Minebea intec
The true measure

Instrument manual

Transmitter Series PR 5220

Translation of the original instrument manual | 9499 050 52201 | Edition 10.9.0 | 02/07/2025

Release 4.60.xx

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Foreword

Must be followed!

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

Note

Table of contents

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 operating instructions look like

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

▶ is placed before a step.

▷ describes the result of a step.

1.3 This is what lists look like

- indicates an item in a list.

1.4 This is what menu items and softkeys look like

[ ] frame menu items and softkeys.

Example:

[Start]- [Applications]- [Excel]

1.5 This is what the 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 death or severe, irreversible personal injury which will occur if the corresponding safety measures are not observed.

▶ Take the corresponding safety precautions.

⚠ WARNING

Warning of hazardous area and/or personal injury

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

▶ Take the corresponding safety precautions.

⚠ CAUTION

Warning of personal injury.

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

▶ Take the corresponding safety precautions.

NOTICE

Warning of damage to property and/or the environment.

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

▶ Take the corresponding safety precautions.

Note:

User tips, useful information, and notes.

1.6 Hotline

Phone: +49.40.67960.444

Fax: +49.40.67960.474

eMail: help@minebea-intec.com

2 Safety instructions

2.1 General notes

⚠ CAUTION

Warning of personal injury.

The product 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 of the analysis device 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.

No warranty is given that the product is free of faults, especially not in conjunction with third-party software and hardware components required for operation.

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

2.3 Initial inspection

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

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 designed for mounting rail installation (35 mm, as per DIN 46277).

NOTICE

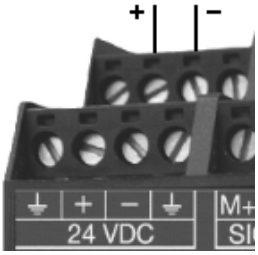
Excessive heat may reduce the device lifetime.

- When mounting on the rail, make sure that the distance from other instruments left and right of the device is at least 20 mm.

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

2.4.2 Supply voltage connection

Supply voltage U_{DC} = 24 V ±20 %



Max. power consumption:

- PR 5220/00: 6.5 W
- PR 5220/01: 8.5 W
- PR 5220/06: 8.5 W
- PR 5220/07: 8.5 W

For a connection to 230/115 V alternating current, an external power supply is required.

2.4.3 Protective ground connection

The protective ground connection is made via the support rails.

2.5 RF interference suppression

The device is intended for use in an industrial environment. Operation of this device in a residential environment is likely to cause radio frequency interference, see Chapter 17.4.3. In this case, the operator may be required to take 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

The device does not have any replaceable fuse.

The load cell supply is protected against short circuit.

In case of loss of load cell supply, disconnect the device from the supply voltage, find out the cause and eliminate it.

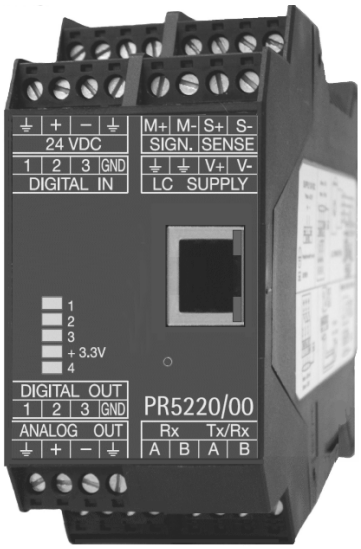
After this, the supply voltage can be switched on again.

3 Device description

3.1 Transmitter versions

3.1.1 General information

The transmitter of the PR 5220 series exists in 4 versions. A later extension of the version is not possible. Each type is clearly fixed by the corresponding number. The front overlays are adapted to the corresponding type.

PR 5220/00	PR 5220/01
	

PR 5220/06	PR 5220/07
	

3.1.2 PR 5220/00

This type has digital inputs and outputs as well as one analog output and a LAN-Adapter for configuring and operating of the device. At the serial output e.g. a remote display can be connected.

3.1.3 PR 5220/01 ProfiBus DP

In addition to PR 5220/00, the instrument is provided with a ProfiBus port.

3.1.4 PR 5220/06 ProfiNet I/O

In addition to PR 5220/00, the instrument is provided with two ProfiNet I/O ports.

3.1.5 PR 5220/07 EtherNet IP

In addition to PR 5220/00, the instrument is provided with two EtherNet-IP ports.

3.2 General notes

The instrument contains two applications:

- Default
- EasyFill

Most functions are supported by both applications.

A few functions are application-dependent.

3.3 Overview of the device

- Accuracy 10,000 d according to OIML R76
- Internal resolution 7.5 million counter steps
- Linearity <0.002%
- Measure rate is configurable: 6 to 100/sec
- Digital filter with adjustable characteristic line
- Electrically isolated interfaces
- 3 programmable pairs of limits
- Supply voltage connection U_{DC} = 24 V
- Connection via plug-in terminal blocks
- Socket for LAN adapter
- The device is snapped to a mounting rail.
- 5 status indicator LEDs for power supply, communication, error detection
- The "EasyFill" application allows for quick and reliable filling and emptying of vessels (for functional description, see Chapter 6.1).

The menu-guided calibration and configuration of the device are carried out on a notebook/PC.

- Calibration using weights according to the mV/V method or using load cell data (smart calibration)
- Analogue output 0/4 to 20 mA, configurable for gross/net weight
- Analog value via field bus
- 3 digital inputs, electrically isolated
- 3 digital outputs, electrically isolated

3.3.1 Communication protocols

For the internal RS-485:

- Remote display protocol
- ModBus-RTU (slave)
- SMA protocol
- xBPI protocol

Field bus (slave):

- PR 5220/01 ProfiBus DP
- PR 5220/06 ProfiNet I/O
- PR 5220/07 EtherNet-IP

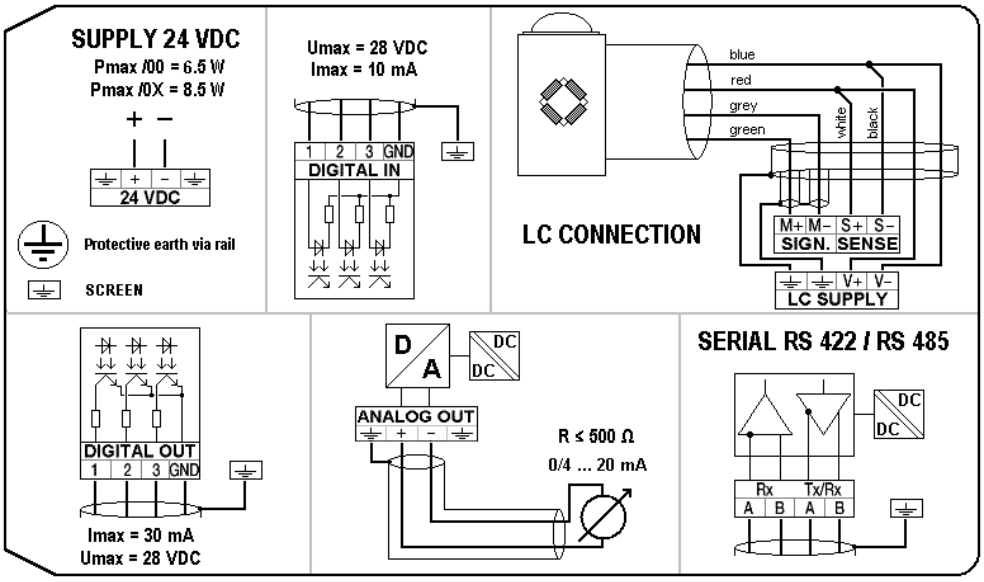
For the internal LAN:

- ModBus-TCP
- Ethernet TCP/IP
- OPC-UA, refer to the corresponding documentation

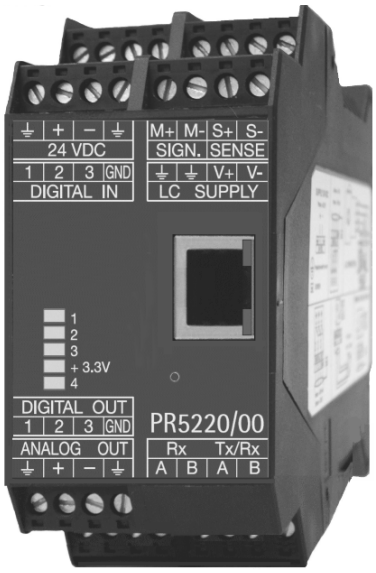
3.4 Housing

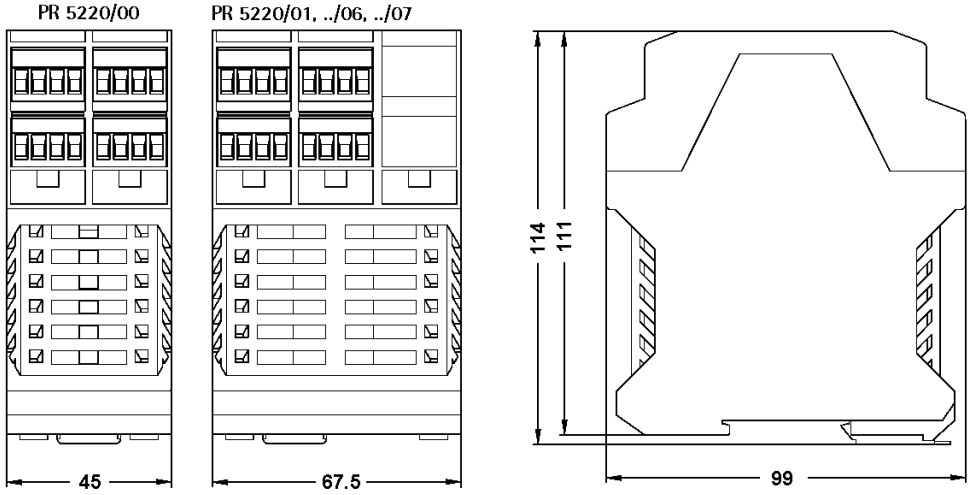
3.4.1 Sticker

The connection diagram is located on the side of the housing.



3.4.2 Dimensions





all dimensions in mm

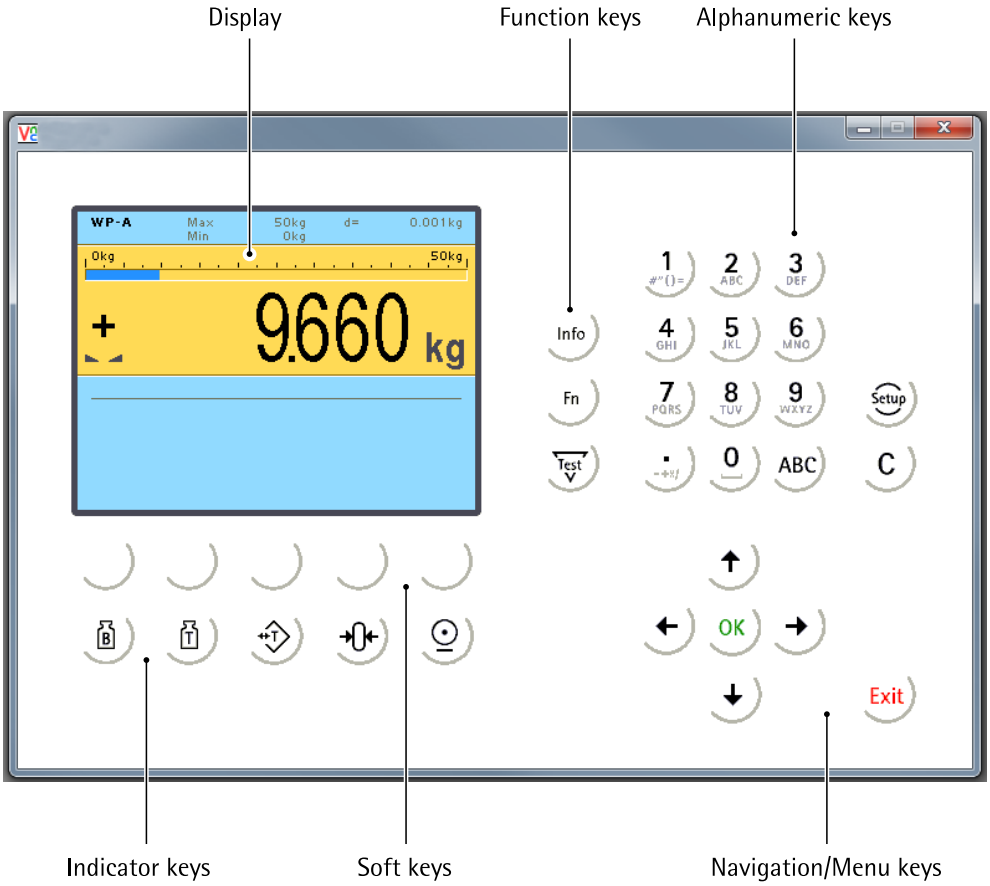
3.5 Display and operating elements

3.5.1 General information

The transmitter of the PR 5220 series can only be operated by Notebook/PC.

- VNC viewer (see Chapters 3.5.4.4 and 7.9) or
- WEB browser (see Chapter 7.10)

3.5.2 Overview



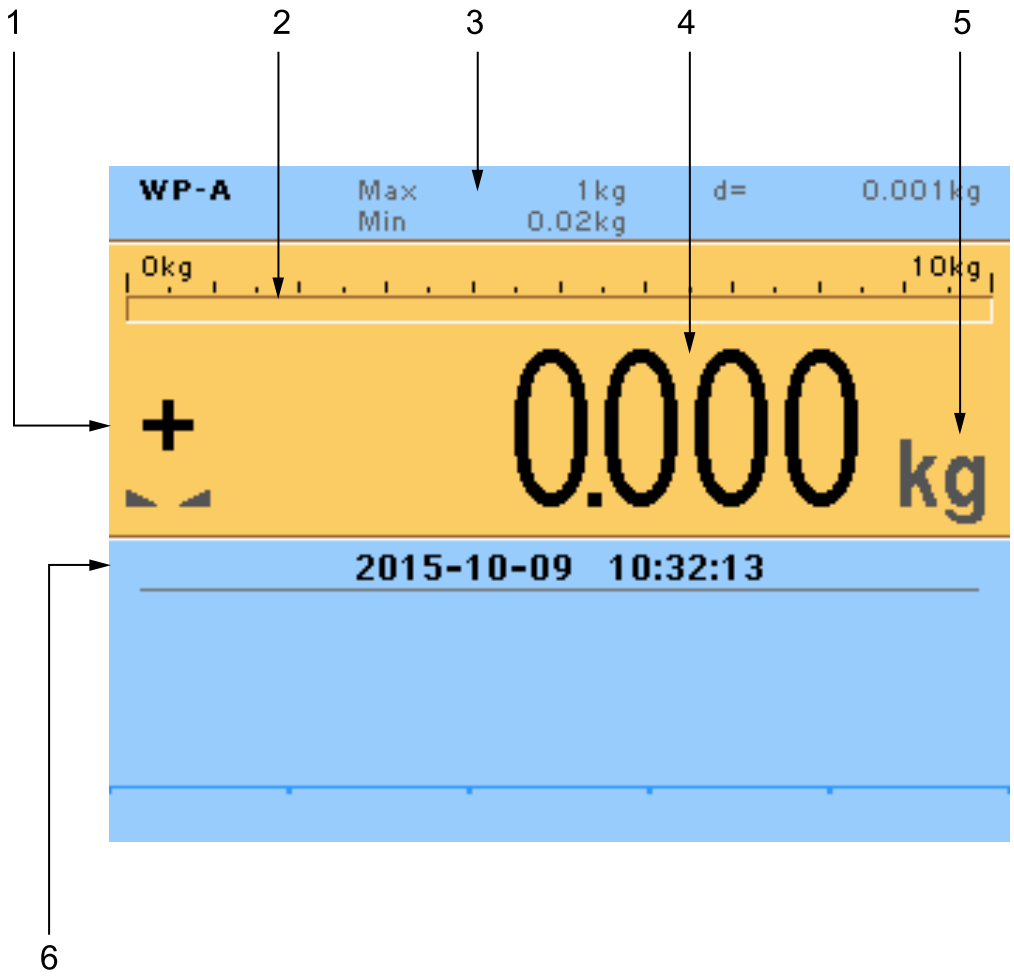
3.5.3 Display

3.5.3.1 User interface

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

The available mass units are t, kg, g, mg, lb, or oz.

Above the weight display on the user interface, the currently displayed weight is shown in a bar graph that indicates the percentage of the maximum capacity (Max). 0 is on the left, and 100% on the right.



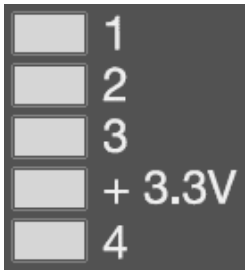
No.	Description
1	Weight type/plus or minus sign/standstill
2	Bar graph
3	Status display
4	Weight value
5	Symbols/mass unit
6	Info line

Weight type/plus or minus sign	Description
B	Gross weight
G	Gross weight in NTEP or NSC mode
N	Net weight (Net = gross - tare)
T	Tare weight
PT	Preset tare
TST	The weight display shows the test value without mass 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 batching is "stopped"; rapid flashing indicates "error status"

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

3.5.3.2 LEDs



The device has 5 green LEDs for the following status displays:

- Operational status
- Error status

Power supply, bus connection

LED	Power on	Bus	Bus connection not provided
1			
2			
3			
+3.3V	lit		
4		lit*	flashing 1 Hz

* The LED for bus activity (PR 5220/01 lights up as soon as there is a connection.

Note:

The LED remains lit, even if there is no communication or the physical connection is interrupted.

Weight status

LED	Standstill	± Null	< Null or > FSD**
1	lit		
2		lit	
3			lit
+3.3V			
4			

** FSD (full scale deflection)

Note:

For weight error status, see Chapter 16.2.

3.5.4 Operating elements

3.5.4.1 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.		
	**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

Setup	Access the Setup menu.	Test	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.
Info	Information on version number, fitted hardware, 10-fold resolution		**Softkeys 1...5** Select appropriate menu function, see also Chapter 3.5.4.2.
Fn	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.

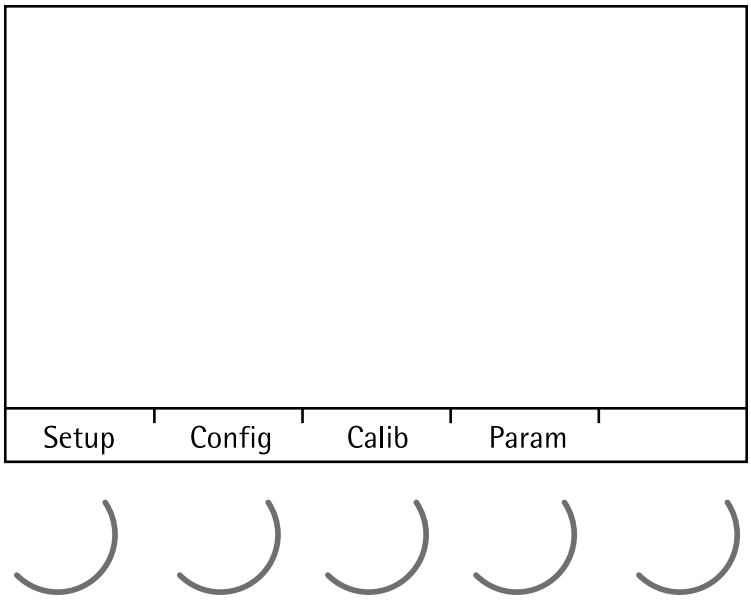
Press the ← cursor key within an entry to return to the previous character.

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.

3.5.4.2 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].

3.5.4.3 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.

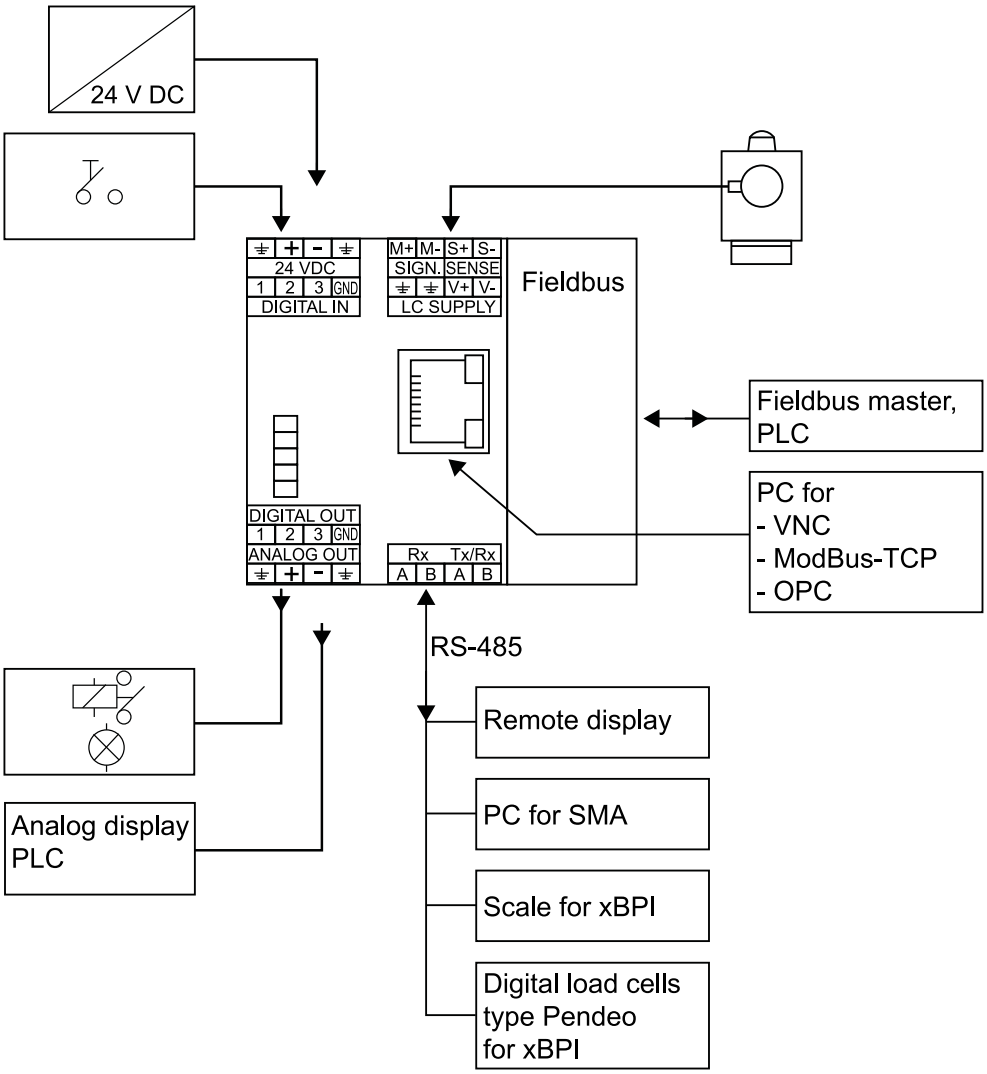
An arrow in front of a menu item indicates that there are menu sublevels.
Possible settings and an available selection list is indicated by double arrows.

The parameter is selected using the OK key.

3.5.4.4 Operation using VNC

User interface, see Chapters 3.5.2, 3.5.3.1 and 3.5.4.1.

3.6 Overview of connections



4 Device installation

4.1 General notes

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

Note:

When using in UL-regulated applications:

The transmitters PR 5220 must be installed in an NTRL end housing.

⚠ WARNING

Warning of hazardous area and/or personal injury

▶ All cable connections must be protected from damage.

Note:

- Measurement cables should be kept away from power equipment.
- Signal cables and measurement cables should be installed separately from electric power lines.
- 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.
- 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

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

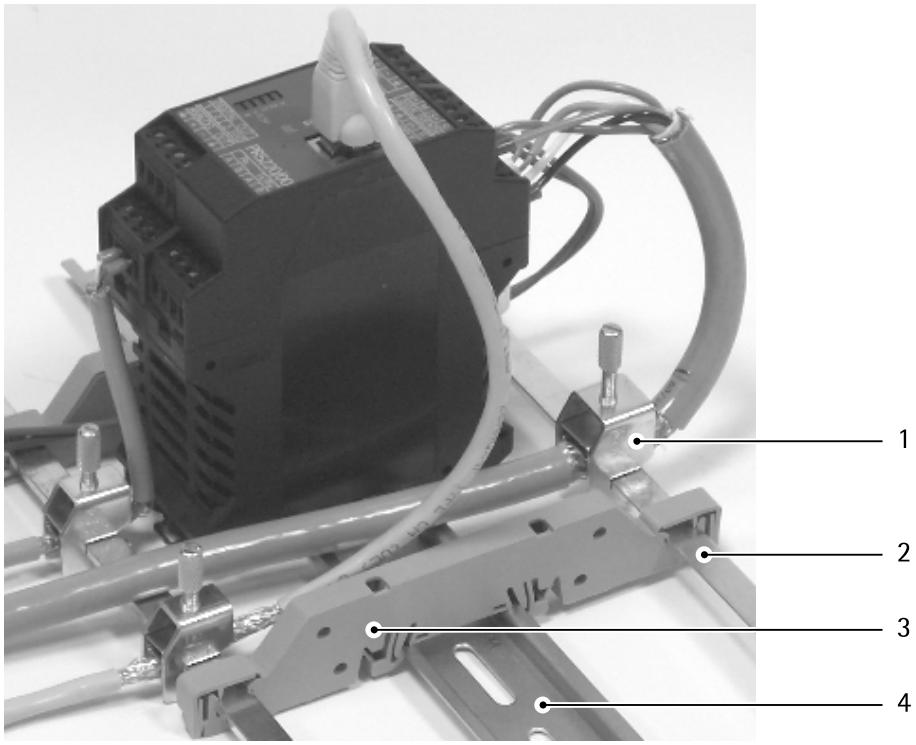
Other procedure:

- Install the device.
- Secure the cable at the place of installation, e.g. using cable ties.

- Remove the insulation from the cable ends and keep the strands short.
- Connect the screens to the screen clamping rail using screen terminals; see Chapter 4.3.
- Establish grounding/equipotential bonding between devices/system components.

4.3 EMC-compliant installation

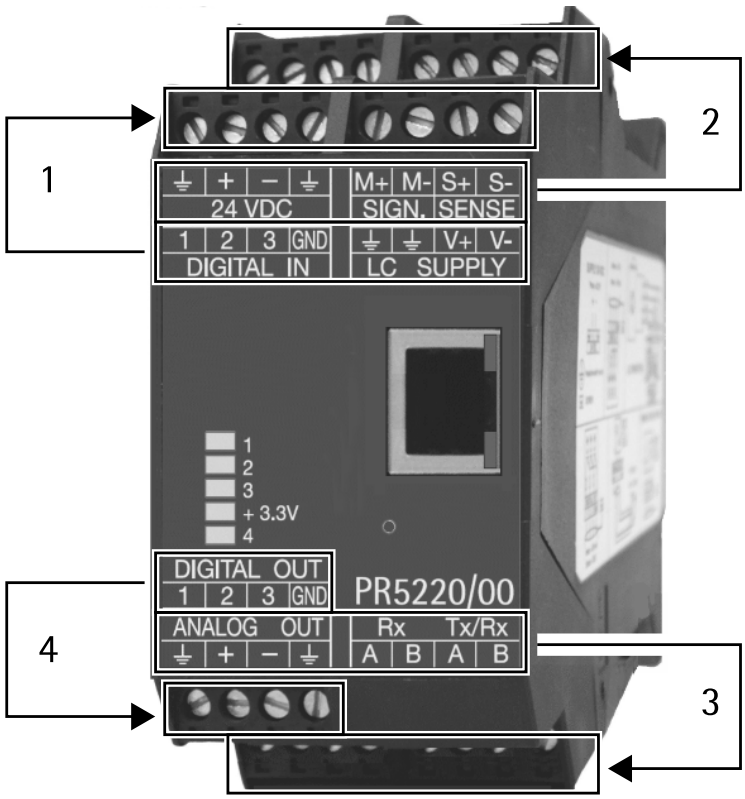
- Only use screened data cables.
- Connect screens to ground on both sides.
- Keep unscreened cable ends short.
- Establish a low-resistance connection between the screen clamping rail and the cabinet/housing.
- Use a metallic or metalized connector housing.
- Establish equipotential bonding between devices/system components (this is essential for Ex applications).
- Use a standardized reference potential.
- Connect the mounting rail to protective ground.
- Keep measurement and data cables away from power cables.



No.	Description
1	Screen clamp (e.g. Phoenix SK8-D)
2	Screen clamping rail (e.g. Phoenix NLS-CU 3/10)
3	Rail connector (e.g. Phoenix AB-SK 65D)
4	Mounting rail (35 mm)

4.4 Hardware construction

4.4.1 Notes on the connections



The labeling on the front side of the transmitter is assigned to the terminals as follows:

- bottom row to the front terminals (1)
- top row to the rear terminals (2)
- bottom row to the rear terminals (3)
- top row to the front terminals (4)

4.4.2 Network port

The device has an internal Ethernet port.

NOTICE

Damaged data will bring a stop to IT operations.

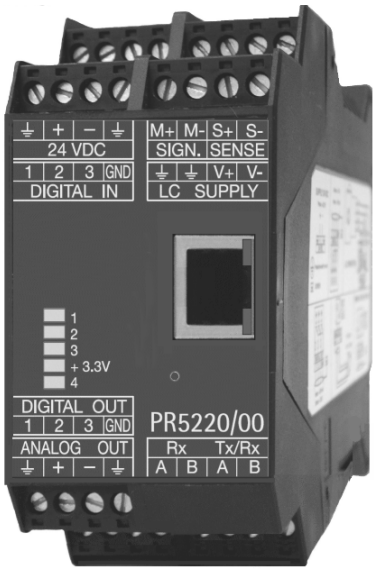
Protect the IT network to prevent unauthorized access.

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

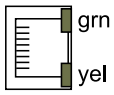
4.4.2.1 Ethernet port

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

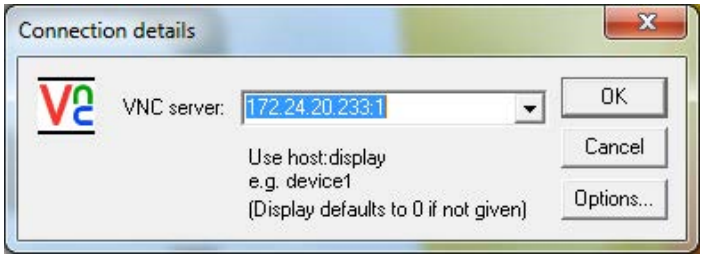
Function tests can be performed via the LEDs (green and yellow) in the RJ-45 socket.



Technical data

Description	Data
Connection 	RJ-45 socket on the device front 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

4.4.2.2 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).

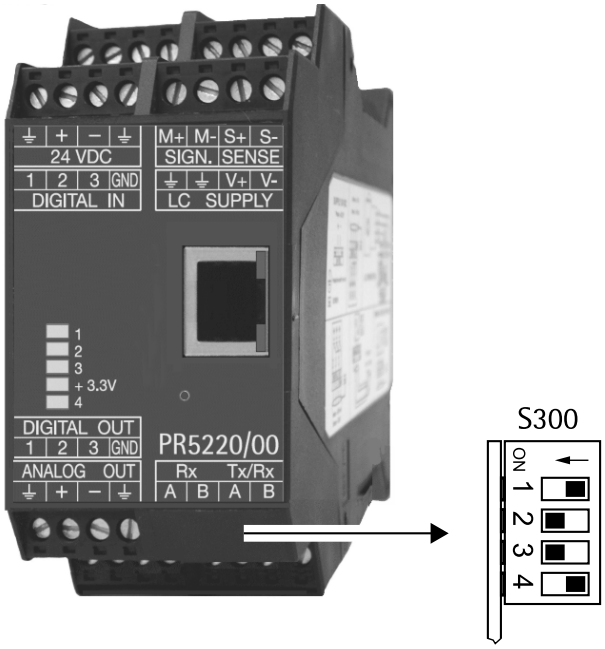
For the network address, see Chapter 7.7.

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

4.4.3 RS-485 interface

The device is equipped with an integrated RS-485 interface. The interface can be configured by software.

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



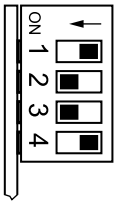
Technical data

Description	Data
Connection	Terminal, 4-pin
Number of channels	1
Type	RS-485, full duplex (4-wire) RS-485, half duplex (2-wire)
Transmission rate [bit/s]	300, 600, 1200, 2400, 4800, <9600>, 19200
Bits/Stopbit	<8/1> or 7/1
Parity	even, <uneven>, none
Signals	TxA, RxA (R-), TxB, RxB (R+)
Potential isolation	yes
Cable type	Twisted pair, screened (e.g., LifYCY 2×2×0.20)
Cable gauge	1.5 mm^2
Cable length	max. 1000 m

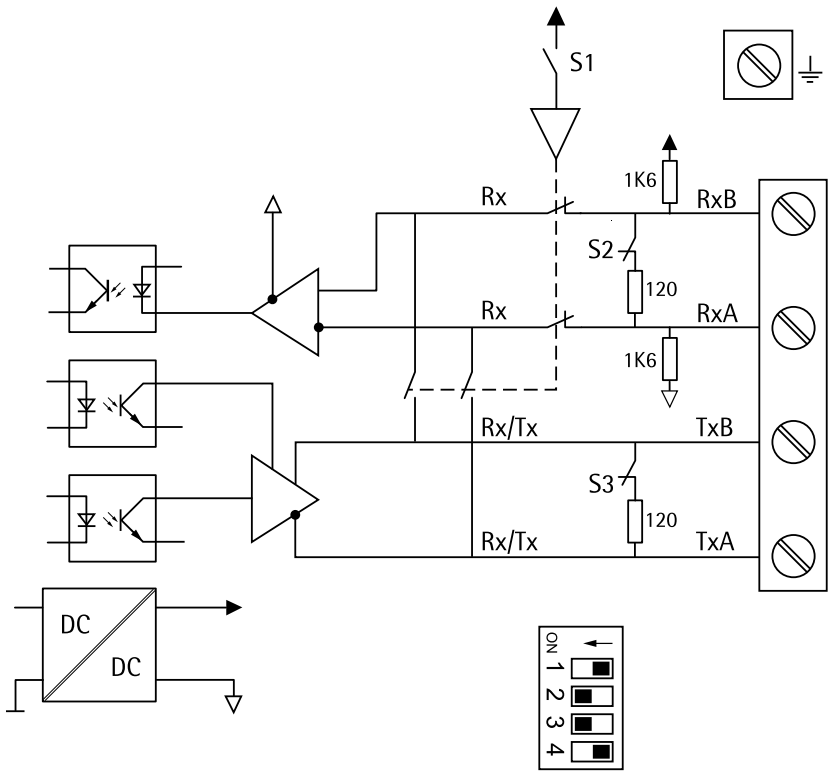
<...> = preset values (factory settings)

S300 switch

The S300 switch is located under a cover cap, which can be opened with a knife, see Chapter 7.1.3.2.
Factory settings:



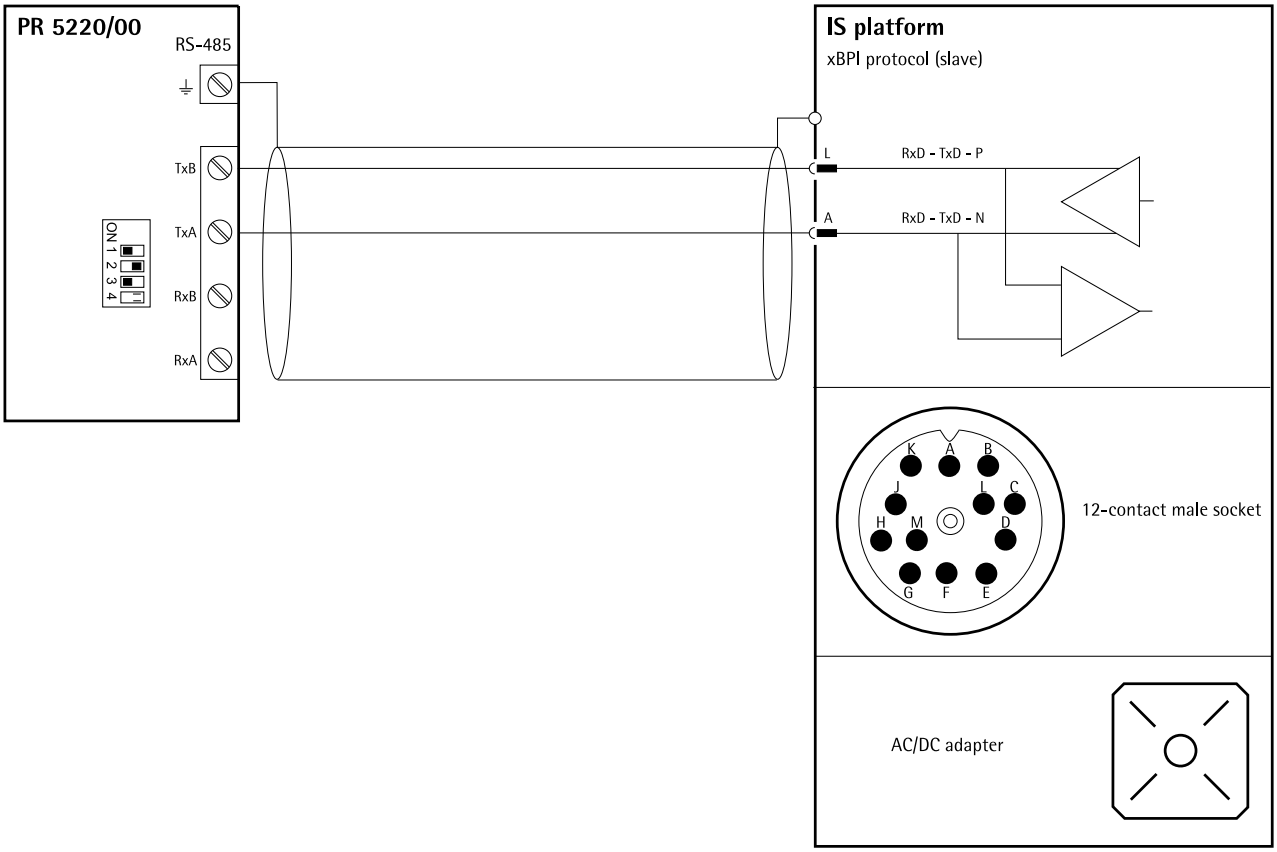
Block diagram RS-485



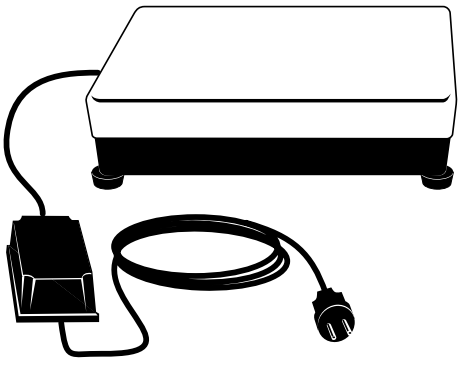
S	Function	Settings for RS-485	
1	Changeover 2 to 4 wires	OFF: 4-wire	ON: 2-wire
2	Rx bus termination	OFF: not connected	ON: (RxA 120 Ω RxB)
3	Tx/Rx bus termination	OFF: not connected	ON: (TxA 120 Ω TxB)
4	CAL switch see also Chapter 7.1.3.1.	OFF: no write protection	ON: Write protection active

4.4.3.1 Connecting an IS platform

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



PR 5220/00 switch settings	PR 5220/00 configuration
ON: S1, S2, S3 S4 not relevant	Setup - [Serial ports parameters] - [xBPI port] - [Built-in RS-485]



Note:

For further information, see the platform scale operating instructions.

