value_Selected								e.g. gross
5	Write Active	Power Fail	Out 3	Out 2	Out 1	Limit 3	Limit 2	Limit 1	Status
6	Cmd Busy	Cmd Error	Inp. 3	Inp. 2	Inp. 1	Tare Active	Cal Active	Test Active	Command status
7	Dimmed	Standstill	Inside ZSR	Center Zero	Below Zero	Overload	Above Max	ADC error	Device status
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	

Variable	Function
Read_Value	The weight value is transmitted as a binary 32-bit value with plus or minus sign. Type of data: DINT
Read_Value_Selected	Acknowledgment of the transmitted value.
Write_Active	The function selected with **Write_Value_Select** is executed once. This bit is deleted if **Write_Value_Select** is set to 0.
Power_Fail	Is set when switching on the device. Is reset by **ResPower** with transition from 0→1.
Cmd_Busy	The device is busy executing a command (e.g., the device has received a tare command and is waiting for standstill).
Cmd_Error	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 at **Last error**. It is set only if an action is executed.
Tare_Active	The scale has been tared.
Cal_Active	The device is/was configured. When this bit is 1, the scale parameters (EXPO/UNIT/STEP) must be read again. Set after "Power on" and reset after reading the FSD.

Variable	Function
Test_Active	The device executes the ADC test. The read weight value is not the gross value, but the test value.
Out	Below zero or above Max (FSD).
Standstill	The scale is stable.
InsideZSR	The weight value is within the zero setting range.
CenterZero	The weight value is within **center zero** (0 ±0.25 d).
BelowZero	The weight value is negative (gross < -0.25 d).
Overload	The weight value has exceeded the measuring range. No valid weight data is specified (gross > FSD+overload).
AboveMax	The weight value has exceeded the Max (FSD), but is still within Max + permissible overload (gross ≤ FSD + overload).
AdcError	AD conversion error (details are given in register 1, Read_Value_Select = 1).

12.2.4.3 Reading and writing register via fieldbus

Read data: Read_Value, Read_Value_Select, Read_Value_Selected

When the master has to read from the device, the register number is transmitted to **Read_Value_Select** in the input area. The result is specified with **Read_Value_Selected** in the output area.

Action of the master	Reaction of the PR 5410
Write register no. to **Read_Value_Select**.	
	Write the selected register to **Read_Value**.
	Copy **Read_Value_Select** to **Read_Value_Selected**.
Wait until **Read_Value_Selected** = **Read_Value_Select**.	
Read **Read_Value**.	

Write data: Write_Value, Write_Value_Select, Write_Active

When the master has to write to the device, the required action is transmitted to the input area with **Write_Value_Select** together with the data. Execution is indicated by the **Write_Active** bit in the output area.

Action of the master	Reaction of the PR 5410
Write value to **Write_Value**.	
Write register number to **Write_Value_Select**.	
	Write **Write_Value** to the selected register.

Action of the master	Reaction of the PR 5410
	Set the **Write_Active** bit.
Wait until **Write_Active** has been set.	
Write 0 to **Write_Value_Select**.	
	Reset the **Write_Active** bit.

Set the bit: Action_Select, Write_Active

Single bits can be set or reset directly with **Write_Value_Select**.

For setting, the bit number (80...127) is written to **Write_Value_Select**.

For reset, the bit number + 128 (208...255) is written to **Write_Value_Select**.

Action of the master	Reaction of the PR 5410
Write register number to **Write_Value_Select**.	
	Write **Write_Value** to the selected register.
	Write **Write_Value** to the selected register.
	Set the **Write_Active** bit.
Wait until **Write_Active** has been set.	
Write 0 to **Write_Value_Select**.	
	Reset the **Write_Active** bit.

12.2.4.4 Reading bit

Single bits can be read only by reading a register. The procedure is described in Chapter 12.2.4.3.

12.2.4.5 Control byte

Some device functions can be executed by setting bits in the input area directly.

Action of the master	Reaction of the PR 5410
Set bits in the **Control byte**.	
	The operation is processed.
Reset bits in the **Control byte**.	Copy **Read_Value_Select** to **Read_Value_Selected**.

12.2.4.6 Waiting for the result of the action

When an action taking a longer time was started, the end of execution can be waited for after starting (see Chapters 12.2.4.3 and 12.2.4.5).

Action of the master	Reaction of the PR 5410
For setting bits, see Chapters 12.2.4.3 and 12.2.4.5.	

Action of the master	Reaction of the PR 5410
	Acknowledge the "set bit" (see Chapter 12.2.4.3).
	Set the **CmdBusy** bit.
	The operation is processed.
	In the event of an error: Set the **CmdError** bit and the **LastError** byte.
	Reset the **CmdBusy** bit.
Wait until **CmdBusy** has been reset.	
Check the **CmdError** bit.	
If set, read **LastError**.	

This is applicable to taring, zero setting etc. over the fieldbus.

Example: Reading the gross weight

The master writes value 8 in **Read_Value_Select** (byte 4) of the input area.

Input section

Byte	Name	Description
0		
1		
2		
3		
4	8	Gross
5		
6		
7		
	Bit 7 Bit 6 Bit 5 Bit 4 Bit 3 Bit 2 Bit 1 Bit 0	

The master waits until value 8 is reflected in **Read_Value_Selected** (byte 4) of the output area.

Output area

Byte	Name	Description
0	00	Gross value
1	00	Gross value
2	4	Gross value
3	D2	Gross value
4	8	Gross weight request detected
5		Status

Byte	Name								Description
6								Test Active	Command status
7		Stand-still	Inside ZSR	Center Zero	Below Zero	Over-load	Above Max	ADC error	Device status
	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.

When the "Overload", "Test Active" or "ADC error" bits are set, the read value is invalid.

Negative values are output in the second complement.

12.2.5 Special hints 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 bytes 0...3, e.g. with device type and software version, see table below.

Standard sequence		Sequence for DeviceNet and EtherNet-IP	
Byte 0	TYPE MSB	Byte 0	SUBVERSION
Byte 1	TYPE LSB	Byte 1	MAIN VERSION
Byte 2	MAIN VERSION	Byte 2	TYPE LSB
Byte 3	SUBVERSION	Byte3	TYPE MSB

Consequently, the sequence on the PLC side must be changed when using the DeviceNet and EtherNet–IP field bus types.

12.2.6 Fieldbus register

12.2.6.1 Register 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								

12.2.6.2 Register 1: Scale status (Read)

Dynamic status

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	OUT	STND	INZSR	CZERO	BELOW0	OVL	>Max	ADUERR
Byte 1				E9	E6	E1	E3	E7
Byte 2						PowerFail	ActionAc-tive	CmdError

Byte 3	TareActive	CalActive	TestActive

Note:

Byte 0 corresponds to byte 7 in the output area; for weight error, see also the table in Chapter 16.1.