4.4.3.2 Connecting digital load cells from Minebea Intec

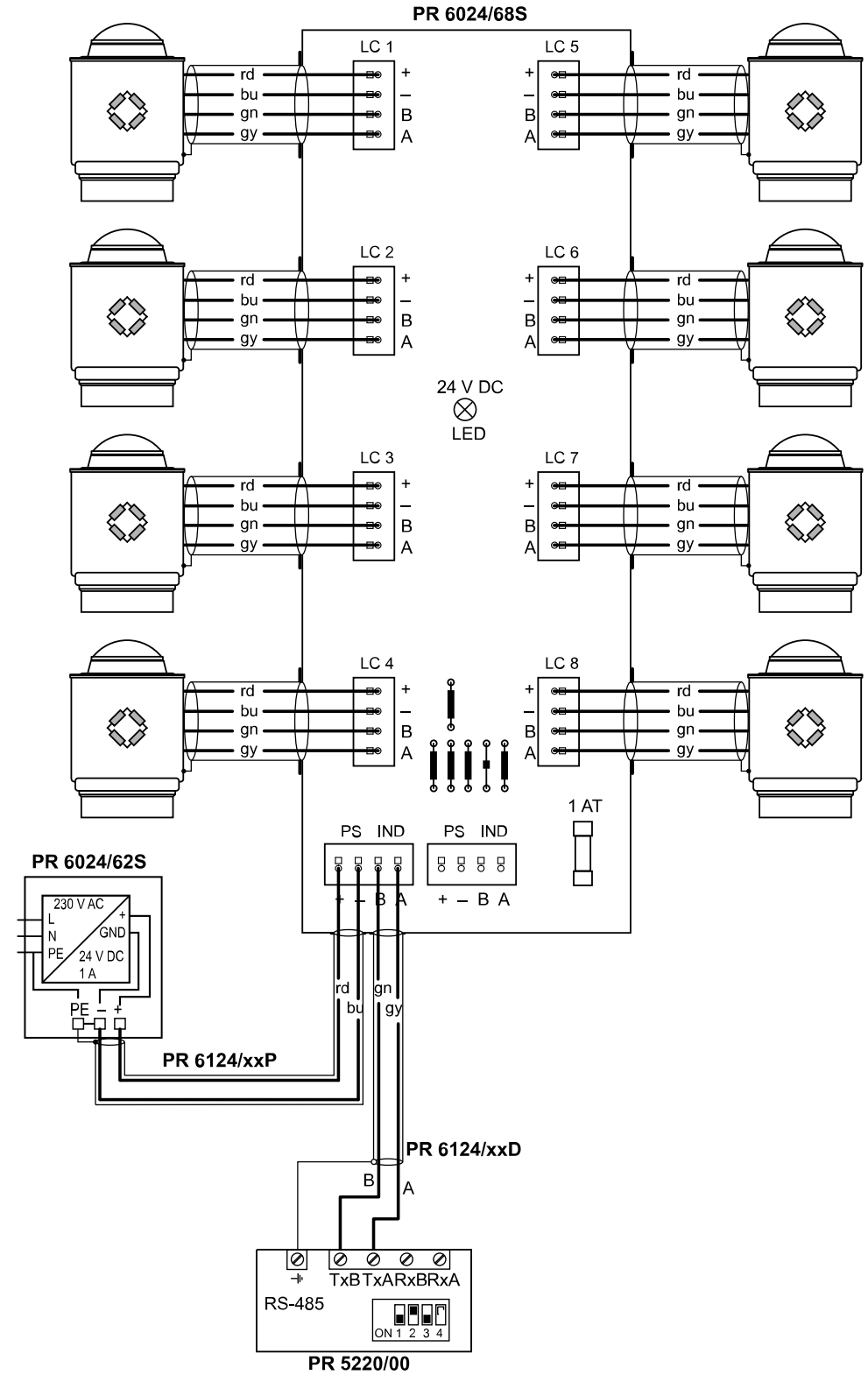
The device can be ported to Minebea Intec digital load cells via the xBPI port and the RS-485 interface (2-wire).

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 6024/68S junction box using 8 digital load cells from Minebea Intec.

Connection example



PR 5220/00 switch settings	PR 5220/00 configuration
ON: S1, S3 OFF: S2 S4 not relevant	Setup - [Serial ports parameter] - [xBPI-Port] - [Built-in RS-485]

Note:

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

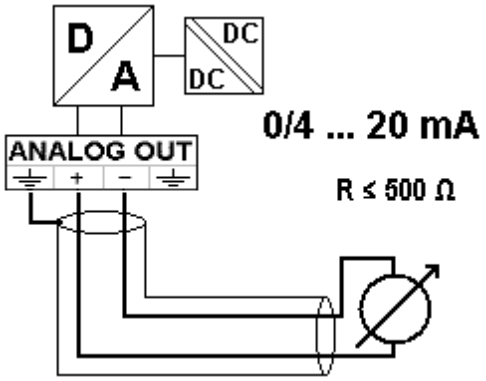
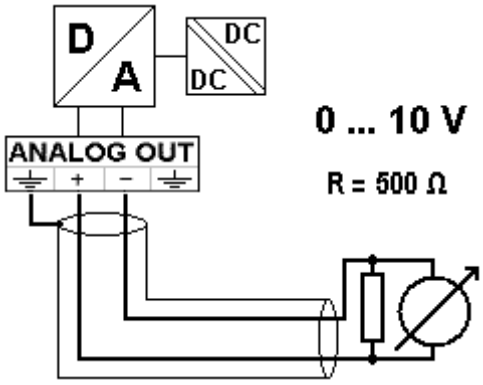
4.4.4 Analog outputs

An analog output is integrated into the device . The interface can be configured by software.

Technical data

Description	Data
Connection	Terminal, 4-pin
Output: Number	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 or via Profibus
Output: Range	0/4... to 20 mA, configurable
Output: Resolution	e. g. 0...20 mA in max. 40,000 counts
Output: Linearity error	@ 0 to ...20 mA: <0.05 % @ 4 to ...20 mA: <0.025 %

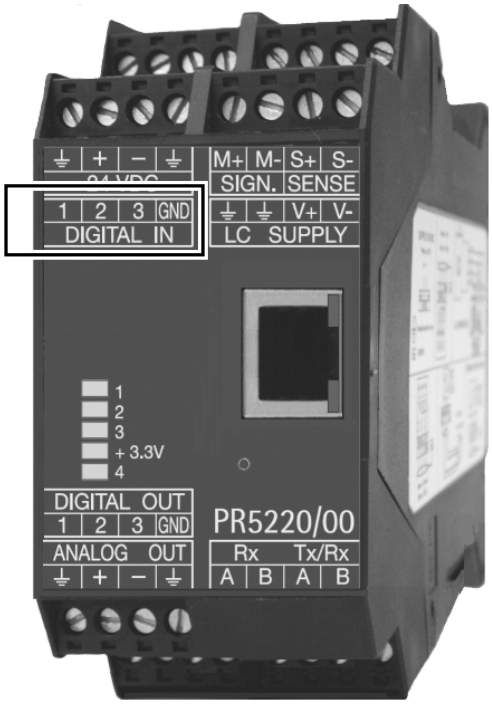
Description	Data
Output: Temperature error	<100 ppm/K
Output: Zero point error	0.05%
Output: Max. error	<0.1 %
Output: Load	Max. 0... to 500 Ω
Output: Protected against short-circuit	yes
Output: Potential isolation	yes
Cable type	Screened twisted pair (e.g., LifYCY 2x2x0.20)
Cable length	<150 m screened

Analog signal "current output"	Analog signal "voltage output"
	
Current is supplied directly via the terminal contacts.	The voltage level corresponds to the voltage drop at the external 500 Ω resistor.

4.4.5 Digital inputs

3 passive opto-decoupled inputs are permanently built into the device. The interface can be configured by software.

All inputs have a common GND (-).

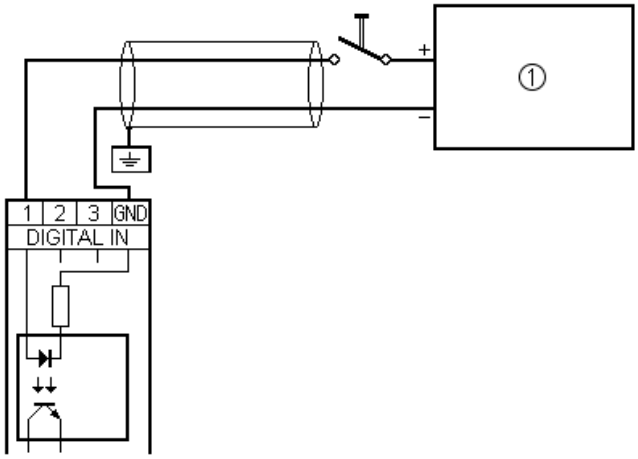


Technical data

Description	Data
Connection	Terminal, 4-pin
Number of inputs	3
Input voltage	Low: U_{DC} = 0 to 5 V High: U_{DC} = 10 to 28 V Passive, external power supply required
Input current	≤11 mA @ U_{DC} = 24 V ≤5 mA @ U_{DC} = 12 V
Signals	GND (-) common for all inputs
Potential isolation	Yes, via optocoupler
Cable length	Max. 50 m screened

Example:

Contact input



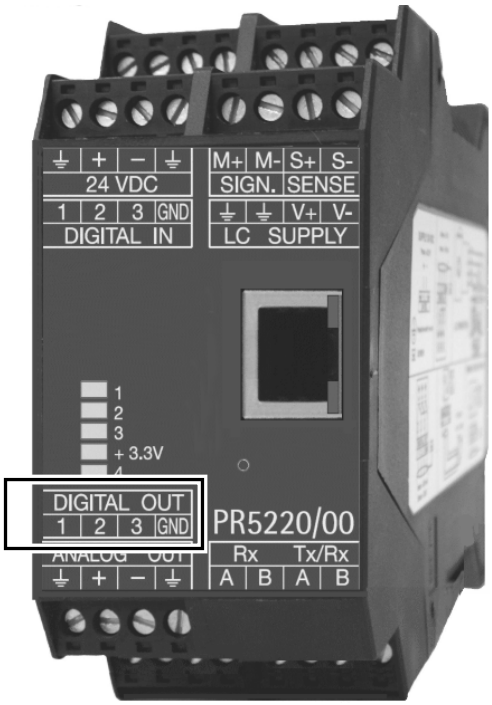
① Supply unit U_{DC} = 24 V 0.5 A

If the voltage at terminals (in this example: 1-GND) is U_{DC} = 10 V, input 1 is active (true).

4.4.6 Digital outputs

3 passive opto-decoupled outputs are permanently built into the device. The interface can be configured by software.

All outputs have a common GND (-).

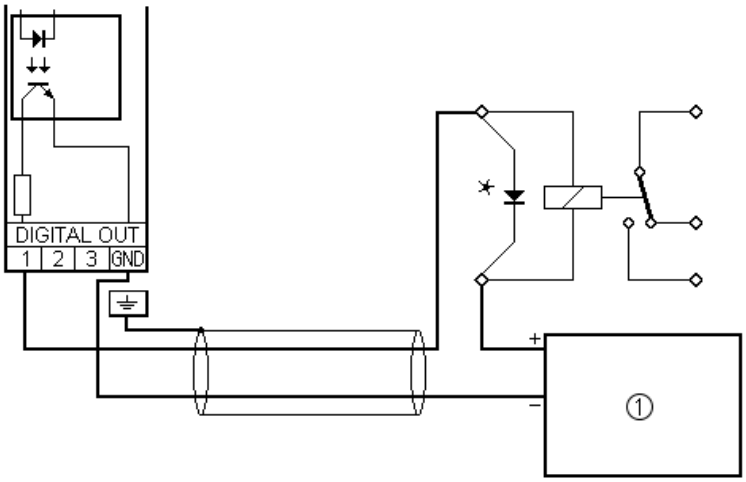


Technical data

Description	Data
Connection	Terminal, 4-pin
Number of outputs	3
Supply voltage	Max. 24 V +10%, external
Switching current	Max. 30 mA
Signals	GND (-) common for all outputs
Potential isolation	Yes, via optocoupler
Cable length	Max. 50 m screened

Example:

Relay control (power output)



① Supply unit U_{DC} = 24 V 0.5 A

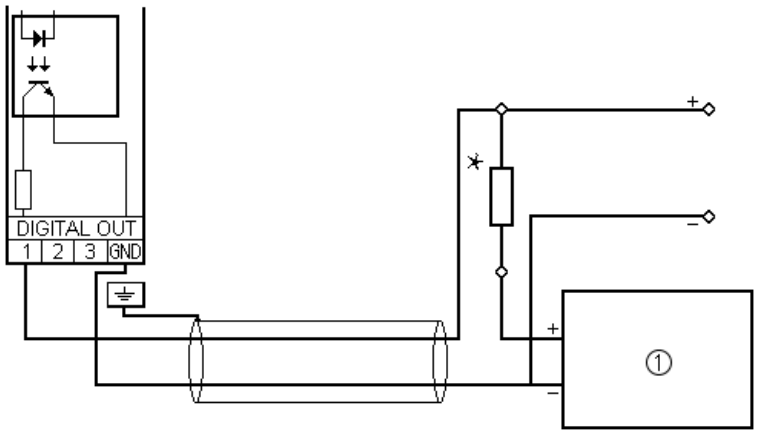
* Inductive load for free-wheel diode

The relay switches when the output 1 is active (true).

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

Example:

Voltage output



① Supply unit U_{DC} = 24 V 0.5 A

When the output 1 is active (true), the output voltage drops from U_{DC} = 24/U_{DC} = 12 V to U_{DC} <3 V.

* The load resistance must be 2.2/1 kΩ.

4.4.7 Connection of analog load cells and weighing platforms

4.4.7.1 General information

Load cells can be connected to the device doing the following:

- One load cell directly, see Chapter 4.4.7.2 and 4.4.7.3
- several load cells in the junction box via connecting cable, see Chapter 4.4.7.4 and 3.4.1

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

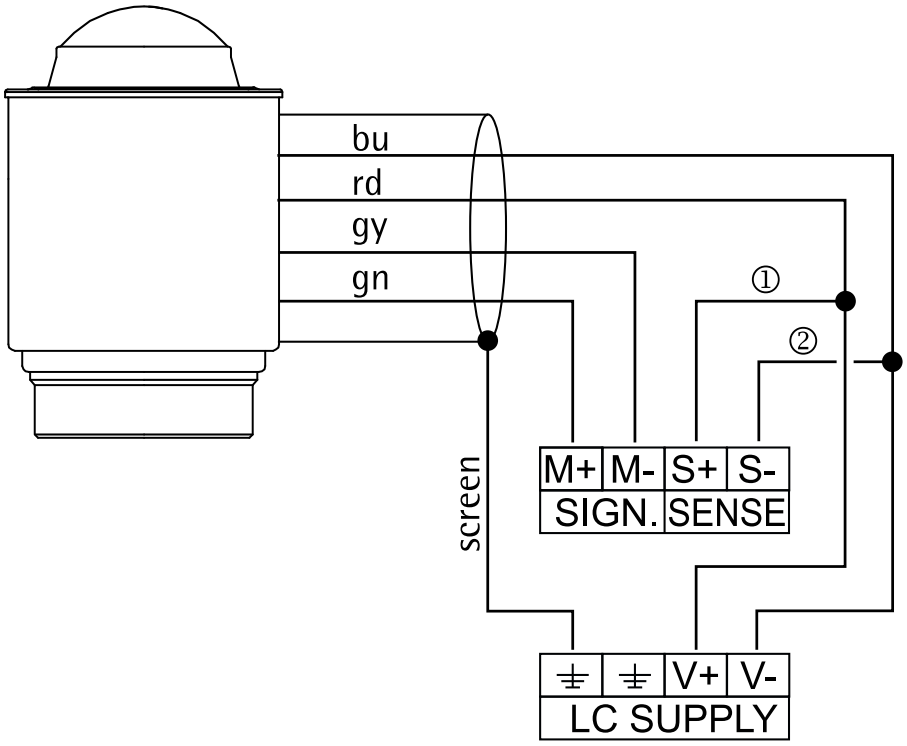
For additional information on the connection of load cells and cable junction boxes, refer to the corresponding installation manuals.

4.4.7.2 Connecting a load cell with a 4-wire cable

The following links between the terminal contacts are provided:

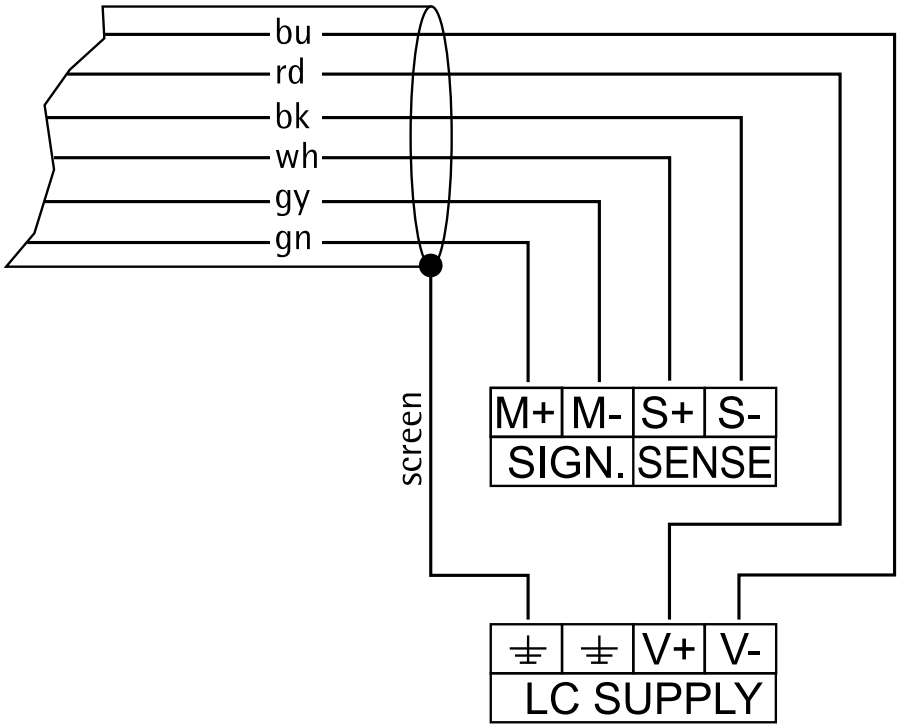
① from SIGN. SENSE S+ to LC SUPPLY V+

② from SIGN. SENSE S- to LC SUPPLY V-



Terminal	Connection/color code	Description
SIGN. M+	+ Meas./gn	+ Measuring voltage (load cell output)
SIGN. M-	- Meas./gy	- Measuring voltage (load cell output)
SENSE S+	+ Sense	+ Sense voltage
SENSE S-	- Sense	- Sense voltage
LC SUPPLY V+	+ Supply/rd	+ Supply voltage
LC SUPPLY V-	- Supply/bu	- Supply voltage
LC SUPPLY ⏚	Grounding	Screen (ground)

4.4.7.3 Connecting a load cell with a 6-wire cable



Terminal	Connection/color code	Description
SIGN. M+	+ Meas./gn	+ Signal (LC output)
SIGN. M-	- Meas./gy	- Signal (LC output)
SENSE S+	+ Sense/wh	+ Sense
SENSE S-	- Sense/bk	- Sense
LC SUPPLY V+	+ Supply/rd	+ Supply (excitation)
LC SUPPLY V-	- Supply/bu	- Supply (excitation)
LC SUPPLY ⏚	Grounding	Screen (ground)

4.4.7.4 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 Ω each
- The supply voltage is fixed at U_{DC} = 12 V and protected against short circuits.

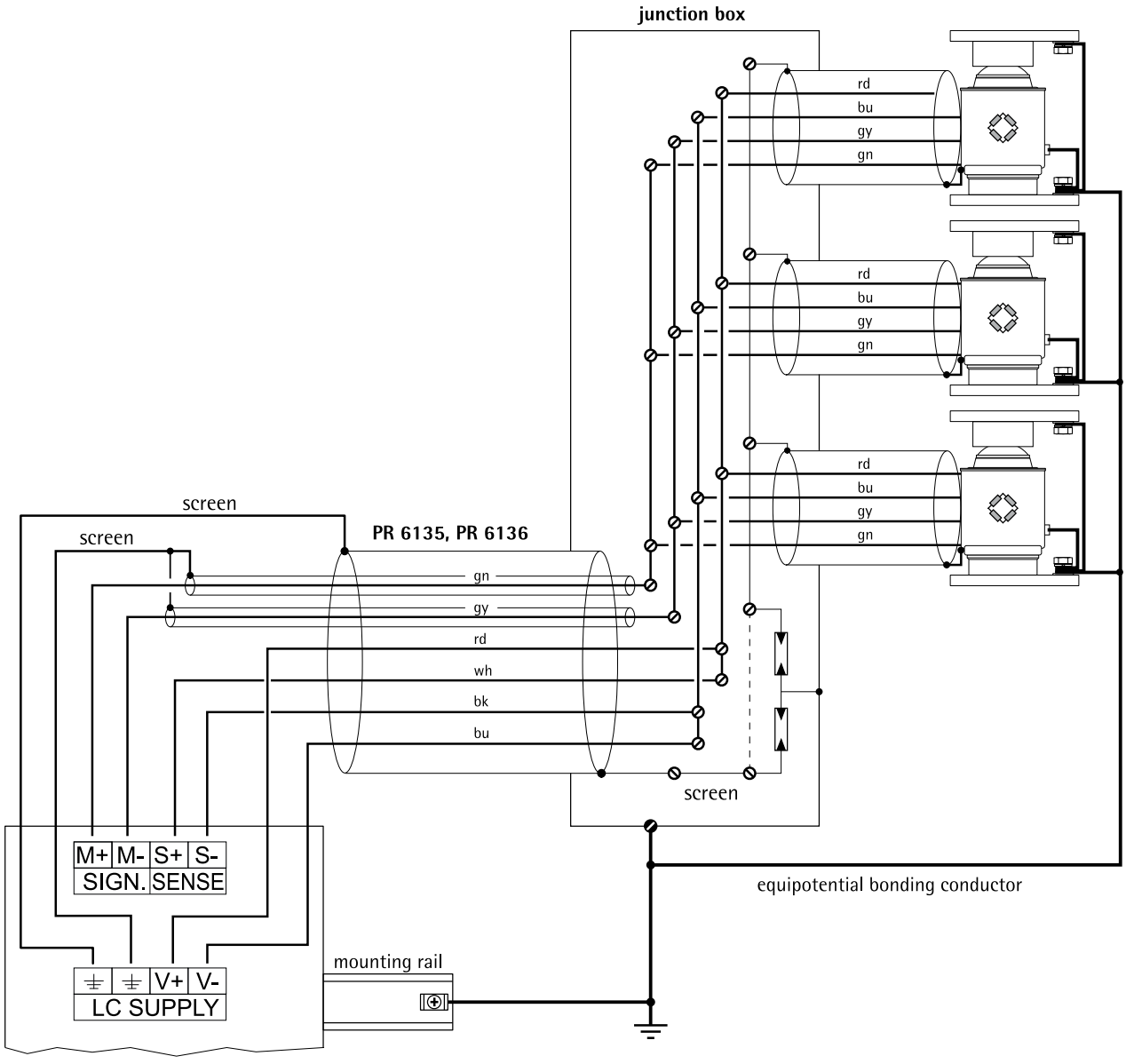
For further technical data, see Chapter 17.5.1.

Note:

If hum interference occurs, the cable screens should only be connected on one side.

Depending on the design of the cable junction box used, either the jumper J3 must be removed or the cable screens must be disconnected from the terminal contacts highlighted in yellow.

Connection example



4.4.7.5 Connecting load cells of type series PR 6221

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

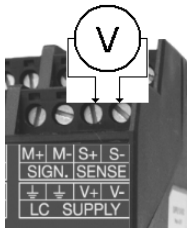
4.4.7.6 Testing the measuring circuit

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

Note:

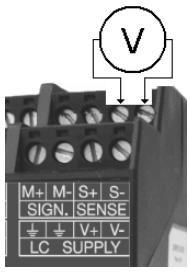
In the case of an external load cell supply voltage or use of an isolating unit, the internal load cell supply is not relevant.

Supply voltage



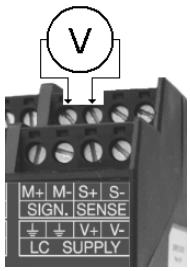
12 V ±0.8 V (symmetrical to housing ground)

Sense voltage



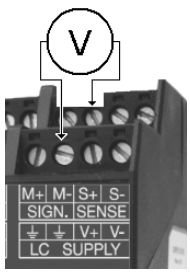
12 V ±0.8 V (symmetrical to housing ground)

Measuring voltage



0–12 mV @ LC with 1.0 mV/V
0–24 mV @ LC with 2.0 mV/V

Measuring voltage



0 V ±0.5 V

4.4.7.7 External supply to load cells

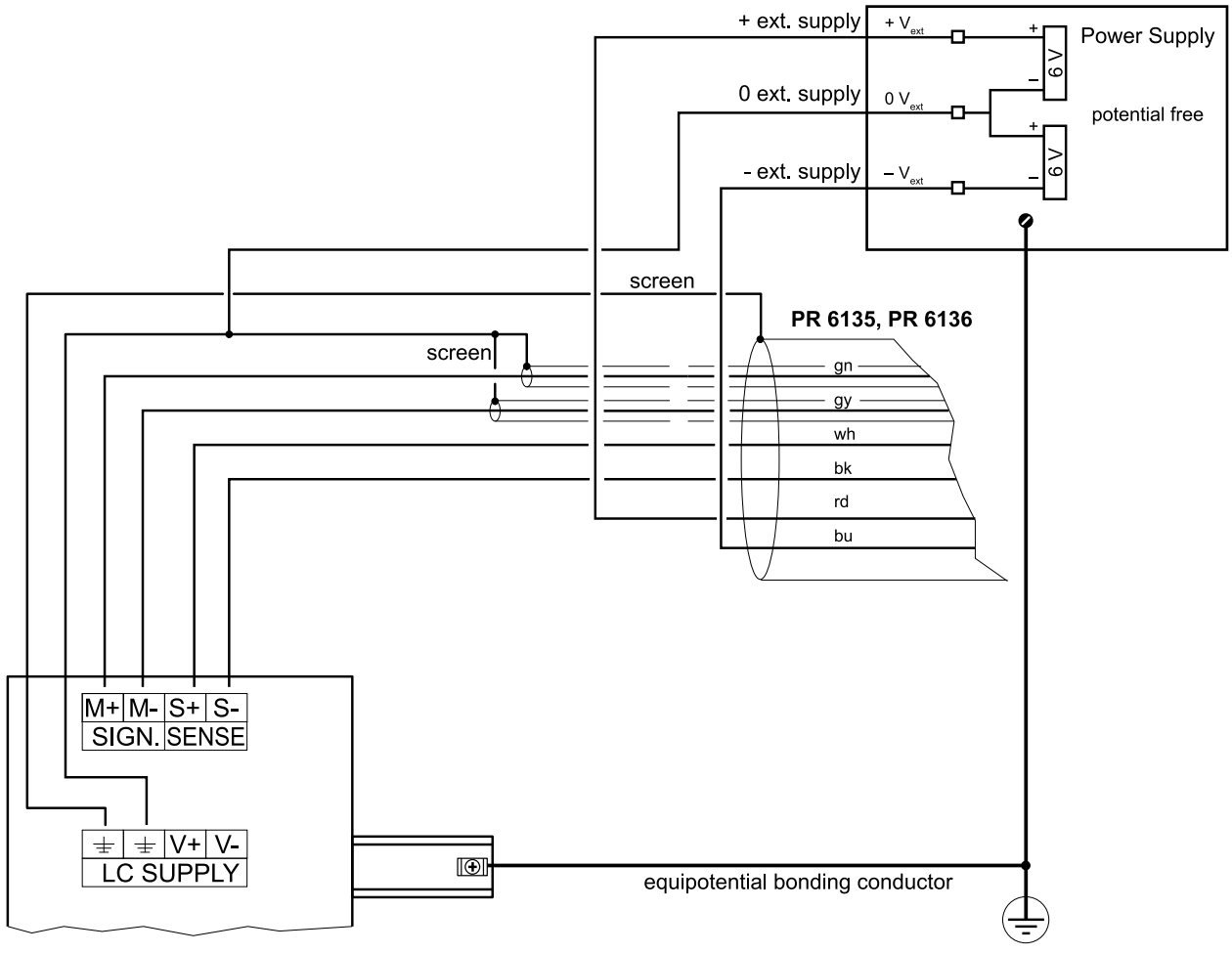
If the total resistance of the load cells is ≤75 Ω (e.g., more than 4 load cells with 350 Ω), an external load cell supply is required. In this case, the internal supply is replaced by a potential-free external supply.

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

The internal supply is not connected.

If the external supply U_{DC} <8 V (±4 V), the supply at Setup - [Weighing point] - [WP A] - [Calibration] - [Param] - [External supply] has to be set to "below 8 V DC" in order to reduce the sense voltage U_{DC} to below approx. ±4 V.

Connection example



4.4.7.8 Connection to relay PR 1626/6x

The connection is made via the connecting cable PR 6135/.. .

The internal load cell power supply (V+, V-) of the PR 5220 must **not** be connected.

Note:

Other connections are described in the PR 1626/6x instrument manual.

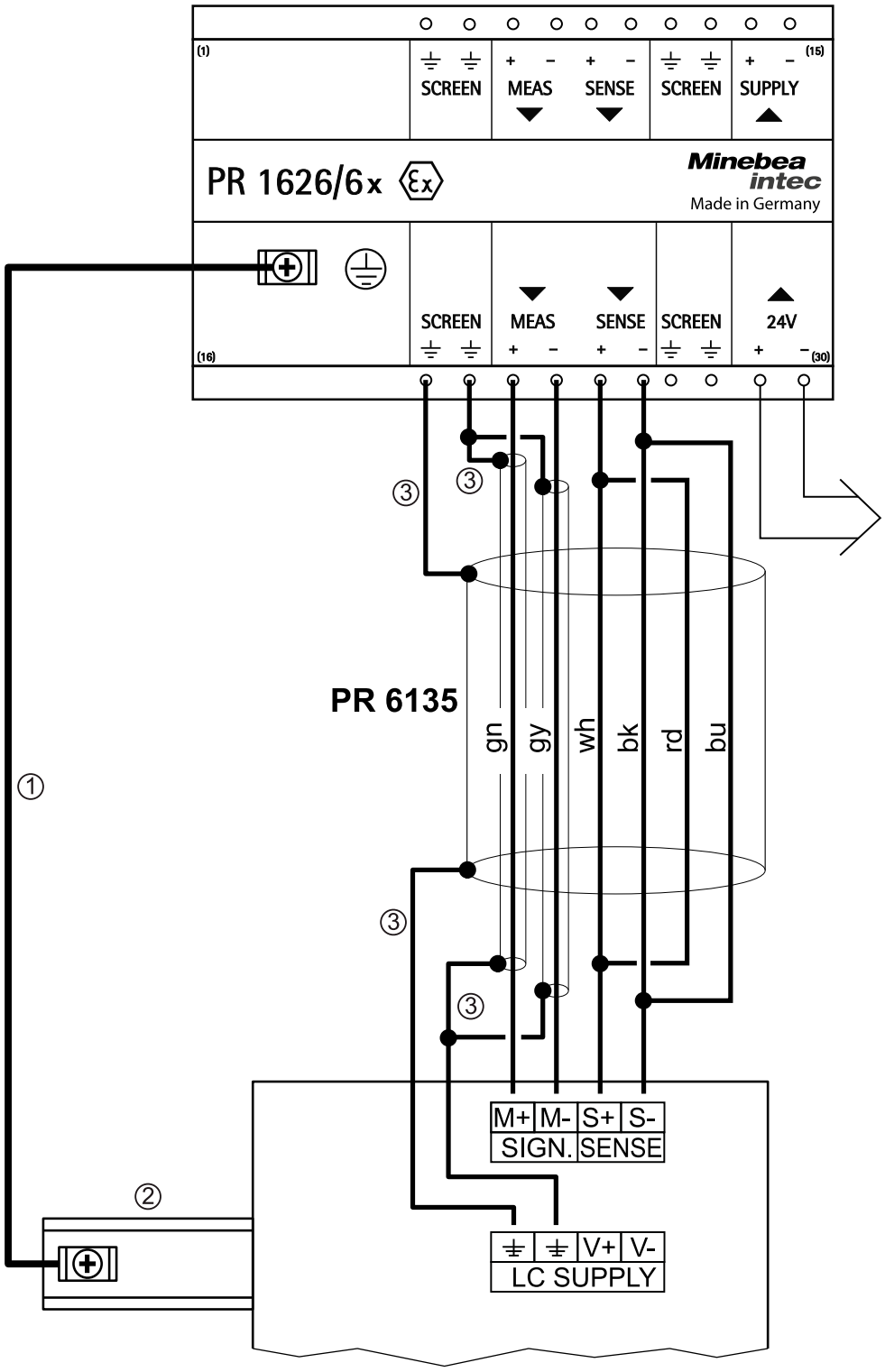
If PR 1626/61 (U_{DC} = 7,5 V) is connected, in the menu Setup - [Weighingpoint] - [WP A] - [Calib] - [Param] - [External supply] , the parameter must be set to "below 8 V DC". The sense voltage detection is now switched.

NOTICE

Installation in the Ex zone

- The screen of the load cell cable and the screen of the connecting cable must not be connected inside the junction box, if connection of both ends is not permissible according to the regulations for installation in the ex-zone.

Connection example



① Equipotential bonding conductor

② Mounting rail

③ Screen

NOTICE

Metrological problems may occur.

- Make sure there is equipotential bonding between PR 1626/6x and the mounting rail.

4.4.7.9 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.

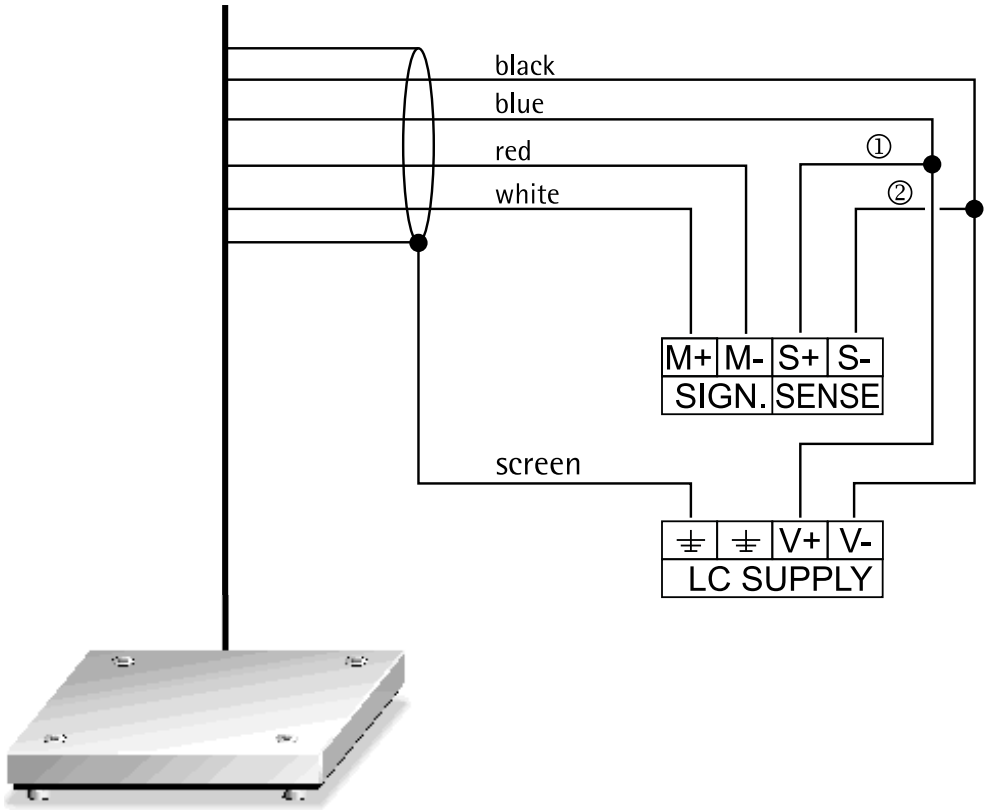
Connection designations

Combics 1 to 3 devices	PR 5220
BR_POS	V+ LC SUPPLY
SENSE_POS	S+ SENSE
OUT_POS	M+ SIGN.
OUT_NEG	M- SIGN.
SENSE_NEG	S- SENSE
BR_NEG	V- LC 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



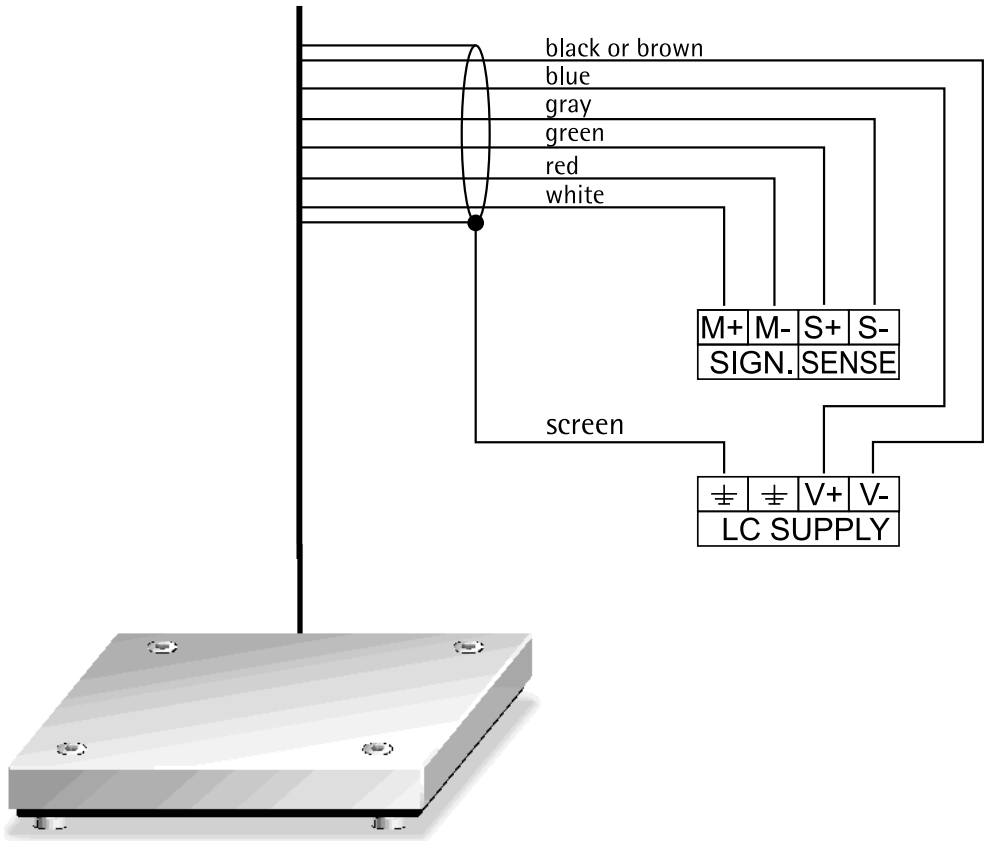
The following links between the terminal contacts are provided:

① from SIGN. SENSE S+ to LC SUPPLY V+

② from SIGN. SENSE S- to LC SUPPLY V-

Example:

Platform with 6-wire connection



4.5 Interfaces

4.5.1 ProfiBus DP interface

The ProfiBus DP interface has the type designation PR PR 5220/01.

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 on the front of the device.

Technical data

Description	Data
Transfer rate	9.6 kbit/s to 12 Mbit/s, baud rate auto-detection
Connection mode	ProfiBus network, connections can be made/released without affecting other stations.
Protocol	PROFIBUS-DP-V0 SLAVE to IEC 61158
Configuration	GSD file "SART5220.gsd"
Potential isolation	Yes, optocoupler in lines A and B (RS-485)
Bus termination	The bus termination in the last device is implemented via the integrated terminating resistor in the ProfiBus plug.
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

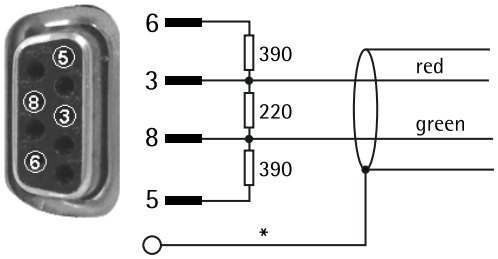
Note:

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

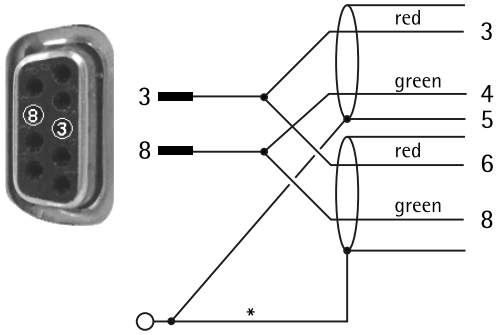
ProfiBus connection

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



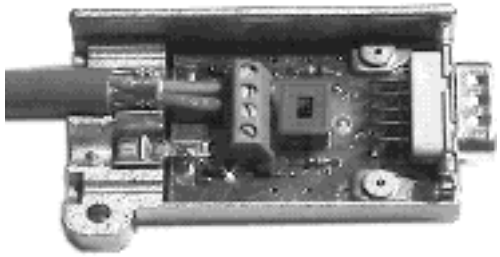
* screen on connector housing

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



* screen on connector housing

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
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:

Only plug connections with integrated terminating resistors may be used.

4.5.2 ProfiNet I/O interface

The ProfiNet I/O interface has the type designation PR 5220/06.

It is a complete ProfiNet I/O adapter (slave) with standard RJ-45 sockets for network connection.

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

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-PR5220-2P-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 IP address and subnet mask are set under Setup - [Fieldbus parameters] (refer also to Chapter 7.15.3 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]).

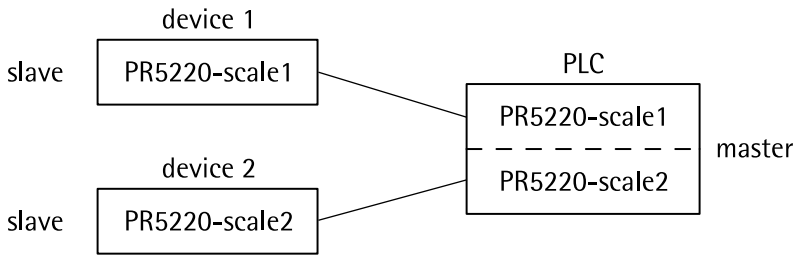
NOTICE

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:



4.5.3 EtherNet/IP interface

The EtherNet/IP interfaces have the type designation PR 5220/07.

It is a complete EtherNet/IP adapter (slave) with standard RJ-45 sockets for network connection.

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

Technical data

Description	Data
Transfer rate	10 Mbit/s and 100 Mbit/s Auto-detection (100, FullDX)
Protocol	EtherNet IP
Connection mode	Network
Configuration	EDS file "sag_5220_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	ODVA for HMS Industrial Networks AB - Product code: 99 - Product name: Anybus-CC 40 EtherNet/IP - SOC file name: ABCC40-EIP-2P.stc 15.05.2014

Note:

The IP address and subnet mask are set under Setup - [Fieldbus parameters] (refer also to Chapter 7.15.3 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

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
- 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 the batching of single components.

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

The dosing process can be started, stopped, interrupted and restarted via the VNC user interface, digital inputs, OPC/Modbus and field bus (except for CC link).

6.1.2 Display functions

- Display of gross, net or tare weight
- Tare/reset tare
- Set gross to zero
- 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.

7 Getting started

7.1 Power failure/Data backup/Restart

7.1.1 Power failure

If the grid power fails,

- all entered configuration and calibration parameters and
- all the materials written on the built-in memory

are saved.

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.

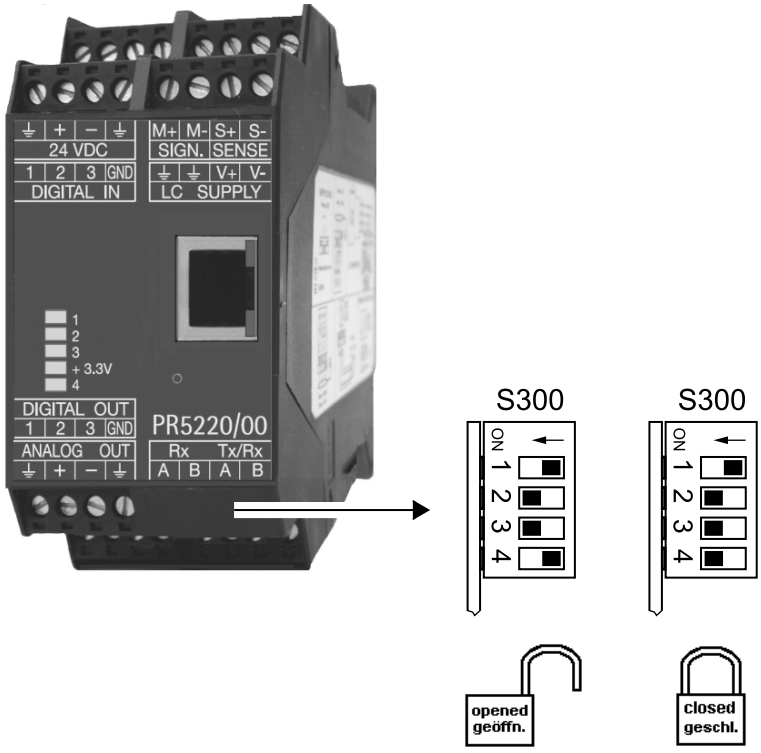
Additional write protection is provided for calibration data and parameters (see Chapter 7.1.3.1).

7.1.3 Overwrite protection

7.1.3.1 CAL switch

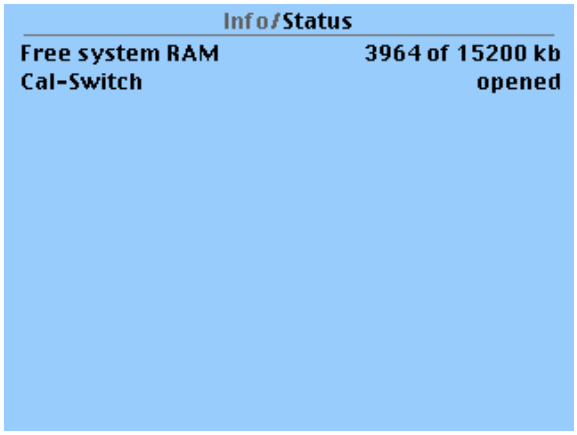
The CAL switch protects the calibration data and parameters against unauthorized access.

The CAL switch is located under a cover that can be opened by means of a knife, see Chapter 7.1.3.2.



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.

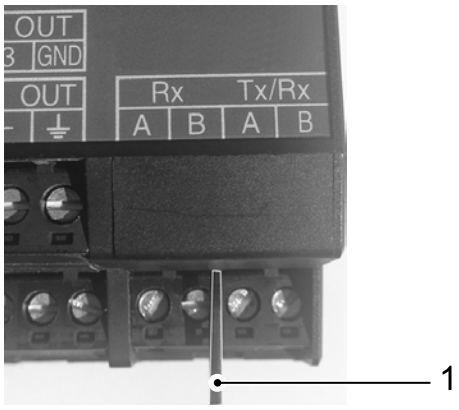


The position of the CAL switch is shown with VNC/WEB browser under Info – [Show status]:

[opened] = opened, no write protection.

[closed] = closed, write protection is active.

7.1.3.2 Removing the cover



Remove the cover as follows:

1. Insert a knife (1) into the slot below the cover and press until it is released.
2. Remove the cap.

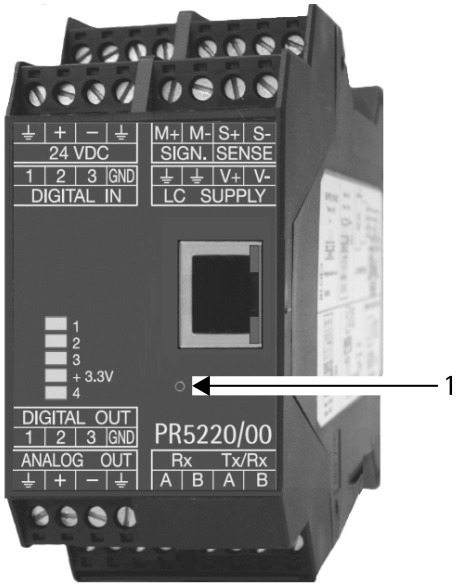
7.1.3.3 Factory settings

Calibration data <default>	Calibration parameters <default>
Full Scale (FSD) (Max) <3000> <kg>	Measurement time (M) <320> ms
Scale interval <1>	Measuring rate <160> ms
Dead load <0.000000> mV/V	Standstill time <1> M
SPAN <1.000000> mV/V	Standstill range <1.00> d
	Standstill timeout <8> M

Calibration parameters <default>	Test mode <absolute>
Overload (range over Max.) <9>d	Zero range <50.00> d
W&M node <none>	Zerotrack range <0.25> d

Calibration parameters <default>	Test mode <absolute>
Digital filter <off>	Zerotrack step width <0.25> d
Frequency <1.56 Hz>	Zerotrack time interval <0> M

7.1.4 Restart



The instrument can be reset using a pin with a diameter of approx. 1.0 mm (e.g. paper clip).

After pressing the Reset key (1) briefly (less than 1 sec.), the device is restarted.

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.

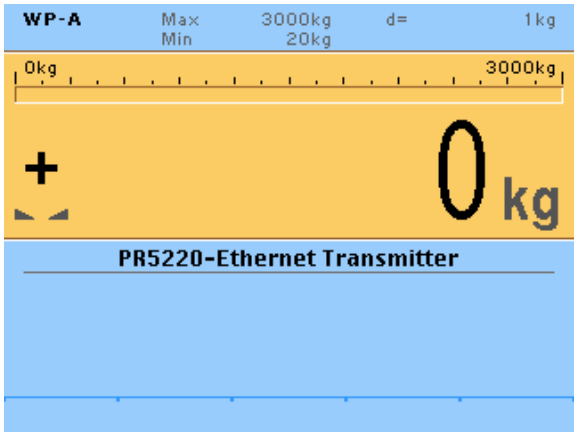
7.2 Switching on the device

The device can be set up as follows:

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

When the device is powered up, the following is shown on the display and/or notebook/PC:

Checking... **Booting...** **Restoring...**	The device is booting up.
PR 5220	- The instrument type is displayed, PR 5220 - BIOS version - Firmware version - Automatic display test - Weight display
Ext. meas. device error	Error message: if no load cells are connected, see also Chapter 16.1.
No values from scale	Error message: if there is no communication with the xB-PI scale (see also Chapter 16.1). Error message: unable to read weight values from the ADC (analog-digital converter); see also Chapter 16.1.
Scale not ready	Error message: if no load cells or no scale is connected (see also Chapter 16.3).



The weight display is shown.

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 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.

Note:

If the web browser supports the Java application, the device can be operated via[remote configuration (VNC).]

If the web browser does **not** support the Java application, the menu items will be inaccessible (grayed out).

7.6 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 5220 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).

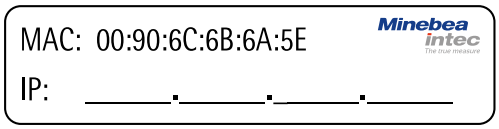
   These IP addresses are different on both sides:

   - 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.)

7.7 Searching the device in the network with "IndicatorBrowser"

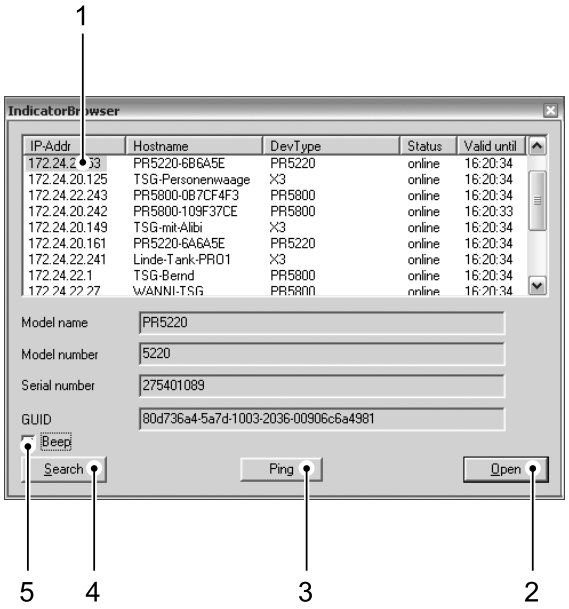
The IP address can be found out using the "IndicatorBrowser" application (supplied on CD-ROM) and via the "host name" of the device.

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: PR5220-6B6A5E

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



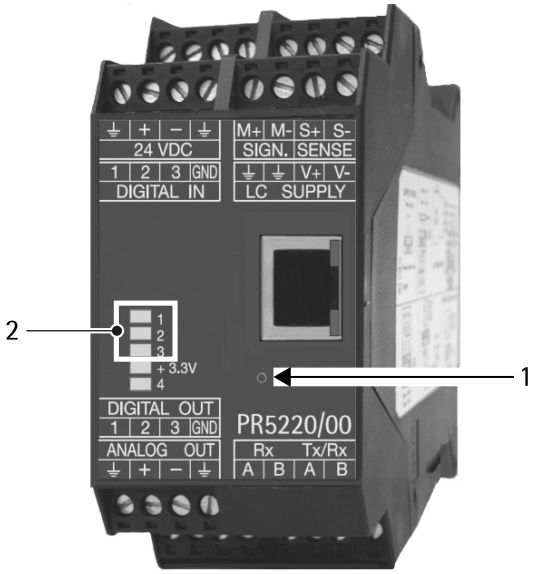
No.	Description
1	The program searches within the current network ID, e.g. 169.254. and 172.24., on all available network adapters in the PC (several possible/recommended, e.g. LAN global/LAN local) **Result:** List of all connected devices with status: search??? – online - byebye – lost???
2	Click the 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"!

7.8 Resetting the network address



The device can be reset using a pin with a diameter of approx. 1.0 mm (e.g. paper clip).

Holding down the reset key (1) for a longer period [wait until the 3 upper LEDs (2) are all on] resets the network settings to default/factory settings.

This means

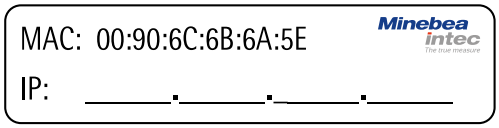
- "DHCP" is activated.
- "Hostname" is initialized to, e.g. PR 5220-6B6A5E (type MAC-ID).

  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 7.15.4.

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).

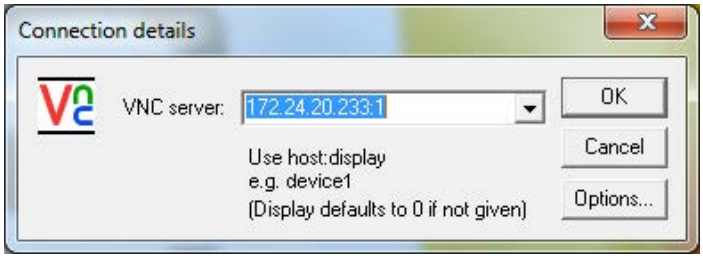
7.9 Operation using VNC

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:

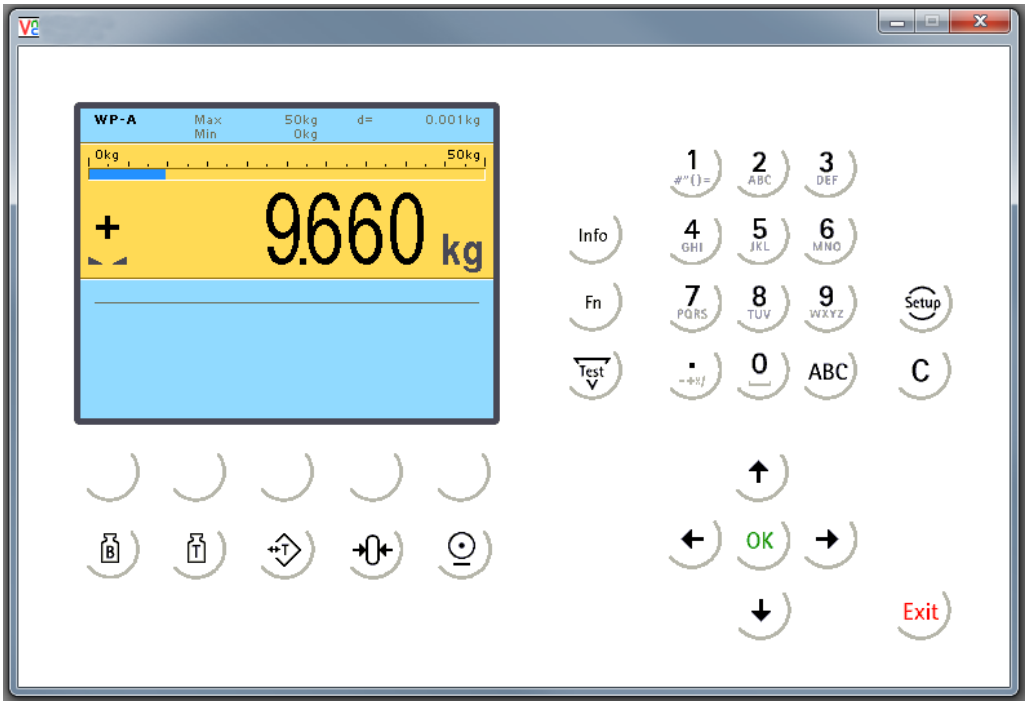
If the colors appear distorted, a better color format must be selected in the VNC viewer.



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 in the network can be limited, see Chapter 7.15.4.



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.

7.10 Operation via a web browser

Instead of the VNC viewer, the web browser can also be used directly.

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

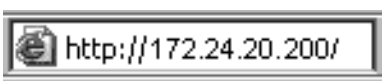
Note:

If the web browser supports the Java application, the device can be operated via[remote configuration (VNC).]

If the web browser does **not** support the Java application, the menu items will be inaccessible (grayed out).

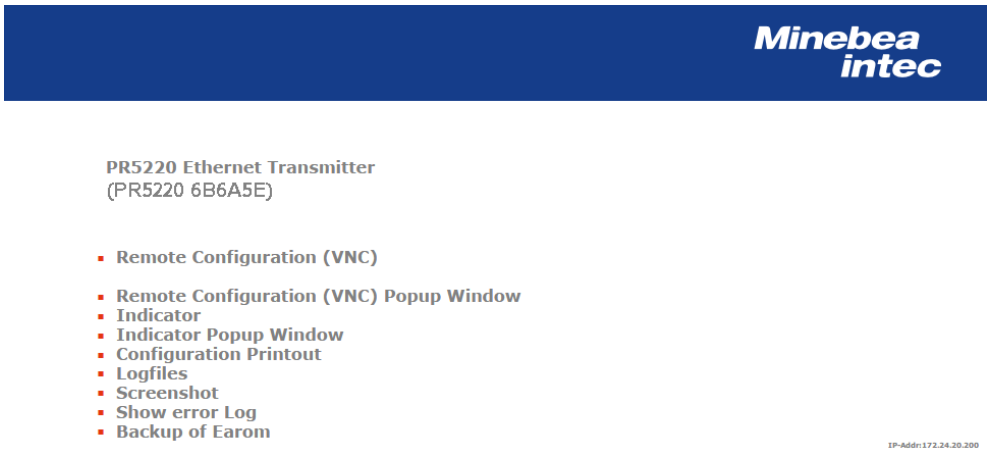
In addition to VNC, this includes:

- 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) Pop-up Window] menu item must be selected in order for 2 windows to be opened with the VNC viewer always remaining open, even if individual menu items are selected in the web menu.

7.11 System setup

7.11.1 Serial ports parameter

Remote display	Remote display Selection: <none>, built-in RS-485
Param	Selection: Assigned to, Baudrate, Bits, Parity, Stopbits, Mode
ModBus RTU	Selection: <none>, built-in RS-485
Param	Selection: Assigned to, Baudrate, Bits, Parity, Stop bits, Slave-ID
SMA	Selection: <none>, built-in RS-485
Param	Selection: Assigned to, Baudrate, Bits, Parity, Stopbits
xBPI-Port	Selection: <none>, built-in RS-485
Param	Selection: Assigned to, Baudrate, Bits, Parity, Stopbits

7.11.2 Operating parameters

Application	Selection: Standard, EasyFill
PIN	Entry code with which to protect the system control from unauthorized use. Input: 6 numerical characters

SetTareKey	Tare key Selection: Tare&reset tare, tare&tare again, disabled
SetZeroKey	Set zero key Select: only when not tared, reset tare on zeroset, disabled.

7.11.3 Fieldbus parameter

Fieldbus protocol	Fieldbus protocol, display: depending on model version Only for PR 5220/01, ../06 and ../07, see Chapter 7.15.3.

7.11.4 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

7.11.5 Weighing points

Weighing point A	Selection: Internal A, xBPI-scale, dig. PR LCs
Calib	Calibration, selected "Internal A:" New, Modify, Param, see Chapter 7.11.5.1.
Setup	Setup, "xBPI-Scale" selected: Calibration, Configuration, Select, Show device info, see Chapter 7.11.5.2.
Config	Configuration, "xBPI-Scale" selected: Type, W&M, Tare timeout, Serial number, SBN Address, see Chapter 7.11.5.2.
Param	Configuration, "xBPI-Scale" selected: Assigned to, Baudrate, Bits, Parity, Stopbits, see Chapter 7.11.5.2
Assign	Assign, "dig. PR LCs" selected: Search, View, Calib, LC name, Service, see Chapter 7.11.5.3.

7.11.5.1 "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 Note: Transmitters of the PR 5220 series are not approved for legal-for-trade mode.
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 >...25 s
Zeroset range	± Range of zero point when there is no standstill. Input: 0.00 d...<50.00 d>...10000.00 d
Zerotrack indic. range	Input of the zerotrack indication 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 of the 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 7.12.15.1 and 7.12.15.2.
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)

7.11.5.2 "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 igit, 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 Note: Transmitters of the PR 5220 series are not approved for legal-for-trade mode.
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

7.11.5.3 "PR DLC process"/"PR DLC truck" weighing point

Assign	Assignment of the digital 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 "PR DLC truck": Only shown if the number of load cells is equal to 8.
Number of vessel feet	Only for "PR DLC 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 Note: Transmitters of the PR 5220 series are not approved for legal-for-trade mode.
Unbal. Check deviat.	Unbalanced check 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	± Range of zero point when there is no standstill. Input: 0.00 d...<50.00 d>...10000.00 d
Zerotrack indic. range	Input of the zerotrack indication 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...<9 d>...999999 d
Min	Input of the minimum load: 0 d...<50 d>...999999 d

Range mode	Range selection: <Single range>, Multiple range, Multi-interval See also Chapters 7.12.15.1 and 7.12.15.2.
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!

7.11.6 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 7.15.5.
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 7.15.5.

7.11.7 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 7.15.7.
Input 1...3 on	Configure inputs
Action	Action, selection: see Chapter 7.15.6.1.
Condition	Condition, selection: see Chapter 7.15.6.2.
Input 1...3 off	Configure inputs
Action	Action, selection: see Chapter 7.15.6.1.
Condition	Condition, selection: see Chapter 7.15.6.2.

7.11.8 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 7.15.8.
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

7.12 Calibrating internal weighing point

7.12.1 General information

Transmitters of the PR 5220 series are not approved for calibration.

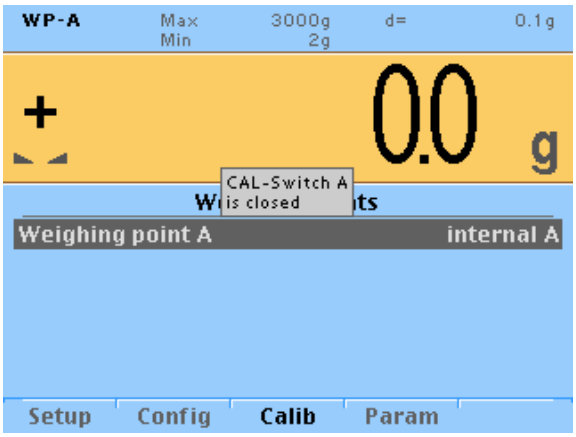
The legal-for-trade application of PR 5220 with other device has to be verified.

The calibration data are protected by the CAL switch (see Chapter 7.1.3.1).

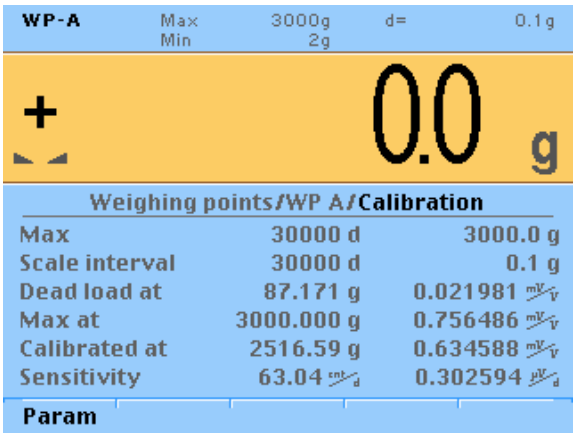
During calibration, the instrument must be set to gross weight display (reset tare, if necessary).

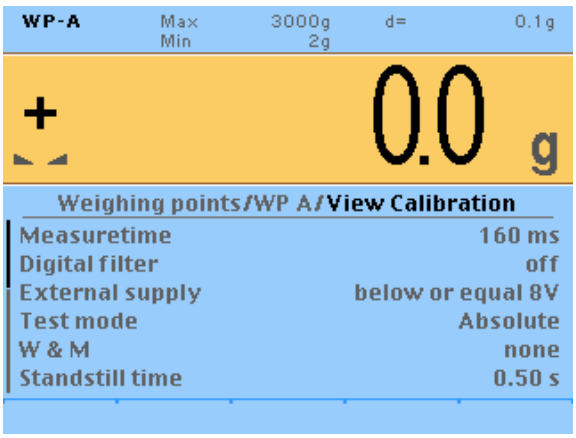
7.12.2 Displaying calibration data

7.12.2.1 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.

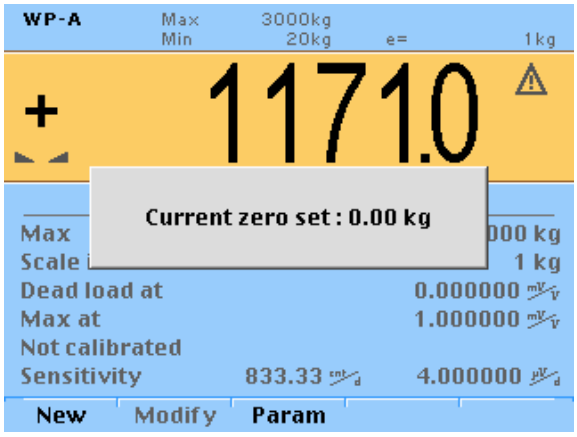
The calibration data and parameters are displayed in the format entered/determined during calibration.

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.

7.12.2.2 Increased resolution (10-fold)



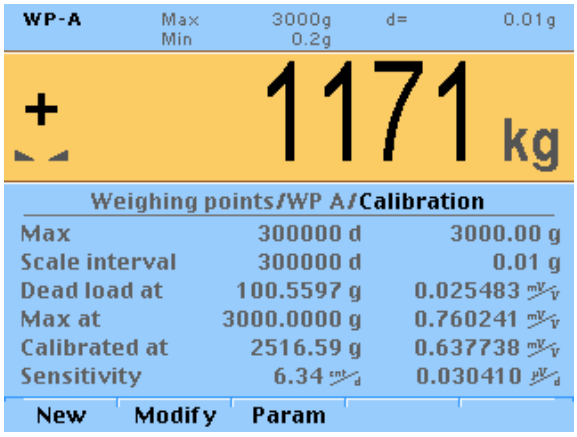
In the Setup-[Weighing point]- [Calib] menu the weight is displayed with 10-fold resolution (also with the CAL switch closed) with Info.

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

7.12.3 Selecting the calibration mode

Note:

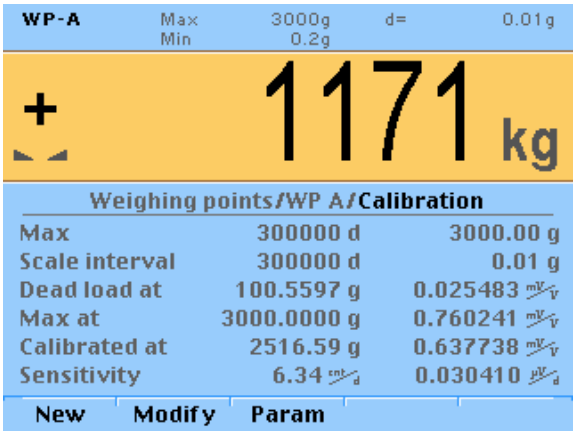
The [Modify] menu item is only used for small changes (e.g. changing the dead load/ preload, changing the mV/V values for dead load/preload and/or Max, changing the scale interval). Otherwise select the [New] menu item.



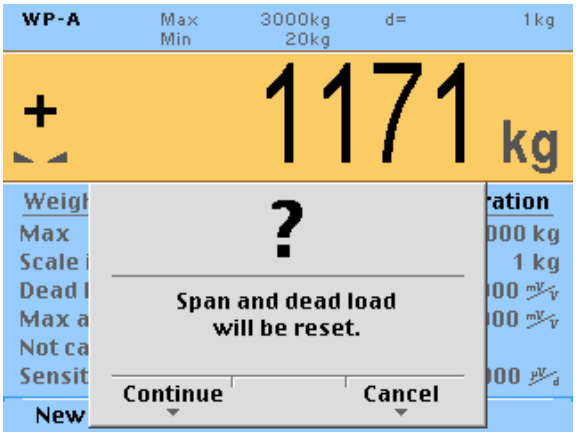
Under Setup- [Weighing point] - [Calib] choose between [New] and [Modify].

7.12.3.1 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 7.12.4.
5. Determining the scale interval [Scale interval], see Chapter 7.12.5.
6. Determining the dead load [Deadload at], see Chapter 7.12.6.
7. Calibrating with load [Max at], see Chapter 7.12.7.
8. Calibrating with mV/V [Max at], see Chapter 7.12.8.
9. Calibrating with load cell data (smart calibration) [Max at], see Chapter 7.12.8.1.
10. Carrying out linearization, see Chapter 7.12.11.

7.12.3.2 Modifying a calibration

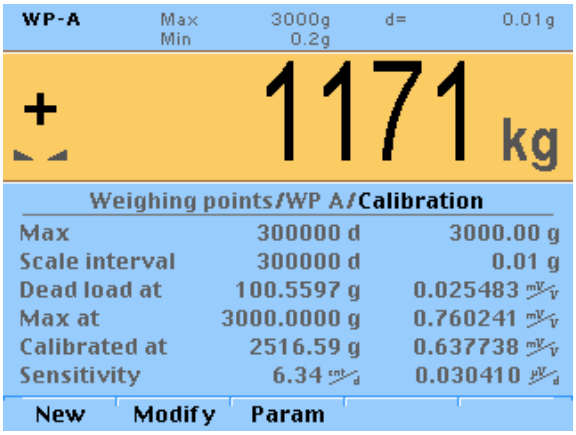
Note:

[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]!

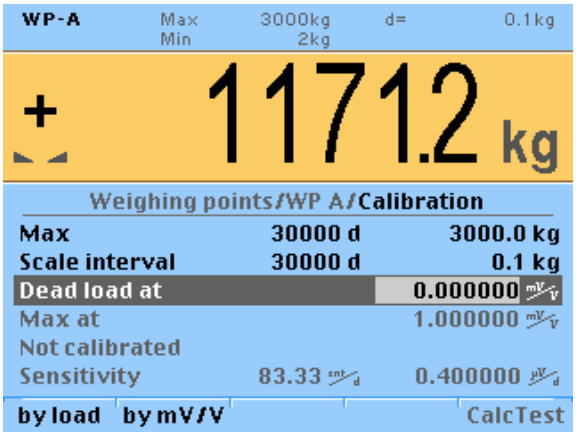
Example:

Resetting the Dead Load

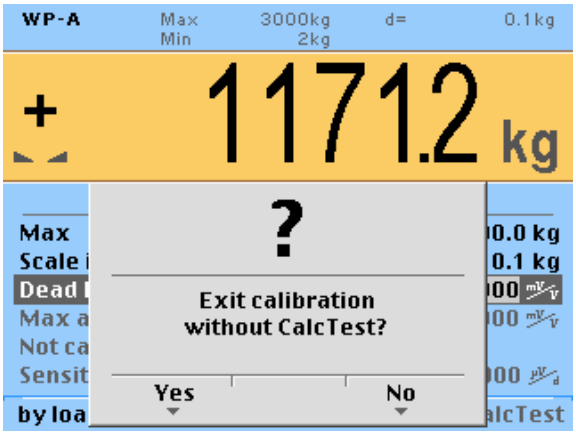
1. Select Setup -[Weighing point]- [Calib] and confirm.



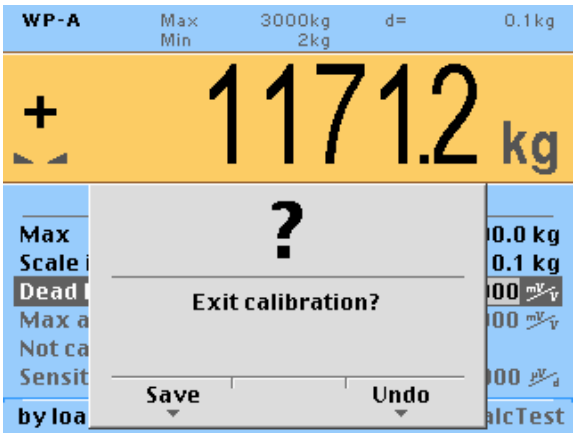
2. Press the [Modify] softkey.



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.

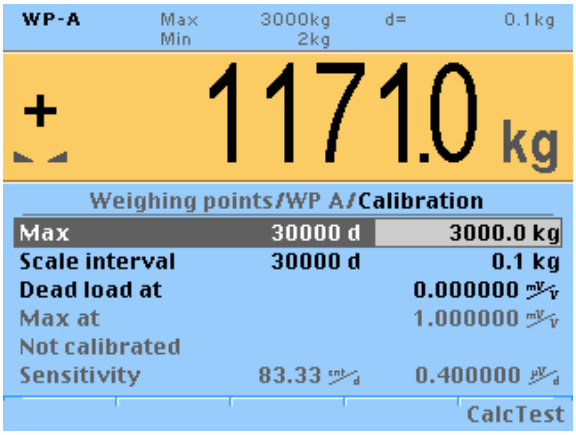
7.12.4 Setting maximum load

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, mg, lb or oz.

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 16.5.

7.12.5 Determining the scale interval

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

Example:

Max = 6000 kg

Scale interval (1 d) = 2 kg

Calculation for scale interval for Max (automatic):

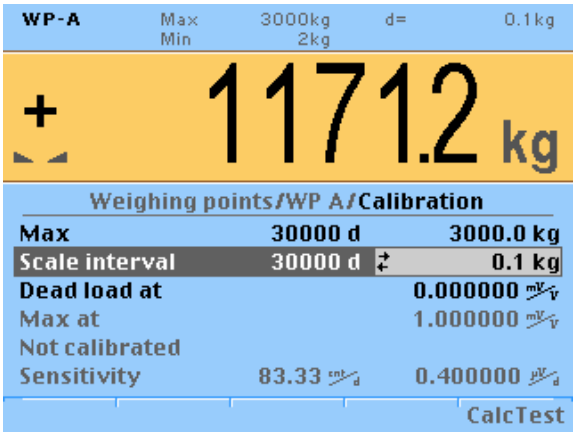
d = Max/scale interval (1 d)

d = 6000 kg/2 kg

d = 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 16.5.

7.12.6 Determining the dead load

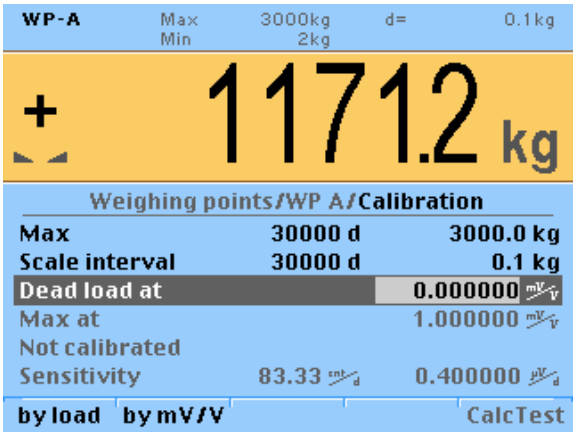
Note:

If a linearization was carried out (see Chapter 7.12.11), 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 16.5.