Bit	Description
ADUERR	Error of analog conversion/load cell circuit (OR function of the E1, E3, E7 bits).
>Max	Gross value is higher than Max (FSD); the scale range was exceeded.
OVL	Scale overload; Gross >Max + overload, **Error 2**
BELOW0	Gross weight is negative (<0-¼ d).
CZERO	"Center of zero", weight within 0 ±¼ d.
INZSR	The gross weight is within the zero setting range.
STND	The scale is stable.
OUT	Below zero or above Max (FSD) (0-¼ d >weight value >Max).
E7	The measuring signal is negative (inverse conversion), **Error 7**
E6	No or too low sense voltage; **Error 6**
E3	The measuring signal is >36 mV (no end of conversion), **Error 3**
E1	Arithmetic error (overflow), **Error 1**
E9	No communication with xBPI scale, **Error 9**
CmdError	Error during execution (cmdError); e.g. the "taring" operation is not handled, because the scale is not stable. The error is stored in**LastError** (register 4). The bit is reset with the **ResetError** bit (register 121).
ActionActive	The operation is being processed; processing is ongoing.
PowerFail	Power failure; is always set after power on. The **PowerFail** bit is reset with the **ResetPWF** bit (register 85) "Reset power failure."
TestActive	The analog test is busy.
CalActive	The device is/was configured. When this bit is 1, the scale parameters (EXPO/UNIT/STEP) must be read again. Set after "Power on" and reset after reading the FSD.
TareActive	The instrument was tared.

12.2.6.3 Register 2: State of state-controlled action bits (Read)

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: Get-FixTare	86: Set-FixTare	85: Reset-PWF	84: Reset-Test	83: SetTest	82: Reset-Tare	81: SetTare	80: Set-Zero
Byte 3							89: Reset-Error	88: Print

12.2.6.4 Register 3: State of leading edge-controlled action bits (read)

Is always 0.

12.2.6.5 Register 4: Calibration information, error byte (Read)

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	EXPO							
Byte 1	UNIT							
Byte 2	STEP							
Byte 3	LASTER-ROR							

Bit	Description
EXPO	One byte for the position of the decimal point; content in decimal form: 0...255.
	0 = 000000
	1 = 00000.0
	2 = 0000.00
	3 = 000,000
	4 = 00.0000
	5 = 0.00000
UNIT	One byte for the weight unit; content in decimal form: 0...255
	2 = g (gram)
	3 = kg (kilogram)
	4 = t (tons)
	5 = lb (pound)
STEP	One byte for the scale interval; content in decimal form: 0...255
	1 = scale interval "1"
	2 = scale interval "2"
	5 = scale interval "5"
	10 = scale interval "10"
	20 = scale interval "20"

Bit	Description
	50 = scale interval "50"
LASTERROR	Last error byte; see also **CmdError** bit, number of "last error":
	31 = no standstill was reached (e.g. when taring).
	33 = negative weight value when taring and legal-for-trade mode on.
	47 = no zero setting; weight not within zero setting range.
	107 = no standstill with **Getfixtare**.

12.2.6.6 Register 5: Device type and software release (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	MAIN VERSION							
Byte 3	SUBVERSION							

12.2.6.7 Register 6: Board number (Read)

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

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

12.2.6.8 Register 7: reserved

12.2.6.9 Registers 8...22: Weight data (Read)

The gross, net, and tare weight are stored as DINT fix point. The real data value is derived from DINT and EXPO as follows:

$Value_{Real} = reading_{DINT} \times 10^{(-EXPO)}$

Register 8	Current gross value
Register 9	Current net value, if tared; otherwise gross
Register 10	Current tare value, if tared, otherwise 0
Register 11	Value in the front readout
Register 12	Reserved
Register 13	Reserved
Register 14	Max (FSD)

Register 15	Reserved (free)
Register 16	Print gross weight/write to Alibi memory
Register 17	Print net weight/write to Alibi memory
Register 18	Print tare weight/write to Alibi memory
Register 19	Print sequence number/write to Alibi memory
Register 20	Output value (BCD format)
Register 21	Print date/write to Alibi memory (BCD format)
Register 22	Print time/write to Alibi memory (BCD format)

12.2.6.10 Registers 24...29: Limits(Read/Write)

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

12.2.6.11 Registers 30, 31: Fixed values (Read/Write)

Register 30	Fixed value for analog output; value (num) 0...20000 corresponds to 20 mA
Register 31	Fixed value for preset tare, see also **SetFixTare**, **GetFixTare** in Chapter 12.2.6.3.

12.2.6.12 Registers 80...92: State-controlled action bits (Write)

Note:

For setting bits, see Chapter 12.2.4.3.

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 12.2.4.3).

The bit is reset at the specified number +128.

Register 80	SetZero	Set the gross weight to zero.
Register 81	SetTare	Execute taring.
Register 82	ResetTare	Reset tare.
Register 83	SetTest	Start the ADC test.
Register 84	ResetTest	Finish the ADC test.

Register 85	ResetPwf	Reset the PowerFail bit (Register 1; the bit was set after power on).
Register 86	SetFixTare	Taring with weight in numerical address D 31 "Fixtare."
Register 87	GetFixTare	The current gross weight is copied into numerical address D31.
Register 89	ResetError	The **CmdError** error bit is reset.
Register 90	GetAlibi	Export selected data record from alibi memory.
Register 91	GetDate	Read current date and time.
Register 92	SetDate	Store (set) current date and time.

12.2.6.13 Registers 112...124: Transition-controlled action bits (Write)

For setting bits, see Chapter 12.2.4.3.

As soon as the bit was set, it is reset internally and the operation is handled; this is transition-controlled (for writing once).

The bit is set as **Write_Value_Select** with the specified number (see Chapter 12.2.4.3).

Register 112	SetZero
Register 113	SetTare
Register 114	ResetTare
Register 115	SetTest
Register 116	ResetTest
Register 117	ResetPwf
Register 118	SetFixTare
Register 119	GetFixTare
Register 121	ResetError
Register 122	GetAlibi
Register 123	GetDate
Register 124	SetDate

Note:

To prevent excessively frequent writing in the EAROM memory, the write interval should not be less than 15 seconds.

12.3 Filling protocol (64-Byte) for the "EasyFill" application

The "EasyFill" application uses a 64-byte interface.

The 8-byte scale protocol for the "Standard" application is not available.

12.3.1 Write window (input area)

Data are transferred from the master (PLC) to the slave (PR 5410) in this window.

12.3.2 Read window (output area)

Data are transferred from the slave (PR 5410) to the master in this window.