7.12.7 Calibrating with weight

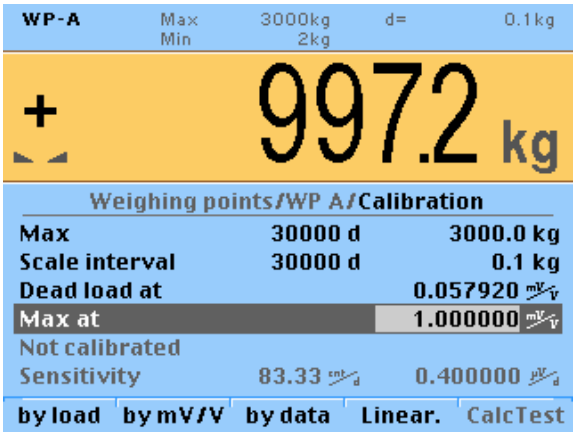
Note:

If a linearization was carried out (see Chapter 7.12.11), after selection of the line [Max at] the following tip is displayed:

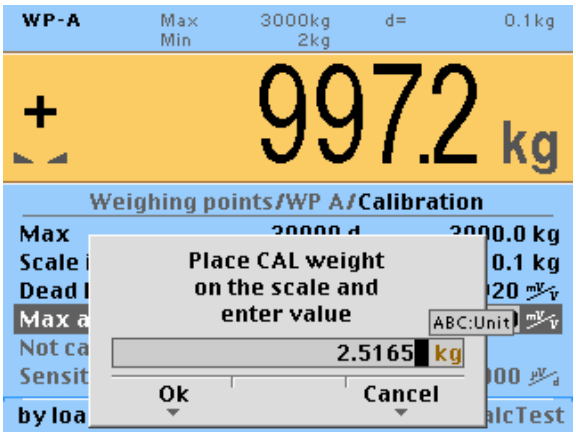
```
Cannot be changed here while linearization is active.
```

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].

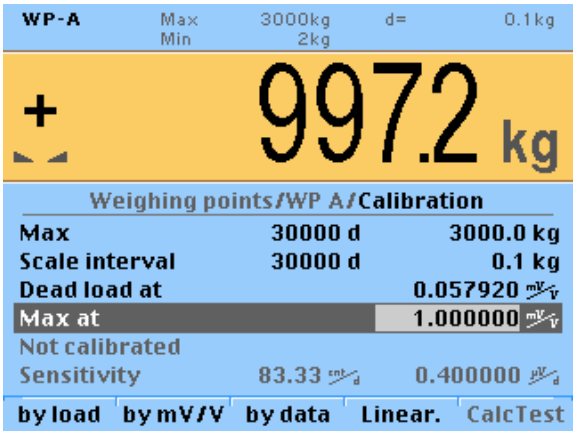
Note:

Error messages, calibration see Chapter 16.5.

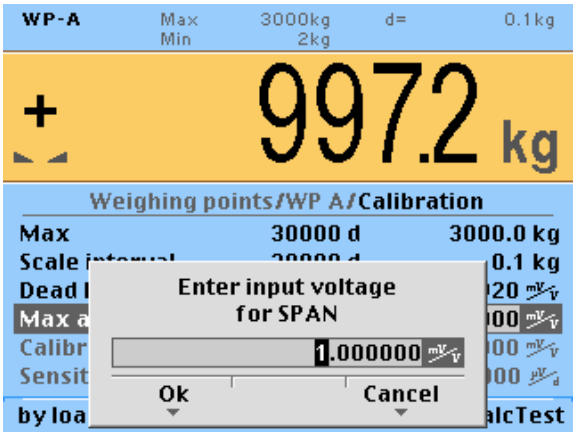
7.12.8 Calibrating with mV/V

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 PR- 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 7.12.8.1.
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 7.12.10).

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 16.5.

7.12.8.1 Calculating SPAN value

Calculating SPAN

SPAN indicates the equivalent input voltage in mV/V related to the maximum capacity (Max) of the scale. It is calculated as follows:

SPAN [mV/V] = maximum capacity x load cell sensitivity C_n [mV/V] / load cell capacity (maximum capacity E_{max} x number of load cells)

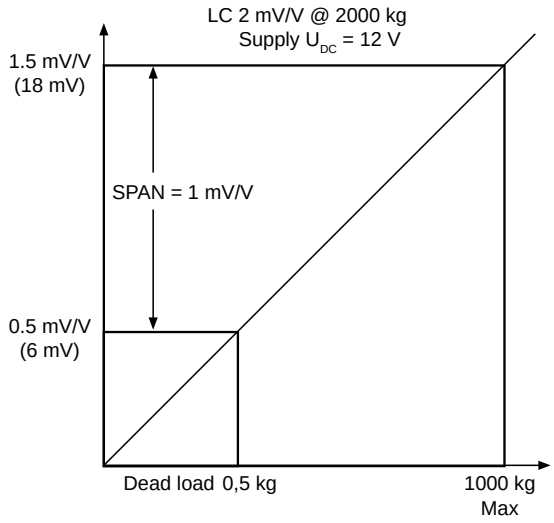
load cell sensitivity C_n = rated output C_n (see technical data for the load cell)

Calculate dead load

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

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

Subsequent dead load correction (see Chapter 7.12.10) can be used for later re-determination of the dead load, when the scale or vessel is empty.

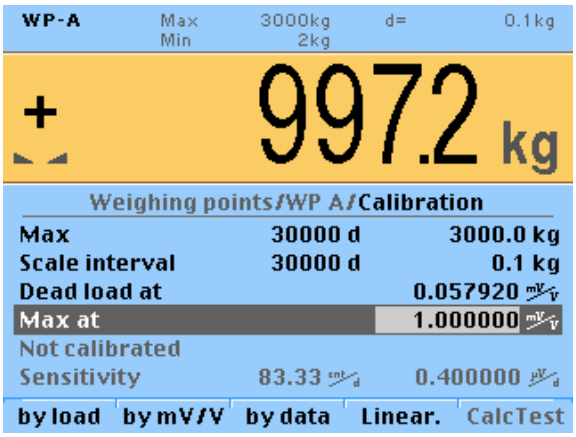


Example

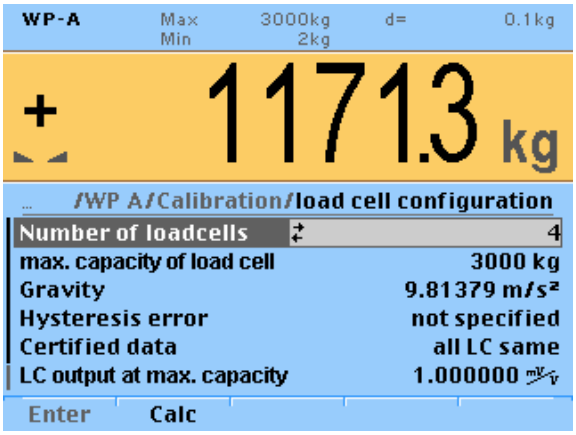
- 1 load cell with rated output C_n = 2 mV/V
- At maximum capacity 2000 kg
- Maximum capacity 1000 kg
- Dead load 500 kg
- Load cell supply voltage U_{DC} = 12 V

7.12.9 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

[max. capacity of load cell]

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 output at max. capacity], [LC output impedance]

LC = load cell

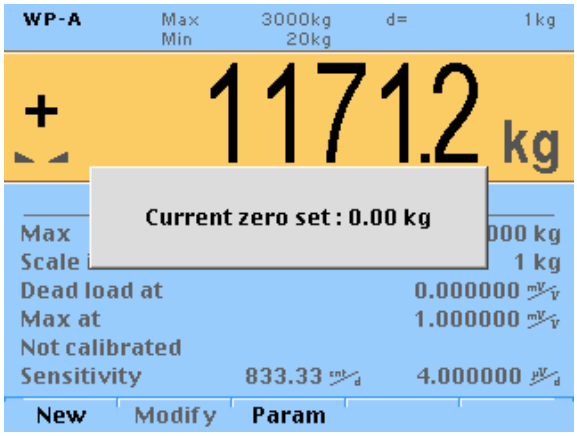
When [all LC same] is set, only one value for [LC output at max. capacity] and [LC output impedance] are required.

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.

7.12.10 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 7.12.6).

Note:

If a linearization was carried out (see Chapter 7.12.11), 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!

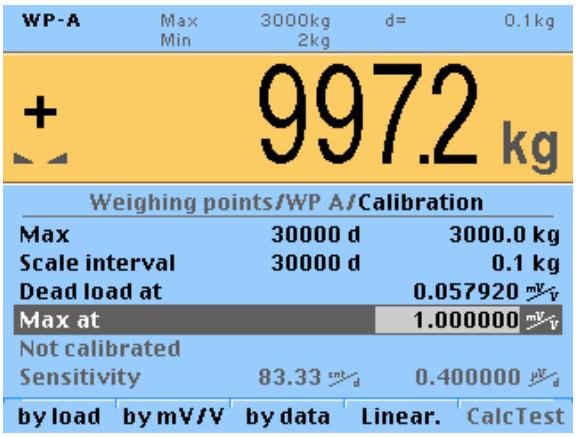
7.12.11 Linearization

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

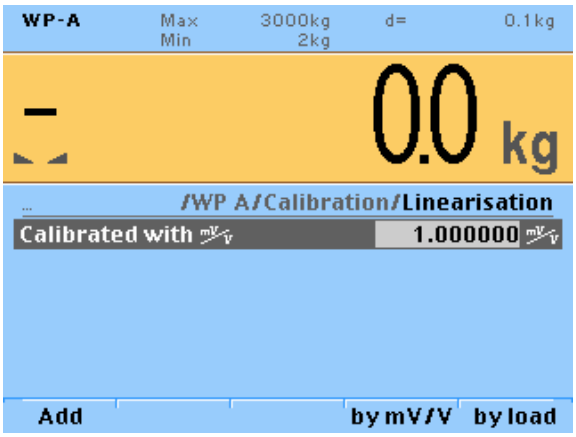
Requirements:

Calibration of Max and dead load was done.

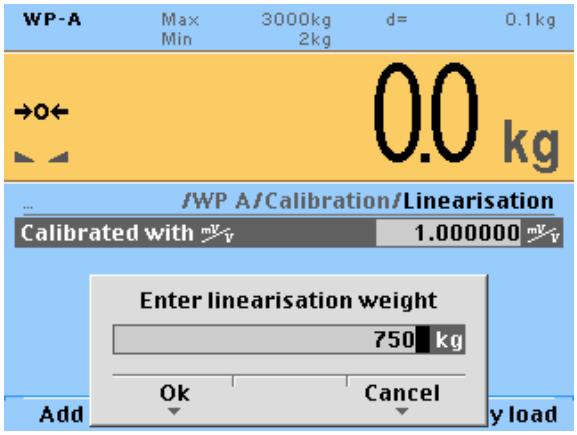
Procedure:



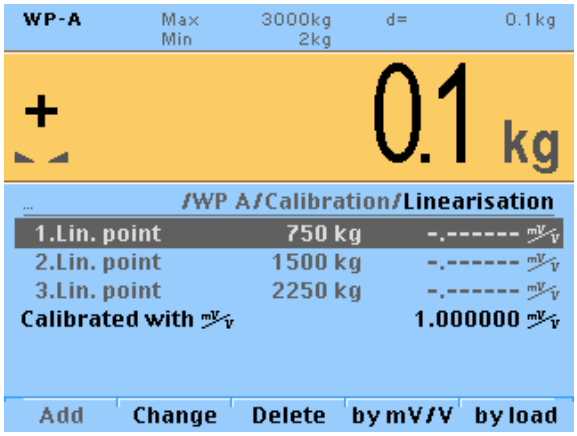
1. Press the [Linear.] softkey.
   ▷ The menu linearization is shown.



2. Press the [Add] softkey to set a linearization point.
   ▷ The input window opens.



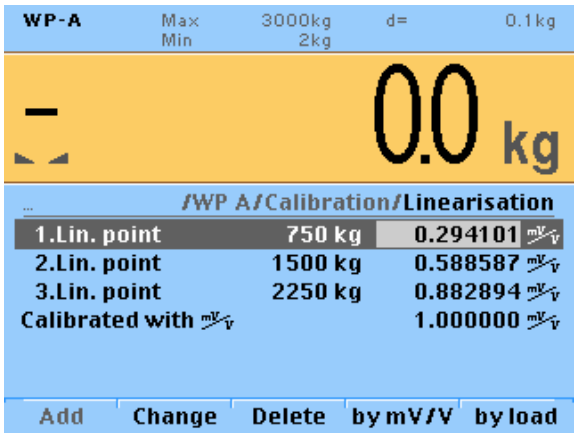
3. Enter the desired value using the keyboard.
4. Press the [Ok] softkey.
5. Repeat these steps to set up to three linearization points in succession.
   ▷ The window shows the set linearization points.



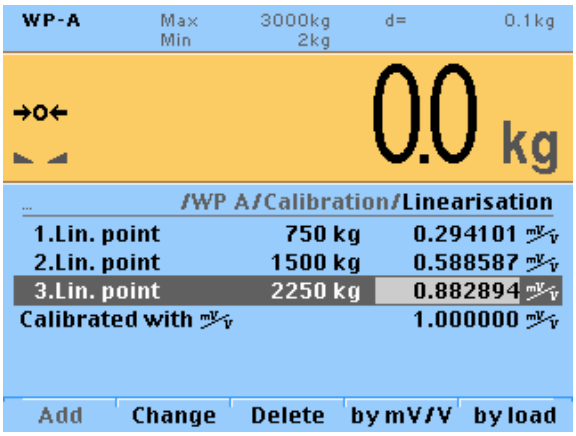
By pressing [by mV/V] the value can be entered directly.

By pressing [Change] the selected linearization point can be changed.

By pressing [Delete] the selected linearization point can be deleted.

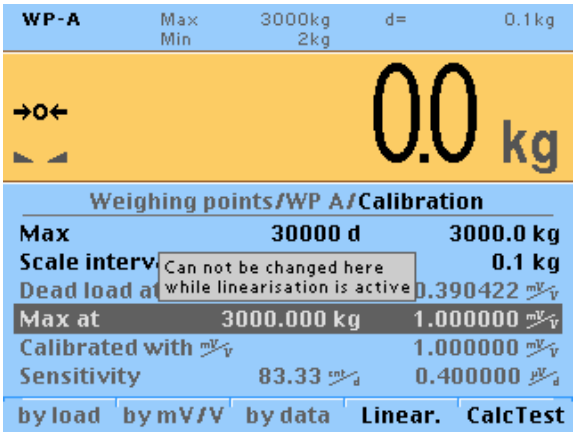


6. Select a linearization point, place the corresponding weight on the scale, and press the [by load] softkey.
   ▷ The value corresponding to the weight is automatically entered in mV/V.



7. Repeat these steps to automatically enter the corresponding values for the weights of all set linearization points in mV/V.

8. Press Exit to switch to the previous window.



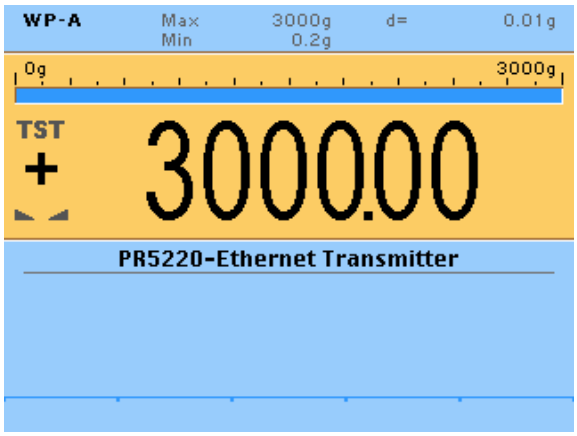
▷ A message is displayed, indicating that the value for Max cannot be changed as long as linearization is active.

7.12.12 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.

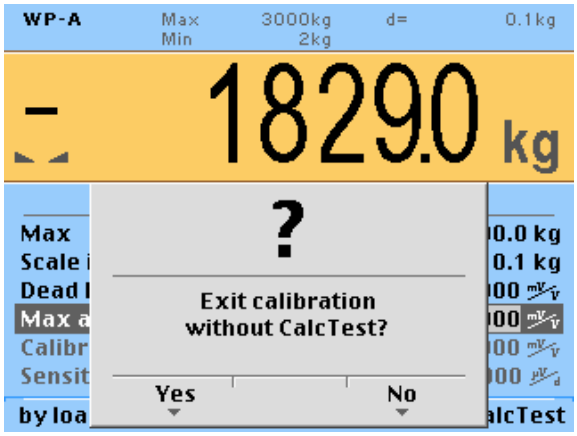
Depending on the settings under Setup - [Weighing point] - [Calib] - [Param] - [Test mode] the following is displayed by calling the Test with the Test key later on:



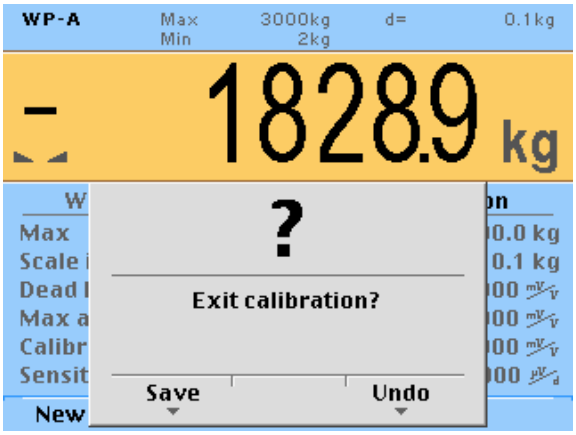
- with [Absolute] the maximum load
- with [Relative] the deviation from the test value

7.12.13 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.

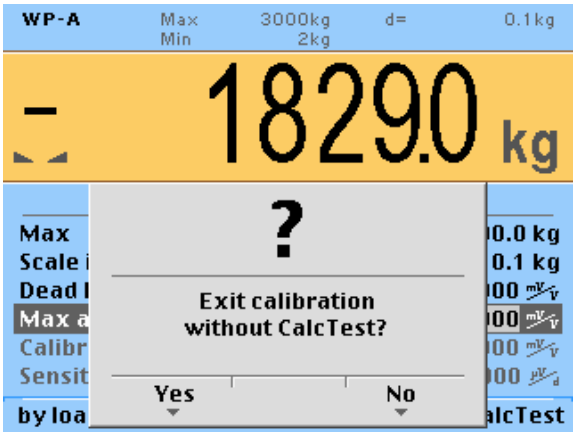
The verification is displayed by "Saving calibration".

Leaving the menu is displayed by "Exit calibration".

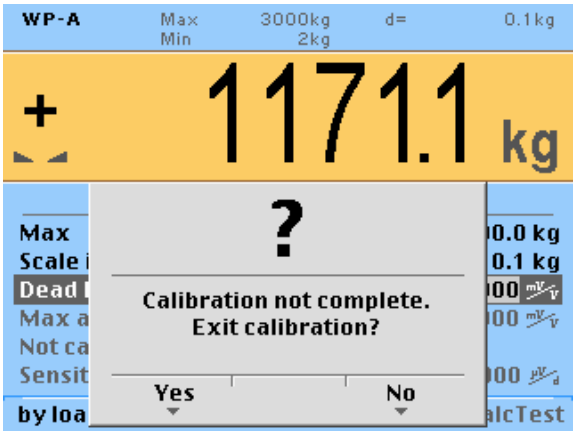
After finishing the calibration, set the CAL switch to the closed position; see also Chapter 7.1.3.1.

7.12.14 Cancelling a calibration

Quit calibration by pressing the Exit softkey.

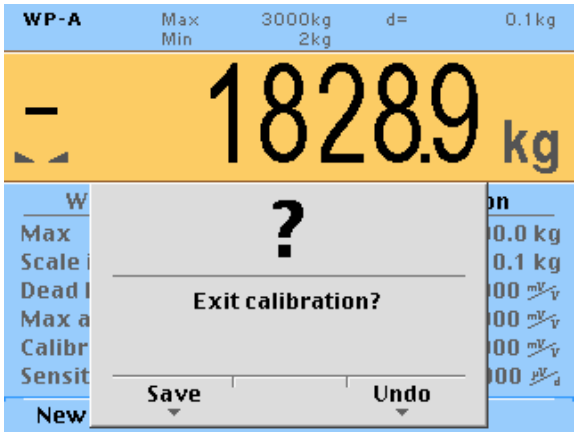


You are prompted to confirm whether calibration should be closed without determining the test value.



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:

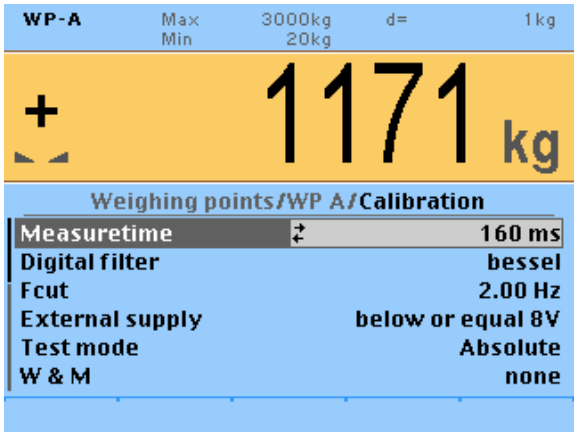


If you press [Undo], changes are not saved and the display returns to the selection menu for the weighing points.

Leaving the menu is displayed by "Exit calibration".

7.12.15 Parameter Input

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



[Measuretime]

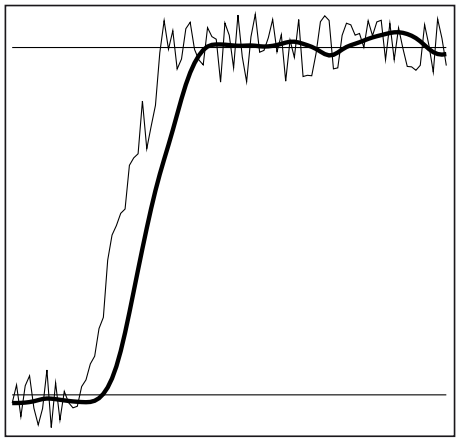
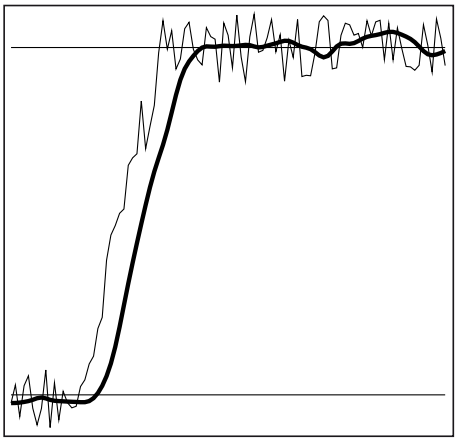
Measuring time: The duration of a measurement can be selected.

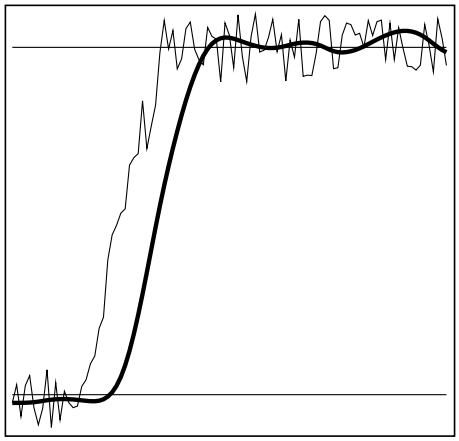
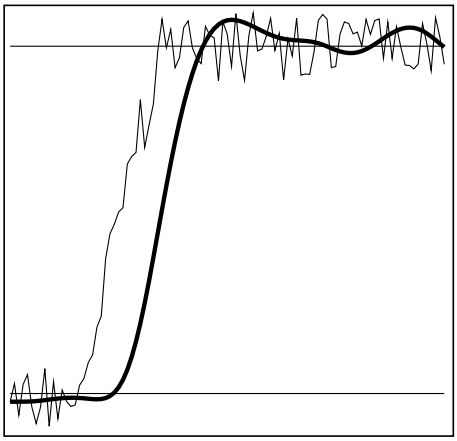
Selection: 5 ms, 10 ms, 20 ms, 40 ms, 80 ms, 160 ms, <320 ms>, 640 ms, 960 ms, 1280 ms, 1600 ms.

[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 7.12.12.

[W&M]

Setting for legal-for-trade mode.

Note:

The transmitter of the series PR 5220 are not approved for calibration.

[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

[Zerotrack indic. range]

Indication range within which automatic zero tracking compensates deviations.

Setting range: 0.25...10000.00 d

[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

[Zerotrack time]

Time interval for automatic zero tracking.

Setting range: 0.1...25 s

At 0.0 s the zero tracking is switched off.

[Overload]

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

Setting range: 0...9999999 d

[Minimum weight]

Minimum weight at which a print command can be triggered.

Setting range: 0...9999999 d

[Range mode]

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

For scale range selection, see Chapter 7.12.15.1 and 7.12.15.2.

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

7.12.15.1 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:

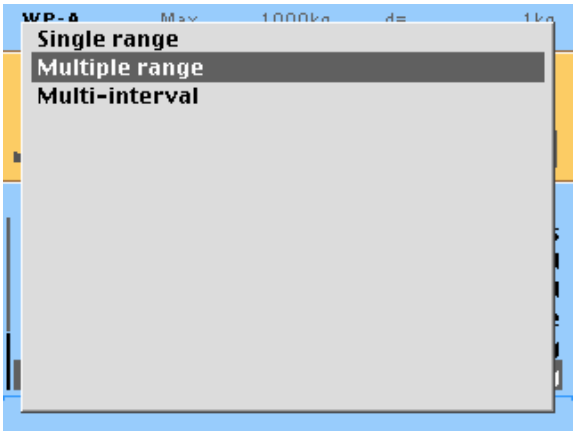
Range mode: "Multiple range"

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

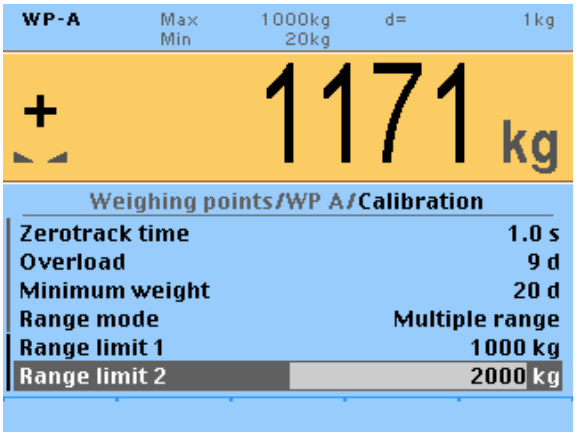
Range 2: 0...2000 kg (next highest scale interval: 2 kg)

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.

7.12.15.2 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 displayed 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:

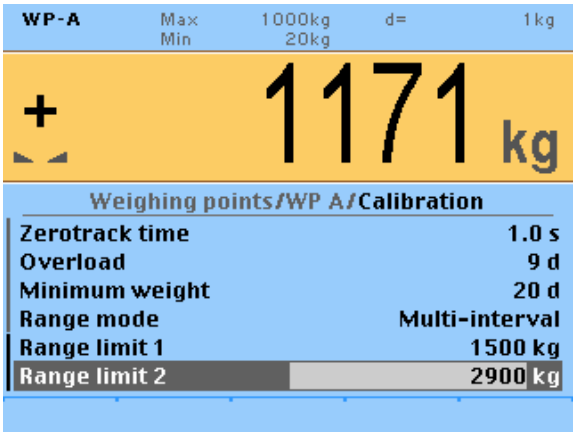
Range mode: "Multi-interval"

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.

7.13 Calibrating xBPI-scale

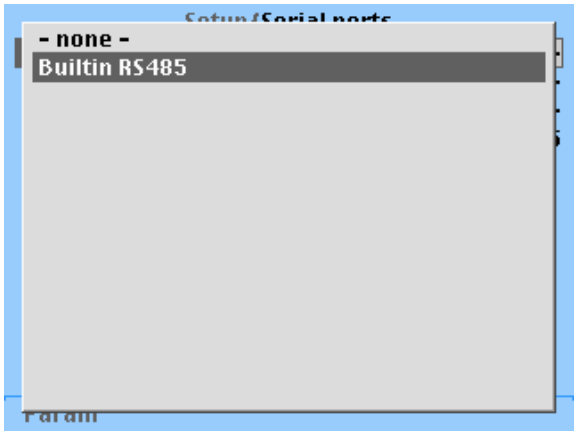
7.13.1 General information

The legal-for-trade application of PR 5220 with a xBPI-scale is not possible.

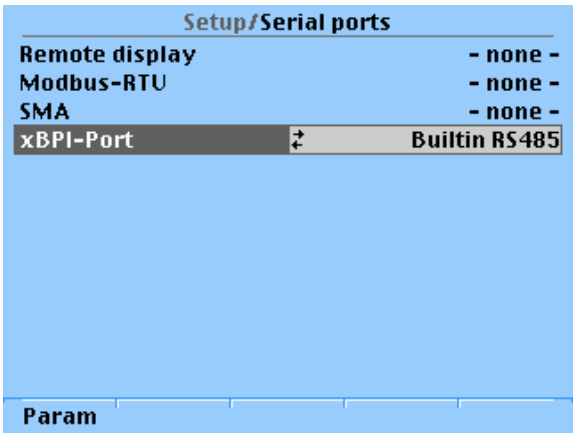
7.13.2 Parameters for serial interface

1. Select Setup-[Serial ports parameter]- [xBPI-Port] and confirm.

▷ The following window opens:

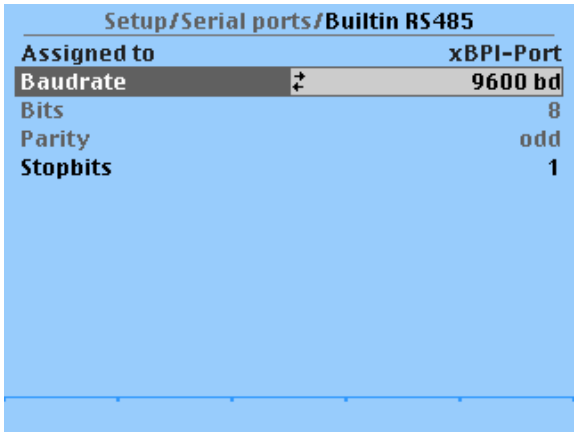


2. Select the desired interface and confirm.



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.

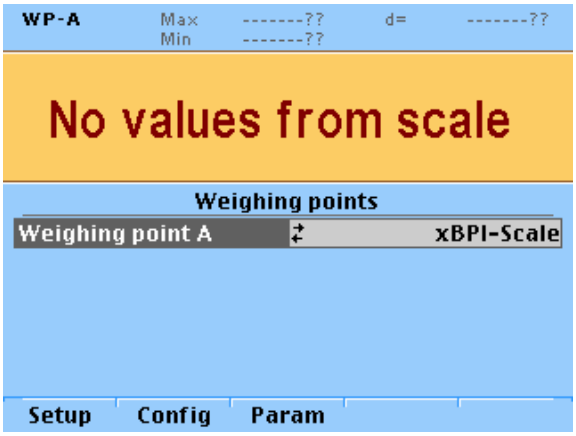
5. Press Exit to exit the menu and to save the settings.

7.13.3 Parameters for the xBPI-weighing function

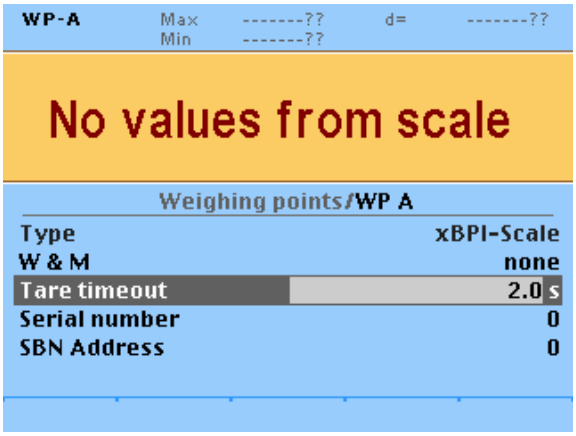
The following parameters must be entered for this menu item:

- Timeout for tare function depending on the application
- SBN-address for each xBPI-scale in bus operation mode

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.

   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.

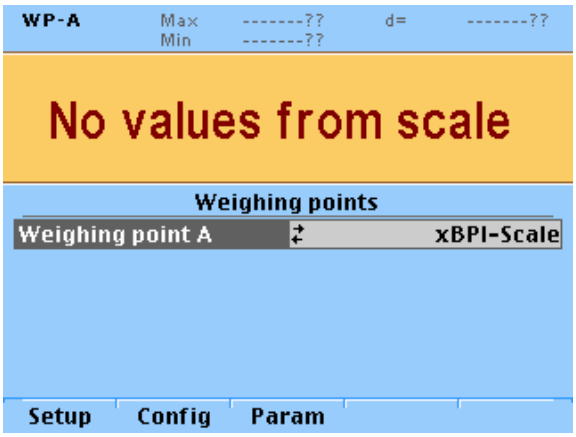
The SBN Address is shown on the display.

Example: Address 31 at WP-A

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

7.13.4 Setting up an xBPI platform

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



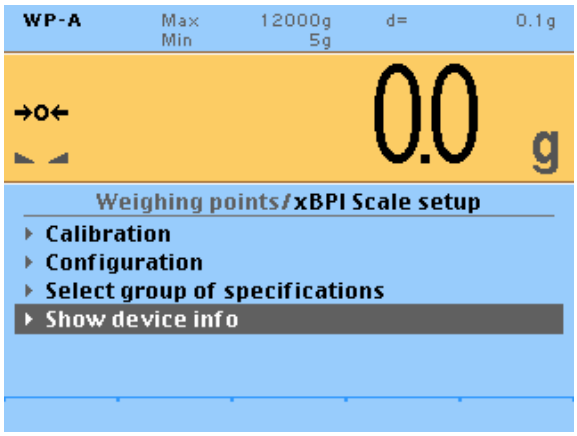
2. Press the [Setup] softkey.

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

Ticks indicate the progress.

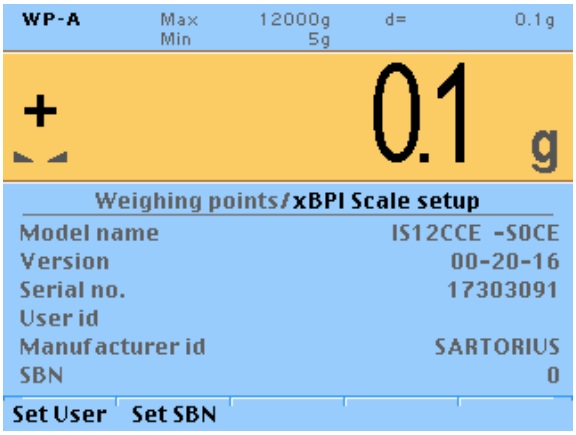
An error message is displayed if communication with the xBPI scale is not possible!

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 7.13.5.1.

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 7.13.5.2.

    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 7.13.5.3.

    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.

7.13.5 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].

7.13.5.1 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

7.13.5.2 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**

7.13.5.3 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**
  - **Space**
  - **Odd**
  - **Even**

g
kg
ct
lb

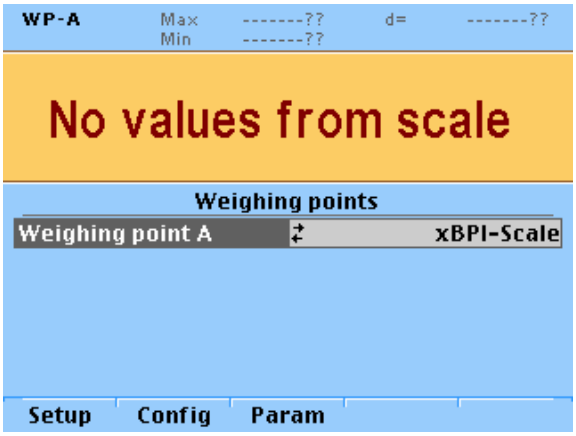
- **Stop bits**
  - **1 stop bit**
  - **2 stop bits**
- **Handshake**
  - **software handshake**
  - **CTS with 2 chr.pau**
  - **CTS with 1 chr.pau**
- **Data output print**
  - **on requ always**
  - **on requ when stab**
  - **on requ with store**
  - **auto**
  - **auto when stable**
- **Auto print**
  - **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**

7.13.6 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.

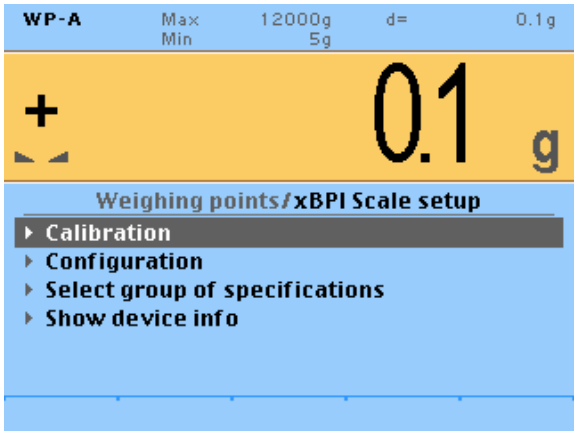


2. Press the [Setup] softkey.
   ▷ The parameters of the xBPI-scale are read into the device.

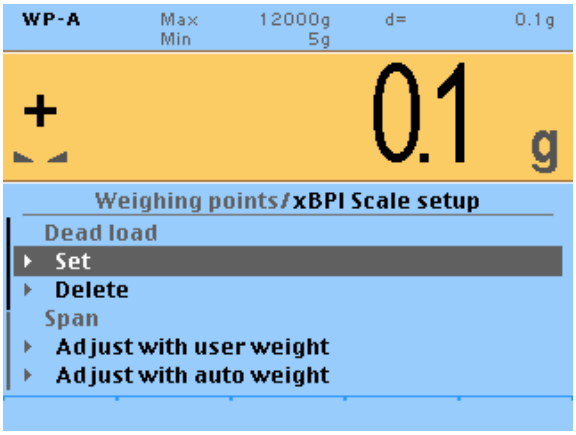
   Ticks indicate the progress.

   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.

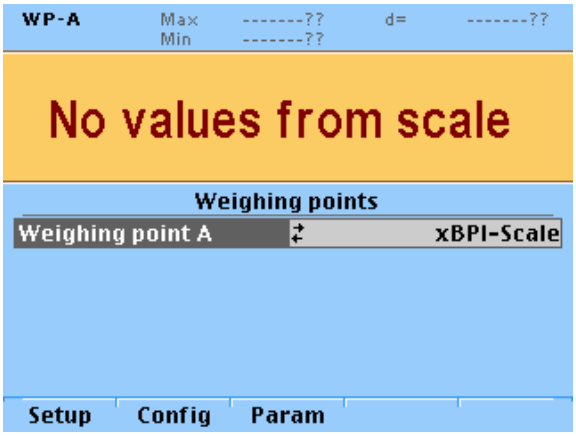
7.13.7 xBPI calibration with user specified weight

Requirements:

- The xBPI protocol has been selected (see Chapter 7.13.2).
- The "xBPI-scale" weighing point has been selected (see Chapter 7.13.3).
- The platform has been set up (see Chapter 7.13.4).
- 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.

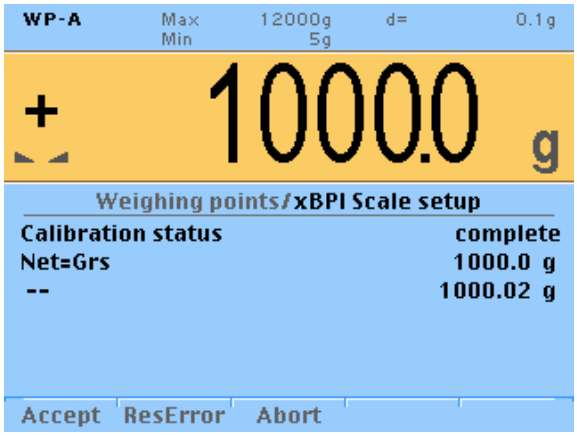
Procedure:

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.

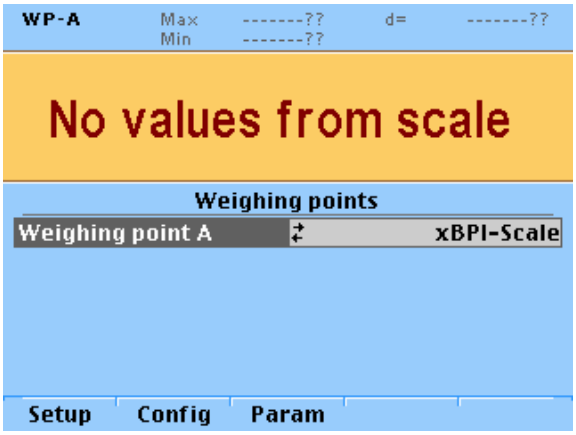
7.13.8 xBPI calibration with automatic weight detection

Requirements:

- The xBPI protocol has been selected (see Chapter 7.13.2).
- The "xBPI-scale" weighing point has been selected (see Chapter 7.13.3).
- The platform has been set up (see Chapter 7.13.4).
- 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.

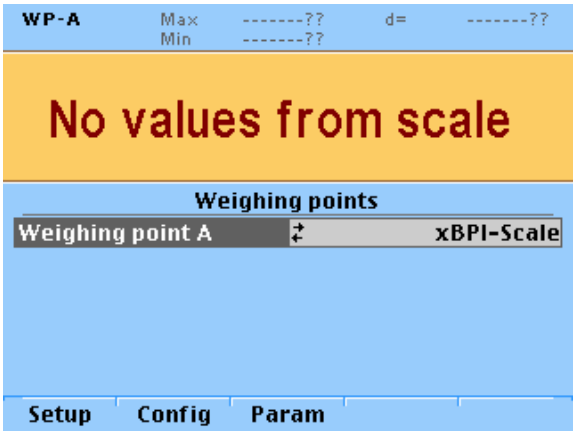
7.13.9 xBPI calibration with default weight

Requirements:

- The xBPI protocol has been selected (see Chapter 7.13.2).
- The "xBPI-scale" weighing point has been selected (see Chapter 7.13.3).
- The platform has been set up (see Chapter 7.13.4).
- 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.

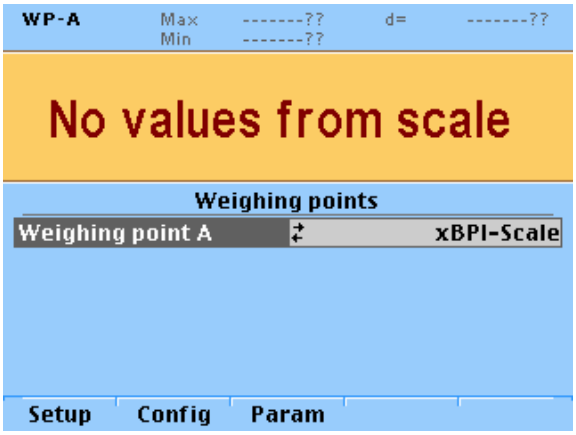
7.13.10 xBPI calibration with built-in weight

Requirements:

- The xBPI protocol has been selected (see Chapter 7.13.2).
- The "xBPI-scale" weighing point has been selected (see Chapter 7.13.3).
- The platform has been set up (see Chapter 7.13.4).
- 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.

7.13.11 xBPI linearization

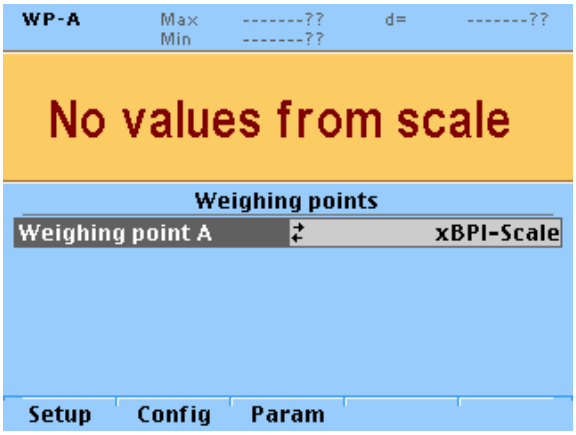
The measurement range for a straight can be optimized by setting the linearization points. The following describes standard linearization.

Requirements:

- The xBPI protocol has been selected (see Chapter 7.13.2).
- The "xBPI-scale" weighing point has been selected (see Chapter 7.13.3).
- The platform has been set up (see Chapter 7.13.4).
- 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.

7.14 Calibrating digital load cells from Minebea Intec

7.14.1 General information

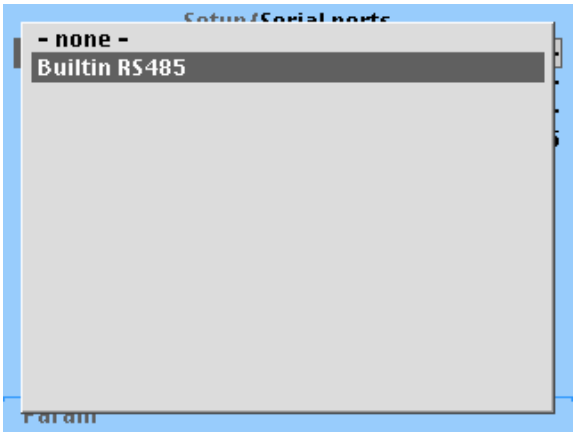
The digital load cells have been calibrated at the factory based on the acceleration of gravity at Hamburg (9.81379 m/s^2). The calibration data in the load cells are invariable. The calibration data for the gravity acceleration at the place of installation can be adapted only in the instrument and protected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

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

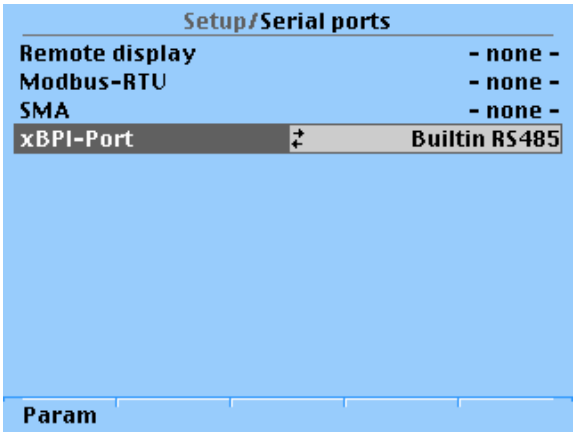
The available interfaces are visible under Info-[Show HW-slots].

7.14.2 Selecting and configuring RS-485 interface

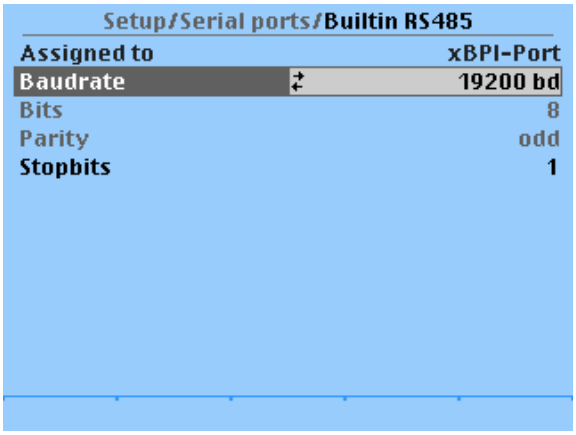
1. Select Setup-[Serial ports parameter]- [xBPI-Port] and confirm.
   ▷ The following window opens:



2. Select the desired interface and confirm.



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



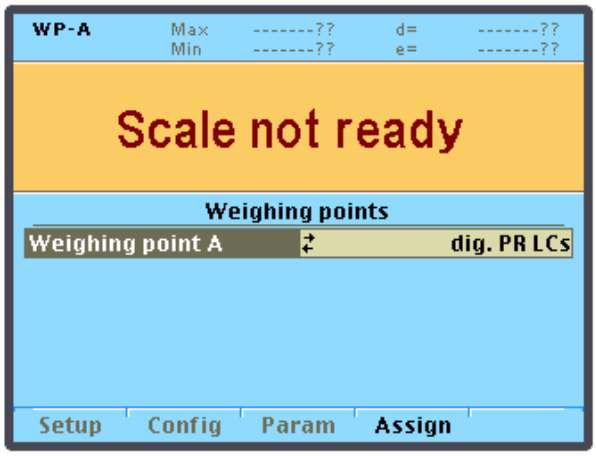
4. Select [Baudrate] and confirm.
   ▷ A selection window opens.
5. Select "19200 bd" and confirm.
6. Select [Stopbits] and confirm.

▷ A selection window opens.

7. Select "1" and confirm.
8. Press Exit to exit the menu and to save the settings.

7.14.3 Selecting the load cell type

1. Select Setup-[Weighing point]- [Weighing point A].
   ▷ A selection window opens.
2. Select [dig. PR LCs] and confirm.



3. Press Exit to exit the menu and save.

7.14.4 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:

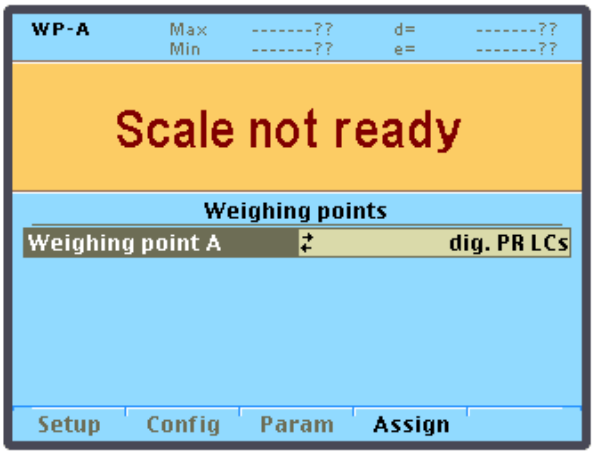
- Search for load cells, see Chapter 7.14.5.
- Assign load cells, see Chapter 7.14.6.
- Recalibrate: Maximal load with weight unit, scale interval, dead load, CAL weight, see Chapter 7.14.7.
- Perform a corner correction if necessary; see Chapter 7.14.10.3.

Note:

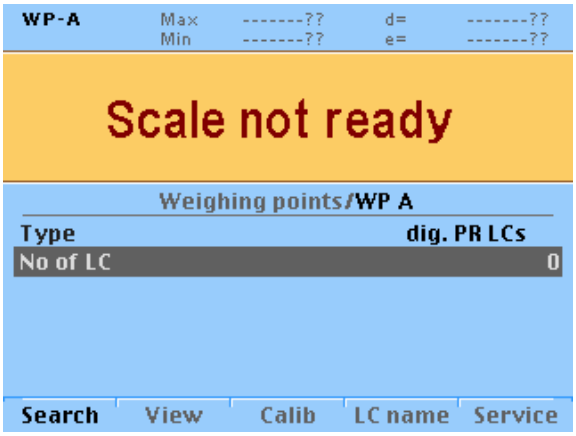
For further information about calibrating weighing points, see Chapter 7.12.3.

7.14.5 Searching load cells

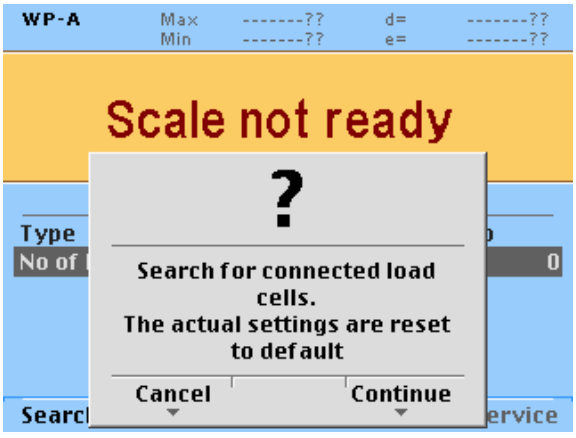
1. Select Setup-[Weighing point]- [Weighing point A].



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 7.14.8), the view can be switched with the [by name] softkey.

7. Press Exit to exit the menu and save.

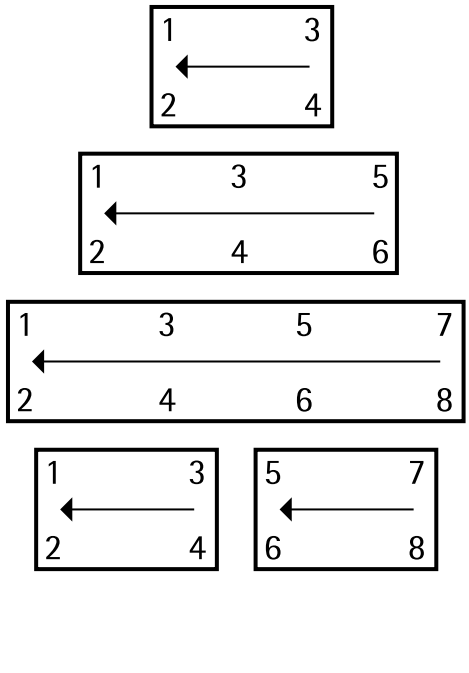
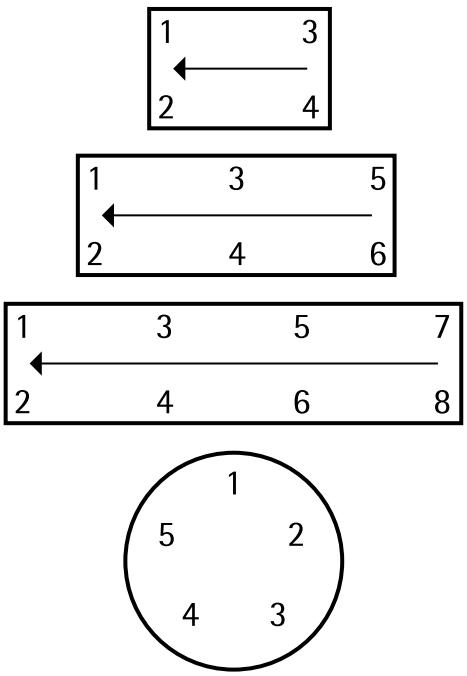
7.14.6 Assigning load cells

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 "PR DLC truck"	with load cells of type "PR DLC 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 7.14.10.1.
13. Press the Exit softkey to exit the menu and save.

7.14.7 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 "PR DLC truck" load cells)

   This parameter is shown only in the case of 8 load cells.

   Entering the number of platforms.

[Number of vessel feet] (only for "PR DLC 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 7.14.10.3.

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.

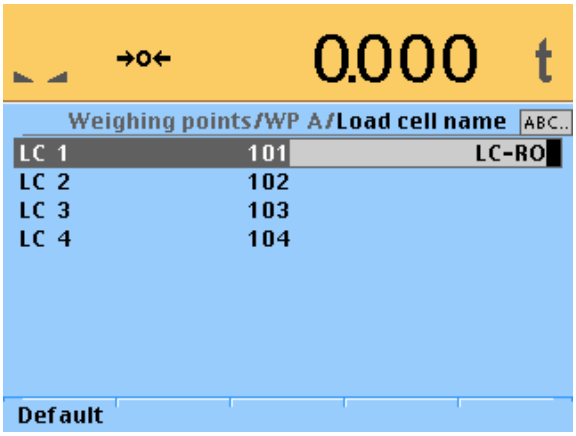
---

5. Press the Exit softkey to exit the menu.

7.14.8 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] .



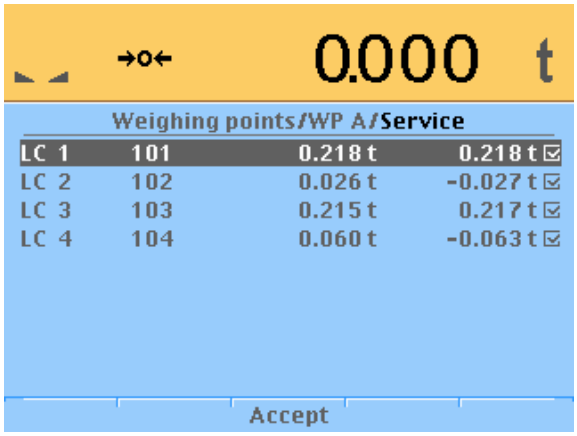
1. Select the line, enter the name with the keyboard (max. 20 alphanumerical characters) and confirm.
2. Repeat these steps for load cells 2...4.
3. Press Exit to exit the menu and save.

7.14.9 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.

7.14.9.1 Deactivating the load cell

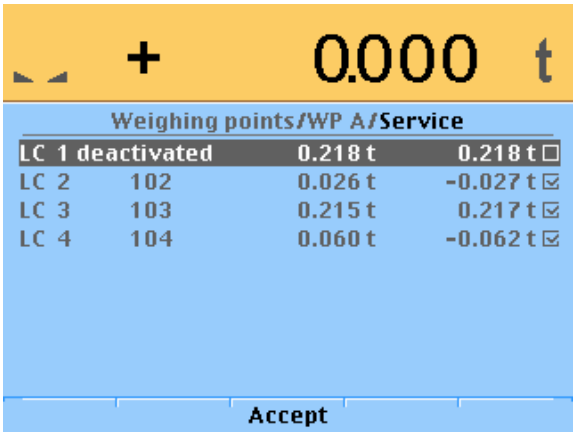
A load cell can be deactivated if it is defective. The weight is then distributed to the remaining load cells.

Note:

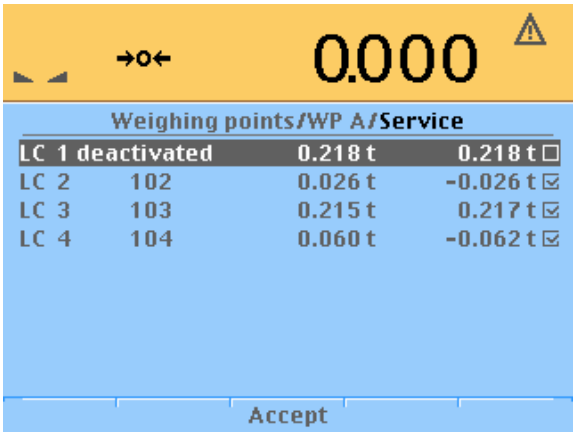
For vehicle weighbridges:

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.



7.14.9.2 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.

7.14.10 Corner correction

7.14.10.1 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.

7.14.10.2 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 7.14.10.3.

7.14.10.3 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].

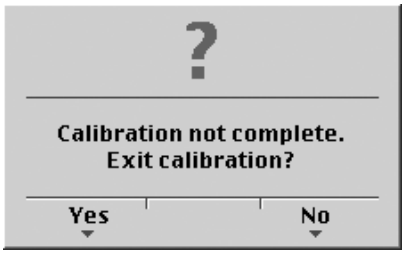
1. Press the [Modify] softkey.
2. Select and confirm [Corner correction].
3. Set the CAL weight on an area of the scale structure.
   ▷ The position (e.g.: LC 4) is highlighted.
4. Confirm this position.
   ▷ Is displayed by ☑.
5. Remove the CAL weight.
6. Repeat steps 3 to 5 for the remaining load cells. 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.

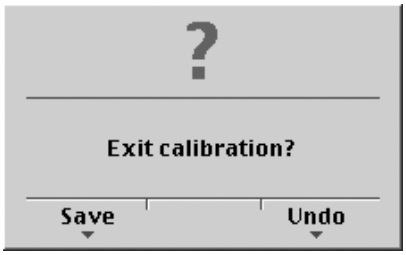
7.14.11 Terminating/saving calibration

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:



1. Press the [Yes] softkey to exit the calibration.
2. Confirm Exit.
   ▷ A prompt window opens.

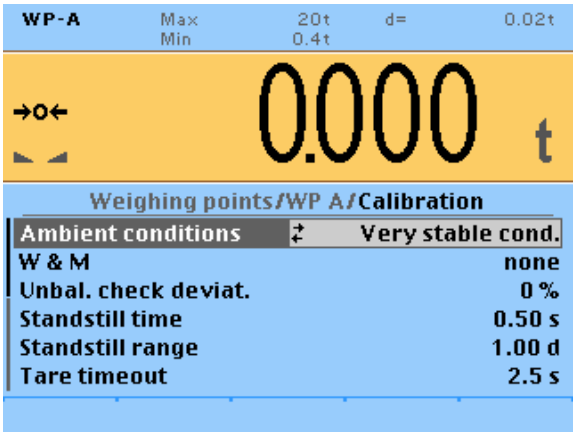


3. Press the [Save] softkey to save changes in calibration data.
   ▷ The verification is displayed by "Saving calibration".
4. Press the [Undo] softkey if you do not want to save the changes.
   ▷ The scale returns to the selection menu.

   Leaving the menu is displayed by "Exit calibration".
5. After finishing calibration, set the CAL switch to the closed position; see Chapter 7.1.3.1.

7.14.12 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 5220 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

[Zerotrack indic. range]

Indication range within which automatic zero tracking compensates deviations.

Setting range: 0.25...10000.00 d

[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

[Zerotrack time]

Time interval for automatic zero tracking.

Setting range: 0.1...25 s

At 0.0 s the zero tracking is switched off.

[Overload]

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

Setting range: 0...9999999 d

[Minimum weight]

Minimum weight at which a print command can be triggered.

Setting range: 0...9999999 d

[Range mode]

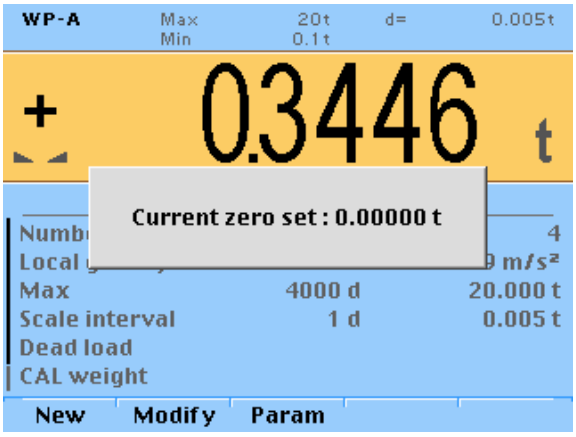
Selection: <Single range>, Multiple range, Multi-interval

For scale range selection, see Chapter 7.12.15.1 and 7.12.15.2.

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

7.14.13 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 7.14.7).

7.14.14 Displaying weighing point serial number

After searching via Setup-[Weighing point]- [Weighing point A]- [Assign]- [Search] the corresponding weighing point serial number is displayed.

7.15 General parameter settings

The parameter settings which are not related to the weighing electronics are divided into several ranges.

- Serial interfaces [Serial ports parameter]
- Operating parameter [Operating parameter]
- 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]

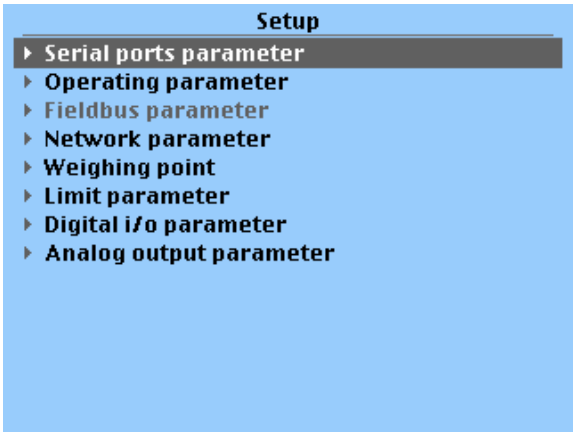
Note:

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

- Configuring analog output [Analog output parameter]

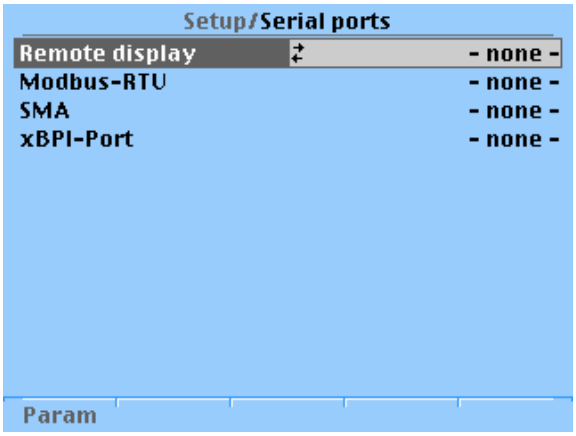
7.15.1 Selecting and configuring serial interfaces

The interfaces are configured under this menu item.

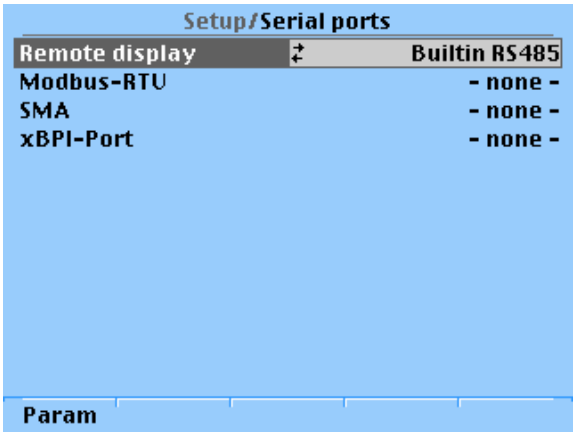


▶ Select Setup - [Serial ports parameter] and confirm.

▷ The following window opens.

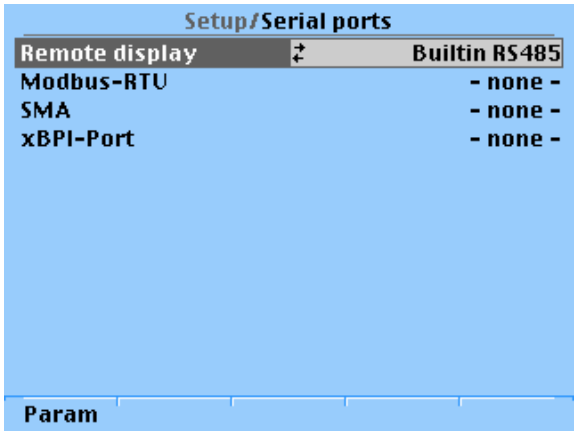


7.15.1.1 Remote display protocol

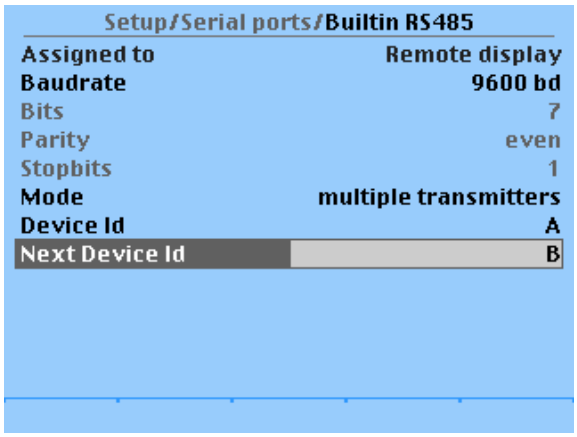


1. Select [Remote display] and confirm.
   ▷ A selection window opens.
2. Select the desired interface and confirm.

▷ The selected interface is displayed.

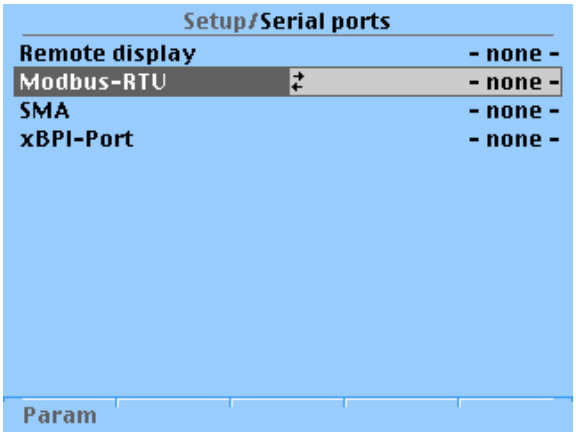


3. Press the [Param] softkey to set the parameters.
   ▷ The following window opens:

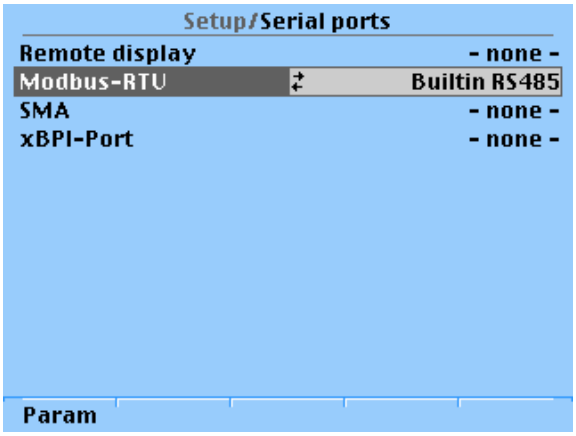


4. Select [Baudrate] and confirm.
   ▷ A selection window opens.
5. Select the desired transmission speed and confirm.
6. Select [Mode] and confirm.
7. If several remote displays are connected, select the "multiple transmitters" mode. If only 1 instrument is connected to a remote display (normal case), [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.

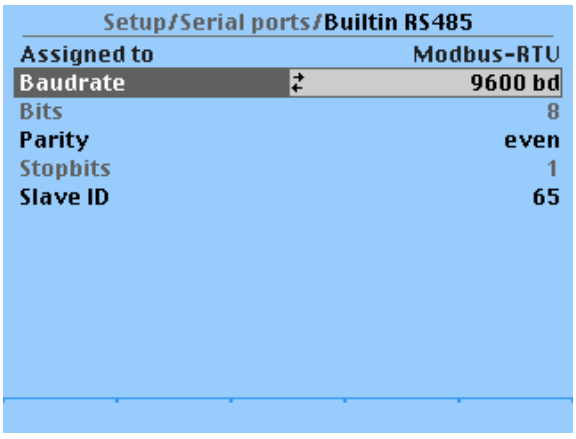
7.15.1.2 ModBus RTU protocol



1. Select [ModBus-RTU] and confirm.
   ▷ A selection window opens.
2. Select the desired interface and confirm.
   ▷ The selected interface is displayed.



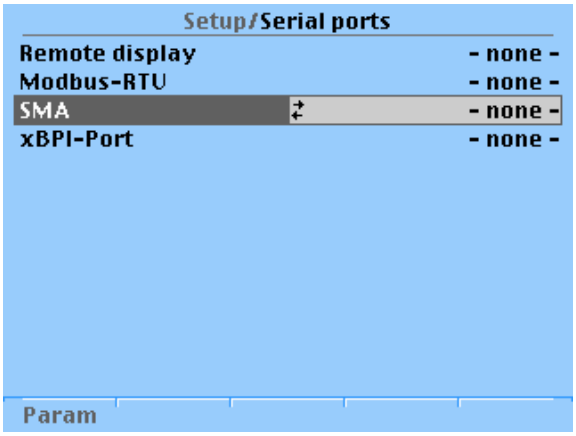
3. Press the [Param] softkey to set the parameters.
   ▷ The following window opens:



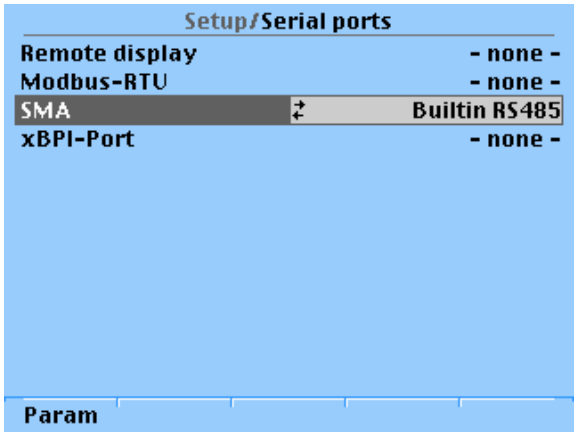
4. Select [Baudrate] and confirm.
   ▷ A selection window opens.
5. Select the desired transmission speed and confirm.

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.

7.15.1.3 SMA protocol

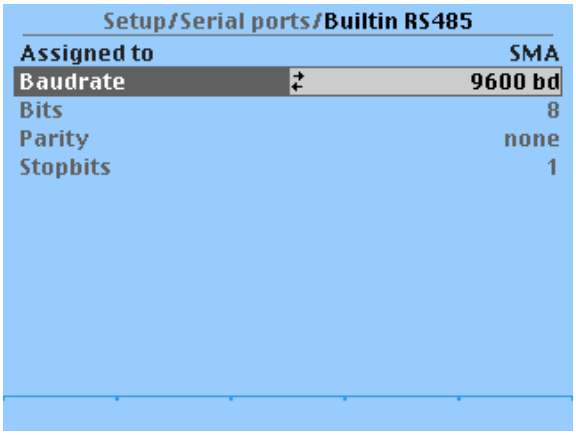


1. Select [SMA] and confirm.
   ▷ A selection window opens.
2. Select the desired interface and confirm.
   ▷ The selected interface is displayed.



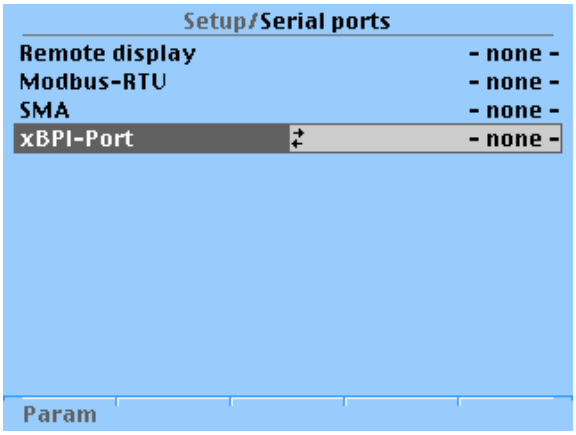
3. Press the [Param] softkey to set the parameters.

▷ The following window opens:

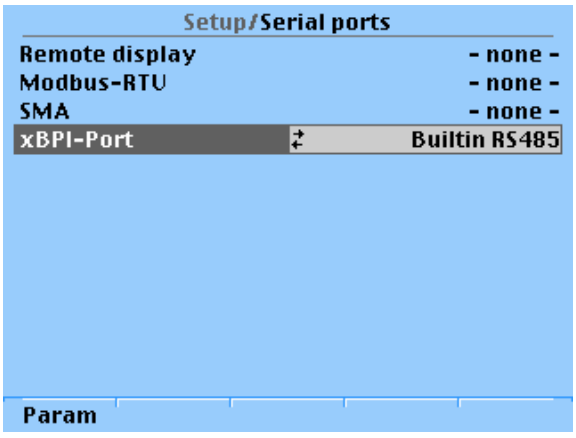


4. Select [Baudrate] and confirm.
   ▷ A selection window opens.
5. Select the desired transmission speed and confirm.
6. Press Exit two times to exit the menu and save.

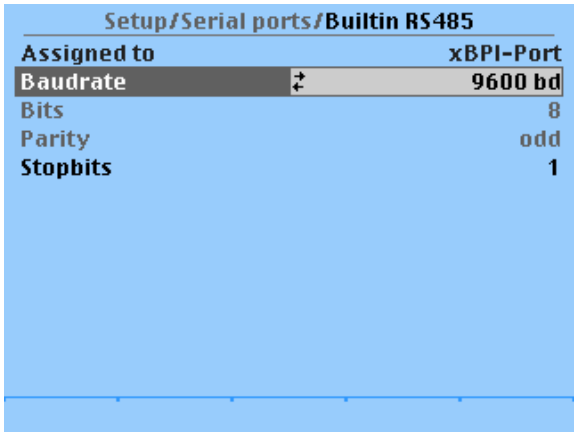
7.15.1.4 xBPI protocol



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:

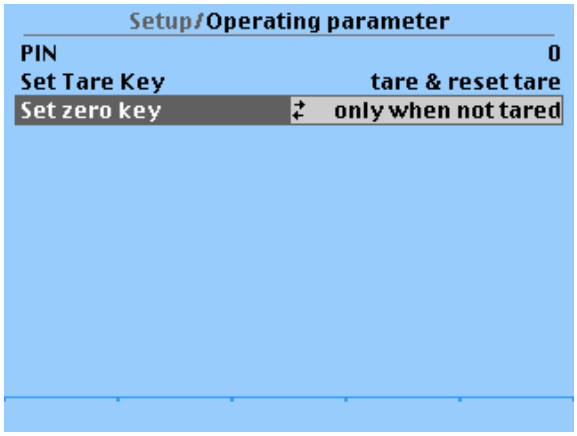


4. Select [Baudrate] and confirm.
   ▷ A selection window opens.
5. Select the desired transmission speed and confirm.
6. Select [Stopbits] and confirm.
   ▷ A selection window opens.
7. Select the desired stopbit and confirm.
8. Press Exit two times to exit the menu and save.

7.15.2 Operating parameters

The operating parameters are set under this menu item.

Open the menu via Setup-[Operating parameter].



[Application]

Application selection: Standard, EasyFill

[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."

[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

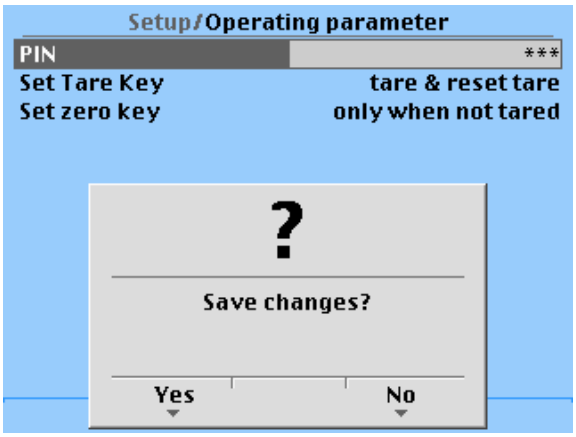
The function of the zero-setting key (operation via VNC/Internet Browser) can be restricted with [only when not tared] to the gross mode or automatically toggle with [reset tare on zeroset] to the gross mode.

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].

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.

7.15.3 Fieldbus parameters

The fieldbus parameters are set under this menu item.

Open the menu via Setup-[Fieldbus parameter].

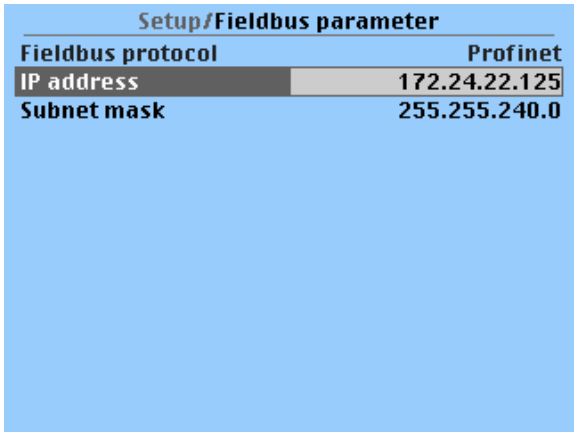
This menu item can only be selected for the devices PR 5220/01, PR 5220/06 and PR 5220/07.