The data required for monitoring and controlling filling does not fit in a 64-byte write window. For this reason the system differentiates between system and material parameters. The value of the first byte can be used to determine whether the data refers to the system or the material.

12.3.3 Indicator functions

E.g., gross, net, tare; all indicator statuses and commands are available at the same time.

In contrast to the 8-byte interface, in the 64-byte interface the parameters, statuses, and values are all available simultaneously.

Some values may be output as data type DINT or REAL depending on write bit 2 in byte 2.

12.3.4 Filling functions

12.3.4.1 Filling start

12.3.4.1.1 General information

There are two ways to carry out filling:

- (A) Filling parameters are written at each start by the PLC.
- (B) Filling parameters are stored in the device (PR 5410).

Requirements:

The system is ready.

The device has been checked to ensure it is ready for the start of filling. It is ready when no filling is currently taking place and no parameters are being changed.

This status is signaled by bit 2 (Ready) in byte 3.

12.3.4.1.2 Filling start A

The material parameters can be found in the PLC.

1. Write the material parameters.
   - Set point
   - Preset
   - Material overshoot (OVS)
   - Tolerance above/below set point
   - Calming time
2. Set start bit:

   Byte 1

   These parameters are applied with the rising edge of the start bit. If the parameters are valid, the filling process is started and the Dosing_Run bit is set.

   The end of the filling process is signaled by the falling edge of the Dosing_Run bit.

12.3.4.1.3 Filling start B

The material parameters can be found in the device material table (PR 5410).

1. Write the material ID to byte 3.
2. Set start bit:

0000 1000 in byte 1

12.3.4.2 Filling control

12.3.4.2.1 Pausing filling

Requirements:

The system is filling, i.e.,

- the Dosing_Run bit is active

  and

- the hold bit is not active

Example:

Set stop bit with 0100 0000 in byte 1.

Filling stops with the rising edge and the system goes to the hold status (hold state).

If the system is in hold state, filling can be restarted or canceled.

12.3.4.2.2 Restarting filling

Requirements:

The system stops, i. e., the Hold_state bit is active.

Example:

Set stop bit with 0010 0000 in byte 1.

Filling starts again with the rising edge and the system leaves the hold status (hold state) and continues filling.

12.3.4.2.3 Canceling filling

Requirements:

The system stops, i. e., the Hold_state bit is active.

Example:

Set cancel bit with 0001 0000 in byte 1.

Filling starts again with the rising edge and the system leaves the hold status (hold state) and goes back to the ready status (ready/idle).

12.3.4.3 Filling report

The filling results are stored after filling and only overwritten when there is a new result.

12.3.4.4 Filling error

Last_Error

The last error number is retained until it is reset.

The possible error numbers are listed in Chapter 16.6.2.

12.3.4.5 Reading the material table

The material parameters can be read from the material table of the device (PR 5410).

Procedure:

1. Write the material ID to byte 3.
2. Write command 1 to byte 0 in order to see the material parameters on the read side.
3. Write command 0000 0001 to byte 2 in order to copy the material parameters from the material table.

▷ If all parameters of the material were available to be read, 1000 0000 is set to byte 2.

4. Write command 0 to byte 0 in order to see the filling parameters again on the read side.

12.3.5 Setup of the fieldbus interface

For description of the data types see Chapter 13.2.

12.3.5.1 PLC → write window EasyFill

Bytes 0...63	Name	Type of data	Function
Byte 0	TableSelect	USINT	The first byte controls (multiplexes) the data written in the read window by the device. A "0" describes the read window according to the system data layout. A "1" copies the material data to the read window.
Byte 1 Bit 0: MSB	Bit 0: start filling Bit 1: stop filling Bit 2: restart filling Bit 3: cancel filling Bit 4: load material and start filling Bit 5: print last filling result Bit 6: reserved Bit 7: reserved	BOOL	**Bit 0:** EasyFill adopts the sent material parameters from byte 4 with the rising edge of this bit. A valid set point (byte 4...7) that can be coded as DINT or REAL is required. The filling process can be started when the ready bit is set. **Bit 1:** rising edge during filling **Bit 2:** rising edge in the stop status (hold state) **Bit 3:** rising edge in the stop status (hold state) **Bit 4:** rising edge: A valid material ID is required in byte 3. **Bit 5:** rising edge: The printout of the last filling result starts.

Bytes 0...63	Name	Type of data	Function
Byte 2	Bit 0: reset power failure (power fail) Bit 1: reset error Bit 2: weights as DINT Bit 3: zero Bit 4: tare Bit 5: reset tare Bit 6: filling mode Bit 7: read material from the material table	BOOL	**Bit 0:** rising edge **Bit 1:** rising edge: resets the error flag and error code. **Bit 2:** status-controlled: Value: 0 = Real, 1 = DINT **Bit 3:** rising edge **Bit 4:** rising edge **Bit 5:** rising edge **Bit 6:** status-controlled: 0 = fill, 1 = empty **Bit 7:** rising edge: A valid material ID is required in byte 3. Filling does not start. This function can be used to display material parameters on external displays.
Byte 3	Material ID	BYTE	Value range: 1...10
Byte 4...7	Set point	DINT/REAL	Weight
Byte 8...11	Preset	DINT/REAL	Preset point for switching from coarse flow to fine flow.
Byte 12...15	Material overshoot (OVS)	DINT/REAL	Weight
Byte 16...19	Calming time	DINT	[ms]
Byte 20...23	Tolerance above set point	DINT/REAL	Weight
Byte 24...27	Tolerance below set point	DINT/REAL	Weight

12.3.5.2 Read window EasyFill → PLC

The data required for monitoring and controlling filling does not fit in a 64-byte write window. For this reason the system differentiates between system and material parameters. The value of the first byte can be used to determine whether the data refers to the system or the material.

12.3.5.2.1 System data

Before starting filling, a check must be carried out to ensure that the system is ready (byte 3: bit 2).

The Dosing_Run bit is set once filling has successfully started.

Bytes 0...63	Name	Type of data	Function
Byte 0	TableSelect	USINT	Content of read data: 0 = system data, 1 = material data

Bytes 0...63	Name	Type of data	Function
Byte 1 Bit 0: MSB	Bit 0: ADC error Bit 1: above max. + still permissible range (OVL) Bit 2: above max. (FSD) Bit 3: below zero Bit 4: zero ±¼ d Bit 5: within zero set range (ZSR) Bit 6: weight is stable Bit 7: weight above max. (FSD) and below overload	BOOL	
Byte 2	Bit 0: read material data valid Bit 1: change calibration Bit 2: tare Bit 3: reserved Bit 4: reserved Bit 5: power failure (power fail) Bit 6: within menu [Set-up]/[Configuration] Bit 7: filling mode	BOOL	**Bit 0:** The material data is available. **Bit 1:** Calibrate weighing point. **Bit 2:** Set tare of the instrument. **Bit 5:** After a power failure the bit is set and can be reset by bit 0 in byte 2. **Bit 6:** Filling is not possible within the menu items. **Bit 7:** status-controlled: 0 = fill, 1 = empty
Byte 3	Bit 0: error in the application Bit 1: filling is active Bit 2: system ready Bit 3: filling stopped Bit 4: coarse flow Bit 5: fine flow Bit 6: calming time Bit 7: tolerance alarm	BOOL	**Bit 0:** Error bit is set if any action has failed. We recommend evaluating the error bit (Appl_Error) and the detailed error code in byte 63 after each action. **Bit 1:** The filling phase is active. **Bit 2:** The system is ready for filling. **Bit 3:** Filling was stopped. **Bit 4:** System is filling: coarse flow bit is set. **Bit 5:** System is filling: fine flow bit is set. **Bit 6:** The bit is set according to the set calming time. **Bit 7:** alarm if tolerance is above/below set point
Byte 4...7	Gross	DINT/REAL	Weight
Byte 8...11	Net	DINT/REAL	Weight
Byte 12...15	Tare	DINT/REAL	Weight

Bytes 0...63	Name	Type of data	Function
Byte 16...19	Max. weight (FSD)	DINT/REAL	Weight
Byte 20...23	Min. weight	DINT/REAL	Weight
Byte 24...27	Scale interval	DINT/REAL	Weight
Byte 28	Exponent	USINT	Number of decimal places Example: 1.23 is displayed Exponent: 2
Byte 29...30	Unit	STRING_2	Unit in plain text "t ", "kg", "g ", "lb"
Byte 31	Reserved		
Byte 32...35	Gross filling result	DINT/REAL	The filling results are stored after filling and only overwritten when there is a new result.
Byte 36...39	Tare filling result	DINT/REAL	
Byte 40...43	Net filling result	DINT/REAL	
Byte 44...47	Set point filling result	DINT/REAL	
Byte 48...51	Date of filling result	DINT	**Example:** 20161116h corresponds to November 16, 2016
Byte 52...55	Time of filling result	DINT	**Example:** 14153199h corresponds to 14:15:31 and 99 ms
Byte 56...59	Sequence number of filling result	DINT	Sequential number
Byte 60	Filling result status	BYTE	1 = successful, 2 = tolerance alarm, 3 = canceled
Byte 61...62	Reserved		
Byte 63	"Last_Error" error		The last error number is retained until it is reset (for possible errors see Chapter 16.6.2).

12.3.5.2.2 Material data

The first 15 bytes and byte 63 (Last_Error) correspond to the layout of the system data.

Bytes 0...63	Name	Type of data	Function
Byte 0	TableSelect	USINT	Content of read data: 0 = system data, 1 = material data

Bytes 0...63	Name	Type of data	Function
Byte 1 Bit 0: MSB	Bit 0: ADC error Bit 1: above max. + still permissible range (OVL) Bit 2: above max. (FSD) Bit 3: below zero Bit 4: zero ±¼ d Bit 5: within zero set range (ZSR) Bit 6: weight is stable Bit 7: weight above max. (FSD) and below overload	BOOL	
Byte 2	Bit 0: trigger material data reading Bit 1: change calibration Bit 2: tare Bit 3: reserved Bit 4: reserved Bit 5: power failure (power fail) Bit 6: within menu [Set-up]/[Configuration] Bit 7: filling mode	BOOL	**Bit 0:** Reading of material data was triggered by the fieldbus. **Bit 1:** Calibrate weighing point. **Bit 2:** Set tare of the instrument. **Bit 5:** After a power failure the bit is set and can be reset by bit 0 in byte 2. **Bit 6:** Filling is not possible within the menu items. **Bit 7:** status-controlled: 0 = fill, 1 = empty
Byte 3	Bit 0: error in the application Bit 1: filling is active Bit 2: system ready Bit 3: filling stopped Bit 4: coarse flow Bit 5: fine flow Bit 6: calming time Bit 7: tolerance alarm	BOOL	**Bit 0:** Error bit was set. **Bit 1:** The filling phase is active. **Bit 2:** The system is ready for filling. **Bit 3:** Filling was stopped. **Bit 4:** System is filling: coarse flow bit is set. **Bit 5:** System is filling: fine flow bit is set. **Bit 6:** The bit is set according to the set calming time. **Bit 7:** alarm if tolerance is above/below set point
Byte 4...7	Gross	DINT/REAL	Weight
Byte 8...11	Net	DINT/REAL	Weight
Byte 12...15	Tare	DINT/REAL	Weight
Byte 16	Material ID	BYTE	Current material ID

Bytes 0...63	Name	Type of data	Function
Byte 17	Reserved		
Byte 18...35	Material name	STRING_18	Current material name
Byte 36...39	Set point	DINT/REAL	Current set point
Byte 40...43	Preset	DINT/REAL	Current set point
Byte 44...47	Material overshoot (OVS)	DINT/REAL	Current set point
Byte 48...51	Calming time	DINT	Current set point
Byte 52...55	Tolerance above set point	DINT/REAL	Current set point
Byte 56...59	Tolerance below set point	DINT/REAL	Current set point
Byte 60...62	Reserved		
Byte 63	"Last_Error" error		The last error number is retained until it is reset (for possible errors see Chapter 16.6.2).

13 SPM

13.1 General information

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 OPC and ModBus communication. In addition, individual bits are copied back and forth between digital inputs and outputs and the SPM via the I/O configuration.

Note:

If a text is defined e.g. from SPM address B401, this must be defined in the OPC server from SPM address B400 so that the content actually begins at B401.

13.2 Elementary data types

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

All commands of the BOOL data type are executed with a rising edge.

Data type	Description	Value range
BOOL	bool	0 (FALSE) or 1 (TRUE)
SINT	short integer	-128 to 127
INT	integer	-32.768 to 32767
DINT	double integer	-2^{31} to $2^{31}-1$
LINT	long integer	-2^{63} to $2^{63}-1$
USINT	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 about 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 12/31/2099
TIME_OF_DAY	time of day (only)	00:00:00.00 to 23:59:59.99
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)

Data type	Description	Value range
BYTE	bit-sequence 8	...
WORD	bit-sequence 16	...
DWORD	bit-sequence 32	...
LWORD	bit-sequence 64	...