The protocol displayed automatically depends on the device version :

- [ProfiBus-DP] for PR 5220/01
- [ProfiNet I/O] for PR 5220/06
- [EtherNet-IP] for PR 5220/07

Example:

PR 5220/06 ProfiNet I/O

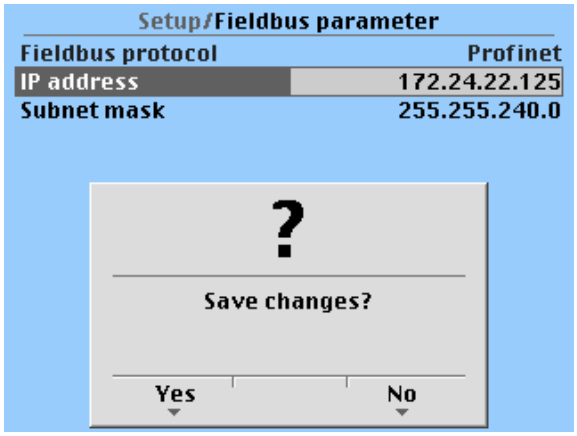


Note:

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.

7.15.3.1 ProfiBus-DP settings for S7

Requirements:

- PR 5220/01 ProfiBus-DP is installed.
- The parameters are selected and saved.

Procedure:

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 "sart5220.gsd" from CD and install it in the development environment.
4. Add the PR 5220 device to the project and assign the I/O ranges.

Note:

See Chapter 12.2

Example:

The gross weight should be read.

I/O size = 8 bytes, counted from byte 0–7

7.15.3.2 ProfiNet I/O settings for S7

Requirements:

- PR 5220/06 ProfiNet I/O is installed.

Procedure:

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. Load the file "GSDML-Vx.xx-Sartorius-5220-2P-xxxxxx.xml" from CD and install it in the development environment.
4. Add the PR 5220 device to the project and assign the I/O ranges.

Note:

See Chapter 12.2

Example:

The gross weight should be read.

I/O size = 8 bytes, counted from byte 0–7

5. Assign the instrument name to the PR 5220.

7.15.3.3 EtherNet-IP settings for Rockwell workstation

Requirements:

- PR 5220/07 EtherNet-IP is installed.

Procedure:

1. Enter the IP address and network mask under Setup - [Fieldbus parameter] and confirm.

2. Register the file "sag_5220_Ethernetip.eds" using the "Hardware Installation Tool".
3. Select and insert the instrument from the catalog into the I/O configuration.

Note:

See Chapter 12.2

Example:

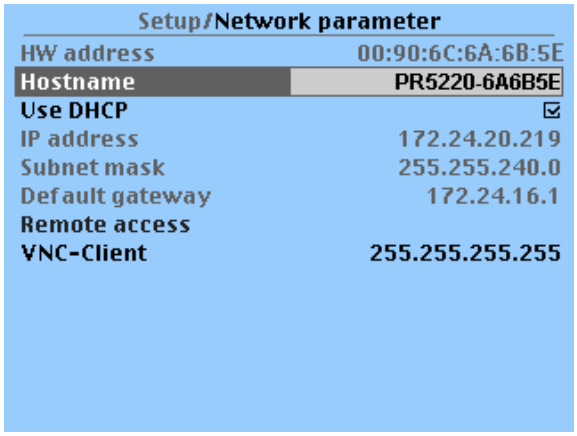
The gross weight should be read.

I/O size = 8 bytes, counted from byte 0–7

7.15.4 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.

7.15.5 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.

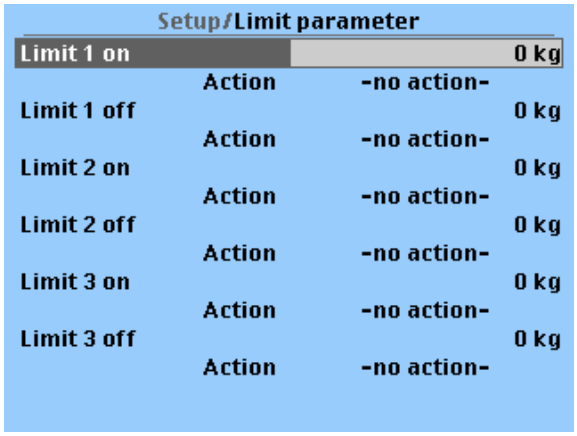
NOTICE

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].

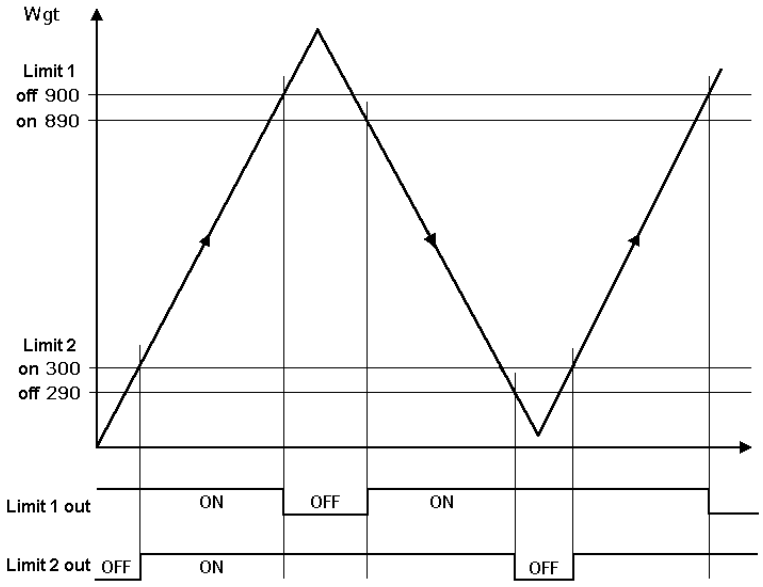


For the configuration the following order must be followed:

1. Define limits.
2. Define an action.
3. Determine a condition.
4. Save parameters.

7.15.5.1 Defining limits

Example 1:



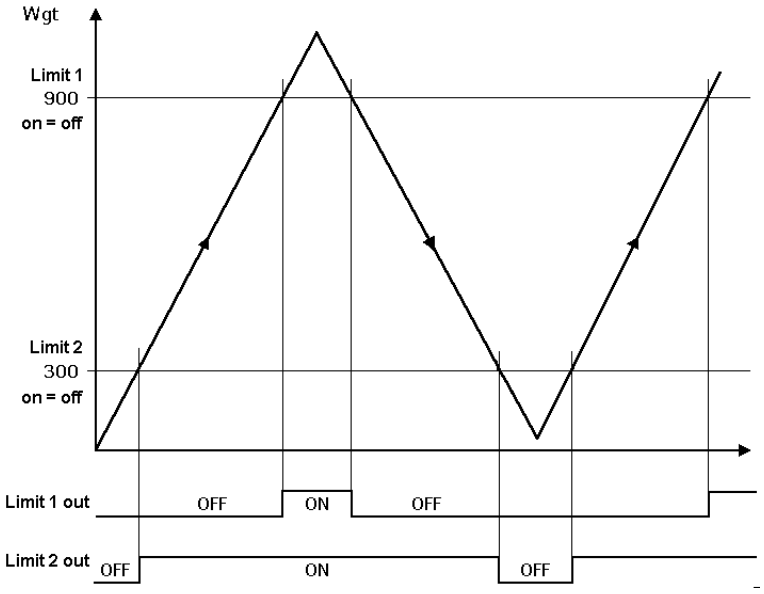
The output signal (Limit 1 out) of limit 1 switches OFF above a weight (Wgt) of 900 kg.

The output signal (Limit 2 out) of Limit 2 switches OFF below 290 kg.

The two limit values have a hysteresis of 10 kg.

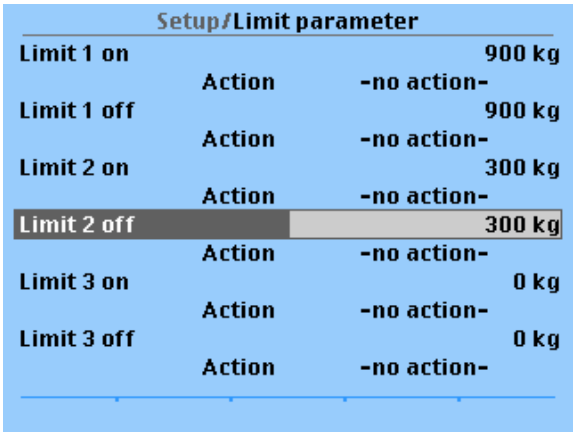
In the event of a power failure both outputs turn to "off" ("OFF"), thus indicating underfill and overfill simultaneously.

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).

7.15.5.2 Defining an action

The possible actions are listed in the following table.

Selection list for the actions [Action]

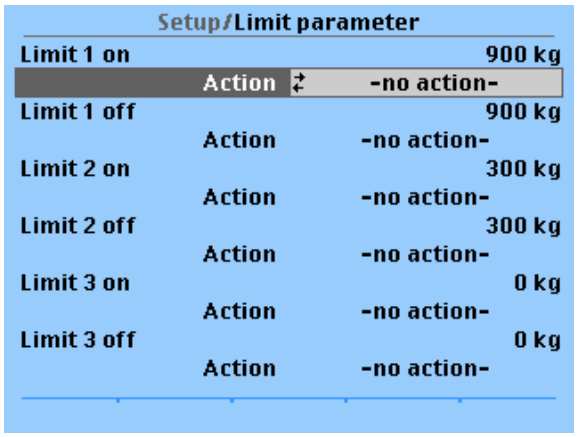
Function	SPM Bit	Description
-no action-	---	no function
set marker 1	X64 = 1	Set marker 1
set marker 2	X65 = 1	Set marker 2
set marker 3	X66 = 1	Set marker 3
clr marker 1	X64 = 0	Clear marker 1

Function	SPM Bit	Description
clr marker 2	X65 = 0	Clear marker 2
clr marker 3	X66 = 0	Clear marker 3

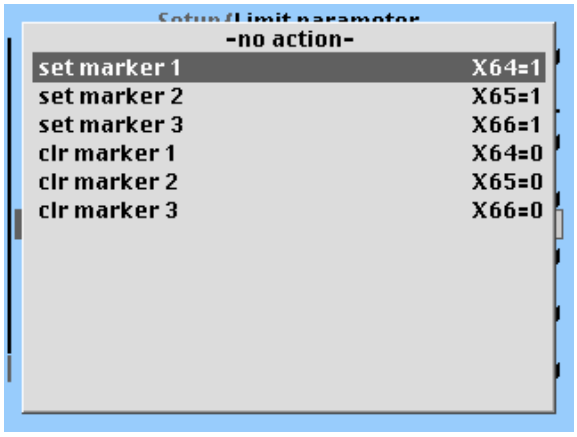
Note:

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.

7.15.5.3 Determining a condition

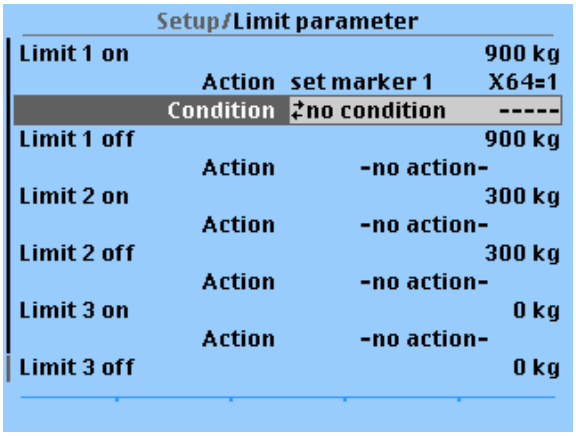
Additionally, a [Condition] can be assigned to the marker.

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.
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

Function	SPM Bit	Description
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".
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.

7.15.5.4 Saving parameters

▶ Press the Exit softkey to exit the menu.

7.15.6 Configuring digital inputs

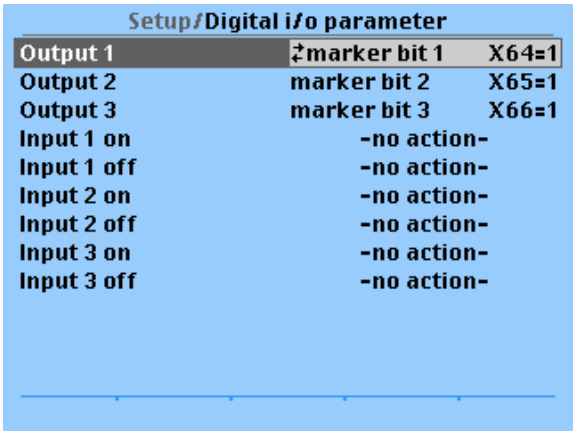
An action both for signal change from 0 to 1 (on) and from 1 to 0 (off) can be determined for each of the three inputs.

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

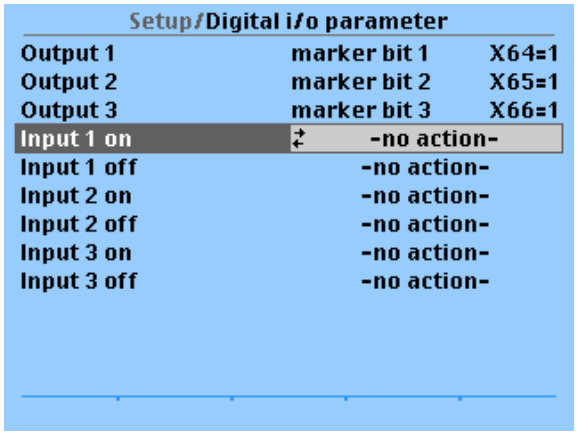
7.15.6.1 Defining an action

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
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).

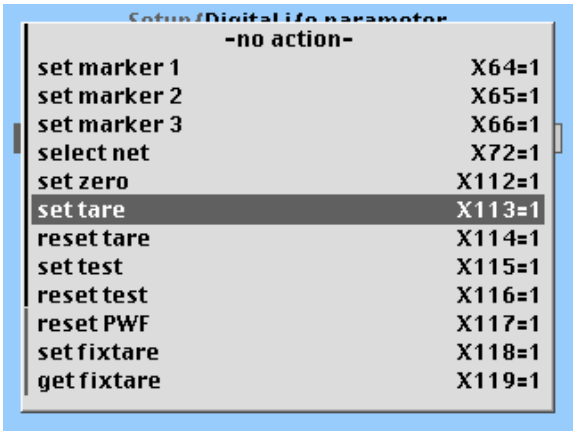


1. Select the appropriate line using the cursor (here: Input 1 on) and confirm.

   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.

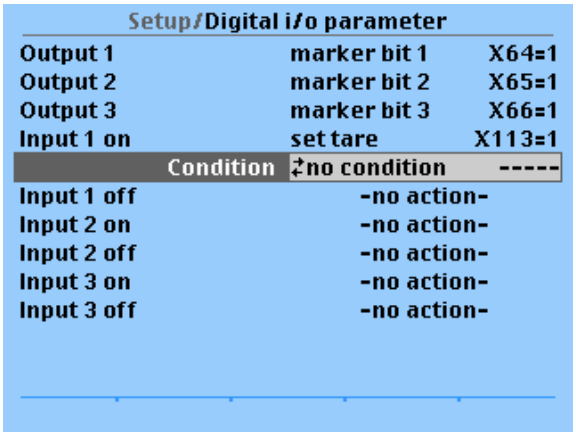


2. Select and confirm the appropriate line.
3. If applicable, select additional actions (setting bits) and confirm.

7.15.6.2 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 7.15.5.3.

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.

7.15.6.3 Saving parameters

▶ Press the Exit softkey to exit the menu.

7.15.7 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
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 (of range)	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".

Function	SPM Bit	Description
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
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 (of range)	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]

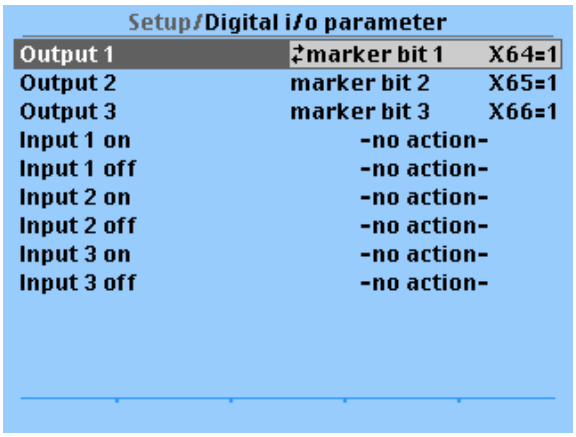
Function is active and output is not active (e.g.: if "overload" is reached, a lamp goes out).

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).

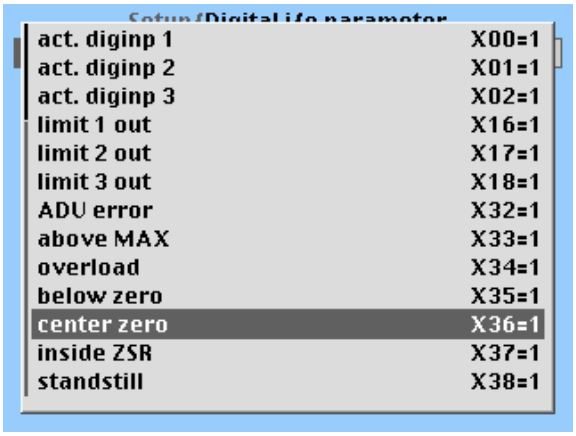
2. Select [below zero] and confirm.
3. Select [Output 2] and confirm.

▷ 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.

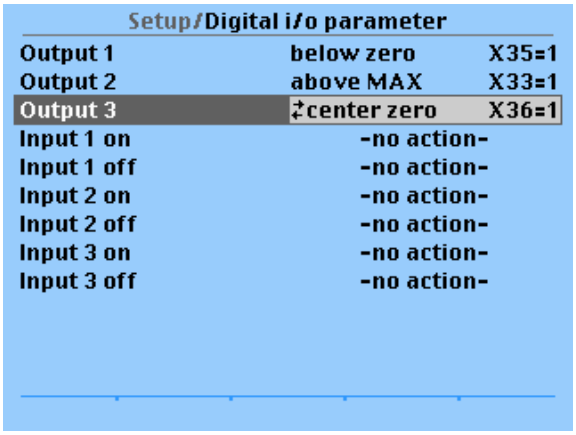
▷ A selection window opens.



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.

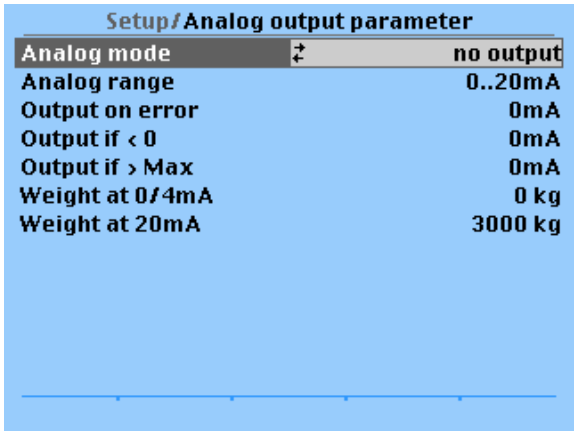


7. Press Exit to exit the menu and save.

7.15.8 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.
[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.

Menu item	Selection	Description
	[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 9.1.2.1.

7.16 System information

This menu displays system information.

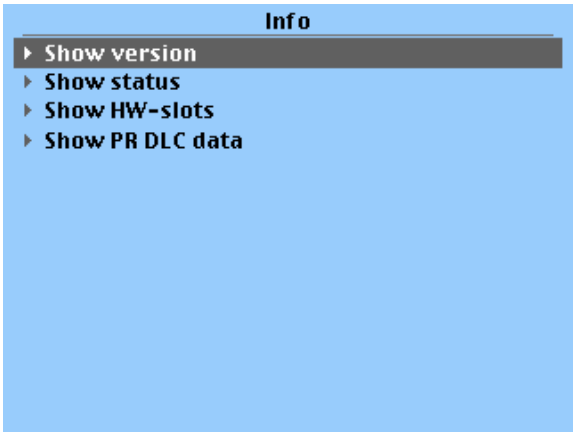
You can also check inputs and outputs, see Chapter 9.1.2.2.

▶ Press Info to access the menu.

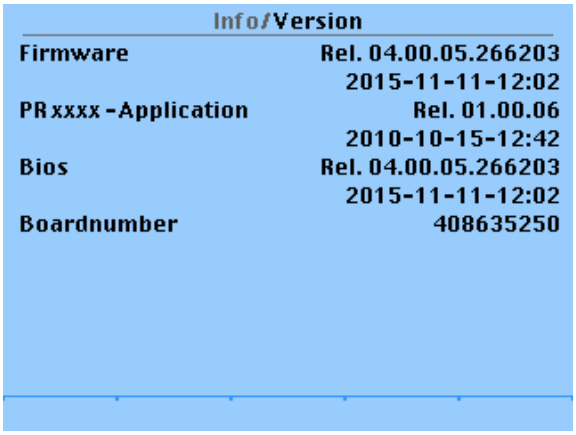
Note:

Info also has other functions; see Chapters 7.12.2.2 and 7.12.10.

7.16.1 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]

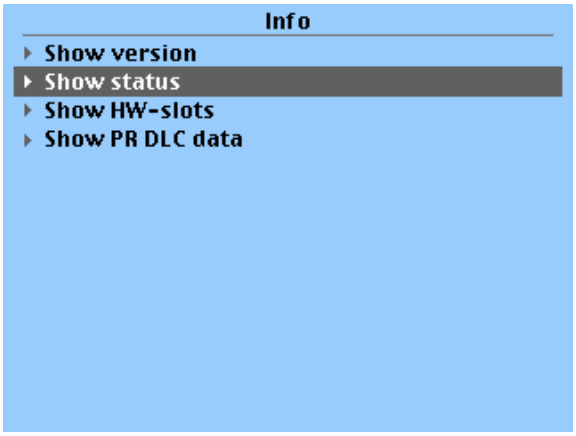
Version number and BIOS creation date

[Board number]

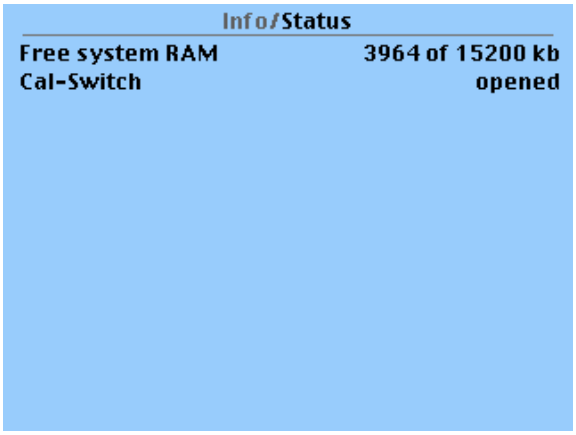
Nine-digit board number

2. Press Exit to return to the previous window.

7.16.2 Displaying the status



1. Select [Show status].



▷ This line shows the following device statuses:

[Free system RAM]

Free working system memory space

[CAL switch]

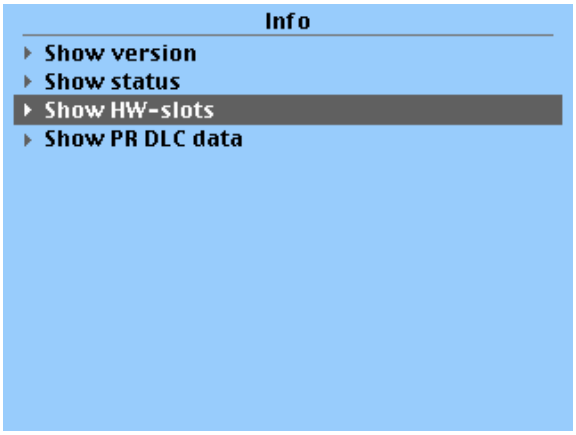
Status display

[opened] = opened, no write protection.

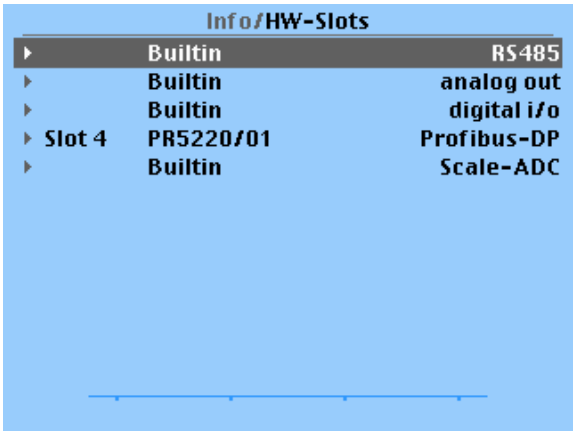
[closed] = closed, write protection is active.

2. Press Exit to return to the previous window.

7.16.3 Showing hardware options



1. Select [Show HW-slots] and confirm.



▷ This line shows the following device statuses:

1st line

Standard interface, serial

2nd line

Standard interface, analog outputs

3rd line

Standard interface, digital I/Os

4th line

In this case: Slot 4, ProfiBus-DP interface

The tool tip displays the version number.

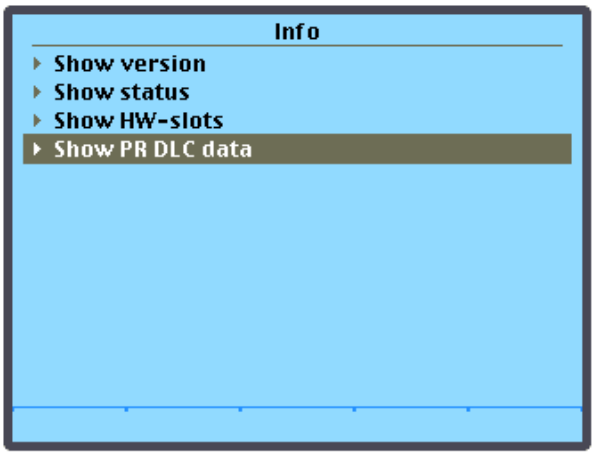
5th line

Standard interface, weighing electronics

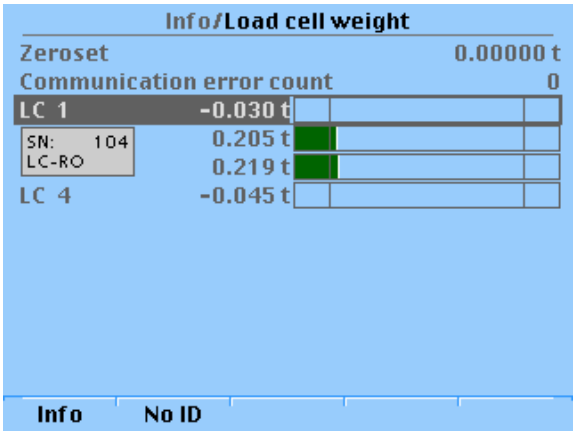
The tool tip displays the weighing point serial number and manufacturing date of the factory.

2. Press Exit to return to the previous window.

7.16.4 Displaying data of digital load cells from Minebea Intec



1. Select [Show PR DLC data] and confirm.



▷ An info window opens.

[Zero correction] (zero point correction)

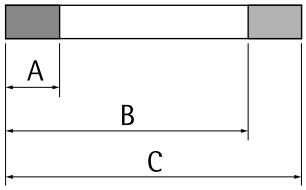
The zero point correction in use is displayed.

[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:

Info/Load cell weight/**Load cell info**

Model name	PR6204/53tC3
Software version	01.00.04
Loadcell serial number	101
Emax	5.0 t
n	3000 e
Y	14000
Z	3000
Overload	50.0 t
Overload counter	0
Temperature	17.4 °C
Max temperature	18.2 °C
Min. temperature	17.4 °C
Max. weight at	1999-11-30-00:07:42

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
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
Firmware checksum	Display of the firmware checksum in HEX format Checksum about the installed firmware version
Config. checksum	Display of the config. checksum in HEX format Checksum about the memory area where the parameters that are relevant for calibration are stored.

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.

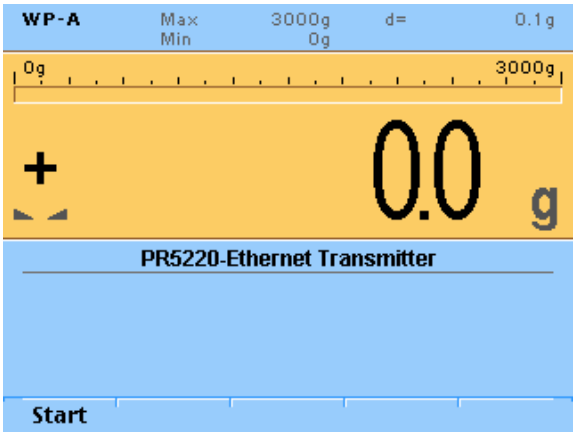
▶ It is important to save material data.

8.2 Starting the application

Requirements:

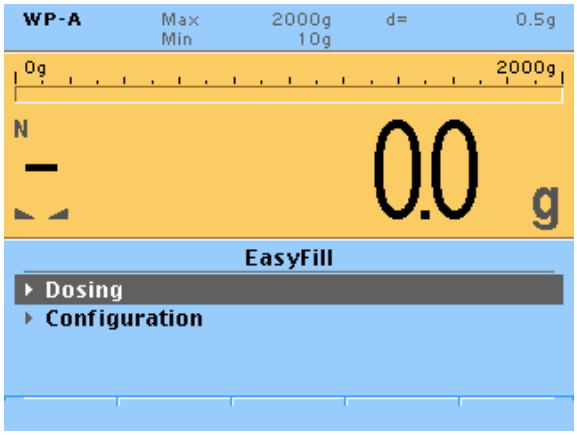
- The "EasyFill" application has been selected; see Chapter 7.15.2.

Procedure:



▶ Press the [Start] softkey.

▷ The menu opens.

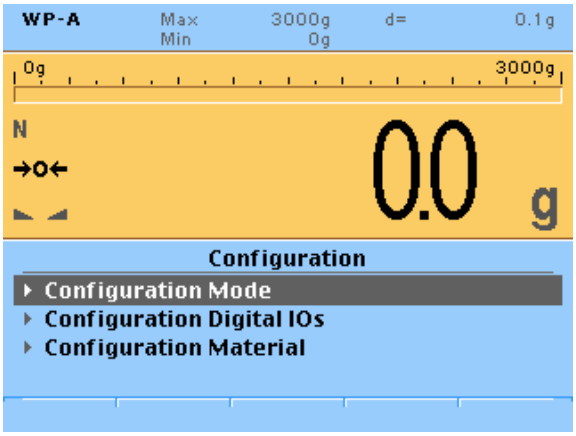


8.3 Configuration via a notebook/PC

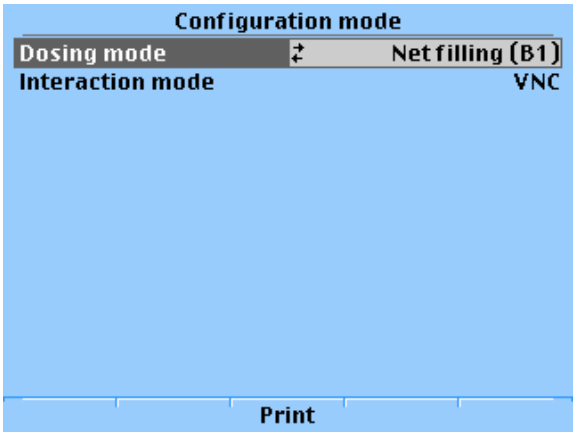
8.3.1 Configuring production mode

The following modes are configured under the [Configuration mode] menu item:

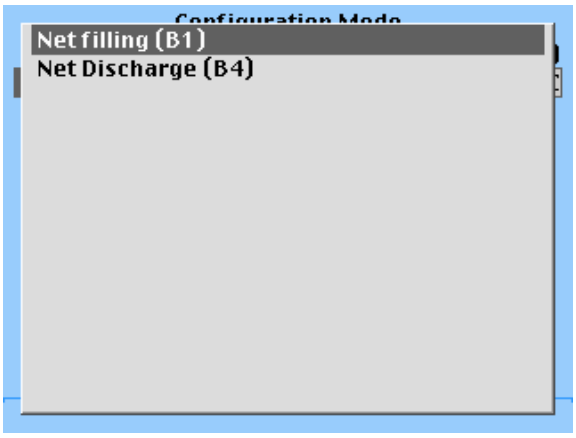
- Filling mode
- Interaction mode



1. Select [Configuration mode] and confirm.

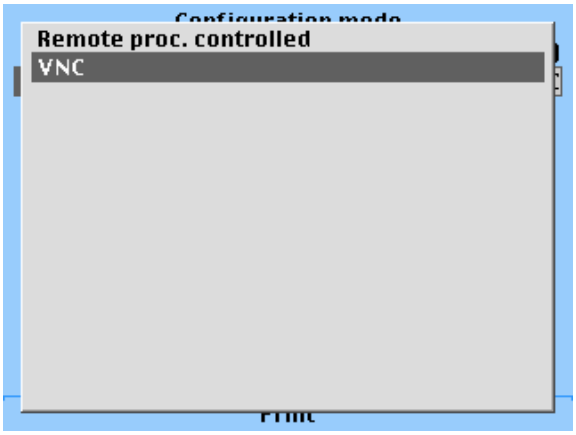


2. Select [Dosing mode] and confirm.
   ▷ A selection window opens.

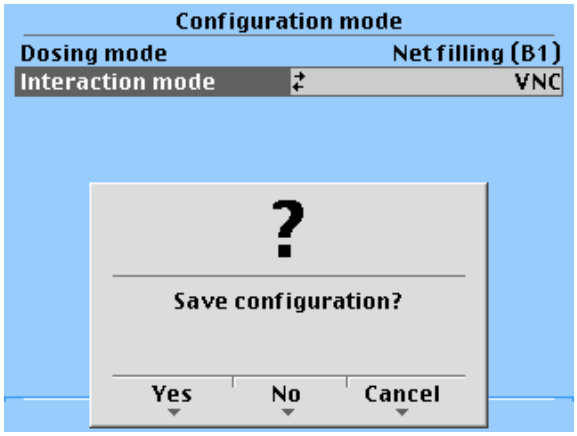


3. Select the desired filling mode (see Chapters 8.3.1.1 and 8.3.1.2) and confirm.

4. Select [Interaction mode] and confirm.



5. Select the desired interaction mode (see Chapter 8.3.1.3) and confirm.
6. Press Exit to exit the menu.
   ▷ A prompt window opens.



7. Press the [Yes] softkey to save the changes.

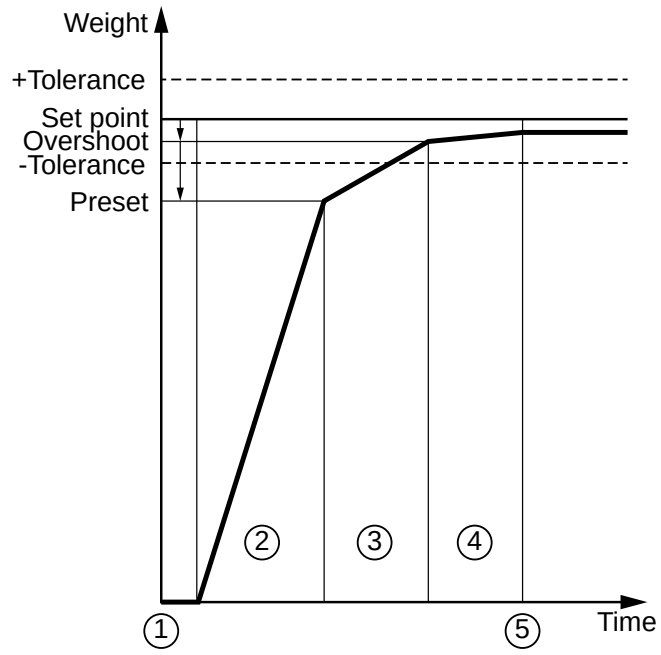
8.3.1.1 Net filling (B1)

The scale is tared and then the amount listed in the process line is automatically (Coarse/ Fine) added.

A fix overshoot value is configurated.

Net = gross - tare

[Net filling] with dosing signals "Coarse/Fine" procedure



① Taring:
The current gross weight is saved as tare weight, and the net weight starts at zero.

② Coarse:
A coarse flow (coarse and fine) is batched until the preset 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.

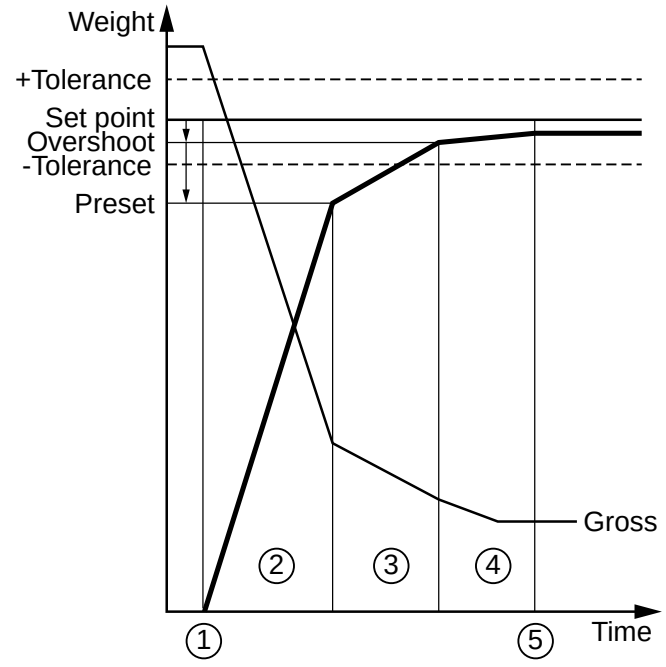
8.3.1.2 Net decrease (B4)

The scale is automatically discharged up to the specified value. The other parameters and the process correspond to the [Net filling] mode; see Chapter 8.3.1.1.

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.

8.3.1.3 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)

The following table shows how individual modes are locked when production starts.

Starting production

Mode	VNC	Remote control OPC/ModBus	Remote control fieldbus	Digital inputs	Digital outputs
[Remote proc. control]		✗	✗	✗	✗
[VNC]	✗				✗

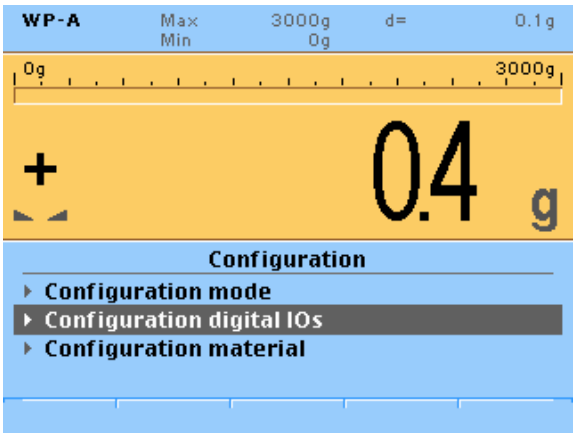
8.3.2 Configuring digital inputs and outputs

SPM addresses are assigned to the digital inputs and outputs under the [Configuration digital IOs] menu item.