13.3 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

13.4 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	Standard only: Output limit 1–3
B4	**BYTE**	R	**Indicator status**
X32	BOOL	R	ADC error
X33	BOOL	R	> Max (FSD)
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 (FSD)
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)
X44	BOOL	R	No communication with xBPI scale (error 9)

SPM address	Data type	R/W	Function
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	Instrument is tared
X59	BOOL	R	Pendeo only: no standstill
X60	BOOL	R	Pendeo only: operation with a simulated load cell
X64	BOOL	R/W	Standard only: Read/write marker bit 1
X65	BOOL	R/W	Standard only: Read/write marker bit 2
X66	BOOL	R/W	Standard only: 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 value as tare
X119	BOOL	W	Store the current gross weight in the fixed tare memory (D31)
X120	BOOL	W	EasyFill only: Start printout. Standard only: Weight report
X121	BOOL	W	Reset error B19 = 0.
X123	BOOL	W	Read out current time and date.
X124	BOOL	W	Save (set) current time and date.
B16	USDINT	R	Exponent Number of decimal places Example: 1.23 is displayed Exponent: 2
B17	USDINT	R	Weight unit 1 = mg, 2 = g, 3 = kg, 4 = t, 5 = lb, 9 = oz
B18	USDINT	R	Scale interval (for multi-interval/multi-range = d1 or e1)
B19	BYTE	R	Last weighing point error, see Chapter 16.6.1.
B20	BYTE	R	Higher byte of product code (0x54)
B21	BYTE	R	Lower byte of product code (0x10)

SPM address	Data type	R/W	Function
B22	BYTE	R	Major part of version number (1.0)
B23	BYTE	R	Minor part of version number (1.0)
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 (FSD)
D15	DINT	R	Min weight
D16	DINT	R	Report: Gross weight
D17	DINT	R	Report: Net weight
D18	DINT	R	Report: Tare weight
D19	DINT	R	Report: Sequence number
D20	DINT	R	Application-independent: Flow value (weight change•100/minute) if no BCD card is installed. Standard only: BCD value for "transparent" mode
D21	DINT	R	Report: Date
D22	DINT	R	Report: Time, BCD display
D23	DINT	R	Activity counter, test of communication with device
D24	DINT	R	Standard only: Limit: Limit 1 on
D25	DINT	R	Standard only: Limit: Limit 1 off
D26	DINT	R	Standard only: Limit: Limit 2 on
D27	DINT	R	Standard only: Limit: Limit 2 off
D28	DINT	R	Standard only: Limit: Limit 3 on
D29	DINT	R	Standard only: Limit: Limit 3 off
D30	UDINT	R/W	Standard only: Analog output for "transparent" mode
D31	DINT	R/W	Write the value in the fixed tare memory.
B144	**BYTE**	R	EasyFill only: **Batching status 1**
X1152	BOOL	R	Batching mode active
X1153	BOOL	R	Batching mode ready/idle
X1154	BOOL	R	Batching mode error
X1155	BOOL	R	Batching mode in setup

SPM address	Data type	R/W	Function
B145	**BYTE**	R	EasyFill: **Batching status 2**
X1160	BOOL	R	Batching in progress
X1161	BOOL	R	Batching stopped
X1162	BOOL	R	Coarse flow
X1163	BOOL	R	Fine flow
X1164	BOOL	R	Calming
X1165	BOOL	R	Tolerance alarm
B146	**BYTE**	W	EasyFill only: **Batching command 1**
			Start batching with the current record:
X1168	BOOL	W	Start/Restart
X1169	BOOL	W	Stop/Cancel
			Load a defined material and start in one step:
X1170	BOOL	W	Start ID 1
X1171	BOOL	W	Start ID 2
X1172	BOOL	W	Start ID 3
X1173	BOOL	W	Start ID 4
X1174	BOOL	W	Start ID 5
X1175	BOOL	W	Start ID 6
B147	**BYTE**	W	EasyFill only: **Batching command 2**
X1176	BOOL	W	Start ID 7
X1177	BOOL	W	Start ID 8
X1178	BOOL	W	Start ID 9
X1179	BOOL	W	Start ID 10
X1180	BOOL	W	Print report
X1181	BOOL	W	Reset error status D67 = 0
B148	**BYTE**	W	EasyFill only: **Batching command 3**
X1182	BOOL	W	Load selected material
X1183	BOOL	W	Save selected material
B149	BYTE	R/W	EasyFill only: Batching modes (1 = B1; 2 = B4)
W76	DINT	R/W	EasyFill only: Material ID
B156–173	BYTE	R/W	EasyFill only: Material name for ID1–10
D44	DINT	R/W	EasyFill only: Set point
D45	DINT	R/W	EasyFill only: Preset
D46	DINT	R/W	EasyFill only: Material overshoot (OVS)
D47	DINT	R/W	EasyFill only: Calming time [ms]
D48	DINT	R/W	EasyFill only: Tolerance below set point
D49	DINT	R/W	EasyFill only: Tolerance above set point
W104 (B208)	WORD	R	EasyFill only: Report: Material ID
B212–229	BYTE	R	EasyFill only: Report: Material name
D58	DINT	R	EasyFill only: Report: Batched weight
D59	DINT	R	EasyFill only: Report: Set point

SPM address	Data type	R/W	Function
D60	DINT	R	EasyFill only: Report: Preset
D61	DINT	R	EasyFill only: Report: Material overshoot (OVS)
D62	DINT	R	EasyFill only: Report: Calming time [ms]
D63	DINT	R	EasyFill only: Report: Tolerance below set point
D64	DINT	R	EasyFill only: Report: Tolerance above set point
D67	DINT	R	EasyFill only: "Last_Error" error, see Chapter 16.6.2
OPC server only			
R264	REAL	R	Gross weight (as floating point number)
R265	REAL	R	Net weight (as floating point number)
R266	REAL	R	Tare weight (as floating point number)
R267	REAL	R	Current gross/net weight selected with X72 (as floating point number)
R270	REAL	R	Max weight (FSD) (as floating point number)
R271	REAL	R	Min weight (as floating point number)
R272	REAL	R	Report: Gross weight (as floating point number)
R273	REAL	R	Report: Net weight (as floating point number)
R274	REAL	R	Report: Tare weight (as floating point number)
R280	REAL	R	Standard only: Limit: Limit 1 on (as floating point number)
R281	REAL	R	Standard only: Limit: Limit 1 off (as floating point number)
R282	REAL	R	Standard only: Limit: Limit 2 on (as floating point number)
R283	REAL	R	Standard only: Limit: Limit 2 off (as floating point number)
R284	REAL	R	Standard only: Limit: Limit 3 on (as floating point number)
R285	REAL	R	Standard only: Limit: Limit 3 off (as floating point number)
R287	REAL	R/W	Write the value in the fixed tare memory (as floating point number)
L17 X1088–1151	**LWORD** BOOL	W R	**SPM out** Output
L18 X1152–1215	**LWORD** BOOL	W R	**SPM out AND coarse** Output and coarse
L19 X1216–1279	**LWORD** BOOL	W R	**SPM out AND fine** Output and fine

Note:

The system variables (e.g.: ST_WGT_A) for communication via OPC are described in operating instructions PR 1792 (Chapter 4 + 5).

Example:

Production start

Write material parameters (D44–D49)

Start batching (X1168).

Monitor status (B144, B145).

Once batching is complete, read report data.

14 Repairs and maintenance

14.1 Repairs

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.

14.1.1 Battery for date/time

The lithium battery (5) for backing up the calendar/time chip is located beside the power supply on the main board (under the cover; see Chapter 4.4.1).

The lithium battery for backing up the calendar/time chip is located on the main board.

The battery is activated before the device leaves the factory.

Note:

After initial start-up, the date and time must be checked and set if necessary under Setup - [Date&Time].

14.1.2 Changing the battery for date/time

The device is equipped with a lithium battery for backing up the time/calendar chip. If the voltage drops below the specified minimum, or in case of defect, the battery must be replaced by Minebea Intec customer service or by an equivalent trained technician.

The battery is activated by setting the date and time under Setup - [Date&Time].

For disposal information, see Chapter 15.

For battery lifespan, see Chapter 17.3.1.

14.2 Maintenance

Maintenance work may only be carried out by a trained technician with expert knowledge of the hazards involved and the required precautions.

14.3 Soldering work

Soldering work on the device is neither required nor permitted.

14.4 Cleaning

NOTICE

Property damage caused by unsuitable cleaning utensils/agents.

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 blasting with compressed air is not permitted.

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.

15 Disposal

If the packaging is no longer required, please take it to your local waste disposal facility and/or a reputable disposal company or collection point. The packaging largely consists of environmentally friendly materials which can be used as secondary raw materials.

It is not permitted—even for small businesses—to dispose of this product with the regular household waste or at collection points run by local public waste disposal companies.

EU legislation requires its Member States to collect electrical and electronic equipment and dispose of it separately from other unsorted municipal waste so that it can then be recycled.

Before disposing of or scrapping the product, any batteries should be removed and taken to a suitable collection point.

Please see our T&Cs for further information.

Service addresses for repairs are listed in the product information supplied with the product and on our website (www.minebea-intec.com).

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

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: +49.40.67960.666

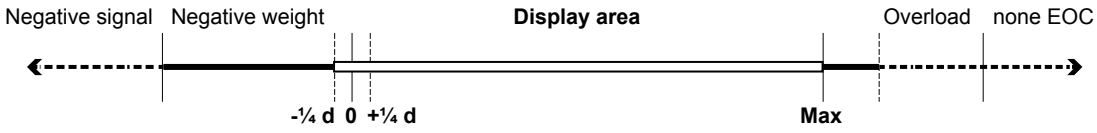
service.HH@minebea-intec.com

16 Error messages

16.1 Error messages measuring circuit

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

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



16.2 Error messages for xBPI scales

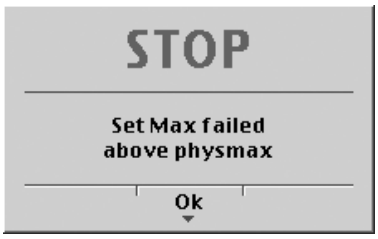
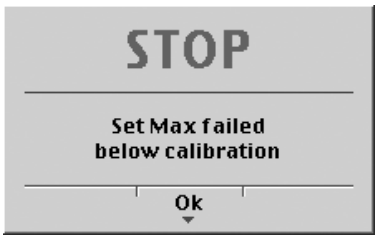
Display	VNC text	Error and possible cause	Remote display
Error 3	Ext. meas. device error	No weight values can be read from scale: - Scale error	Error 3
Error 4	Value exceeds display	The weight value is not displayed: - Too many digits have been set.	Error 4
Error 9	No values from scale	No communication with xBPI scale: - Cable break. - Internal scale error. - The scale is not connected to the power supply.	Error 9
Error 11	No weight data	No weight display: - Another weighing point was selected. Press OK to assign the new weighing point to the device. **Requirements:** Setup - [Serial ports parameter]- [xBPI port]- [Slot 1/2 RS 485] is selected.	Error •
Error 12	Scale not ready	The scale is not ready for weighing: - The device is in the warm-up phase. - The device is in automatic taring mode. - The device was switched on with the scale loaded. Switch the device off and on again.	Error <
Error 15	Wrong serial number	Serial number of scale does not match the number set in the device.	Error?

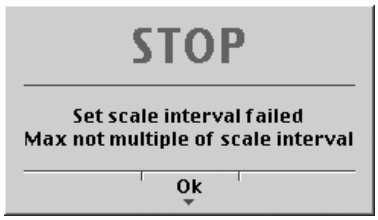
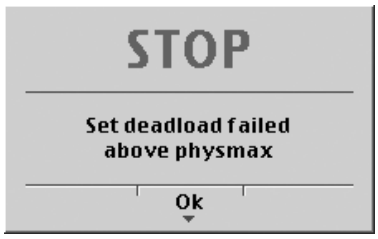
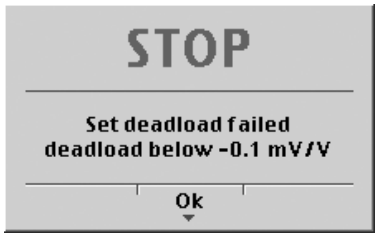
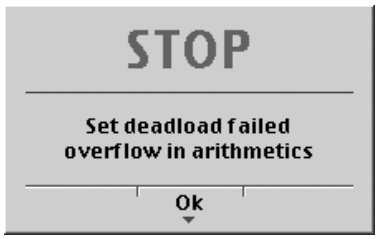
16.3 Error messages for Pendeo load cells

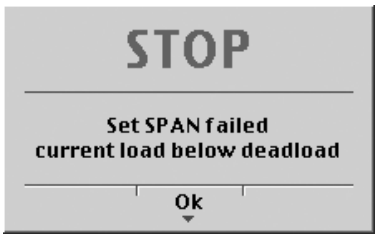
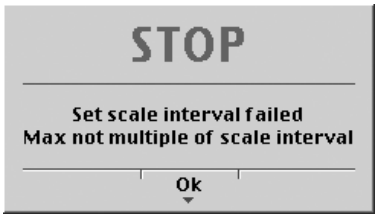
Display	VNC text	Error and possible cause	Remote display
Error 2	Overload	The measuring signal is higher than Max + (x d): - Wrong setting. - Too much weight on the scale.	Error 2
Error 4	Value exceeds display	The weight value is not displayed: - Too many digits have been set.	Error 4

Display	VNC text	Error and possible cause	Remote display
Error 8	Incompatible units	Incompatible units: - Incorrect calibration values e.g. due to incorrect calibration	Error 8
Error 9	No values from scale	No communication with Pendeo load cell: - Cable break. - Internal scale error. - The junction box is not connected to the supply voltage.	Error 9
Error 12	Scale not ready	The scale is not ready for weighing: - At least 1 load cell gives an error status or is defective (no communication).	Error <
Error 13	Wrong configuration	The number of load cells does not match the configuration.	Error =
Error 15	Wrong serial number	Serial number of scale does not match the number set in the device.	Error?