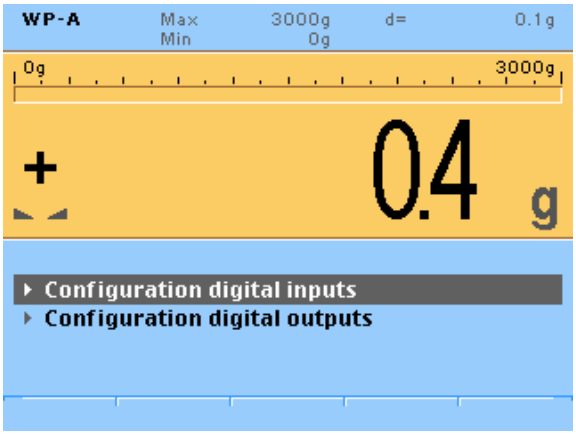
Note:

The selected SPM address must be unique within the system.

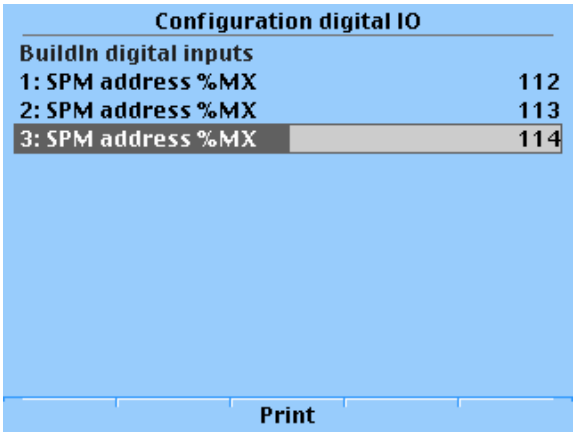
The SPM addresses for the input and outputs are unchanged after a restart.



1. Select [Configuration digital IOs] and confirm.



2. Select [Configuration digital inputs] and confirm.
   ▷ The following window opens:

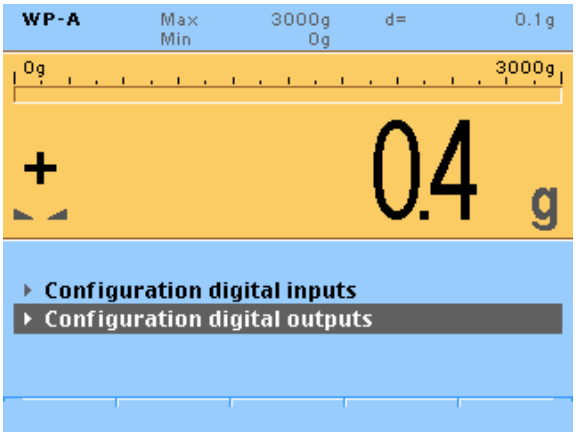


3. Select inputs 1...3. Use the keypad to enter and confirm a corresponding SPM address %MXxxx (see Chapter 13.4).

Note:

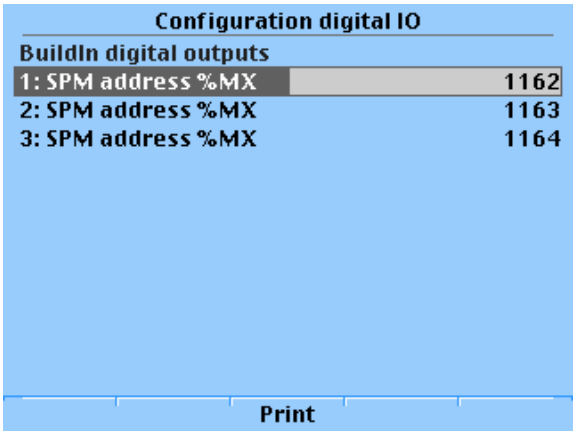
The SPM address %MX for an unused digital input = 0.

4. Press Exit to exit the window and to save the changes.



5. Select [Configuration digital outputs] and confirm.

▷ The following window opens:



6. Select outputs 1...3. Use the keypad to enter and confirm a corresponding SPM address %MXxxx (see Chapter 13.4).

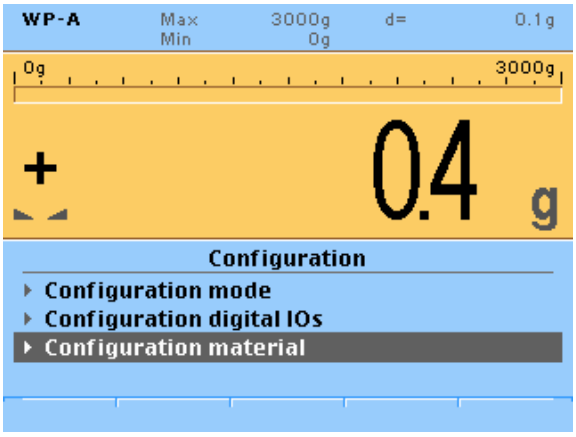
Note:

The SPM address %MX for an unused digital output = 0.

7. Press Exit to exit the window and to save the changes.

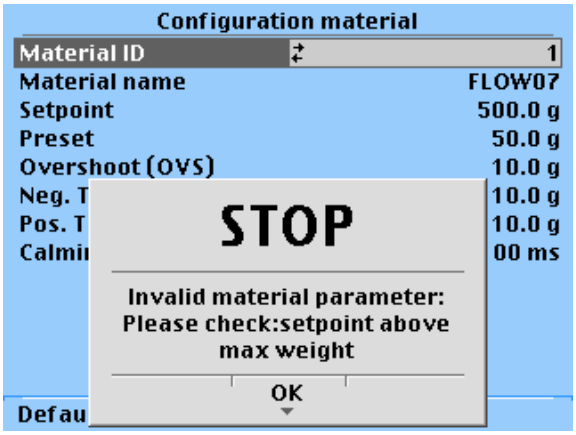
8.3.3 Configuring material

The materials (products) 1...10 are configured under the [Configuration material] menu item.



1. Select [Configuration material] and confirm.

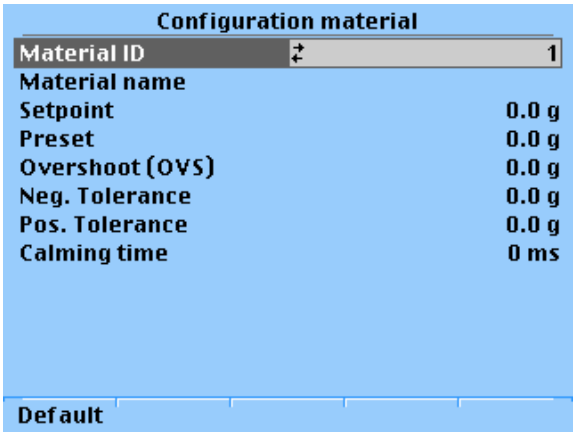
▷ The configuration window appears.



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)]

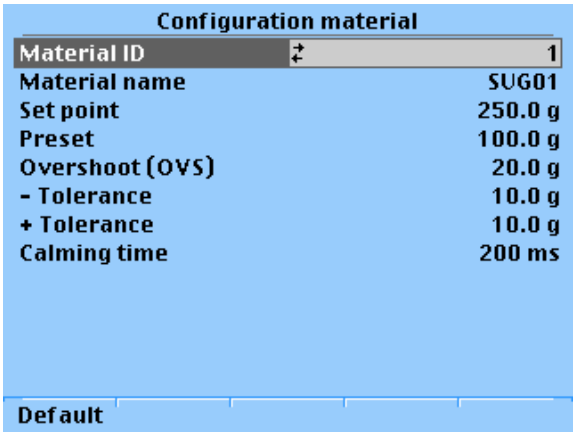
Input: Material overshoot

[+/- tolerance]

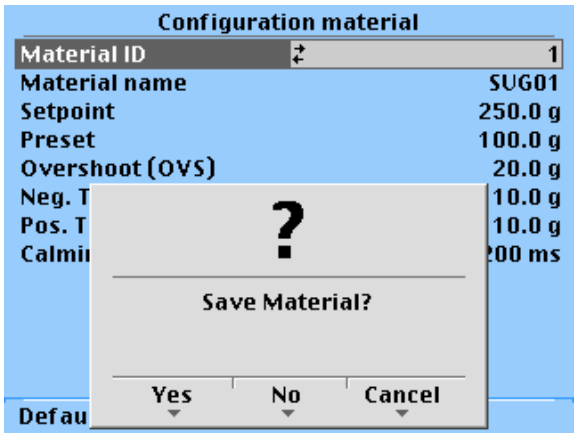
Input: Tolerance above/below set point

[Calming time]

Input: Calming time



5. Configure additional materials if necessary.
6. Press Exit to exit the window.
   ▷ A prompt window opens.



7. Press the [Yes] softkey to save the changes.

8.4 Filling

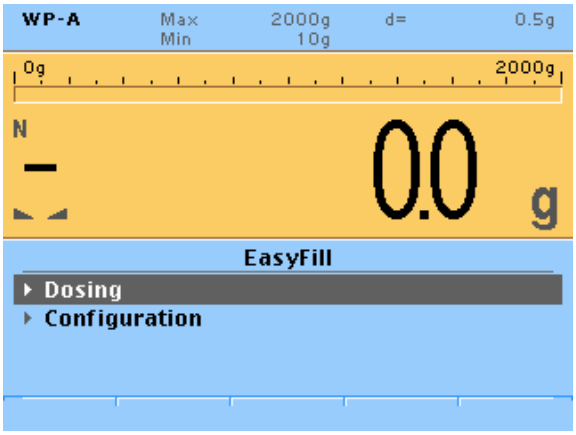
Requirements:

- Weighing point is calibrated.
- Production mode is configured; see Chapter 8.3.1.
- Digital inputs and outputs are configured (optional); see Chapter 8.3.2.
- Material (product) is configured; see Chapter 8.3.3.

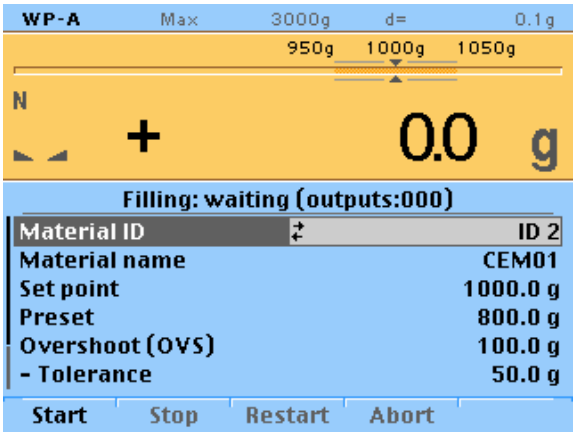
Example:

- 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.

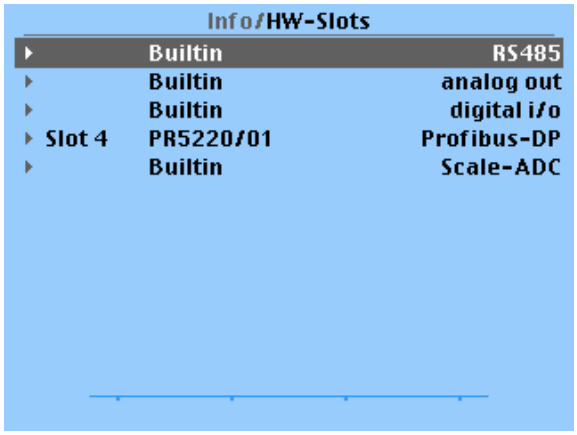
9 Extended functions

9.1 Hardware test

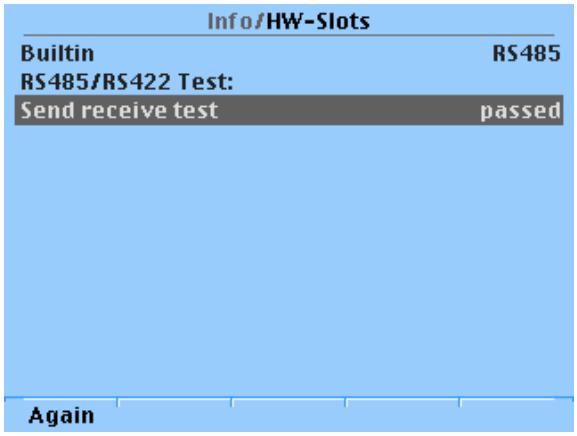
9.1.1 Serial interfaces

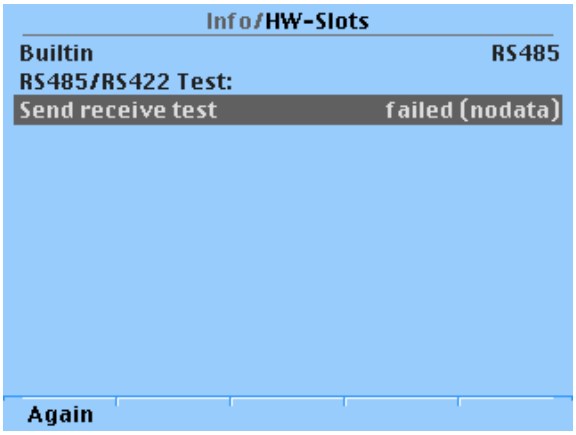
9.1.1.1 RS-485-interface

Open the menu with Info - [HW-Slots].



1. Plug the test connector (see Chapter 18.2) into the RS-485 interface.
2. Place the switch in the proper position, see Chapter 18.2.
3. Select and confirm the desired interface.
   ▷ The results are displayed:
   - passed = ok
   - failed (no data) = error



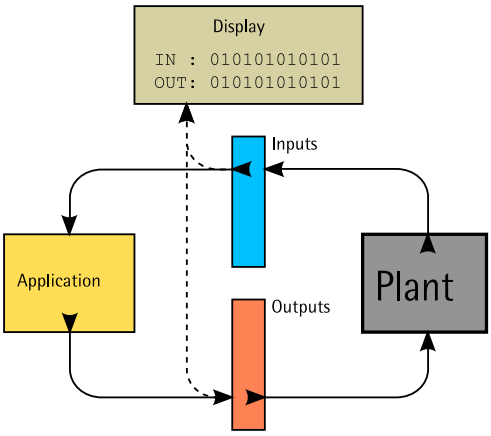
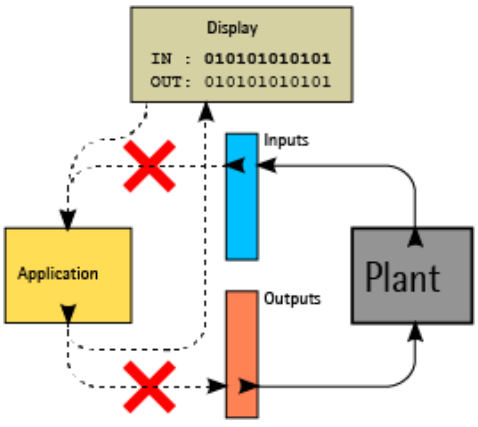


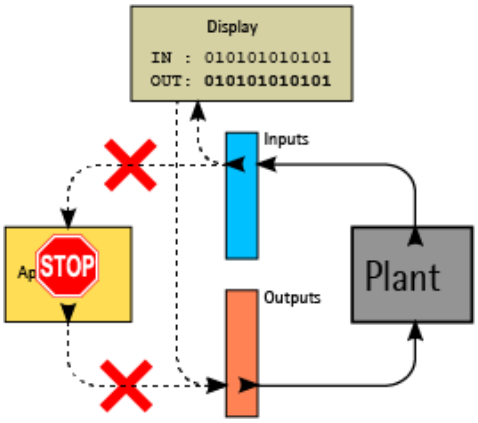
4. Press the Exit key to return to the previous window.

9.1.2 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"

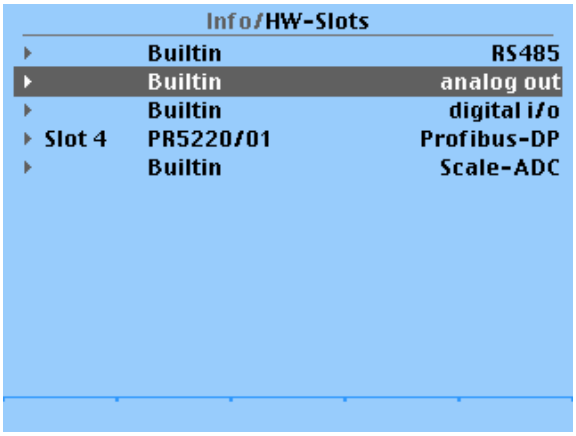
Test mode	Description
"Monitor" 	Active PLC: - The physical inputs of the system (plant) are directed to the PLC (application). - The physical outputs of the system (plant) are set by the PLC (application). - The physical inputs and outputs are displayed (display).
"Internal" 	Active PLC: - The entered 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).

Test mode	Description
"External" 	Deactivated PLC: - The physical inputs are displayed (display). - Output values can be entered. - The given output values are set on the physical outputs.

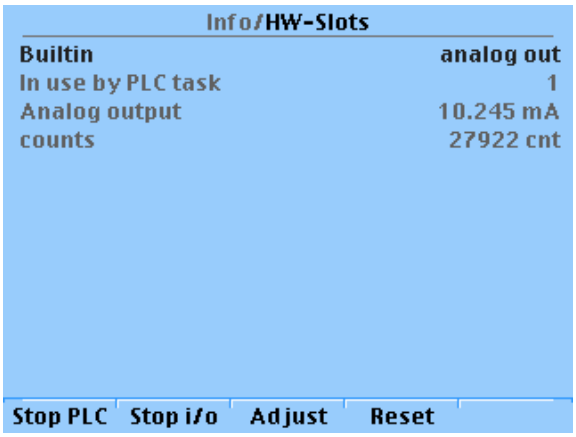
9.1.2.1 Adapting the analog output

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].

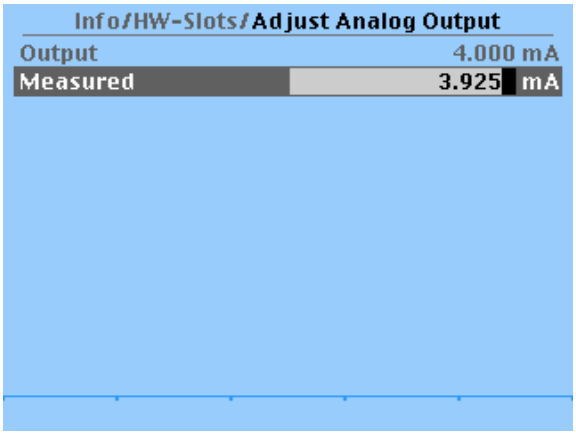


1. Select and confirm the analog output.



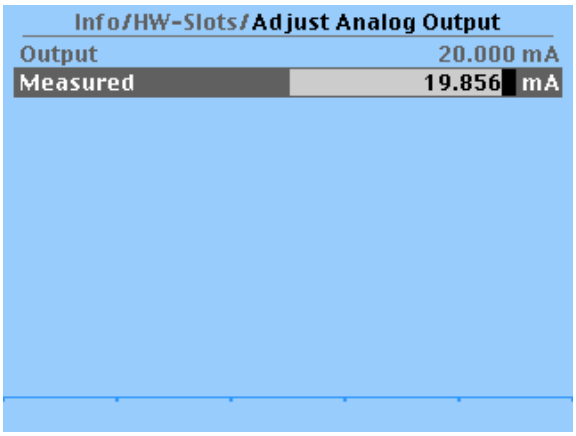
2. Press the [Adjust] softkey.

▷ The window for the 1st value opens.



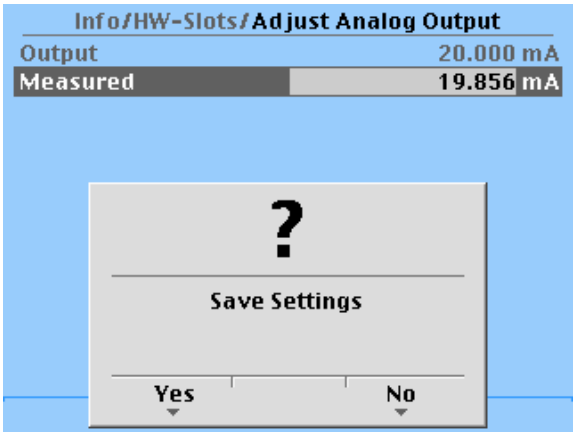
3. Enter and confirm e.g. the value for 4 mA measured by the connected PLC under [Measured].

▷ 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].

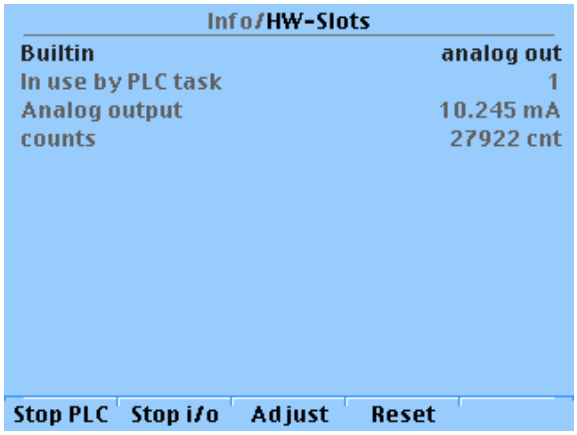
▷ A prompt window opens.



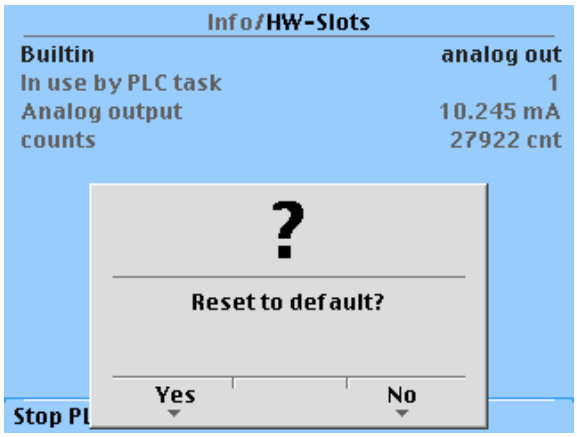
5. Press the [Yes] softkey to save the settings.

   If applicable, press the [No] softkey to keep the original values.

▷ The following window opens:



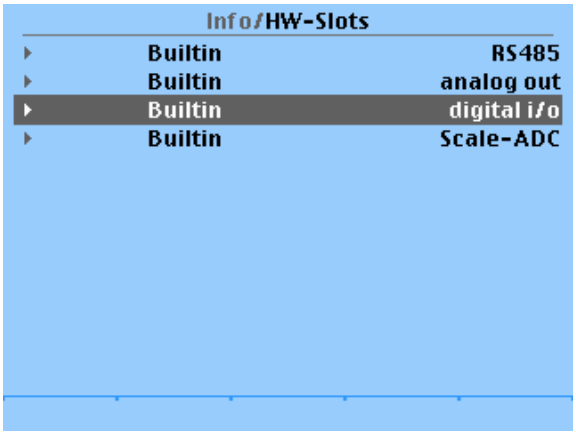
6. Press the [Reset] softkey to reset to the factory settings (4 mA and 20 mA).
   ▷ A prompt window opens.



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.

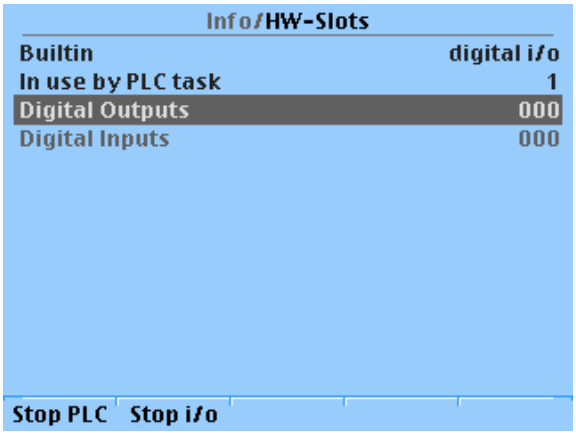
9.1.2.2 Digital inputs and outputs

Open the menu with Info - [HW-Slots].



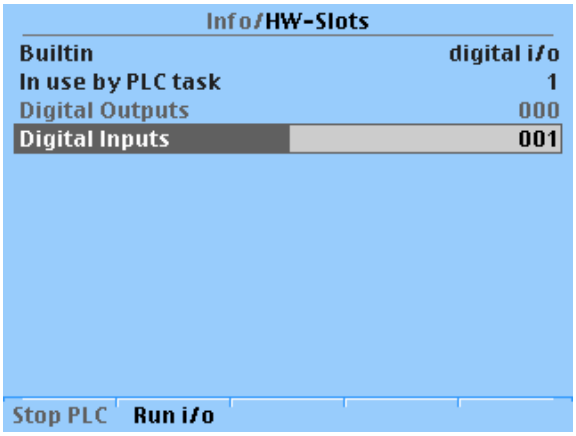
1. Select and confirm the appropriate line.

▷ 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.

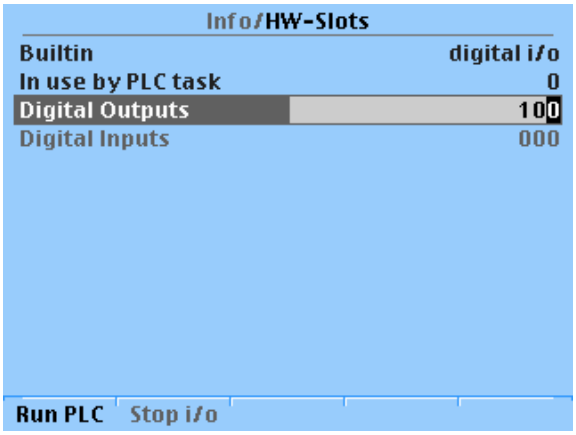
   Input: 0 and 1 (e.g.: 111; 001)

   ▷ 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 9.1.2.

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 9.1.2).

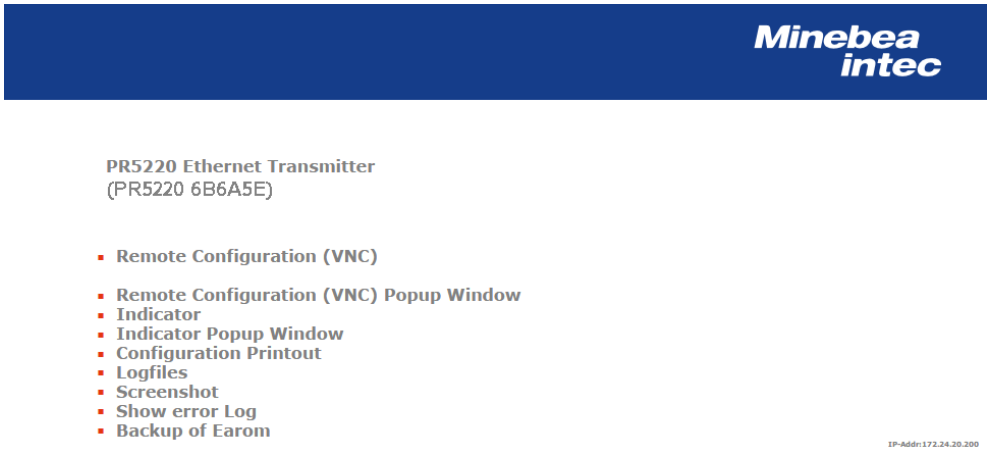
7. Press Exit to return to the previous window.

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 7.10).



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 7.9.

[Remote Configuration (VNC) Pop-up Window]

Operation using the VNC program, see Chapter 7.9.

[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.

[Backup of Earom]

Saving and restoring the configuration and calibration data, see Chapter 9.2.7.1.

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.

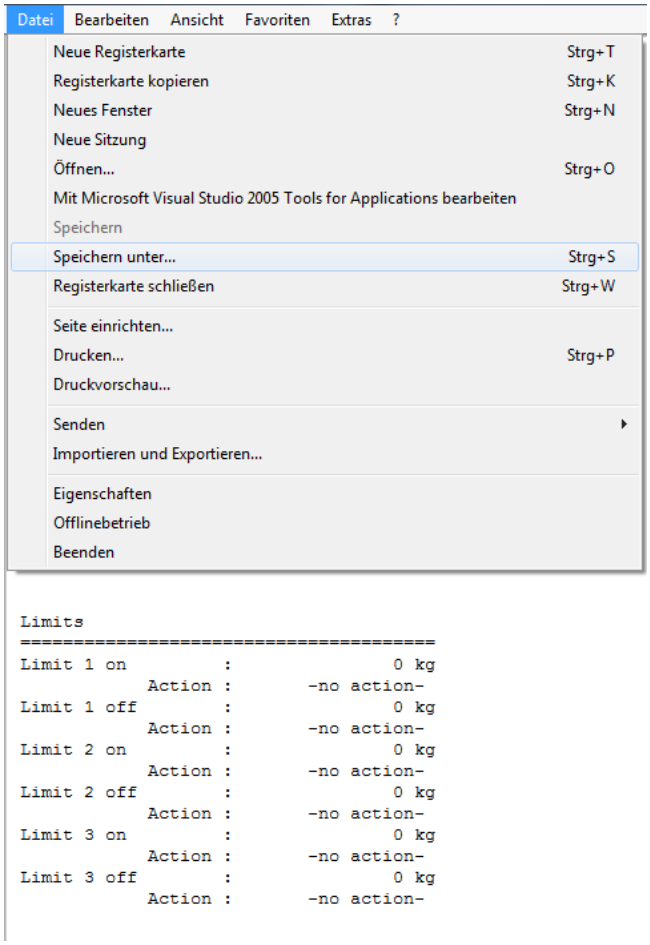
4. Click on the  symbol to return to the WEB menu.

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.

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.

```
Configuration of PR5220
=======================================
Firmware             :Rel 04.00.05.266203
                          2015-11-11 12:02
PR5220-Application :       Rel 01.00.06
                       2010-10-15 12:42
Bios                 :Rel 04.00.05.266203
                          2015-11-11 12:02
Boardnumber          :           408635250


HW-Options
=======================================
Builtin                             RS485
Builtin                        analog out
Builtin                       digital i/o
Slot 4 PR5220/07       EtherNet/IP 2Port
Builtin                         Scale-ADC


Fieldbus parameter
=======================================
Fieldbus protocol  : EtherNet/IP 2 Port
IP address         :       172.24.24.89
Subnet mask        :      255.255.240.0


PR5220/07 EtherNet/IP 2Port  version
=======================================
Fieldbus sw version:               01.0F
Module sw version  :               01.0F
Serial number      :         2686899850


Operating parameter
=======================================
PIN                :                  0
Set Tare Key       :  tare & reset tare
Set zero key       :only when not tared


Limits
=======================================
Limit 1 on         :                0 kg
           Action :       -no action-
Limit 1 off        :                0 kg
           Action :       -no action-
Limit 2 on         :                0 kg
           Action :       -no action-
Limit 2 off        :                0 kg
           Action :       -no action-
Limit 3 on         :                0 kg
           Action :       -no action-
Limit 3 off        :                0 kg
           Action :       -no action-


Digital I/O
=======================================
Output 1           :marker bit 1  X64=1
Output 2           :marker bit 2  X65=1
Output 3           :marker bit 3  X66=1
Input 1 on         :set zero     X112=1
         Condition :no condition  -----
Input 1 off        :       -no action-
Input 2 on         :set tare     X113=1
         Condition :no condition  -----
Input 2 off        :       -no action-
Input 3 on         :reset tare   X114=1
         Condition :no condition  -----
Input 3 off        :       -no action-
```

```
Parameters
---------------------------------------
Ambient conditions :  Very stable cond.
W & M              :                none
Unbal. check deviat:                 0 %
Standstill time    :              0.50 s
Standstill range   :              1.00 d
Tare timeout       :              2.5 s
Zeroset range      :             50.00 d
Zerotrack range    :              0.25 d
Zerotrack step     :              0.25 d
Zerotrack time     :              1.0 s
Overload           :                9 d
Minimum weight     :               20 d
Range mode         :       Single range


Loadcells
---------------------------------------
Number of Loadcells:                   4
No. of vessel feet :                   4
Local gravity      :           9.813790
LC  1              :                104
LC  2              :                101
LC  3              :                103
LC  4              :                102


Load cell tag name
---------------------------------------
LC  1              :              LC-RO
LC  2              :              LC-RU
LC  3              :              LC-LU
LC  4              :              LC-LO


Load cell info
=======================================
Model name         :       PR6204/53tC3
Software version   :           01.00.04
Loadcell serial num:                104
Emax               :              5.0 t
n                  :             3000 e
Y                  :              14000
Z                  :               3000
Overload           :             50.0 t
Overload counter   :                  0
Temperature        :             17.5 °C
Max temperature    :             17.5 °C
Min. temperature   :             17.4 °C
Max. weight at     :1999-11-30-00:08:43
Max. weight value  :         0.7478992 t
```

```
Load cell info
=======================================
Model name         :       PR6204/53tC3
Software version   :           01.00.04
Loadcell serial num:                101
Emax               :              5.0 t
n                  :             3000 e
Y                  :              14000
Z                  :               3000
Overload           :             50.0 t
Overload counter   :                  0
Temperature        :             17.4 °C
Max temperature    :             18.2 °C
Min. temperature   :             17.4 °C
Max. weight at     :1999-11-30-00:07:42
Max. weight value  :         0.8970114 t
```

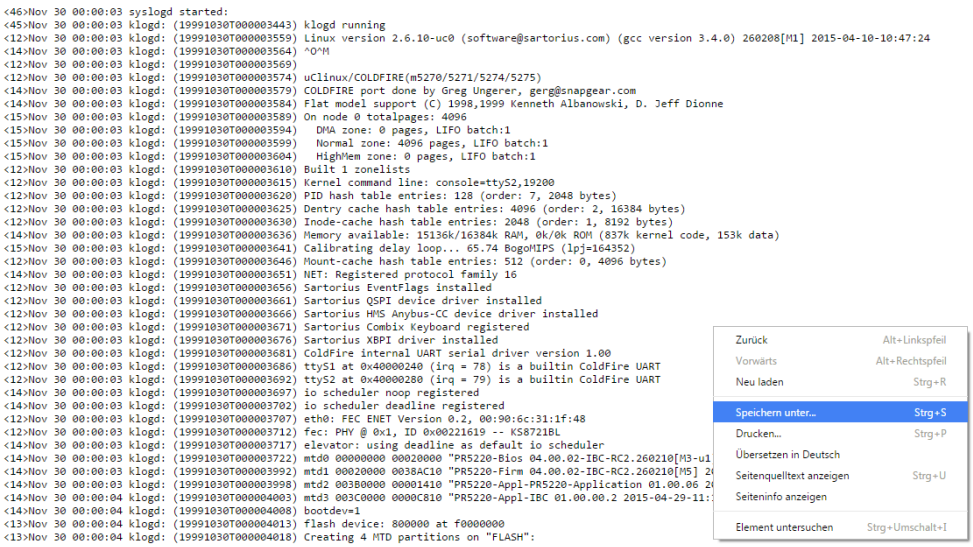
5. Click on [Print]- [File...].
6. Select the connected printer and click [Print].
7. Click on the  symbol in the Internet browser to return to the WEB menu.

9.2.4 Log files

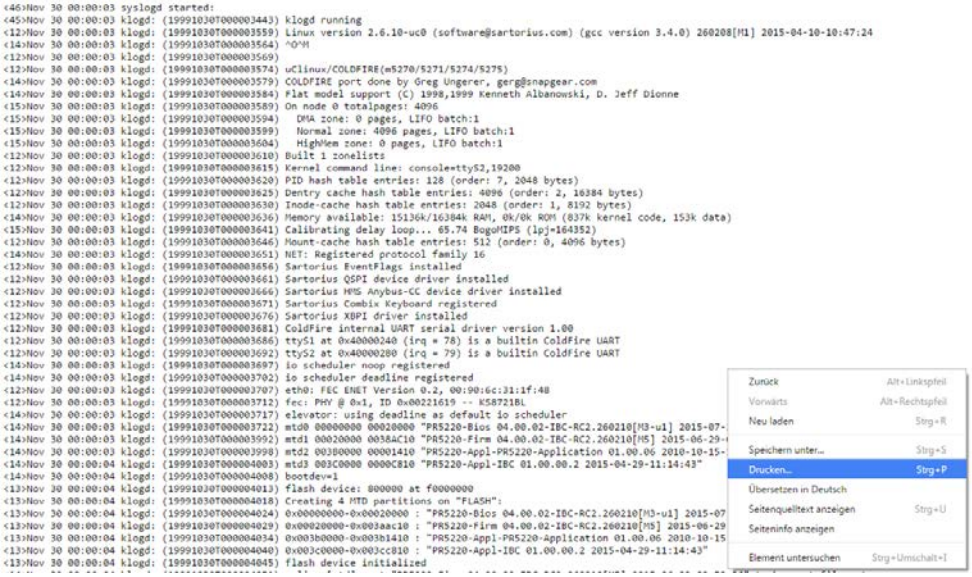
With the [Logfiles] menu item the logfiles of the device can be displayed, saved and printed out.

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.

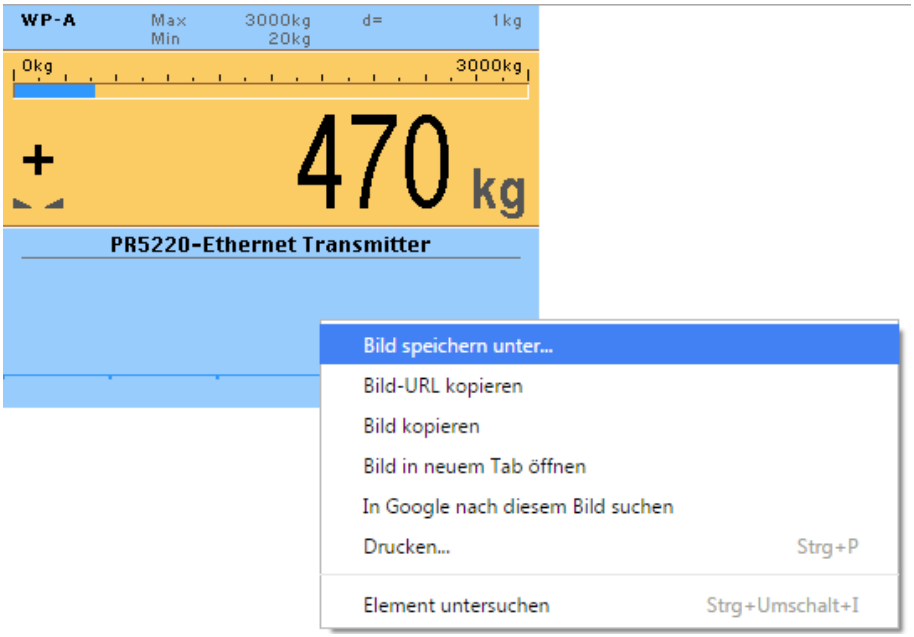


7. Click on [Print...].
8. Select the connected printer and click [Print].
9. Click on the  symbol in the Internet browser to return to the WEB menu.