16.4 Error messages during calibration

Message	Possible causes
	This message displays, if the maximum load is too high.
	The maximum load of the scale can be increased retroactively. When the capacity is reduced, however, a message is displayed when the new maximum load is lower than the CAL weight ([Calibrated at]).
	This message is displayed if the selected resolution is too low, e.g., 5 kg.

Message	Possible causes
	This message is displayed if the selected resolution is so high that less than 0.8 internal counts per scale interval (d) and/or 0.5 µV/e are available if legal-for-trade acc. to OIML/NSC.
	This message displays if the maximum load is not an integer multiple of the scale interval.
	Weight units don't match, e.g., subsequent change for [Max] from kg into lb.
	This message is displayed when the dead load entered in mV/V plus scale interval in mV/V is higher than 3 mV/V (= 36 mV).
	This message displays, if the scale is not stable. **Remedy** - Check the mechanical function of the scale. - Adapt the filter setting; reduce the resolution. - Adapt the standstill conditions.
	This message is displayed when the measurement signal is negative when determining the dead load with [by load]. **Cause** Load cell connected with wrong polarity, or defective.
	This message is displayed when the dead load entered is › 5 mV/V.

Message	Possible causes
	This message displays, if the scale is not stable. **Remedy** - Check the mechanical function of the scale. - Adapt the filter setting; reduce the resolution. - Adapt the standstill conditions.
	This message is displayed if the weight on the scale is < the dead load after input of the weight value.
	The maximum capacity is not an integer multiple of the scale interval.

16.5 General error messages

Display	Error and Possible Cause
Err 21	BIOS is too old for the firmware.
Err 22	Firmware is too old for the BIOS.
Err 23	Boot not possible: - ROM error - No firmware found
Err 25	Plug-in card combination is not permissible.
Err 29	"Flash" process has failed.
Err 31	The digit group for IP address/mask is not within 0–255, or is invalid.
Err 32	The IP address is already in use. Two instruments with identical IP addresses.
Err 33	Wrong parameter
Err 34	No Ethernet cable (LINK) found
Err 41	Major system error
Err 42	Major system error in controls.
Err 43	Monitoring time has expired.
Err 44	Cannot save to EAROM.

Display	Error and Possible Cause
Err 45	Cannot load from EAROM.
Err 46	Wrong access code
Err 51	DeviceNet: Not all DIL switches are set to "ON."
Err 52	The selected optional card does not exist.
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.
Err 71	A weight error occurs during calibration via the front panel if the connection to the weighing point is interrupted.
Err 72	This message is displayed for internal weighing point - during the warm-up phase. - when the device is in the automatic taring mode. - if the device has been switched on with the scale loaded. Switch the device off and on again.
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

Display	Error and Possible Cause
Err 86	xBPI weighing point is selected. This weighing point can only be calibrated via VNC.
Err 87	Sequence no. was not found in alibi memory.
Err 88	Sequence no. cannot be changed because the alibi memory is activated.
Err 89	No EW-Com interface assigned.
Err 90	No printer interface assigned.
Err 91	Linearization is active.
Err 92	xBPI interface cannot be opened.
Err 93	Too many Pendeo load cells were found.
Err 94	Search for Pendeo load cells is defective.
Err 95	Communication error with Pendeo load cells.
Err 96	Not all Pendeo load cells are the same type.
Err 97	Dead load cannot be set for Pendeo load cells.
Err 98	Weighing point cannot be assigned to the Pendeo load cell.
Err 99	xBPI communication is not assigned.

16.6 Error numbers @ "LAST_ERROR"

16.6.1 Weighing point error

Number	Display	Cause
2	in use	Weighing point is in use, e. g., by an application.
6	test active	Test is active, no weights.
7	cali active	Calibration is active, no weights.
8	no standstill	No standstill of the scale.
13	tare is active	Tare is active.
15	weight is dimmed	Weight is not legal-for-trade (<0 or >max.).
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.
102	timeout	Only on xBPI scales: Time limit exceeded when sending a command to the scale.
142	calibration active	During calibration, 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.

16.6.2 Error in the "EasyFill" application

Number	Display	Cause
0		No error.
1	fatal error	Weight error; weighing point is faulty.
2	Material ID invalid	Number <0 or >10 entered.
3	Material name invalid	Material name is invalid.
4	Set point invalid	Set point + gross value > scale end value, (B1 mode) or gross value.
5	Preset point invalid	Value > set point.
6	OVS invalid	Value > set point.
8	Neg. tol. invalid	Value > set point.
9	Pos. tol. invalid	Value > set point.
10	Sequence number invalid	Sequence number is invalid.
13	Invalid fieldbus command	Fieldbus action is invalid (e. g., simultaneous start and stop command).
15	Cannot read from earom	Error when reading a material entry from the hard drive memory (EAROM) → hardware error
16	Cannot write to earom	Error when writing a material entry to the hard drive memory (EAROM) → hardware error
17	Action not allowed	Fieldbus action is not permitted. Example: Starting filling during an ongoing filling process or starting filling when querying the system setup.
18	Weight unit of material invalid	The unit of the weighing point does not match the unit of the material.

17 Specifications

17.1 Note on using "free software"

The firmware on the PR 5410 device contains "free software" that is licensed under the

- GNU General Public License (GPL) Version 2, June 1991, and
- GNU Lesser General Public License (LGPL) Version 2.1, February 1999.

This "free software" developed by third parties is copyrighted and is provided free of charge. The license terms and conditions of Free Software Foundation, Inc. in English are included in the delivery of the device. The source text for the terms and conditions can be found on the CD-ROM included.

17.2 Decoding the serial number

30 252 00015		
30	252	00015
Location no.: 30 = Hamburg	Code for the year/month: 252* = April 2010	Current number

* Is increment according to the year group table of Minebea Intec.

17.3 General data

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

17.3.1 Backup battery for time/date

The lithium battery for backing up the date/time chip is activated before the instrument leaves the factory.