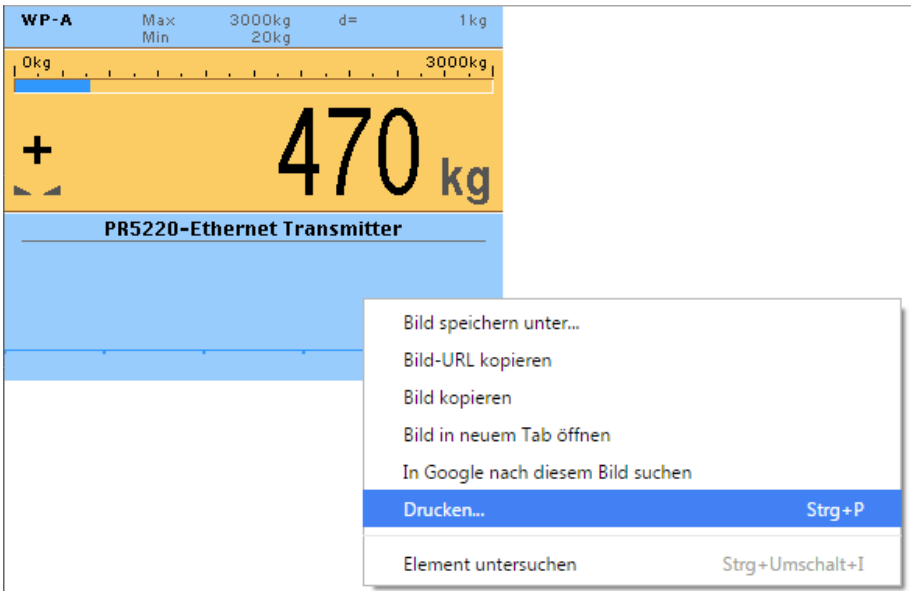
9.2.5 Screenshots

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

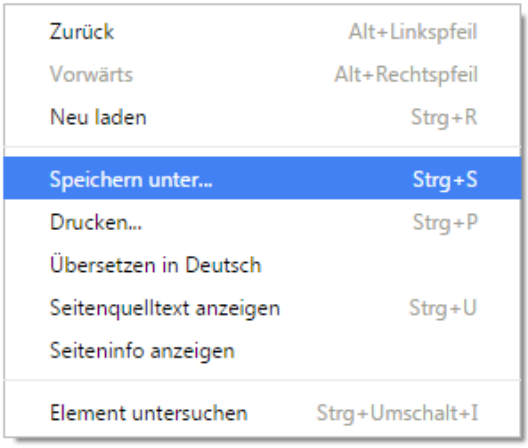
With the [Show error Log] menu item the error log of the device can be displayed, saved and printed out.

1. Click the [Show error Log] menu item in the WEB menu.

   The error log of the device is shown on the display.

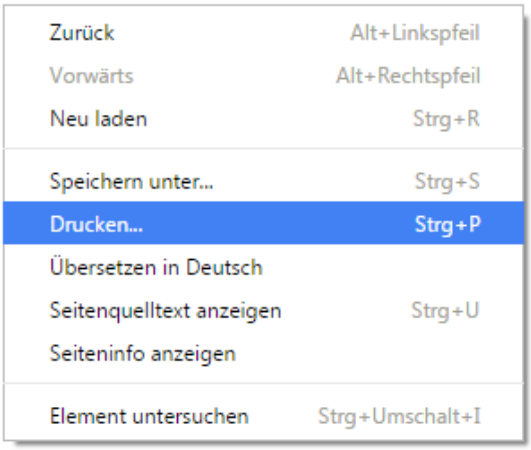
2. Press the right mouse button.

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



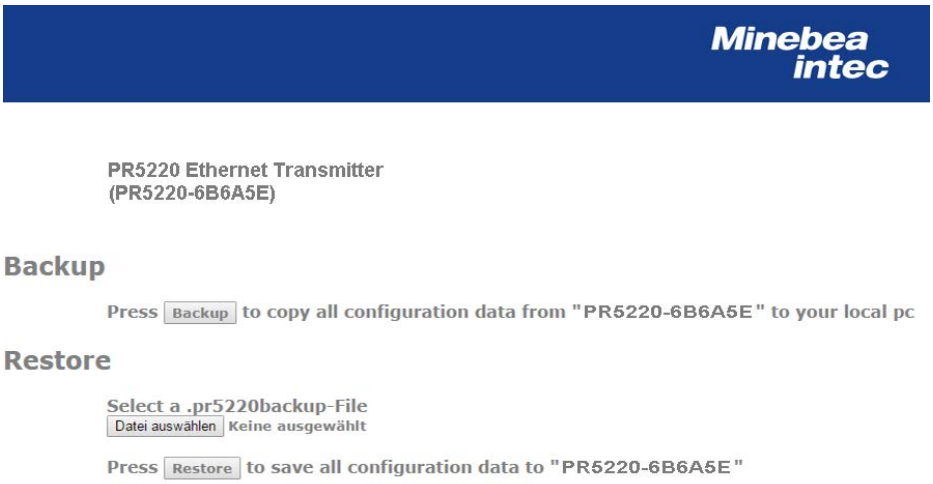
7. Click on [Print...].
8. Select the connected printer and click [Print].
9. Click on the  symbol in the Internet browser to return to the WEB menu.

9.2.7 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.



9.2.7.1 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.

9.2.7.2 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

Note:

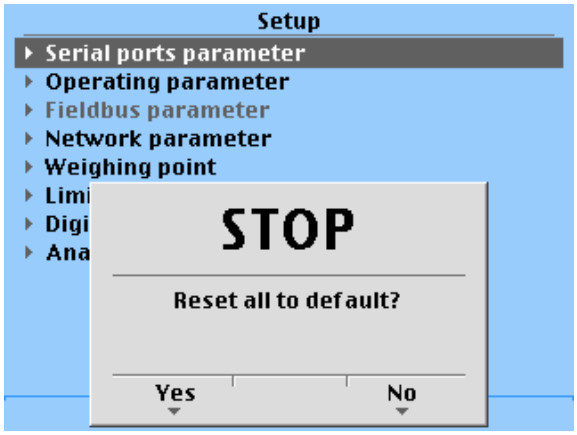
Reset to the factory settings is possible only, when the CAL switch is open. The IP address and the Hostname remain unaffected.

1. Click on 

.
2. Click on 

.

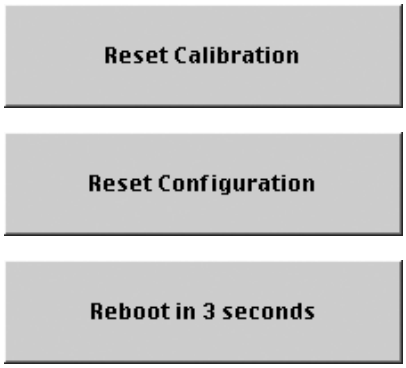
▷ The following prompt window appears:



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:



9.4 Updating new software with FlashIt

Note:

Updating new software is only possible with a fixed IP address!

Always flash/load the BIOS into the device first, and then the firmware&application.

9.4.1 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 7.15.4.
- 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 5220: IP address 192.24.22.1

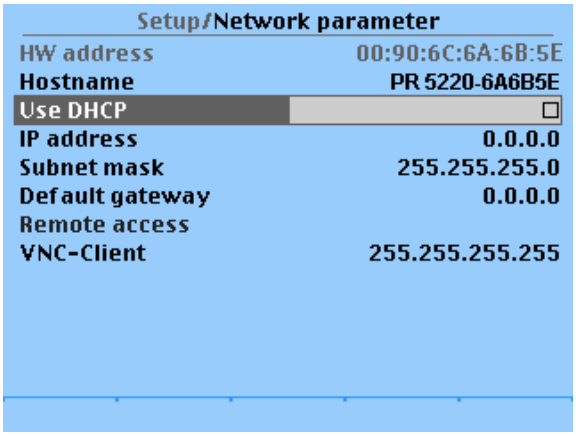
Notebook/PC: IP address 192.24.22.2

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.

9.4.1.1 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:

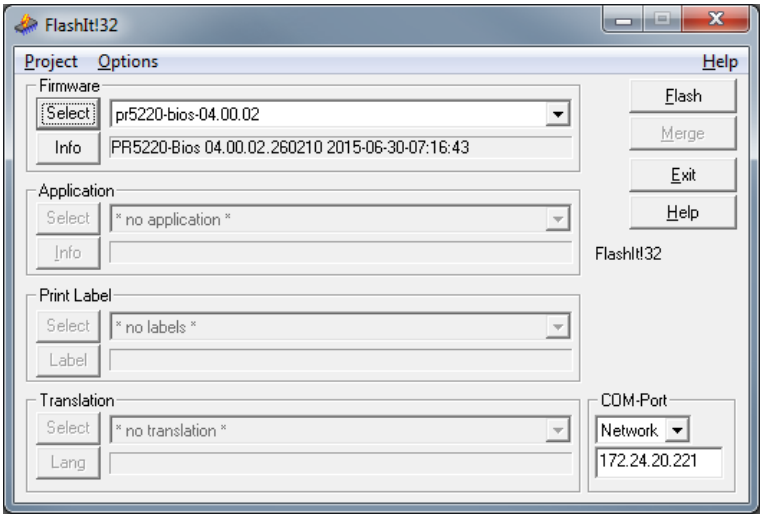
PR 5220: IP address 192.24.22.1

Notebook/PC: IP address 192.24.22.2

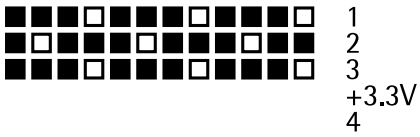
Device and notebook/PC have the subnet mask 255.255.255.0.

4. Enter the corresponding subnet mask.
5. Press Exit to exit the window and to save the changes.

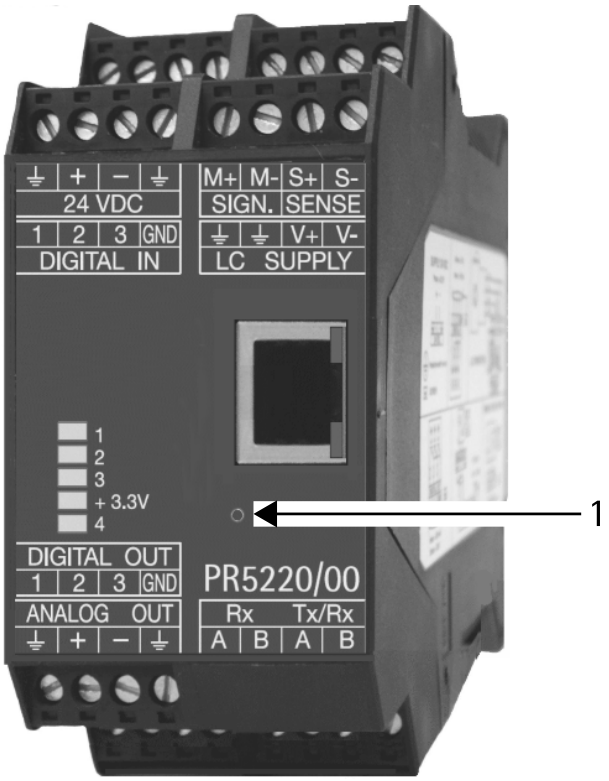
9.4.1.2 Loading the software on your notebook/PC



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.



▷ The first three LEDs blink in a pattern on the device for 30 seconds.



4. Press the reset key (1) on the device a short time, within these 30 seconds using a pen tip or paper clip with a diameter of 1.0 mm.

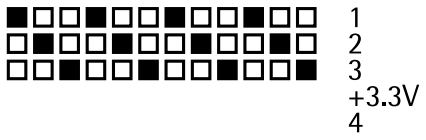
Note:

The flash procedure will not start if the reset key is not pressed within the 30-second time period.

▷ During the flash procedure, LEDs 1...4 blink in a pattern.

As soon as software loading is completed the device will be re-started.

5. Load next file, as described.



Note:

If the device cannot start because the software has not loaded correctly, the first three LEDs blink in a pattern to prompt an update.

10 ModBus protocol

10.1 General description

The ModBus protocol implemented in the device enables rapid, simple, and reliable communication between a PC or SPS and up to a maximum of 127 devices.

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

Implementation:

The functions 1, 2, 3, 4, 5, 6, 8, 15, and 16 are supported.

Bits can only be read or set individually or in groups of eight.

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
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.

The RS-485 interface is used as an interface.

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

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

The transmitter sends a reply on each received command after approx. 100 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

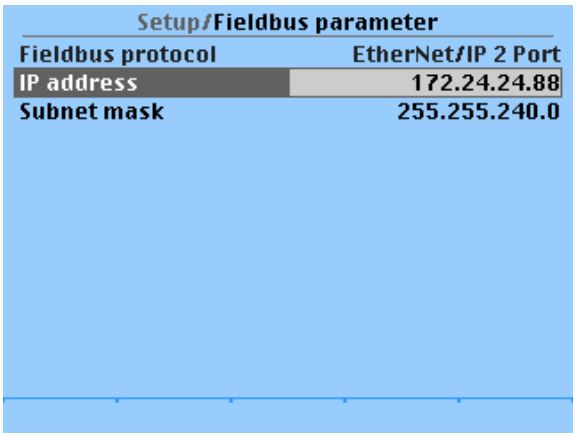
12 Fieldbus interface

12.1 General notes

The PR 5220 can be included under a communication master (e.g. Siemens S7 ProfiBus) as a field bus slave.

The update rate is 50 ms.

The interface is configured under Setup-[Fieldbus parameter] in the device. The corresponding field bus protocol (in this case: Ethernet IP 2-Port) is shown.



The field bus exchanges its data cyclically with each slave. That means: In each cycle, the entire data range is written and read, even if there are no changes to the data content.

Concept definition

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

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 for each weighing point.

Note:

All fieldbus data is only valid, if 'Read_Value_Selected' has been reflected.

12.2.1 Data exchange range

Overview

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

Write window (MOSI)

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

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

Read window (MISO)

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

Field	Size	Function
Read data	4 bytes	Data to be read as a binary 32-bit value with plus or minus sign. Data type: DINT
Read_Value_Selected	1 byte	Acknowledgment of the transmitted function number.
WriteActive	1 bit	The function selected with **Write_Value_Select** has been executed once. This bit is deleted if **Write_Value_Select** is set to 0.
PowerFail	1 bit	Is set when switching on the device. Is reset by **ResPower** with transition from 0→1.
CmdBusy	1 bit	The device is busy executing a function (e.g., waiting for a standstill for taring)
CmdError	1 bit	The device has interrupted the execution of a command (e.g., **standstill** could not be reached within the defined standstill time). The error number can be read from "LASTERROR", see Chapter 12.2.5.5.
Tare_Active	1 bit	The scale has been tared.
Cal_Changed	1 bit	The device has been calibrated. When this bit is 1, the weighing point parameters (EXPO/UNIT/STEP+FSD) must be read again. Set after "Power on" and reset after reading the FSD.

Field	Size	Function
Test_Active	1 bit	The device executes the ADC test. The read weight value is not the gross value, but the test value.
OutOfRange	1 bit	Below zero or above max. (FSD).
Standstill	1 bit	The scale is stable.
InsideZSR	1 bit	The gross weight value is within the zero setting range.
CenterZero	1 bit	The weight value is within **center zero** (0 ±0.25 d).
BelowZero	1 bit	The weight value is negative (gross < 0 d).
Overload	1 bit	The weight value has exceeded the measuring range. No valid weight data is specified (gross > FSD+overload).
AboveMax	1 bit	The weight value has exceeded the max. (FSD), but is still within max. + permissible overload (gross ≤ FSD+overload).
ADUError	1 bit	AD conversion error, see Chapter 12.2.5.2.

12.2.2 Reading and writing data with function numbers

12.2.2.1 Reading data

Procedure:

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

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

12.2.2.2 Writing data

Procedure:

1. Wait until **Write_Active** = 0 in the read window (slave is ready to receive new data).
2. Write value in bytes 0-3 of the write window.

3. Write the function number as **Write_Value_Select** in byte 5 of the write window (e.g., "Basic" application: 190 = analog output 1).
4. Wait until **Write_Active** = 1 in the read window.
5. Write 0 in byte 5 (**Write_Value_Select**).
   ▷ **Write_Active** is reset.

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

12.2.2.3 Writing bits

In addition to the control bits in bytes 6/7, further bits can be set and, if necessary, reset directly with **Write_Value_Select**.

To set bits 80 to 127, the corresponding function number is written to **Write_Value_Select** (see Chapter 12.2.5).

To reset bits 80 to 89, the corresponding function number +128 (208 to 217) is written to **Write_Value_Select**.

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

12.2.2.4 Reading bits

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

The procedure is the same as that described in Chapter 12.2.2.1.

12.2.3 Reading and writing bits directly

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

12.2.3.1 Reading status bit

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

12.2.3.2 Writing control bits

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

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

12.2.4 Waiting for the result of the action

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

Action of the master	Slave reaction
For setting bits, see Chapter 12.2.2.3 or 12.2.3.2.	
	Set the **CmdBusy** bit.
	Function is executed.
	In the event of an error: Set the **CmdError** bit and the **LastError** byte.
	If the function is executed or timeout: reset the **CmdBusy** bit.
Wait until **CmdBusy** = 0.	
Check the **CmdError** bit.	
If **CmdError** is set: Evaluate the **LastError** (for function number 4, see Chapter 12.2.5.5)	
Set the **ResetError** bit (for function number 121, see Chapter 12.2.5.13).	
	The **ResetError** bit is reset.
	The **CmdError** bit is reset.

12.2.5 Function numbers

Function numbers are written to MOSI by the master (SPS) and reflected in MISO by the PR 5220.

- Funktionsnummer 0: I/O status bits (read), see Chapter 12.2.5.1
- Function number 1: scale status (read), see Chapter 12.2.5.2
- Function number 4: calibration information, error byte (read), see Chapter 12.2.5.5
- Function number 5: device type and software version (read), see Chapter 12.2.5.6
- Function number 6: serial number of the weighing point (read), see Chapter 12.2.5.7
- Function numbers 8 to 15: weight data (read), see Chapter 12.2.5.9
- Function numbers 24 to 29: Limit value (read/write), see Chapter 12.2.5.10
- Function numbers 30, 31: values of the current weighing point (read), see Chapter 12.2.5.11
- Function numbers 80 to 89: state-controlled action bits (write), see Chapter 12.2.5.12
- Function numbers 112 to 119; 121: transition-controlled action bits (write), see Chapter 12.2.5.13

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

Dynamic status

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

12.2.5.2 Function number 1: scale status (read)

Dynamic status

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	OutOf Range	Standstill	Inside ZSR	Center Zero	Below Zero	Overload	Above Max	ADU Error
Byte 1				E9	E6	E1	E3	E7
Byte 2						PowerFail	Action Active	CmdError
Byte 3						Tare Active	Cal Changed	Test Active

Note:

Byte 0 corresponds to byte 7 in the output area. Weight error in byte 1, see table in Chapter 16.1.

Field	Function
ADUError	AD conversion error (OR function of bits E1, E3, E7).
AboveMax	The weight value has exceeded the Max (FSD), but is still within Max + permissible overload (gross ≤ FSD+overload).
Overload	The weight value has exceeded the measuring range. No valid weight data is specified (gross > FSD+overload); **error 2**.
BelowZero	The weight value is negative (gross < 0d).
CenterZero	The weight value is within center zero (0 ± 0.25 d)
InsideZSR	The gross weight value is within the zero setting range.
Standstill	The scale is stable.
OutOfRange	Below zero or above max. (FSD).
E7	The measuring signal is negative (inverse conversion); **error 7**
E6	Sense voltage not present or too low; **error 6**
E3	The measuring signal is >36 mV (no end of conversion); **error 3**
E1	Arithmetic error (overflow); **error 1**
E9	No communication with xBPI scale; **error 9**
CmdError	Error during execution (CmdError); e.g., the "taring" operation is not processed, because the scale is not at a standstill. The error is stored in **LastError** (function number 4). The bit is reset with the **ResetError** bit (function number 121, see Chapter 12.2.5.13).
ActionActive	The device is busy executing a function (e.g., waiting for downtime for taring).
PowerFail	Power failure; is always set after power on. The **PowerFail** bit is reset with the **ResetPWF** bit (function number 85, see Chapter 12.2.5.12) "Reset power failure".
Test_Active	The device executes the ADC test. The read weight value is not the gross value, but the test value.
Cal_Changed	The device has been calibrated. When this bit is 1, the weighing parameters (EXPO/UNIT/STEP) must be read again. Set after "Power on" and reset after reading the FSD (Full scale deflection).
Tare_Active	The scale has been tared.

12.2.5.3 Function number 2: For internal use only.

12.2.5.4 Function number 3: For internal use only.

12.2.5.5 Function number 4: calibration information, error byte (read)

Byte	Description
0: EXPO	One byte for the position of the decimal point; content in decimal form: 0 to 255.
	0 = 000000
	1 = 00000.0
	2 = 0000.00
	3 = 000.000
	4 = 00.0000
	5 = 0.00000
1: UNIT	One byte for the weight unit; content in decimal form: 0 to 255
	2 = g (grams)
	3 = kg (kilograms)
	4 = t (tons)
	5 = lb (pounds)
2: STEP	One byte for the scale interval; content in decimal form: 0 to 255
	1 = scale interval "1"
	2 = scale interval "2"
	5 = scale interval "5"
	10 = scale interval "10"
	20 = scale interval "20"
	50 = scale interval "50"
3: LASTERROR	Last error byte; see also **CmdError** bit, number of LASTERROR:
	8 = no standstill was achieved (e.g., when taring).
	13 = zero setting is not possible. The scale has been tared.
	18 = negative weight value when taring and W&M mode on.
	147 = no zero setting; weight not within zero setting range.
	255 = general command error

Note:

Other error nos are possible.

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

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

e.g.: PR 5220 Rel 1.23 = 52200123_{hex}

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

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

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

12.2.5.8 Function number 7: For internal use only.

12.2.5.9 Function number 8 to 15: weight data (read)

The gross, net, and tare weight are stored as a DINT fix point. The real data value is derived from DINT and EXPO as follows:

$Value_{Real} = reading_{DINT} \times 10^{(-EXPO)}$

Function number 8	Current gross value
Function number 9	Current net value, if tared; otherwise gross
Function number 10	Current tare value, if tared; otherwise 0
Function number 11	Current gross/net weight selected with bit 72.
Function number 12	Current gross value in internal resolution (1/100d)
Function number 13	Current tare value in internal resolution (1/100d)
Function number 14	Max (Full scale deflection)
Function number 15	Reserved for internal use.

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

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

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

Function number 30	Fixed value for analog output, value (num) 0...20000 corresponds to 20 mA
Function number 31	Fixed value for preset tare, see also **SetFixTare**, **GetFixTare** in Chapter 12.2.1.

12.2.5.12 Function number 80–89: state-controlled action bits (write)

Note:

For setting bits, see Chapter 12.2.2.3 .

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 12.2.2.3).

The bit is reset at the specified number +128.

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

12.2.5.13 Function number 112–119, 121: transition-controlled action bits (write)

For setting bits, see Chapter 12.2.2.3 .

As soon as the bit has been set, it is reset internally and the process is carried out; this process is transition-controlled (for one write operation).

The bit is set as **Write_Value_Select** with the specified number (see Chapter 12.2.2.3).

Function number 112	SetZero
Function number 113	SetTare
Function number 114	ResetTare
Function number 115	SetTest
Function number 116	ResetTest

Function number 117	ResetPwf
Function number 118	SetFixTare (function number 86, see Chapter 12.2.5.12).
Function number 119	GetFixTare (function number 87, see Chapter 12.2.5.12).
Function number 121	ResetError

Note:

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

12.2.6 Example: reading the gross weight

Input range (MOSI)

Byte	Value	Description
0		
1		
2		
3		
4	08	Read the gross weight (for function number 8, see Chapter 12.2.5.9)
5		
6		
7		

Output range (MISO)

Byte	Value								Description
0	00								Gross weight - byte 0 (MSB)
1	00								Gross weight - byte 1
2	04								Gross weight - byte 2
3	D2								Gross weight - byte 3 (LSB)
4	08								Gross weight request detected.
5	Write Active	Power Fail							In direct access, status bits are independent of the write or read request.
6	Cmd Busy	Cmd Error				Tare Active	Cal Active	Test Active	
7	OutOf range	Stand-still	Inside ZSR	Center Zero	Below Zero	Over-load	Above Max	ADU Error	
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	

The gross value (hex:000004D2 <=> 1234) can be read from bytes 0...3.

Negative values are output in the second complement.

12.2.7 Special note for DeviceNet and EtherNet IP

With these fieldbus types, the sequence of the bytes (only applicable for words and individual bytes) is inverted.

With long words, this problem does not arise due to compensation by the firmware.

Sequence of data bytes 0...3:

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

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

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 5220) in this window.

12.3.2 Read window (output area)

Data are transferred from the slave (PR 5220) 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 5220).

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 5220).

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 5220).

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.

Bytes 0...63	Name	Type of data	Function
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.
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]

Bytes 0...63	Name	Type of data	Function
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
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

Bytes 0...63	Name	Type of data	Function
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
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 ", "mg", "lb", "oz"
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

Bytes 0...63	Name	Type of data	Function
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
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

Bytes 0...63	Name	Type of data	Function
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
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 and fieldbus with SPM interface.

In addition, individual bits are copied back and forth between digital inputs and outputs and the SPM via the I/O configuration.

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 data type BOOL 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	-32768 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 bis 3.4E38 (with approx. 7 significant digits)
LREAL	long real number	±1.18E-308 bis 3.4E308 (with approx. 16 significant digits)
TIME	time duration	1 ms to $\pm 2^{47}$ ms
DATE	date (only)	1.1.1900 to 31.12.2099
TIME_OF_DAY	time of day (only)	00:00:00.00 to 23:59:59.99
DATE_AND_TIME	Date and time of day	see DATE and TIME_OF_DAY
STRING	variable-long character string	max. 255 characters (ISO)

Data type	Description	Value range
WSTRING	variable-long wide character string	max. 255 characters (Unicode)
BYTE	bit-sequence 8	...
WORD	bit-sequence 16	...
DWORD	bit-sequence 32	...
LWORD	bit-sequence 64	...

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 = Full Scale Deflection)
X34	BOOL	R	> Max + permitted range (OVL)
X35	BOOL	R	< zero
X36	BOOL	R	Zero ±¼ d
X37	BOOL	R	Within the zeroset range (ZSR)
X38	BOOL	R	The weight is stable
X39	BOOL	R	Weight < zero or > Max (FSD = Full Scale Deflection)

SPM address	Data type	R/W	Function
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)
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	"dig. PR LCs" only: parameter [Unbal. check deviat.]
X60	BOOL	R	"dig. PR LCs" 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.
B10	**BYTE**	W	**Control bits** ("rising edge", must be reset manually)
X80	BOOL	W	Zero device
X81	BOOL	W	Tare device
X82	BOOL	W	Reset the tare of the device
X83	BOOL	W	Start the test mode
X84	BOOL	W	Finish the test mode
X85	BOOL	W	Reset the power fail signal
X86	BOOL	W	Set fixed tare weight D31 as tare
X87	BOOL	W	Store the current gross weight in the preset tare memory (D31)
B11	**BYTE**	W	**Control bits** ("rising edge", must be reset manually)
X89	BOOL	W	Reset error B19 = 0.
B14	**BYTE**	W	**Control bits** ("test-and-clear", is reset by the device)
X112	BOOL	W	Zero device
X113	BOOL	W	Tare device
X114	BOOL	W	Reset the tare of the device
X115	BOOL	W	Start the test mode
X116	BOOL	W	Finish the test mode
X117	BOOL	W	Reset the power fail signal
X118	BOOL	W	Set fixed tare weight D31 as tare
X119	BOOL	W	Store the current gross weight in the preset tare memory (D31)
B15	**BYTE**	W	**Control bits** ("test-and-clear", is reset by the device)
X121	BOOL	W	Reset error B19 = 0.

SPM address	Data type	R/W	Function
B16	SINT	R	Exponent Number of decimal places Example: 1.23 is displayed Exponent: 2
B17	SINT	R	Weight unit 1 = mg, 2 = g, 3 = kg, 4 = t, 5 = lb, 9 = oz
B18	SINT	R	Verification 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 (0x52)
B21	BYTE	R	Lower byte of product code (0x20)
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 = Full Scale Deflection)
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
D21	DINT	R	Report: Date
D22	DINT	R	Report: Time
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

SPM address	Data type	R/W	Function
D30	UDINT	R/W	Standard only: Analog output for "transparent" mode
D31	DINT	R/W	Preset tare memory (X118, X119)
B144	**BYTE**	R	EasyFill only: **Batching status 1**
X1152	BOOL	R	Batching active
X1153	BOOL	R	Batching ready (ready/idle)
X1154	BOOL	R	Batching is in error state
X1155	BOOL	R	The setup menu of the scale is active.
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; 4 = 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]

SPM address	Data type	R/W	Function
D48	DINT	R/W	EasyFill only: Tolerance below set point
D49	DINT	R/W	EasyFill only: Tolerance above set point
W104 (B209)	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
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 L19 (FSD = Full Scale Deflection) (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 preset tare memory (as floating point number).
L17	**LWORD**	W	**SPM out**
X1088...1151	BOOL	R	Output

SPM address	Data type	R/W	Function
L18	**LWORD**	W	**SPM out AND coarse**
X1152...1215	BOOL	R	Output and coarse
L19	**LWORD**	W	**SPM out AND fine**
X1216...1279	BOOL	R	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.

14.2 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

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

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

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

Please see our General Terms and Conditions for further information.

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

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

Minebea Intec GmbH

Repair center

Meiendorfer Strasse 205 A

22145 Hamburg, Germany

Phone: +49.40.67960.333

service.HH@minebea-intec.com

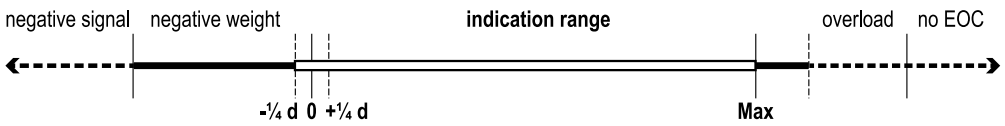
We reserve the right not to accept products that are contaminated with hazardous substances (ABC contamination).

16 Error messages

16.1 Error messages measuring circuit

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

VNC text	Error and possible cause
Arith err	Internal arithmetic overflow: - Faulty calibration values.
Overload	The measuring signal is higher than Max + (x d): - Wrong setting. - Too much weight on the scale.
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.
Value exceeds display	The weight value is not displayed: - Too many digits have been set.
No sense voltage	No sense voltage: - Load cells not connected. - Sense line or supply line is interrupted. - Wrong polarity or sense voltage is low.
Negative input	Negative measuring signal: - Wrong polarity of load cell signal. - Wrong polarity of load cell supply voltage.
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.



16.2 Weight error status

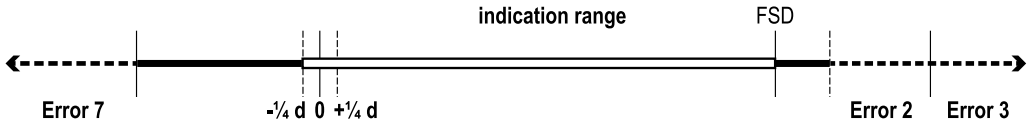
LED	Error 1 Arithmetic	Error 7 (negative)	Error 2 Overload	Error 3 (>36 mV)	Error 6 Sense control	Error 9 Communication
1	Flash. 1Hz	Flash. 1Hz			Altern. flash. 1Hz	Altern. flash. 1Hz
2	Flash. 1Hz			Flash. 1Hz	Altern. flash. 1Hz	
3	Flash. 1Hz	Flash. 1Hz	Flash. 1Hz	Flash. 1Hz	Altern. flash. 1Hz	Altern. flash. 1Hz
+3.3V						
4						

Note:

VNC text, see also Chapter 16.1.

Note:

In all other messages, the top status LED will flash.



FSD = Full scale deflection

16.3 Error messages for xBPI scales

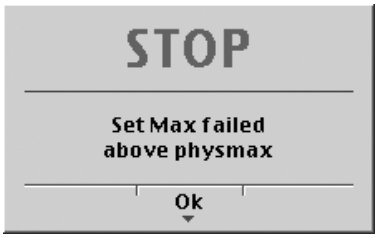
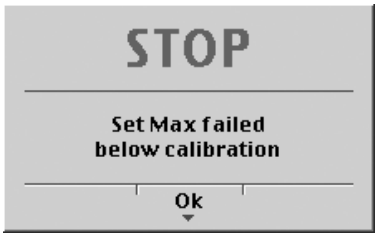
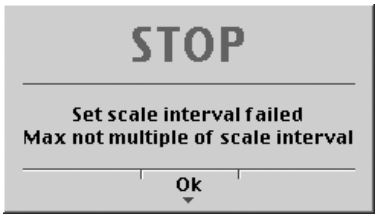
VNC text	Error and possible cause
Ext. meas. device error	No weight values can be read from scale: - Scale error
Value exceeds display	The weight value is not displayed: - Too many digits have been set.
No values from scale	No communication with xBPI scale: - Cable break. - Internal scale error. - The scale is not connected to the power supply.
No weight data	The weight value is not displayed: - Another weighing point was selected. Press OK to assign the new weighing point to the device.

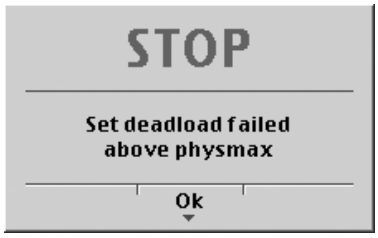
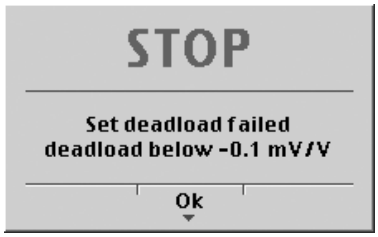
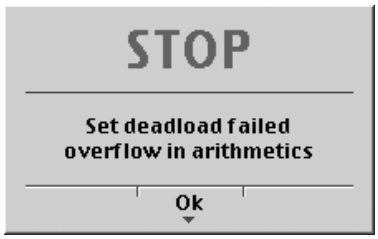
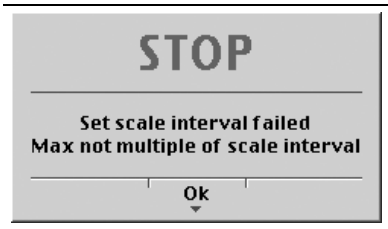
VNC text	Error and possible cause
Scale not ready	The scale is not ready for weighing: - The device is in the warm-up phase. - The device is in automatic taring mode. - The device was switched on with the scale loaded. Switch the device off and on again.
Wrong serial number	Serial number of scale does not match the number set in the device.

16.4 Error messages for digital load cells from Minebea Intec

VNC text	Error and possible cause
Overload	The measuring signal is higher than Max + (x d): - Wrong setting. - Too much weight on the scale.
Value exceeds display	The weight value is not displayed: - Too many digits have been set.
Incompatible units	Incompatible units: - Incorrect calibration values e.g. due to incorrect calibration
No values from scale	No communication with digital load cell from Minebea Intec: - Cable break. - Internal scale error. - The junction box is not connected to the supply voltage.
Scale not ready	The scale is not ready for weighing: - At least 1 load cell gives an error status or is defective (no communication).
Wrong configuration	The number of load cells does not match the configuration.
Wrong serial number	Serial number of scale does not match the number set in the device.

16.5 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.
	This message is displayed if the selected resolution is so high that less than 0.8 internal counts per scale interval (d) are available.
	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.

Message	Possible causes
	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.
	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.

16.6 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

Number	Display	Cause
16	Cannot write to ea-rom	Error when writing a material entry to the hard drive memory (EA-ROM) → 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 Technical data

17.1 Note on using "free software"

The firmware on the PR 5220 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 Supply voltage

Supply voltage		U_{DC} = 24 V ±20 %
Max. power consumption	Default	6.5 W
	with field bus option	8.5 W

17.4 Effect of ambient conditions

17.4.1 Ambient conditions

Temperature range	Reference temperature	23 °C
	Ambient temperature for operation	-10...+50 °C
	Power-on temperature	0...+50 °C
	Limits for storage/transport	-40...+70 °C
Moisture		<95%, non-condensing (acc. to IEC 60068-2)
Protection class		Housing: IP30
Height		<2000 m

17.4.2 Electromagnetic Compatibility (EMC)

All data in compliance EN 61326 industrial section

Housing	High frequency electromagnetic fields (80...1000 MHz)	EN 61000-4-3	10 V/m
	High frequency electromagnetic fields (1.4...2.0 GHz)	EN 61000-4-3	3 V/m
	High frequency electromagnetic fields (2.0...2.7 GHz)	EN 61000-4-3	1 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 kV
	Conducted disturbances by high frequency coupling (0.15...80 MHz)	EN 61000-4-6	10 V

Mains inputs	Fast transient disturbances (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

17.4.3 RF interference suppression

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

17.5 Weighing electronics

The weighing electronics are suitable for connection of strain-gauge load cells.

17.5.1 Load cells

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

17.5.2 Principle

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

17.5.3 Accuracy and stability

Accuracy*	0.5 µV/d corr. to 3 mV for 6000 d 0.5 µV/d corr. to 5 mV for 10,000 d Class III, according to OIML R76/EN45501
Min. measuring signal (OIML)*	6,000 d: ≥0.25 mV/V 10,000 d: ≥0.42 mV/V
Linearity*	<0.002 %
Zero point stability error (TK_0)*	<0.02 µV/K RTI; ≤0.004 %/10K at 1 mV/V
SPAN stability error (TK_{span})*	< ±2 ppm/K

* at a measurement time of 160 ms.

17.5.4 Sensitivity

Sensitivity	0.5 µV/d @ 10,000 d (class III); OIML R76
Max. resolution	7.5 million internal counts at 3 mV/V, not verifiable
Measurement input (measuring signal + dead load)	U_{DC} = 0...max. 36 mV, symmetrical to zero
Dead load suppression	max. measuring signal of U_{DC} = 36 mV (dead load + range); entry/calibration via software

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

Polyamide housing for mounting rail installation, black, flammability class V0 (UL94).

17.6.2 Weights

	PR 5220/00	PR 5220/01, -/06, -/07
Net weight	0.29 kg	0.35 kg

17.7 Documentation on the CD included

The documents and manuals listed in the appendix (see Chapter 18.3) can be found on the PR 5220 CD.

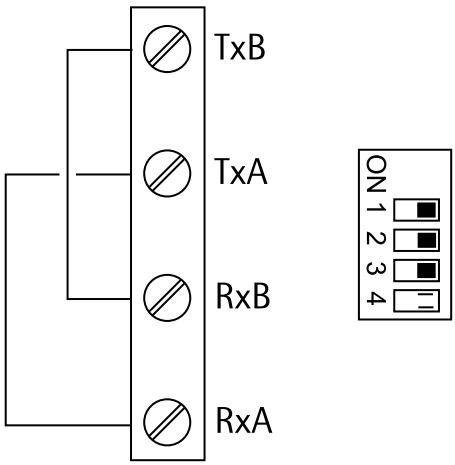
18 Appendix

18.1 Replacement parts

Spare part no.	Spare part designation
5312 264 48012	Connector, 4-pin
5312 321 28052	PC connection cable USB A/B; 1.8 m
5312 447 98005	Dummy cap

18.2 Test connector

for the RS-485 interface

Pin assignment	Switch setting
	S1 = OFF S2 = OFF S3 = OFF S4 = OFF

18.3 Certificates

Ser. no.	Description	Document no.
1	EU-Declaration of Conformity	MEU17030
2	Declaration of Conformity	MDC17004
3	Certificate of Conformance UL	20170313 – E478290

The documents listed in the table can be found on the PR 5220 CD.

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Minebea intec
The true measure