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

17.3.2 Supply voltage connection 230 V AC

Supply voltage	100 to 240 V AC	+10%/-15%, 50/60 Hz
Max. power consumption	11 W/13 VA	
Primary fuse	800 mAT; 5 × 20 mm;	

17.3.3 Supply voltage connection 24 V DC

Supply voltage	24 V DC	±20%
Max. power consumption	11 W	
Primary fuse	1.6 AT; 5 × 20 mm	

17.4 Effect of ambient conditions

17.4.1 Ambient conditions

Temperature range	Reference temperature	23°C
	Ambient temperature for operation	-10 to +50°C
	Ambient temperature for use in legal metrology	-10 to +40°C
	Power-on temperature	0 to +50°C
	Limits for storage/transport	-20 to +70°C
Moisture		<95%, non-condensing (acc. to IEC 60068-2)
Protection class		Housing: IP30 Front panel: IP65
Altitude		<2000 m

17.4.2 Electromagnetic Compatibility (EMC)

All data in compliance with NAMUR NE 21, EN 45501 and EN 61326.

Housing	High frequency electromagnetic fields (80...1000 MHz)	EN 61000-4-3	10 V/m
	Electrostatic discharge (ESD)	EN 61000-4-2	6/8 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 V
	Conducted disturbances by high frequency coupling (0.15...80 MHz)	EN 61000-4-6	10 V
	Voltage dips	EN 61000-4-11	0/40% 20/200 ms
	Mains failure link	EN 61000-4-11	20 ms

17.4.3 RF interference suppression

Interference emission		According to EN 61326, limit value class A, for industrial sectors

17.5 Weighing electronics

The weighing electronics are suitable for connection of strain-gauge load cells.

17.5.1 Load cells

Load cell type	DMS cells	6 or 4-wire connection possible
Supply voltage	12 V DC	- for I_{max} = 160 mA - for max. 8 load cell with je 650 Ω - 4 load cells with 350 Ω each
Sense voltage monitoring		Shortfall of +4 V DC -4 V DC is recognized. Can be turned off by software.
Max. load	≥75 Ω	

17.5.2 Principle

Principle	DC voltage, delta-sigma converter, ratiometric to the load cell supply voltage
Conversion/measuring time	5, 10, 20, 40, 80, 160, 320, 640, 960, 1200, 1600 ms
Digital filter	Can be activated, active 4th order (low pass) Characteristic: Bessel, aperiodic, Butterworth, Tscheby-scheff
Limit frequency	configurable

17.5.3 Accuracy and stability

Accuracy*	0.5 µV/e corr. to 3 mV for 6000 e 0.5 µV/e corr. to 5 mV for 10,000 e Class III, according to OIML R76/EN45501
Min. measuring signal (OIML)*	6,000 e: ≥0.25 mV/V 10,000 e: ≥0.42 mV/V
Linearity*	<0.003 %
Zero standstill error (TK_0)*	<0.05 µV/K RTI; ≤0.004 %/10K at 1 mV/V
SPAN stability error (Tk_{span})*	< ±2.5 ppm/K

* with a measurement time of 160 ms.

17.5.4 Sensitivity

Sensitivity	0.5 µV/e @ 10,000 e (Cl. III) OIML R76
Max. resolution	7.5 million internal counts at 3 mV/V
Measuring input (measuring signal + dead load)	0...max. 36 mV DC, symmetrical to zero

Dead load suppression	Max. measuring signal of 36 mV DC (dead load + range); input/calibration via software

17.5.5 Connecting cables

Length of the connecting cable between junction box and instrument

Cable type	PR 6135, PR 6135A	Max. 500 m – length of the load cell cable

Length of the connecting cable between weighing platform and instrument

Cable type	LiYCY	max. 500 m

17.6 Mechanics

17.6.1 Design

Metal housing made of aluminum with steel cover and rear panel, protection class IP65 (front).

17.6.2 Weights

Net weight	1.45 kg
Shipping weight	2.00 kg

17.7 Documentation on the CD included

Certificates and manuals are found on the PR 5410 CD.

18 Appendix

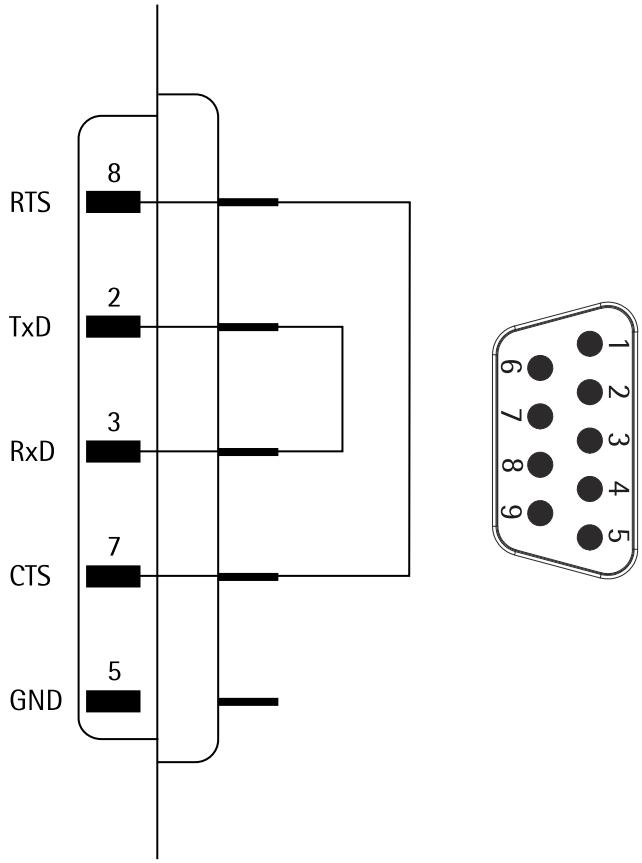
18.1 Spare parts

Spare part no.	Spare part description
5322 530 51247	Installed sealing ring
5312 253 98005	Fuse 800 mA T 250 V 5×20 mm
5312 256 98005	Bracket set including screws
5312 264 58017	7-pin I/O connector
5312 447 98006	Optional panels with screws
5312 505 18015	Knurled screw set for brackets
5322 214 90581	Display PCB with screen
5312 253 98006	Fuse 1.6 A T 250 V 5×20 mm (for 24 V devices)
5312 455 98052	Keypad overlay
5322 214 90084	Main board 230 V
5322 214 90085	Main board 24 V
5312 138 18014	Buffer battery *3 V/120 mAh)
5312 264 48017	6-pin connector
5312 264 58018	Fuse terminal (for 24 V devices)
5322 214 90582	Converter 230 V-24 V

18.2 Test connector

for the RS-232 interface

Pin assignment



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